FINAL POND SITING REPORT

SR 710
From US 441 to the L-63N Canal

Financial Project ID
419344-3-32-01

Okeechobee County, Florida

Prepared For:
Florida Department of Transportation
District 1
801 North Broadway Avenue
Bartow, FL 33830-3809

Prepared By:

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March 28, 2017

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PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a registered professional engineer in the State of Florida practicing engineering with **The Balmoral Group** and that I have supervised the preparation of and approve the analysis, findings, opinions, conclusions and technical advice hereby reported for:

PROJECT: SR 710 New Alignment
From US 441 to the L-63N Canal
Financial Project ID: 419344-3-32-01
Okeechobee County, Florida

The engineering work represented by this document was performed through the following duly authorized engineering business:

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Certificate of Authorization No. **26123**

This report provides the results of the analysis of the existing drainage conditions and the analysis required for the determination of the recommended locations for the proposed stormwater management facilities. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of hydrologic analysis and hydraulic engineering as applied through professional judgment and experience.

Any engineering analysis, documents, conclusions or recommendations relied upon from other professional sources or provided with responsibility by the client are referenced accordingly in the following report.

FLORIDA REGISTERED ENGINEER:
Lori C. Stanfill, State of Florida, Professional Engineer, License No. 52107
This item has been electronically signed and sealed by:

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Executive Summary

The State of Florida Department of Transportation (FDOT) proposes a new alignment for SR 710 that begins at the intersection with US 441 and extends southeasterly to south of the L-63N Canal (Interceptor Creek), where it ties into the existing SR 710, in Okeechobee County, Florida. The Balmoral Group has subcontracted with Wantman Group, Inc. to provide the Pond Siting Report for the project. A four-lane suburban typical section is proposed. The roadway will consist of two 12-foot wide travel lanes in each direction, separated by a raised 30-foot wide grassed median. This roadway section will also include four foot shoulders to the inside of the travel lanes and six and one-half-foot (eight-foot useable) shoulders adjacent to the outside travel lanes. Type E curb and gutter will be provided along the median and outside edges of the roadway along with a closed storm-water conveyance system. The total length of the project is 3.8 miles. The project datum is NAVD, 1988. All stations are referenced to Centerline of Construction. The project is located in Sections 10, 11, 13, 14, 15, and 24, Township 37 South, and Range 35 East.

In the existing drainage condition, the project is located within Lake Okeechobee Watershed drainage basin S-133. Runoff during rainfall events is conveyed as sheet flow or shallow concentrated flow to localized depressions or wetlands, eventually outfalling to the L-63N Canal or Taylor Creek, an unnamed historic canal, or Mosquito Creek. Within Taylor Creek, the L-63N Canal, and Mosquito Creek, water levels and flow are controlled with drainage structures. Runoff within this basin eventually drains into Lake Okeechobee.

South Florida Water Management District (SFWMD) environmental resource permits (ERP's) for existing residential and commercial areas were obtained. These permits were researched and utilized to create a regional pre-development ICPR model.

Six pre-development drainage basins have been identified to the east of Taylor Creek. As the SR 710 project consists primarily of a new alignment, there are currently no existing cross drains within the limits of the project except the bridge crossing over the L-63N Canal.

For the proposed drainage condition, there are five post-development drainage basins. Sixteen pond alternatives have been evaluated throughout the project. Generally, three pond sites were evaluated per basin.

The objective of this report is to provide ideal locations for the construction of stormwater facilities to manage the runoff from the proposed improvements of SR 710. Design considerations for each pond site location include hydraulic data, hydrology (land use cover, soil types and seasonal high water elevations), environmental impacts, wetland impacts, impacts to protected conservation areas and species, economic factors affecting each pond location, cost of right-of-way (ROW) acquisition and impacts to cultural resources. The following table, **ES Table 1,** provides a summary of the results of the analysis.

ES Table 1: Pond Site Evaluation Matrix

Pond Site	Treatment Method	Construction Feasibility	Total Cost	Cultural Impact Potential Level I (All Sites) Level II (Preferred Sites)	Potential for Involvement of Jurisdictional Wetland Systems	Potential For Involvement of Protected Species	Contamination Risk Potential Level I (All Sites) Level II (Preferred Sites)	Floodplain (2015)	Pond Site Rating
1A	Wet Detention	Fair	$355,012	Low	None	Low	No	Yes	Fair
1B	Dry Retention	Good	$320,073	Level I-Low Level II-No	Medium*	Low	Level I-Low Level II-No	No	Good
1C	Dry Retention	Fair	$324,664	Low	High	Low	No	Yes	Fair
2A Option 1	Wet Detention	Good	$1,337,314	Level I-Moderate Level II-No	None*	Low	Level I-No Level II-No	No	Good
2A Option 2	Wet Detention	Good	$1,644,419	Moderate	None	Low	No	No	Fair
2A Option 3	Wet Detention	Good	$1,976,879	Moderate	None	Low	No	No	Fair
2B Option 1	Wet Detention	Good	$1,330,064	Moderate	None	Low	No	No	Fair
2B Option 2	Wet Detention	Good	$1,601,045	Moderate	None	Low	No	No	Fair
2B Option 3	Wet Detention	Good	$1,898,262	Moderate	None	Low	No	No	Fair
2C Option 1	Wet Detention	Good	$1,339,526	Low	Low**	Low	No	No	Good
2C Option 2	Wet Detention	Good	$1,655,070	Low	Low**	Low	No	No	Fair
3A	Wet Detention	Good	$901,448	Low	None	Low	Medium	No	Fair
3B	Wet Detention	Good	$701,565	Level I-Low Level II-No	Low*	Low	Level I-No Level II-No	No	Good
3C	Wet Detention	Good	$773,483	Low	None	Low	Low	No	Good
4A Option 1	Wet Detention	Good	$1,088,121	Low	None	Medium	Low	No	Good
4A Option 2	Wet Detention	Good	$1,342,958	Low	None	Medium	Low	No	Fair
4B/4C Option 1	Wet Detention	Good	$1,223,843	Moderate	Low	Low	Medium	No	Fair
4B Option 2	Wet Detention	Good	$904,222	Level I-Moderate Level II-No	Low*	Low	Level I-No Level II-No	No	Good
4D Option 1	Wet Detention	Good	$1,071,066	Low	None	Medium	Medium	No	Good
4D Option 2	Wet Detention	Good	$1,279,153	Low	None	Medium	Medium	No	Fair
5A	Dry Retention	Fair	$444,696	Level I-Low Level II-No	Medium*	Low	Level I-No Level II-No	Yes	Good
5B	Dry Retention	Fair	$466,083	Moderate	Low	Low	No	No	Good
5C	Dry Retention	Fair	$461,723	Low	None	Low	Low	No	Good

*Note: Pond Sites 1B, 3B, and 5A were determined to have wetland impacts of 0.47 ac., 0.35 ac., and 0.11 ac., respectively. Pond Sites 2A-Option 1 and 4B-Option 2 were determined to have no wetland impacts.
**Note: Pond Sites 2C-Option 1 and 2C-Option 2 were initially assessed low for wetland impacts, but the site was subsequently reconfigured around the wetland.

It is recommended to use Pond Site 1B in Basin 1 to provide water quality treatment and peak discharge attenuation for a drainage area of 5.20 acres (including pond). This pond site will outfall to Taylor Creek and eventually discharge to Lake Okeechobee.

It is recommended to use Pond Site 2A-Option 1 in Basin 2 to provide water quality treatment and peak discharge attenuation for a drainage area of 46.49 acres (including pond). This pond site will outfall to Taylor Creek and eventually discharge to Lake Okeechobee.

It is recommended to use Pond Site 3B in Basin 3 to provide water quality treatment and peak discharge attenuation for a drainage area of 12.83 acres (including pond). For the pond siting analysis, this pond site will outfall to an unnamed historic ditch and eventually discharge to Lake Okeechobee. For Final Design, this pond will likely outfall to the L-63N canal which is not impaired for nutrients.

It is recommended to use Pond Sites 4B-Option 2 in Basin 4 to provide water quality treatment and peak discharge attenuation for a drainage area of 31.65 acres (including pond). This option does not require the road to be raised 1 foot. For the pond siting analysis, this pond site will outfall to an unnamed historic ditch and eventually discharge to Lake Okeechobee. For Final Design, this pond will likely outfall to the L-63N canal which is not impaired for nutrients.

It is recommended to use Pond Site 5A in Basin 5 to provide water quality treatment and peak discharge attenuation for a drainage area of 11.12 acres (including pond). This pond site will outfall to Mosquito Creek and eventually discharge to Lake Okeechobee.

TABLE OF CONTENTS

APPENDICES

APPENDIX 1: FIGURES
APPENDIX 2: GEOTECHNICAL INFORMATION (PONDS)
APPENDIX 3: PROTECTED SPECIES AND WETLANDS POND SITING ASSESSMENT REPORT
APPENDIX 4: DRAFT CONTAMINATION SCREENING EVALUATION REPORT & DRAFT FIELD SCREENING REPORT
APPENDIX 5: CULTURAL RESOURCE ASSESSMENT SURVEY
APPENDIX 6: PRELIMINARY POND ESTIMATED RIGHT-OF-WAY AND CONSTRUCTION COSTS
APPENDIX 7: POLLUTANT LOADING CALCULATIONS
APPENDIX 8: ENGINEERING CALCULATIONS
APPENDIX 9: CORRESPONDENCE
APPENDIX 10: SR 710 REGIONAL POND FEASIBILITY STUDY

LIST OF FIGURES (Appendix 1)

LIST OF TABLES

I. GENERAL INFORMATION

A. Background

The project limits for State Road 710 span from Station 500+34 (US 441) to Station 703+50 (Mosquito Creek). The previous Preliminary Engineering Report, PD&E Study (September 2012) for SR 710 from US 441 to CR 714 identified the need for the proposed urban principal arterial for the following reasons.

- To improve regional connectivity as SR 710 is part of the Strategic Intermodal System (SIS) and connects to other SIS facilities (SR 70).
- To serve as an evacuation route for the City of Okeechobee. SR 710 is one of the few east to west roads in this area with the ability to connect the east coast to the inland.
- To accommodate Okeechobee County's future population and growth. Much of the population is located near the City of Okeechobee and the intersection of US 441 and SR 70.
- To meet local government goals and objectives. The SR 710 extension is included in the Okeechobee County Long Range Transportation Needs Assessment Study (Needs Plan for 2035). It is also included as a four-lane roadway in the Okeechobee County Year 2020 Comprehensive Plan, amended May 7, 2009.

There are a number of existing and proposed facilities which will require consideration during the early design process. This would include the US 441/Okeechobee Health Care Facility, Okeechobee Utility Authority Impacts/Well Heads, Hamrick & Sons, Inc. Property, Northshore Village/SR 70, SE Community Access/Everglades Elementary. See **Figures 8A to 8G,** Existing SFWMD Permits Map in Appendix 1.

B. PROJECT OVERVIEW

The State of Florida Department of Transportation (FDOT) proposes a new alignment for SR 710 from the intersection with US 441 to the L-63N Canal, where it ties into the existing SR 710 in Okeechobee County, Florida. The new alignment for the SR 710 project begins at US 441 (Station 500+34 and connects with the existing SR 710 alignment just south of SR 70 (Station 675+00), ending at Station 703+50 in the vicinity of Mosquito Creek.

SR 710 is designated as an Urban and Rural Principal Arterial and a Strategic Intermodal System (SIS) facility. The existing SR 710 is currently classified by FDOT as an Access Management Class four facility. The proposed access classification for the new roadway extension is class three from U.S. 441 to Taylor Creek and class two from Taylor Creek to S.R. 70, the remainder of the corridor would be classified as class three from S.R. 70 to Mosquito Creek. The design speed for the entire facility is 50 miles-per-hour (mph).

A four-lane suburban typical section is proposed. The roadway will consist of two twelve foot wide travel lanes in each direction, separated by a raised 30-foot wide grassed median. This roadway section will also include four foot shoulders to the inside of the travel lanes and six and one-half-foot (eight-foot useable) shoulders adjacent to the outside travel lanes. Type E curb and gutter will be provided along the median and outside edges of the roadway along with a closed storm-water conveyance system. A continuous five foot wide concrete sidewalk will be provided on the south side of the roadway and a ten foot wide shared-use path will be provided on the north side of the roadway. Appropriate left and/or right turn lanes will be provided at major intersections. This typical section has a twenty nine foot border width and is to be constructed within one-hundred sixty foot minimum of right-of-way. The surrounding land uses consist primarily of large areas of rangeland, pastureland, residential developments, and rural residences. The total length of this project is 3.8 miles. See **Figure 2** in Appendix 1 for the proposed typical section.

The project is located in Sections 10, 11, 13, 14, 15, and 24, Township 37 South, and Range 35 East. The new alignment will cross Taylor Creek and L-63 N Canal which are both structure controlled waterways and eventually outfall into Lake Okeechobee. Bridge Hydraulics Reports have been prepared for these crossings under separate cover. Near the southern end of the project where the new alignment connects with existing SR 710, the roadside ditches are currently permitted to provide water quality treatment prior to outfall into the L-63N Canal and Mosquito Creek.

The project employs the North American Vertical Datum of 1988 (NAVD88) (feet). The conversion from NGVD to NAVD is as follows: 1.17 ft NGVD = 0.00 ft NAVD. All Stations are referenced to the Centerline Construction.

C. LAND USE

The existing land use along SR 710 is agricultural/undeveloped (woods and pasture), commercial and industrial (See **Figure 6**). The general topography of the project area is flat terrain with elevations ranging from 15 feet to 30 feet NAVD88 based on LiDAR contours and USGS topographic map (See **Figure 3)**. The future land uses within the project area are depicted on **Figure 7**. The project is located in mainly urban residential mixed use with some portions shown in agriculture.

The existing SFWMD Environmental Resource Permits (ERP) were investigated through the project area. South of the SR 710 alignment, there is an existing Wastewater Treatment Plant located on the east side limits of the City of Okeechobee. The Okeechobee City Commerce Center is southeast of the Wastewater Treatment Plant and just west of the residential subdivision Douglas Park (a.k.a. Cypress Quarters). According to the SFWMD permit, the water management system consists of roadside swales/ditches collecting runoff and routing it to Taylor Creek via existing ditches. Six (6) water supply wells for the City of Okeechobee are located north of the Okeechobee City of Commerce Center and south of the new SR 710 alignment. Minor commercial properties include the BP Gas Station just west of the L63-N Canal bridge and the Total Roadside Services on the existing SR 710 to remain. The existing SFWMD ERP Exhibit can be found in **Figure 8**. A planned unit development,

Northshore Village, is shown in **Figure 9,** and is located where SR 710 turns to the south.

Historically, the hydrology of the area has been substantially changed by the channelization of Taylor Creek and subsequent downstream control of water levels by the S-133 Pump Station. Water Elevations at S-133 are maintained at an elevation of 13.5 feet NGVD (12.33 feet NAVD) by pumped discharge into Lake Okeechobee. If Lake Okeechobee stages are below 13.5 feet NGVD (12.33 feet NAVD), then the flood gates remain open and Taylor Creek is controlled by the lower Lake Okeechobee stage (from permit information for City of Okeechobee Commerce Center, Permit Application No.040130-34).

D. SOIL CHARACTERISTICS

The USDA National Resources Conservation Service (NRCS) Custom Soil Resource Report for Okeechobee County was used to identify the soil types within and adjacent to the proposed project on the SR 710 corridor. The primary soil series encountered along the project are Immokalee fine sand (11) (0 to 2 percent slopes), poorly drained soil; Manatee loamy fine sand, depressional, (6) (0 to 2 percent slopes) very poorly drained soil; Pineda fine sand (8) (0 to 2 slope percent slopes), poorly drained soil; Basinger fine sand (2) (0 to 2 percent slopes) poorly drained soil; Riviera fine sand (9) (0 to 2 percent slopes) poorly drained soil; and Basinger and Placid soils, depressional (3) (0 to 1 percent slopes), very poorly drained soils. These soils generally have a high water table depth. The permeability averages of the most limiting layers range from 0.06 to 0.20 in/hr to 6 to 20 in/hr. These are poorly drained soils found on South Florida Flatwoods, sloughs, and freshwater marshes/ponds. See **Figure 4,** Appendix 1 for the SCS Soils Map. **Table 1** below summarizes the soils within the project limits.

Table 1 – Existing Soils

SCS MAP SYMBOL	SOIL NAME	Hydrologic Soil Group	Depth of Seasonal High Water Table (ft)
2	Basinger fine sand	A/D	0-1
3	Basinger and Placid soils, depressional	A/D	0
5	Valkaria fine sand	A/D	0-1
6	Manatee loamy fine sand, depressional	B/D	0
7	Floridana, Riveria, and Placid soils, depressional	C/D	0
8	Pineda fine sand	C/D	0-1
9	Riviera fine sand	C/D	0-1
10	Ft. Drum fine sand	B/D	0.5-1.5
11	Immokalee fine sand	B/D	0.5-1.5
12	Udorthents, 2 to 35 percent slopes	A	>6.7
14	Myakka fine sand	A/D	0.5-1.5
18	Parkwood fine sand	C/D	0-1
19	Floridana, Placid, and Okeelanta soils, frequently flooded	C/D	0-1
20	Pomello fine sand	A	2-3.5
23	St. Johns fine sand	B/D	0-0.5
25	Wabasso fine sand	C/D	0.5-1.5

The Florida Department of Transportation, District 1 Geotechnical Department, performed a geotechnical investigation report dated October 31, 2013. The report is presented in **Appendix 2**. Soil borings were taken at each potential pond site to determine existing groundwater table and to estimate the SHWT. The pond locations where the borings have been taken can be found in **Figure 11** in **Appendix 1**. The estimated SHGT elevations ranged in depth from ground surface to approximately 2 feet below the existing ground surface. A subsequent investigation was performed by the FDOT Dist. 1 Geotechnical Department on November 2, 2016 to obtain data for Pond Site 4B. **Table 2** below summarizes the boring data collected at the pond sites.

Table 2 – Pond Site Seasonal High Water Table Estimation

Pond	Boring Number	Estimated Location		Date Performed	Boring Depth (feet)	Measured Groundwater Depth (feet)	Estimated Seasonal High Groundwater Depth (feet)	Indicators
		Station	Offset					
1A	PB-1A	Offsite		10/16/2013	15.0	2.5	1.50 +/- 0.5	Stain Line
1B	PB-1B	509+35	122 Rt.	10/16/2013	20.0	2.5	0.75 +/- 0.5	Root System
1C	PB-1C	508+60	440 Rt.	10/16/2013	20.0	1.0	0.00 +/- 0.5	Ground Surface
2A	PB-2A	554+60	230 Lt.	10/22/2013	20.0	2.0	0.67 +/- 0.5	Root System
2B	PB-2B	553+50	280 Rt.	10/23/2013	20.0	3.0	0.75 +/- 0.5	Root System
2C	PB-2C	523+10	350 Lt.	10/23/2013	20.0	3.5	0.67 +/- 0.5	Root System
3A	PB-3A	630+10	1120 Lt.	10/16/2013	20.0	3.5	1.92 +/- 0.5	Root System/Stain Line
3B	PB-3B	629+25	250 Lt.	10/16/2013	20.0	+0.2	0.50 +/- 0.5	Ground Surface
3C	PB-3C	642+30	310 Lt.	10/22/2013	20.0	3.0	1.25 +/- 0.5	Root System
4A	PB-4A	680+40	75 Lt.	10/23/2013	20.0	3.0	1.08 +/- 0.5	Root System/Stain Line
	PB-4A	683+15	100 Lt.	10/23/2013	20.0	4.5	1.08 +/- 0.5	Root System/Stain Line
4B	PB-4B	659+06	384 Rt.	11/2/2016	20.0	2.0	2.00 +/- 0.5	Stain Line
4B/4C	PB-4BC	659+75	410 Rt.	10/22/2013	20.0	2.5	1.25 +/- 0.5	Root System
4D	PB-4D	671+75	400 Rt.	10/22/2013	20.0	3.0	1.17 +/- 0.5	Root System
5A	PB-5A	696+10	190 Lt.	10/22/2013	20.0	2.0	0.75 +/- 0.5	Root System
5B	PB-5B	688+50	210 Lt.	10/22/2013	20.0	2.0	0.50 +/- 0.5	Root System
5C	PB-5C	698+75	220 Rt.	10/23/2013	20.0	2.5	1.00 +/- 0.5	Root System

Note: "+" in the Water Table Depth represents standing water

For estimation purposes for the proposed pond sites, the SHWT was assumed to be 0.5 foot lower as indicated.

E. WETLANDS, PROTECTED SPECIES AND PROTECTED SPECIES HABITAT

Scheda Ecological Associates, Inc. has prepared a Protected Species and Wetlands Pond Siting Assessment Report for SR 710 within the project area, dated February 2014. Please note that the pond areas have been adjusted after the initial survey, but the pond locations have not changed.

According to the report, data was collected and reviewed from a variety of sources to determine if any wetlands and/or protected species or their habitats occur within or adjacent to the proposed pond locations. Pedestrian field surveys of the proposed pond locations were conducted to verify preliminary data and to assess existing ecological conditions at each site. The proposed sites were field reviewed within a 50-foot buffer around each location to visually scan for evidence of listed species and general wildlife utilization. See **Appendix 3** for the SR 710 Protected Species and Wetlands Pond Siting Assessment Report.

Scientist from the Wantman Group conducted on-site surveys to locate jurisdictional wetlands and/or surface waters within or immediately adjacent to each proposed pond site. Wetlands were identified and characterized according to the USFWS Classification System of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). The boundaries were delineated using handheld GPS, and the existing land use/land cover was classified according to FLUCFCS. The wetlands associated with the pond sites are identified in the Protected Species and Wetlands Pond Siting Assessment Report (See **Appendix 3**). A summary of the evaluations for potential impacts to wetlands, protected species and their habitats for each proposed pond site is provided as **Table 3**.

According to the Environmental Report, the wetland mitigation cost assumes moderate wetland quality scores. The description of the wetland/surface water involvement ratings are as follows:

- None – No wetland/surface water impacts; no protected species anticipated to occur based on habitat quality, no observations or records.
- Low – Wetlands/surface waters comprise 1% to 24% of pond footprint; potential but unlikely presence of protected species.
- Medium – Wetlands/surface water comprise 25%to 49% of pond footprint; indication of species where mitigation is reasonable and possible.
- High – Wetlands/surface waters comprise 50% or more of pond footprint; indication of species where mitigation is difficult, costly, or not possible.

The **Table 3** matrix summarizes the results of field surveys, literature searches, and evaluations for wetlands, protected species and their habitats in the areas of the SR 710 proposed pond sites. According to this study, for Wetland/Surface Water Involvement, the proposed Pond Sites 1A, 2A, 2B, 3A, 3C, 4A, 4C, 4D, and 5C have a rating of "None". Pond Sites 2C, 3B, 4B, and 5B have ratings of "Low"; Pond Sites 1B and 5A have a rating of "Medium"; and Pond Site 1C has a rating of "High" for Wetland/Surface Water Involvement. For all pond sites except those with a rating of "None", wetland mitigation costs were assessed. For Pond Sites 2C-Option 1, and 2C-Option 2, the rating was initially assessed as "Low", but the pond options were subsequently reconfigured to provide a 25 foot buffer around the wetland.

All pond sites were assessed a rating of "Low" for Protected Species Involvement except for Pond 4A and Pond 4D. Protected gopher tortoise burrows were identified at these two sites. The cost associated with mitigation at these two sites is estimated to be $18,000 and $15,000 for Pond 4A and Pond 4D, respectively. This would include relocation of the gopher tortoise with the associated permits from the FWC.

Table 3 – SMF Site Descriptions and Wetlands/Protected Species Involvement

SMF Site	SMF Acreage	Description	FLUCFCS Code	Soils (NRCS Soil Survey)	Wetland Acreage	Percent Wetland Coverage	Wetland Mitigation Cost*	Wetlands / Surface Water Involvement	Protected Species Involvement/Concerns
1A	2.32	Undeveloped Parcel dominated by exotic vegetation (woody and herbaceous)	3200 - Shrub & Brushland	Immokalee Fine Sand (11)	0	0%	$0	None	Low
1B	1.21	Undeveloped parcel containing mix of shrub and wooded areas	4340 – Hardwood – Conifer Mixed; 6410 - Freshwater Marsh	Manatee Loamy Fine Sand, Depressional (6)	0.5	40%	$30,000	Medium	Low
1C	0.88	Forested wetland (mix of exotic and native species); existing small pond near southern limit	6170 - Mixed Wetland Hardwoods	Manatee Loamy Fine Sand, Depressional (6)	0.88	100%	$52,800	High	Low
2A	7.84	Undeveloped parcel containing mix of open pasture and wooded areas	2110 - Improved Pasture; 4271 - Oak - Cabbage Palm Forest	Immokalee Fine Sand (11), Riviera Fine Sand (9)	0	0%	$0	None	Low
2B	9.95	Undeveloped parcel containing mix of pasture and wooded areas	2110 - Improved Pasture;	Immokalee Fine Sand (11)	0	0%	$0	None	Low
2C	10.55	Undeveloped parcel containing mix of pasture and wooded areas	2110 - Improved Pasture; 4271 - Oak - Cabbage Palm Forest; 6170 Mixed Wetland Hardwoods; 6410 - Freshwater Marsh	Basinger Fine Sand (2); Pindea Fine Sand (8); Floridana, Placid, and Okeelanta Soils, Frequently Flooded (19)	0.7	7%	$42,000	Low	Low
3A	3.82	Unimproved pasture with some slash pine and saw palmetto	2110 - Improved Pasture	Immokalee Fine Sand (11)	0	0%	$0	None	Low
3B	3.74	Unimproved pasture	2120 - Unimproved Pasture; 2110 - Improved Pasture; 6410 - Freshwater Marsh	Immokalee Fine Sand (11); Basinger and Placid Soils, Depressional (3)	0.3	8%	$18,000	Low	Low
3C	3.78	Undeveloped parcel containing mix of pasture and wooded areas	4340 – Hardwood – Conifer mixed	Immokalee Fine Sand (11); Basinger and Placid Soils, Depressional (3)	0	0%	$0	None	Low
4A	7.79	Undeveloped parcel containing mix of distrubed herbaceous uplands (spoil berms), palmetto-dominated shrub, and wooded areas	3100 Herbaceous Dry Prairie; 4340 – Hardwood – Conifer mixed	Immokalee Fine Sand (11)	0	0%	$0	None	Medium
4B	4.58	Undeveloped parcel containing mix of pasture and wooded areas	2120 - Unimproved Pasture; 4340 – Hardwood – Conifer Mixed; 5100 - Streams and Waterways	Immokalee Fine Sand (11); Basinger and Placid Soils, Depressional (3)	0.1	2%	$6,000	Low	Low
4C	3.57	Undeveloped parcel containing mix of pasture and wooded areas	2120 - Unimproved Pasture; 4340 – Hardwood – Conifer Mixed	Immokalee Fine Sand (11)	0	0%	$0	None	Low
4D	8.61	Wooded area disturbed by frequent ATV activity adjacent to a medium density residential area	4340 – Hardwood – Conifer Mixed; 1130 - Mixed Use, Low Density Fixed and Mobile Home Units; 1210 - Fixed Single Family Units - Medium Density	Immokalee Fine Sand (11)	0	0%	$0	None	Medium
5A	2.63	Undeveloped parcel dominated by wooded areas	4340 – Hardwood – Conifer Mixed; 6170 Mixed Wetland Hardwoods	Immokalee Fine Sand (11); Floridana, Placid, and Okeelanta Soils, Frequently Flooded (19)	0.8	30%	$48,000	Medium	Low
5B	2.53	Unimproved pasture with some laurel oak, cabbage palm, and saw palmetto	2510 – Horse Farm; 6410 - Freshwater Marsh	Immokalee Fine Sand (11)	0.5	20%	$30,000	Low	Low
5C	3.53	Undeveloped parcel dominated by wooded areas	4340 – Hardwood – Conifer Mixed	Immokalee Fine Sand (11); Floridana, Placid, and Okeelanta Soils, Frequently Flooded (19)	0	0%	$0	None	Low

* = Approximate wetland mitigation cost assumes moderate wetland quality scores (UMAM = 0.5 per acre) and $120,000 per credit

NOTES:

None	No wetland/surface water impacts; no protected species anticipated to occur based on habitat quality, no observations or records
Low	Wetlands/surface waters comprise 1% to 24% of pond footprint; potential but unlikely presence of protected species
Medium	Wetlands/surface waters comprise 25% to 49% of pond footprint; indication of species where mitigation is reasonable and possible
High	Wetlands/surface waters comprise 50% or more of pond footprint; indication of species where mitigation is difficult, costly, or not possible

After preferred pond sites were chosen, the wetland impacts to each site were further field evaluated by the Wantman Group. The wetland impacts were then surveyed and presented as a design file with text notes indicating the wetland impact area. Pond Site 1B, Pond Site 3B, and Pond Site 5A were determined to have wetland impacts of 0.47 acres, 0.35 acres, and 0.11 acres, respectively. Pond Site 2A-Option 1 and Pond Site 4B-Option 2 do not have wetland impacts. Prior to stormwater permitting of the selected pond sites, the sites will need to be resurveyed for Listed Species, including caracara.

F. FLOODPLAINS

The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRM) for unincorporated Okeechobee County Areas. The project is covered by FIRM Map Numbers 12093C0415C, 12093C0420C, 12093C0480C, and 12093C0485C which became effective July 16, 2015. There are areas defined as Zone A and Zone AE (floodplain elevation determined) within the 100 year floodplain. See **Figure 5** in **Appendix 1** for the updated FEMA FIRM Map with pond alternatives. **Table 4** shows the effective FEMA floodplains for each proposed pond site.

Table 4 – 2015 Effective FEMA Floodplains

Pond Site	2015 Effective FEMA Floodplain
1A	Yes
1B	No
1C	Yes
2A	No
2B	No
2C	No
3A	No
3B	No
3C	No
4A	No
4B/4C	No
4D	No
5A	Yes
5B	No
5C	No

A preliminary ICPR model of the existing region was performed to determine the 100 year floodplain. The 100 year storm (FDOT 14 inches) was input into the analysis. The resulting floodplain depicts a similar floodplain to the 2015 FEMA FIRM Maps.

During actual pond design, the depressional areas impacted by the roadway will be analyzed for the pre-post conditions. Importer/exporter calculations will be used as opposed to providing compensating ponds. The hydroperiod in the wetlands will be maintained in the offsite design. For this reason, floodplains are not considered to be a critical factor in the pond design.

G. CONTAMINATION SCREENING

An initial Draft Level I PSR Contamination Screening Evaluation Report (CSER) – Proposed Ponds was conducted by Tierra, Inc. for the subject project dated November 22, 2013. The initial report was updated to the Draft Level I PSR CSER (Rev. 2) and dated July 14, 2014 (See **Appendix 4**). This screening is based on historical aerial and topographic map reviews, governmental database reviews and site reconnaissance.

From the Level I Report, the pond sites within the project corridor were assigned a risk rating for potential contamination. For sites ranked "No" or "Low", additional work is not recommended at this time. If a facility's permitting/regulatory status changes before acquisitions are initiated, additional screening should be performed.

For the sites with rankings of "Medium" or "High", Tierra recommends Level II field screening which will determine if environmental impacts exist at the preferred pond sites. A Level II field screening was required for the five preferred pond sites. This should include, at a minimum, soil borings to the proposed pond depth and soil sampling for total arsenic. **Table 5** has been taken from the CSER (Rev. 2) and shows the Pond Site Potential Contamination Risk Ratings for each proposed site.

Table 5 - Pond Site Potential Contamination Risk Rating

Pond Site	Risk Rating	Comment
1A	No	2.32 Acres. Current and historic woodlands
1B	Low	1.20 Acres. Risk ranking low for possible onsite use as water pipeline construction staging area in 1994. Current and historic woodlands with an apiary (bee hives) and open, grassy area
1C	No	0.88 Acres. Current and historic woodlands
2A – Option 1	No	14.23 Acres. Current and historic pastureland and woodlands
2A – Option 2	No	7.93 Acres. Current and historic pastureland and woodlands
2A – Option 3	No	6.42 Acres. Current and historic pastureland and woodlands
2B - Option 1	No	15.37 Acres. Current and historic pastureland and woodlands
2B – Option 2	No	10.00 Acres. Current and historic pastureland and woodlands
2B – Option 3	No	7.08 Acres. Current and historic pastureland and woodlands
2C - Option 1	No	6.86 Acres. Current and historic pastureland and woodlands
2C – Option 2	No	6.14 Acres. Current and historic pastureland and woodlands
3A (formerly 3B)	Medium	4.18 Acres. Risk ranking Medium for onsite livestock holding pen. Current pastureland, historic woodlands, wetlands, pastureland and cleared land
3B (formerly 3A)	No	2.44 Acres. Current and historic pastureland and woodlands
3C	Low	3.81 Acres. Risk ranking Low for onsite stormwater pond. Current and historic woodlands
4A - Option 1	Low	3.98 Acres. Risk ranking Low for non-adjoining Townstar #40/BP gas station to the southwest. Current woodlands, historic wetlands in northeast corner
4A - Option 2	Low	3.34 Acres. Risk ranking Low for non-adjoining Townstar #40/BP gas station to the southwest. Current woodlands, historic wetlands in northeast corner
4B/4C - Option 1	Medium	8.17 Acres. Risk ranking Medium for onsite livestock holding pen. Current and historic woodlands with two (2) sheds, a livestock holding pen and unpaved trails
4B - Option 2	No	4.59 Acres. Current and historic woodlands with unpaved trails
4D - Option 1	Medium	6.08 Acres. Risk ranking Medium for east adjoining Townstar #40/BP gas station. Current and historic woodlands with unpaved trails/tracks; historic wetlands in northeast corner on-site from 1940 to 1960s; Adjoining operational Townstar #40/BP gas station to the east since 1986; three (3) groundwater monitor wells were installed on Pond 4D in 2007 to assess potential petroleum impacts. The laboratory analytical results did not indicate petroleum contaminants in exceedance of the GCTLs. The highest OVA reading during monitor well installation was one (1) ppm. No soil samples were collected for laboratory analytical testing during this Level I investigation.
4D - Option 2	Medium	4.33 Acres. Risk ranking Medium for east adjoining east Townstar #40/BP gas station. Current and historic woodlands with unpaved trails/tracks; historic

Pond Site	Risk Rating	Comment
		wetlands in northeast corner onsite from 1940 to 1960s
5A	No	2.62 Acres. Current and historic woodlands/wetlands/pastureland
5B	No	2.53 Acres. Pastureland and wetlands associated with north adjacent Paddock Farms (miniature horses)
5C	Low	3.53 Acres. Risk ranking Low for offsite livestock holding pen, approximately 50 feet south. Current and historic woodlands

The contamination screening evaluation has resulted in four "Medium" rankings for pond sites. A "Low" ranking was issued for five pond sites and a "No" ranking was issued for the remaining fourteen pond sites.

Subsequent to this, a Draft Level II Field Screening Report (FSR) – Preferred Ponds was performed by Tierra, Inc. dated January 13, 2017. This included a Level II soil and groundwater field screening at the preferred pond locations. The results of the Level II preferred pond sites contamination analysis are shown in **Table 6** below. Both reports (Level I-Rev. 2 and Level II Screenings) are included in **Appendix 4.**

Table 6 - Level II Contamination Risk Rating Summary for Preferred Pond Sites

Preferred Pond	Pre-Level II Risk Rank	Post-Level II Risk Rank	Arsenic Contamination in Tested Locations
Pond 1B	LOW	NO	NOT INDICATED
Pond 2A-Option 1	LOW	NO	NOT INDICATED
Pond 3B	NO	NO	NOT INDICATED
Pond 4B-Option 2	NO	NO	NOT INDICATED
Pond 5A	NO	NO	NOT INDICATED

Notes: Undesirable buried debris was not encountered in the borings for all 5 pond sites.

As the preferred pond sites did not indicate arsenic in soils tested, Tierra recommends no additional work at this time. Further, all soils identified in this analysis contained less than 2.1 mg/kg total arsenic RDE SCTL, and are unrestricted in the reuse and placement. Also, material (glass fragments, pieces of metal rods, & debris) was observed in the borings for the southern portion of Pond 4B-Option 2 which is not considered to be a contamination concern but should be removed and properly disposed of prior to construction activities.

H. CULTURAL RESOURCE ASSESSMENT

Archaeological Consultants, Inc. (ACI) prepared the Preliminary Cultural Resource Assessment (CRAS) of the proposed pond sites for SR 710, dated October 2013. The CRAS was subsequently updated in April 2015 (See **Appendix 5**). The survey was necessary to determine if any significant or potentially significant cultural resources, including archaeological sites or historic structures, will be impacted by the sixteen alternate pond sites. Known or potentially significant cultural resources are defined as those sites which are listed, determined eligible, or considered potentially eligible for listing in the National Register of Historic Places (NRHP).

The study included an investigation of project aerials, review of Florida Master Site File (FMSF) records, NRHP listings, the cultural resource assessment for the Project Development and Environmental (PD&E) Study, the Okeechobee County Soil Survey, and cultural resource survey reports for the project vicinity.

According to this study, each proposed pond site was evaluated for archaeological potential (high, moderate or low). All of the proposed pond alternates were assigned either a "Low" or "Moderate" potential for prehistoric or historic archaeological sites; and none of the proposed pond sites were assigned a high potential.

The cultural resource impact potential is included in the Archaeological Data found in **Table 7** and in **Appendix 5,** Cultural Resource Assessment of Proposed Pond Sites.

Table 7 – Cultural Resource Assessment

Pond ID	Acres	Soil Type, Elevation, Drainage, and Environmental Association	Archeological Potential/Comments
1A	2.238	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Low
1B	1.203	Manatee, Delray, and Okeelanta soils; Nearly level, very poorly drained on marshy plains	Low
1C	0.929	Manatee, Delray, and Okeelanta soils; Nearly level, very poorly drained on marshy plains	Low
2A	14.227	Immokalee fine sand ; Nearly level, poorly drained in broad flatwoods	Moderate
2B	15.372	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Moderate
2C	6.864	Pompano fine sand; Nearly level, poorly drained in grassy sloughs and depressions	Low
3A	4.181	Basinger and Pompano fine sands: Nearly level, poorly drained, in sloughs and isolated depressions in the flatwoods Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Low
3B	7.244	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Low
3C	5.778	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Low; a portion previously tested with negative results (Janus Research 2010)
4A	7.882	Myakka fine sand: Nearly level, poorly drained in broad flatwoods Placid fine sand; Nearly level, very poorly drained in low areas	Low
4B	8.168	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Moderate
4C	Combined with 4B	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Moderate; dilapidated sheds, ca. 1990 (not historic)
4D	8.616	Myakka fine sand: Nearly level, poorly drained in broad flatwoods Immokalee fine sand; Nearly level, very poorly drained in low areas	Low
5A	2.624	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Low
5B	2.534	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Moderate
5C	3.528	Immokalee fine sand; Nearly level, poorly drained in broad flatwoods	Low

It was determined that five of the potential stormwater management sites had a "Moderate" archaeological potential. The remaining sites were given a rating of "Low" due to the generally level and poorly drained soils at these locations. Another

reason for a "Low" rating is development within or adjacent to potential pond sites. Several historic resources were identified in the surrounding vicinity of the potential pond sites. The report further indicates that no historic buildings (50 years of age or older) were within or adjacent to any proposed pond sites.

After the preferred pond selections were determined, a Cultural Resource Assessment Survey (CRAS) of Preferred Pond Sites was performed by ACI, dated November 2016. Based on background research and field investigations, no prehistoric archaeological sites or historic buildings or structures were recorded or identified within the APE (defined as area of potential effects within each pond site). From this analysis, ACI concluded that, based on the results of the CRAS, this undertaking will have no effect on resources listed, determined eligible, or potentially eligible for listing in the NRHP. The updated April, 2015 CRAS and the CRAS for the Preferred Pond Sites prepared by ACI are included in **Appendix 5**.

I. EXISTING PERMITS

Within the project corridor, there is a number of current SFWMD Permits. Included among these are the Okeechobee Utility Authority (SFWMD Permit #47-00004-W, App. No. 010614-23); the Okeechobee Commerce Center (SFWMD Permit #47-00638-P, App. No. 040130-34); Northshore Village (SFWMD Permit Denied, App. No. 061031-17); SR 710 (SFWMD Permit #47-00327-S, App. No. 910827-3); and SR 70 Widening (SFWMD Permit No. 47-01151-P, App. No. 121210-2). See **Figure 8**, **Appendix 1** for existing permits.

Table 8 summarizes the pond sites located within existing permits or applications. None of these sites are developed as of this submittal.

Table 8 – Summary of Existing Permits

Pond	Map Label	Permit/Application Number	Permit Name
1A	44	47-00847-P/ 051213-5	Southern Trace
3A	41	47-00786-P/ 061031-17, 070807-9	Northshore Village
3B	41	47-00786-P/ 061031-17, 070807-9	Northshore Village
5A	28	47-00582-P/ 071024-1, 061102-4, 040607-11, 020909-5	Okeechobee County Agri-Civic Center

II. DESIGN CONSIDERATIONS

A. Roadway Geometry

Typical Section

A four-lane suburban typical section is proposed. The roadway will consist of two twelve-foot wide travel lanes in each direction, separated by a raised thirty-foot wide grassed median. This roadway section will also include four foot shoulders to the inside of the travel lanes and six and one-half-foot (eight-foot useable) shoulders adjacent to the outside travel lanes. Type E curb and gutter will be provided along the median and outside edges of the roadway along with a closed storm-water conveyance system. A continuous five-foot wide concrete sidewalk will be provided on the south side of the roadway and a ten-foot wide shared-use path will be provided on the north side of the roadway. Appropriate left and/or right turn lanes will be provided at major intersections. This suburban typical section has a twenty nine-foot border width and is to be constructed within one hundred sixty foot minimum of right-of-way.

Horizontal Alignment

The proposed SR 710 runs west to east through the project area. The horizontal alignment consists of several tangents and four major horizontal curves. The design speed for the proposed alignment is 50 miles per hour for the suburban section. There are four sections of superelevated roadway through the curves located throughout the project. The first two curves are near the beginning of the project just before and after the crossing over Taylor Creek, the third curve is a major curve to the south, and the last curve is at the easterly transition to existing SR 710.

Vertical Alignment

The proposed SR 710 vertical alignment is relatively flat for the entire project. Grades appear to generally be 0.30% to 0.50% with some variations above and below. There are two bridge crossings along the new alignment: over Taylor Creek and over L-63N Canal. In these locations, there are uphill grades to accommodate the crossings. The elevation of the roadway Profile Grade Line varies from 23.85 to 34.96 feet NAVD based on the updated profile that incorporated the 15% line and grade meeting comments.

The profile grade has been coordinated with the roadway engineers during the pond site evaluation. There are several areas that are being coordinated during the design to determine if raising the profile 1, 2 or 3 feet will be more cost effective. A Preliminary Design High Water/Base Clearance Memo was prepared by The Balmoral Group under separate cover to determine minimum base clearance and the current profile is based on this document and other factors determined during the 15% line and grade meeting. It was prepared using a minimum of 2 feet of base clearance, as a variance from the required 3 foot base clearance is expected. Costs have been

estimated for right-of-way and additional construction costs for raising the road 1, 2, or 3 feet and these were used to refine the pond sizes in Basin 2 and 4. See **Appendix 6** for cost calculations.

B. RIGHT-OF-WAY

The proposed right-of-way width through the project area will generally be 160 foot minimum. Additional right-of-way will be acquired in various locations along the corridor to construct stormwater treatment facilities. A meeting with the FDOT Right-of-Way personnel was held on September 9, 2013 at FDOT, District 1 offices (See **Appendix 9**)

C. UTILITIES

As the proposed SR 710 is a new alignment, there are very few existing utilities within the corridor.

Pond 3A conflicts with both FPL Distribution and Transmission pole lines. This will require additional coordination and a possible relocation to the north of the lines.

Pond 4C has existing FPL Distribution facilities (aerial pole line) and Centurylink facilities (BT/BFO) along the southern side of Pond 4C. These utilities are not expected to be impacted.

D. PERMIT AGENCY COORDINATION

South Florida Water Management District (SFWMD)

This project is considered to be within the South Florida Water Management District (SFWMD). The SFWMD will regulate and control stormwater discharge and impacts to wetlands and surface waters for this project. The SFWMD will require an Environmental Resource Permit (ERP) for this project prior to initiating construction. The office responsible for the technical review of the permit application package will be the South Florida Water Management District in Okeechobee, Florida. A pre-application meeting was held on May 29, 2013, to discuss and determine SFWMD treatment criteria for the project. A copy of the meeting minutes is located in **Appendix 9**. The following is a summary of the stormwater criteria –

a. The project is mostly located in the S-133 Basin which has an allowable discharge of 15.6 CSM. It was agreed that the SR 710 project could utilize a pre-post method. Kelly Cranford added the pre-development calculations needed to be reasonable and to review the permit for North Shore Village for additional information. Likewise, the Industrial Park at the beginning of the project has a permitted discharge through the Industrial Park project which would be considered the allowable discharge at that outfall location.

b. 2 ½ inches over the impervious area will be the controlling factor for water quality. The additional 50% requirements for impaired water bodies will not be

needed as the pre-post nutrient loading calculations will show that there are no offsite water quality impacts. Basin will be top of slope to top of slope for the Typical Section.

c. Pasture is acceptable for EMC values for the areas that are currently pasture.

d. Drawdown in the wet ponds will be ½" of runoff over the basin in 24 hours. It is expected that the minimum 3" bleeder will be utilized on the control structures.

Additional meetings were held with the SFWMD on July 31, 2014; March 24, 2015; July 7, 2015; to discuss the regional pond option. See **Appendices 9** and **10** for Correspondence and the Regional Pond Study.

United States Fish and Wildlife Service (USFWS)

The United States Fish and Wildlife Service has jurisdiction over federally listed species. All of the proposed Pond Sites are located within the following USFWS Consultation Areas: crested caracara, Florida grasshopper sparrow, Everglade snail kite, Florida bonneted bat, and Okeechobee Gourd. These are addressed in **Appendix 3.**

Florida Fish and Wildlife Conservation Commission

The Florida Fish and Wildlife Conservation Commission will provide commentary during the ERP review process. The Commission will conduct field reviews and comment to the SFWMD on any adverse effects the proposed activity may have on state protected wildlife species and their habitat.

US Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has jurisdiction over all wetlands classified as waters of the United States. The Corps requires the acquisition of a Section 404 Dredge and Fill Permit for activities in all waters of the United States prior to beginning construction. The USACE provides a separate and independent review of the Wetland Resource Management Permit from the SFWMD.

Environmental Protection Agency (EPA)

The EPA requires permits for stormwater discharge in association with the National Pollutant Discharge Elimination System (NPDES) and the Clean Water Act. The application requirements include a stormwater pollution prevention plan indicating both structural and non-structural controls to be implemented. Since it is anticipated that project impacts will be greater than one acre, an NPDES permit will be required.

E. POLLUTANT LOADING REQUIREMENTS

A Stormwater Quality Memorandum was initially prepared separately for the PSR to address Nutrient Loading Requirements. For the Final PSR, the preliminary Pollutant Loading design calculations for the preferred pond sites have been performed and are located in **Appendix 7**. These calculations are subject to change during final design.

Based on the final design, Basins 1 and 2 will drain to Taylor Creek (WBID 3205) and Basin 5 will drain to Mosquito Creek (WBID 3203B). According to FDEP's 2013 Comprehensive Verified List of Impaired Waters, both of these water bodies have nutrients listed in the "Parameters Assessed under the Impaired Waters Rule" column and both have exceeded the threshold for Total Phosphorus (TP) and Total Nitrogen (TN). As such, both TP and TN are considered in this analysis. According to FDOT guidance (*Nutrient Loading Calculations for FDOT Projects*), SFWMD requires demonstration that the project will not result in increased nutrient loading compared to current conditions. Basins 3, 4, and EX-4 (an existing FDOT pond for SR 70) will outfall to the L-63 Canal (WBID 3203C) which is not considered impaired and therefore was not evaluated. EX-4 discharges to Taylor Creek in the existing condition, but will discharge to the L-63N Canal in the post condition.

The procedure for calculating the Existing and Post nutrient loadings is a two-step process. First, the potential for runoff is determined based on an analysis of curve number (CN) for pervious areas and impervious cover to determine a runoff coefficient. Second, Event Mean Concentrations (EMCs) are estimated based on values from the literature. Nutrient loading is then calculated as the product of the annual runoff and the EMC.

To calculate the runoff coefficient, the Directly Connected Impervious Area (DCIA) percentage and non-DCIA CN must be known. In the case of a dual hydrologic soil group, the well-drained assumption was used (e.g., A/D soils were considered to be A soils). This assumption is conservative because it will tend to under-estimate runoff in existing conditions, and thus increase the difference in runoff when it is compared to post conditions. The lookup table used to define the curve number from the land use and soil type is provided in **Table 9.**

Table 9 – Curve Numbers Based on Land Use and Soils

Land Use	Hydrologic Soil Group			
	A	B	C	D
Impervious	98	98	98	98
Pastures Good Cond.	39	61	74	80
Water	100	100	100	100
Open Good Cond.	39	61	74	80
Woods Good Cond.	30	55	70	77
Woods Fair Cond.	36	60	73	79

DCIA percentage was calculated based on land use:

- Impervious and water were assumed to be 100% DCIA
- Pasture, open, and woods were assumed to be 5% DCIA

The area-weighted non-DCIA CN and percent DCIA were calculated for each basin. For the non-DCIA CN, the GIS coverages of land use and soil were overlain and a CN was assigned to every unique combination of land use / soil type within each basin. The area-weighted CN was then computed accordingly. **Appendix 7** provides the details of this analysis for Existing and Post conditions, respectively. Based on the non-DCIA CN and percent DCIA, the runoff coefficient was interpolated from the tables in Appendix E of the Applicants Handbook. For each basin, the area-weighted EMC values were calculated based on the Water Quality land use categories and EMC reference values. The EMC values used in this study are provided in **Table 10**.

Table 10 - EMC Values Based on Land Use

WQ Category	Land Use Category (Source[1])	TN	TP
Highways	Highways (3)	1.190	0.155
Open	Undeveloped, Rangeland, and Forests (2)	1.150	0.055
Pastures	Pastures (1)	2.480	0.700
Waters	Waters (4)	0.000	0.000
Woods	Undeveloped, Rangeland, and Forests (2)	1.150	0.055

[1] Sources are as follows: s1 – s Tables 3.4 of AH; s2 - s Harpers and Baker, s 2007; s3 – s FDOT, s 2011a s & s FDOT, s 2011b; s4 – s no loadings assumed for s waters bodies s and s water quality s ponds s s

For the nutrient loading assessment of Existing and Post conditions, the basins were divided into land use categories by digitizing. Two sets of land use categories were used. The land use categories used to calculate the CN differentiates highways into pervious and impervious surfaces, whereas the WQ land use categories (used to look

up the EMC value) lump impervious and pervious surfaces together. **Figures 1** to **5** within **Appendix 7** show the land use for each basin for Existing and Post conditions, according to the two sets of land use categories (for CNs and EMCs).

Once the Existing and Post nutrient loading values are calculated, the required nutrient removal efficiency is determined based on the applicable regulations. Ponds 1 and 5 provide dry retention. Ponds 2, 3, and 4 provide wet detention.

Nutrient removal efficiency for wet detention is related to pond permanent pool volume using an empirically-derived equation based on the average annual hydraulic residence time (pond permanent pool volume divided by the annual runoff). Nutrient removal efficiency for retention is related to the depth of runoff retained, allowing water to percolate through soils and foster pollutant removal.

Nutrient removal was assessed within the UCF BMPTRAINS (Best Management Practices Treatment for Removal on an Annual Basis in Stormwater) spreadsheet model. The model was set up separately for basins discharging to Taylor Creek and the basin discharging to Mosquito Creek. The objective was to show a net reduction in the pollutant loadings for TN and TP to each of these waterbodies. The BMPTRAINS uses FDEP guidance (*Stormwater Quality Applicant's Handbook*, March 2010) to determine treatment efficiencies and allows input of treatment trains to maximize pollutant removal. The complete input and results for the BMPTRAINS is provided in **Appendix 7**. These results are summarized in **Table 11,** showing the pre/post phosphorous and nitrogen loading results for the post-development condition.

Table 11 - Phosphorus and Nitrogen Loading Analysis Summary

Receiving Water	Post Basins	Pre-Development Phosphorous Outflow Mass Loading (kg/yr)	Post-Development Phosphorous Outflow Mass Loading (kg/yr)	Pre-Development Nitrogen Outflow Mass Loading (kg/yr)	Post-Development Nitrogen Outflow Mass Loading (kg/yr)
Taylor Creek (WBID 3205)	1, 2	17.35	4.69	90.19	82.34
Mosquito Creek (WBID 3203B)	5	1.37	0.62	17.24	5.03

III. STORMWATER CONVEYANCE

A. EXISTING CONDITIONS

In the existing condition, the area in the vicinity of the project discharges to Taylor Creek, a historic ditch, and Mosquito Creek. The existing bridge over the L-63N canal discharges to the L-63N canal. All ultimately discharge to Lake Okeechobee. Control structures are utilized along L-63N Canal and Taylor Creek. The project area is characterized by open drainage basins. For the majority of the project, runoff during rainfall events is conveyed as sheet flow or shallow concentrated flow to localized depressions or wetlands, eventually outfalling to the Taylor Creek. Each depression impacted by the roadway is to be analyzed for its pre-post conditions in order to ensure there are not adverse impacts to water stages to offsite property owners.

As this is a new alignment, and connects with existing SR 710 for only 2540 feet to the project end, there are no existing cross drains on the alignment. However, there are several side drains conveying runoff toward SR 710 existing alignment and one cross drain on the existing SR 710 that will be removed. There is one existing bridge at the L-63N Canal (Station 685+00) which will require replacement and/or an additional bridge constructed on the north side.

B. DRAINAGE BASINS

The topography surrounding the project is flat to gently sloping. The elevations range from 30 feet to 10 feet NAVD. Six pre-development basins have been identified to the east of Taylor Creek which all eventually drain to Lake Okeechobee through Taylor Creek, L-63N Canal, Mosquito Creek, and a historic ditch. For the purposes of establishing drainage basins for this project, data was collected from the original FDOT drainage maps for SR 710 and SR 70, existing SFWMD permits and Okeechobee County Basin Studies. CatchmentSIM™ software was utilized to delineate basins using contour LiDAR data. The drainage basins were then confirmed by field review. See **Figures 10A** to **10H** in **Appendix 1** for the Pre-Development Drainage Basin exhibits. Discharge locations are labeled TWA through TWE (Tailwater A through Tailwater E).

A regional ICPR model was performed for the pre-development areas surrounding the SR 710 alignment. The pre-development basins are delineated as Basin A, Basin B, Basin CC, Basin C, Basin D, and Basin E. Basin A consists of a large tract of rural land located predominantly to the north of and within the proposed SR 710 alignment. It is bounded by Taylor Creek on the west and L-63N Canal on the north and east. Basin A has ten sub-basins which discharge to Taylor Creek. Basin B (aka Douglas Park) has seven sub-basins and discharges to the east side of Taylor Creek south of SR 710. Basin CC (aka Okeechobee City Commerce Center) also discharges to the east side of Taylor Creek and is one large basin. Basin C has six sub-basins which are located which are located to the north of SR 70 and are bounded by the railroad on the southwest. Basin C discharges to the roadside ditches of SR 70 R/W. Basin D has sixteen sub-basins which are located to the north of SR 70. Basin D discharges to the roadside ditches of SR 70 R/W. It is located approximately between Stations 571+00

and 638+00 from the west side to the east side of SR 710, and consists of rural land as well as a residential area. Basin E is located south of SR 70 and is bounded by L-63N Canal on the east side. It is located from the west side to the east side of SR 710 from Station 638+00 to 684+00, and has thirteen sub-basins.

Basin 1

The pre-development SR 710 roadway and pond basins are summarized below. Pre-development Basin 1 is on the eastern side of the City of Okeechobee and is located between US 441 to Taylor Creek, and just south of the Okeechobee Healthcare Facility. The existing basin consists of undeveloped land and spans from Station 500+34 to Station 511+20. The northern half of the basin discharges to the existing ditch to the north which conveys the runoff to the east through a culvert at US 441 and into Taylor Creek. The southern half of the basin discharges into an existing depression which overflows to the east into Taylor Creek. The pre development roadway is within Basins AIRNOFF2 and TCEAST from the regional ICPR model.

The basin for pre-development Pond 1A is located on a vacant parcel west of NW 3rd Avenue and north of NW 13th Street. Runoff from this area is conveyed to the existing ditch to the north which discharges east to Taylor Creek. (Pre Pond 1A is located within Basin SWDITC).

The basin for pre-development Pond 1B is located on a vacant parcel which is west of and adjacent to Taylor Creek. Runoff from this area discharges into Taylor Creek. (Pre Pond 1B is within Basin AIRNOFF2)

The basin for pre-development Pond 1C is located on a vacant parcel which is west of and adjacent to Taylor Creek. Runoff from this area discharges into Taylor Creek. (Pre Pond 1C is within Basin AIRNOFF2)

Basin 2

The Pre-development Basin 2 consists of rural, undeveloped land. From Station 511+20 to Station 571+00, the runoff is conveyed overland to the north filling depressional areas which overflow to the west eventually discharging to Taylor Creek (Tailwater A). From Station 571+00 to Station 602+00, the runoff flows overland to the southwest to depressional areas which fill up and overtop to each other or constructed ditches and flow south to SR 70 (Tailwater D). From Station 602+00 to Station 610+20, the runoff is generally conveyed to the southwest filling depressional areas which overflow and eventually discharge to SR 70 joining the previous basin and flowing to Tailwater D (west of existing SR 710). From there, the runoff is conveyed through existing ditches to the south eventually discharging to Taylor Creek. (The pre-development basins are designated Basins A and D). There is a permitted discharge rate through the City of Okeechobee Commerce park which includes Basin B.

The basin for pre-development Pond 2A is located on undeveloped land north of and adjacent to the SR 710 R/W. Runoff from this area is conveyed overland to the north

filling depressional areas which overflow to the west eventually discharging to Taylor Creek. (Pre Pond 2A is located within Basin A).

The basin for pre-development Pond 2B is located on undeveloped land to the east of Taylor Creek and north of and adjacent to the SR 710 R/W. Runoff from this area is conveyed overland to the west to an existing wetland within the Okeechobee City Commerce Center. This wetland is connected with Commerce Center system which eventually outfalls to the west to Taylor Creek. (Pre Pond 2B is located within Basin A and B.)

The basin for pre-development Pond 2C is located on undeveloped land south of and adjacent to the SR 710 R/W. Runoff from this area is conveyed overland to the north filling depressional areas which overflow to the west eventually discharging to Taylor Creek. (Pre Pond 2C is located within Basin A).

Basin 3

The Pre-development Basin 3 consists of rural, undeveloped land. From Station 610+20 to Station 638+36.94, the runoff is conveyed to the southwest through a residential development eventually outfalling through an existing culvert at SR 70 (west of existing SR 710). From there, the runoff is conveyed through existing ditches to the south eventually discharging to Taylor Creek. (The pre-development basin is designated Basin D).

The basin for pre-development Pond 3A is located on undeveloped land east of and adjacent to the SR 710 R/W. As this location is within a low area, the runoff from this area stays within the depression. The depression will overflow to the south to the existing historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest eventually discharging to Taylor Creek. Pre Pond 3A is located within Basin D and discharges to Tailwater D.

The basin for pre-development Pond 3B is located on undeveloped land east of SR 710 R/W, adjacent to and west of L-63N Canal, and north of SR 70. Runoff from this area is conveyed to the historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest eventually discharging to Taylor Creek. Pre Pond 3B is located within Basin E and discharges to Tailwater E.

The basin for pre-development Pond 3C is located on undeveloped land east of and adjacent to SR 710 R/W. Runoff from this area is conveyed to the historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest eventually discharging to Taylor Creek. Pre Pond 3C is located within Basin E and discharges to Tailwater E.

Basin 4

The Pre-development Basin 4 consists of rural, undeveloped land. From Station 638+36.94 to Station 685+00, the runoff is conveyed to the southwest through a historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest eventually discharging to Taylor Creek. The pre-development basin is designated Basin E.

The basin for pre-development Pond 4A is located on undeveloped land north of and adjacent to SR 710 R/W, also bounded on the east by L-63N Canal. Runoff from this area is conveyed to the historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest at Tailwater E eventually discharging to Taylor Creek. Pre Pond 4A is located within Basin E.

The basin for pre-development Pond 4B/4C is located on undeveloped land southwest of and adjacent to proposed SR 710 R/W. These connected ponds are located in the area bounded by proposed SR 710, existing SR 710, and NE 34th Avenue. Runoff from this area is conveyed to the historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest eventually discharging to Taylor Creek. Pre Pond 4B/4C is located within Basin E.

The basin for pre-development Pond 4C is located on undeveloped land southwest of and adjacent to SR 710 R/W. Runoff from this area is conveyed to the historic unnamed ditch, and is conveyed by culverts through existing SR 710 and E. Center Street. From there, the runoff is conveyed through existing ditches to the southwest eventually discharging to Taylor Creek. Pre Pond 4C is located within Basin E.

The basin for pre-development Pond 4D is located on undeveloped land southwest of and adjacent to proposed SR 710 R/W. Runoff from this area fills the existing depression in Basin E10 and then oveflows to the west to Tailwater E. Pre Pond 4C is located within Basin E.

Basin 5

The Pre-development Basin 5 consists of rural, undeveloped land and existing SR 710 roadway. From Station 685+00 to Station 703+50, the runoff from the north side of the roadway is conveyed to the north, and the runoff from the south side of the roadway is conveyed to the south. From there, the runoff flows overland to the southeast toward Mosquito Creek. This is considered a simple basin and detailed modeling is not included.

The basin for pre-development Pond 5A is located on undeveloped land north of and adjacent to proposed SR 710 R/W. It is bounded by the entrance to the Okeechobee Agricultural Center on the west side. Runoff from this area flows overland to the

southeast to Mosquito Creek. Mosquito Creek drains into L-63N Canal which ultimately discharges into Lake Okeechobee.

The basin for pre-development Pond 5B is located on undeveloped land north of and adjacent to proposed SR 710 R/W. It is bounded by the L-63N Canal on the west side and the entrance to the Okeechobee Agricultural Center on the east side. Runoff from this area fills a depressional area in the vicinity of the pond, and then it is conveyed to through a culvert to the southeast to Mosquito Creek. Mosquito Creek drains into L-63N Canal which ultimately discharges into Lake Okeechobee.

The basin for pre-development Pond 5C is located on undeveloped land south of and adjacent to proposed SR 710 R/W. Runoff from this area flows overland to the southeast to Mosquito Creek. Mosquito Creek drains into L-63N Canal which ultimately discharges into Lake Okeechobee.

C. PROPOSED CONDITIONS

The proposed basin maps are included in **Figures 11** and **13**. The proposed drainage system will consist of curb and gutter inlets connected to the ponds with a systems of storm sewers and manholes. The majority of the roadway is being built in fill. Offsite drainage sheet flows to depressional areas where it will be bypassed through the roadway through piped cross drains along its original drainage path. The offsite areas are too low to be brought into the ponds.

In order to evaluate the cost associated with the pipe system, preliminary storm sewer tabulations were developed for Basins 1 through 4 using the preliminary profile and areas. These tabulations are included in **Appendix 8.** The results were used to develop a cost comparison between each pond site within a basin. The details of these calculations are included the construction cost estimates which are located in **Appendix 6**.

IV. ALTERNATIVE STORMWATER MANAGEMENT FACILITY LOCATIONS

A. BASIS OF EVALUATION

An alternative comparison analysis was developed which consists of the location and description of each Stormwater Management Facility (SMF) location (see **Table 15** in Sub-section C of Section IV.) Each alternative was evaluated based on the following factors:

Constructability: Accommodation of the required pond area including the required setback limits, maintenance access, side slopes and pond bottom area.

Maintainability: Adequate area needed for regular cleaning, sediment removal, mowing and other required maintenance.

Hazardous Materials: Pertains to the presence of hazardous materials or petroleum contamination on or near the site location.

Utilities: Addresses impacts to existing and known future utilities at each alternative location.

Environmental Impacts: Pertains to impacts to floodplain and wetland areas, and to habitats for threatened, endangered or significant wildlife species.

Cultural Resources: Addresses impacts to prehistoric or historic archaeological or historic structures for each site.

Economics: Costs associated with right-of-way acquisition, residential/business relocation, contamination remediation, wetland mitigation and construction costs (see **Appendix 6** for associated costs).

B. ALTERNATIVE STORMWATER MANAGEMENT FACILITY (SMF) LOCATIONS

There will be five drainage basins for the proposed roadway. For the proposed condition, roadway runoff will flow through storm sewer system to stormwater treatment ponds. There are five discharge locations for the proposed pond alternatives locations lower Taylor Creek, the wetland East of Okeechobee Commerce Center, L-63N Canal, an unnamed historic ditch (crosses SR 70 & SR 710), and Mosquito Creek. The ultimate outfall for the project is Lake Okeechobee.

Sixteen pond alternative locations were evaluated as possible stormwater management facilities for the five open basins. All pond alternatives are proposed to be wet detention except for Pond alternates 1B, 1C, 5A, 5B, and 5C which are proposed to be dry retention with underdrains. The amount of proposed pavement contributing runoff to these potential ponds is estimated at 45.10 acres. See **Appendix 8** for treatment volume calculations. Pond site descriptions are as follows:

Basin 1

Basin 1 limits start at the beginning of the project at US 441 (Station 500+34) and extends to Station 511+20. The drainage area for this basin is 4.00 acres, and includes only the SR 710 right-of-way. It is an open basin discharging to Taylor Creek with an eventual outfall to Lake Okeechobee. The soils encountered in Basin 1 are Manatee loamy fine sand, depressional (#6) and Immokalee fine sand (#11). The proposed pond sites within the basin are identified as 1A, 1B, and 1C. The proposed profile was utilized to determine the allowable peak stages within the ponds.

Pond Site 1A is located on an empty parcel located west of US 441 (at begin project) and southwest of an existing FDOT pond. It is located at the northwest quadrant of the intersection of NW 13th Street and NW 3rd Avenue. Access to this site would be from US 441 and NW 13th Street Avenue. The pond outfall is the City Ditch north of the site which runs west to east and outfalls into Taylor Creek. The piped pond outfall will be 270 feet long and is estimated to be a 36" pipe at this time. This potential location consists primarily of grass, brush, and trees. As Pond 1A is within 10,000 feet of the airport, rubble riprap must be constructed around the pond perimeter as a wildlife deterrent.

The soil encountered at this site is Immokalee fine sand (Type B/D) which has an estimated SHGT at 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 1A (to a depth of 15 feet) which determined that the site soil consists of gray and brown fine sand with some rock; and gray, tan, and brown fine sand. From Boring PB-1A, the observed water table elevation on October 16, 2013 was 2.5 feet below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 1.5 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 26 feet NAVD. Therefore, the SHGT elevation was estimated to be 24 feet NAVD. There is an adjacent wet pond which serves US 441 (Pond 1) located diagonal and directly northeast of the proposed site. The normal water elevation in the adjacent pond is at elevation 22.7 feet NGVD (21.53 feet NAVD) from US 441 Plans. According to the FDOT Maintenance in Okeechobee, the adjacent US 441 pond site is not problematic. Therefore, the same normal water elevation (21.50 feet NAVD) was used for the analysis of Pond 1A.

Pond 1A is within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. A wetland was identified on Pond Site 1A from the National Wetlands Inventory, however, no wetlands were observed during field inspection. The contamination screening designated Pond site 1A as having a risk ranking of "No" as the site is historically undeveloped and wooded. Pond Site 1A was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 2.24 acres based on information from the Okeechobee County Property Appraiser. The piped pond outfall to the City Ditch will be within the

local road (NW 5th Avenue) and the City Ditch R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 1A. The estimated right-of-way cost associated with this parcel is **$141,000**, and the construction cost is estimated to be **$214,012** for a total cost of **$355,012**. The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$30,843**); the drainage trunkline cost **($150,826);** and other miscellaneous costs including sodding, clearing and grubbing, rubble riprap (ditch lining) and sediment barrier **($94,029)**.

Pond Site 1B is located adjacent to and south of SR 710 R/W at Station 509+00 and west of Taylor Creek. Access to this site would be from SR 710. The pond outfall into Taylor Creek is estimated to be a 140-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush, and trees.

The soil encountered at this site is Manatee loamy fine sand (Type B/D), depressional which has an estimated SHGT at existing ground level. The FDOT Geotechnical Department performed a boring at Pond 1B (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock; and dark brown fine sand with organics. From Boring PB-1B, the observed water table elevation on October 16, 2013 was 2.5 feet below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.75 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 18 feet NAVD. Therefore, the SHGT elevation was estimated to be 16.75 feet NAVD.

Pond 1B is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "Medium" for wetlands/surface water involvement as the property impacts an estimated 0.5 acre of wetlands and "Low" for protected species involvement. The contamination screening designated Pond site 1B as having a risk ranking of "Low" as the site was noted to have unidentified modifications to the property in historical aerials. Pond Site 1B was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 1.08 acres based on R/W parcel size and surveyed property lines. The piped pond outfall to Taylor Creek will be within SR 710 R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 1B. The estimated right-of-way cost associated with this parcel is **$146,000**, and the construction cost is estimated to be **$144,073** for a total cost of **$320,073**. The construction cost is for comparison purposes only and includes embankment cost (**$19,230**); the drainage trunkline cost **($56,704);** underdrain **($49,280);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($18,859).** Other costs include wetland mitigation **($30,000).**

As Pond Site 1B was determined to be the preferred site for Basin 1, further analysis was performed for this site. To summarize, the results indicated that this site will impact 0.47 acre of wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Pond Site 1C is located south of SR 710 R/W at Station 509+00 and just west of Taylor Creek. Access to this site would be from SR 710 and access roadway. The pond outfall into Taylor Creek is estimated to be a 215-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush, and trees.

The soil encountered at this site is Manatee loamy fine sand (Type B/D), depressional which has an estimated SHWT at existing ground level. The FDOT Geotechnical Department performed a boring at Pond 1C (to a depth of 20 feet) which determined that the site soil consists of gray and orange sandy clay; gray and brown fine sand with some rock; and dark brown organic clay. From Boring PB-1C, the observed water table elevation on October 16, 2013 was 1.0 foot below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.00 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 15 feet NAVD. Therefore, the SHGT elevation was estimated to be 14.50 feet NAVD.

Pond 1C is within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "High" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 1C was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 0.93 acres based on R/W parcel size. As the pond is not adjacent to the SR 710 R/W, an outfall easement (0.22 ac) from the pond site to Taylor Creek will be necessary. The FDOT Right-of-Way Department has provided estimates for proposed Pond 1C. The estimated right-of-way costs and construction costs associated with this parcel are **$105,000** and **$166,864,** respectively**.** Other costs include wetland mitigation **($52,800)**. The total of the costs associated with this parcel are **$324,664**. The construction cost is for comparison purposes only and includes embankment **($42,954**); underdrains **($19,200**); the drainage trunkline cost (**$86,844**); and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($17,866).**

Basin 2

The limit of Basin 2 consists of the SR 710 roadway right-of-way from Station 511+20 to Station 610+20. Basin 2 is an open basin that has two potential outfalls depending on the chosen pond site, Taylor Creek or the wetland area located south of SR 710 R/W and east of the Okeechobee Commerce Center. The eventual outfall for both is Lake Okeechobee. The soils encountered in Basin 2 are Basinger fine sand (#2); Basinger and Placid soils, depressional (#3), Manatee loamy fine sand, depressional (#6), Floridana, Riviera, and Placid soils, depressional (#7), Pindea fine sand (#8), Riviera fine sand (#9), Immokalee fine sand (#11), and Parkwood fine sand (#18).

Pond Site 2A is located adjacent to and north of SR 710 R/W at Station 554+50 and to the east of Taylor Creek. Access to this site would be from SR 710. The pond outfall

into the existing wetland is estimated to be a 300-foot long, 18" pipe. This potential location consists primarily of grass with some trees.

The soil type encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT at 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 1C (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-1C, the observed water table elevation on October 22, 2013 was 2.0 feet below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.67 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 22.2 feet NAVD. Therefore, the SHGT elevation was estimated to be 21.03 feet NAVD.

Pond 2A is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 2A was assessed as having a "Moderate" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

Three potential stormwater management facility options were analyzed for Pond 2A. This was done to determine if raising the roadway and thereby reducing the required pond area would be more cost effective than acquiring a large stormwater management facility. The additional storage volume afforded by raising the roadway reduces the pond size. The FDOT Right-of-Way Department has provided estimates for each proposed pond option and for raising the roadway by one foot intervals. The information for raising the roadway was modified for use per basin. Each option will utilize a piped outfall to the wetland east of the Commerce Center and will be within SR 710 R/W. See **Appendix 6** for right-of-way cost estimate information and calculations.

Pond 2A – Option 1 area is estimated at 9.43 acres based on measurement. This is the required pond area for the currently proposed roadway profile. The estimated right-of-way cost and construction cost associated with this parcel are **$265,000** and **$1,072,314,** respectively**.** The total costs associated with this option are **$1,337,314**. The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$54,610**); the drainage trunkline cost **($1,022,729);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($104,195).**

As Pond Site 2A – Option 1 was determined to be the preferred site for Basin 2, further analysis was performed for this site. To summarize, the results indicated that this site will not impact wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Pond 2A – Option 2 area is estimated at 7.20 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile one foot for

the western portion (approx. 5000 feet) of Basin 2. The cost associated with raising the roadway one foot within this area is estimated at **$317,812**. The estimated right-of-way cost and construction cost associated with this parcel are **$212,000** and **$1,114,607.** The total of the costs associated with this option are **$1,644,419**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$6,293**); the drainage trunkline cost **($1,022,729);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($85,585).**

Pond 2A – Option 3 area is estimated at 6.42 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile two feet for the western portion (approx. 5000 feet) of Basin 2. The cost associated with raising the roadway two feet within this area is estimated at **$635,625**. The estimated right-of-way costs and construction costs associated with this parcel are **$193,000** and **$1,148,255.** The total of the costs associated with this option are **$1,976,879**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$44,449**); the drainage trunkline cost **($1,022,729);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($81,076).**

Pond Site 2B is located adjacent to and south of SR 710 at Station 554+00 and to the east of Taylor Creek. Access to this site would be from SR 710. The pond outfall into the wetland is estimated to be a 200-foot long, 18" pipe at this time. This potential location consists primarily of grass with some trees.

The soil type encountered at this site is Immokalee fine sand (Type B/D) which has a estimated depth to the SHWT at 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 2B (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-2B, the observed water table elevation on October 23, 2013 was 3.0 feet below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.75 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 23.2 feet NAVD. Therefore, the SHGT elevation was estimated to be 21.95 feet NAVD.

Pond 2B is <u>not</u> within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 2A was assessed as having a "Moderate" potential for archaeological sites and historic resources. This potential site has <u>no impacts</u> to existing or known future utilities.

Three potential stormwater management facility options were analyzed for Pond 2B. This was done to determine if raising the roadway and thereby reducing the required pond area would be more cost effective than acquiring a large stormwater management facility. The additional storage volume afforded by raising the roadway reduces the pond size. The FDOT Right-of-Way Department has provided estimates for each proposed pond option and for raising the roadway by one foot intervals. The

information for raising the roadway was modified for use per basin. Each option will utilize a piped outfall to the wetland east of the Commerce Center and will be within SR 710 R/W. See Appendix 6 for right-of-way cost estimate information and calculations.

Pond 2B – Option 1 area is estimated at 15.37 acres based on measurement. This is the required pond area for the currently proposed roadway profile. The estimated right-of-way cost and construction cost associated with this parcel are **$405,000** and **$925,064.** The total costs associated with this option are **$1,330,064**. The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$241,563**); the drainage trunkline cost **($1,016,479);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($150,147).**

Pond 2B – Option 2 area is estimated at 10.00 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile one foot for the western portion (approx. 5000 feet) of Basin 2. The cost associated with raising the roadway one foot within this area is estimated at **$317,812**. The estimated right-of-way cost and construction cost associated with this parcel are **$278,000** and **$1,005,232.** The total of the costs associated with this option are **$1,601,045**. The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$115,526**); the drainage trunkline cost **($1,016,479);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($104,280).**

Pond 2B – Option 3 area is estimated at 7.08 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile two feet for the western portion (approx. 5000 feet) of Basin 2. The cost associated with raising the roadway two feet within this area is estimated at **$635,625**. The estimated right-of-way costs and construction costs associated with this parcel are **$209,000** and **$1,053,637.** The total of the costs associated with this option are **$1,898,262**. The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$42,854**); the drainage trunkline cost **($1,016,479);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($80,012).**

Pond Site 2C is located adjacent to and north of SR 710 at Station 522+50 and to the east of Taylor Creek. Access to this site would be from SR 710. The pond outfall into Taylor Creek is estimated to be an 800-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees. As Pond 2C is within 10,000 feet of the airport, rubble riprap must be constructed around the pond perimeter as a wildlife deterrent.

The soil types encountered at this site are Basinger fine sand (Type A/D) and Pindea fine sand (Type C/D) which both have an estimated depth to the SHWT from 0 feet to 1.0 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 2C (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-2C, the observed water

table elevation on October 23, 2013 was 3.5 feet below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.67 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 19.5 feet NAVD. Therefore, the SHGT elevation was estimated to be 18.33 feet NAVD.

Pond 2C is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "Low" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 2C was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

Two potential stormwater management facility options were analyzed for Pond 2C. This was done to determine if raising the roadway and thereby reducing the required pond area would be more cost effective than acquiring a large stormwater management facility. The additional storage volume afforded by raising the roadway reduces the pond size. The FDOT Right-of-Way Department has provided estimates for each proposed pond option and for raising the roadway by one foot intervals. The information for raising the roadway was modified for use per basin. Each option will utilize a piped outfall to Taylor Creek and will be within SR 710 R/W. See Appendix 6 for right-of-way cost estimate information and calculations.

Pond 2C – Option 1 area is estimated at 6.86 acres based on measurement. This is the required pond area for the currently proposed roadway profile. The estimated right-of-way cost and construction cost associated with this parcel are **$297,000** and **$1,042,526.** The total costs associated with this option are **$1,339,526**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$18,529**); the drainage trunkline cost **($828,989);** and other miscellaneous costs including sodding, clearing and grubbing, rubble riprap and sediment barrier **($195,008).**

Pond 2C – Option 2 area is estimated at 6.14 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile one foot for the western portion (approx. 5000 feet) of Basin 2. The cost associated with raising the roadway one foot within this area is estimated at **$317,812**. The estimated right-of-way cost and construction cost associated with this parcel are **$280,000** and **$1,067,257.** The total of the costs associated with this option are **$1,665,070**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$59,770**); the drainage trunkline cost **($828,989);** and other miscellaneous costs including sodding, clearing and grubbing, rubble riprap and sediment barrier **($178,498).**

Basin 3

The limit of Basin 3 consists of the SR 710 roadway right-of-way from Station 610+20 to Station 638+46.43. Basin 3 is an open basin that has two potential outfalls, L-63N Canal or the unnamed historic ditch that crosses SR 70 and proposed SR 710. The eventual outfall for both is Lake Okeechobee. The soils encountered in Basin 3 are

Basinger fine sand (#2); Basinger and Placid soils, depressional (#3), and Immokalee fine sand (#11).

Pond Site 3A is located east of SR 710 (in vicinity of Sta. 636+00) and north of SR 70 R/W. As this site is not adjacent to SR 710, access to this site would be from SR 70. The pond outfall into L-63N Canal is estimated to be a 140-foot long, 18" pipe at this time. This potential location consists primarily of grass with minimal trees.

The soil type encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 3A (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock; and gray, tan, and brown fine sand. From Boring PB-3A, the observed water table elevation on October 16, 2013 was 3.5 feet below ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 1.92 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 31.0 feet NAVD. Therefore, the SHGT elevation was estimated to be 28.58 feet NAVD. As this site is located adjacent to the L-63N Canal and a wetland, a SHGT of 24.73 feet NAVD was used, and it was assumed that a clay liner would be utilized in the design.

This site is <u>not</u> within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "Medium". As a result of this ranking, this site was preliminarily assessed a cost of $125,000 for cleanup of livestock holding pens, however, further investigation is required. Pond Site 3A was assessed as having a "Low" potential for archaeological sites and historic resources. Pond 3A conflicts with both FPL Distribution and Transmission pole lines. This will require additional coordination and a possible relocation to the north of the lines.

The pond site is estimated at 3.47 acres based on measurement. The piped pond outfall to the L-63N Canal will be within SR 70 R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 3A. The estimated right-of-way costs and construction costs associated with this parcel are **$471,000** and **$430,448.** The total costs associated with this parcel are **$901,448.** The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$49,061**); the drainage trunkline cost **($337,704);** clay liner **($98,851**); and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($42,954).**

Pond Site 3B is located adjacent to and east of SR 710 R/W at Station 629+00. Access to this site would be from SR 710. The pond outfall into the unnamed historic ditch is estimated to be a 1211-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees.

The soil type encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 3B (to a depth of 20 feet)

which determined that the site soil consists of gray and brown fine sand with some rock; gray, tan, and brown fine sand; and light gray clayey sand with rock. From Boring PB-3B, the observed water table elevation on October 16, 2013 was 0.2 feet above the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.50 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 26.4 feet NAVD. Therefore, the SHGT elevation was estimated to be 25.4 feet NAVD.

This site is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "Low" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 3B was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 2.44 acres based on measurement. The piped pond outfall (0.03 ac.) to the historic ditch will be within SR 710 and SR 70 R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 3B. The estimated right-of-way costs and construction costs associated with this parcel are **$383,000** and **$300,565.** Other costs associated with this parcel are mitigation costs **($18,000).** The total costs associated with this parcel are **$701,565.** The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$1,967**); the drainage trunkline cost **($269,624);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($32,908).**

As Pond Site 3B was determined to be the preferred site for Basin 3, further analysis was performed for this site. To summarize, the results indicated that this site will impact 0.35 acre of wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Pond Site 3C is located adjacent to and east of SR 710 R/W at Station 643+50. Access to this site would be from SR 710. The pond outfall into the unnamed ditch is estimated to be an 85-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees. The northern portion of the parcel is currently being used as a wet detention pond for SR 70. As the SR 70 widening project is currently under design, this pond will be modified to accommodate the additional runoff from the improvements. The proposed SR 70 stormwater calculations were reviewed and used for design of a larger wet detention pond which will accommodate runoff from both SR 70 and SR 710.

The soil encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 3C (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-3C, the observed water table elevation on October 22, 2013 was 3.0 feet below the ground surface, and the seasonal high groundwater table

(SHGT) was estimated to be 1.25 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 24.2 feet NAVD. Therefore, the SHGT elevation was estimated to be 22.95 feet NAVD.

This site is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "Low". Pond Site 3C was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 3.81 acres based on measurement. The piped pond outfall to the historic ditch will require a minimal outfall easement. The FDOT Right-of-Way Department has provided estimates for proposed Pond 3C. The estimated right-of-way costs and construction costs associated with this parcel are **$365,000** and **$408,483.** The total costs associated with this parcel are **$773,483.** The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$4,543**); the drainage trunkline cost **($378,759);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($34,267).**

Basin 4

The limit of Basin 4 consists of SR 710 roadway from Station 638+36.94 to Station 685+00. Basin 4 consists of right-of-way and additional pavement used for connection of existing SR 710 to the new alignment of SR 710. Basin 4 is an open basin that has two potential outfalls, L-63N Canal or the unnamed ditch that crosses SR 70. The eventual outfall for both is Lake Okeechobee. The soils encountered in Basin 4 are Basinger fine sand (#2) and Immokalee fine sand (#11).

Pond Site 4A is located adjacent to and east of SR 710 at Station 680+50. Access to this site would be from SR 710. The pond outfall into the L-63N Canal is estimated to be a 150-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees.

The soil type encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed two borings at Pond 4A (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From the two Borings, both designated PB-4A, the observed water table elevation on October 23, 2013 was 3.0 feet and 4.5 feet below the ground surface, respectively. The seasonal high groundwater table (SHGT) was estimated to be 1.08 feet +/- 0.5 feet for both borings. From contours, the ground elevation at the borings is 25 feet NAVD and 26 feet NAVD, respectively. Therefore, the SHGT elevation was estimated to be 23.42 feet NAVD and 24.42 feet, respectively. For the pond site preliminary analysis, a SHGT elevation of 24.0 feet NAVD was used.

Pond 4A is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Medium" for protected species involvement. The contamination screening designated this site as having a risk ranking of "Low". Pond Site 4A was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

Two potential stormwater management facility options were analyzed for Pond 4A. This was done to determine if raising the roadway and thereby reducing the required pond area would be more cost effective than acquiring a large stormwater management facility. The additional storage volume afforded by raising the roadway reduces the pond size. The FDOT Right-of-Way Department has provided estimates for each proposed pond option and for raising the roadway by one foot intervals. The information for raising the roadway was modified for use per basin. Each option will utilize a piped outfall to the L-63N Canal and will be within the canal right-of-way. See Appendix 6 for right-of-way cost estimate information and calculations.

Pond 4A – Option 1 area is estimated at 3.98 acres based on measurement. This is the required pond area for the currently proposed roadway profile. The estimated right-of-way cost and construction cost associated with this parcel are **$435,000** and **$635,121.** Other costs associated with this parcel include protected species mitigation **($18,000).** The total costs associated with this option are **$1,088,121**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$27,006**); the drainage trunkline cost **($555,219);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($52,898).**

Pond 4A – Option 2 area is estimated at 3.34 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile one foot within Basin 4. The cost associated with raising the roadway one foot within this area is estimated at **$296,392**. The estimated right-of-way cost and construction cost associated with this parcel are **$391,000** and **$637,566.** Other costs associated with this parcel include protected species mitigation **($18,000).** The total of the costs associated with this option are **$1,342,958**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$35,863**); the drainage trunkline cost **($555,219);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($46,485).**

Pond Site 4B is located adjacent to and west of SR 710 at Station 656+00. Access to this site would be from SR 710 or connector roads. This pond has been analyzed as a combined site with Pond Site 4C as they are both small remainder parcels between SR 710, SR 70, and connector roads as well as a single pond site. The pond outfall into the unnamed historic ditch is estimated to be a 135-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees.

The soil encountered at 4B is Immokalee (Type B/D) and Basinger fine sands (Type A/D) which have an estimated depth to the SHWT from 0.5 feet to 1.5 feet and 0 to 1.0 feet, respectively, below existing ground. The FDOT Geotechnical Department

performed a boring at Pond 4B (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-4B, the observed water table elevation on November 2, 2016 was 2.0 feet below the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 2.00 feet +/- 0.5 feet. The FDOT Geotechnical Department determined that the ground elevation at the boring location was 23.04 feet NAVD. Therefore, the SHGT elevation is estimated to be 20.54 feet NAVD.

Pond 4B is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "Low" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 4B was assessed as having a "Moderate" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 4.20 acres based on measurement. The piped pond outfall to the historic ditch will be within local road R/W. The cost estimate for Pond 4B is located below Pond Site 4C information.

Pond Site 4C is located adjacent to and west of SR 710 at Station 663+00. Access to this site would be from SR 710 or connector roads. This pond has been analyzed as a combined site with Pond Site 4B as they are both small remainder parcels between SR 710, SR 70, and connector roads. The pond outfall into the unnamed historic ditch is estimated to be a 135-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees with several buildings.

The soil encountered at 4C is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 4B/4C (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-4BC, the observed water table elevation on October 22, 2013 was 2.5 feet below the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 1.25 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 24.0 feet NAVD. Therefore, the SHGT elevation was estimated to be 22.25 feet NAVD.

This site is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "Medium". As a result of this ranking, this site was preliminarily assessed a cost of $125,000 for cleanup of livestock holding pens, however, further investigation is required. Pond Site 4C was assessed as having a "Moderate" potential for archaeological sites and historic resources. Pond 4C has existing FPL Distribution facilities (aerial pole line) and Centurylink facilities (BT/BFO) along the southern side of Pond 4C. These utilities are not expected to be impacted.

Two potential stormwater management facility options were analyzed for the Pond 4B/4C combination. This was done to determine if raising the roadway and thereby

reducing the required pond area would be more cost effective than acquiring a large stormwater management facility. The additional storage volume afforded by raising the roadway reduces the pond size. The FDOT Right-of-Way Department has provided estimates for each proposed pond option and for raising the roadway by one foot intervals. The information for raising the roadway was modified for use per basin. Each option will utilize a piped outfall to the to the historic ditch and will be within local road R/W. See Appendix 6 for right-of-way cost estimate information and calculations.

Pond 4B/4C – Option 1 area is estimated at 7.17 acres (Pond 4B (4.20 ac.)/Pond 4C (2.97 ac.) based on measurement. This is the required pond area for the currently proposed roadway profile. The estimated right-of-way cost and construction cost associated with this parcel are **$658,000** and **$559,843.** Other costs associated with this parcel (Pond 4B) include wetland mitigation **($6,000).** The total costs associated with this option are **$1,223,843**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$17,090**); the drainage trunkline cost **($442,625);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($100,128).**

Pond 4B – Option 2 area is estimated at 4.20 acres based on measurement. This options works without raising the road. The estimated right-of-way cost and construction cost associated with this parcel are **$403,000** and **$501,222.** Other costs associated with this parcel (Pond 4B) include wetland mitigation **($6,000).** The total of the costs associated with this option are **$904,222**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$2,081**); the drainage trunkline cost **($442,625);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($56,516).**

As Pond Site 4B – Option 2 was determined to be the preferred site for Basin 4, further analysis was performed for this site. To summarize, the results indicated that this site will not impact wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Pond Site 4D is located adjacent to and southwest of SR 710 at Station 672+00. Access to this site would be from SR 710. The pond outfall into the historic ditch to the west is estimated to be an 860-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees.

The soil encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 4D (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-4D, the observed water table elevation on October 22, 2013 was 3.0 feet below the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 1.17 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 25.5 feet NAVD. Therefore, the SHGT elevation was estimated to be 23.83 feet NAVD.

This site is not within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Medium" for protected species involvement. The contamination screening designated this site as having a risk ranking of "Medium". This site was preliminarily assigned a ranking of "Medium" for contamination due to proximity to a retail fuel site, but a ranking of "Low" was considered after further investigation uncovered cleanup of the adjacent site. However, as this station is active and in close proximity to the project, the District Contamination Impact Coordinator (DCIC) has requested that the ranking remain "Medium". Pond Site 4D was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

Two potential stormwater management facility options were analyzed for Pond 4D. This was done to determine if raising the roadway and thereby reducing the required pond area would be more cost effective than acquiring a large stormwater management facility. The additional storage volume afforded by raising the roadway reduces the pond size. The FDOT Right-of-Way Department has provided estimates for each proposed pond option and for raising the roadway by one foot intervals. The information for raising the roadway was modified for use per basin. Each option will utilize a piped outfall to the historic ditch and will be within the road right-of-way. See Appendix 6 for right-of-way cost estimate information and calculations.

Pond 4D – Option 1 area is estimated at 6.08 acres based on measurement of GIS parcel lines. This is the required pond area for the currently proposed roadway profile. The estimated right-of-way cost and construction cost associated with this parcel are **$491,000** and **$565,066.** Other costs associated with this parcel include protected species mitigation **($15,000).** The total costs associated with this option are **$1,071,066**. The construction cost is for comparison purposes only and includes savings due to import of fill to roadway (**$15,380**); the drainage trunkline cost **($506,593);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($73,853).**

Pond 4D – Option 2 area is estimated at 4.33 acres based on measurement. This is the required pond area determined by analysis of raising the roadway profile one foot within Basin 4. The cost associated with raising the roadway one foot within this area is estimated at **$296,392**. The estimated right-of-way cost and construction cost associated with this parcel are **$373,000** and **$594,761.** Other costs associated with this parcel include protected species mitigation **($15,000).** The total of the costs associated with this option are **$1,279,153**. The construction cost is for comparison purposes only and includes the cost due to import of fill to roadway (**$20,519**); the drainage trunkline cost **($506,593);** and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($67,650).**

Basin 5

The limit of Basin 5 consists of the SR 710 roadway right-of-way from Station 685+00 to Station 703+40. Basin 5 is an open basin that has two potential outfalls, L-63N

Canal or Mosquito Creek. The eventual outfall for both is Lake Okeechobee. The soils encountered in Basin 5 are Immokalee fine sand (#11); and Floridana, Placid, and Okeelanta soils, frequently flooded (#19). The roadway within the basin currently being constructed as a transition section but is assumed to be the full typical section within the basin limits to accommodate the future widening to the east.

If Basin 5 discharges to Mosquito Creek, then nutrient removal will be required so underdrains are included in the pond cost estimates. Should the ponds be able to discharge to the L63-N canal without needing nutrient removal then dry detention will be utilized. The pond treatment volumes were based on dry detention.

Pond Site 5A is located adjacent to and northeast of SR 710 at Station 697+00. Access to this site would be from SR 710. The pond outfall into the Mosquito Creek to the east is estimated to be a 595-foot long, 18" pipe at this time. This potential location consists primarily of grass, brush and trees.

The soil encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 5A (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-5A, the observed water table elevation on October 22, 2013 was 2.0 feet below the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.75 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 23.0 feet NAVD. Therefore, the SHGT elevation was estimated to be 21.75 feet NAVD.

Pond Site 5A is within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. The area is within floodplain Zone AE, with a base flood elevation of 23.0 feet NAVD. It is expected that this site will minimally impact the floodplain with a floodplain depth of less than 0.5 foot. It has a rating of "Medium" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 5A was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 2.62 acres based on measurement. The piped pond outfall to Mosquito Creek will be within SR 710 R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 5A. The estimated right-of-way costs and construction costs associated with this parcel are **$127,000** and **$269,696.** Other costs associated with this parcel include wetlands mitigation **($48,000).** The total costs associated with this combined parcel are **$444,696.** The construction cost is for comparison purposes only and includes embankment (**$51,768**); the drainage outfall pipe cost **($28,257);** underdrains **($142,800**); and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($46,871).**

As Pond Site 5A was determined to be the preferred site for Basin 5, further analysis was performed for this site. To summarize, the results indicated that this site will not impact wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Pond Site 5B is located adjacent to and northeast of SR 710 at Station 689+00. Access to this site would be from SR 710. The pond outfall into the L-63N Canal to the west is estimated to be a 125-foot long, 18" pipe at this time. This potential location consists primarily of grass with some trees.

The soil encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 5B (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some rock. From Boring PB-5B, the observed water table elevation on October 22, 2013 was 2.0 feet below the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 0.50 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 23.0 feet NAVD. Therefore, the SHGT elevation was estimated to be 22.00 feet NAVD.

Pond 5B is <u>not</u> within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "Low" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "No". Pond Site 5B was assessed as having a "Moderate" potential for archaeological sites and historic resources. This potential site has <u>no impacts</u> to existing or known future utilities.

The pond site is estimated at 2.53 acres based on measurement. The piped pond outfall to Mosquito Creek will be within SR 710 R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 5B. The estimated right-of-way costs and construction costs associated with this parcel are **$171,000** and **$265,083.** Other costs associated with this parcel include wetlands mitigation **($30,000).** The total costs associated with this combined parcel are **$466,083.** The construction cost is for comparison purposes only and includes embankment cost (**$60,120**); the drainage outfall pipe cost **($5,936);** underdrains **($153,920**); and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($45,106).**

Pond Site 5C is located adjacent to and south of SR 710 at Station 699+00. Access to this site would be from SR 710. The pond outfall into the L-63N Canal to the west is estimated to be a 400-foot long, 18" pipe at this time. This potential location consists primarily of grass brush, and trees.

The soil encountered at this site is Immokalee fine sand (Type B/D) which has an estimated depth to the SHWT from 0.5 feet to 1.5 feet below existing ground. The FDOT Geotechnical Department performed a boring at Pond 5C (to a depth of 20 feet) which determined that the site soil consists of gray and brown fine sand with some

rock. From Boring PB-5C, the observed water table elevation on October 23, 2013 was 2.5 feet below the ground surface, and the seasonal high groundwater table (SHGT) was estimated to be 1.00 feet +/- 0.5 feet. From contours, the ground elevation at the boring is 24.00 feet NAVD. Therefore, the SHGT elevation was estimated to be 22.50 feet NAVD.

This site is within the 100 year floodplain as determined from the Effective 2015 FEMA Maps. It has a rating of "None" for wetlands/surface water involvement and "Low" for protected species involvement. The contamination screening designated this site as having a risk ranking of "Low". Although this site was preliminarily assigned a ranking of "Medium" for contamination due to proximity to livestock holding pen, the ranking changed to "Low" after further investigation determined the holding pen was 50 feet away from the site. Pond Site 5B was assessed as having a "Low" potential for archaeological sites and historic resources. This potential site has no impacts to existing or known future utilities.

The pond site is estimated at 3.53 acres based on measurement of GIS Parcels. The piped pond outfall to Mosquito Creek will be within SR 710 R/W. The FDOT Right-of-Way Department has provided estimates for proposed Pond 5C. The estimated right-of-way costs and construction costs associated with this parcel are **$195,000** and **$266,723.** The total costs associated with this parcel are **$461,723.** The construction cost is for comparison purposes only and includes embankment cost (**$35,268**); the drainage outfall pipe cost **($18,996);** underdrains **($150,000**); and other miscellaneous costs including sodding, clearing and grubbing, and sediment barrier **($62,460).**

C. POND SIZING

Pond sizes for the Pond Siting Report are based on the proposed suburban typical section. The pond size requirements are based on SFWMD criteria for wet detention systems. According the Pre-Application Meeting with the SFWMD on May 29, 2013, the following criteria was determined for the proposed stormwater management design: (See **Appendix 9**, Correspondence for Meeting Minutes)

- Attenuation of the peak pre/post discharge
- Water quality treatment volume - 2.5 inches over the impervious area (controlling factor)
- Additional 50% treatment requirements for impaired water bodies not required as the pre-post nutrient loading calculations show no offsite water quality impacts
- Drawdown (wet ponds) - one half inch of runoff over the basin in 24 hours
- Minimum 3" bleeder utilized on control structures

Preliminary pond designs were performed which include storm routings for the SFWMD's 25 year, 72 hour storm. Stormwater routings for each storm were also performed for the 5 year, 1 hour storm to provide a realistic tailwater for the preliminary storm sewer calculations. These storm sewer calculations were

performed to determine if the proposed pond sites will work hydraulically given the proposed roadway profile (See **Appendix 8** for calculations).

Additional criterion used in the sizing of the stormwater management facilities:

1. The ponds will function similarly with regards to design stages.
2. Side slopes: 1:4 (includes back slopes of berms)
3. Level maintenance area width: 20 feet
4. One foot of freeboard
5. Pond allowed to stage up to one-half foot below low profile elevation
6. For dry detention facilities, treatment volume determined by the greater of 75% of 1 inch over the drainage area or 75% of 2.5 inches over the impervious area.

Each proposed pond site was preliminarily sized based on the above criteria. The calculated treatment volumes for each site are listed below in **Table 12**. The pond information including required size, 25 year, 72 hour peak stage, berm elevation, normal water elevations, basin profile low point elevation, maximum allowable stage, drainage area, allowable discharge, and outfall location are included in the **Table 13** below.

For final pond design, the ponds will need to include storm routings for the SFWMD's 25 year, 72 hour storm and the FDOT's critical duration analysis for storms up through the 100-year, 3 day storm (Rule 14-86 criteria for open basins) will be included as this is a pumped outfall.

Table 12 – Pond Site Treatment Volumes

			Wet Detention		Dry Detention		
Pond Site	**Total Drainage Area (AT)1**	**Total Impervious Area For Treatment (Ai)1**	**1" over Basin Area2 (AT) x (1"/12)**	**2.5" over Impervious Area2 (Ai) x (2.5"/12)**	**75% of 1" over Basin Area3 (AT) x (1"/12)**	**75% of 2.5" over Impervious Area3 (Ai) x (2.5"/12)**	**Required Treatment Volume**
	(acres)	**(acres)**	**(ac-ft)**	**(ac-ft)**			**(ac-ft)**
1A	6.32	2.40	0.53	0.50			0.53
1B (Dry)	5.20	2.40			0.32	0.38	0.38
1C (Dry)	4.87	2.39			0.30	0.37	0.37
2A-Option 1	46.49	22.35	3.87	4.66			4.66
2A-Option 2	44.26	22.35	3.69	4.66			4.66
2A-Option 3	43.48	22.35	3.62	4.66			4.66
2B-Option 1	52.43	22.35	4.37	4.66			4.66
2B-Option 2	47.06	22.35	3.92	4.66			4.66
2B-Option 3	44.15	22.35	3.68	4.66			4.66
2C-Option 1	43.93	22.35	3.66	4.66			4.66
2C-Option 2	43.20	22.35	3.60	4.66			4.66
3A	14.56	6.26	1.21	1.30			1.30
3B	12.83	6.26	1.07	1.30			1.30
3C	21.72	10.44	1.81	2.18			2.18
4A-Option 1	31.05	10.06	2.59	2.10			2.59
4A-Option 2	30.41	10.06	2.53	2.10			2.53
4B/4C-Option 1	35.23	10.06	2.94	2.10			2.94
4B-Option 2	31.65	10.06	2.64	2.10			2.64
4D-Option 1	33.14	10.06	2.76	2.10			2.76
4D-Option 2	31.39	10.06	2.62	2.10			2.62
5A (Dry)	11.12	4.03			0.69	0.63	0.69
5B (Dry)	11.03	4.03			0.69	0.63	0.69
5C (Dry)	12.02	4.03			0.75	0.63	0.75

Table 13 - Pond Design Parameters

Pond Site	Drainage Area (ac)	Control El. (NHW or Dry Pond Bottom (ft NAVD)	Treatment Volume Stage (ft NAVD)	25 Yr/72 Hr Stage (ft NAVD)	Berm El. (ft NAVD)	Max Stage (ft NAVD)	Profile Low Point El. (Station) (ft NAVD)	Discharge (cfs)	Disch./Ac. (cfs/ac)	Allowable Discharge (cfs)	Outfall Location
1A	6.32	21.60	22.15	22.94	24.50	23.50	23.85 (502+40)	6.33	1.00	12.14	City Ditch
1B	5.20	18.28 (dry)	19.38	19.85	21.28	20.28	23.85 (502+40)	10.50	2.02	12.14	Taylor
1C	4.87	17.0 (dry)	20.18	20.77	22.00	21.00	23.85 (502+40)	9.77	2.01	12.14	Taylor
2A-Option 1	46.49	21.03	21.76	23.35	24.43	23.43	24.03 (516+00)	20.07	0.43	24.62	Commerce
2A-Option 2	44.26	21.03	22.17	24.16	25.43	24.43	25.03 (516+00)	22.86	0.52	24.62	Commerce
2A-Option 3	43.48	21.03	22.47	25.29	26.43	25.43	26.03 (516+00)	23.51	0.54	24.62	Commerce
2B-Option 1	52.43	21.95	22.35	23.48	24.43	23.43	24.03 (516+00)	29.94	0.57	24.62	Commerce
2B-Option 2	47.06	21.95	22.62	24.34	25.43	24.43	25.03 (516+00)	21.40	0.45	24.62	Commerce
2B-Option 3	44.15	21.95	23.01	25.22	26.43	25.43	26.03 (516+00)	22.73	0.51	24.62	Commerce
2C-Option 1	43.93	18.33	19.67	23.34	24.43	23.43	24.03 (516+00)	8.11	0.18	9.93	Taylor
2C-Option 2	43.20	18.33	20.17	24.28	25.43	24.43	25.03 (516+00)	9.51	0.22	9.93	Taylor
3A	14.56	24.73	25.49	27.58	29.73	28.73	29.15 (636+50)	6.00	0.41	9.86	Historic ditch
3B	12.83	25.40	26.46	28.58	29.73	28.73	29.15 (636+50)	7.80	0.61	7.85	Historic ditch
3C	21.72	22.45	23.45	25.78	28.00	27.00	29.15 (636+50)	10.33	0.48	18.53	Historic ditch
4A-Option 1	31.05	24.00	25.13	27.89	29.00	28.00	28.56 (657+50)	15.11	0.49	15.78	L-63N
4A-Option 2	30.41	24.00	25.51	28.92	30.00	29.00	29.56 (657+50)	15.01	0.49	15.78	L-63N
4B/4C-Option 1	35.23	22.25	23.13	25.64	29.00	28.00	28.56 (657+50)	13.59	0.39	15.95	Historic Ditch
4B-Option 1	31.65	22.25	23.50	27.04	30.00	29.00	29.56 (657+50)	9.59	0.30	15.95	Historic Ditch
4D-Option 1	33.14	23.83	24.70	27.09	29.00	28.00	28.56 (657+50)	14.30	0.43	16.13	Historic Ditch
4D-Option 2	31.39	23.83	25.20	28.10	30.00	29.00	29.56 (657+50)	15.68	0.50	16.13	Historic Ditch
5A	11.12	24.00 (dry)	24.65	25.83	27.00	26.00	27.64 (703+50)	10.57	0.95	18.65	Mosquito
5B	11.03	24.00 (dry)	24.73	25.61	27.00	26.00	27.64 (703+50)	16.19	1.47	18.65	L-63N
5C	12.02	24.00 (dry)	24.40	25.26	27.00	26.00	27.64 (703+50)	11.57	0.96	18.65	Mosquito

The right-of-way area and estimated drainage outfall easements required for each potential site are listed in **Table 14**. It is estimated that only two of the pond sites will require drainage easements for outfall.

Table 14 – Summary of Required Right-of-Way for Pond Sites & Drainage Easements

Pond Site	Estimated Drainage Easement Area (ac)	Right-of-Way Area (ac)*
1A	0	2.24
1B	0	1.08
1C	0.22	1.15
2A-Option 1	0	9.43
2A-Option 2	0	7.20
2A-Option 3	0	6.42
2B-Option 1	0	15.37
2B-Option 2	0	10.00
2B-Option 3	0	7.08
2C-Option 1	0	6.86
2C-Option 2	0	6.14
3A	0	3.47
3B	0	2.44
3C	0.03	3.81
4A-Option 1	0	3.98
4A-Option 2	0	3.34
4B/4C-Option 1	0	7.17
4B-Option 2	0	4.20
4D-Option 1	0	6.08
4D-Option 2	0	4.33
5A	0	2.62
5B	0	2.53
5C	0	3.53

*Note: Pond Site 3C includes existing FDOT Pond for net 1.81 ac. R/W area required.

D. RECOMMENDATIONS

Table 15 presents the Pond Site Evaluation Matrix used to determine the recommended Stormwater Management Facilities for each basin.

Table 15 – Pond Site Evaluation Matrix

Pond Site	Treatment Method	Construction Feasibility	Total Cost	Cultural Impact Potential Level I (All Sites) Level II (Preferred Sites)	Potential for Involvement of Jurisdictional Wetland Systems	Potential For Involvement of Protected Species	Contamination Risk Potential Level I (All Sites) Level II (Preferred Sites)	Floodplain (2015)	Pond Site Rating
1A	Wet Detention	Fair	$355,012	Low	None	Low	No	Yes	Fair
1B	Dry Retention	Good	$320,073	Level I-Low Level II-No	Medium*	Low	Level I-Low Level II-No	No	Good
1C	Dry Retention	Fair	$324,664	Low	High	Low	No	Yes	Fair
2A Option 1	Wet Detention	Good	$1,337,314	Level I-Moderate Level II-No	None*	Low	Level I-No Level II-No	No	Good
2A Option 2	Wet Detention	Good	$1,644,419	Moderate	None	Low	No	No	Fair
2A Option 3	Wet Detention	Good	$1,976,879	Moderate	None	Low	No	No	Fair
2B Option 1	Wet Detention	Good	$1,330,064	Moderate	None	Low	No	No	Fair
2B Option 2	Wet Detention	Good	$1,601,045	Moderate	None	Low	No	No	Fair
2B Option 3	Wet Detention	Good	$1,898,262	Moderate	None	Low	No	No	Fair
2C Option 1	Wet Detention	Good	$1,339,526	Low	Low	Low	No	No	Good
2C Option 2	Wet Detention	Good	$1,655,070	Low	Low	Low	No	No	Fair
3A	Wet Detention	Good	$901,448	Low	None	Low	Medium	No	Fair
3B	Wet Detention	Good	$701,565	Level I-Low Level II-No	Low*	Low	Level I-No Level II-No	No	Good
3C	Wet Detention	Good	$773,483	Low	None	Low	Low	No	Good
4A Option 1	Wet Detention	Good	$1,088,121	Low	None	Medium	Low	No	Good
4A Option 2	Wet Detention	Good	$1,342,958	Low	None	Medium	Low	No	Fair
4B/4C Option 1	Wet Detention	Good	$1,223,843	Moderate	Low	Low	Medium	No	Fair
4B Option 2	Wet Detention	Good	$904,222	Level I-Moderate Level II-No	Low*	Low	Level I-No Level II-No	No	Good
4D Option 1	Wet Detention	Good	$1,071,066	Low	None	Medium	Medium	No	Good
4D Option 2	Wet Detention	Good	$1,279,153	Low	None	Medium	Medium	No	Fair
5A	Dry Retention	Fair	$444,696	Level I-Low Level II-No	Medium*	Low	Level I-No Level II-No	Yes	Good
5B	Dry Retention	Fair	$466,083	Moderate	Low	Low	No	No	Good
5C	Dry Retention	Fair	$461,723	Low	None	Low	Low	No	Good

*Note: Pond Sites 1B, 3B, and 5A were determined to have wetland impacts of 0.47 ac., 0.35 ac., and 0.11 ac., respectively. Pond Sites 2A-Option 1 and 4B-Option 2 were determined to have no wetland impacts.

Basin 1

The recommended pond site for Basin 1 is Pond 1B. It is located adjacent to SR 710 right-of-way and outfall, Taylor Creek. As such, it works best hydraulically and will not incur extra cost for an outfall easement or piping. Pond 1A is located offsite and approximately 800 feet to the west of the Begin Project Station 500+00, and will require piping to convey runoff to the pond as well as for outfall into the City Ditch. Pond 1C is a smaller site located just south of Pond 1B. Since it is not directly adjacent to SR 710, this site will require more piping for conveyance of runoff to the pond as well as outfall into Taylor Creek through an outfall drainage easement. Both Pond 1B and Pond 1C have wetland impacts, however, Pond 1B has less wetland impacts, therefore, will require less wetland mitigation cost. Pond 1A has a higher cost than Pond 1B and Pond 1C, partially due to the additional piping and cost of

rubble riprap. Pond 1A is less desirable as an alternative due to its close proximity to the airport which requires rubble riprap installation around the perimeter of wet detention ponds as a wildlife deterrent.

The initial screenings indicated that Pond 1B has a rating of "Medium" for wetlands/surface water involvement as the property impacts an estimated 0.5 acre of wetlands and "Low" for protected species involvement. The contamination screening designated Pond site 1B as having a risk ranking of "Low" as the site was noted to have unidentified modifications to the property in historical aerials. Pond Site 1B was assessed as having a "Low" potential for archaeological sites and historic resources.

After Pond Site 1B was determined to be the preferred site for Basin 1, a more in-depth analysis of the site was performed. To summarize, the results indicated that this site will impact 0.47 acre of wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Basin 2

The recommended pond site for Basin 2 is Pond 2A-Option 1. It is north of and adjacent to SR 710 R/W. It is located approximately 3,750 feet east of Taylor Creek. Pond 2A-Option 1 is almost the most cost effective option, and is very comparable to Pond 2B-Option 1. This option does not include raising the road. It is located close to the low point in the road, therefore, it is hydraulically more efficient for conveyance of runoff to the pond site. Further, Pond 2A – Option 1 has a lower estimated SHWT than Pond 2B – Option 1 and takes a portion of a parcel which is already being impacted by the roadway which makes it more desirable than Pond 2B - Option 1. In addition, the estimated cost difference between Ponds 2A - Option 1 and 2B - Option 1 is minimal at 0.5% of the total cost of Pond 2A - Option 1. Pond 2A - Option 1 is a smaller site, only 9.43 ac versus 15.37 ac for Pond 2B-Option 1. As the pond footprint is smaller, there will be less impact to the property owner. It does not need rubble riprap due to proximity to the airport as is needed by Pond 2C-Option 1. This site will not incur extra cost for an outfall easement.

The initial screenings indicated that Pond 2A-Option 1 has ratings of "Moderate" for Cultural Impact Potential; "None" for Wetland/Surface Water Involvement; and "Low" for Protected Species Involvement. It has a rating of "No" for Contamination Risk Potential.

After Pond Site 2A – Option 1 was determined to be the preferred site for Basin 2, a more in-depth analysis of the site was performed. To summarize, the results indicated that this site will not impact wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Basin 3

The recommended pond site for Basin 3 is Pond 3B. It is adjacent to and just east of SR 710 R/W, and therefore, conveyance of runoff to the pond site would be more efficient. Pond 3B is the least costly alternative in Basin 3. This site will not incur extra cost for an outfall easement. Pond 3A and Pond 3C have a greater total cost than Pond 3B. Pond 3A is not adjacent to SR 710 and is located over 700 feet east of the SR 710 R/W. Pond 3C would include modification of an existing FDOT pond site. The initial screenings indicated that Pond 3B has ratings of "Low" for Cultural Impact Potential, Protected Species Involvement, and Wetland/Surface Water Involvement. It has a rating of "No" for Contamination Risk Potential.

After Pond Site 3B was determined to be the preferred site for Basin 3, a more in-depth analysis of the site was performed. To summarize, the results indicated that this site will impact 0.35 acre of wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Basin 4

The recommended pond site for Basin 4 is Site 4B-Option 2. This site is located adjacent to SR 710 right-of-way in the infield area between the proposed SR 710 alignment, existing SR 710, and NE 34th Avenue. It is located close to the low point in the roadway profile, therefore, pipe costs are lower for these sites. This site will not incur extra cost for an outfall easement. Pond 4A and Pond 4D have an additional protected species mitigation cost associated with them for the relocation of gopher tortoise burrows. Pond 4B-Option 2 has a lower cost than all other options for this basin.

The initial screenings indicated that Pond 4B-Option 2 had ratings of "Low" for Wetland/Surface Water Involvement and Protected Species Involvement. Pond 4B-Option 2 had a rating of "No" for Contamination Risk Potential. Pond 4B-Option 2 had a rating of "Moderate" for Cultural Impact Potential.

After Pond Site 4B – Option 2 was determined to be the preferred site for Basin 4, a more in-depth analysis of the site was performed. To summarize, the results indicated that this site will not impact wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

Basin 5

The recommended pond site for Basin 5 is Pond 5A. Pond 5A is directly adjacent to and northeast of SR 710 R/W. All three pond sites in Basin 5 are comparable; however, Pond 5A is the most cost effective option.

The initial screenings indicated that Pond 5A had ratings of "Medium" for Wetland/Surface Water Involvement and "Low" for Protected Species Involvement. Pond 5A had a rating of "No" for Contamination Risk Potential. Pond 5A had a rating of "Low" for Cultural Impact Potential. It is located within the 100 year floodplain.

After Pond Site 5A was determined to be the preferred site for Basin 5, a more in-depth analysis of the site was performed. To summarize, the results indicated that this site will impact 0.11 acres of wetlands; the risk rank for contamination is "No" with arsenic contamination "Not Indicated" in the tested locations; and there are no archaeological or historic resources within the APE of this site.

General

Several of the chosen sites will work with underdrains and the discharge to the L63-N will be further discussed with the SFWMD. Pre-Application Meetings were held with the SJRWMD for the purpose of assessing the stormwater criteria and discussion of use of a single large onsite regional pond for project stormwater treatment. Documentation of the Regional Pond Analysis has been included in **Appendix 10**, SR 710 Regional Pond Feasibility Study.

V. REFERENCES

Archaeological Consultants, Inc. *Preliminary Cultural Resource Assessment Proposed Pond Sites for SR 710*, April, 2015.

Scheda Ecological Associates. *Protected Species and Wetlands Pond Siting Assessment Report for SR 710*, February, 2014.

Florida Department of Transportation – *Geotechnical Considerations for Pond Siting Report*, November 2, 2016.

Tierra, Inc. *Draft Level I PSR Contamination Screening Evaluation Report (CSER) for the Proposed Pond Sites (Rev. 2)*, July 14, 2014.

Tierra, Inc. *Draft Level II Field Screening Report – Preferred Ponds*, January 13, 2017.

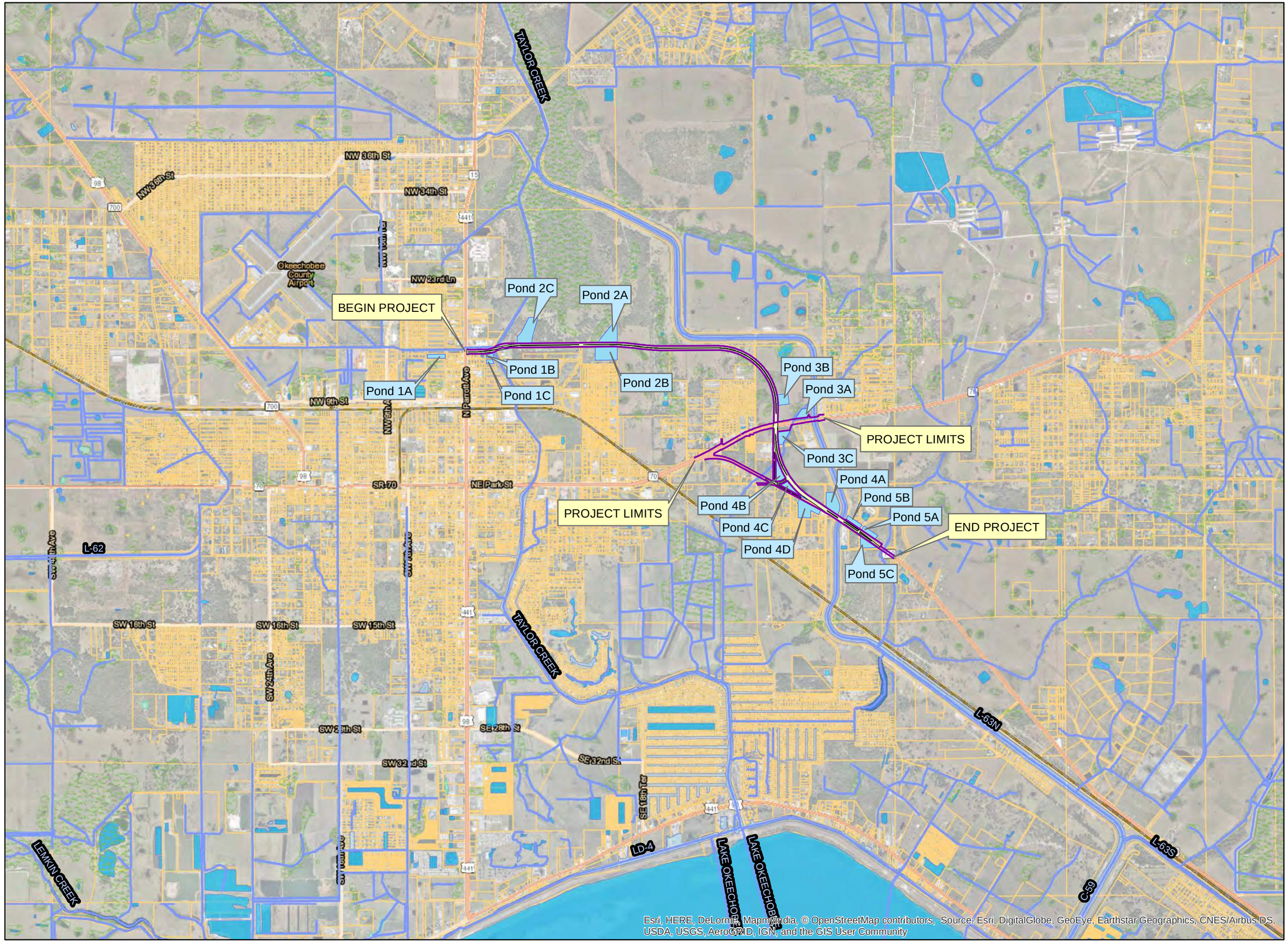
Inwood Consulting Engineers. *Preliminary Engineering Report, PD&E Study for SR 710 from US 441 to CR 714*, September 2012.

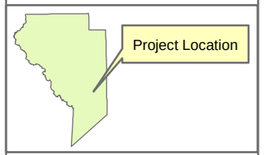
Federal Emergency Management Agency. *2015 Flood Insurance Rate Maps, Okeechobee County, Florida and Incorporated Areas.* Map Numbers 12093C0415C, 12093C0420C, 12093C0480C, and 12093C0485. July 16, 2015.

South Florida Water Management District http://www.sfwmd.gov/

Florida Department of Transportation. *Memorandum on Event Mean Concentration (EMC) Values for FDOT proejcts,* April 25, 2011.

Appendix 1
Figures





Legend

- Proposed ROW
- Proposed Roadway
- Proposed Ponds
- Parcels

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoober Dike Area, existing permits, and recent survey files.

N W E S

0 200,000 Feet

0 50 Miles

Location Map
Figure 1

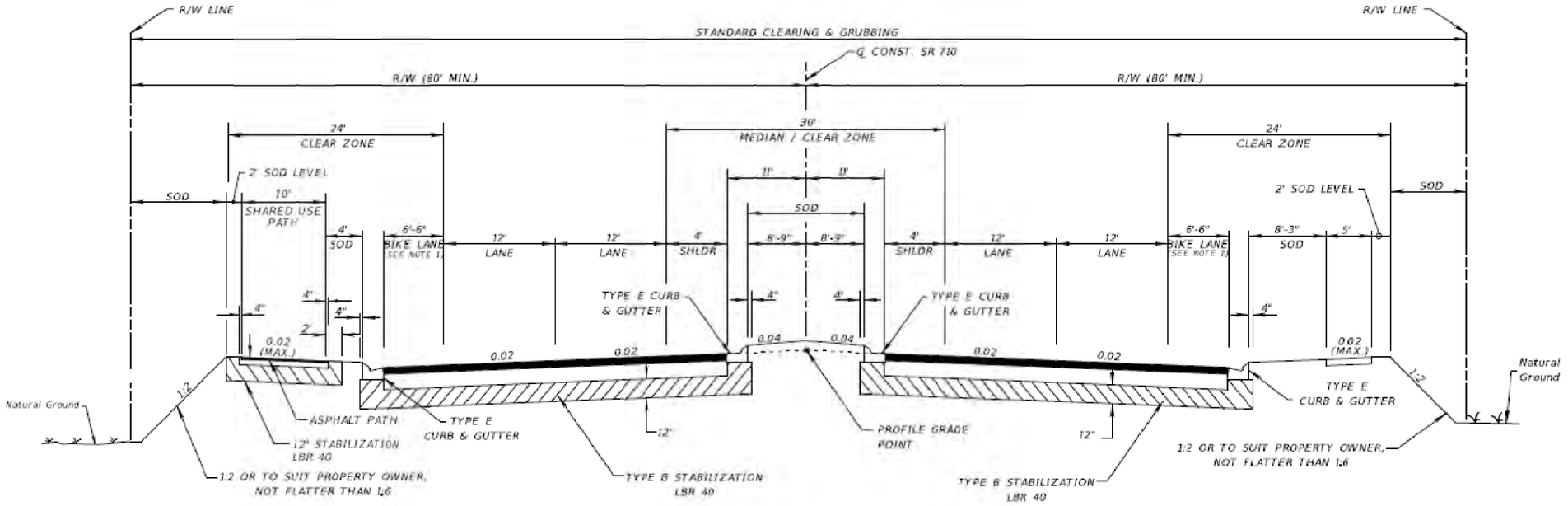
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG1_Location_SR710.mxd	October, 2013	The Balmoral Group



TYPICAL SECTION NO. 1
SR 710
STA. 500+00.00 TO STA. 703+50.00

TYPICAL SECTION NOTES:

1. PROVIDES FOR 8' USABLE SHOULDER.

NEW CONSTRUCTION

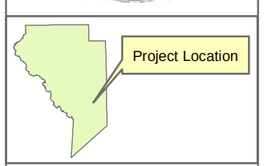
OPTIONAL BASE GROUP 11 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (4")
AND FRICTION COURSE FC-5 (¾") (RUBBER)

PATH

OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC A) (1")

TRAFFIC DATA

CURRENT YEAR = 2013 AADT = 7,100
ESTIMATED OPENING YEAR = 2015 AADT = 11,400
ESTIMATED DESIGN YEAR = 2035 AADT = 14,190
K = 9.0% D = 56.2% T = 20.9% (24 HOUR)
DESIGN HOUR T = 10.5%
DESIGN SPEED = 50 MPH



Typical Section
Figure 2

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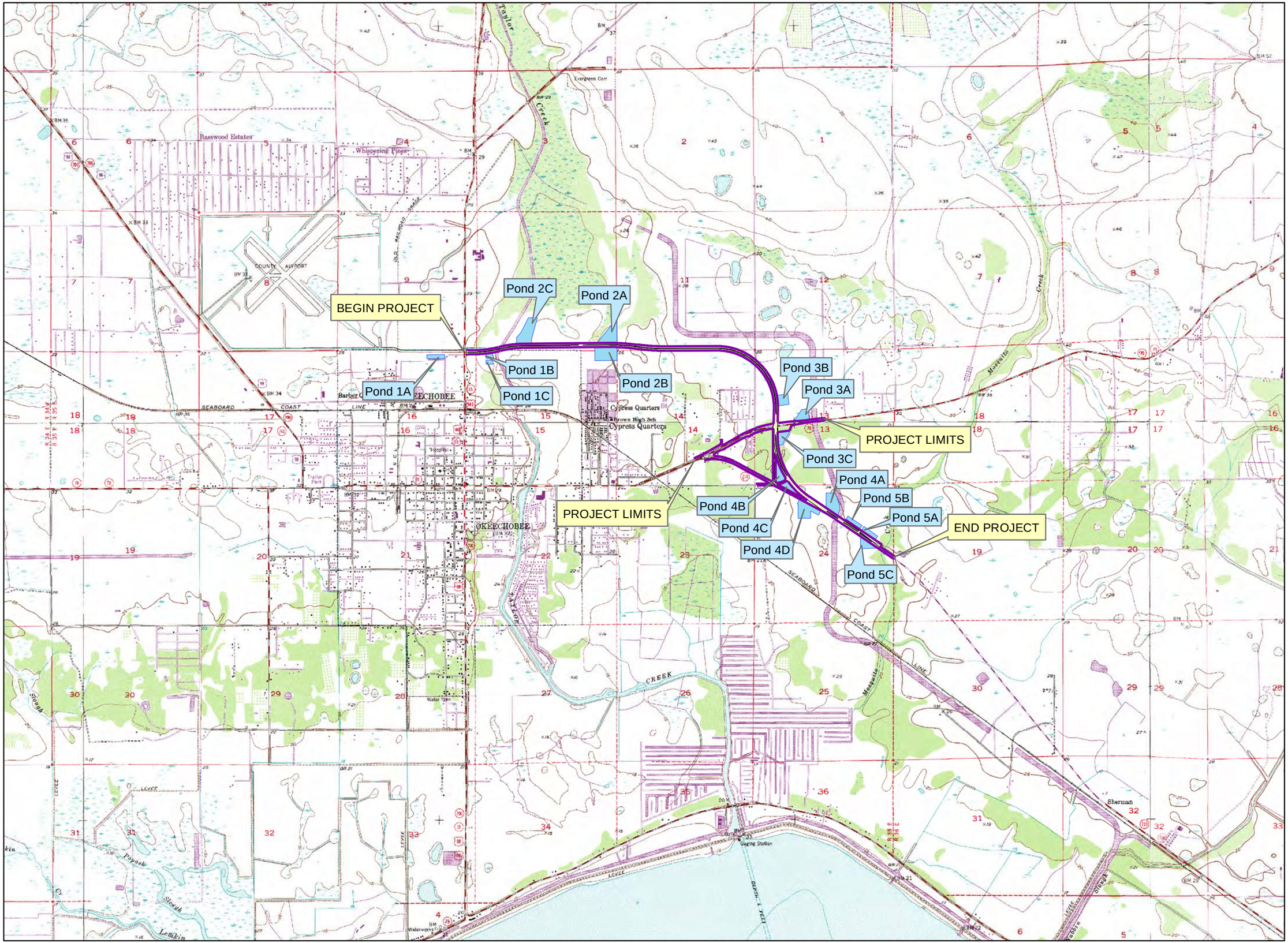
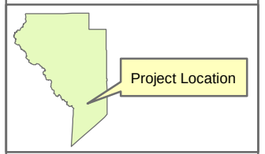
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG2_TypicalSection_SR710.mxd	October, 2013	The Balmoral Group





Legend

- Proposed Roadway
- Proposed Ponds
- Proposed ROW

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N W E S

0 1,000 2,000 Feet

0 0.25 Miles

USGS Topographic Map Figure 3

The Balmoral Group
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SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG3_USGSMap_SR710.mxd	October, 2013	The Balmoral Group

BEGIN PROJECT

Pond 1A

Pond 1B

Pond 1C

Pond 2A

Pond 2B

Pond 2C

Pond 3A

Pond 3B

Pond 3C

PROJECT LIMITS

PROJECT LIMITS

Pond 4A

Pond 4B

Pond 4C

Pond 4D

Pond 5A

Pond 5B

Pond 5C

END PROJECT

Soil Type Description

02: BASINGER FINE SAND, A/D

03: BASINGER AND PLACID SOILS, A/D

04: BRADENTON FINE SAND, B/D

05: VALKARIA FINE SAND, A/D

06: MANATEE LOAMY FINE SAND, B/D

07: FLORIDANA, RIVERIA, AND PLACID SOILS, C/D

08: PINDEA FINE SAND, C/D

09: RIVIERA FINE SAND, C/D

10: FT. DRUM FINE SAND, B/D

11: IMMOKALEE FINE SAND, B/D

12: UDORTHENTS, A

14: MYAKKA FINE SAND, A/D

15: OKEELANTA MUCK, A/D

17: ORSINO FINE SAND, A

18: PARKWOOD FINE SAND, C/D

19: FLORIDANA, PLACID, AND OKEELANTA SOILS, C/D

20: POMELLO FINE SAND, A

21: ADAMSVILLE FINE SAND, A

23: ST. JOHNS FINE SAND, B/D

24: TERRA CEIA MUCK, A/D

25: WABASSO FINE SAND, C/D

99: WATER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Project Location

Legend

- Proposed Roadway
- Soil Type Boundary
- Proposed ROW
- Proposed Ponds

Notes:

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2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoober Dike Area, existing permits, and recent survey files.

N W E S

0 1,000 2,000 Feet

0 0.25 Miles

SCS Soils Map
Figure 4

The Balmoral Group
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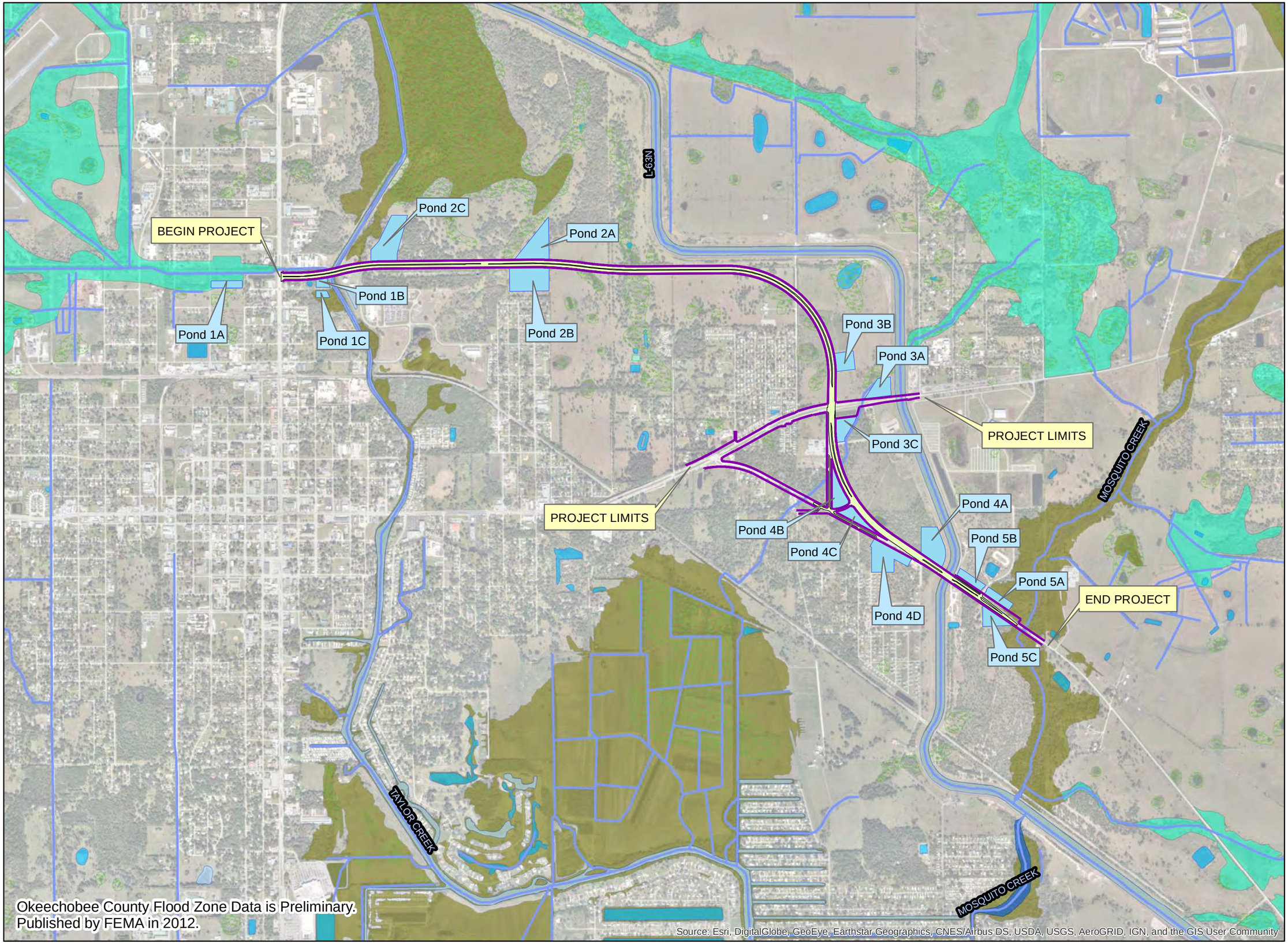
TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

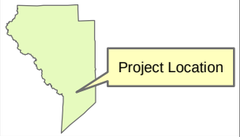
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG4_SoilsMap_SR710.mxd	October, 2013	The Balmoral Group



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION



Legend

- Proposed Roadway
- Proposed ROW
- Proposed Ponds

Flood Zones

- A
- AE

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoober Dike Area, existing permits, and recent survey files.

N
W E
S

0 1,000 2,000 Feet

0 0.25 Miles

FEMA FIRM Map
Figure 5

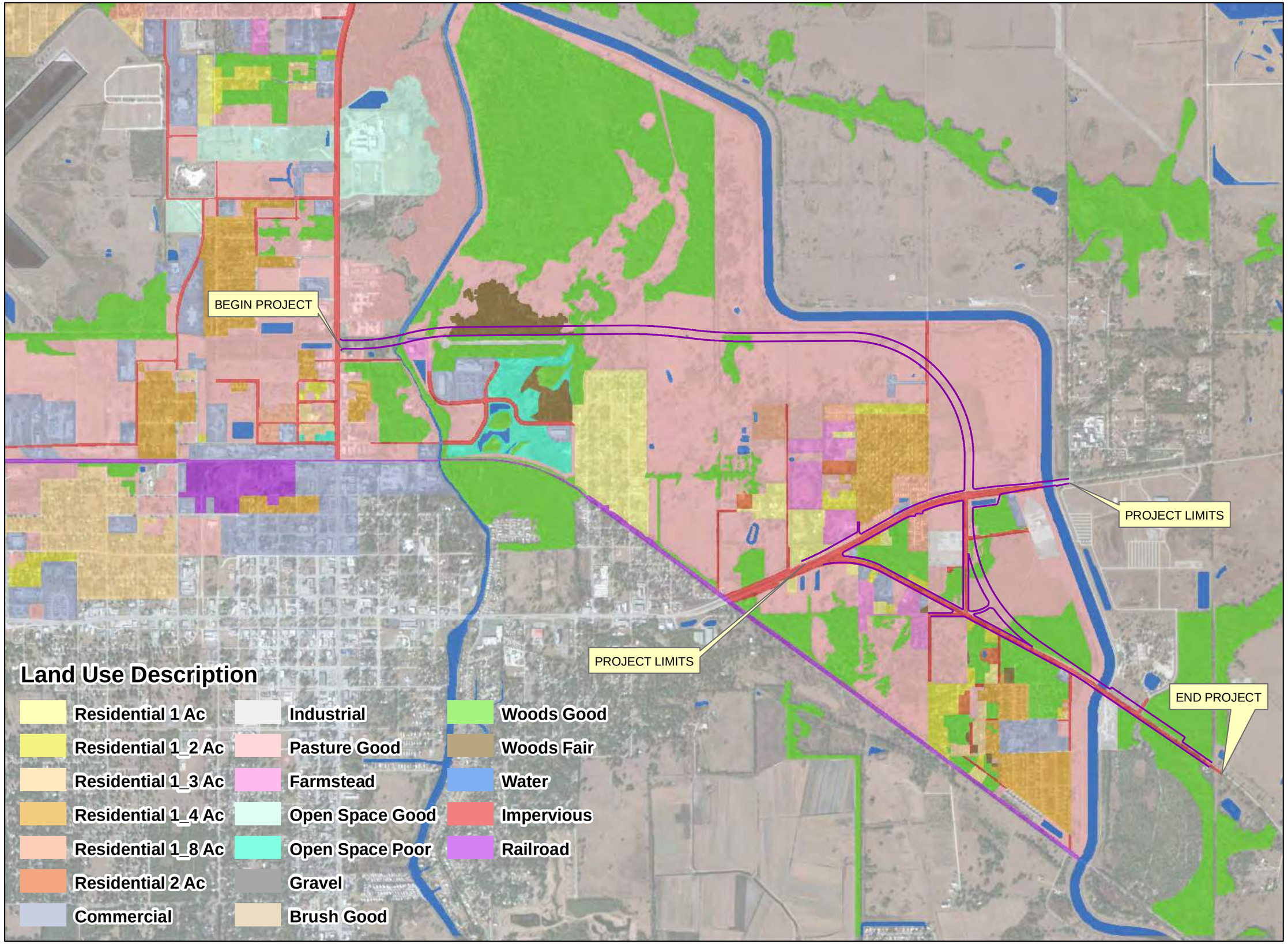
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

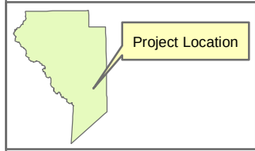
TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
PIGS_FEMAMap_SR710.mxd	October, 2013	The Balmoral Group





Legend

Proposed ROW

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoober Dike Area, existing permits, and recent survey files.

N
W E
S

0 200,000 Feet

0 50 Miles

Land Use Map
Figure 6

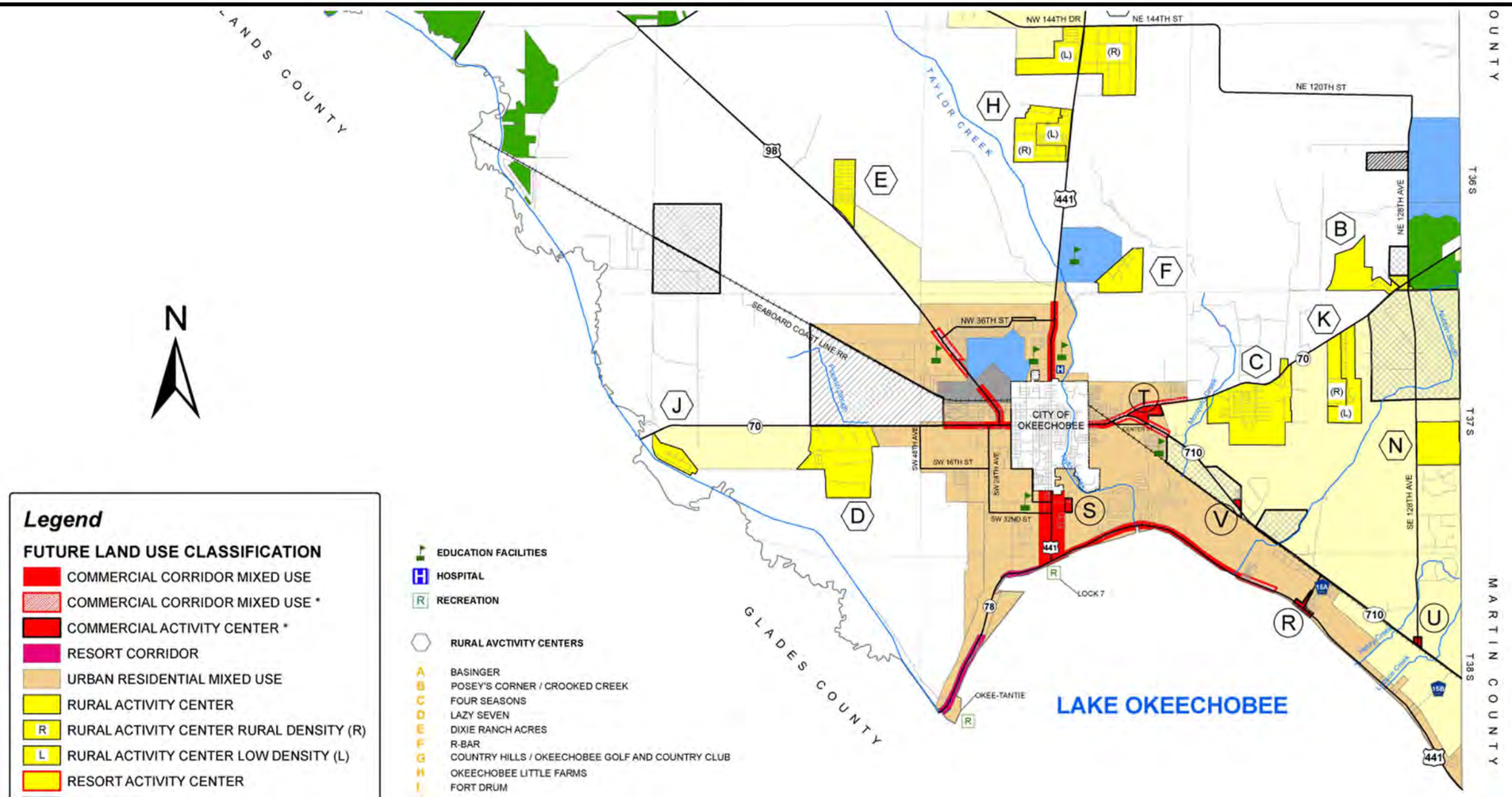
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG6_Landuse_SR710.mxd	October, 2013	The Balmoral Group



Legend

FUTURE LAND USE CLASSIFICATION

- COMMERCIAL CORRIDOR MIXED USE
- COMMERCIAL CORRIDOR MIXED USE *
- COMMERCIAL ACTIVITY CENTER *
- RESORT CORRIDOR
- URBAN RESIDENTIAL MIXED USE
- RURAL ACTIVITY CENTER
- R RURAL ACTIVITY CENTER RURAL DENSITY (R)
- L RURAL ACTIVITY CENTER LOW DENSITY (L)
- RESORT ACTIVITY CENTER
- INDUSTRIAL
- INDUSTRIAL *
- INDUSTRIAL OVERLAY
- INDUSTRIAL OVERLAY *
- RURAL ESTATE
- PUBLIC / SEMI-PUBLIC FACILITIES
- AGRICULTURE
- CONSERVATION 1
- MAJOR ROADS
- OTHER ROADS
- SEABOARD COAST LINE RR
- TOWNSHIP RANGE

*See Comprehensive Plan Policies for Specific Development Criteria

- EDUCATION FACILITIES
- H HOSPITAL
- R RECREATION

RURAL AVCTIVITY CENTERS

- A BASINGER
- B POSEY'S CORNER / CROOKED CREEK
- C FOUR SEASONS
- D LAZY SEVEN
- E DIXIE RANCH ACRES
- F R-BAR
- G COUNTRY HILLS / OKEECHOBEE GOLF AND COUNTRY CLUB
- H OKEECHOBEE LITTLE FARMS
- I FORT DRUM
- J RIVER OAKS
- K SPOT IN THE SUN / STARNES LOOP
- L EDWARDS / OTTER CREEK
- M VIKING
- N AMISTAD

RESORT ACTIVITY CENTERS

- O RUCK'S RV RESORT

COMMERCIAL ACTIVITY CENTERS

- R CR 15A
- S WOLFF ROAD
- T SR 70 / 710
- U SR 710 / BERMAN ROAD
- V SR 710 *

OKEECHOBEE COUNTY

CONCEPTUAL FUTURE LAND USE 2020

0 1 2 4 6 8 Miles

This Conceptual Future Land Use Map is a graphic representation of the Okeechobee County Comprehensive Plan Future Land Use Element, and is not intended to be interpreted without the goal, objectives and policies contained within the element.

Revised: 2012

Okeechobee County Planning and Development
Amended August 23, 2012

Map 2.1

Figure 7

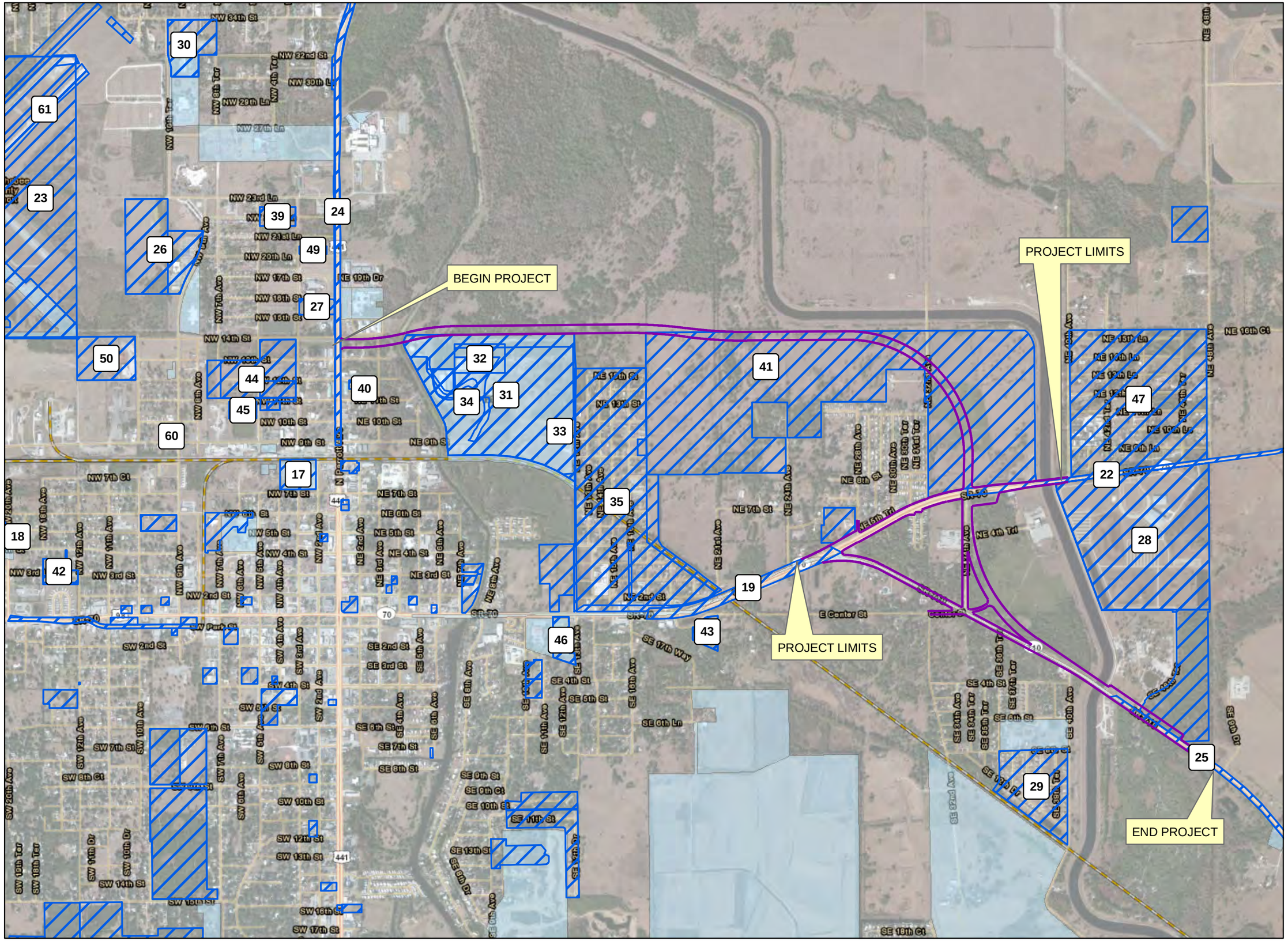

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Figure 8B

SR 710 Involved Permits								
Number	**Project Name**	**Date Issued**	**Permit No./App. No.**	**Type**	**Description**	**Station**	**Involvement**	**Resolution**
1	Raymonds C. s Melear, s Inc.	3-Jun-94	47-00010-D/940504-1-D	Wetlands Resources Exemption	Commercial			
2	Raulersons Hospital	28-Jul-97, s 24-Jan-96, s 16-Dec-94, s 11-Feb-93, s 11-May-78	47-00050/970529-10, s 950614-18, s 941205-5, s 920717-7, s 12027-G	Surfaces Waters Managements (Generals Permits Modification, s Permits Transfer, s Compliances Letters Mod, s Construction/Operations Modification, s News Construction/Operation)	Institutional			
3	Okeechobees Countys Schools Board	7-Jun-79	47-00063-S/s 03219-A, s X000012007	Surfaces Waters Managements (News Construction/Operation)	Institutional			
4	Okeechobees Airport/s T-Hangers Addition	12-Aug-03, ss 07-May-02, s 24-May-96, ss 25-Apr-96, s 21-Nov-95	47-00074-S/030521-4, s 020124-11, s 960325-13, s 960202-12, s 950803-8, s 910829-2	Surfaces Waters Managements (Generals Permits Modification, s Compliances Letters Mod, s Engineers Certifieds Modification)	Airports Relateds Facilities			
5	Hamricks And s Sons s Inc.	22-Feb-01, s 12-Apr-90	47-00086-Q/s 010129-13, s 900124-5-Q	Works ofs the s Districts Loks (Permits Transfer), ss Loks Swims Works ofs the s Districts Modification				
6	Airports Industrials Parks (Okechobees Cos Bds Of)	10-May-84	47-00091-S/s X000012018	Surfaces Waters Managements (News Construction/Operation)	Industrial			
7	Nathaniels Hazellief	11-Jan-01, s 14-Jun-90	47-00134-Q/s 001027-5, s 900129-14-Q	Loks Swims Works ofs the s Districts Modification				
8	Okeechobee-Shermans #1s Trans Ln	1-Jul-87	47-00154-S/s 04097-4	Surfaces Waters Managements (News Construction/Operation)	Highway			
9	Sloanes Rays Dairy/s Lanier/s Melears Raymonds C	09-Sep-05, s 15-Oct-98, s 12-Jun-97, s 29-Jan-96, ss 13-Aug-92, s 15-Nov-90	47-00169-Q/s 050718-2, s 980727-21, s 940907-1-Q, s 960102-8, s 920318-1-Q, s 900820-1-Qss	Works ofs the s Districts Loks (Permits Transfer), ss Loks Swims Works ofs the s Districts Addendums Modification, s Modification, s News Loks Swims Works ofs the s District				

Figure 8C

Number	Project Name	Date Issued	Permit No./App. No.	Type	Description	Station	Involvement	Resolution
10	OkeechobeesCountysAirport	20-Jul-88	47-00180-S/s06138-1	SurfacesWatersManagements (News Construction/Operation)	Commercial			
11	OkeechobeesElementarysSchool	07-Nov-08,s 23-Jun-89	47-00242-S/s080926-19,s 890309-6	SurfacesWatersManagements (GeneralsPermitsModification,s NewsGeneralsPermit)	Institutional			
12	OkeechobeesCountysRecreations Center	8-Sep-89	47-00253-S/s890718-5	SurfacesWatersManagements (NewsGeneralsPermit)	Recreational			
13	OkeechobeesCountysSchoolsBoards Transportation	12-May-98,s 29-Aug-90	47-00293-S/s980217-10,s 900824-5	SurfacesWatersManagements (GeneralsPermitsModification,s NewsEngineersCertifieds GeneralsPermit)	Institutional			
14	ConsolidatedsHrssFacility	2-Jan-91	47-00303-S/901214-11	SurfacesWatersManagements (NewsEngineersCertifieds GeneralsPermit)	Commercial			
15	PublicsSupplysWellfield	14-May-96,s 09-Oct-92,s 27-May-92,s 13-Jun-91	47-00314-S/s960417-2,s 920925-14,s920511-3,s 901228-22	SurfacesWatersManagements (PermitsTransfer/sCompliances LettersMod/sNrmsLettersMod/s NewsConstruction/Operation)	Industrial			
16	StatesRoads710	6-Nov-91	47-00327-S/s910827-3	SurfacesWatersManagements (NewsEngineersCertifieds GeneralsPermit)	Highway			
17	UnitedsFeedsCo-Op	01-Mar-12,s 06-Oct-10,s 14-Oct-92	47-00352-S/120201-7,s 100813-8,920707-9	EnvironmentalsResources (CompliancesLettersMod,s GeneralsPermitsModification),s SurfacesWatersManagements (NewsGeneralsPermit)	Commercial,s Industrial			

Figure 8D

Number	Project Name	Date Issued	Permit No./App. No.	Type	Description	Station	Involvement	Resolution
18	SR 700/US 98 Drainages Improvements	14-Sep-07, 22-Jun-07, 14-Dec-01, 15-Apr-93	47-00371-S/ 070813-3, 070423-32, 011015-10, 930216-13	Surfaces Waters Managements (Compliances Letters Mod, Generals Permits Modification, News Generals Permit), Environmentals Resources (Compliances Letters Mod)	Highway			
19	SR 70	11-Jul-03, 09-Dec-93	47-00401-S/ 030612-3, 930719-16	Environmentals Resources (Compliances Letters Mod), Surfaces Waters Managements (News Construction/Operation)	Highway			
20	Sloane-Rays Subdivision	5-Jan-95	47-00430-S	Surfaces Waters Managements (News Generals Permit)	Residential			
21	Nichols Sanitation	16-Apr-96	47-00442-P/ 951004-11	Environmentals Resources (News Generals Permit)	Commercial			
22	SR 70	30-Oct-96	47-00446-P	Environmentals Resources (News Generals Permit)	Highway			
23	Airports	10-Nov-10, 02-Oct-08, 29-Feb-08, 28-Sep-07, 09-Nov-2007, 14-Sep-07, 03-Oct-06, 26-Jan-07, 11-Jul-06, 12-Mar-04, 13-Dec-02, 10-Oct-02, 09-Oct-02, 23-Jul-02, 16-Apr-98, 08-Nov-96, 14-Nov-96	47-00447-P/100930-28, 080806-2, 080103-4, 070928-17, 070822-5, 070813-1, 061003-22, 060828-1, 060320-7, 040301-4, 021016-22, 020910-19, 020909-1, 020524-4, 010212-1, 980114-8, 961101-8, 960202-13	Environmentals Resources (Generals Permits Modification, Construction/Operations Modification, Compliances Letters Mod, Earlys Work)	Industrial, Commercial			
24	FDOT US 441	21-Sep-05, 12-Jan-04, 04-Sep-98	47-00489-P/ 050815-4, 031103-3, 980311-13	Environmentals Resources (Compliances Letters Mod, News Generals Permit)	Highway			

Figure 8E

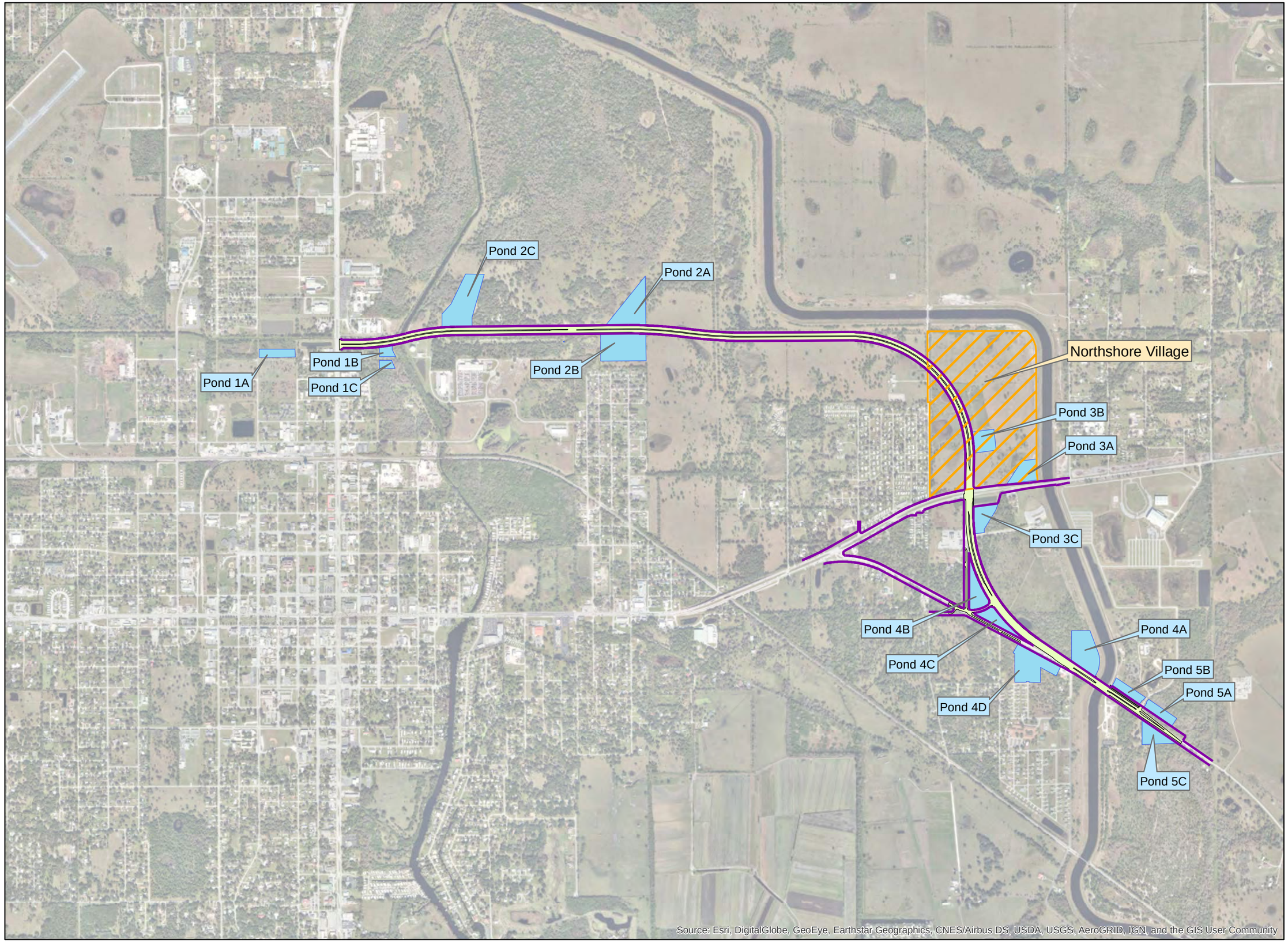
Number	Project Name	Date Issued	Permit No./App. No.	Type	Description	Station	Involvement	Resolution
25	SR 710	05-Jan-01, 16-Jul-99	47-00510-P/001204-1, 990126-13	Environmental Resources (Compliances Letters Mod, News Generals Permit)	Highway			
26	Indians Rivers Communitys College-s Dixon-Hendrys Campus	12-Jul-07, 02-Mar-01, 01-Oct-99	47-00514-P/070228-75, 010124-2, 990624-10	Environmentals Resources (Generals Permits Modification, News Generals Permit)ss	Institutional			
27	Okeechobees Medicals Center	8-Jul-02	47-00562-P/020313-12	Environmentals Resources(News Generals Permit)	Commercial			
28	Okeechobees Countys Agri-Civics Center	02-Jul-12, 17-Nov-06, 23-Nov-04, 10-Apr-03	47-00582-P/071024-1, 061102-4, 040607-11, 020909-5	Environmentals Resources (Construction/Operations Modification, Compliances Letters Mod, Generals Permits Modification, News Construction/Operation)	Commercial			
29	Conner's Gables Subdivision	15-May-03	47-00590-P/021213-17	Environmentals Resources(News Generals Permit)	Residential			
30	Okeechobees Achievements Academy/Schools Boards Buss Facility	04-Mar-10, 19-Mar-07, 21-Apr-04	47-00636-P/091203-14, 070126-12, 040113-19	Environmentals Resources (Generals Permits Modification, Compliances Letters Mod, News Generals Permit)	Institutional, Commercial			
31	Okeechobees Commerces Center	30-Mar-2007, 12-Jan-07, 26-Oct-06, 11-Aug-04	47-00638-P/070227-31, 061115-11, 060929-24, 040130-34	Environmentals Resources (Compliances Letters Mod, Nos Notices Generals Permit, News Construction/Operation)	Industrial			
32	Okeechobees Commerces Center	17-Aug-06, 31-Jan-06, 15-Nov-04	47-00638-P-02/060314-11, 050906-4, 041004-12	Environmentals Resources (Generals Permits Modification)	Industrial, Commercial			
33	Adrons Fence	14-May-07	47-00638-P-03/070221-1	Environmentals Resources (Generals Permits Modification)s	Commercial			
34	Okeechobees Commerces Centers Bridge	21-Jul-04	47-00645-P/040716-15	Environmentals Resources(News Generals Permit)	Industrial			
35	Douglass Park	22-Jan-09, 06-May-08, 06-Jan-05	47-00652-P/081124-8, 080314-2, 040604-15	Environmentals Resources (Generals Permits Modification, News Generals Permit)ss	Government, Residential			

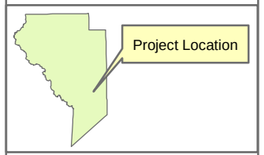
Figure 8F

Number	Project Name	Date Issued	Permit No./App. No.	Type	Description	Station	Involvement	Resolution
36	SuperiorsWater/sMcCoins CommercialsDevelopment	03-Feb-11,s 08-Oct-07,ss 24-Jun-05	47-00677-P/s101207-1,s 070822-2,s050427-1	EnvironmentalsResources (LettersModsW/Transfer,s CompliancesLettersMod,sNews GeneralsPermit)	Commercial			
37	DrivewaysCulvert-sSecuritysFencing	30-Nov-05	47-00711-P/s051102-18	EnvironmentalsResources(News GeneralsPermit)	AirportsRelatedsFacilities			
38	RoyalsConcretesConcepts	14-Sep-07,s 30-May-07,s 08-Mar-06	47-00717-P/s070720-16,s 070220-40,s050909-3	EnvironmentalsResources (CompliancesModsNrm,s GeneralsPermitsModification,s ConceptualsApprovalsandsNews Construction/Operation)	Industrial			
39	TownessofsOkeechobee	6-Apr-06	47-00726-P/s060310-10	EnvironmentalsResources(News GeneralsPermit)	Residential			
40	UtahsApartments	15-Jun-06	47-00727-P/s051222-3	EnvironmentalsResources(News GeneralsPermit)	Residential			
41	NorthshoresVillage	08-Sep-11,s 11-Aug-11	47-00786-P/s061031-17,s 070807-9	EnvironmentalsResources(News Construction/Operation),sNews WatersUses(GeneralsPermit)	Residential,s Landscape			
42	LaurelsOaksSeniorsApartments	03-Oct-07,s 04-May-07	47-00804-P/s070831-18,s 061010-16	EnvironmentalsResources (CompliancesLettersMod,sNews GeneralsPermit)	Residential			
43	CentersStreetsStorage	22-Sep-08,s 26-Oct-07	47-00830-P/s080725-4,s 070803-19	EnvironmentalsResources (GeneralsPermitsModificaton,s NewsGeneralsPermit)	Commercial			
44	SouthernsTrace	4-Apr-08	47-00847-P/s051213-5	EnvironmentalsResources(News GeneralsPermit)	Residential			
45	CasasBella	7-Mar-08	47-00879-P/s071121-20	EnvironmentalsResources(News GeneralsPermit)	Residential			
46	ParksPlace	29-Aug-12,s 18-Oct-11,s 07-Jul-08	47-00920-P/s120816-6,s 110729-7,s071105-6	EnvironmentalsResources (CompliancesLettersMod,s GeneralsPermitsModification,s NewsGeneralsPermit)	Commercial			
47	HancocksPropertysBmps	17-Jan-13	47-00921-P-02/s121228-6	EnvironmentalsResources (CompliancesLettersMod)s	Publicsands Institutional			

Figure 8G

Number	Project Name	Date Issued	Permit No./App. No.	Type	Description	Station	Involvement	Resolution
48	OkeechobeesGardenssCulverts Replacements	14-Jul-08	s47-00921-P/s071206-14	EnvironmentalsResources(News GeneralsPermit)	Publicsands Institutional			
49	Dr.sRedsBrownsChildren'ssHealths Center	5-Nov-09	47-00992-P/s090812-1	EnvironmentalsResources(News GeneralsPermit)	Commercial			
50	EarthwisesMulch	7-Jan-11	47-01047-P/s090824-9	EnvironmentalsResources(News GeneralsPermit)	Industrial			
51	OkeechobeesCountys2008sDisasters Recovery	4-Aug-11	47-01069-P/s110520-5	EnvironmentalsResources(News GeneralsPermit)	Governments			
52	OkeechobeesAutosSalvage	27-Dec-11	47-01089-P/s111104-6	EnvironmentalsResources(News DeminimussExemption)	Commercial			
53	SRs70sBridgesOversTaylorsCreek	27-Mar-78	78-00046-S/sX000005952	SurfacesWatersManagements (NewsGeneralsPermit)	Highway			
54	SRs70sfromsHamricksRoadstosSRs 710	21-May-79	79-00076-S/sX000006232	SurfacesWatersManagements (NewsGeneralsPermit)	Highway			
55	SRs15sBridgesReplacements	25-Mar-83	83-00057-S/sX000007884	SurfacesWatersManagements (NewsGeneralsPermit)	Highway			
56	OkeechobeesElementarysSchool	12-Aug-86	86-00105-S/s06116-D	SurfacesWatersManagements (NewsGeneralsPermit)	Institutional			
57	ChandlersEquipmentsCo.	3-Oct-85	138-85-S/sX000001149	SurfacesWatersManagements (NewsExemption)	Commercial			
58	PinelandsPreserve	17-Jun-08	060206-21	EnvironmentalsResources(News GeneralsPermit)	Residential			
59	ArmstrongsAutomotivesFacility	2-May-03	021004-13	EnvironmentalsResources(Nos NoticesGeneralsPermit)	Commercial			
60	FirstsMissionarysBaptistsChurch	18-Mar-04	030828-5	EnvironmentalsResources(Nos NoticesGeneralsPermit)				
61	TaxiwaysAs&sCsRehabilitation	7-Oct-10	101007-57	EnvironmentalsResources(News GeneralsPermit)	AirportsRelatedsFacilities			
62	SRs70sWideningsFromss31sStstos 3200sFtsEastsofs80thsAve	10-Dec-12	121210-2	EnvironmentalsResources(News Construction/Operation)	Roadway			





Legend

- Proposed Roadway
- PUD
- Proposed Ponds
- Proposed ROW

Notes:

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N W E S

0 200,000 Feet

0 50 Miles

Planned Unit Development Map
Figure 9

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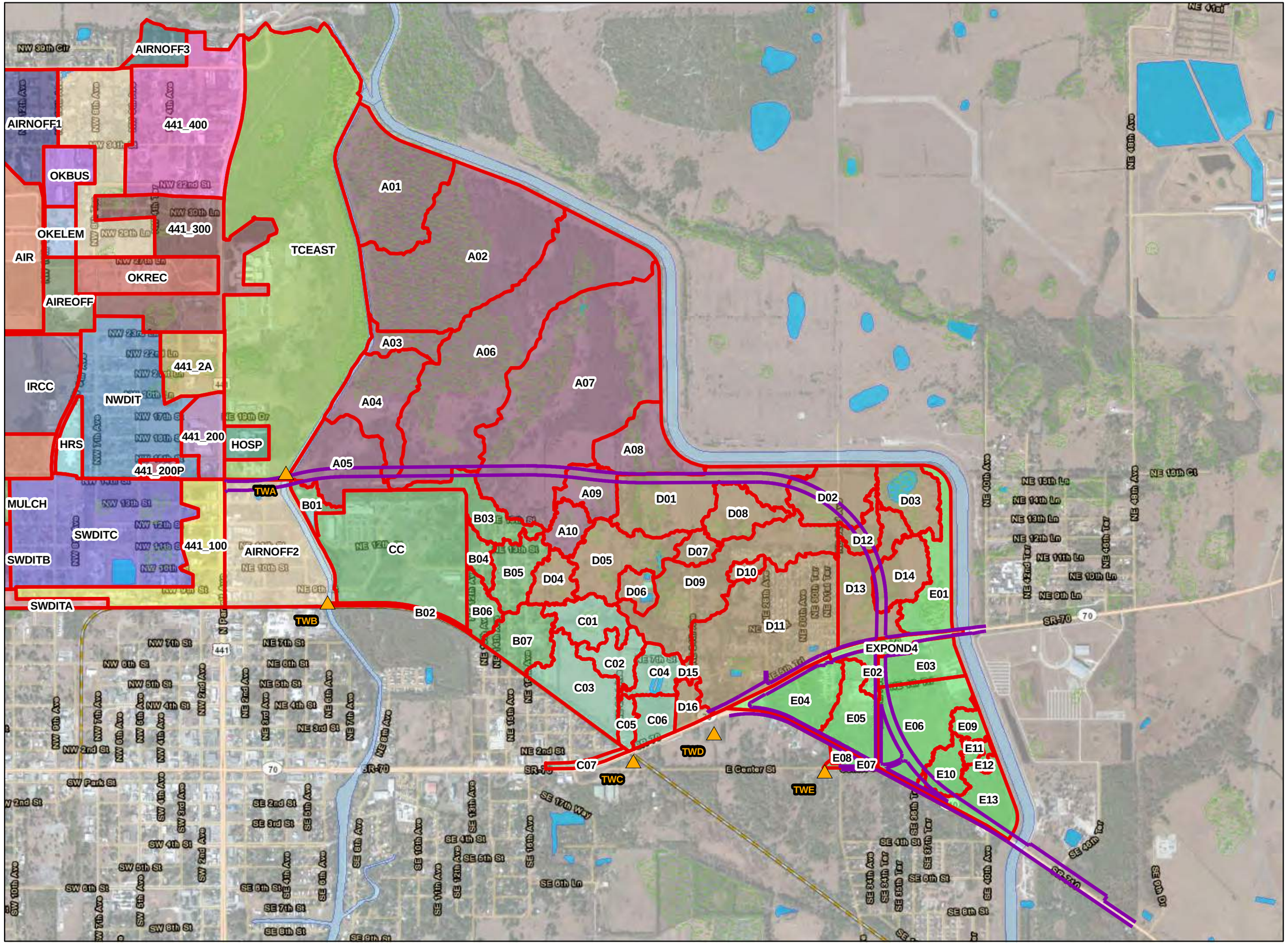
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG9_PUD_SR710.mxd	October, 2013	The Balmoral Group



Legend

- Pre Basins
- Proposed ROW
- Pre Tailwater Nodes

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N W E S

0 750 1,500 Feet

0 0.25 Miles

Pre Basin Map
Figure 10A

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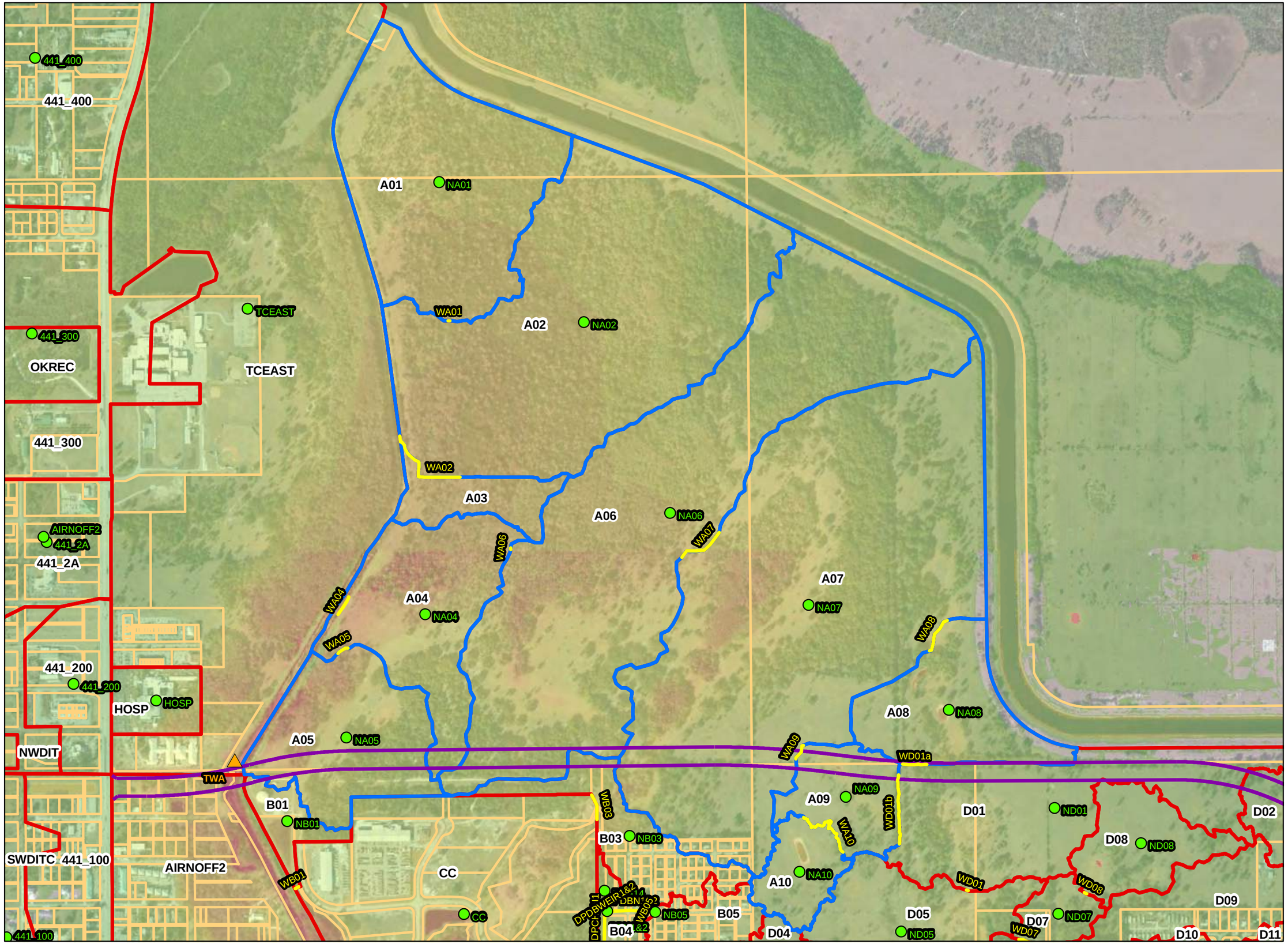
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_0.mxd	October, 2013	The Balmoral Group



Project Location

Legend

- Pre Basin A
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N

W E

S

0 500 1,000 Feet

0 0.1 Miles

Pre Basin Map
Basin A
Figure 10B

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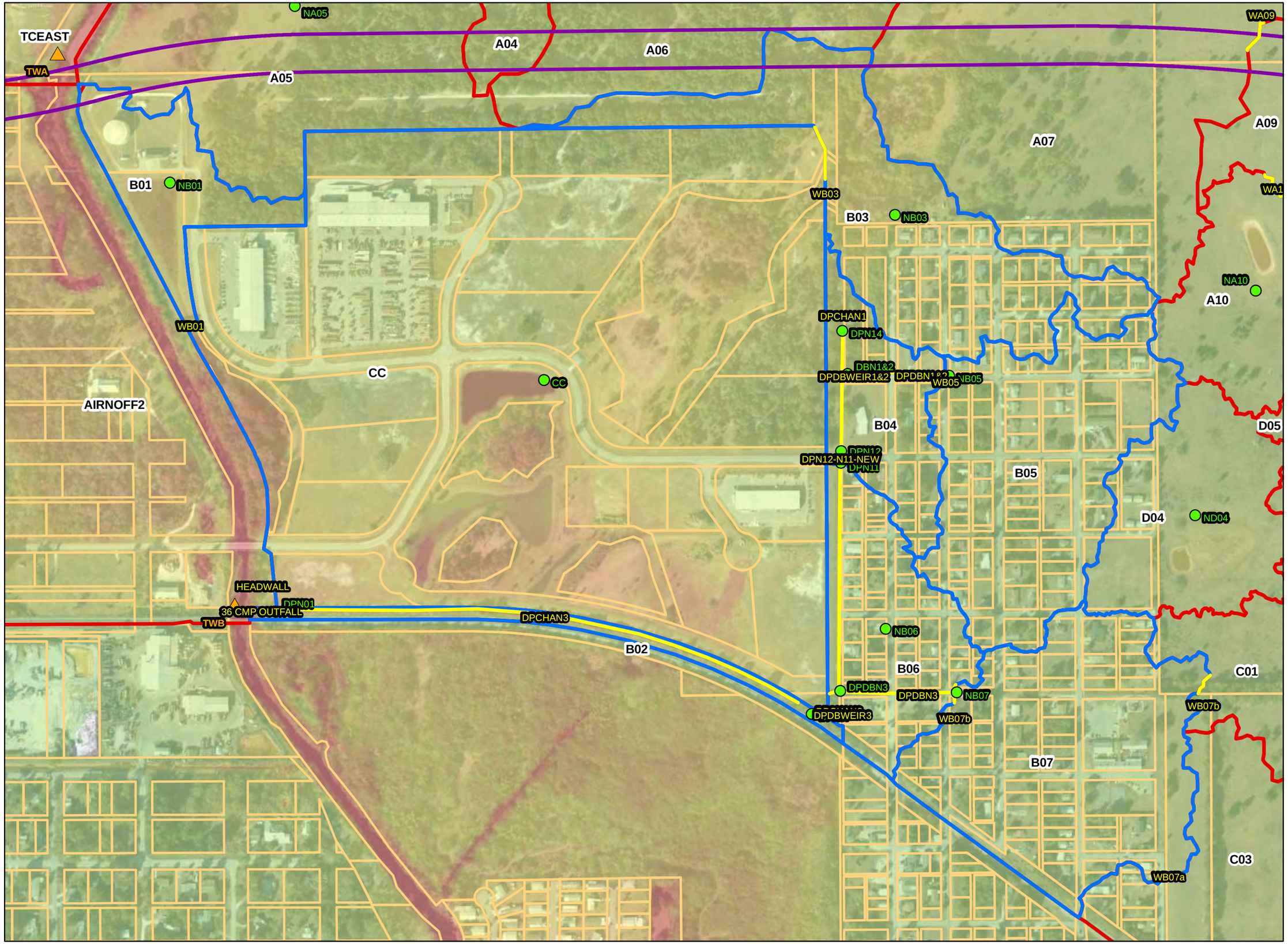
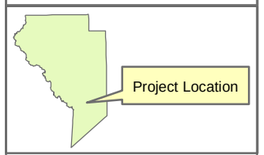
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_A.mxd	October, 2013	The Balmoral Group





Legend

- Pre Basin B
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N
W E
S

0 200 400 Feet

0 0.05 Miles

Pre Basin Map
Basin B
Figure 10C

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SR 710 from US 441 to the L-63N Canal

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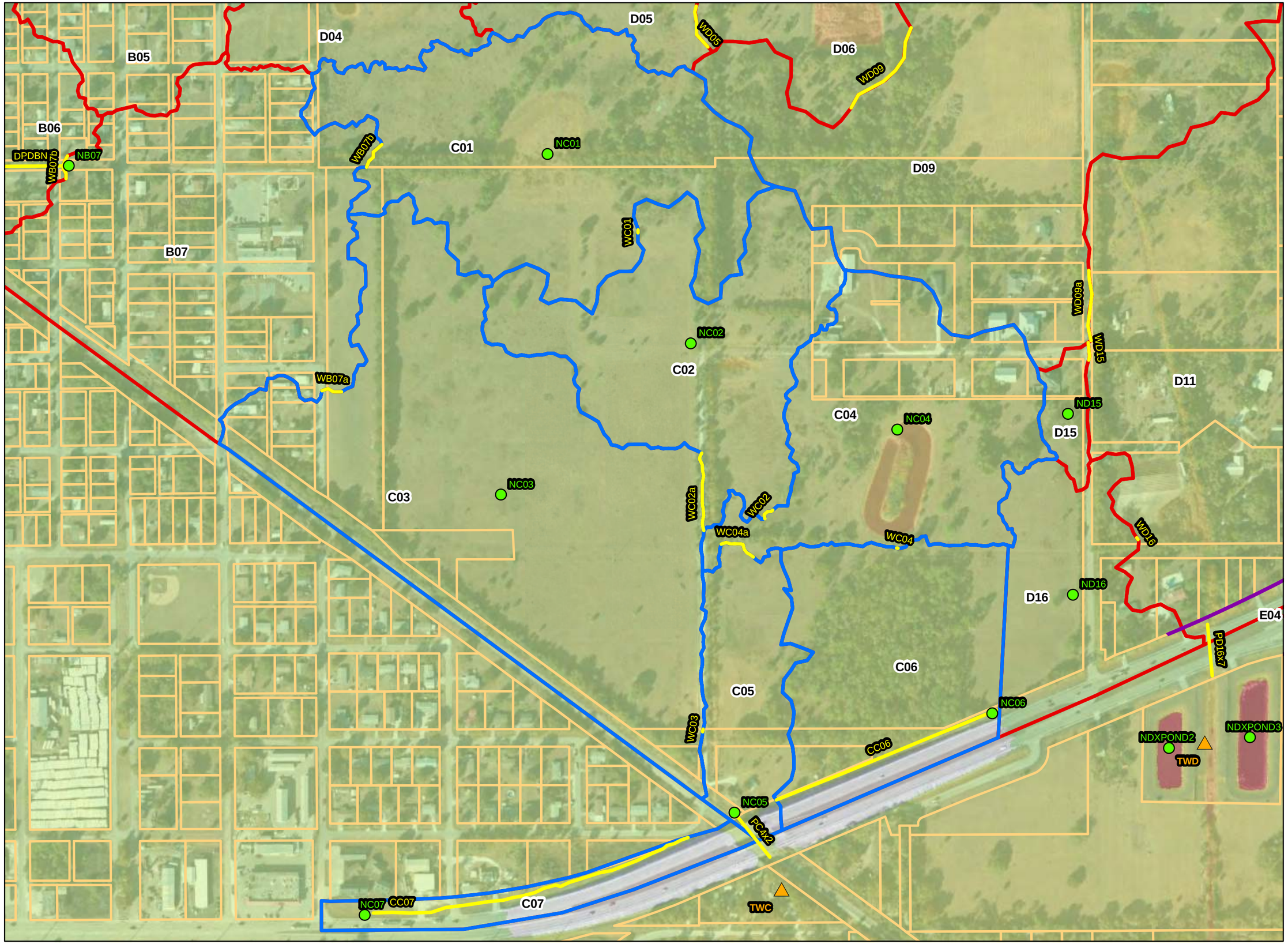
SR710_Pre_Basins_B.mxd	October, 2013	The Balmoral Group



Project Location

Legend

- Pre Basin C
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N

0 200 400 Feet

0 0.05 Miles

Pre Basin Map
Basin C
Figure 10D

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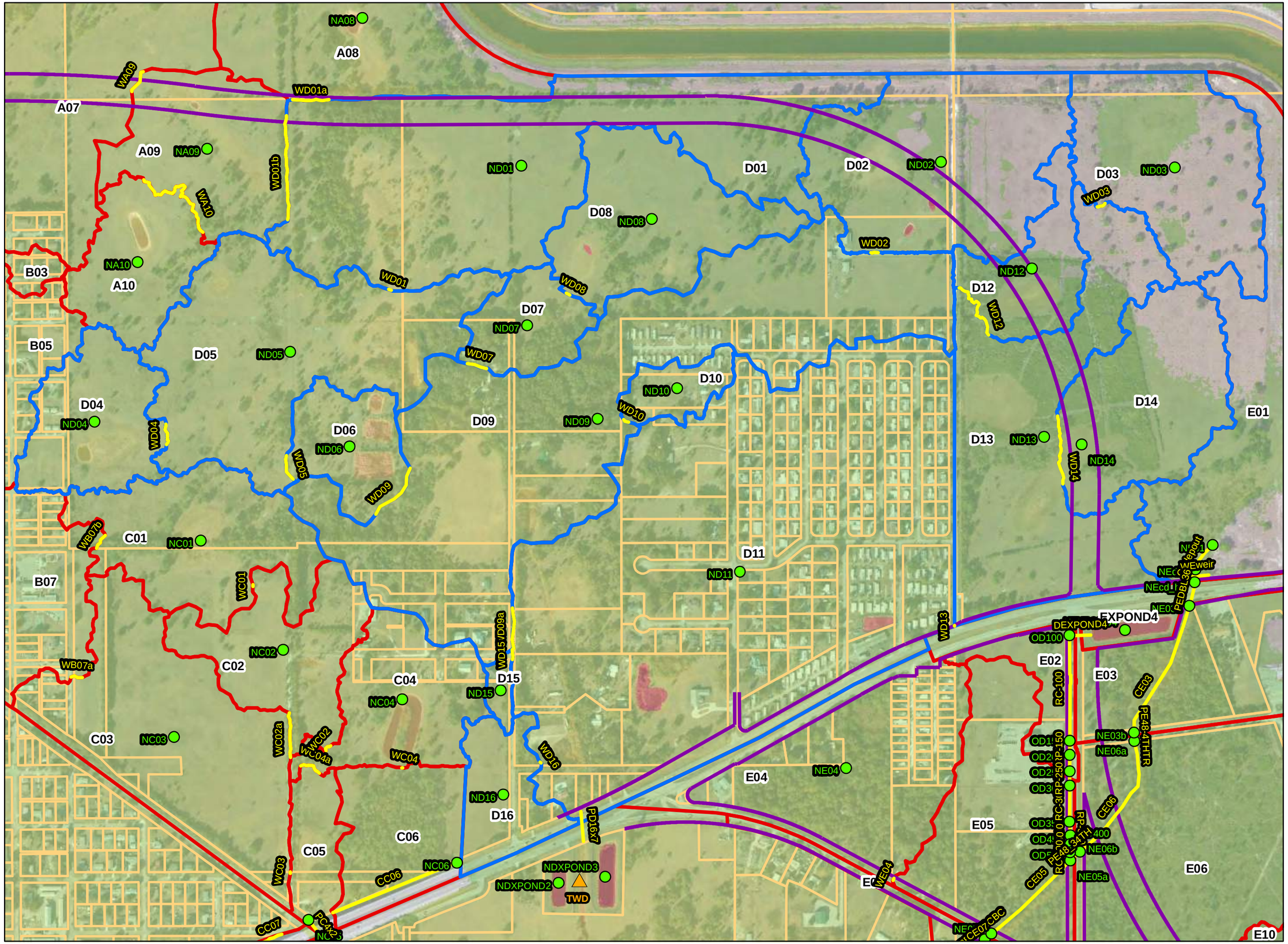
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_C.mxd	October, 2013	The Balmoral Group



Legend

- Pre Basin D
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N

0 300 600 Feet

0 0.1 Miles

Pre Basin Map
Basin D
Figure 10E

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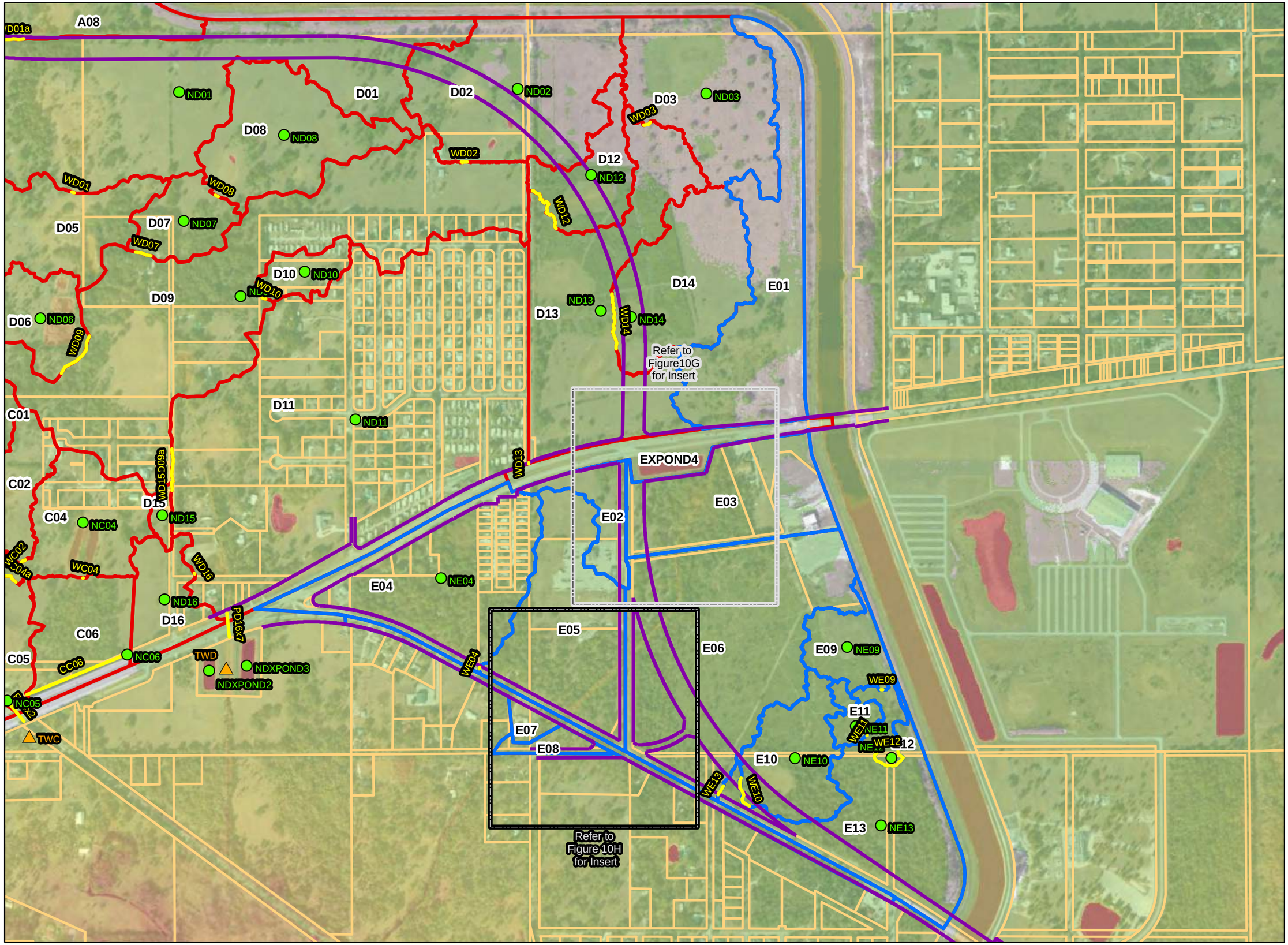
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_D.mxd	October, 2013	The Balmoral Group



Project Location

Legend

- Pre Basin E
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N

0 400 800 Feet

0 0.1 Miles

Pre Basin Map
Basin E
Figure 10F

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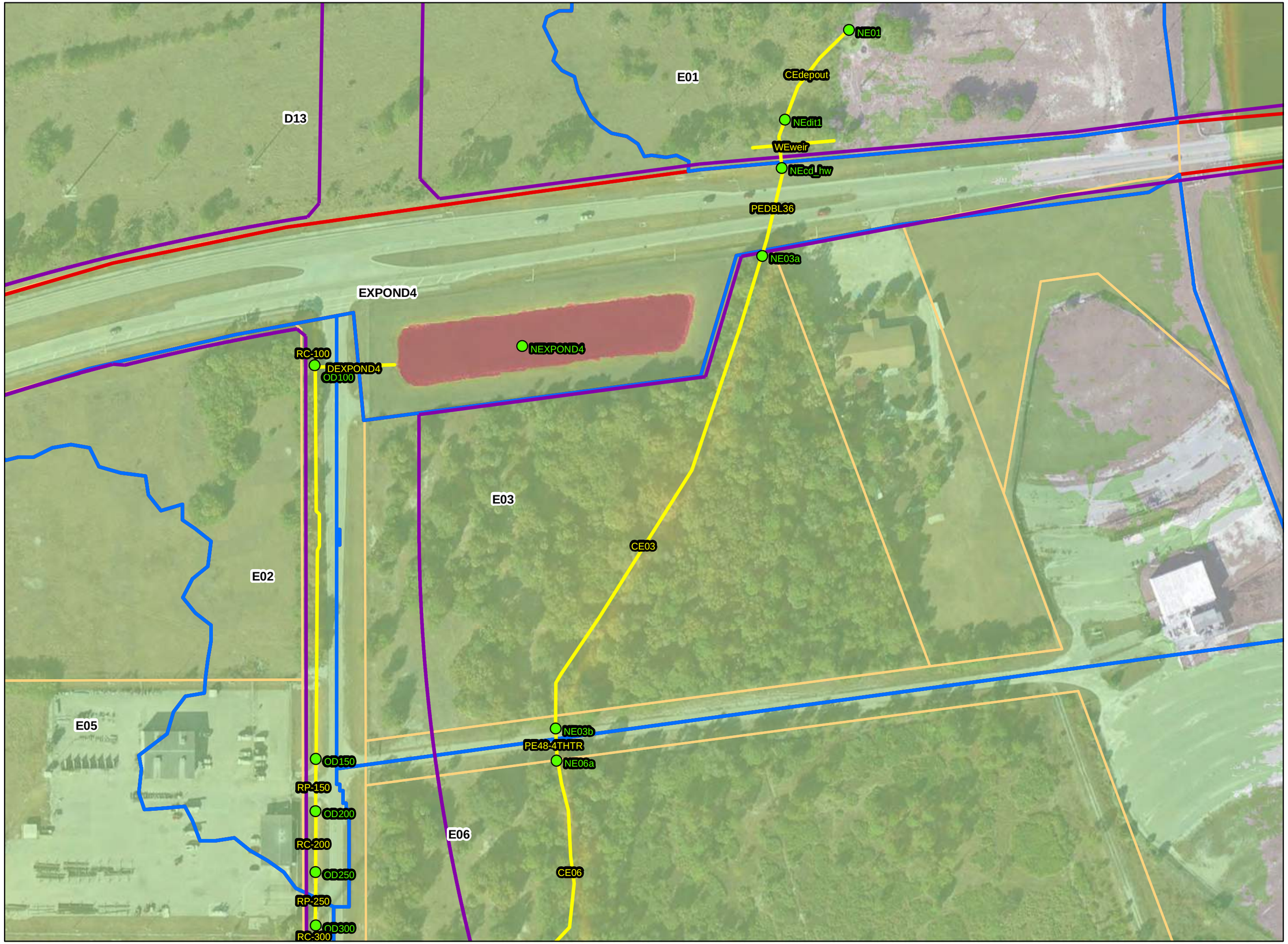
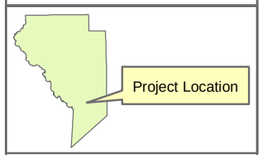
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_E.mxd	October, 2013	The Balmoral Group





Legend

- Pre Basin E
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N W E S

0 75 150 Feet

Pre Basin Map
Basin E
Figure 10G

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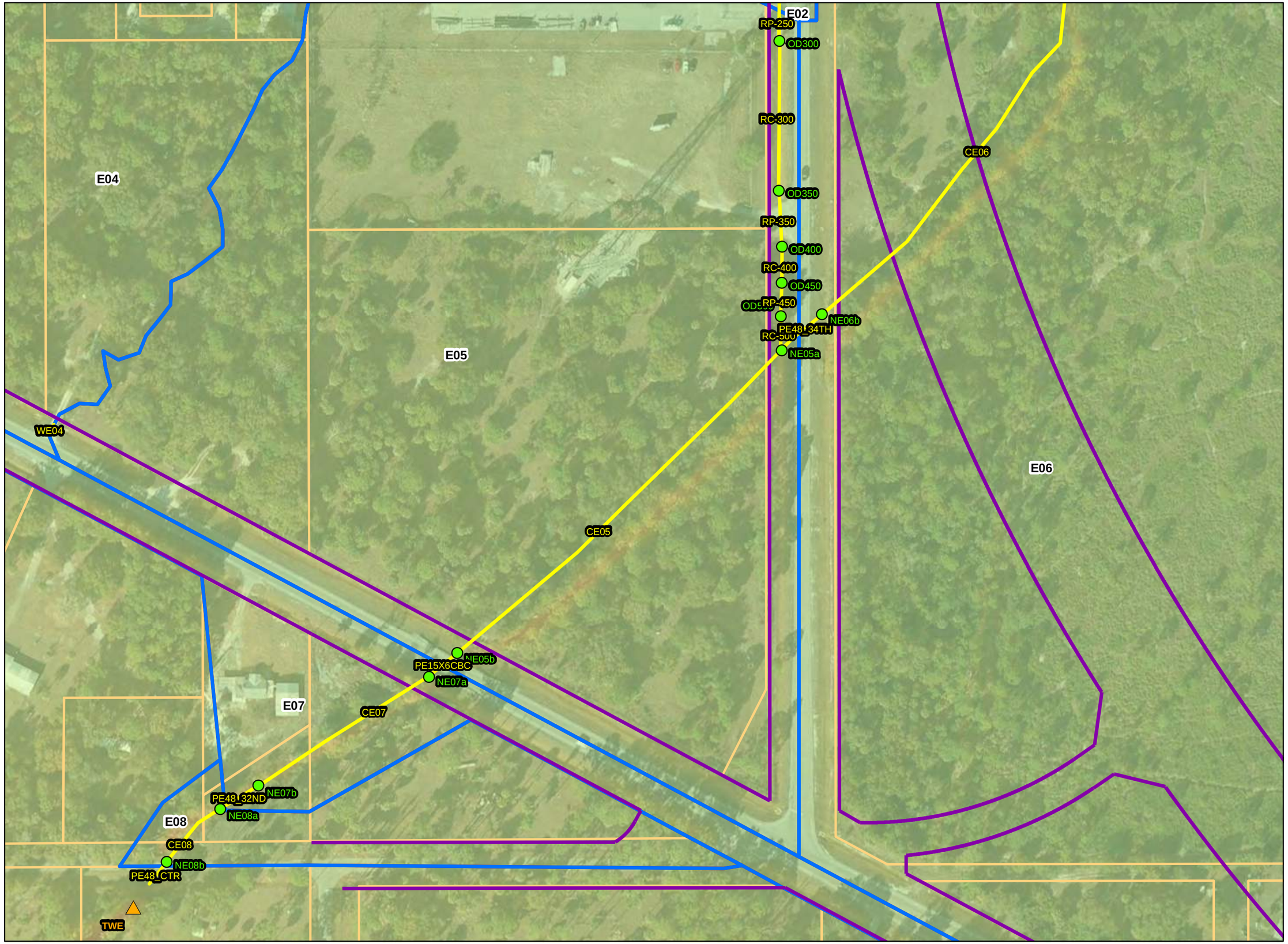
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_E.mxd	October, 2013	The Balmoral Group



Project Location

Legend

- Pre Basin E
- Pre Basins
- Parcels
- Proposed ROW
- Pre Nodes
- Pre Links
- Pre Tailwater Nodes

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N W E S

0 75 150 Feet

Pre Basin Map
Basin E
Figure 10H

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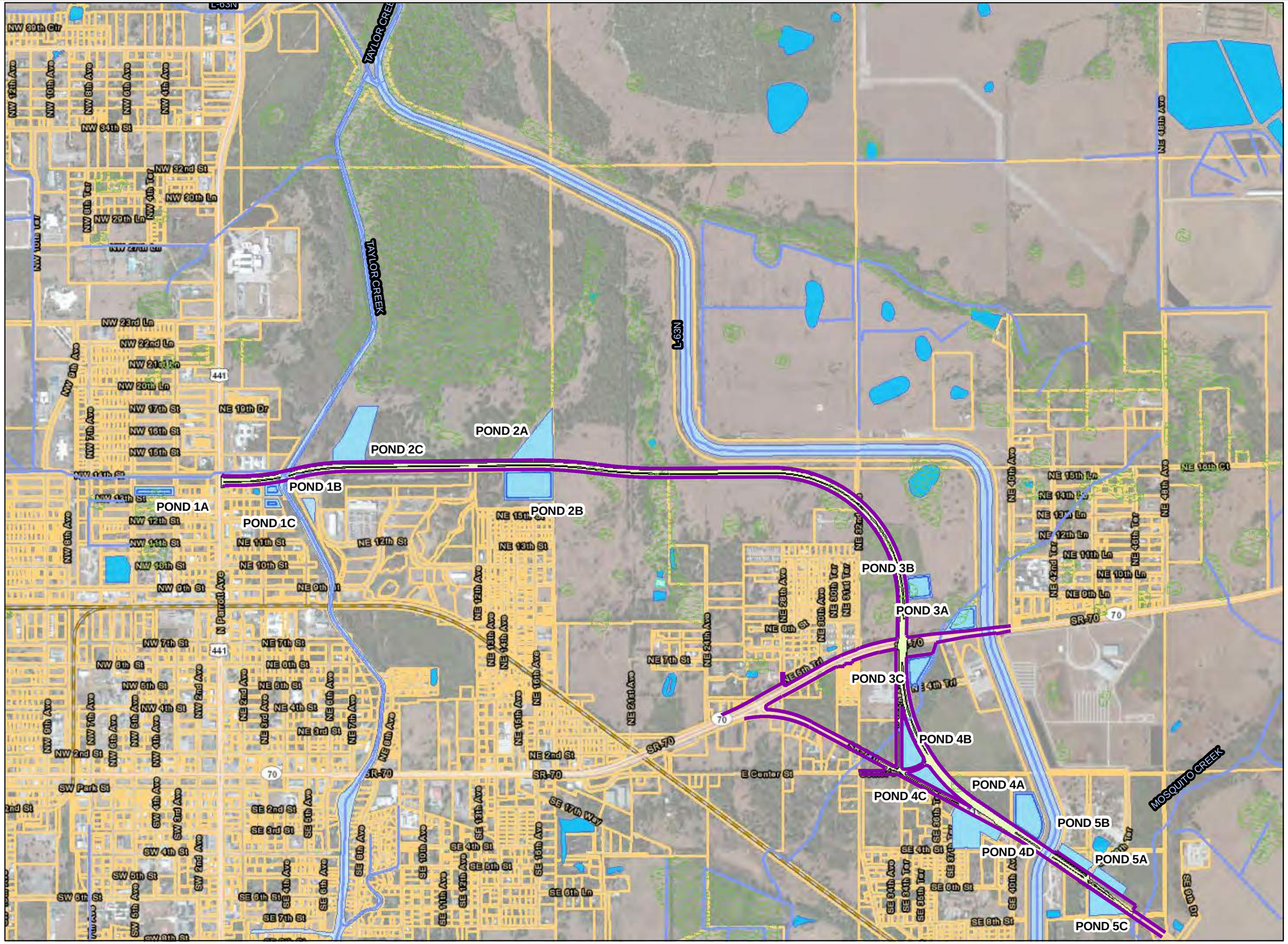
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Pre_Basins_E.mxd	October, 2013	The Balmoral Group



Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Proposed ROW

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N W E S

0 800 1,600 Feet

0 0.2 Miles

Post Basin Map
Figure 11A

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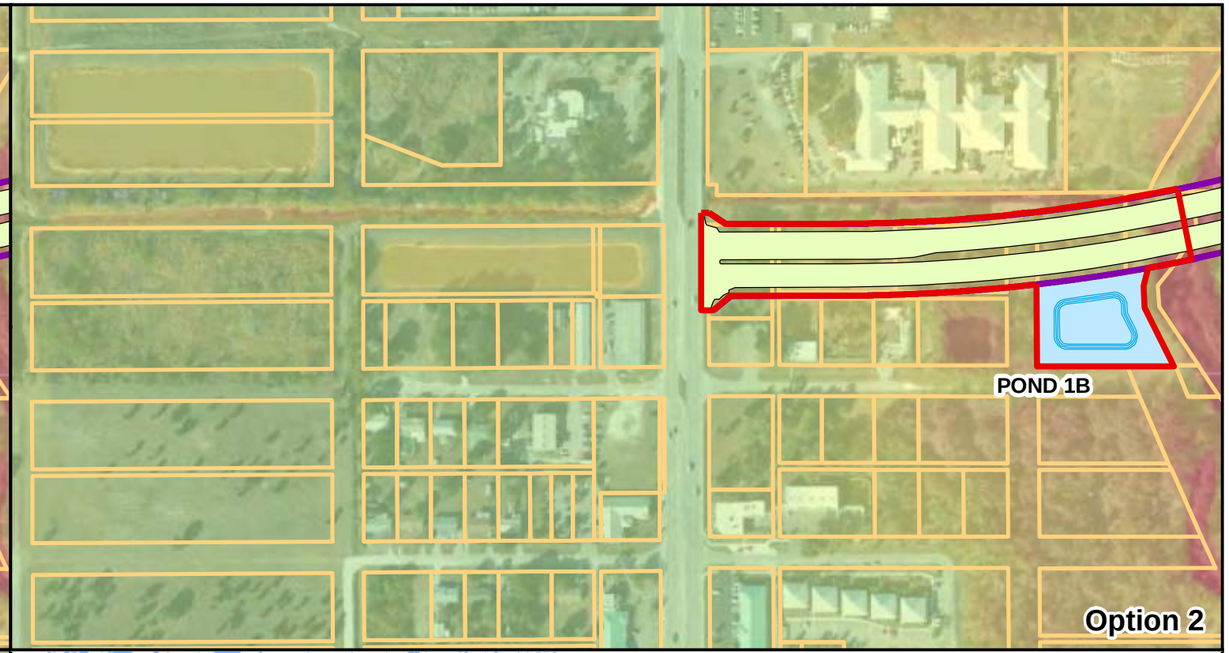
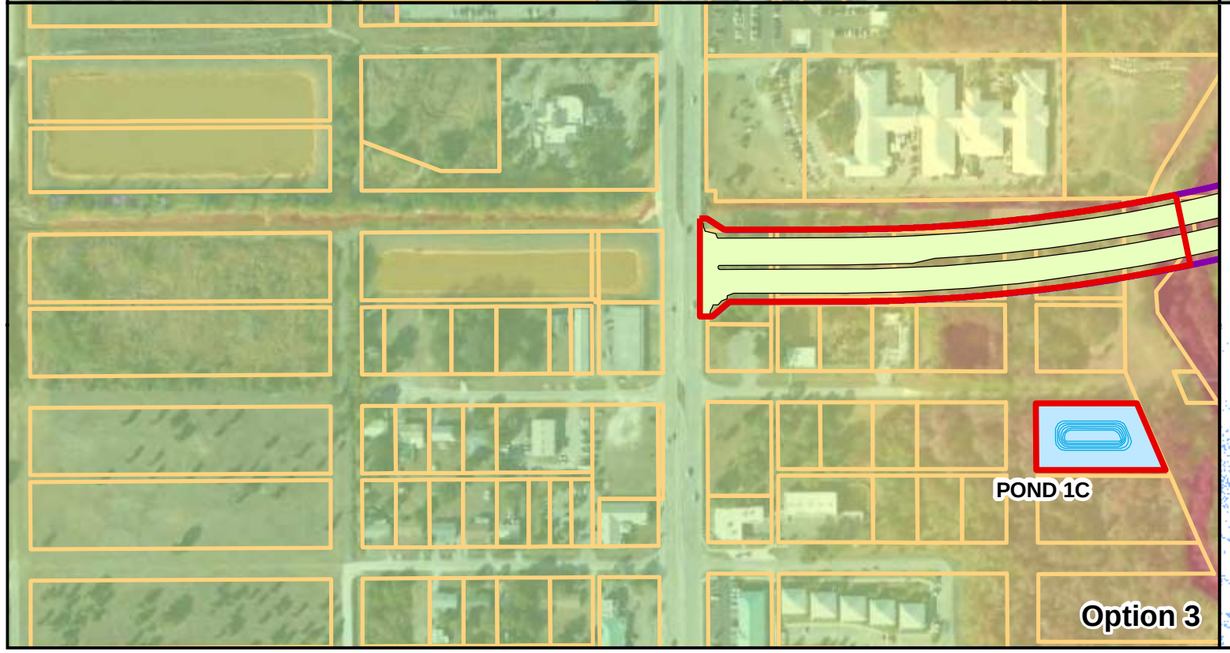
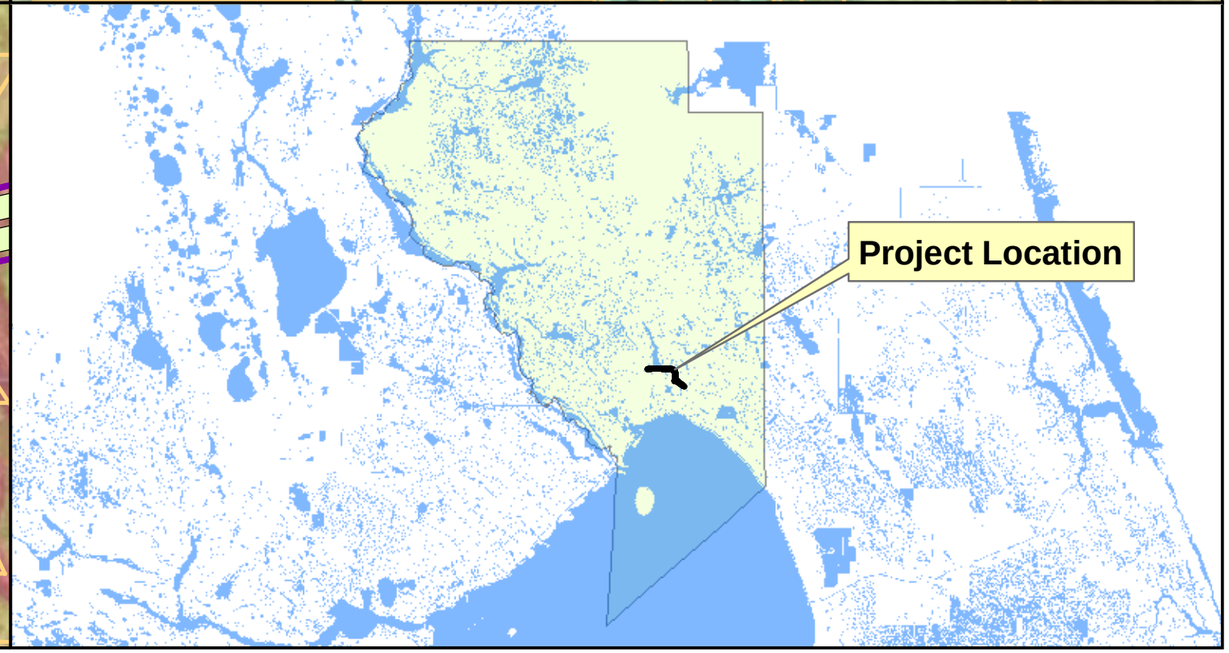
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
SR710_Post_Basins_Map_S.mxd	October, 2013	The Balmoral Group







Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Post Basins
- Proposed ROW

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N W E S

0 150 300 Feet

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Filename: SR710_multiviews_Post_Basins_1.mxd

Map Date: October, 2013

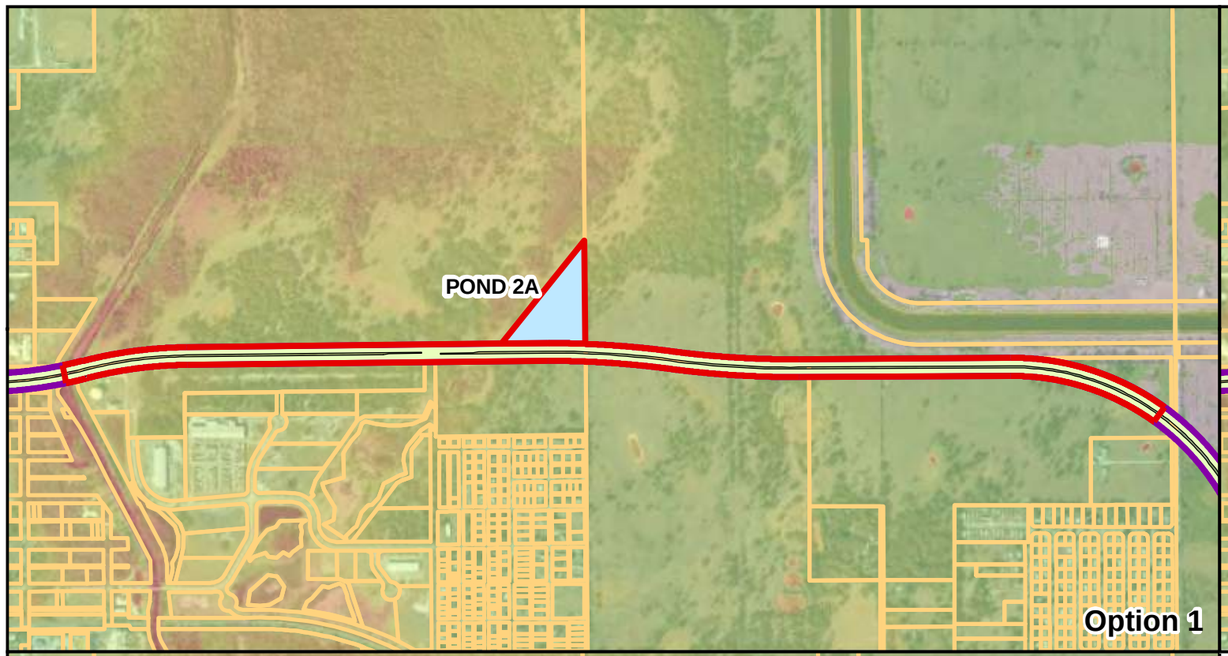
Map Prepared By: The Balmoral Group

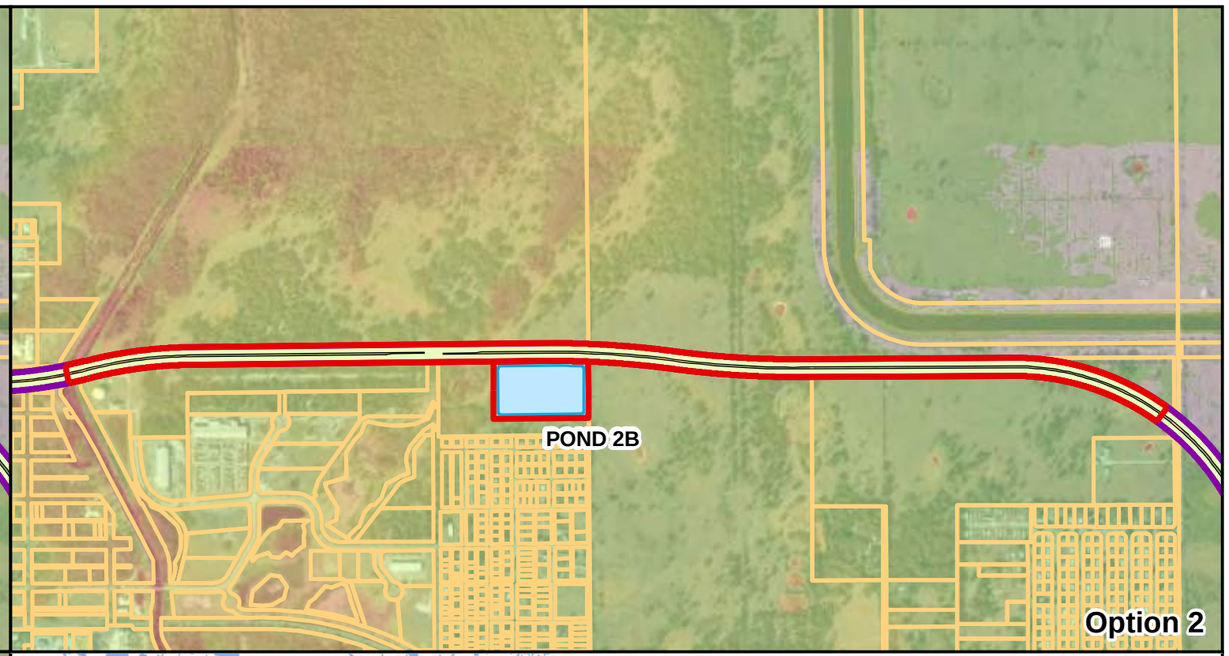
Post Basin Map
Basin 1 Pond Locations
Figure 11B

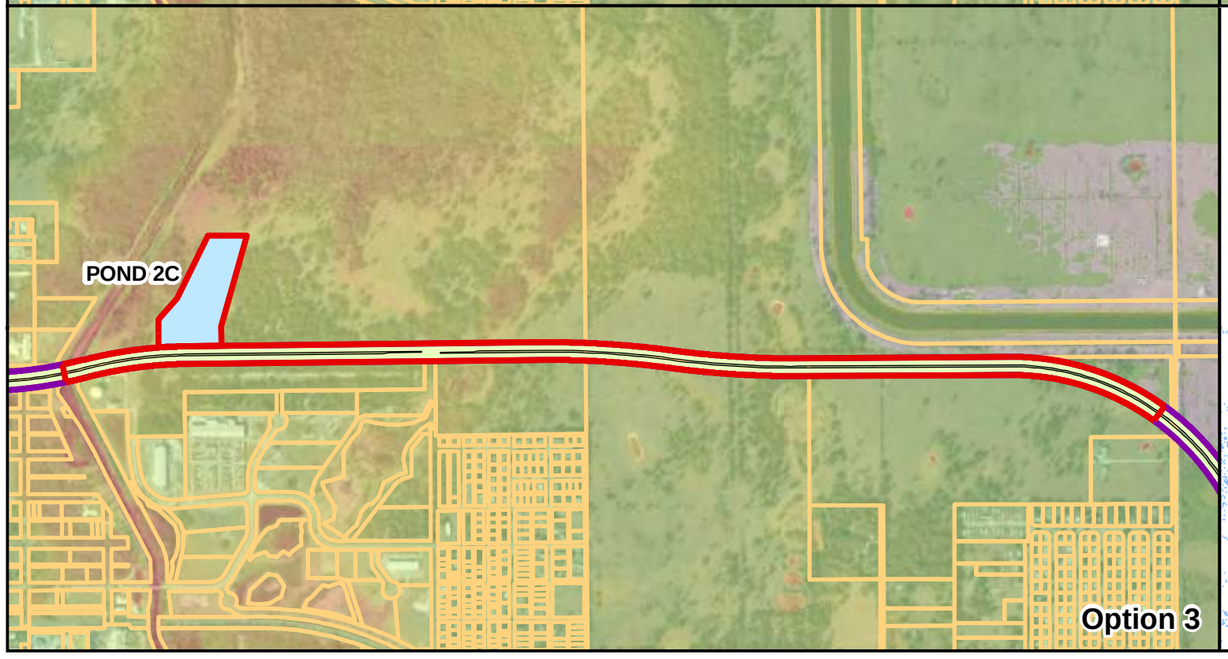
TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

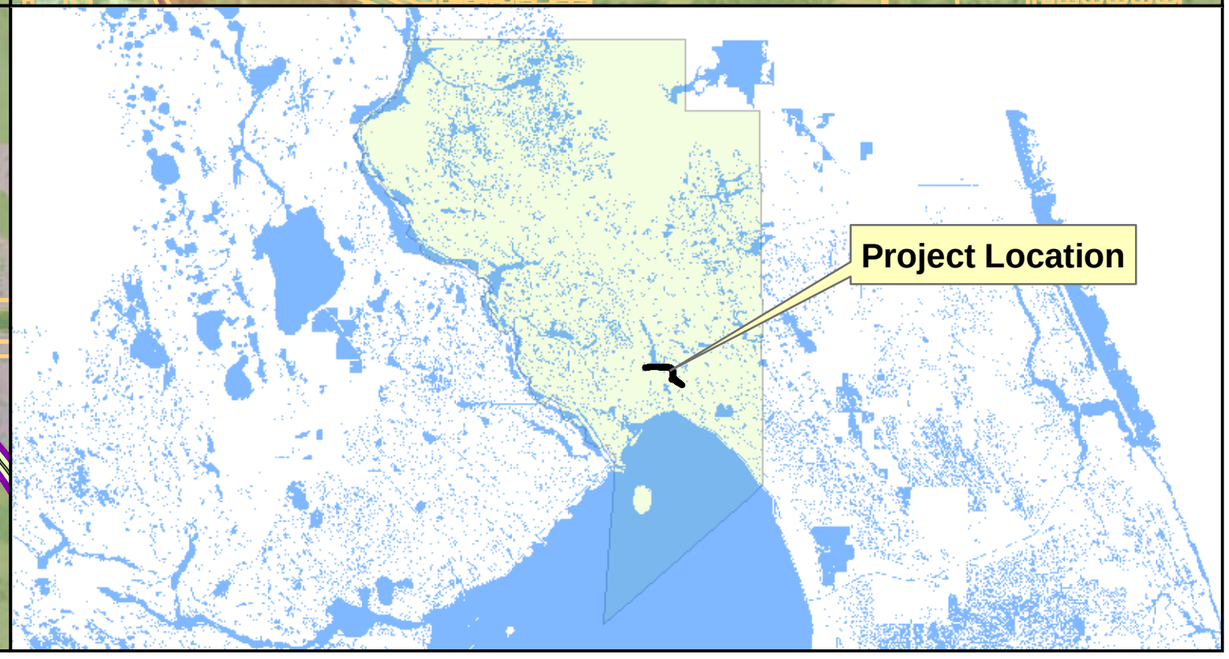
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida









Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Post Basins
- Proposed ROW

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N W E S

0 500 1,000 Feet

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Filename: SR710_multiviews_Post_Basins_2.mxd

Map Date: October, 2013

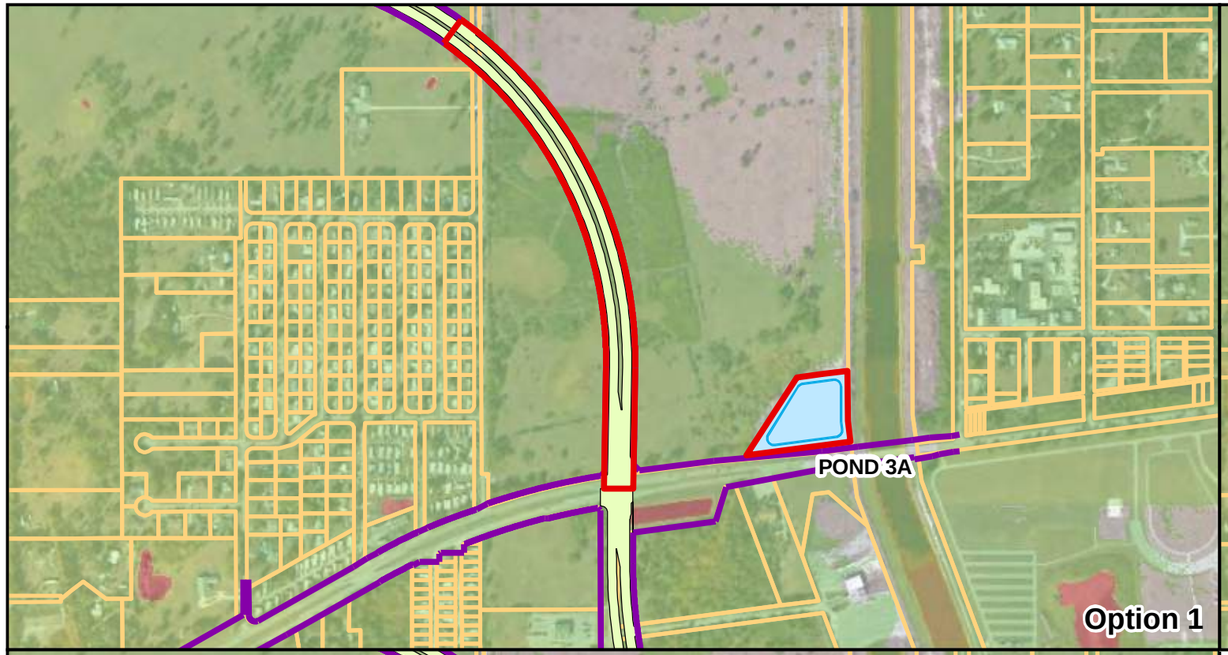
Map Prepared By: The Balmoral Group

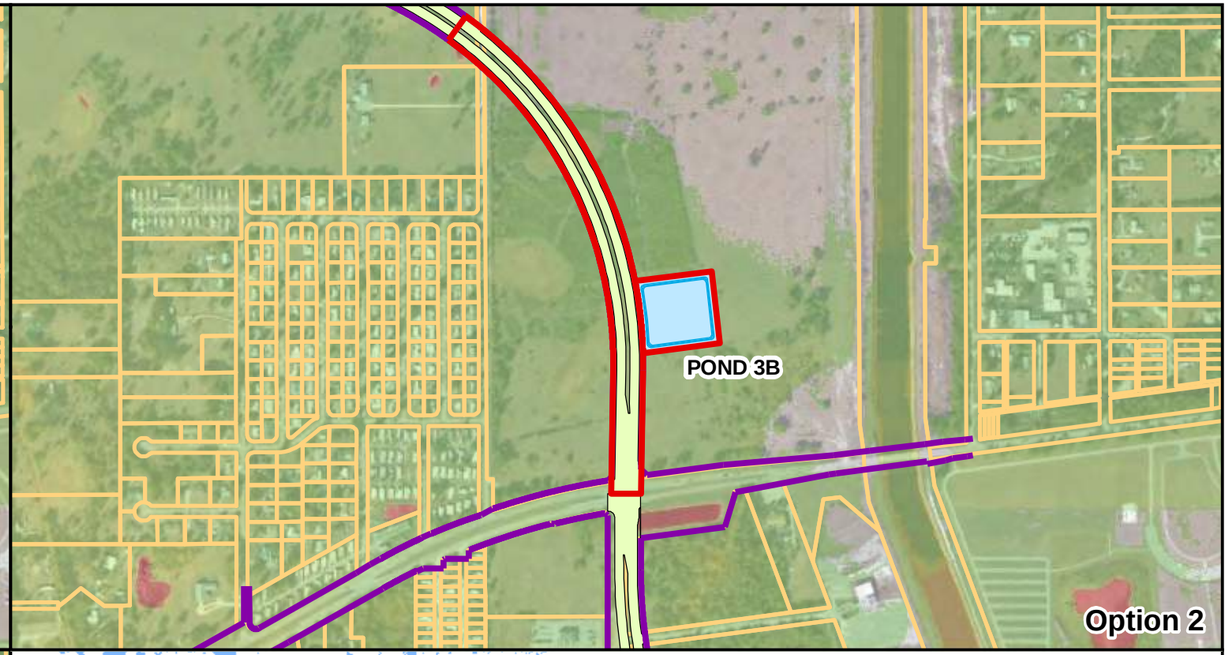
Post Basin Map
Basin 2 Pond Locations
Figure 11C

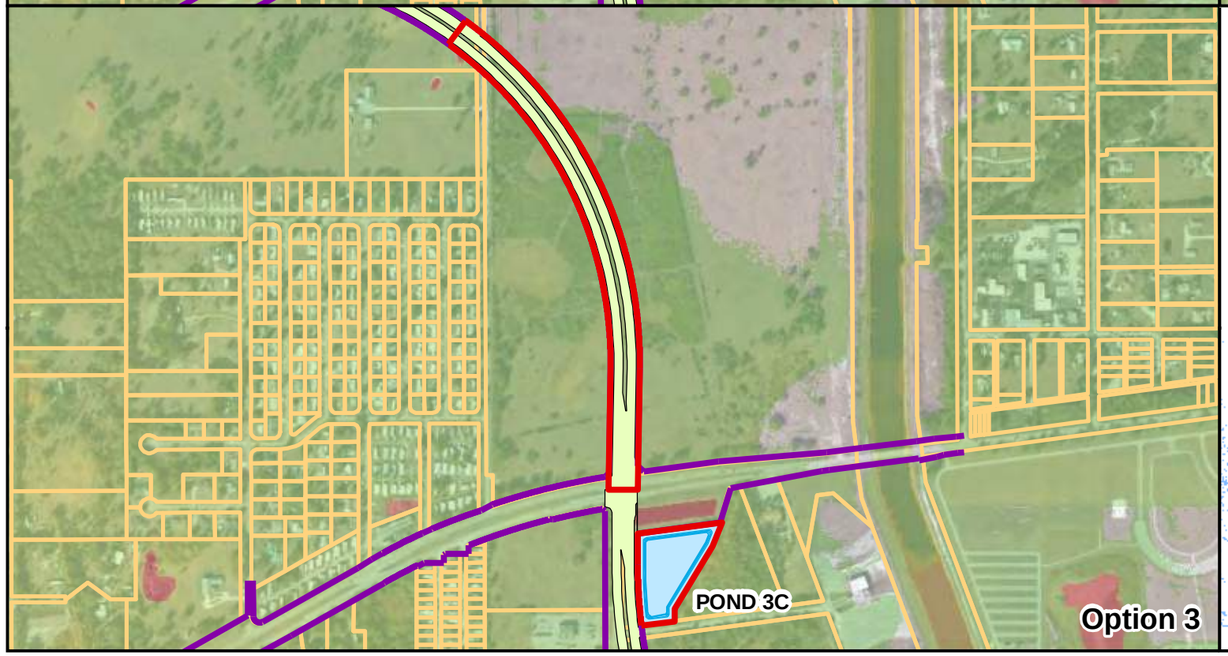
TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

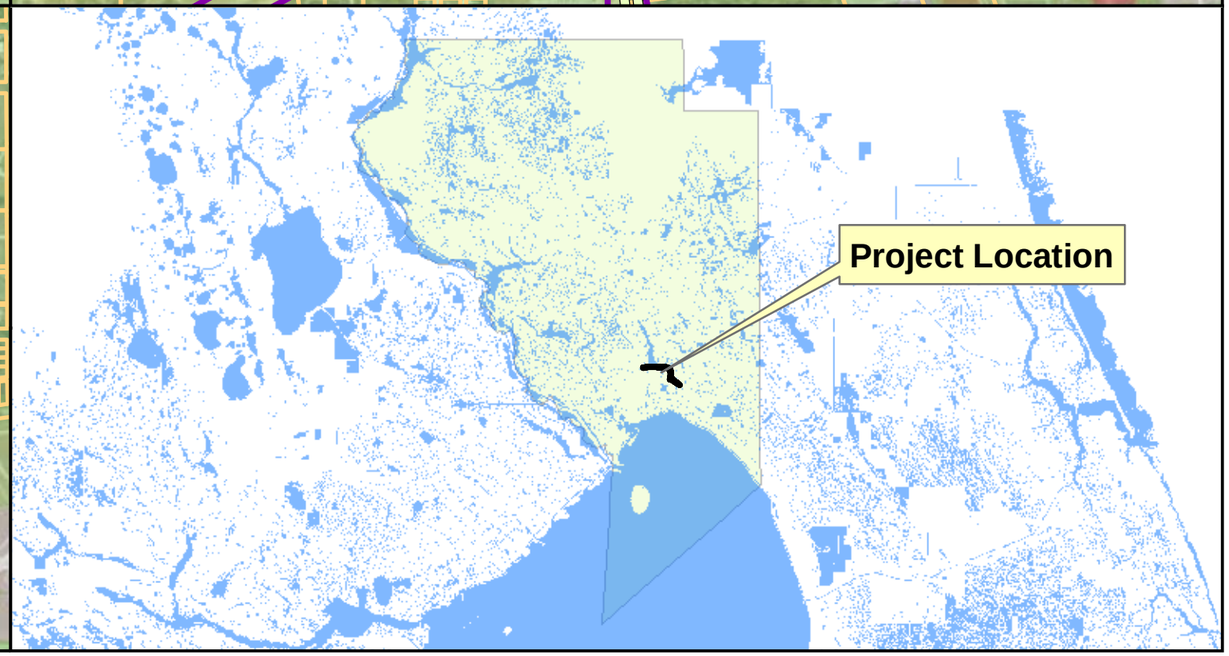
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida









STATE OF FLORIDA • DEPARTMENT OF TRANSPORTATION

Legend

- Proposed Roadway
- Parcels
- Proposed Ponds
- Post Basins
- Proposed ROW

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoober Dike Area, existing permits, and recent survey files.

N W E S

0 300 600 Feet

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Filename: SR710_multiviews_Post_Basins_3.mxd

Map Date: October, 2013

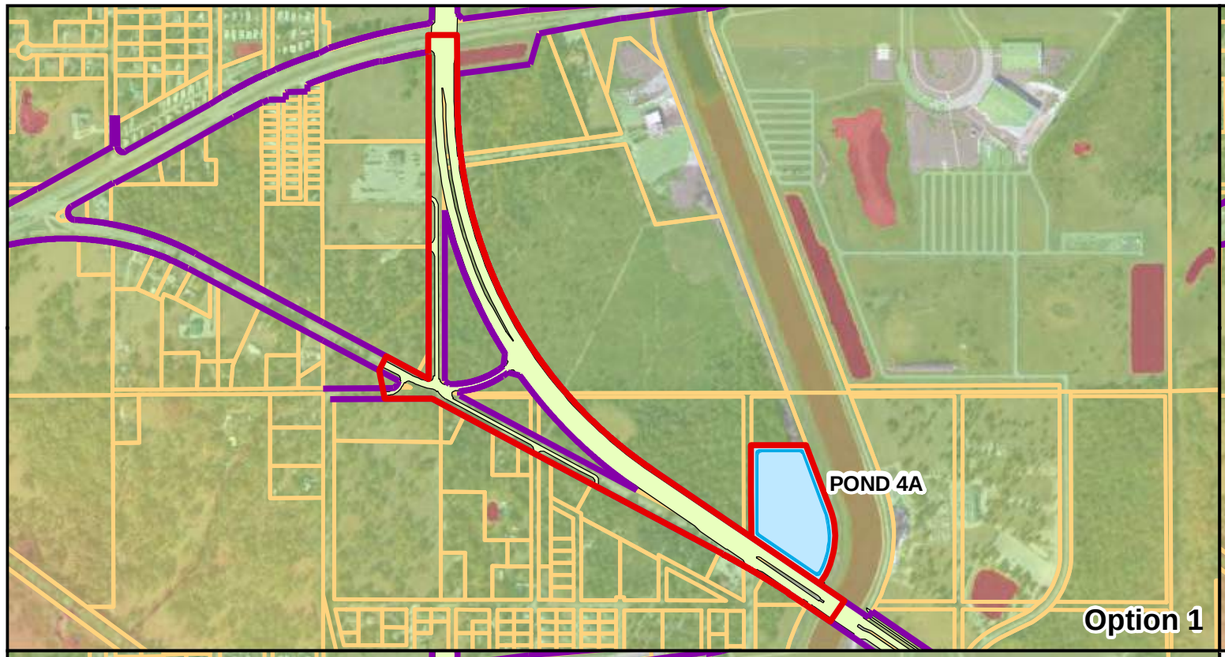
Map Prepared By: The Balmoral Group

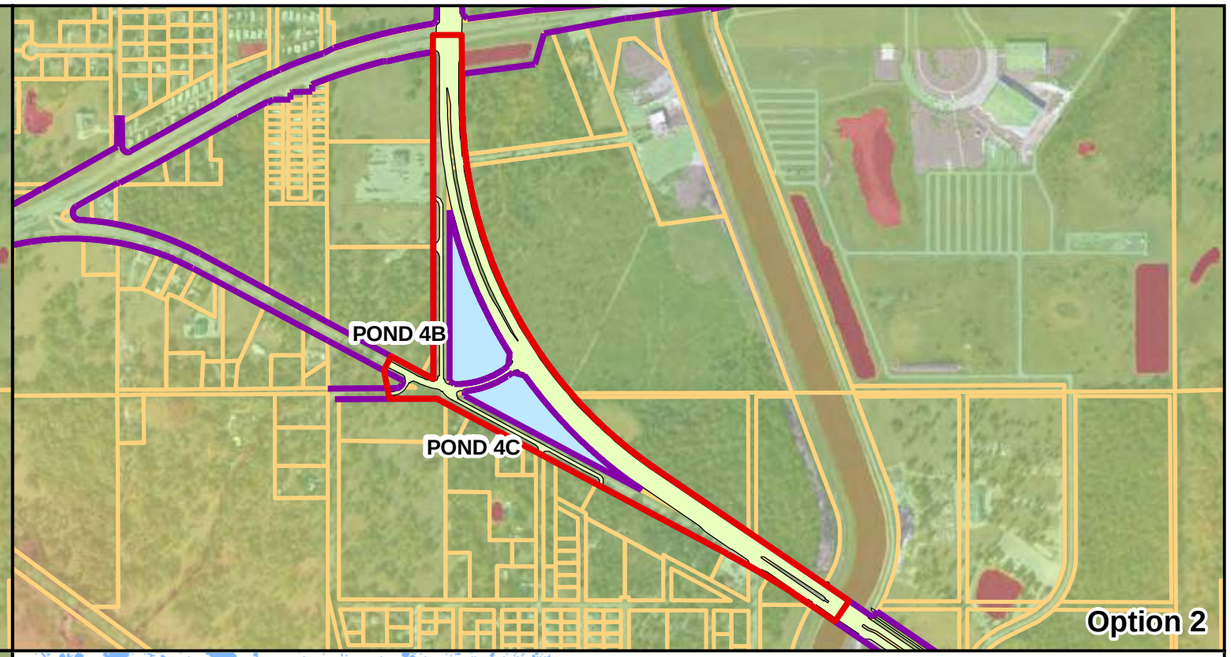
Post Basin Map
Basin 3 Pond Locations
Figure 11D

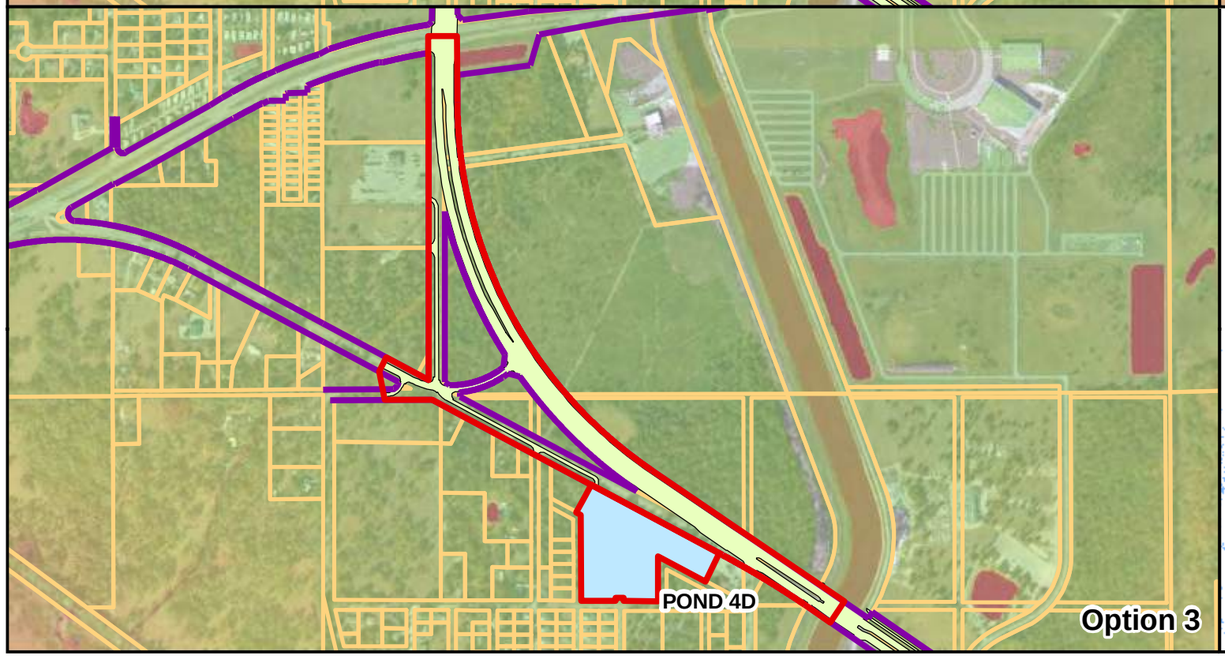
TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

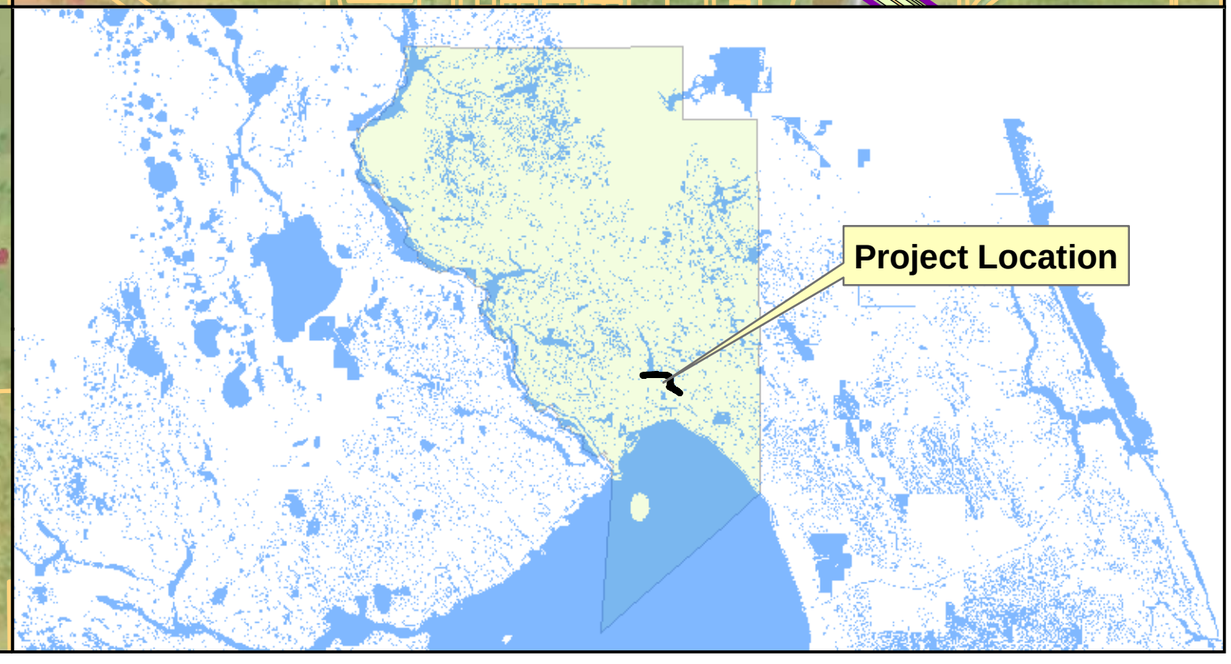
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida









Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Post Basins
- Proposed ROW

Notes:

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N W E S

0 400 800 Feet

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Filename: SR710_multiviews_Post_Basins_4.mxd

Map Date: October, 2013

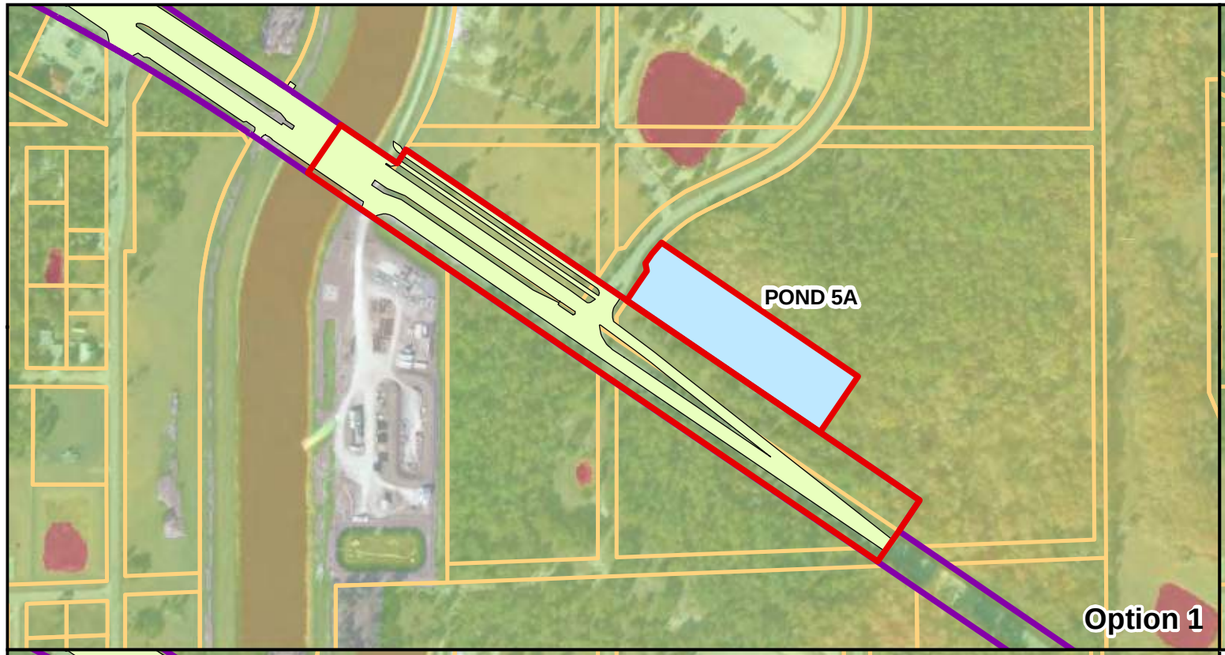
Map Prepared By: The Balmoral Group

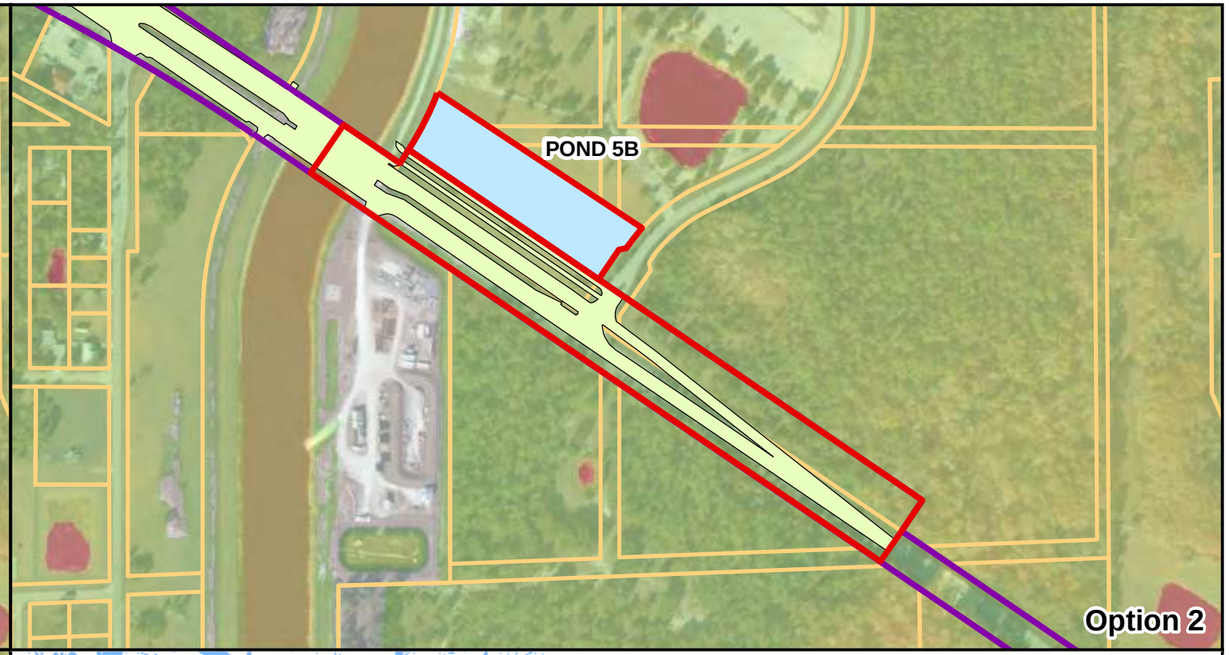
Post Basin Map
Basin 4 Pond Locations
Figure 11E

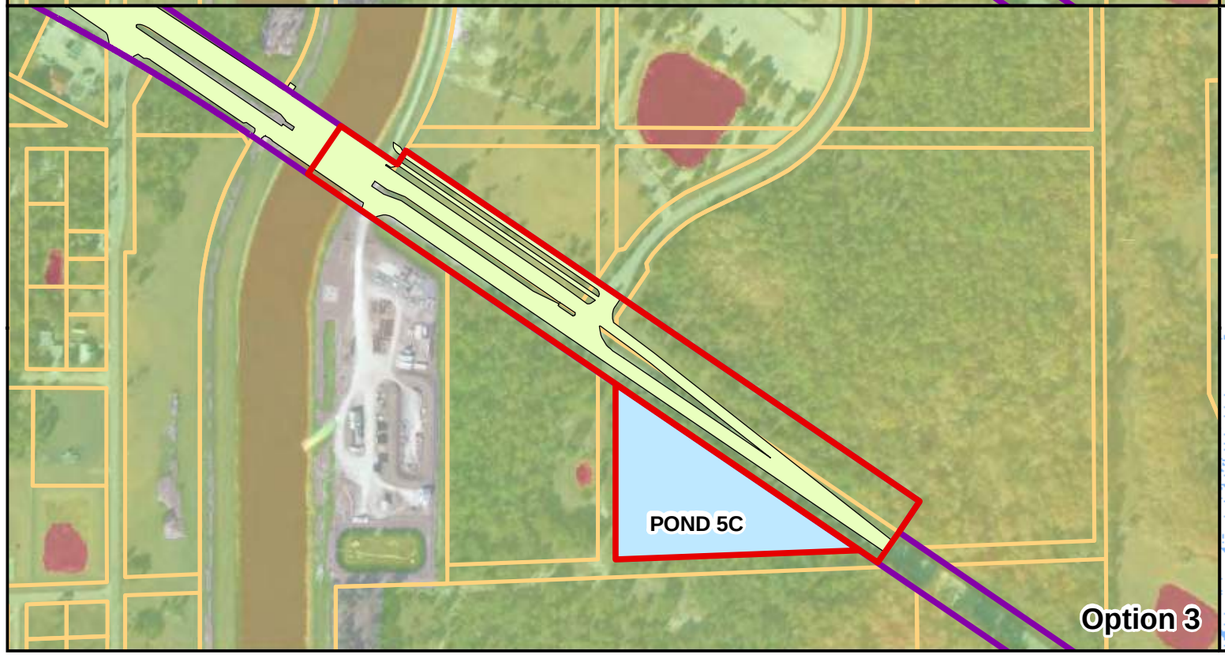
TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

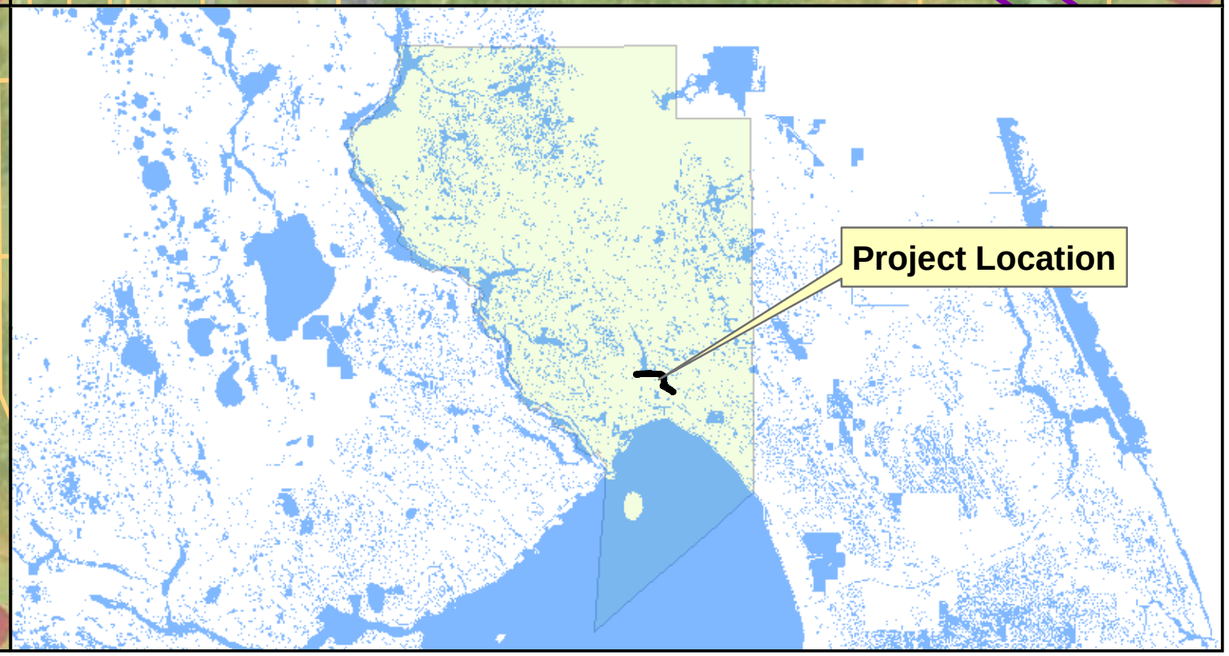
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida









STATE OF FLORIDA • DEPARTMENT OF TRANSPORTATION

Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Post Basins
- Proposed ROW

Notes:

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N W E S

0 150 300 Feet

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Filename: SR710_multiviews_Post_Basins_5.mxd

Map Date: October, 2013

Map Prepared By: The Balmoral Group

Post Basin Map
Basin 5 Pond Locations
Figure 11F

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 1A Aerial
Figure 12A

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to the L-63N Canal

Revised:

May Date: February, 2014

Map Prepared By: The Balmoral Group

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 1B Aerial
Figure 12B

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to the L-63N Canal

Filename:

Map Date:
February, 2014

Map Prepared By:
The Balmoral Group

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 1C Aerial
Figure 12C

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to
the L-63N Canal

Revised:

May Date:
February, 2014

Map Prepared By:
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Project Location

Legend

Proposed ROW

Parcels

N W E S

0 50 100 Feet

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 2A Aerial
Figure 12D

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to the L-63N Canal

Filename:

Map Date:
February, 2014

Map Prepared By:
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Legend

- Proposed ROW
- Parcels

Project Location

N W E S

0 50 100 Feet

Notes:

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Pond 2B Aerial
Figure 12E

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TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

Proposed ROW

Parcels

N W E S

0 25 50 Feet

Notes:

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Pond 2C Aerial
Figure 12F

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to
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Revised:

May Date:
February, 2014

Map Prepared By:
The Balmoral Group

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 3A Aerial
Figure 12G

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to the L-63N Canal

Filename:

Map Date:
February, 2014

Map Prepared By:
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Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

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Pond 3B Aerial
Figure 12H

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to
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May Date:
February, 2014

Map Prepared By:
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Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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Pond 3C Aerial
Figure 12I

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SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Revised:

May Date:
February, 2014

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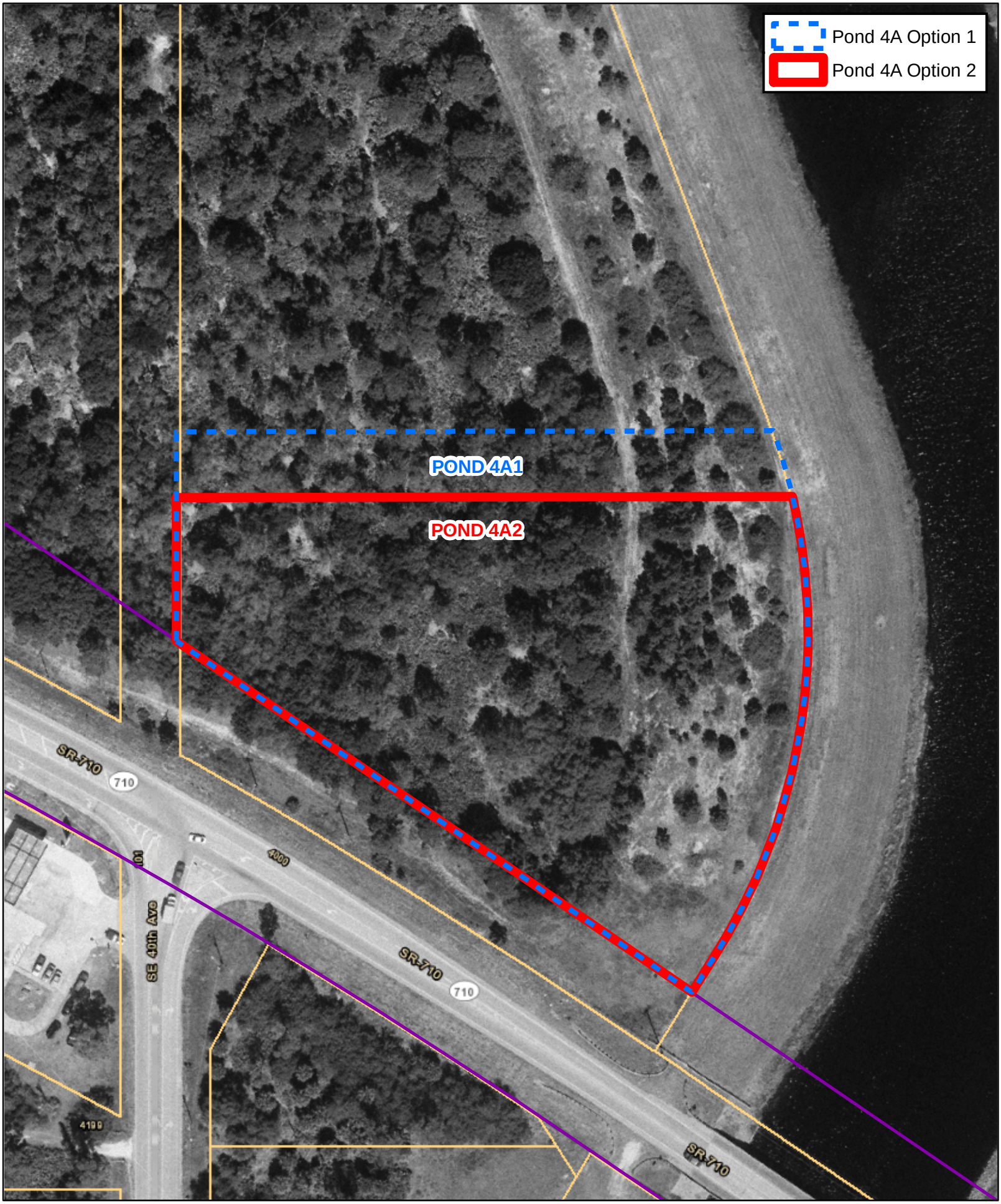

Project Location

Legend

- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 4A Aerial
Figure 12J

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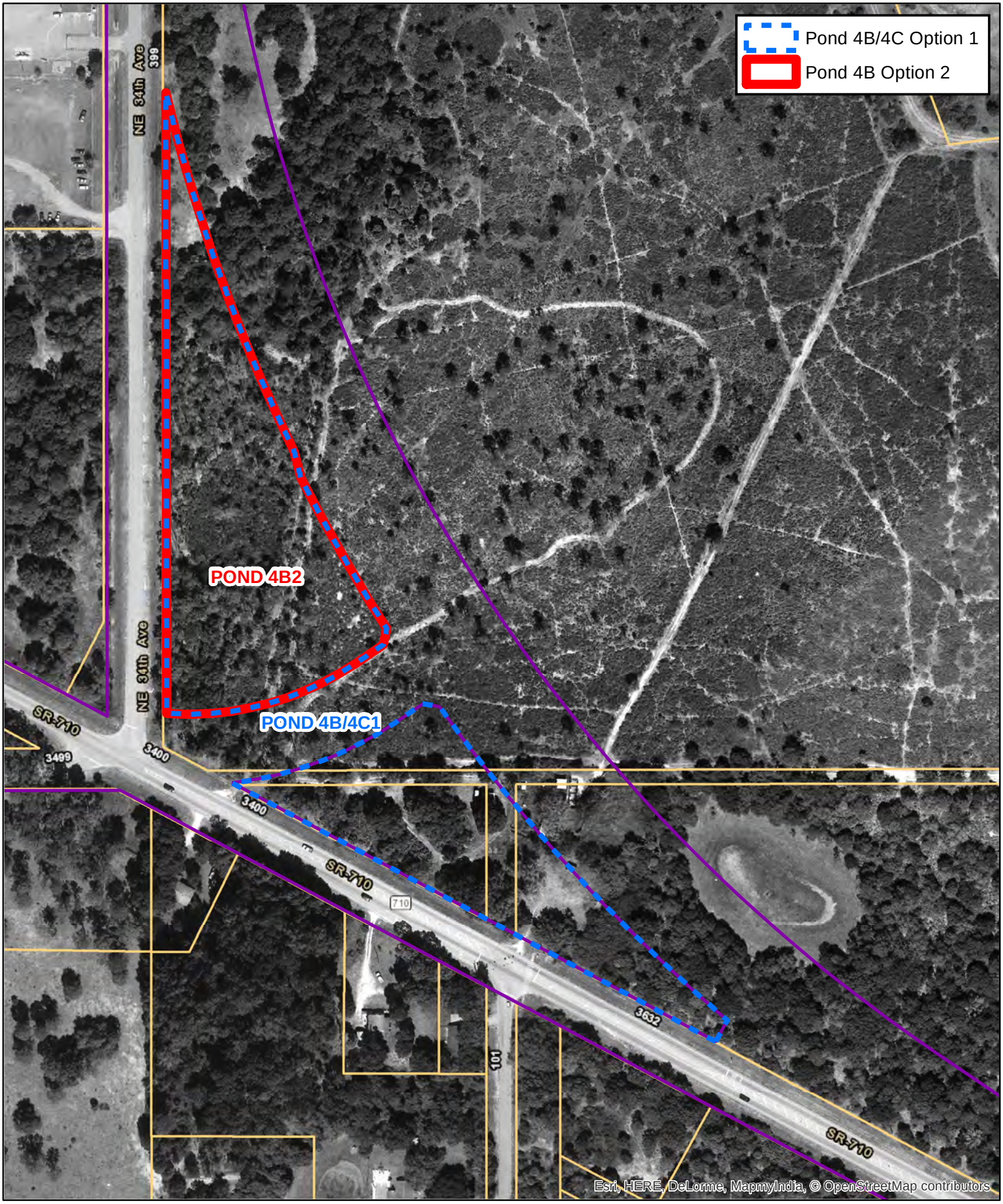
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Revised:

May Date:
February, 2014

Map Prepared By:
The Balmoral Group



Project Location

Legend

- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 4B/4C Aerial
Figure 12K

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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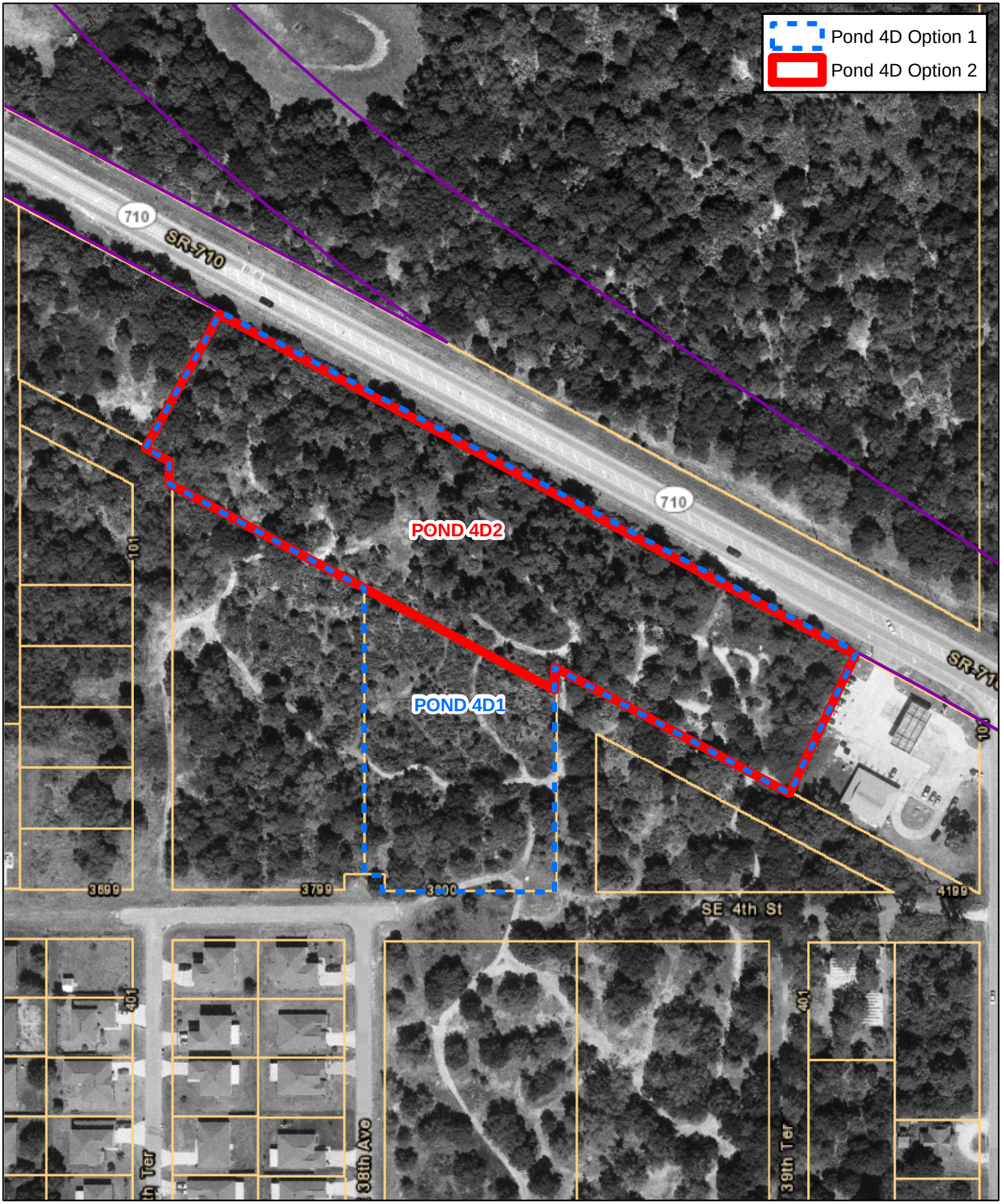
SR 710 from US 441 to the L-63N Canal

Filename

Map Date: February, 2014

Map Prepared By: The Balmoral Group



Project Location

Legend

Proposed ROW

Parcels

N W E S

0 25 50 Feet

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Pond 4D Aerial
Figure 12L

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to the L-63N Canal

Revised:

May Date: February, 2014

May Prepared By: The Balmoral Group

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 5A Aerial
Figure 12M

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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SR 710 from US 441 to
the L-63N Canal

Revised:

May Date:
February, 2014

Map Prepared By:
The Balmoral Group

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

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Pond 5B Aerial
Figure 12N

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

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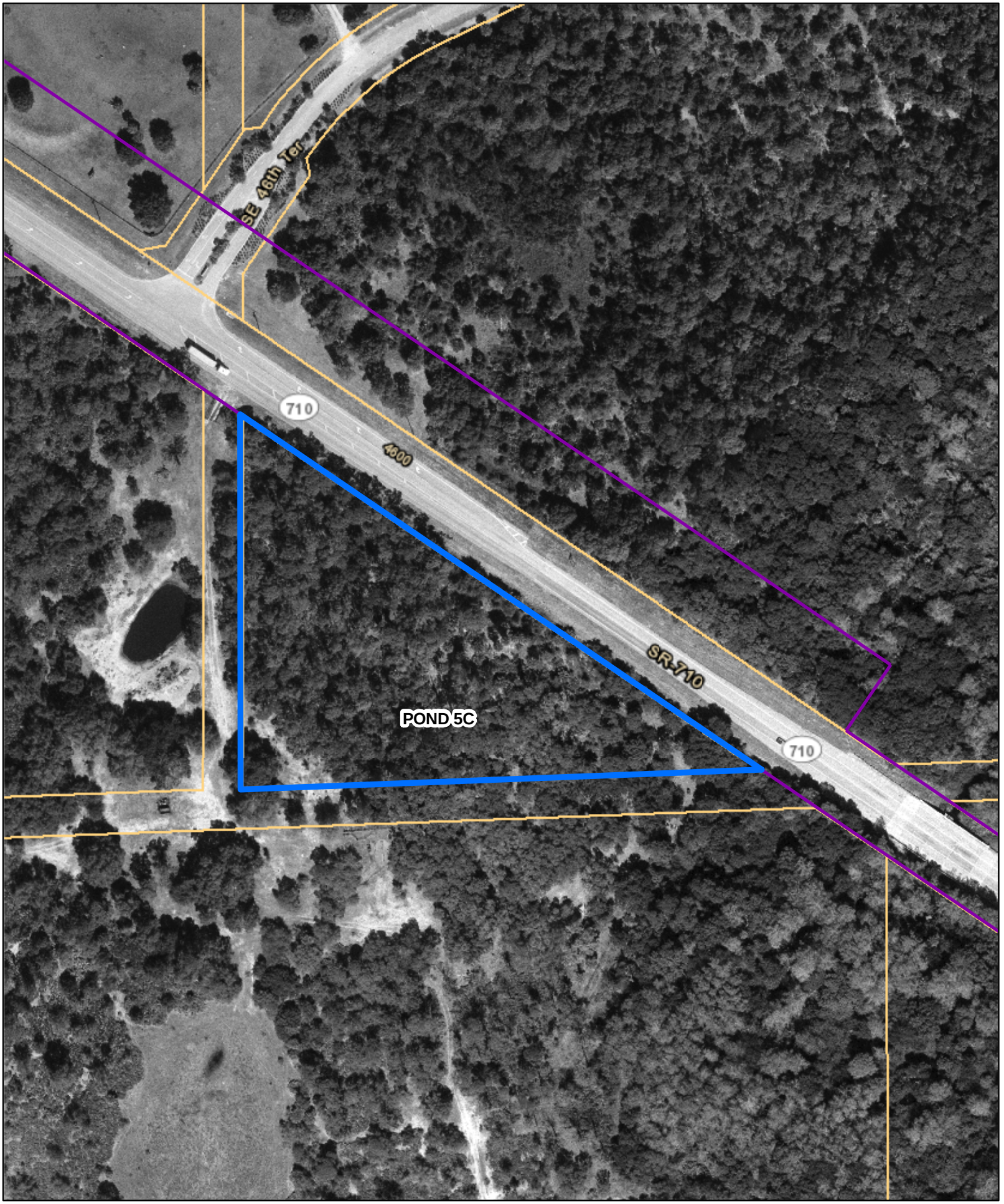
SR 710 from US 441 to the L-63N Canal

Revised:

May Date: February, 2014

Map Prepared By: The Balmoral Group



Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

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Pond 5C Aerial
Figure 12O

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TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Revised:

May Date:
February, 2014

Map Prepared By:
The Balmoral Group

BEGIN PROJECT
BEGIN FULL CONSTRUCTION
STA. 500+00.00

BASIN 1 ← → BASIN 2

PROPOSED GRADE LINE

EXISTING GROUND

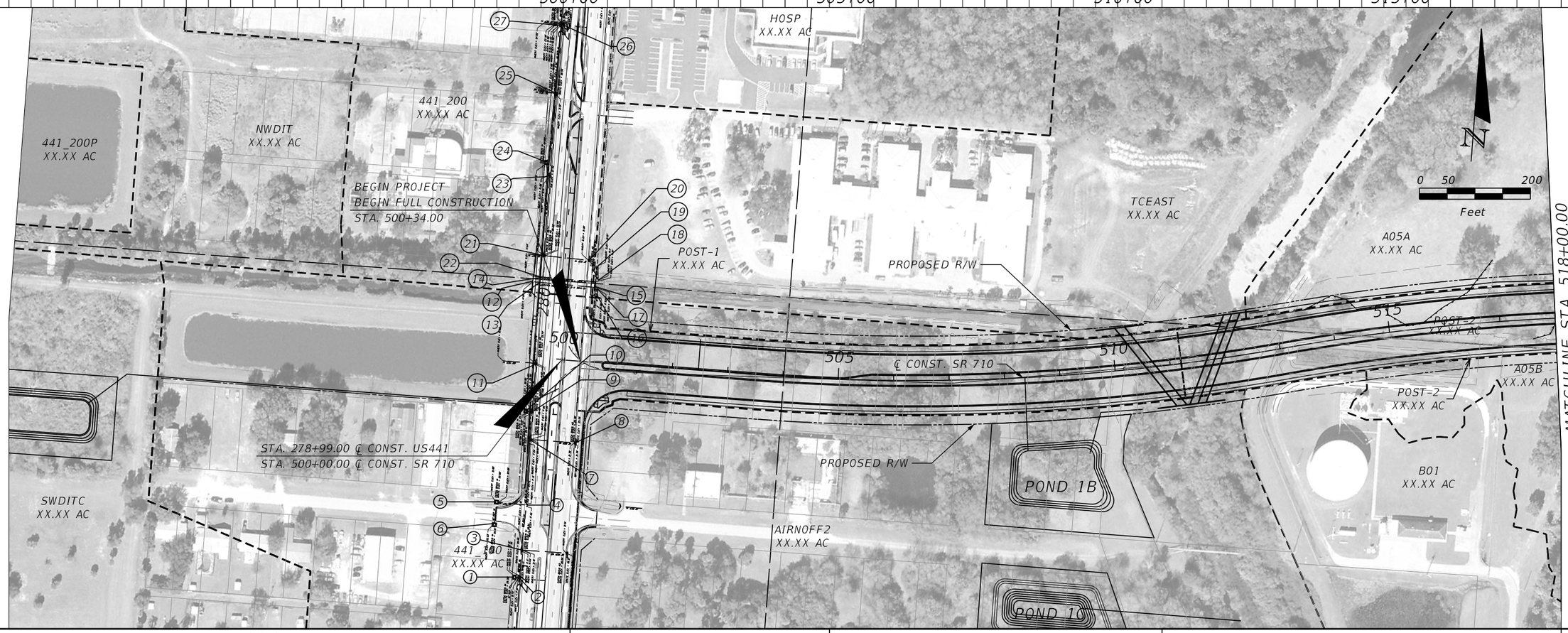
26.83 25.90 23.95 23.98 26.47 26.74 26.67 24.03 24.28 22.84 17.67

40 30 20 10 0 -10 -20

500+00 505+00 510+00 515+00

NOTES:
1. DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERN.
2. ALL PLAN ELEVATIONS ARE IN NAVD '88 DATUM (NAVD '88 EL 0.00 = NGVD '29 EL. +1.17 FOR EXAMPLE: EL. 10.00 SHOWN IN PLANS EQUAL TO EL. 11.17 NGVD.
3. THE EXISTING STRUCTURE INFORMATION HAS BEEN COMPILED FROM MULTIPLE SOURCES INCLUDING EXISTING PLANS, ORIGINAL SURVEY FILES, RECENT SURVEY FILES AND AS BUILT'S. CONTRACTOR SHALL NOTIFY EOR OF ANY SIGNIFICANT DISCREPANCIES ENCOUNTERED IN THE FIELD.

Scale: Horiz. 1" = 200'
Vert. 1" = 20'



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123
E.O.R.: Gregory S. Seidel, P.E. No. 47571

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13A
DRAINAGE MAP

FIGURE NO. 1

$USER$ $DATE$ $TIME$ $FILE$

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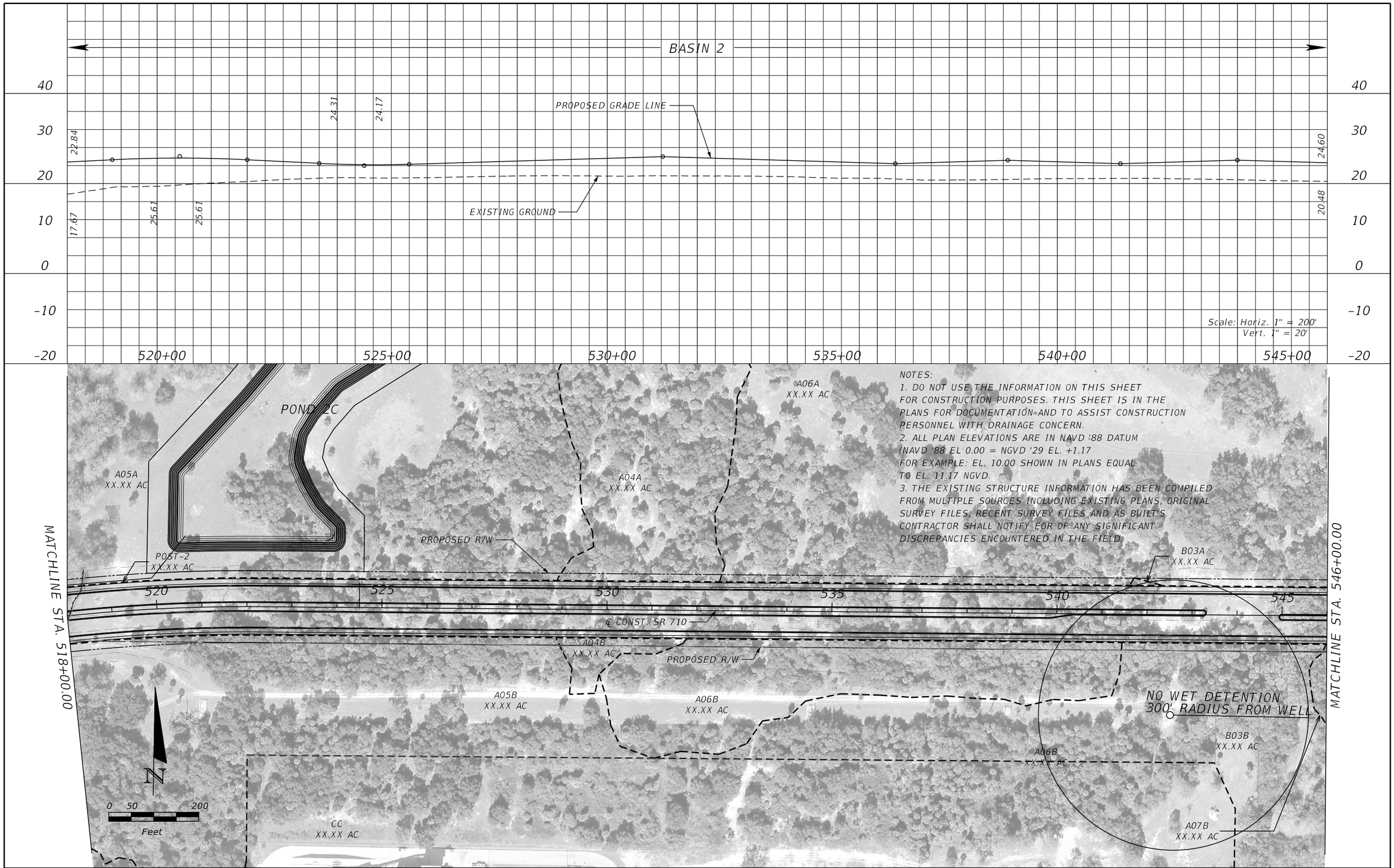

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

The Balmoral Group
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Winter Park, FL 32789
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Certificate of Authorization No. 26123
E.O.R.: Gregory S. Seidel, P.E. No. 47571

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13B
DRAINAGE MAP

FIGURE NO.
2

$USER$ $DATE$ $TIME$ $FILE$

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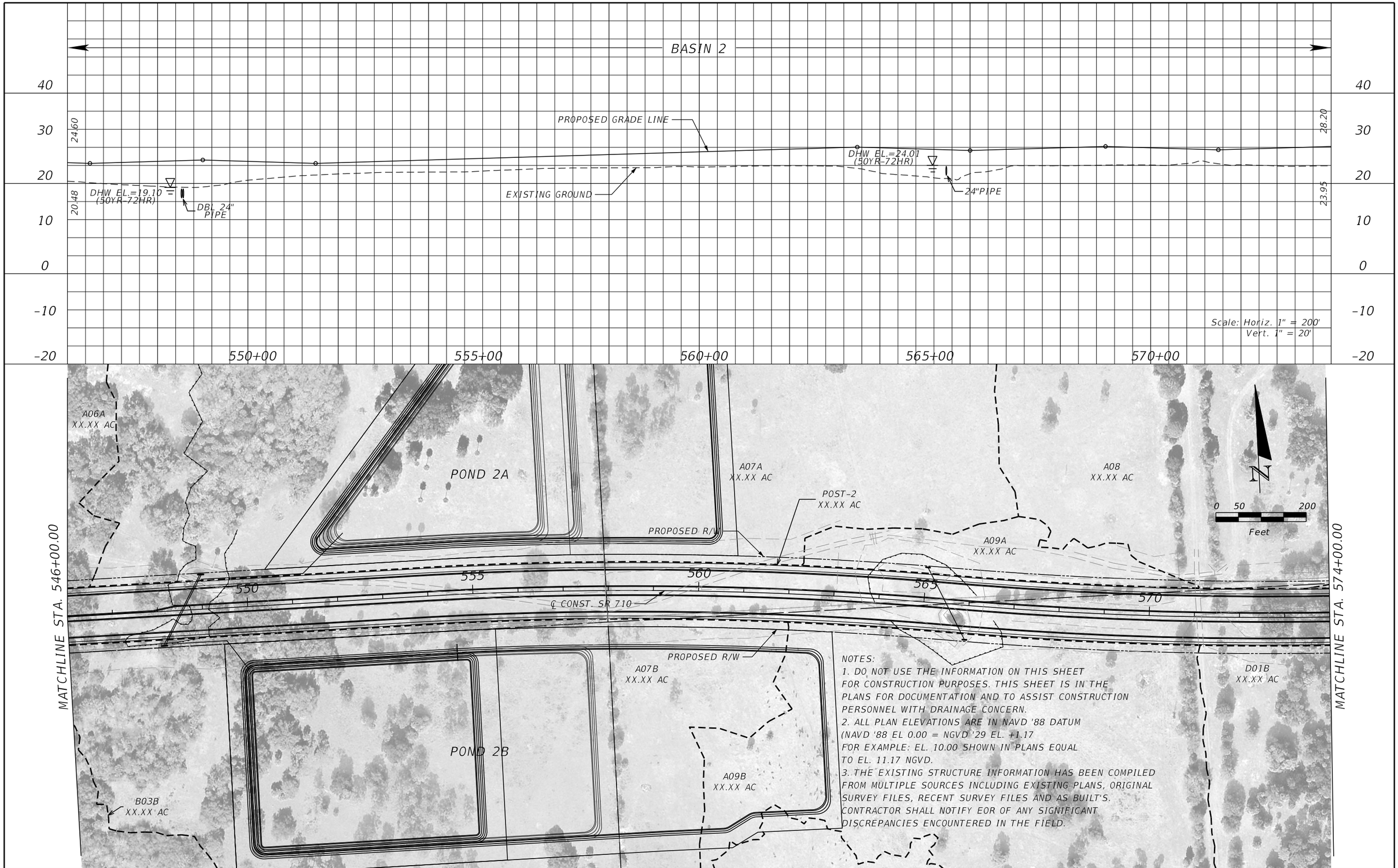

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

The Balmoral Group
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Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123
E.O.R.: Gregory S. Seidel, P.E. No. 47571

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

$USER$ $DATE$ $TIME$ $FILE$

Figure 13C
DRAINAGE MAP

FIGURE NO. 3

BASIN 2

40 30 20 10 0 -10 -20

28.20 23.95 29.54 29.78 32.50 32.28 32.62 32.69 27.70

PROPOSED GRADE LINE

EXISTING GROUND

Scale: Horiz. 1" = 200'
Vert. 1" = 20'

575+00 580+00 585+00 590+00 595+00 600+00

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MATCHLINE STA. 574+00.00

A08
XX.XX AC

D01A
XX.XX AC

D01B
XX.XX AC

D08
XX.XX AC

POST-2
XX.XX AC

PROPOSED R/W

PROPOSED R/W

℄ CONST. SR 710

575 580 585 590 595 600

MATCHLINE STA. 602+00.00

N

0 50 200
Feet

REVISIONS			
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13D
DRAINAGE MAP

FIGURE NO.
4

$USER$ $DATE$ $TIME$ $FILE$

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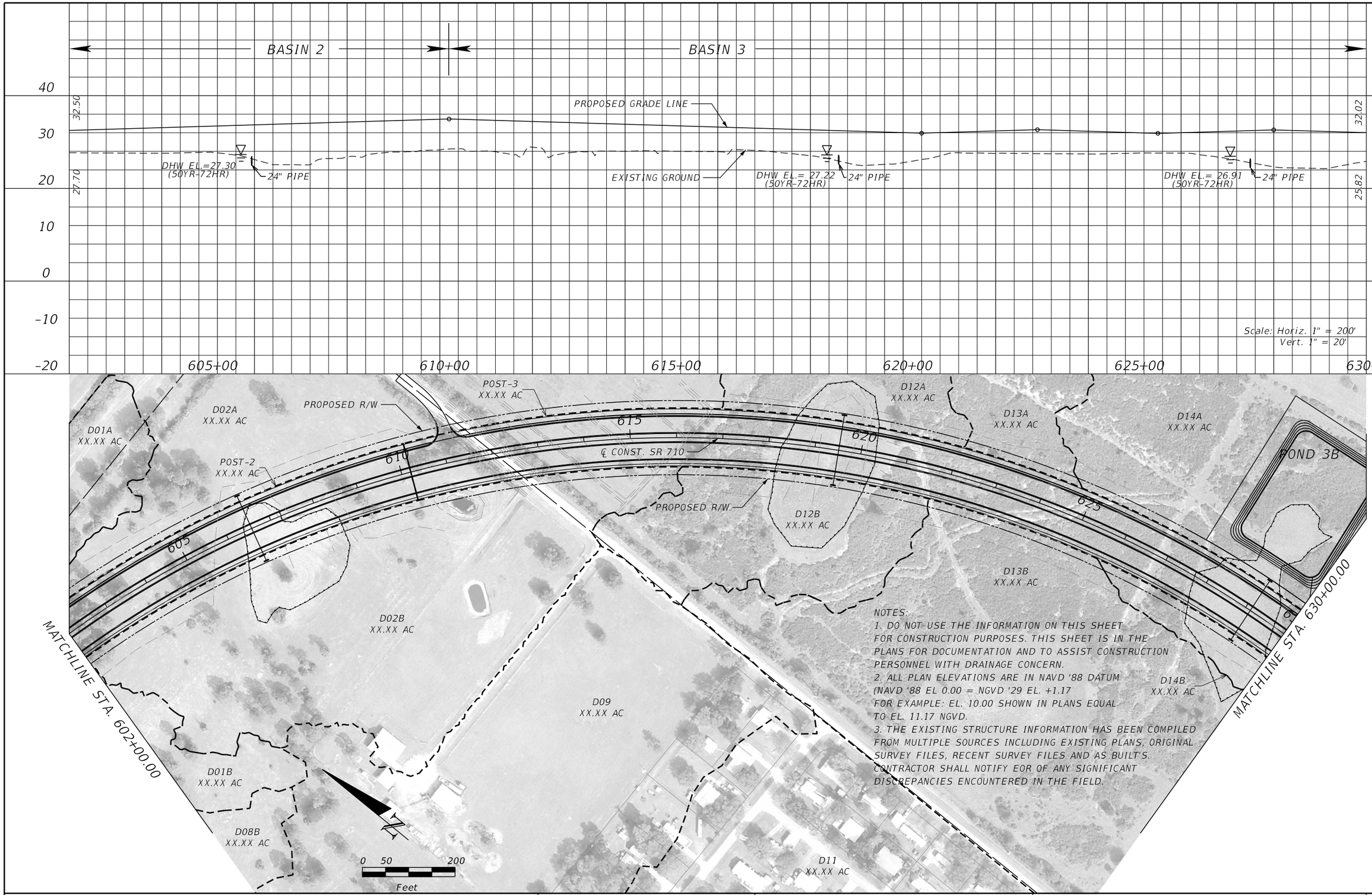

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13E
DRAINAGE MAP

FIGURE NO. 5

$USER$ $DATE$ $TIME$ $FILE$

BASIN 3

BASIN 4

32.02

29.21

29.18

28.68

28.93

PROPOSED GRADE LINE

28.71

25.82

EXISTING GROUND

29.32

29.45

29.31

DHW EL.= 25.86
(50YR-72HR)

48" PIPE

24.26

40
30
20
10
0
-10
-20

Scale: Horiz. 1" = 200'
Vert. 1" = 20'

630+00
635+00
640+00
645+00
650+00
655+00

MATCHLINE STA. 630+00.00

MATCHLINE STA. 658+00.00

E01
XX.XX AC

E03
XX.XX AC

EXPOND4A
XX.XX AC

E06A
XX.XX AC

D14A
XX.XX AC

D13C
XX.XX AC

℄ CONST. SR 70

PROPOSED R/W

POST-3
XX.XX AC

POND 3C

D14B
XX.XX AC

D13B
XX.XX AC

℄ CONST. SR 710

POST-4
XX.XX AC

EXPOND4B
XX.XX AC

E02
XX.XX AC

E05
XX.XX AC

POND

105

100

1095

635

640

645

650

655

0 50 200
Feet

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13F
DRAINAGE MAP

FIGURE NO. 6

$USER$ $DATE$ $TIME$ $FILE$

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BASIN 4

BASIN 5

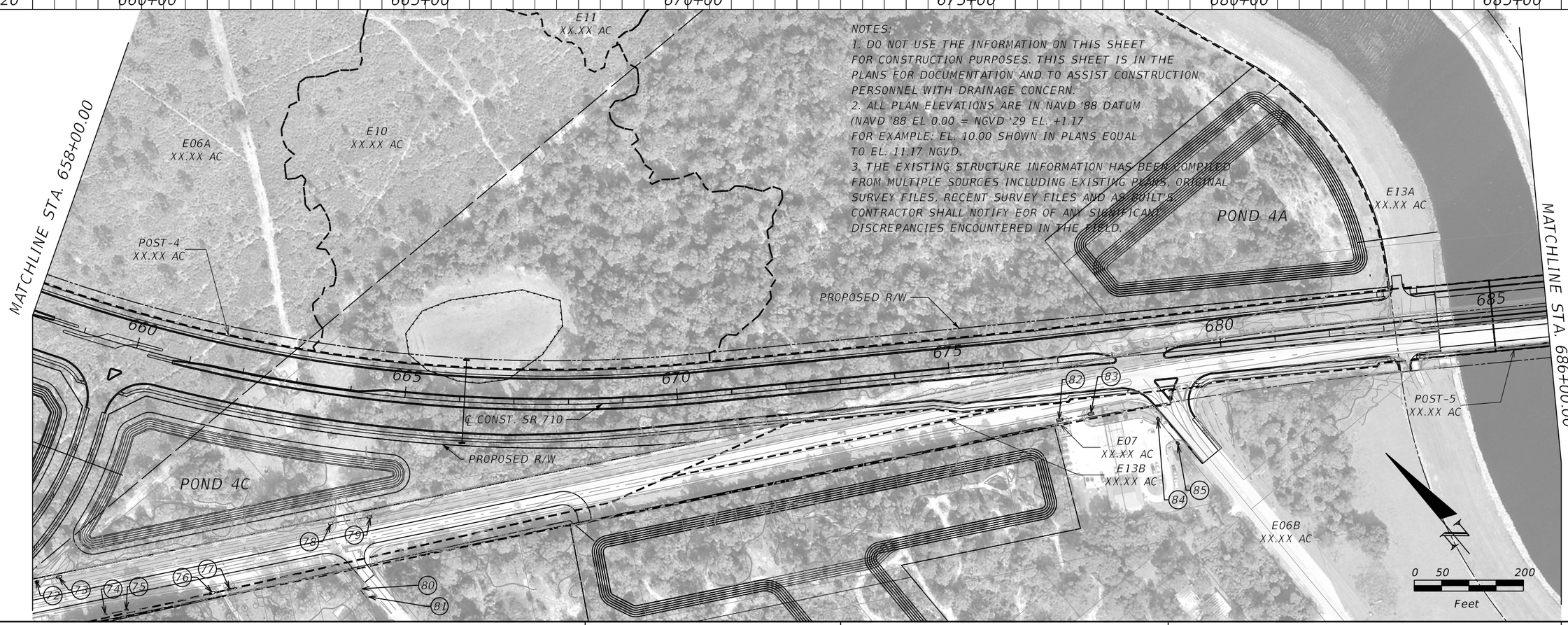
40
30
20
10
0
-10
-20

28.71
24.26
29.06
29.16
29.17
28.66
33.06
31.52
15.26
30.57
30.73
30.57

PROPOSED GRADE LINE
PGL RT
PGL LT
DHW EL= 25.30
(50YR-72HR)
24" PIPE
EXISTING GROUND

660+00
665+00
670+00
675+00
680+00
685+00

Scale: Horiz. 1" = 200'
Vert. 1" = 20'



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13G
DRAINAGE MAP

FIGURE NO. 7

$USER$ $DATE$ $TIME$ $FILE$

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BASIN 5

END PROJECT
END CONSTRUCTION
STA. 703+40.00

31.52 33.06
27.64 27.64
27.79
15.26

PGL LT
PGL RT
EXISTING GROUND

40
30
20
10
0
-10
-20

690+00 695+00 700+00 705+00

Scale: Horiz. 1" = 200'
Vert. 1" = 20'

MATCHLINE STA. 686+00.00

POND 5B
POND 5A
POND 5C

PROPOSED R/W

END PROJECT
END CONSTRUCTION
STA. 703+50.00

690 695 700 705

℄ CONST. SR 710

86 87 88 89

POST-5
XX.XX AC

0 50 200
Feet

N

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
710	OKEECHOBEE	419344-3-32-01

Figure 13H
DRAINAGE MAP

FIGURE NO. 8

$USERS $DATES $TIMES $FILES

Appendix 2
Geotechnical Information (Ponds)

Florida Department of Transportation

RICK SCOTT
GOVERNOR

801 North Broadway Avenue
Bartow, FL 33830

Jim Boxold
SECRETARY

Date: November 11, 2016

To: Amy Setchell, P.E. – Senior Project Manager
Florida Department of Transportation – District 1 Project Management

Copies: Alfredo Rodriguez, P.E. – Project Manager
The Wantman Group, Inc.

From: Teresa N. Puckett, P.E., District Geotechnical Engineer (Districts 1 and 7)
By: Keith A. Ellis, P.E., Geotechnical Construction Engineer (Districts 1 and 7)

Subject: Results of Preliminary Geotechnical Exploration for Ponds
(Updated November 2016)

Description: SR 710 from US 441 to L-63 Canal
FPID: **419344-3-32-01**
County: Okeechobee

We have completed a preliminary geotechnical exploration for the ponds for the project in subject. This submittal contains the Report of Auger Borings and the Seasonal High Ground Water (SHGW) table estimates.

If you have any questions, or need further information, please call this office at 863-519-4225.

Report of Seasonal High Groundwater Tables

Date Prepared: 11/10/2016

Financial Project ID: 419344-3-32-01

Project Description: SR 710 from US 441 to L-63 Canal - Geotech Exploration for Pond Alternatives

County: Okeechobee

Boring No.	Date Performed	Estimated Location		Coordinates		Ground Surface Elevation	Boring Depth (ft)	Water Table (GNE: Groundwater Not Encountered)		Estimated Seasonal High Groundwater Table		SCS Soil Type	Indicators
		Station (ft)	Offset (ft)	Latitude	Longitude			Depth* (ft)	Elevation (ft)	Depth (ft)	Elevation (ft)		
PB-1A	10/16/2013	OFFSITE	-	N 27 ° 15 ′ 25.9 ″	W 80 ° 50 ′ 0.2 ″	N.A.	15.0	2.50	N.A.	1.50 ± 0.50	N.A.	To be identified	Stain Line
PB-1B	10/16/2013	509+35	122 RT	N 27 ° 15 ′ 27 ″	W 80 ° 49 ′ 37.2 ″	N.A.	20.0	2.50	N.A.	0.75 ± 0.50	N.A.	To be identified	Root System
PB-1C	10/16/2013	508+60	440 RT	N 27 ° 15 ′ 23.8 ″	W 80 ° 49 ′ 37.4 ″	N.A.	20.0	1.00	N.A.	0.00 ± 0.50	N.A.	To be identified	Ground Surface
PB-3B	10/16/2013	629+25	250 LT	N 27 ° 15 ′ 9.2 ″	W 80 ° 47 ′ 34 ″	N.A.	20.0	+0.20	N.A.	0.50 ± 0.50	N.A.	To be identified	Ground Surface
PB-3A	10/16/2013	630+10	1120 LT	N 27 ° 15 ′ 3.6 ″	W 80 ° 47 ′ 24.6 ″	N.A.	20.0	3.50	N.A.	1.92 ± 0.50	N.A.	To be identified	Root System, Stain Line
PB-3C	10/22/2013	642+30	310 LT	N 27 ° 14 ′ 54.9 ″	W 80 ° 47 ′ 33.6 ″	N.A.	20.0	3.00	N.A.	1.25 ± 0.50	N.A.	To be identified	Root System
PB-4BC	10/22/2013	659+75	410 RT	N 27 ° 14 ′ 37.5 ″	W 80 ° 47 ′ 35.1 ″	N.A.	20.0	2.50	N.A.	1.25 ± 0.50	N.A.	To be identified	Root System
PB-4D	10/22/2013	671+75	400 RT	N 27 ° 14 ′ 27.9 ″	W 80 ° 47 ′ 23.7 ″	N.A.	20.0	3.00	N.A.	1.17 ± 0.50	N.A.	To be identified	Root System
PB-5B	10/22/2013	688+50	210 LT	N 27 ° 14 ′ 23.7 ″	W 80 ° 47 ′ 4.9 ″	N.A.	20.0	2.00	N.A.	0.50 ± 0.50	N.A.	To be identified	Root System
PB-5A	10/22/2013	696+10	190 LT	N 27 ° 14 ′ 19.4 ″	W 80 ° 46 ′ 58.2 ″	N.A.	20.0	2.00	N.A.	0.75 ± 0.50	N.A.	To be identified	Root System
PB-2A	10/22/2013	554+60	230 LT	N 27 ° 15 ′ 32.7 ″	W 80 ° 48 ′ 47.1 ″	N.A.	20.0	2.00	N.A.	0.67 ± 0.50	N.A.	To be identified	Root System
PB-2B	10/23/2013	553+50	280 RT	N 27 ° 15 ′ 27.7 ″	W 80 ° 48 ′ 48.2 ″	N.A.	20.0	3.00	N.A.	0.75 ± 0.50	N.A.	To be identified	Root System
PB-2C	10/23/2013	523+10	350 LT	N 27 ° 15 ′ 33.6 ″	W 80 ° 49 ′ 22.1 ″	N.A.	20.0	3.50	N.A.	0.67 ± 0.50	N.A.	To be identified	Root System
PB-4A	10/23/2013	683+15	100 LT	N 27 ° 14 ′ 25.9 ″	W 80 ° 47 ′ 10.7 ″	N.A.	20.0	4.50	N.A.	1.08 ± 0.50	N.A.	To be identified	Root System, Stain Line
PB-4A	10/23/2013	680+40	75 LT	N 27 ° 14 ′ 27.3 ″	W 80 ° 47 ′ 13.4 ″	N.A.	20.0	3.00	N.A.	1.08 ± 0.50	N.A.	To be identified	Root System, Stain Line
PB-5C	10/23/2013	698+75	220 RT	N 27 ° 14 ′ 14.6 ″	W 80 ° 46 ′ 58.4 ″	N.A.	20.0	2.50	N.A.	1.00 ± 0.50	N.A.	To be identified	Root System
PB-4B	11/2/2016	659+06	384 RT	N 27 ° 14 ′ 38.8 ″	W 80 ° 47 ′ 35.6 ″	23.04	20.0	2.00	21.04	2.00 ± 0.50	21.04 ± 0.50	To be identified	Stain Line

Notes:

*: "+" in the Water Table Depth represents standing water.

N.A.: Not Available at the time of this submittal.

Report of Auger Borings

Date Prepared: 10/31/2013

Financial Project ID: 419344-3-32-01
Project Description: SR 710 from US 441 to L-63 Canal - Geotech Exploration for Pond Alt.s
County: Okeechobee

Prepared for: Keith Ellis, FDOT D1
Field Exploration Dates: 10/16/2013 - 11/02/2016

Auger Boring / SHWT	Approx. Station B/L Survey SR 710	Approx. Offset from B/L Survey (ft)	Date Performed	Depth (ft) From - To	Stratum No.	Soil Description	AASHTO Classific.	Measured Groundwater (ft)
PB-1A	OFFSITE	OFFSITE	10/16/13	0.0 - 10.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.5
				10.0 - 15.0	N.A.	Gray, tan, and brown fine SAND	N.A.	
PB-1B	509+35	122.0 RT	10/16/13	0.0 - 10.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.5
				10.0 - 20.0	N.A.	Dark brown fine SAND w/ organics	N.A.	
PB-1C	508+60	440. RT	10/16/13	0.0 - 2.0	N.A.	Gray and Orange sandy CLAY	N.A.	1.0
				2.0 - 15.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	
				15.0 - 20.0	N.A.	Dark brown organic CLAY	N.A.	
PB-2A	554+60	230.0 LT	10/22/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.0
PB-2B	553+50	280.0 RT	10/23/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	3.0
PB-2C	523+10	350.0 LT	10/23/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	3.5
PB-3A	630+10	1118.0 LT	10/16/13	0.0 - 18.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	3.5
				18.0 - 20.0	N.A.	Gray, tan, and brown fine SAND	N.A.	
PB-3B	629+25	250.0 LT	10/16/13	0.0 - 10.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	0.2
				10.0 - 15.0	N.A.	Gray, tan, and brown fine SAND	N.A.	
				15.0 - 20.0	N.A.	Light Gray clayey SAND with rock	N.A.	
PB-3C	642+30	310.0 LT	10/22/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	3.0
PB-4A	680+40	75.0 LT	1/23/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	3.0
PB-4A	683+15	100.0 LT	1/23/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	4.5
PB-4BC	659+75	410.0 RT	10/22/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.5
PB-4D	671+75	400.0 RT	10/22/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	3.0
PB-5A	696+10	190.0 LT	10/22/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.0
PB-5B	688+50	210.0 LT	10/22/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.0
PB-5C	698+75	220.0 RT	10/23/13	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	N.A.	2.5
PB-4B	659+06	383.6 RT	11/2/16	0.0 - 20.0	N.A.	Gray and brown fine SAND w/ some rock	A-3	2.0

Note:
N.A.: Not Available at the time of this submittal.

Appendix 3
Protected Species and Wetlands Pond Siting Assessment Report

PROTECTED SPECIES AND WETLANDS

POND SITING ASSESSMENT REPORT

SR 710

FROM US 441 to L-63N Canal

Okeechobee County, Florida

Financial Project ID No. 419344-3-52-01

Prepared for:
Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33831-1249

February 2014

INTRODUCTION

The proposed project includes a new urban roadway (SR 710) consisting of four 12-foot travel lanes (two in each direction), a 12-foot multi use path, and a 5-foot sidewalk from US 441 to the L-63 Canal, in Okeechobee County, a distance of approximately three miles. This project also includes a new bridge over Taylor Creek and Interceptor Creek. This project falls within Sections 10, 13, 15, 16, and 24 of Township 37S, Range 35E;

This report presents the methodology used and results of data collection and field investigation for potential involvement with threatened and endangered species and/or wetlands associated with development of the Stormwater Management Facilities (SMFs) with the project area.

DATA COLLECTION

Readily available data sources were reviewed to determine if any wetlands and/or protected species or their habitats occur within or adjacent to proposed SMF locations. The primary information sources utilized for protected species occurrences and potential wetland involvement within the project area included:

- 2008 South Florida Water Management District (SFWMD) Digital Orthographic imagery;
- 2008 SFWMD Florida Land Use, Cover and Forms Classification System (FLUCFCS);
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory data;
- United States Department of Agriculture (USDA) & National Resources Conservation Service (NRCS) Soil Survey of Okeechobee County;
- Florida Natural Areas Inventory (FNAI) element occurrence records and protected resources data;
- Florida Fish and Wildlife Conservation Commission (FWC) bald eagle nest sites, wading bird rookeries, wildlife observation database, protected species occurrence records, managed areas, and wildlife management areas; and
- USFWS protected species Consultation Areas (CA).

METHODOLOGY

Following the in-house data collection effort, scientists from Scheda Ecological Associates, Inc. (Scheda) conducted pedestrian field surveys of the SMF sites on September 17-18, 2013 and October 9, 2013 to verify the preliminary data previously obtained and to assess existing ecological conditions present at each site. Using meandering pedestrian and vehicular transects, appropriate habitats within a 50-foot buffer around each SMF site boundary were visually scanned for evidence of listed species as well as general wildlife utilization. Most natural areas (rangeland, upland forests, and wetlands) as well as agricultural lands were considered to be appropriate wildlife habitat. Observations were recorded to characterize vegetative communities present and evaluate the sites' potential to support protected wildlife and floral species.

Scientists from The Wantman Group conducted on-site surveys to determine if areas within or directly adjacent to the proposed pond sites contain jurisdictional wetlands and/or surface waters. All wetlands were identified and characterized according to the USFWS Classification System of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979). All identified wetland and surface water boundaries were delineated using handheld GPS. The existing land use/land cover was classified in accordance with FLUCFCS.

For comparison purposes, a rating scale was used for each SMF location reviewed. A rating of "None", "Low", "Medium", or "High" is provided to identify the potential for wetland or protected species involvement associated with the SMF sites. With respect to wetlands, scoring was based on the proportion of the pond's footprint comprised of wetlands: a rating of "None" means 0%; a rating of "Low" is assigned for percentages between 0.10% and 24%; a "Medium" rating is for wetland composition between 25% and 49%; and a "High" rating is assigned when wetland composition is equal to or greater than 50%. Scoring for potential impacts to protected species is based on the type of habitat and its relative condition for supporting wildlife, if particular species were actually observed in the area, and the ease and cost of mitigation if necessary. A rating of "None" means no protected species anticipated; a "Low" rating is for potential but unlikely presence of protected species; a rating of "Medium" is for indication of protected species presence where mitigation is reasonable and possible; and a "High" rating is for indication of protected species presence where mitigation is difficult, costly, or not possible.

Existing land uses were classified in accordance with the SFWMD FLUCFCS and field-verified for accuracy (**Figure 1, Sheets 1-3**).

RESULTS

Based on the literature and database review potential federally listed or federally protected faunal and floral species within the project area include: crested caracara (*Caracara cheriway*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), wood stork (*Mycteria americana*), eastern indigo snake (*Drymarchon corais couperi*),, West Indian manatee (*Trichechus manatus*), bald eagle (*Haliaeetus leucocephalus*), Florida bonneted bat (*Eumops floridanus*) and Okeechobee gourd (*Cucurbita okeechobeensis*). All of the proposed SMF sites are located within the following USFWS CAs: crested caracara, Florida grasshopper sparrow, Everglade snail kite, Florida bonneted bat, and Okeechobee Gourd.

Potential state listed faunal species in the project area include: Florida burrowing owl (*Athene cunicularia floridana),* Florida sandhill crane (*Grus Canadensis pratensis*), little blue heron (*Egretta caerulea*), limpkin (*Aramus guarauna*), roseate spoonbill (*Platalea ajaja*), snowy egret (*Egreta thula*), southeastern American kestrel (*Falco sparverius paulus*), tricolored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*), gopher frog (*Lithobates capito*), Florida pine snake (*Pituophis melanoleucus mugitus*), gopher tortoise (*Gopherus polyphemus*), American alligator (*Alligator mississippiensis*), Sherman's fox squirrel (*Sciurus niger avicennia*), and Florida mouse (*Podomys floridanus*)..

Potential state listed floral species in the project area include: Catebby lily (*Lilium catesbaei*), lowland loosestrife (*Lythrum flagellare*), Simpson's stopper (*Myrcianthes fragrans*), shell mound prickly pear (*Opuntia stricta*), yellow butterwort (*Pinguicula lutea*), hooded pitcher plant (*Sarracenia minor*), lace-lip ladies tresses (*Spiranthes laciniata*), leafless beaked orchid (*Stenorrhynchos lanceolatus*), inflated wild pine (*Tillandsia balbisiana*), common wild pine (*Tillandsia fasciculata*), soft-leaved wild pine (*Tillandsia valenzuelana*), and redmargin zephyrlily (*Zephyranthes simpsonii*).

All proposed SMF sites are located within the USFWS CA for the crested caracara. Crested caracara surveys conducted during the 2013 nesting season (January – April) for project FPID No. 419344-2-22-01 documented one adult crested caracara, flying over the project corridor, within the limits of this project. However, no nests were observed within the USFWS-defined primary (300 meter) or secondary (1,500 meter)

buffer zones of the project corridor. The FDOT has committed to resurveying the project area prior to construction, and coordinating with the USFWS at that time.

All potential SMF sites fall within the USFWS CA for the Florida grasshopper sparrow. However, no suitable habitat was observed within any of the proposed SMF site locations and no grasshopper sparrows were observed during field survey efforts. Similarly, all SMFs sites are also located with the USFWS CA for the Everglade snail kite. No snail kites were observed during project surveys. No Florida apple snails (*Pomacea paludosa*) or exotic ramshorn apple snails (*Marisa cornuarietis*), which are the primary food sources for the snail kite, were observed within the proposed SMF sites. No large, relatively deep and open marsh habitats, which provide the snail kite's primary foraging habitat, occur in any of the proposed SMF sites. The Taylor Creek Canal, located within the project limits, is accessible to the West Indian manatee. Should any SMF sites be selected that outfall to the canal, the standard manatee conditions for in-water work will be implemented to protect the species, as it will also be implemented for the bridge construction over the Taylor Creek Canal.

Although the project is located within the USFWS Okeechobee gourd CA, no gourd specimens have been documented in Okeechobee County, and the species was not observed during field surveys. If protected plant species are observed within the proposed impact limits during the design phase, coordination with the Florida Department of Agriculture and Consumer Services (FDACS) will be initiated, and efforts will be made prior to construction to allow for seed collection and/or relocation to adjacent habitat or other suitable protected lands.

ALL SMF sites are located within the newly-created CA for the Florida bonneted bat. The Florida bonneted bat has been documented historically in, and continues to have the potential to inhabit, a variety of habitat types including mangroves, earth midden hammocks, pine rockland, wet prairie, tropical hardwoods, hardwood hammock, pine flatwoods, lakes, cypress hammock, scrubby flatwoods, and wetland scrub habitat, as well as man-made and altered areas such as residential and urban areas canals, and developed park land (Federal Register, October 2013). Although the species has been documented in this variety of habitat types, very little is known about the specific habitat requirements of the Florida bonneted bat (Federal Register, October 2013). Currently, the only known Florida bonneted bat roosts are in bat boxes. All SMF sites have limited potential to support the Florida bonneted bat. Following SMF site selection, future field surveys will target the mainline corridor and selected SMF sites for identifying any potential Florida bonneted bat roosts.

The entire project area falls within the core foraging area (CFA) of two known wood stork colonies (Atlas numbers 616047A and 616108). Although no wood storks were observed within the proposed SMF site locations during the recent survey efforts, suitable foraging habitat (i.e., marshes, ditches, canals, open water ponds and forested wetlands) is present within or adjacent to the sites. Any required wetland mitigation is expected similarly compensate for wood stork foraging habitat impacts, and if wetland impacts exceed 5 acres, a wood stork foraging analysis will be conducted to ensure that wetland mitigation adequately offsets wood stork impacts.

Suitable foraging habitat for the Florida sandhill crane is present throughout the project corridor. Recent field surveys did not identify any nests or appropriate nesting habitat within the project area. Several individuals were observed flying over the project area and several were observed foraging within pastures adjacent to the proposed project footprint. Therefore, given the close proximity of additional foraging and nesting habitat surrounding the project area, construction of the SMFs is not likely to affect the Florida sandhill crane.

Field surveys conducted during the PD&E Study identified one individual Sherman's fox squirrel within an alignment that is no longer being considered during this design phase. No Sherman's fox squirrel individuals or nests were identified during recent surveys of the project area. However, foraging and nesting habitat occurs within and adjacent to the project corridor. Given the close proximity of additional foraging and nesting habitat surrounding the project area, construction of the SMFs is not likely to affect the Sherman's fox squirrel.

The bald eagle is no longer listed by the USFWS or FWC but remains protected under the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668d), as amended, and the Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712). In 2011, the FWC conducted a bald eagle nesting season survey in Okeechobee County which identified an active bald eagle nest approximately 3.2 miles from the SR 710 and SR 70 intersection (Nest ID: OK031, FWC Eagle Nest Locator). Given the proximity of the bald eagle nest to the project corridor, human activity in the surrounding area, the uncertainty of nest activity status when project construction is scheduled to commence, and the possibility of new nests being identified by the FWC during future nesting season surveys, the FDOT shall commit to resurveying the project area prior to construction. If any nests within 660-foot protection zone are deemed active, the FDOT will act in accordance with the BGEPA and MBTA.

Based on the findings obtained during corridor and SMF site survey efforts on September 17-18, 2013 and October 9, 2013, the following three (3) state-listed faunal species were observed within or adjacent to the proposed SMF sites: gopher tortoise, snowy egret, and white ibis. No listed floral species were observed.

Suitable gopher tortoise habitat is located throughout the project area. Gopher tortoise burrows, both "potentially occupied burrows" and "abandoned burrows", were identified within the proposed footprints of two (2) SMF sites: 4A and 4D. A total of 13 potentially occupied burrows were identified at the 4A site, another 8 potentially occupied burrows were identified at 4D. Impacts to gopher tortoises, their burrows and habitat, can be mitigated through permitted relocation efforts.

Wading birds such as the limpkin, white ibis, little blue heron, snowy egret, tricolored heron, and roseate spoonbill are not listed as endangered or threatened by the USFWS (although they are protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712), but are listed by the FWC as Species of Special Concern (SSC). Suitable foraging habitat for wading birds is located throughout the proposed project area. Ample wading bird foraging habitat occurs adjacent to and in the immediate vicinity of the project area, therefore construction of the SMF sites is not likely to affect protected wading birds.

Table 1 summarizes the land use / land cover, habitat, and protected species concerns for each SMF site. **Table 1** also summarizes the anticipated wetland and surface water impacts associated with each potential SMF site. **Figure 1** depicts the location of all proposed SMF sites, the surrounding land use / land cover for the SMF alternatives, and the location of all identified wetlands and/or surface waters located within or adjacent to the SMF sites. **Figure 2** depicts the locations of the observed potentially occupied gopher tortoise burrows within the proposed SMF 4A and 4D sites.

SMF Descriptions

SMF 1A – 2.32 acres (Photo 1)

SMF 1A is located approximately 700 feet west of US 441, northwest of the western terminus of NW 13th Street. The SMF site contains the Shrub and Brushland (FLUCFCS 3200) land use / land cover type. No wetlands were observed within this SMF; therefore the wetland rating is "None".

The SMF site is completely overgrown with invasive/nuisance vegetation such as Brazilian pepper (*Schinus terebinthifolius*), air potato (*Dioscorea bulbifera*), cogon grass

(*Imperata cylindrica*), West Indian marsh grass (*Hymenachne amplexicaulis*), and other exotic vegetation. Some native species such as cabbage palm (*Sabal palmetto*) and grape vine (*Vitis rotundifolia*) are also present. Some depressional areas are present, but the areas are above the natural ground elevation, and will not be claimed jurisdictional by the SFWMD or USACE, and therefore will not require mitigation.

No state or federally listed protected species were previously documented in SMF 1A and none were observed during recent field surveys. Due to the thick coverage of invasive/nuisance vegetation that provide suboptimal habitat for most protected species and the site's proximity to development, this site was given a rating of "Low" for protected species.

SMF 1B – 1.21 acres (Photo 2)

SMF 1B is located approximately 700 feet east of US 441, northeast of the eastern terminus of NW 13th Street. This SMF contains Hardwood - Conifer Mixed (FLUCFCS 4340) and Freshwater Marshes (FLUCFCS 6410) land use / land cover types. An estimated 0.5 acres of wetlands occur within the SMF site, equating to approximately 40% of the total SMF acreage, therefore it was given a wetland rating on "Medium".

The SMF site is comprised of a mix of freshwater marshes and upland forested habitat containing invasive/nuisance vegetation, such as Brazilian pepper, air potato, and others, and native tree species including live oak (*Quercus virginiana*), laurel oak (*Quercus laurifolia*), and cabbage palm. Herbaceous wetland areas are interspersed throughout the forested habitat in the western half of the proposed SMF site.

No state or federally listed protected species were previously documented in SMF 1B and none were observed during recent field surveys. State-protected wading birds and wood storks could forage in the marshes. Coverage by invasive/nuisance vegetation in the forested upland limits potential nesting by crested caracara. Therefore, this site was given a rating of "Low" for protected species.

SMF 1C – 0.88 acres (Photos 3 & 4)

SMF 1C is located approximately 700 feet east of US 441, southeast of the eastern terminus of NW 13th Street. The entire SMF site contains Mixed Wetland Hardwoods (FLUCFCS 6170), therefore it was given a wetland rating of "High".

The entire SMF site contains saturated soils and standing water. The SMF site is comprised mainly of wetland forest vegetation including bald cypress (*Taxodium distichum*), red maple (*Acer rubrum*), swamp fern (*Blechnum serrulatum*), cabbage palm, and Brazilian pepper. Wetland impacts at this site will require compensatory mitigation.

No state or federally listed protected species were previously documented in SMF 1C and none were observed during recent field surveys. State-protected wading birds and wood storks could forage in the forested wetland. Species and canopy coverage is not suitable for crested caracara nesting. Therefore, this site was given a rating of “Low” for protected species.

SMF 2A – 7.84 acres (Photos 5)

SMF 2A is located within a large undeveloped area approximately 800 feet north on NE 15th Street and one mile east of US 441. This SMF contains Improved Pasture (FLUCFCS 2110) and Oak – Cabbage Palm Forest (FLUCFCS 4271) land use / land cover types. No wetlands were observed within this SMF; therefore the wetland rating is “None”.

The SMF site consists of live oak, cabbage palm, pasture land, and minimal presence of exotic upland vegetation. No state or federally listed protected species were previously documented in SMF 2A. Crested caracara were observed in close proximity to this site (flying over) and the site contains suitable crested caracara nesting habitat, but no nests were identified in 2013 surveys. This site was given a rating of “Low” for protected species.

SMF 2B – 9.95 acres (Photo 6)

SMF 2B is located to the south of SMF 2A, approximately 300 ft north on NE 15th Street and one mile east of US 441. The entire SMF site contains Improved Pasture (FLUCFCS 2110). No wetlands were observed within this SMF; therefore the wetland rating is “None”.

The SMF site consists mainly of pasture land, with a few small patches of slash pine (*Pinus elliotii*), live oak, cabbage palm, and minimal presence of exotic upland vegetation. No state or federally listed protected species were previously documented in SMF 2B. Crested caracara were observed in close proximity to this site (flying over) and the site contains suitable crested caracara nesting habitat, but no nests were identified in 2013. This site was given a rating of “Low” for protected species.

SMF 2C – 10.55 acres (Photos 7 & 8)

SMF 2C is located within a large undeveloped area approximately 1,800 feet east of US 441 and 600 feet north of the Integra roof tile factory. This SMF contains the following land use / land cover classifications: Improved Pasture (FLUCFCS 2110), Oak – Cabbage Palm Forest (FLUCFCS 4271), Mixed Wetland Hardwood (FLUCFCS 6170), and Freshwater Marshes (FLUCFCS 6410). The mixed wetland hardwood occurs over an estimated 0.5 acres of the site. The freshwater marsh wetland occurs over an

estimated 0.2 acres. The combined wetland acreage is less than 10% of the total SMF site acreage, therefore it was given a wetland rating of “Low”.

The SMF site consists mainly of live oak, cabbage palm, pasture land and some exotic upland vegetation. Forested wetlands consisting of a mix of exotic and native tree and shrub species occur along the west boundary of this proposed SMF site. A small depressional herbaceous marsh occurs on the east side of the open grassland pasture.

No state or federally listed protected species were previously documented in SMF 2C and none were observed during recent field surveys. The small size of the marsh area will limit foraging by State-listed wading birds and wood storks. The site contains suitable crested caracara nesting habitat, however none were observed in the vicinity during 2013 nesting season surveys. This site was given a rating of “Low” for protected species.

SMF 3A – 3.82 acres (Photo 9)

SMF 3A is located adjacent to and northeast of the SR 70 crossing over the L-63N Canal. The entire SMF site contains Improved Pasture (FLUCFCS 2110). No wetlands were observed within this SMF; therefore the wetland rating is “None”.

This SMF site consists mainly of pasture land. The dominant vegetation was made up of various upland grasses with some slash pine and saw palmetto (*Serenoa repens*) scattered throughout. Herbaceous wetlands occur adjacent to the northwest boundary of the proposed SMF site. Impacts to the herbaceous wetlands could require compensatory mitigation. A drainage ditch containing emergent wetland vegetation occurs along the west limit of this proposed SMF site. The SFWMD will claim the ditch as an “Other Surface Waters” (OSW) that will not require mitigation. The USACE may require compensatory mitigation for any impacts to the ditch.

No state or federally listed protected species were previously documented in SMF 3A and none were observed during recent field surveys. The site’s proximity to SR 70 likely limits protected species utilization. The site’s proximity to adjacent wetlands and surface waters may result in limited utilization by State-listed wading birds and wood storks. The site contains sub-optimal crested caracara nesting habitat. For these reasons, this site was given a rating of “Low” for protected species.

SMF 3B – 3.74 acres (Photo 10)

SMF 3B is located within a large undeveloped area approximately 700 feet north of SR 70 and 900 west of the L-63N Canal. This SMF contains the following land use / land cover classifications: Improved Pasture (FLUCFCS 2110), Unimproved Pasture (FLUCFCS 2120), and Freshwater Marshes (FLUCFCS 6410). The marsh covers an

estimated 0.3 acres, which is less than 10% of the SMF site's total acreage. Therefore, the wetland rating is 'Low".

This SMF site consists mainly of unimproved pastureland. The dominant vegetation was made up of various upland grasses with some scattered slash pine. Much of the site contained saturated soils. The western portion of this SMF site contained a freshwater marsh which was connected to a larger wetland located outside this SMF footprint. Wetland impacts at this site will require compensatory mitigation.

No state or federally listed protected species were previously documented in SMF 3B and none were observed during recent field surveys. The on-site marsh area and site's proximity to adjacent wetlands may result in limited utilization by state-listed wading birds and wood storks. The site contains sub-optimal crested caracara nesting habitat. For these reasons, this site was given a rating of "Low" for protected species.

SMF 3C – 3.78 acres (Photo 11)

SMF 3C is located adjacent to and between NE 4th trail and SR 70, east of NE 34th Avenue. It is situated to the south of an existing retention pond. The entire SMF site contains Hardwood – Conifer Mixed (FLUCFCS 4340) land use / land cover type. No wetlands were observed within this SMF; therefore the wetland rating is "None".

This SMF site consists mainly of a mixed hardwood conifer forest. Dominant vegetation includes live oak, laurel oak, saw palmetto, cabbage palm, Brazilian pepper, and small patches of upland grasses. A drainage ditch dominated by Brazilian pepper occurs along the east limit of this proposed SMF site. The SFWMD will claim the ditch as an OSW and will not require mitigation. The USACE may require compensatory mitigation for any impacts to the ditch.

No state or federally listed protected species were previously documented in SMF 3C and none were observed during recent field surveys. The site's proximity to the adjacent ditch may result in limited utilization by state-listed wading birds and wood storks. The site contains sub-optimal crested caracara nesting habitat. For these reasons, this site was given a rating of "Low" for protected species.

SMF 4A – 7.79 acres (Photos 12 & 20; Figure 2)

SMF 4A is located adjacent to and north of the SR 710 crossing over the L-63N Canal. The SMF site contains Herbaceous Dry Prairie (FLUCFCS 3100) and Hardwood – Conifer Mixed (FLUCFCS 4340) land use / land cover types. No wetlands were observed within this SMF; therefore the wetland rating is "None".

Thirteen (13) potentially occupied gopher tortoise burrows were located within this SMF footprint. A berm consisting of spoil material approximately 10-15 feet high occupies the

entire eastern portion of the site. The berm is sparsely to heavily vegetated with various exotic/invasive weeds and shrubs along with slash pine, Brazilian pepper, and saw palmetto. The remainder of the site consisted of pine flatwoods primarily vegetated by slash pine, saw palmetto, and scattered live oak, with Brazilian pepper scattered along the southern portion near SR 710. Due to the presence and quantity of gopher tortoise burrows at this site, and the associated cost of mitigation (burrow excavation, tortoise relocation, and species-specific permitting), it was given a rating of "Medium" for protected species

SMF 4B – 4.58 acres (Photo 13)

SMF 4B is located directly adjacent to and east of NE 34th Avenue, north of SR 710. This SMF contains the following land use / land cover classifications: Unimproved Pasture (FLUCFCS 2120), Hardwood – Conifer Mixed (FLUCFCS 4340), and Streams and Waterways (FLUCFCS 5100). The Streams and Waterways land use / land cover type represents a drainage ditch that occurs in the north corner of the proposed SMF site. It is classified as a surface water by the State. The ditch covers an estimated 0.1 acres, which is less than 2% of the SMF site's total acreage. Therefore, the wetland rating is 'Low".

This SMF site consists mainly of a mixed hardwood conifer forest with some unimproved pasture land. Dominant vegetation includes saw palmetto and slash pine, with scattered live oak and cabbage palms. The drainage ditch is dominated by Brazilian pepper. The SFWMD will claim the ditch as an OSW and will not require mitigation. The USACE may require compensatory mitigation for any impacts to the ditch.

No state or federally listed protected species were previously documented in SMF 4B and none were observed during recent field surveys. State-listed wading birds and wood storks may utilize the ditch. The site contains suitable crested caracara nesting habitat, however none were observed in the vicinity during 2013 nesting season surveys. This site was given a rating of "Low" for protected species.

SMF 4C – 3.57 acres (Photo 14)

SMF 4C is located directly adjacent to and north of SR 710, east of NE 34th Avenue. The SMF site contains Unimproved Pasture (FLUCFCS 2120) and Hardwood – Conifer Mixed (FLUCFCS 4340) land use / land cover types. No wetlands were observed within this SMF; therefore the wetland rating is "None".

This SMF site consists mainly of a mixed hardwood conifer forest with some unimproved pasture land. Dominant vegetation includes saw palmetto and slash pine, with scattered live oak and cabbage palms. No state or federally listed protected

species were previously documented in SMF 4C and none were observed during recent field surveys. The site contains suitable crested caracara nesting habitat, however no caracaras were observed in the vicinity during 2013 nesting season surveys. This site was given a rating of “Low” for protected species.

SMF 4D – 8.61 acres (Photos 15, 16, & 20; Figure 2)

SMF 4D is located directly adjacent to (south of) SR 710, between SR 710 and SE 4th Street. It consists primarily of the Hardwood – Conifer Mixed (FLUCFCS 4340) land use / land cover type, but also includes Mixed Use, Low Density Fixed and Mobile Home Units (FLUCFCS 1130) and Fixed Single Family Units, Medium Density (FLUCFCS 1210) land use / land cover. No wetlands were observed within this SMF; therefore the wetland rating is “None”.

Eight (8) potentially occupied gopher tortoise burrows were located within this SMF footprint. This site contained many disturbed areas resulting from pedestrian and ATV activity. Slash pine, laurel oak, live oak, cabbage palm, saw palmetto, grapevine, and smilax (*Smilax sp*.) were the dominant vegetative species identified. Due to the presence and quantity of gopher tortoise burrows at this site, and the associated cost of mitigation (burrow excavation, tortoise relocation, and species-specific permitting), it was given a rating of “Medium” for protected species.

SMF 5A – 2.63 acres (Photo 17)

SMF 5A is located north of SR 710, east of the Okeechobee County Agri-Civic Center access road. This SMF contains Hardwood – Conifer Mixed (FLUCFCS 4340) and Mixed Wetland Hardwoods (FLUCFCS 6170) land use/land cover types. The forested wetland area covers an estimated 0.8 acres in the northwest quadrant, which equates to approximate 30% of the SMF site’s total acreage. Therefore, the wetland rating is ‘Medium”.

The SMF site consisted mainly of slash pines, live oak, saw palmetto, and some exotic upland vegetation. A forested wetland containing a mix of exotic and native tree and shrub species occur on the northwest portion of the proposed SMF site. Wetland impacts at this site will require compensatory mitigation.

No state or federally listed protected species were previously documented in SMF 5A and none were observed during recent field surveys. State-protected wading birds and wood storks could forage in the on-site forested wetland. The site contains sub-optimal crested caracara nesting habitat but no caracaras were observed in the vicinity during 2013 nesting season surveys. Therefore this site was given a rating of “Low” for protected species.

SMF 5B – 2.53 acres (Photo 18)

SMF 5B is located north of SR 710, west of the Okeechobee County Agri-Civic Center access road. This SMF contains Horse Farm (FLUCFCS 2510) and Freshwater Marsh (FLUCFCS 6410) land use/land cover types. The marsh covers an estimated 0.5 acres in the northeast quadrant, which equates to approximate 20% of the SMF site's total acreage. Therefore, the wetland rating is 'Low".

This SMF site consisted mainly of pasture land, along with scattered laurel oaks, cabbage palm, and saw palmetto. An herbaceous wetland occurs in the northeastern portion of the SMF footprint. Wetland impacts at this site will require compensatory mitigation.

No state or federally listed protected species were previously documented in SMF 5B and none were observed during recent field surveys. State-protected wading birds and wood storks could forage in the on-site marsh area. The site contains sub-optimal crested caracara nesting habitat but no caracaras were observed in the vicinity during 2013 nesting season surveys. Therefore this site was given a rating of "Low" for protected species.

SMF 5C – 3.53 acres (Photo 19)

SMF 5C is located directly adjacent to (south of) SR 710, east of the L-63N Canal. It consists entirely of the Hardwood – Conifer Mixed (FLUCFCS 4340) land use / land cover type. No wetlands were observed within this SMF; therefore the wetland rating is "None".

The SMF site consisted mainly of slash pines, live oak, saw palmetto, and some exotic upland vegetation. No state or federally listed protected species were previously documented in SMF 5C and none were observed during recent field surveys. The site contains sub-optimal crested caracara nesting habitat but no caracaras were observed in the vicinity during 2013 nesting season surveys. Therefore this site was given a rating of "Low" for protected species.

CONCLUSIONS AND RECOMMENDATIONS

Wetlands

Based on the results of the preliminary data collection and field reviews, we have determined that nine SMFs (Sites 1A, 2A, 2B, 3A, 3C, 4A, 4C, 4D, and 5C) will have no wetland impacts, four SMFs will have low wetland impacts (Sites 2C, 3B, 4B, and 5B), two SMFs (Sites 1B and 5A) will have medium wetland impacts, and one SMF (Site 1C) will have high wetland impacts. Measures to avoid or minimize wetland and water

quality impacts will be implemented during final pond site design. If selected SMF sites involve wetland impacts, mitigation will be provided through credit purchase at an appropriate mitigation bank such as the Bluefield Ranch Mitigation Bank. Cost-per-credit pricing information for the BRMB was unavailable for review. However, based on recent experience with the FDOT's Invitation-to-Bid process, it is anticipated that the actual cost-per-credit will be approximately $120,000 per credit. An estimated UMAM score of 0.5 per acre (moderate quality score) was assigned to the wetland areas within the proposed SMF sites to provide an estimated per site wetland mitigation cost. These values are provided in **Table 1**. Both wetlands and surface waters were considered as potentially requiring mitigation due to the USACE methods of determining mitigation requirements for waters of the U.S. and wood stork suitable foraging habitat impacts.

Protected Species

Based on results of preliminary data collection and field reviews, we have determined that 14 of the 16 SMF sites (all sites other than 4A and 4D) have low potential protected species involvement. These are due to multiple factors which include, but are not limited to, having suitable crested caracara nesting habitat but no observations of caracaras or nests during recent nesting season surveys, sub-optimal crested caracara nesting habitat, sub-optimal Florida bonneted bat habitat, and/or relatively small-acreage wood stork foraging habitat which may also be used by state-listed wading birds. Due to the presence of potentially-occupied gopher tortoise burrows, SMF sites 4A (with 13 identified burrows) and 4D (with eight identified burrows) have a medium potential for protected species involvement. Access to these sites is readily available, therefore mitigation in the form of burrow excavation and/or gopher tortoise trapping and relocation, with the proper permits from the FWC, is a feasible option to offset impacts. It is estimated that mitigation for gopher tortoise impacts, which includes permitting, burrow excavation, and tortoise relocation, will cost $18,000 at site 4A and $15,000 at Site 4D.

RESOURCES

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Table 1. SMF Site Descriptions and Wetlands/Protected Species Involvement.

SMF Site	SMF Acreage	Description	FLUCFCS Code	Soils (NRCS Soil Survey)	Wetland Acreage	Percent Wetland Coverage	Wetland Mitigation Cost*	Wetlands / Surface Water Involvement	Protected Species Involvement/Concerns
1A	2.32	Undeveloped Parcel dominated by exotic vegetation (woody and herbaceous)	3200 - Shrub & Brushland	Immokalee Fine Sand (11)	0	0%	$0	**None**	**Low**
1B	1.21	Undeveloped parcel containing mix of shrub and wooded areas	4340 – Hardwood – Conifer Mixed; 6410 - Freshwater Marsh	Manatee Loamy Fine Sand, Depressional (6)	0.5	40%	$30,000	**Medium**	**Low**
1C	0.88	Forested wetland (mix of exotic and native species); existing small pond near southern limit	6170 - Mixed Wetland Hardwoods	Manatee Loamy Fine Sand, Depressional (6)	0.88	100%	$52,800	**High**	**Low**
2A	7.84	Undeveloped parcel containing mix of open pasture and wooded areas	2110 - Improved Pasture; 4271 - Oak - Cabbage Palm Forest	Immokalee Fine Sand (11), Riviera Fine Sand (9)	0	0%	$0	**None**	**Low**
2B	9.95	Undeveloped parcel containing mix of pasture and wooded areas	2110 - Improved Pasture;	Immokalee Fine Sand (11)	0	0%	$0	**None**	**Low**
2C	10.55	Undeveloped parcel containing mix of pasture and wooded areas	2110 - Improved Pasture; 4271 - Oak - Cabbage Palm Forest; 6170 Mixed Wetland Hardwoods; 6410 - Freshwater Marsh	Basinger Fine Sand (2); Pindea Fine Sand (8); Floridana, Placid, and Okeelanta Soils, Frequently Flooded (19)	0.7	7%	$42,000	**Low**	**Low**
3A	3.82	Unimproved pasture with some slash pine and saw palmetto	2110 - Improved Pasture	Immokalee Fine Sand (11)	0	0%	$0	**None**	**Low**
3B	3.74	Unimproved pasture	2120 - Unimproved Pasture; 2110 - Improved Pasture; 6410 - Freshwater Marsh	Immokalee Fine Sand (11); Basinger and Placid Soils, Depressional (3)	0.3	8%	$18,000	**Low**	**Low**
3C	3.78	Undeveloped parcel containing mix of pasture and wooded areas	4340 – Hardwood – Conifer mixed	Immokalee Fine Sand (11); Basinger and Placid Soils, Depressional (3)	0	0%	$0	**None**	**Low**
4A	7.79	Undeveloped parcel containing mix of distrubed herbaceous uplands (spoil berms), palmetto-dominated shrub, and wooded areas	3100 Herbaceous Dry Prairie; 4340 – Hardwood – Conifer mixed	Immokalee Fine Sand (11)	0	0%	$0	**None**	**Medium**
4B	4.58	Undeveloped parcel containing mix of pasture and wooded areas	2120 - Unimproved Pasture; 4340 – Hardwood – Conifer Mixed; 5100 - Streams and Waterways	Immokalee Fine Sand (11); Basinger and Placid Soils, Depressional (3)	0.1	2%	$6,000	**Low**	**Low**
4C	3.57	Undeveloped parcel containing mix of pasture and wooded areas	2120 - Unimproved Pasture; 4340 – Hardwood – Conifer Mixed	Immokalee Fine Sand (11)	0	0%	$0	**None**	**Low**
4D	8.61	Wooded area disturbed by frequent ATV activity adjacent to a medium density residential area	4340 – Hardwood – Conifer Mixed; 1130 - Mixed Use, Low Density Fixed and Mobile Home Units; 1210 - Fixed Single Family Units - Medium Density	Immokalee Fine Sand (11)	0	0%	$0	**None**	**Medium**
5A	2.63	Undeveloped parcel dominated by wooded areas	4340 – Hardwood – Conifer Mixed; 6170 Mixed Wetland Hardwoods	Immokalee Fine Sand (11); Floridana, Placid, and Okeelanta Soils, Frequently Flooded (19)	0.8	30%	$48,000	**Medium**	**Low**
5B	2.53	Unimproved pasture with some laurel oak, cabbage palm, and saw palmetto	2510 – Horse Farm; 6410 - Freshwater Marsh	Immokalee Fine Sand (11)	0.5	20%	$30,000	**Low**	**Low**
5C	3.53	Undeveloped parcel dominated by wooded areas	4340 – Hardwood – Conifer Mixed	Immokalee Fine Sand (11); Floridana, Placid, and Okeelanta Soils, Frequently Flooded (19)	0	0%	$0	**None**	**Low**

* = Approximate wetland mitigation cost assumes moderate wetland quality scores (UMAM = 0.5 per acre) and $120,000 per credit

NOTES:

None	No wetland/surface water impacts; no protected species anticipated to occur based on habitat quality, no observations or records
Low	Wetlands/surface waters comprise 1% to 24% of pond footprint; potential but unlikely presence of protected species
Medium	Wetlands/surface waters comprise 25% to 49% of pond footprint; indication of species where mitigation is reasonable and possible
High	Wetlands/surface waters comprise 50% or more of pond footprint; indication of species where mitigation is difficult, costly, or not possible

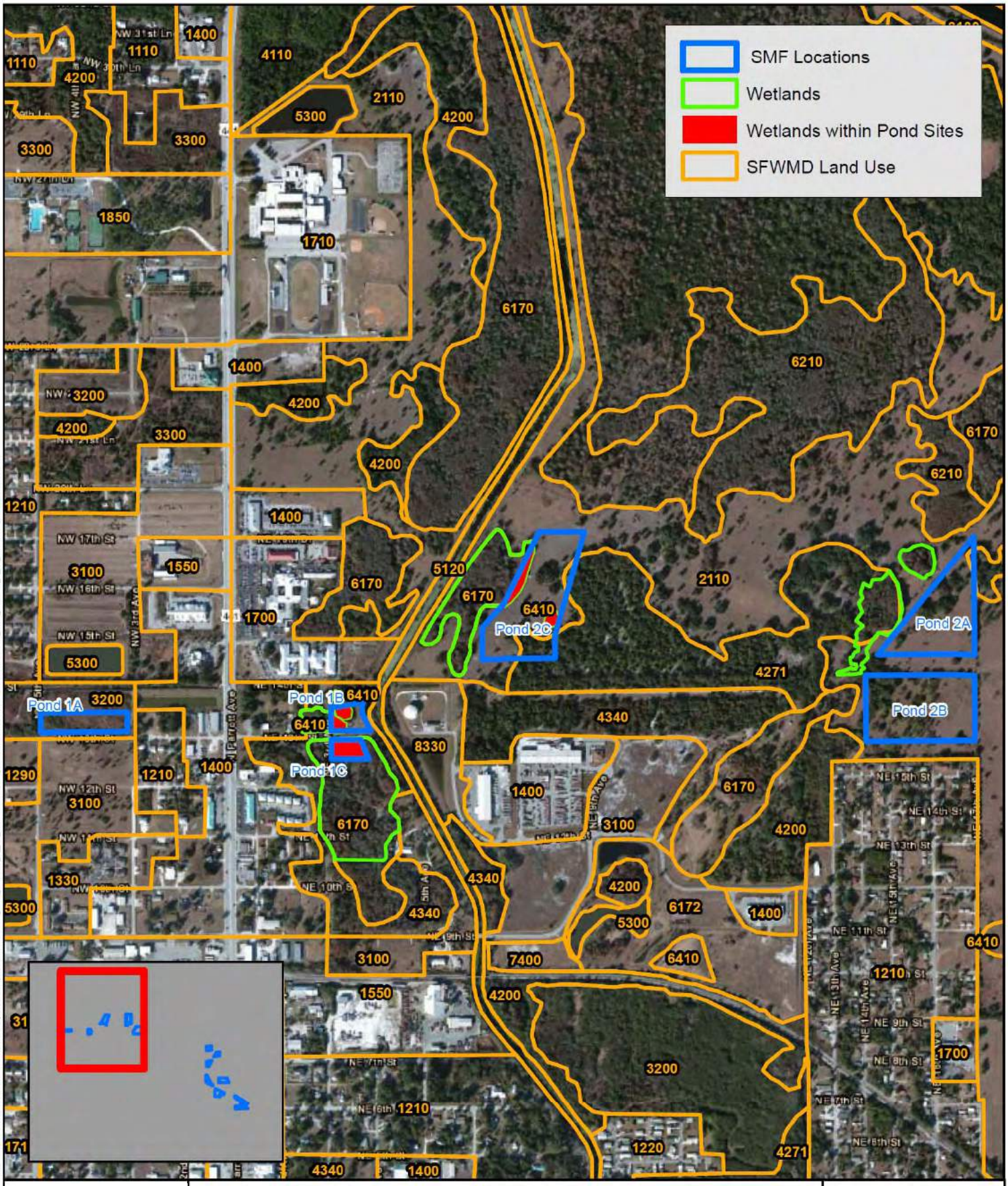


FIGURE 1

SFWMD Land Use Map

Sheet 1 of 3
FPID #: 419344-3-52-01
SR 710 from US 441 to L-63 Canal - Pond Siting
Okeechobee County, Florida

0 1,000 2,000 3,000 Feet

N

Data Source:
-Wantman
-Scheda
-SFWMD
Imagery Source:
-2010 Microsoft

Coordinate System:
NAD 1983 Florida
State Plane East

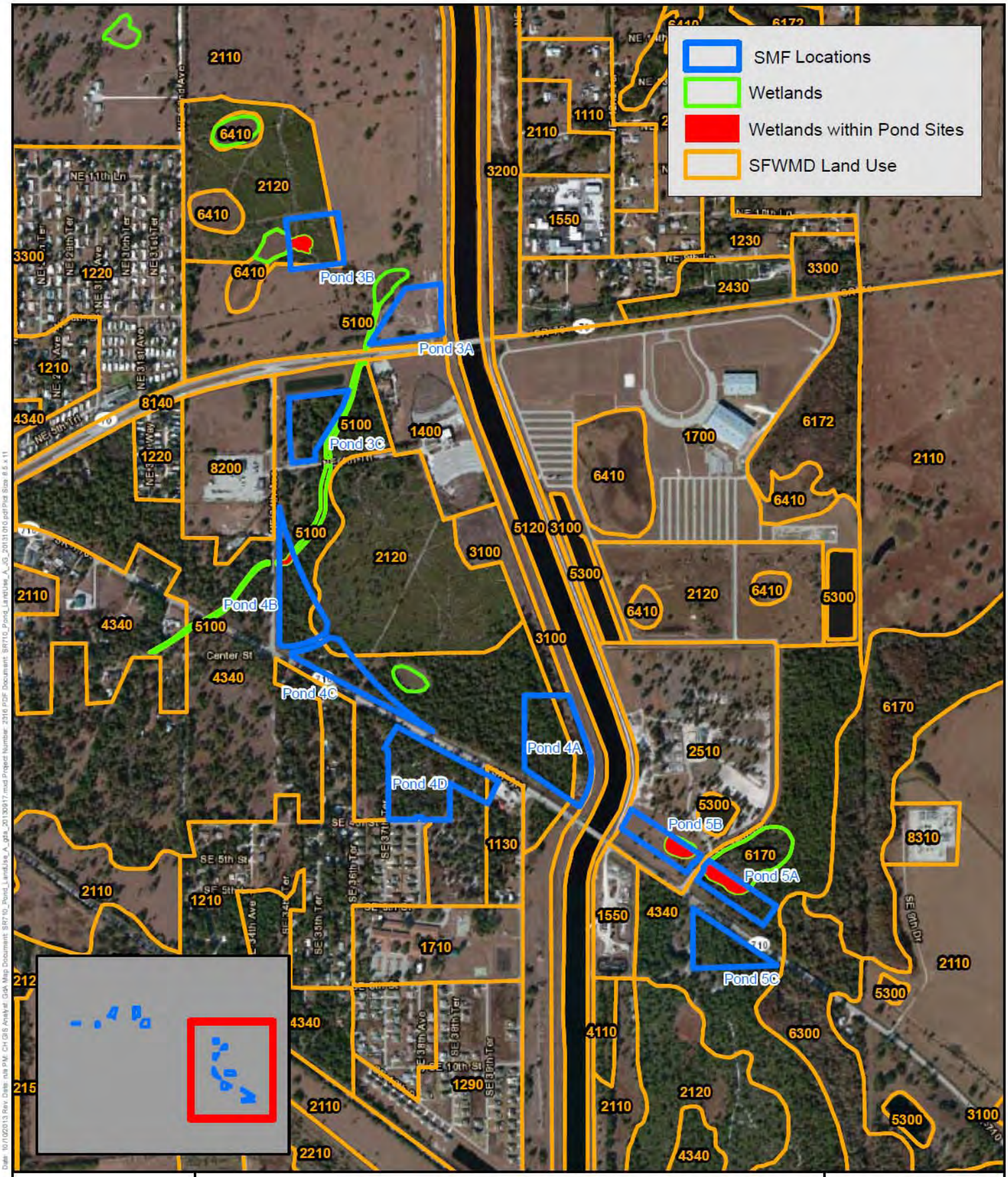


FIGURE 1

SFWMD Land Use Map

Sheet 2 of 3
FPID #: 419344-3-52-01
SR 710 from US 441 to L-63 Canal - Pond Siting
Okeechobee County, Florida

0 1,000 2,000 3,000 Feet

N

Data Source:
-Wantman
-Scheda
-SFWMD
Imagery Source:
-2010 Microsoft

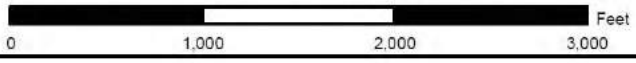
Coordinate System:
NAD 1983 Florida
State Plane East

Pond Name	SFWMD Land Use	Acres
Pond 1A	3200 - SHRUB AND BRUSHLAND	2.322
Pond 1B	4340 - HARDWOOD - CONIFER MIXED	0.734
Pond 1B	6410 - FRESHWATER MARSHES	0.469
Pond 1C	6170 - MIXED WETLAND HARDWOOD	0.882
Pond 2A	2110 - IMPROVED PASTURE	7.721
Pond 2A	4271 - OAK - CABBAGE PALM FOREST	0.122
Pond 2B	2110 - IMPROVED PASTURE	9.954
Pond 2C	2110 - IMPROVED PASTURE	8.356
Pond 2C	4271 - OAK - CABBAGE PALM FOREST	1.481
Pond 2C	6170 - MIXED WETLAND HARDWOOD	0.531
Pond 2C	6410 - FRESHWATER MARSHES	0.185
Pond 3A	2110 - IMPROVED PASTURE	3.819
Pond 3B	2110 - IMPROVED PASTURE	0.513
Pond 3B	2120 - UNIMPROVED PASTURES	2.883
Pond 3B	6410 - FRESHWATER MARSHES	0.345
Pond 3C	4340 - HARDWOOD - CONIFER MIXED	3.775
Pond 4A	3100 - HERBACEOUS (DRY PRAIRIE)	2.462
Pond 4A	4340 - HARDWOOD - CONIFER MIXED	5.332
Pond 4B	2120 - UNIMPROVED PASTURES	0.514
Pond 4B	4340 - HARDWOOD - CONIFER MIXED	3.989
Pond 4B	5100 - STREAMS AND WATERWAYS	0.089
Pond 4C	2120 - UNIMPROVED PASTURES	0.392
Pond 4C	4340 - HARDWOOD - CONIFER MIXED	3.187
Pond 4D	1130 - MIXED UNITS, FIXED AND MOBILE HOME UNITS - LOW DENSITY	0.253
Pond 4D	1210 - FIXED SINGLE FAMILY UNITS - MEDIUM DENSITY	0.008
Pond 4D	4340 - HARDWOOD - CONIFER MIXED	8.354
Pond 5A	4340 - HARDWOOD - CONIFER MIXED	1.825
Pond 5A	6170 - MIXED WETLAND HARDWOOD	0.799
Pond 5B	2510 - HORSE FARMS	2.027
Pond 5B	6410 - FRESHWATER MARSHES	0.507
Pond 5C	4340 - HARDWOOD - CONIFER MIXED	3.528

FIGURE 1

SFWMD Land Use Map

Sheet 3 of 3
FPID #: 419344-3-52-01
SR 710 from US 441 to L-63 Canal - Pond Siting
Okeechobee County, Florida



Data Source:
-Wantman
-Scheda
-SFWMD
Imagery Source:
-2010 Microsoft

Coordinate System:
NAD 1983 Florida
State Plane East

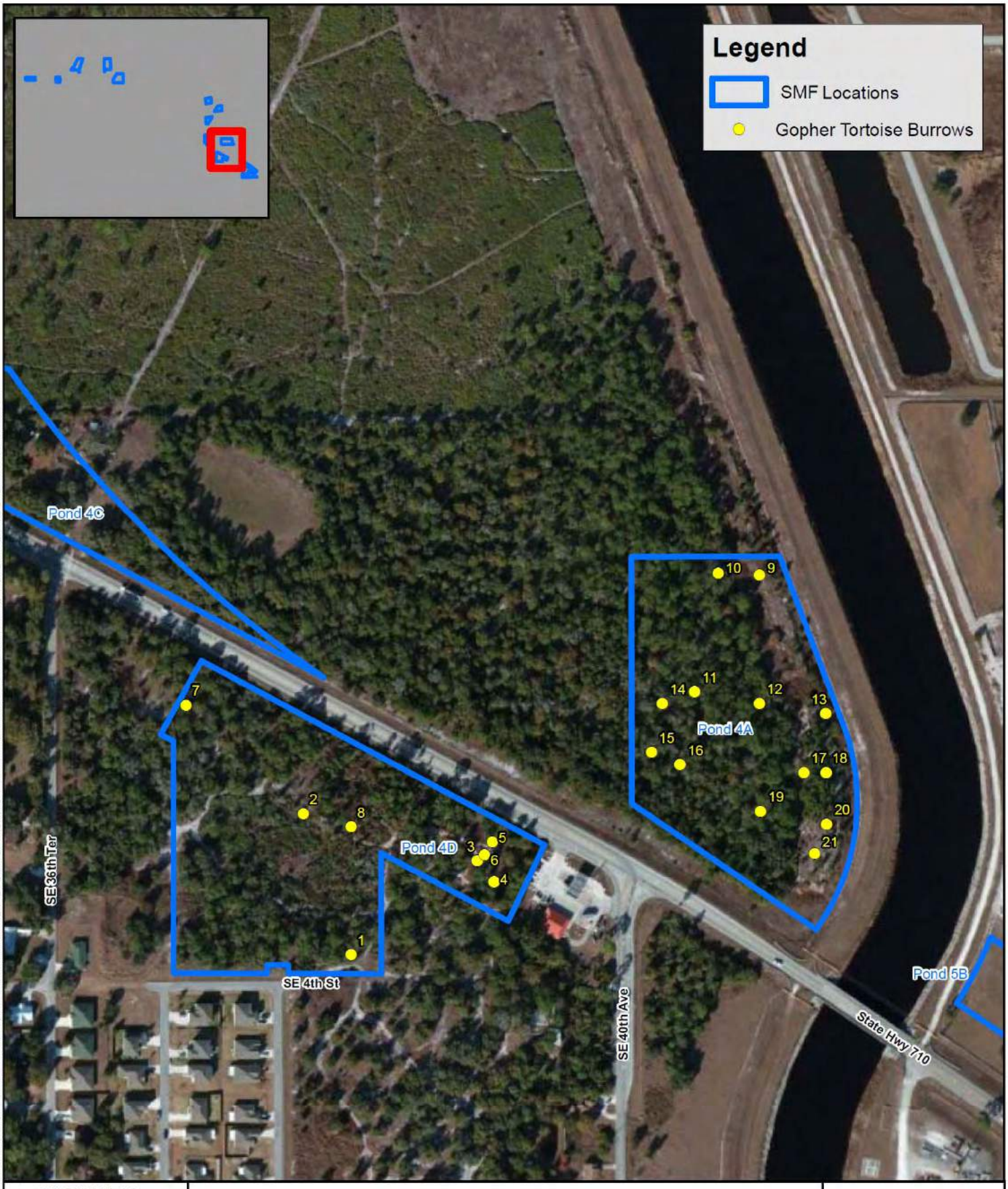


FIGURE 2

Gopher Tortoise Burrow Location Map

FPID #: 419344-3-52-01
SR 710 from US 441 to L-63 Canal - Pond Siting
Okeechobee County, Florida

0 300 600 900 Feet

N

Data Source:
-Wantman
-Scheda
-SFWMD
Imagery Source:
-2010 Microsoft

Coordinate System:
NAD 1983 Florida
State Plane East

Representative Photographs


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Photo 1 – Typical view of habitats occurring at proposed SMF 1A site.

Photo 2 – Typical view of habitats occurring at proposed SMF 1B site.

Photo 3 – Typical view of habitats occurring at proposed SMF 1C site.

Photo 4 – Small pond occurring near southern limit of proposed SMF 1C site.

Photo 5 – Typical view of habitats occurring at proposed SMF 2A site.

Photo 6 – Typical view of habitats occurring at proposed SMF 2B site.

Photo 7 – Typical view of habitats occurring at proposed SMF 2C site.

Photo 8 – Typical view of habitats occurring at proposed SMF 2C site.

Photo 9 – Typical view of habitats occurring at proposed SMF 3A site.

Photo 10 – Typical view of habitats occurring at proposed SMF 3B site.

Photo 11 – Typical view of habitats occurring at proposed SMF 3C site.


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Photo 12 – Typical view of habitats occurring at proposed SMF 4A site.

Photo 13 – Typical view of habitats occurring at proposed SMF 4B site.

Photo 14 - Typical view of habitats occurring at proposed SMF 4C site.

Photo 15 – Typical view of habitats occurring at proposed SMF 4D site.

Photo 16 – Typical view of habitats occurring at proposed SMF 4D site.

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Photo 17 – Typical view of habitats occurring at proposed SMF 5A site.

Photo 18 – Typical view of habitats occurring at proposed SMF 5B site.


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Photo 19 – Typical view of habitats occurring at proposed SMF 5C site.

Photo 20 – Typical view of a potentially occupied gopher tortoise burrow.

Appendix 4
Draft Level I PSR Contamination Screening Evaluation Report (CSER) (July 14, 2014-Rev.2) & Draft Level II Field Screening Report (FSR) – Preferred Ponds (January 13, 2017)

July 14, 2014 (*Rev.2)*

Wantman Group, Inc.
213 South Dillard St, Suite 210
Winter Garden, Florida 34787

Attn: Mr. Alfredo Rodriguez, PE
Project Manager

RE: Draft Level I PSR Contamination Screening Evaluation Report – Proposed Ponds
SR 710 from US 441 to the L-63 Canal
Okeechobee County, Florida
FPN: 419344-3-32-01
Tierra Project No.: 6511-12-054A

Mr. Rodriguez:

Tierra, Inc. (Tierra) has completed a Level I Pond Siting Contamination Screening Evaluation Report (CSER), dated November 22, 2013 based on the proposed pond alternative locations received in October 2013. Subsequent to receiving updated pond information in March 2014, the report was revised to reflect the changes and dated April 21, 2014.

This report revision incorporates edits made based on comments received from the client and the FDOT in May/June 2014. For reference, a copy of Tierra's Response to Comments Memo, dated July 10, 2014 was submitted along with this revised Draft PSR-CSER.

The information presented herein is intended to provide a risk ranking of all pond sites to support the Pond Siting Report (PSR). The contamination screening evaluation presented herein is based on historical aerial photograph and topographic map reviews, governmental database reviews and site reconnaissance.

Should you have any questions, please contact us at (813) 989-1354.

Respectfully Submitted,

TIERRA, INC.

Clare E. Kramer, PG
Senior Scientist

Donald R. Polanis, PSSC, CGC
Chief Scientist

Executive Summary

Tierra, Inc. (Tierra) has prepared this pond site Contamination Screening Evaluation Report (CSER) for the project referenced above. The information presented is intended to provide a risk ranking of all proposed pond alternatives to support the Pond Siting Report (PSR). The contamination screening evaluation presented herein is based on historical aerial photograph and topographic map reviews, governmental database reviews and site reconnaissance. The Proposed Pond Alternative locations are presented on recent aerial photographs included in **CSER-Appendix A**.

The contamination screening evaluation has resulted in the following risk rankings for the proposed pond alternatives:

Proposed Pond Alternative	Risk Ranking	Comment
Pond 1A	No	2.32-Acres. Current and historic woodlands
Pond 1B	Low	1.20-Acres. Risk ranking Low for possible onsite use as water pipeline construction staging area in 1994. Current and historic woodlands with an apiary (bee hives) and open, grassy area
Pond 1C	No	0.88-Acres. Current and historic woodlands
Pond 2A – Option 1	No	14.23-Acres. Current and historic pastureland and woodlands
Pond 2A – Option 2	No	7.93-Acres. Current and historic pastureland and woodlands
Pond 2A – Option 3	No	6.42-Acres. Current and historic pastureland and woodlands
Pond 2B – Option 1	No	15.37-Acres. Current and historic pastureland and woodlands
Pond 2B – Option 2	No	10.00-Acres. Current and historic pastureland and woodlands
Pond 2B – Option 3	No	7.08-Acres. Current and historic pastureland and woodlands
Pond 2C – Option 1	No	6.86-Acres. Current and historic pastureland and woodlands
Pond 2C – Option 2	No	6.14-Acres. Current and historic pastureland and woodlands
Pond 3A (formerly 3B)	Medium	4.18-Acres. Risk ranking Medium for onsite livestock holding pen. Current pastureland, historic woodlands, wetlands, pastureland and cleared land
Pond 3B (formerly 3A)	No	2.44-Acres. Current and historic pastureland and wetlands
Pond 3C	Low	3.81-Acres. Risk ranking Low for onsite stormwater pond. Current and historic woodlands
Pond 4A – Option 1	Low	3.98-Acres. Risk ranking Low for non-adjoining Townstar #40/BP gas station to the southwest. Current woodlands, historic wetland in northeast corner
Pond 4A – Option 2	Low	3.34-Acres. Risk ranking Low for non-adjoining Townstar #40/BP gas station to the southwest. Current woodlands, historic wetland in northeast corner
Pond 4B/4C – Option 1	Medium	8.17-Acres. Risk ranking Medium for onsite livestock holding pen. Current and historic woodlands with two (2) sheds, a livestock holding pen and unpaved trails
Pond 4B – Option 2	No	4.59-Acres. Current and historic woodlands with unpaved trails
Pond 4D – Option 1	Medium	6.08-Acres. Risk ranking Medium for east adjoining Townstar #40/BP gas station. Current and historic woodlands with unpaved trails/tracks; historic wetlands in northeast corner onsite from 1940 to 1960s. Adjoining operational Townstar #40/BP gas station to the east since 1986; three (3) groundwater monitor wells were installed on Pond 4D in 2007 to assess potential petroleum impacts. The laboratory analytical results did not indicate petroleum contaminants in exceedance of the GCTLs. The highest OVA reading during monitor well installation was one (1) ppm. No soil samples were collected for laboratory analytical testing during this Level I investigation.

Proposed Pond Alternative	Risk Ranking	Comment
Pond 4D – Option 2	Medium	4.33-Acres. Risk ranking Medium for east adjoining east Townstar #40/BP gas station. Current and historic woodlands with unpaved trails/tracks; historic wetlands in northeast corner onsite from 1940 to 1960s
Pond 5A	No	2.62-Acres. Current and historic woodlands/wetlands/pastureland
Pond 5B	No	2.53-Acres. Pastureland and wetlands associated with north adjacent Paddock Farms (miniature horses)
Pond 5C	Low	3.53-Acres. Risk ranking Low for offsite livestock holding pen, approximately 50 feet south. Current and historic woodlands

For sites ranked “No” or “Low”, no additional work is recommended at this time. Should a facility’s permitting or regulatory status change between now and the time acquisitions are initiated, additional screening should be conducted.

For the proposed pond sites with risk rankings of “Medium” or “High”, Tierra recommends Level II field screening to determine if environmental impacts exist at the preferred pond sites. Regardless of the risk ranking, all ponds sites selected for final design will require Level II field screening. The field screening scope of work should include, at a minimum, soil borings to the proposed depth of the pond and soil sampling for total arsenic. Additional sample analyses may be required based on historical land use of the pond site and surrounding properties. The District Contamination Impact Coordinator should be consulted regarding the field screening scope of work for all final pond sites.

Definitions, Acronyms, and Abbreviations

HAZARDOUS MATERIAL: Any material which has, or, when combined with other materials will have a deleterious effect on people or the environment. As further discussed and defined in Title 42 United States Code (USC), Section 9601, et seq.

HAZARDOUS WASTE: There are 80 pages in the Code of Federal Regulations (CFR) devoted to the definition and identification of Hazardous Waste. Briefly, the CFR defines hazardous waste as a solid waste (could be a liquid) that has not been excluded from regulation and meets the criteria as defined and discussed in Title 40, CFR, Part 261.3, et seq.

CONTAMINATION: The presence of any regulated material / chemical contained within the soil, surface water or groundwater on or adjacent to Department property, or proposed property, that may require assessment, remediation, or special handling, or that has a potential for liability. These materials would include, but not be limited to, those substances normally referred to as petroleum or petroleum products.

SIGNIFICANT CONTAMINATION: The presence of any contamination that would meet the definition of "hazardous materials" or "hazardous waste" and be regulated under CERCLA or RCRA. Petroleum contamination from underground storage tanks is not regulated by CERCLA or RCRA.

AST	Aboveground Storage Tank
BLS	Below Land Surface
CDV	Cattle Dip Vat
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
De minimis	Lacking significance or of minimum importance as to merit disregard
EDR	Environmental Data Resources, Inc.
EPA	United States Environmental Protection Agency
EROS	Earth Resource Observation and Science Center
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
GCTL	Groundwater Clean-up Target Levels
LUST	Leaking Underground Storage Tank
NADC	Natural Attenuation Default Concentrations
NEPA	National Environmental Policy Act
NFA	Notice of No Further Action
NGVD	National Geodetic Vertical Datum of 1929
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
PD&E	Project Development and Environment
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SCS	Soil Conservation Service
SCTL	Soil Clean-up Target Levels
SRCO	Site Rehabilitation Completion Order
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UST	Underground Storage Tank

Table of Contents

Appendices

1.0 Project Description

The Florida Department of Transportation, District One, is conducting a Project Development and Environmental (PD&E) Study regarding the proposed new road construction (extension to the northwest of existing SR 710) of SR 710 from US 441 to L-63 Canal in Okeechobee County, Florida. The project includes constructing an extension of SR 710 around the northeast side of Okeechobee. The new roadway will have a design speed of 50 mph and will be a high-speed urban four-lane roadway, including a 12-foot multi-use path on one side and five foot sidewalk on the other.

Initially, sixteen (16) Proposed Pond Alternatives were received from the client by email in October 2013. Updated Proposed Pond Alternatives were received from the client in March 2014. There are now a total of twenty-three (23) pond site options identified for evaluation; all are located offsite along or near the proposed new alignment. The project also includes bridge work at the L-63 Canal.

The locations and limits of the pond sites are presented on the Proposed Pond Alternative Location Maps in **CSER-Appendix A**. Also included are the Project Aerial Map Figure 1 (which includes the proposed roadway alignment for SR 710) and the Pond Aerials Figures 12A to 12O, provided by the client and presented in **CSER-Appendix E.**

2.1 Ponds 1A, 1B and 1C

The proposed pond alternatives are all located west of Taylor Creek and north of NW 13th Street in Okeechobee, Florida. Ponds 1B and 1C are both located east of North Parrott Avenue (US Highway 441) and Pond 1A is located west of Parrott Avenue. The specific locations are shown on a recent aerial photographs presented in **CSER-Appendix A** and in **CSER-Appendix E.**

During site reconnaissance, Pond 1A was observed as woodlands; Pond 1B was observed as an open, grassy area with some wooded portions. An apiary (bee nursery) was located onsite near the eastern boundary of Pond 1B. Pond 1C was observed as woodlands. Surrounding properties in the vicinity of Pond 1A include residential neighborhoods approximately 300 feet to the northwest and 150 feet to the southwest. Two manmade ponds were noted approximately 170 feet to the north and 120 feet to the northeast. Developed properties in the surrounding vicinity of Ponds 1B and 1C include Taylor Creek to the east, followed by Okeechobee Utility Authority (water treatment plant constructed about 1994) approximately 120 feet to the east, and Okeechobee Health & Rehabilitation Center approximately 350 feet northwest. The location of the Okeechobee Utility Authority and Okeechobee Health & Rehabilitation Center are indicated on Sheet A-1, Proposed Pond Alternatives Location Map in **CSER-Appendix A**.

Photo 1: View to the north across Pond 1A

Photo 2: View to the north from southeast corner of Pond 1B of onsite bee hives

Photo 3: View to the south from northern boundary of Pond 1C

Historical Land Use Summary

Historical aerial photographs dated 1940, 1953, 1962, 1970, 1983, 1994, 1999, 2004, 2005, 2006, 2007, 2009, 2010, 2011, and 2012 were reviewed from University of Florida Map & Imagery Library (UF), FDOT Survey & Mapping (FDOT) and Google Earth. A summary of our review is depicted in the table below. Copies of select aerial photographs are included in **CSER-Appendix B**.

Table 1		
Year	**Comment**	**Source**
1940 - 1983	Ponds 1A, 1B, 1C : Undeveloped and wooded land 1962 offsite north: Pond 1A – earthwork/excavation activities are apparent 1970 offsite east: Pond 1B & 1C – Man-made modifications (earthwork) to Taylor Creek	UF, FDOT
1994 - 2012	Ponds 1A, 1C : Undeveloped and wooded land 1994: Pond 1B – Possible construction staging area for water pipeline installation to offsite east WTP (under construction)	FDOT & Google Earth

The USGS 7.5-Minute "Taylor Creek SE, Florida" Quadrangle, published in 1983 was reviewed. Pond 1A is shaded white indicating undeveloped or vacant land with a small swamp or marsh located onsite along the central section of the southern boundary. Pond 1B and 1C are shaded white indicating undeveloped or vacant land. Approximate elevation of the land in the area is 25 feet. No structures are depicted onsite. Taylor Creek is depicted to the east of these pond alternatives, but is not labeled on the topographic map. A copy of the topographic map is included in **CSER-Appendix C**.

Regulatory Review

An environmental database search, using Environmental Data Resources, Inc. (EDR) was conducted in October 2013, to identify facilities onsite or within close proximity to the proposed pond alternatives, containing documented or suspected petroleum contamination or other hazardous materials. The regulatory review of federal and state environmental records utilizes an integrated geographic information system database. The search was conducted as a preliminary screening tool to identify facilities that are registered with various county, state, and federal agencies. A copy of the EDR report is included in **CSER-Appendix D**. Supplemental regulatory documentation was reviewed from the EPA's and FDEP's online resources.

Hi-Tek Automotive, an auto repair shop, was not listed in any regulatory reports but was noted to be approximately 500 feet east of Pond 1A. Its location is indicated on Sheet A-1 of **CSER-Appendix 1**.

Risk Ranking

Based on the aerial photographs and regulatory documentation reviewed, Pond 1A and Pond 1C have been historically undeveloped and wooded land. Therefore they are given a risk ranking of "No". Based on the unidentified use of the southeast portion of Pond 1B, as seen in the 1994 aerial photograph and lack of regulatory documentation, Pond 1B is given a potential Risk Ranking of "Low".

2.2 Ponds 2A, 2B and 2C

The proposed pond alternatives are all located generally north of NE 9th Street, east of Taylor Creek and west of the L-63 Canal in Okeechobee, Florida. The specific locations are shown on a recent aerial photographs presented in **CSER-Appendix A** and in **CSER-Appendix E**. During site reconnaissance, Ponds 2A (Options 1, 2 & 3), 2B (Options 1, 2 & 3), and 2C (Options 1 & 2) were observed primarily as pastureland with some wooded areas.

Photo 4: View to the west across Pond 2A from southeastern corner

Photo 5: View to the south across Pond 2B from northern boundary

Photo 6: View to the northeast across Pond 2C from western boundary

Historical Land Use Summary

Historical aerial photographs dated 1940, 1953, 1962, 1970, 1983, 1994, 1999, 2004, 2005, 2006, 2007, 2009, 2010, 2011, and 2012 were reviewed from UF, FDOT and Google Earth. A summary of our review is depicted in the table below. Copies of select aerial photographs are included in **CSER-Appendix B**.

Table 2		
Year	**Comment**	**Source**
1940 - 2012	Ponds 2A and 2B: Pastureland/Woodlands Pond 2C: Pastureland/Woodlands/Wetlands	UF, FDOT & Google Earth

The USGS 7.5-Minute "Taylor Creek SE, Florida" Quadrangle, published in 1983 was reviewed. Ponds 2A, 2B, and 2C are shaded white indicating undeveloped or vacant land. Approximate elevation of the land in the area is 20 to 25 feet. No structures are depicted onsite. Taylor Creek is depicted to the west, and the L-63 Canal is depicted to the east, however both are not labeled. A copy of the topographic map is included in **CSER-Appendix C**.

Regulatory Review

No regulated sites were identified on or within close proximity to the proposed pond alternatives 2A, 2B, and 2C. A copy of the EDR report is included in **CSER-Appendix D**.

Risk Ranking

Based on the historical uses as woodlands and pastureland, Ponds 2A, 2B, and 2C are each given a potential Risk Ranking of "No".

2.3 Ponds 3A, 3B and 3C

The proposed pond alternatives are all located east of NE 32nd Avenue, north and south of SR 70, and west of the L-63 Canal in Okeechobee, Florida. The specific locations are shown on a recent aerial photographs presented in **CSER-Appendix A** and in **CSER-Appendix E**.

During site reconnaissance, Pond 3A (formerly named Pond 3B) was observed to be pastureland with a livestock holding pen (see Photo 8) situated in the southern portion; Pond 3B (formerly named Pond 3A) was observed to be undeveloped land; and Pond 3C was observed as vacant, cleared and wooded land, no signs of soil staining, stressed vegetation, odors or other indications of a potential contamination concern were observed. Pond 3A is adjoined by the L-63 Canal to the east and SR 710 to the south. The Florida Power and Light (FPL) Company service center (Fac. ID 8519987) is located approximately 220 feet southwest of Pond 3C (discussed in following regulatory review). One residence is located approximately 400 feet west of Pond 3C. The FPL facility location is indicated on Sheet A-3, Proposed Pond Alternatives Location Map in **CSER-Appendix A**.

Photo 7: View to the north across Pond 3B from southern boundary

Photo 8: Livestock holding pen located on Pond 3A

Photo 9: View to the north across Pond 3A from southeastern section

Photo 10: View to the east across Pond 3C from western boundary

Historical Land Use Summary

Historical aerial photographs dated 1940, 1953, 1962, 1970, 1983, 1994, 1999, 2004, 2005, 2006, 2007, 2009, 2010, 2011, and 2012 were reviewed from UF, FDOT and Google Earth. A summary of our review is depicted in following the table. Copies of select aerial photographs are included in **CSER-Appendix B**.

Table 3		
Year	**Comment**	**Source**
1940 - 1953	Pond 3A, 3B and 3C: Pastureland/Woodlands/Wetlands	UF & FDOT
1962	Offsite: Pond 3A and 3C adjoined by man-made ditch and unpaved tracks	UF & FDOT
1970	Offsite: Cleared land (for construction of the L-63 Canal) is apparent to the east of Pond 3A	UF & FDOT
1983 - 1994	Pond 3A is depicted as cleared land. Pond 3B and 3C appear unchanged. Offsite: the L-63 Canal is apparent to the east of Pond 3A	FDOT & Google Earth
1999	Pond 3C: a structure with an unpaved parking area is depicted in the southwest Corner Offsite: A man-made stormwater pond is depicted to the north of Pond 3A	Google Earth
2004	Pond 3C: Southwest corner cleared of structure, possible automobile parking or junk yard	Google Earth
2005	Pond 3C: Southwest corner is cleared of vehicles, former building footprint is still apparent	Google Earth
2009 - 2012	Ponds 3A, 3B, 3C: Generally remain the same, undeveloped Pond 3A: Vegetative re-growth is apparent, a cattle pen is noted in the eastern portion of the pond	FDOT & Google Earth

The USGS 7.5-Minute "Taylor Creek SE, Florida" Quadrangle, published in 1983 was reviewed. Ponds 3A and 3B are depicted with small areas of marsh or swamp. Pond 3C is shaded white, indicating undeveloped or vacant land. Approximate elevation of the land in the area is 25 feet. SR 70 and the L-63 Canal are depicted, but are not labeled. No structures are depicted onsite. A copy of the topographic map is included in **CSER-Appendix C**.

Regulatory Review

One (1) site was identified in close proximity to Pond 3C. The Florida Power & Light Company Service Center (Fac. ID 8519987), 825 N.E. 34th Avenue is located approximately 220 feet west of Pond 3C. This facility was identified on the LUST, AST, UST, FINDS and Tier 2 regulatory databases. According to the EDR report one (1) 3,000-gallon unleaded gasoline AST that was installed in November 2007 is currently maintained at this site. Tierra identified the AST approximately 280 feet southwest of Pond 3C during the site reconnaissance. The FPL facility location is indicated on Sheet A-3, Proposed Pond Alternatives Location Map in **CSER-Appendix A**. A copy of the EDR report is included in **CSER-Appendix D**.

A Contamination Assessment Report (CAR) by Atlanta Testing and Engineering, dated October 5, 1993 included a map which identified one former 5,000-gallon UST to be located approximately 650 feet west of Pond 3C. The report included a map indicating shallow groundwater flow was generally toward the southwest, away from the pond site.

A Site Characterization Screening Letter Report dated December 2012 reveals the former UST was installed in 1974 and situated on the western portion of Florida Power & Light Company Property approximately 530 feet west of the nearest pond, Pond 3C. This UST was first stated to contain gasoline and was later changed to vehicular diesel.

A discharge notification form was submitted to the FDEP in 1992 based on groundwater sample analysis from the UST monitoring wells. The UST was removed in September 1992 in conjunction with source removal of an estimated 784 tons of contaminated soil.

Site screening activities included soil and groundwater sampling (performed by ARCADIS) in November 2012. The laboratory analysis indicated VOC's above applicable GCTL's and SCTL's. According to FDEP the discharge status is currently active and cleanup is ongoing, effective in October 2000. Based on distance from Pond 3C, this facility is not considered a significant contamination concern at this time. Applicable pages from these reports have been included in **CSER-Appendix E**.

Risk Ranking

Based on the current use of Pond 3A as pastureland with an observed livestock holding pen, plus the typical use of herbicides/pesticides associated in these areas, Pond 3A is given a Risk Ranking of "Medium". Based on the historical use of Pond 3B as pastureland and wetlands, it is given a potential risk ranking of "No". Based on the general undeveloped use and that no signs of soil staining, stressed vegetation, odors or other indications of potential contamination conditions were observed on Pond 3C, the former presence of an adjoining unknown structure and possible auto junk yard (noted in the 1999 to 2005 aerials) is not considered a concern. Therefore, Pond 3C is given a potential Risk Ranking of "Low".

2.4 Ponds 4A, 4B, 4C and 4D

The proposed pond alternatives 4A, 4B, 4C and 4D are located west of the L-63 Canal and north and south of the existing SR 710 in Okeechobee, Florida. The specific locations are shown on a recent aerial photographs presented in **CSER-Appendix A** and in **CSER-Appendix E**.

During site reconnaissance, the pond sites 4A (Options 1 & 2), 4B/4C (Option 1), 4B (Option 2) and 4D (Options 1 & 2) were observed as pastureland and woodlands with unpaved trails/tracks throughout. Two (2) gray metal sheds, an abandoned tractor and a livestock holding pen were observed near the central section of the northeastern on Pond 4C. One shed was locked and had a mailbox near the front door. Its use is unknown. The second shed contained several tires, a water well pump and several empty 1-gallon automotive fluid containers. The floor was mainly wood with some areas of bare soil. No obvious soil stains or petroleum odors were noted during the site reconnaissance. An operational retail fuel facility, Town Star #40/BP (Fac. ID 8630309), is located adjoining Pond 4D to the east and is discussed further in the following regulatory review section. The Town Star #40/BP location is indicated on Sheet A-4, Proposed Pond Alternatives Location Map in **CSER-Appendix A**.

Photo 11: View to the north across Pond 4A

Photo 12: View to the south across Pond 4B

Photo 13: Gray metal structure, in central portion of the northeastern boundary on Pond 4C

Photo 14: Livestock holding pen on Pond 4C

Photo 15: Inside of shed on Pond 4C

Photo 16: View to the east across Pond 4C towards an abandoned tractor

Photo 17: View to the south from northern boundary of Pond 4D

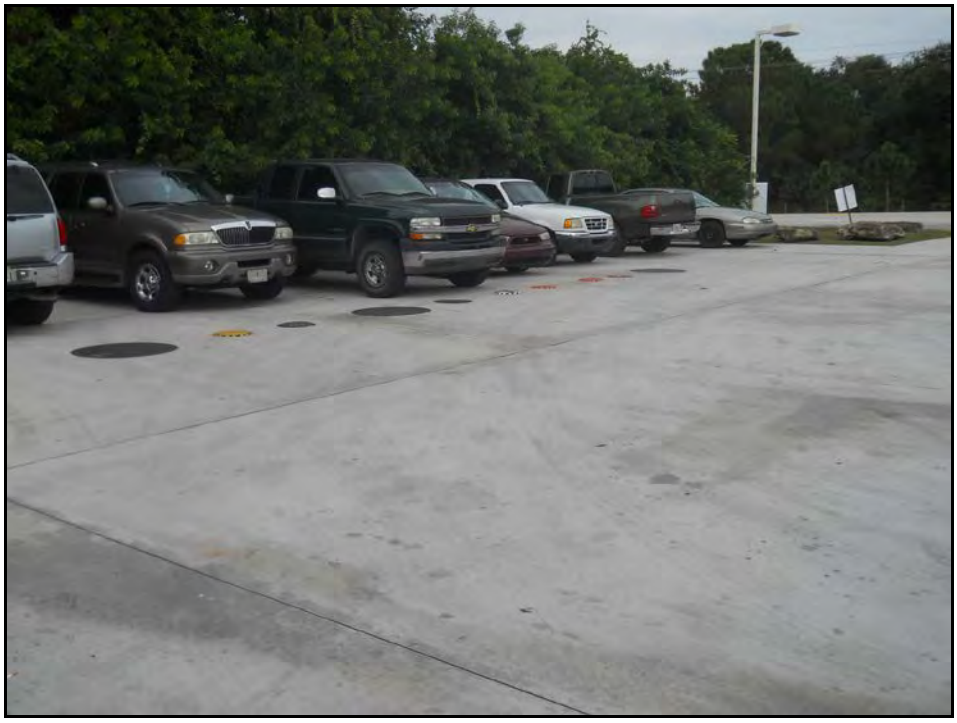


Photo 18: East adjoining Townstar #40/BP gas station tank farm

Historical Land Use Summary

Historical aerial photographs dated 1940, 1953, 1962, 1970, 1983, 1994, 1999, 2004, 2005, 2006, 2007, 2009, 2010, 2011, and 2012 were reviewed from UF, FDOT and Google Earth. A summary of our review is depicted in the table below. Copies of select aerial photographs are included in **CSER-Appendix B**.

Table 4		
Year	**Comment**	**Source**
1940 - 1962	Ponds 4A, 4B, 4C and 4D: Pastureland/Woodlands/Wetlands Offsite: SR 710 is present	UF & FDOT
1970 - 1983	Ponds 4A: possible spoil bank for L-63 Canal construction along the eastern boundary Ponds 4B and 4D: Pastureland/Woodlands Pond 4C: one structure is depicted in the central area Offsite: L-63 canal is apparent to the east of Pond 4A	FDOT
1994 - 2012	Ponds 4A, 4B, 4C, 4D: Appear generally unchanged and undeveloped Offsite: A retail fuel station adjoins Pond 4D to the east	FDOT & Google Earth

The USGS 7.5-Minute "Taylor Creek SE, Florida" Quadrangle, published in 1983 was reviewed. Ponds 4A and 4D are shaded white, indicating undeveloped or vacant land. Ponds 4B and 4C are shaded green and white, indicating undeveloped, wooded, or vacant land. Approximate elevation of the land is 25 feet. One structure is depicted on Pond 4C. No structures are depicted on Ponds 4A, 4B or 4D. L-63 Canal and SR 710 are depicted but not labeled. A copy of the topographic map is included in **CSER-Appendix C**.

Regulatory Review

Three (3) sites were identified in EDR's regulatory database report within close proximity to Ponds 4B and 4D. A copy of the EDR report is included in **CSER-Appendix D**.

The Florida Power & Light Company Service Center (Fac. ID 8519987)
This facility is located at 825 NE 34th Avenue located approximately 80 feet northwest of Pond 4B. This site was listed in the EDR report to have one (1) 3,000-gallon unleaded gas AST installed in November 2007, which is currently in service. During the site reconnaissance, the AST was observed and located approximately 170 feet northwest of Pond 4B. No discharge from this AST was identified in regulatory documentation reviewed. The FPL facility location is indicated on Sheet A-3, Proposed Pond Alternatives Location Map in **CSER-Appendix A**.

Additionally, one former 5,000-gallon unleaded gasoline UST was installed in 1974 and removed in 1992. A discharge report was filed on June 25, 1992 for an unleaded gasoline discharge (quantity not specified). A Contamination Assessment Report (CAR) by Atlanta Testing and Engineering, dated October 5, 1993 included a map which depicted the former 5,000-gallon UST location approximately 650 feet northwest of Pond 4B and indicated that shallow groundwater flow was generally toward the southwest, away from the pond site.

Based on its distance, current regulatory status and the reported groundwater flow direction away from the pond alternatives, this facility is not considered to be a potential contamination concern at this time. Applicable pages from these reports have been included in **CSER-Appendix E**.

Town Star #40/BP gas station (Fac. ID 8630309)
This facility is located at 3990 SR 710, adjoining to the east of Pond 4D (approximately 100 feet southwest of Pond 4A). During the site reconnaissance, this facility was identified as an operational Town Star/BP gas station. According to EDRs regulatory database report this facility had three (3) USTs installed in 1986 and removed in 2009. One (1) 22,000-gallon diesel/gasoline fuel UST installed in 2009 remains in-service. A discharge was reported on November 22, 1988. The Town Star #40/BP facility location is indicated on Sheet A-4, Proposed Pond Alternatives Location Map in **CSER-Appendix A**.

A Supplemental Site Assessment Report by Mactec, dated November 21, 2007 indicated three (3) permanent groundwater monitor wells were installed on Pond 4D. These wells are associated with assessment activities at the gas station. Laboratory results collected did not detect analytes above the applicable CTL's. OVA screening of the soils during well installation did not record measurements above 1 ppm. The groundwater flow map indicated the direction towards the northeast on Pond 4D.

A Source Removal Report by Gator Engineering and Aquifer Restoration, Inc. (GEAR), dated September 29, 2009 depicted the three (3) former USTs and the current UST to be located near the western boundary of the Townstar facility (approximately 10 feet east of Pond 4D). Approximately 345.5 tons of impacted soil was removed and disposed offsite during the tank removal. According to the report, laboratory analytical results of confirmation soil samples collected from the excavation were below SCTLs.

Cleanup activities have been completed at the Townstar facility and a SRCO was issued in September 23, 2013. Applicable pages of these reports have been included in **CSER-Appendix E**.

Chevron #47761 (Fac. ID 8512544)
This facility is located at 2768 SR 710 approximately 1,800 feet west of Pond 4B, the nearest pond alternative. Based on distance, this facility is not considered a potential contamination risk to the pond alternative and is not further discussed.

Risk Ranking

Based on the historically undeveloped use and the distance of the Townstar #40/BP gas station to Pond 4A, it is given potential risk ranking of "Low". Based on the historical land use of Pond 4B as undeveloped and wooded land, Pond 4B is given a potential risk ranking of "No". Based on the presence of a livestock holding pen and sheds, plus the typical use of herbicides/pesticides in these areas, Pond 4C is given a potential Risk Ranking of "Medium". Based on the current use of east adjoining property as a retail fuel station with documented historical discharge, Pond 4D has been given a potential Risk Ranking of "Medium".

2.5 Ponds 5A, 5B and 5C

The proposed pond alternatives are all located west of L-63 Canal, 5A and 5B are north of SR 710 and Pond 5C is located south of SR 710 in Okeechobee, Florida. The specific locations are shown on a recent aerial photographs presented in **CSER-Appendix A** and in **CSER-Appendix E**.

During site reconnaissance, the pond sites were observed as woodlands and pastureland. Pond 5B is part of Paddock Farms, a farm for miniature horses. A livestock holding pen was observed approximately 50 feet south of Pond 5C. The livestock holding pen location is indicated on Sheet A-4, Proposed Pond Alternatives Location Map in **CSER-Appendix A**.

Photo 19: View to the north across southern boundary of Pond 5A

Photo 20: View to the northwest across eastern portion of Pond 5B

Photo 21: View to the south across northern corner of Pond 5C

Historical Land Use Summary

Historical aerial photographs dated 1940, 1953, 1962, 1970, 1983, 1994, 1999, 2004, 2005, 2006, 2007, 2009, 2010, 2011, and 2012 were reviewed from UF, FDOT and Google Earth. A summary of our review is depicted in the table below. Copies of select aerial photographs are included in **CSER-Appendix B**.

Table 5		
Year	**Comment**	**Source**
1940 - 1962	Ponds 5A, 5B and 5C: Pastureland/Woodlands/wetlands Offsite: SR 710 is present	UF, FDOT
1970 - 1999	Offsite: L-63 Canal is apparent to the west of Pond 5B	FDOT & Google Earth
2004	Pond 5B: cleared of vegetation and fenced Offsite: A paved access road has been constructed between Pond 5A and 5B	Google Earth
2005 - 2012	Ponds 5A, 5B, 5C: Pastureland/Woodlands	FDOT & Google Earth

The USGS 7.5-Minute "Taylor Creek SE, Florida" Quadrangle, published in 1983 was reviewed. Ponds 5A, 5B and 5C are shaded white indicating undeveloped or vacant land. Approximate elevation of the land is 25 feet. No structures are depicted onsite. L-63 Canal and SR 710 are depicted but not labeled. A copy of the topographic map is included in **CSER-Appendix C**.

Regulatory Review

No regulated sites were identified on or within close proximity to the proposed pond alternatives 5A, 5B, and 5C. A copy of the EDR report is included in **CSER-Appendix D**.

Risk Ranking

Based on the historical use as pastureland, woodlands and wetlands, Ponds 5A and 5B are given potential risk rankings of "No". Based on the use of Pond 5C as pastureland/woodlands with a livestock holding pen observed offsite, approximately 50 feet south, Pond 5C is given a potential Risk Ranking of "Low".

3.0 Risk Ranking Summary

This Level I contamination screening evaluation has resulted in the following risk rankings for the proposed pond alternatives:

Proposed Pond Alternative	Risk Ranking	Comment
Pond 1A	No	2.32-Acres. Current and historic woodlands
Pond 1B	Low	1.20-Acres. Risk ranking Low for possible onsite use as water pipeline construction staging area in 1994. Current and historic woodlands with an apiary (bee hives) and open, grassy area
Pond 1C	No	0.88-Acres. Current and historic woodlands
Pond 2A – Option 1	No	14.23-Acres. Current and historic pastureland and woodlands
Pond 2A – Option 2	No	7.93-Acres. Current and historic pastureland and woodlands
Pond 2A – Option 3	No	6.42-Acres. Current and historic pastureland and woodlands
Pond 2B – Option 1	No	15.37-Acres. Current and historic pastureland and woodlands
Pond 2B – Option 2	No	10.00-Acres. Current and historic pastureland and woodlands
Pond 2B – Option 3	No	7.08-Acres. Current and historic pastureland and woodlands
Pond 2C – Option 1	No	6.86-Acres. Current and historic pastureland and woodlands
Pond 2C – Option 2	No	6.14-Acres. Current and historic pastureland and woodlands
Pond 3A (formerly 3B)	Medium	4.18-Acres. Risk ranking Medium for onsite livestock holding pen. Current pastureland, historic woodlands, wetlands, pastureland and cleared land
Pond 3B (formerly 3A)	No	2.44-Acres. Current and historic pastureland and wetlands
Pond 3C	Low	3.81-Acres. Risk ranking Low for onsite stormwater pond. Current and historic woodlands
Pond 4A – Option 1	Low	3.98-Acres. Risk ranking Low for non-adjoining Townstar #40/BP gas station to the southwest. Current woodlands, historic wetland in northeast corner
Pond 4A – Option 2	Low	3.34-Acres. Risk ranking Low for non-adjoining Townstar #40/BP gas station to the southwest. Current woodlands, historic wetland in northeast corner
Pond 4B/4C – Option 1	Medium	8.17-Acres. Risk ranking Medium for onsite livestock holding pen. Current and historic woodlands with two (2) sheds, a livestock holding pen and unpaved trails
Pond 4B – Option 2	No	4.59-Acres. Current and historic woodlands with unpaved trails
Pond 4D – Option 1	Medium	6.08-Acres. Risk ranking Medium for east adjoining Townstar #40/BP gas station. Current and historic woodlands with unpaved trails/tracks; historic wetlands in northeast corner onsite from 1940 to 1960s. Adjoining operational Townstar #40/BP gas station to the east since 1986; three (3) groundwater monitor wells were installed on Pond 4D in 2007 to assess potential petroleum impacts. The laboratory analytical results did not indicate petroleum contaminants in exceedance of the GCTLs. The highest OVA reading during monitor well installation was one (1) ppm. No soil samples were collected for laboratory analytical testing during this Level I investigation.

Proposed Pond Alternative	Risk Ranking	Comment
Pond 4D – Option 2	Medium	4.33-Acres. Risk ranking Medium for east adjoining east Townstar #40/BP gas station. Current and historic woodlands with unpaved trails/tracks; historic wetlands in northeast corner onsite from 1940 to 1960s
Pond 5A	No	2.62-Acres. Current and historic woodlands/wetlands/pastureland
Pond 5B	No	2.53-Acres. Pastureland and wetlands associated with north adjacent Paddock Farms (miniature horses)
Pond 5C	Low	3.53-Acres. Risk ranking Low for offsite livestock holding pen, approximately 50 feet south. Current and historic woodlands

For sites ranked “No” or “Low”, no additional work is recommended at this time. Should a facility’s permitting or regulatory status change between now and the time acquisitions are initiated, additional screening should be conducted.

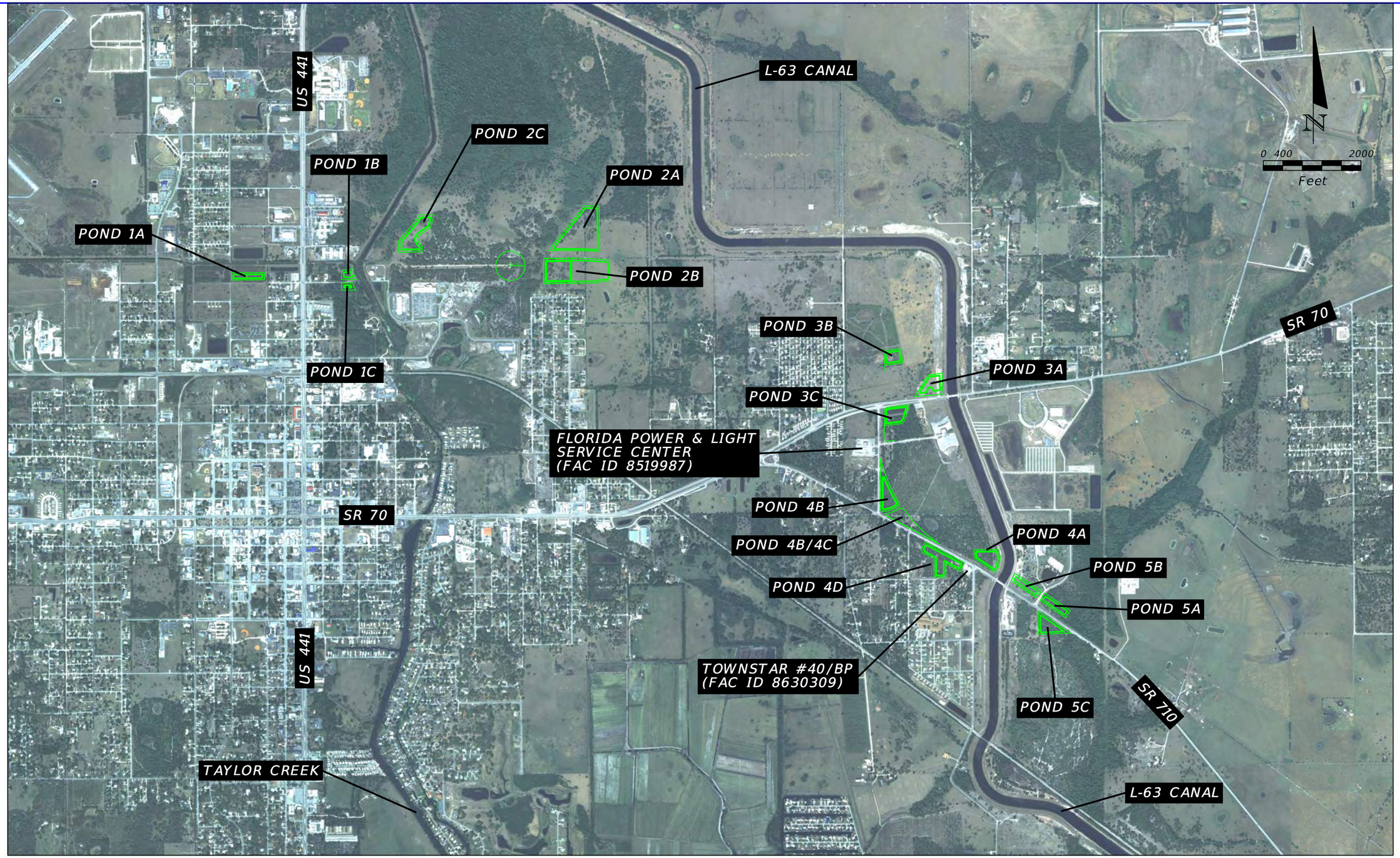
For the proposed pond sites with risk rankings of “Medium” or “High”, Tierra recommends Level II field screening to determine if environmental impacts exist at the preferred pond sites. Regardless of the risk ranking, all ponds sites selected for final design will require Level II field screening. The field screening scope of work should include, at a minimum, soil borings to the proposed depth of the pond and soil sampling for total arsenic. Additional sample analyses may be required based on historical land use of the pond site and surrounding properties. The District Contamination Impact Coordinator should be consulted regarding the field screening scope of work for all final pond sites.

4.0 Limitations

This study was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our course of work and under the scope of work authorized by the client. The information contained in this report is relevant to the date on which this survey was performed, and should not be relied upon to represent conditions at a later date. This report has been prepared on behalf of and exclusively for use by our client for specific application to their project as discussed above. Tierra does not warrant the work of reporting agencies or other third parties supplying information which may have been used in the preparation of this report. No warranty, expressed or implied is made.

CSER-Appendix A

Project Location and Proposed Pond Alternatives Location Maps



PROJECT LOCATION MAP

SOURCE: FDOT SURVEY AND MAPPING DATED 2009

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		A

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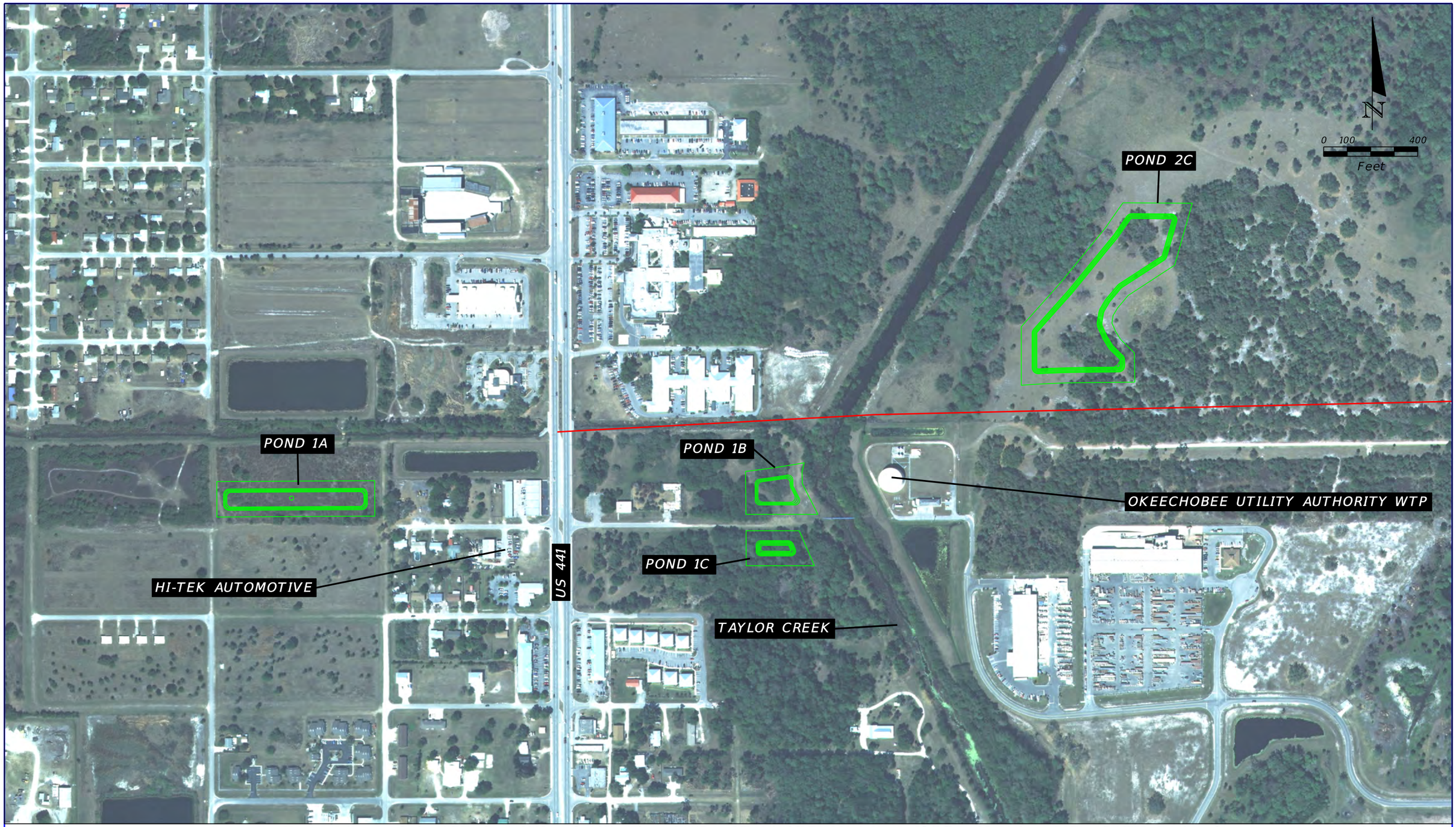

PROPOSED POND ALTERNATIVES LOCATION MAP

SOURCE: FDOT SURVEY AND MAPPING DATED 2009

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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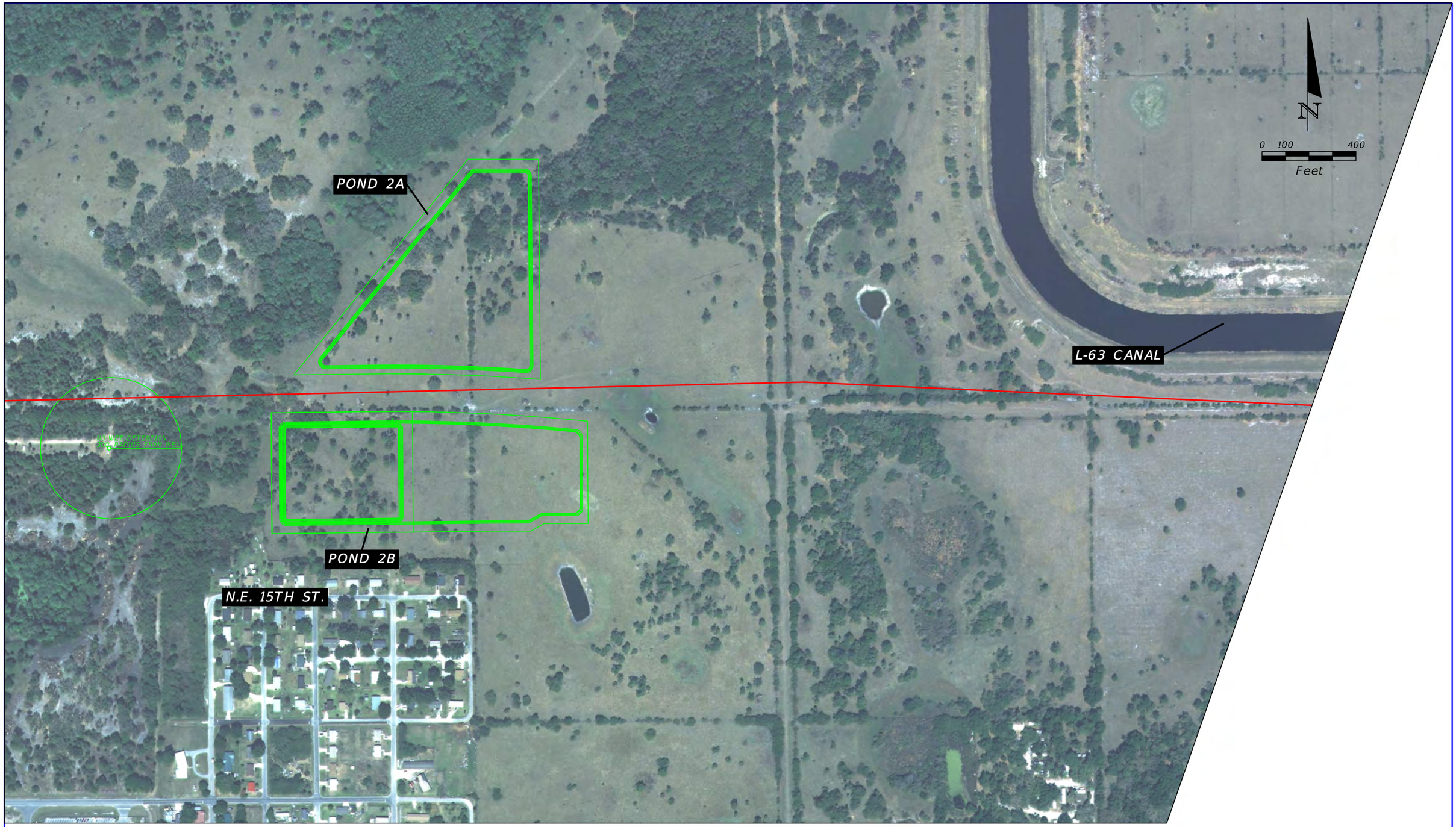

SOURCE: FDOT SURVEY AND MAPPING DATED 2009

PROPOSED POND ALTERNATIVES LOCATION MAP

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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PROPOSED POND ALTERNATIVES LOCATION MAP

SOURCE: FDOT SURVEY AND MAPPING DATED 2009

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DATE	DESCRIPTION	DATE	DESCRIPTION	7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		A-3
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		

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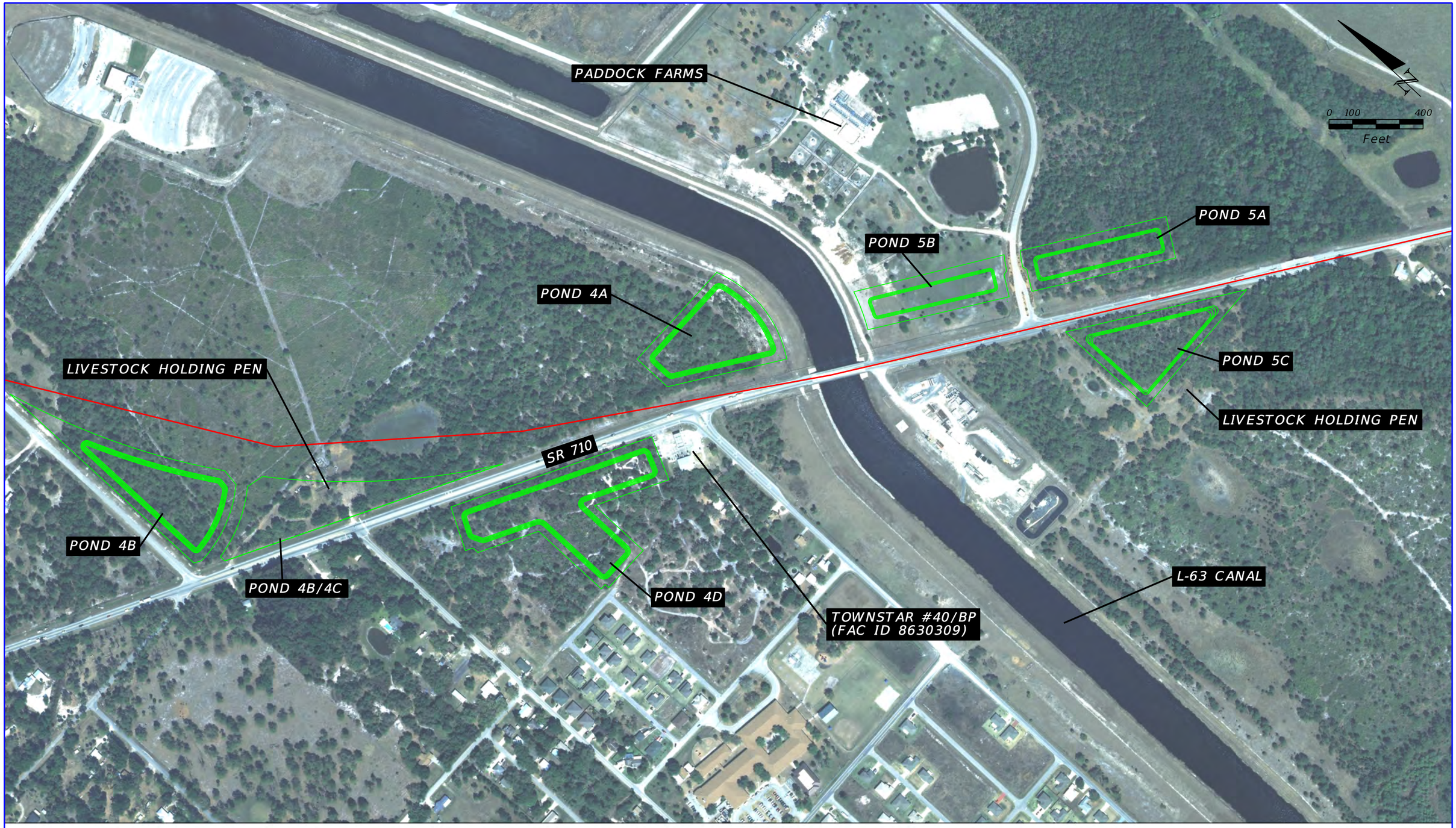

PROPOSED POND ALTERNATIVES LOCATION MAP

SOURCE: FDOT SURVEY AND MAPPING DATED 2009

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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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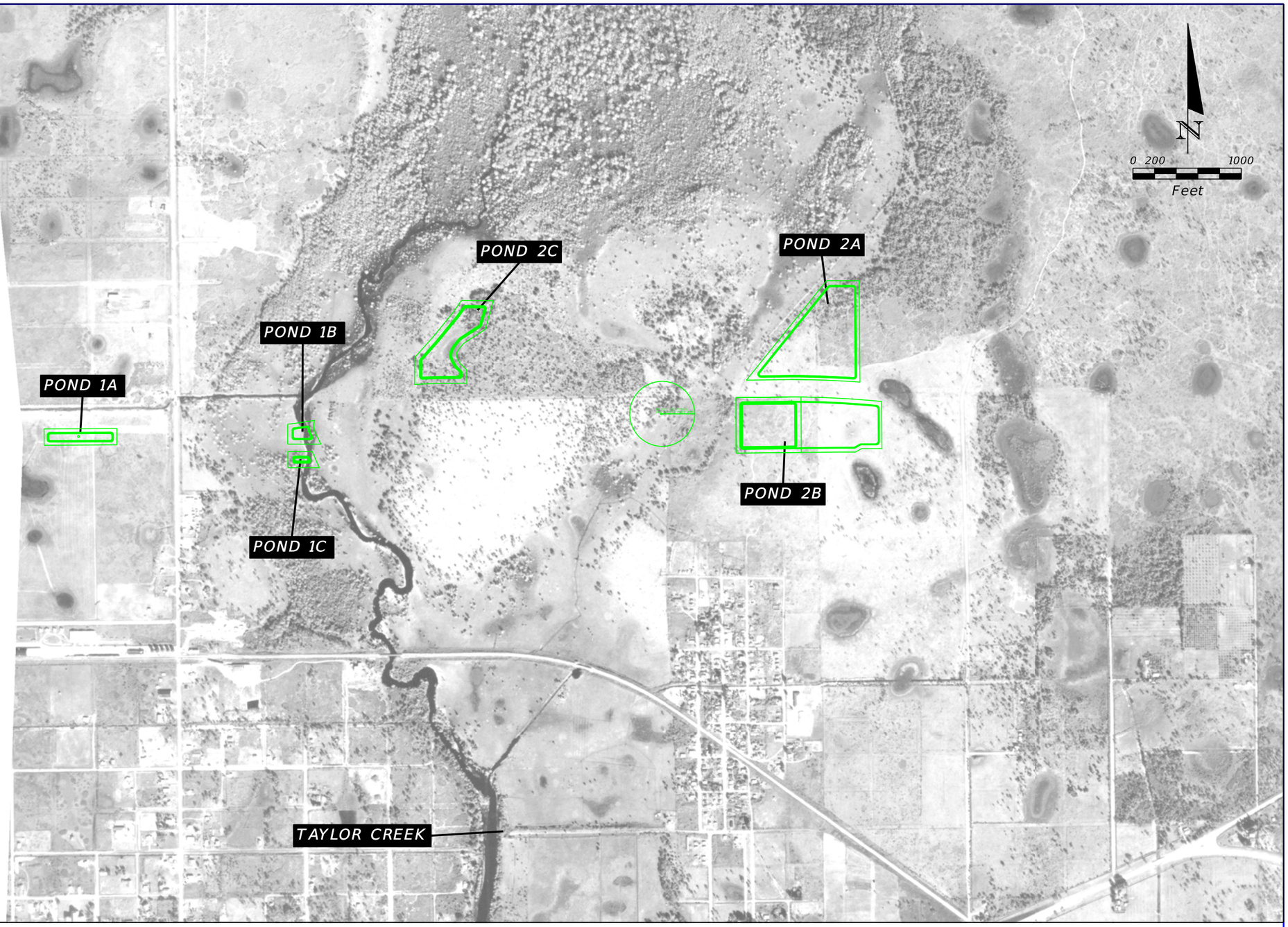
CSER-Appendix B

Historical Aerial Photographs



SOURCE: UNIVERSITY OF FLORIDA

1953 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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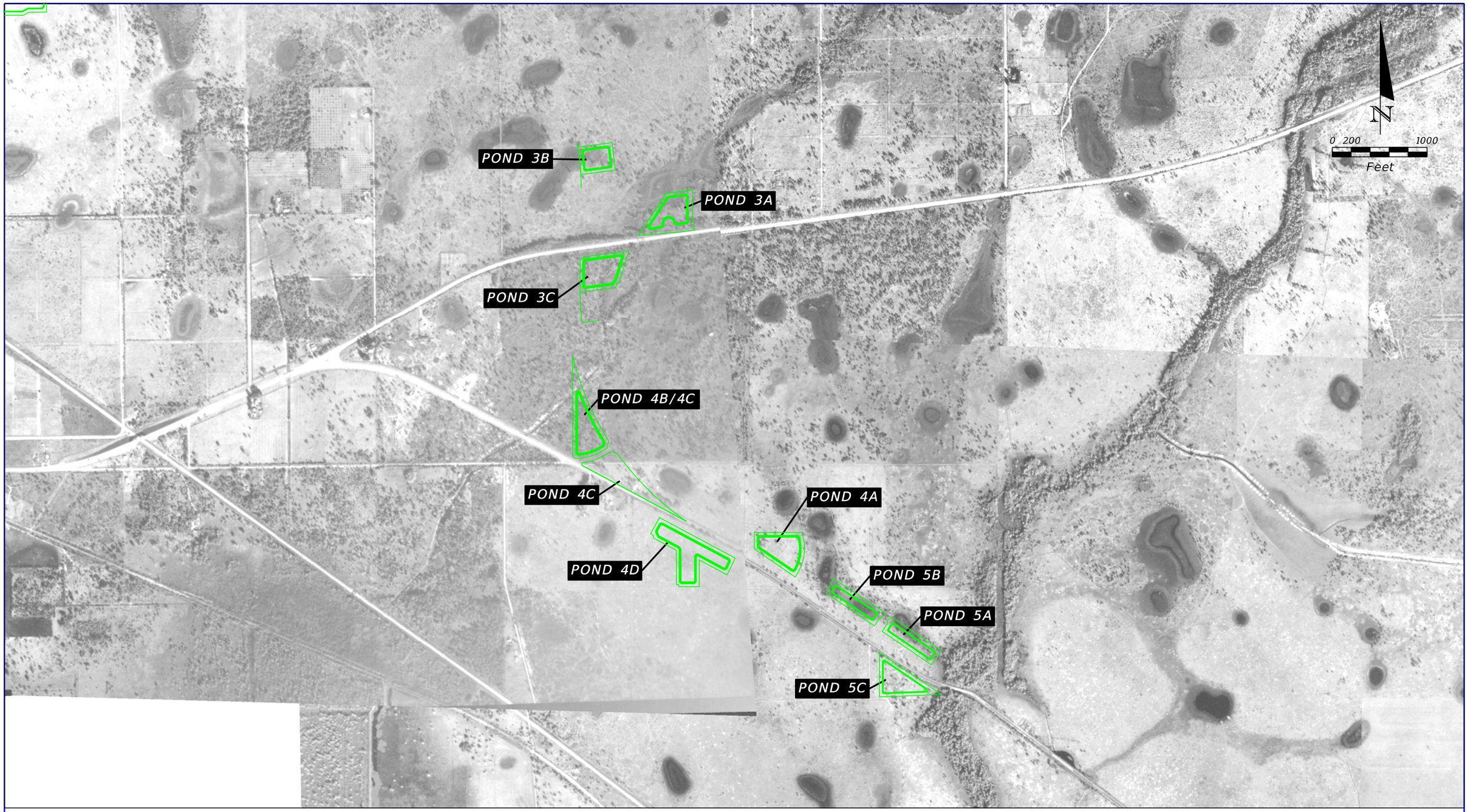

SOURCE: UNIVERSITY OF FLORIDA

1953 HISTORICAL AERIAL PHOTOGRAPH

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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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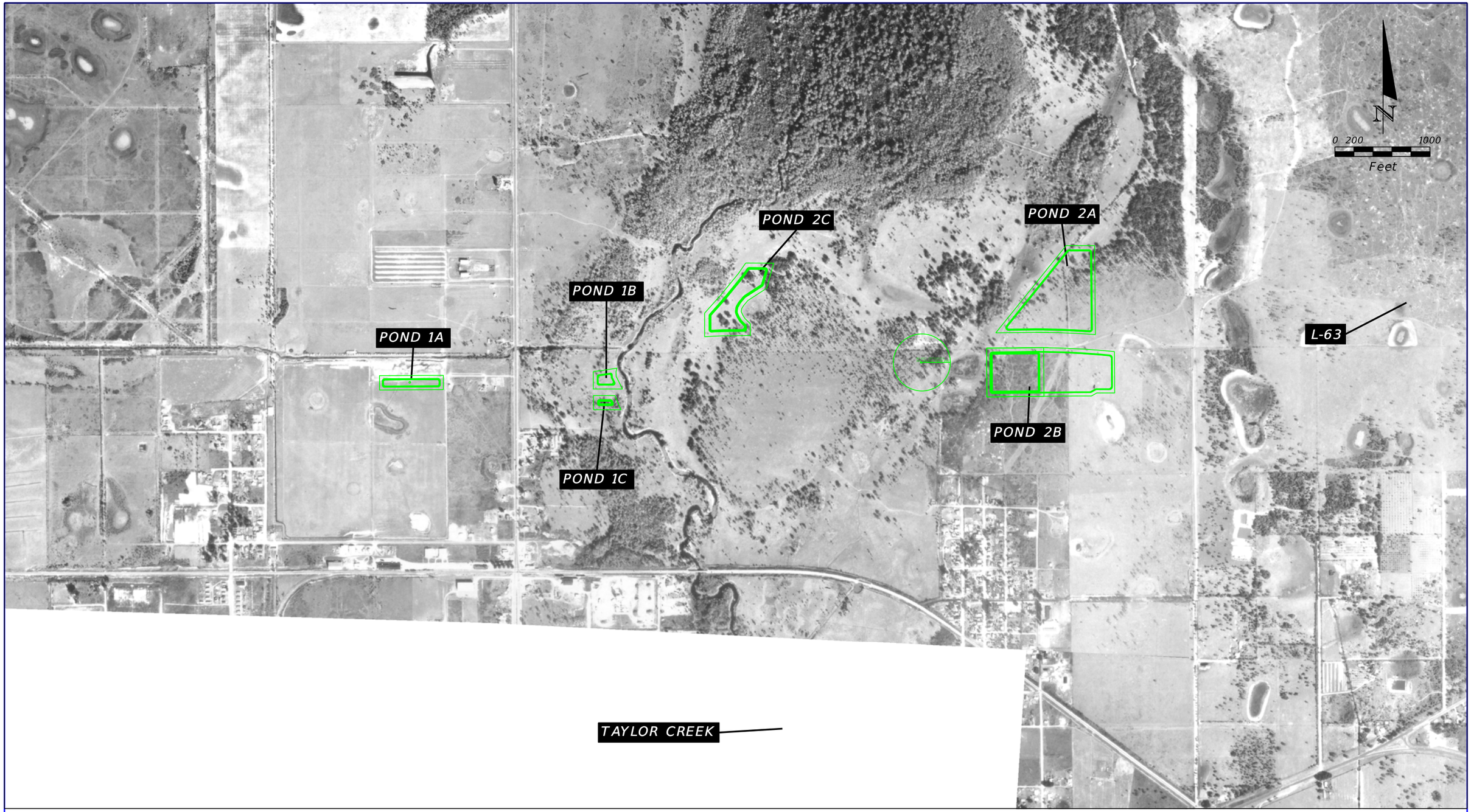

SOURCE: UNIVERSITY OF FLORIDA

1962 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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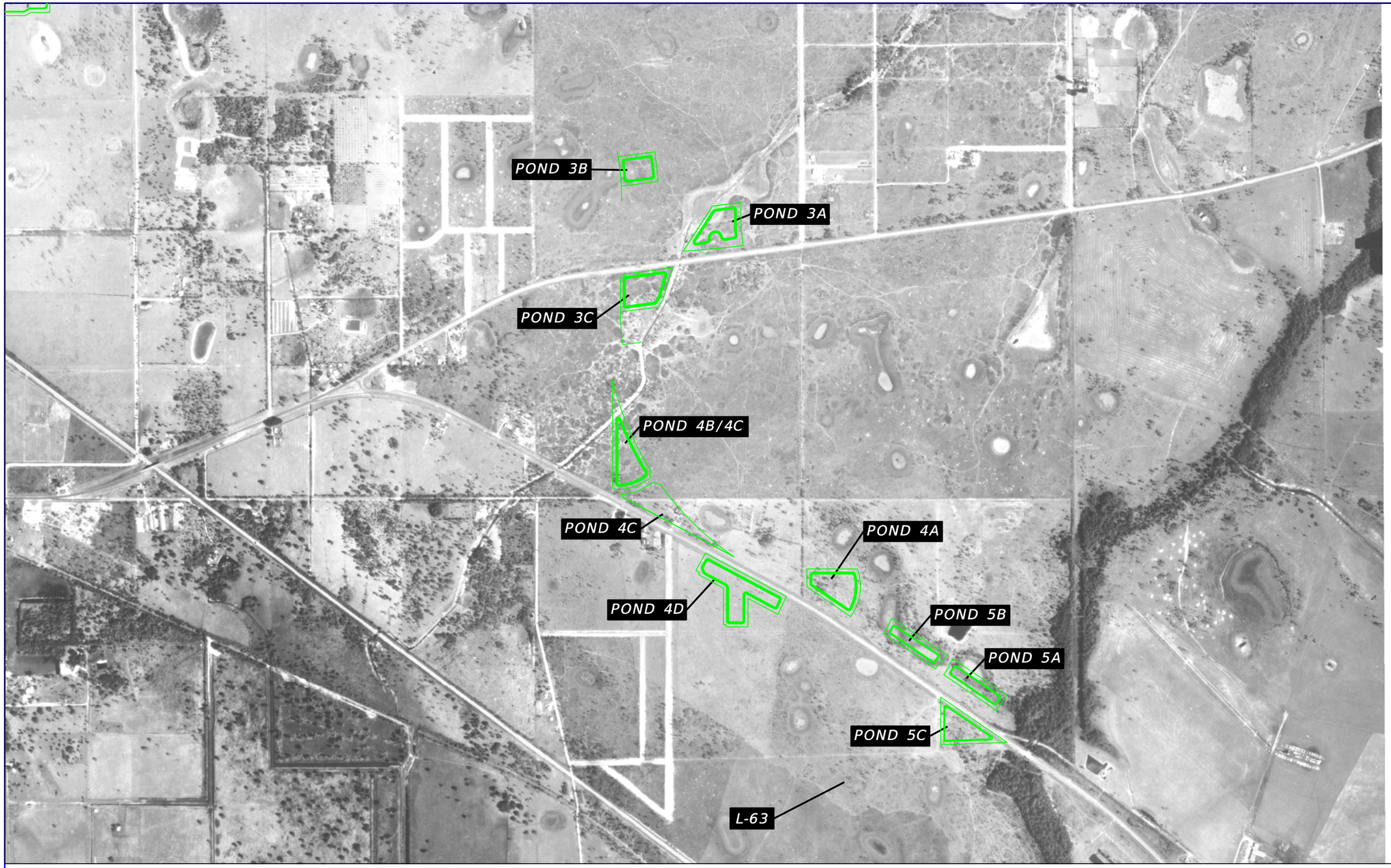

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SOURCE: UNIVERSITY OF FLORIDA

1962 HISTORICAL AERIAL PHOTOGRAPH

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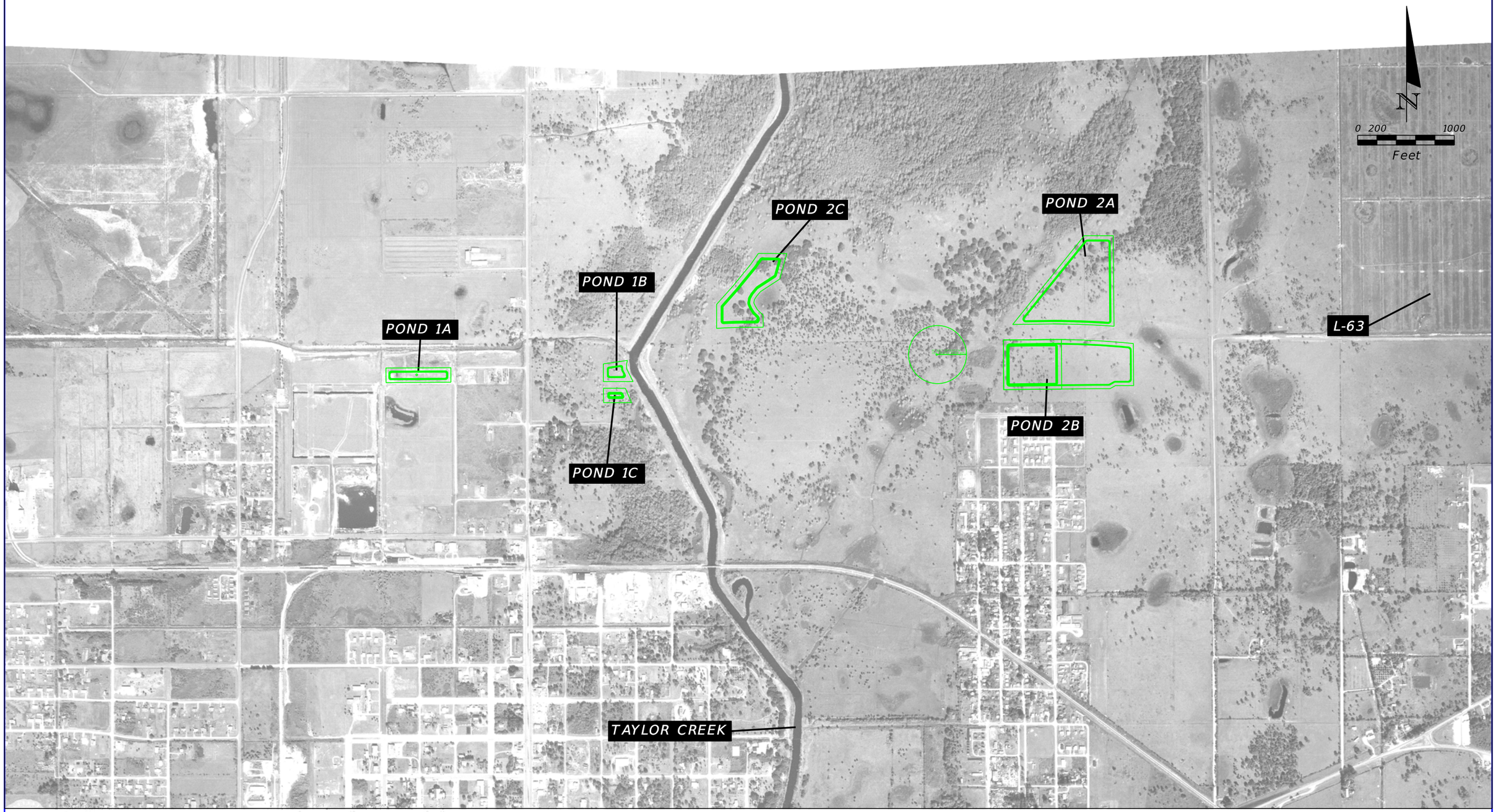

SOURCE: FDOT SURVEY AND MAPPING

1970 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
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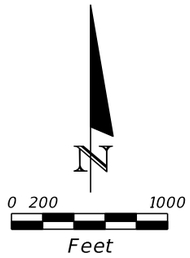

SOURCE: FDOT SURVEY AND MAPPING

1970 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC.	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		B-6
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		

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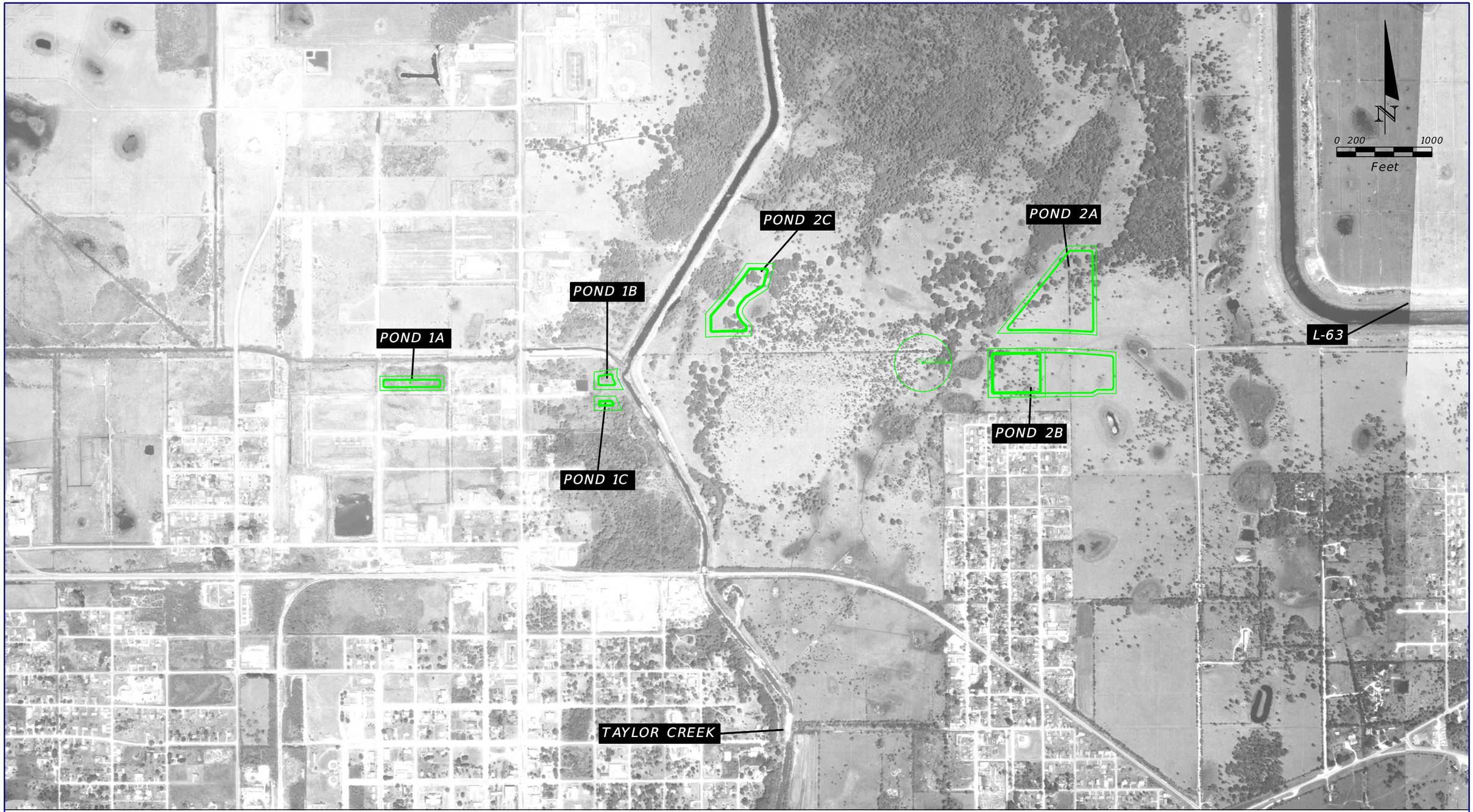
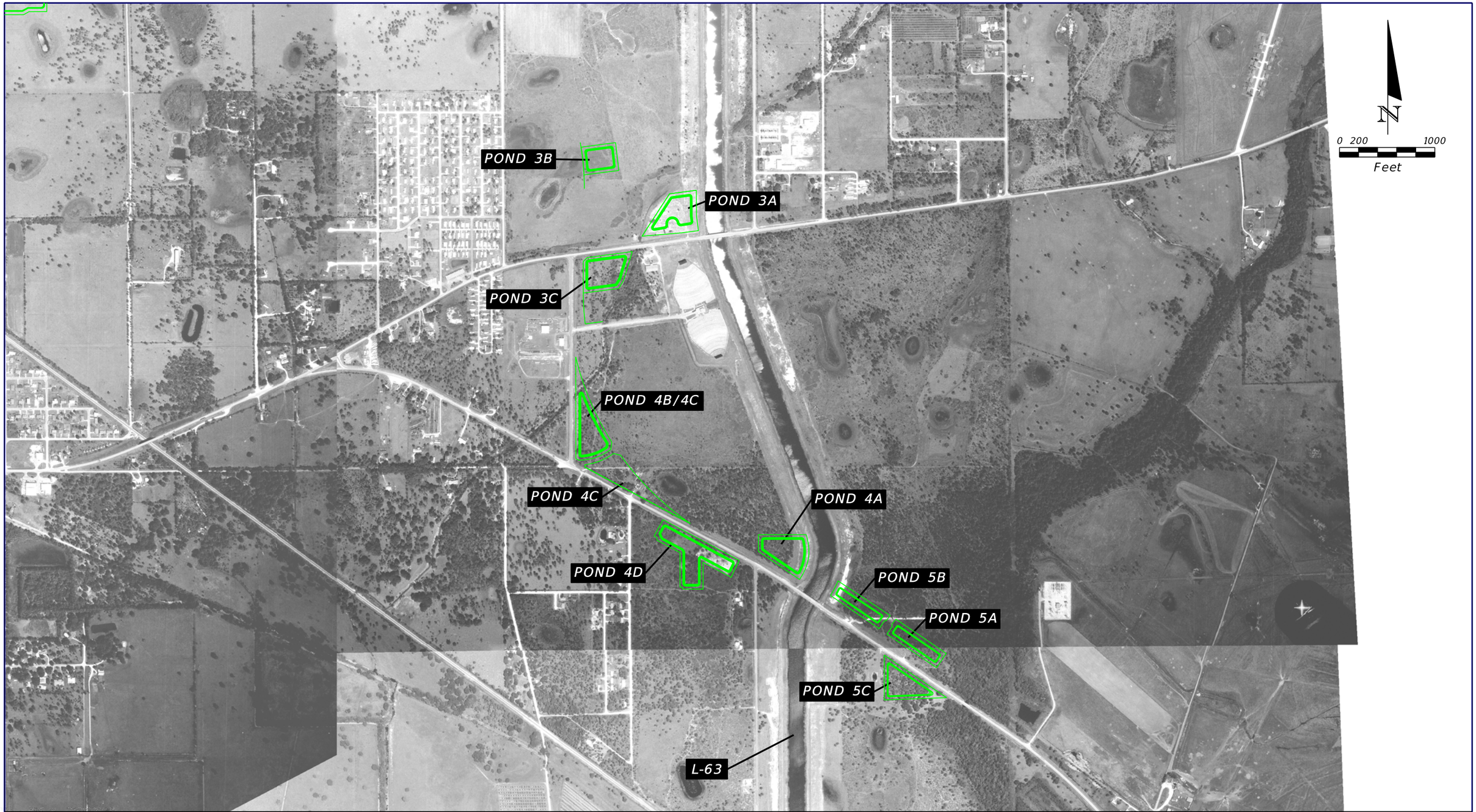


SOURCE: FDOT SURVEY AND MAPPING

1983 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		B-7

bsawaska 7/16/2014 11:36:07 AM J:\6511\2012 Files\6511-12-054 SR 710\Microstation\pdgeoEnvHist1983A.dgn



SOURCE: FDOT SURVEY AND MAPPING

1983 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		B-8

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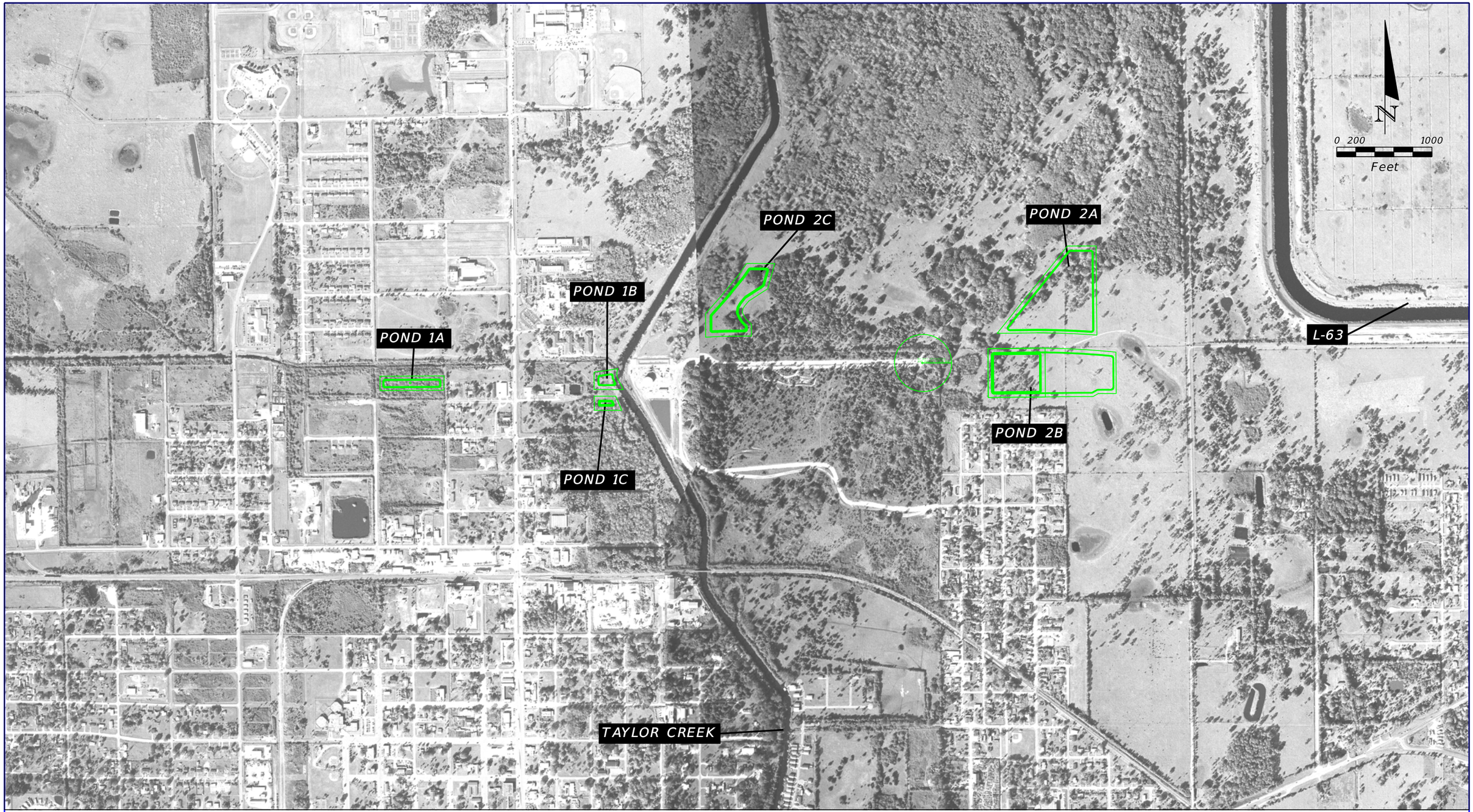
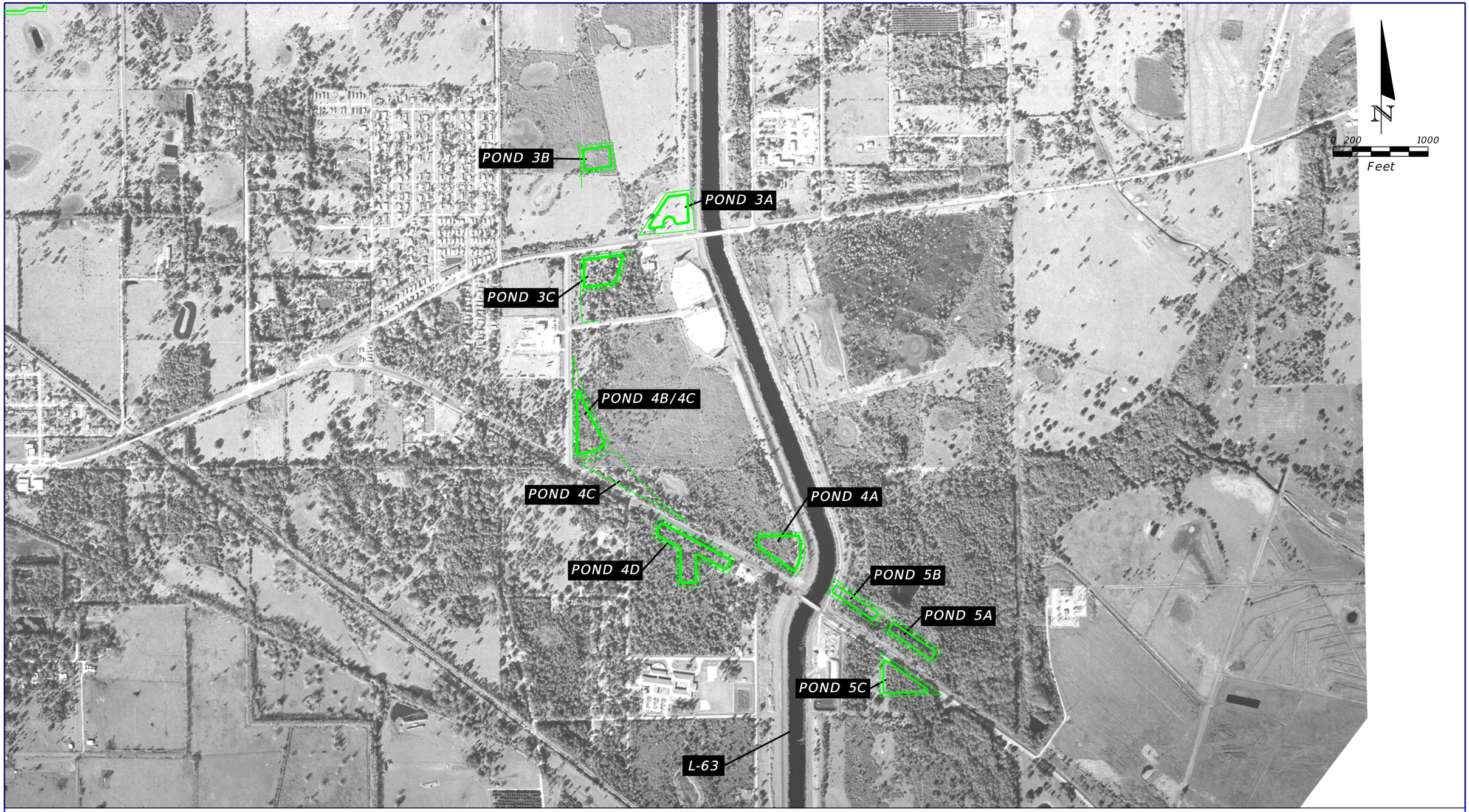


SOURCE: FDOT SURVEY AND MAPPING

1994 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		B-9

bsawaska 7/16/2014 11:36:41 AM J:\6511\2012 Files\6511-12-054 SR 710\Microstation\pdgeoEnvHist1994A.dgn



SOURCE: FDOT SURVEY AND MAPPING

1994 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
			TIERRA PROJECT NO.: 6511-12-054A

TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION 6486

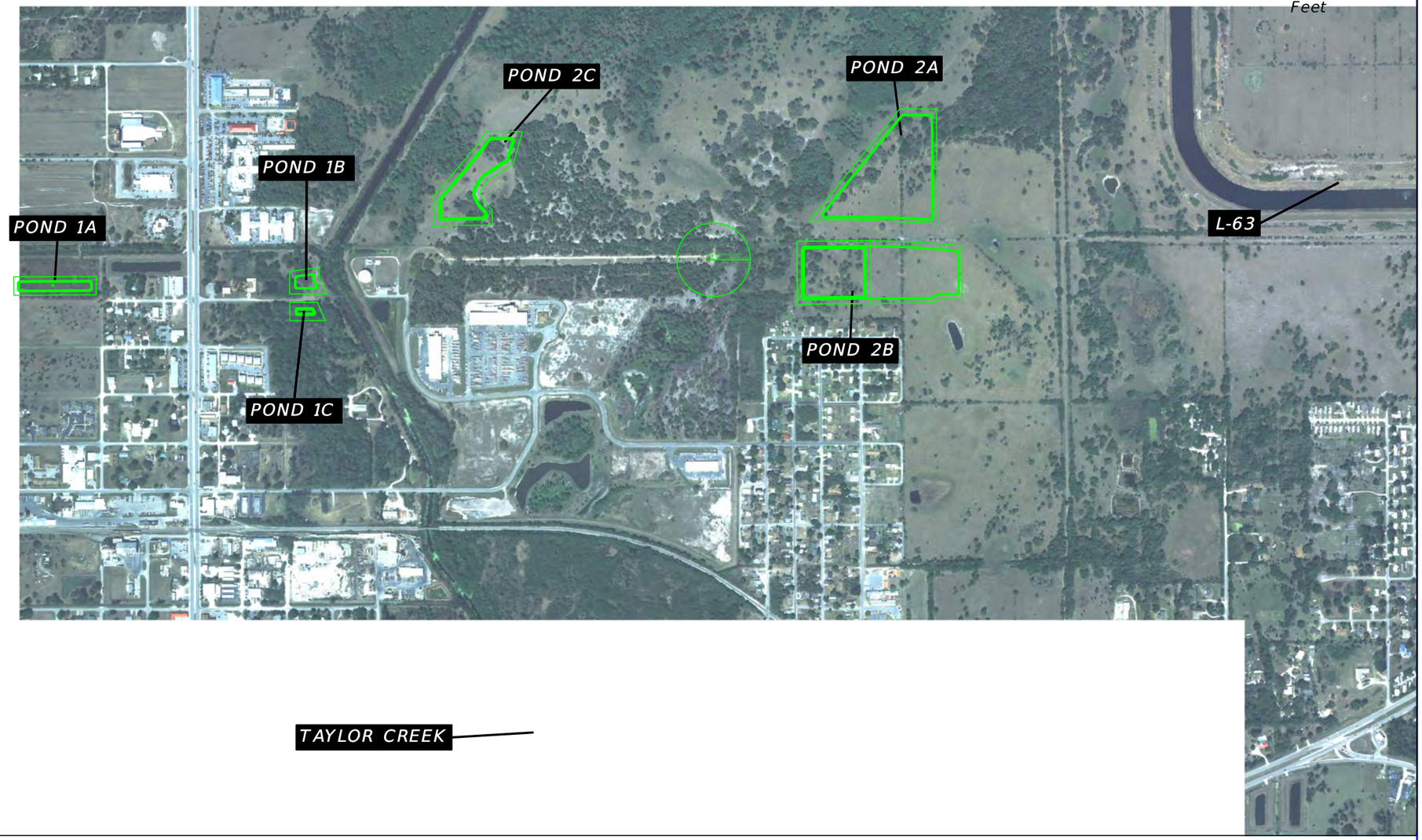
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 710	OKEECHOBEE	419344-3-32-01

SR 710 FROM US 441
TO L-63 CANAL

SHEET NO.
B-10

bsawaska 7/16/2014 11:36:58 AM J:\6511\2012 Files\6511-12-054 SR 710\Microstation\pdgeoEnvHist1994B.dgn



SOURCE: FDOT SURVEY AND MAPPING

2009 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		B-11

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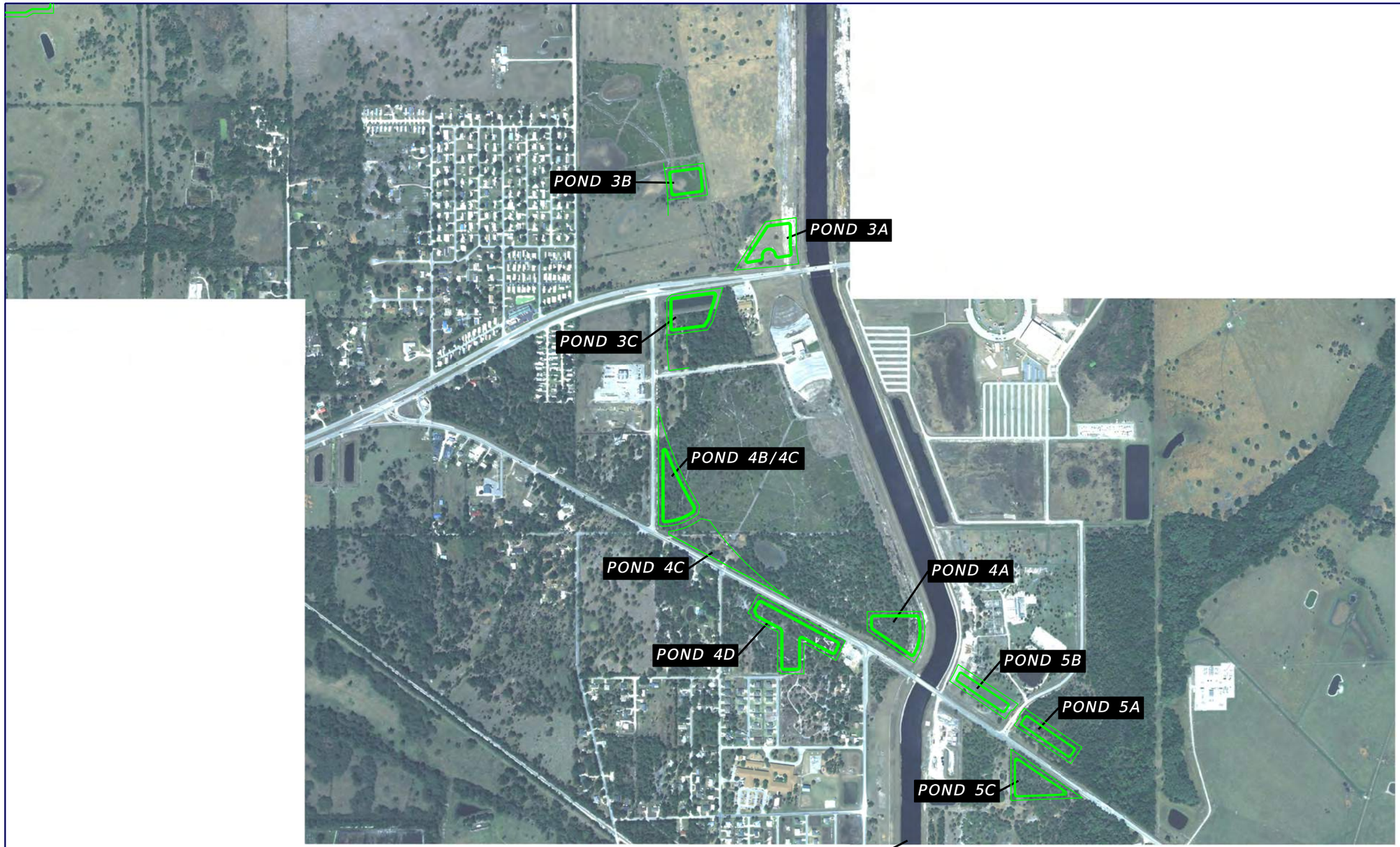

N

0 200 1000

Feet

SOURCE: FDOT SURVEY AND MAPPING

2009 HISTORICAL AERIAL PHOTOGRAPH

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		B-12

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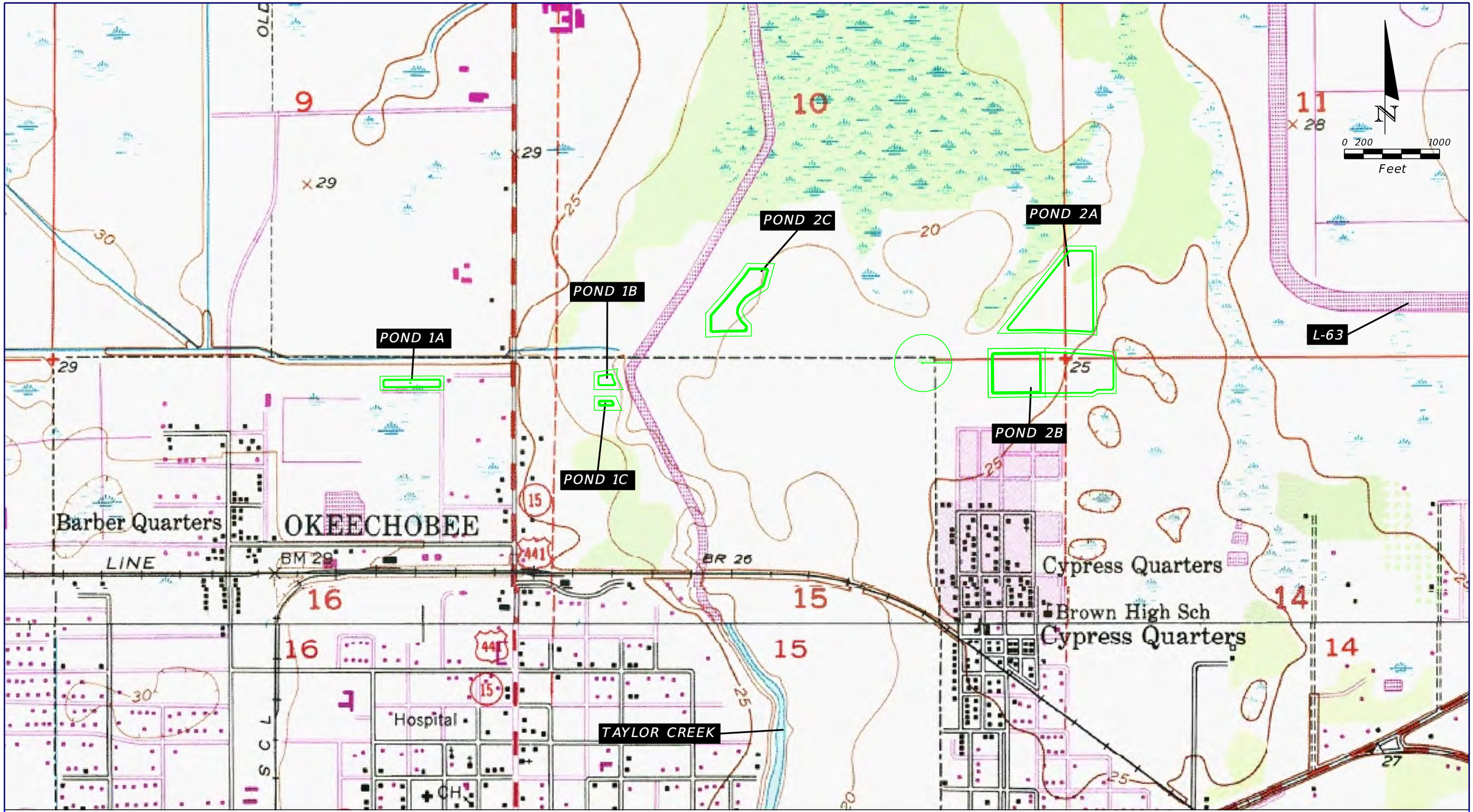
CSER-Appendix C

USGS Topographic Map

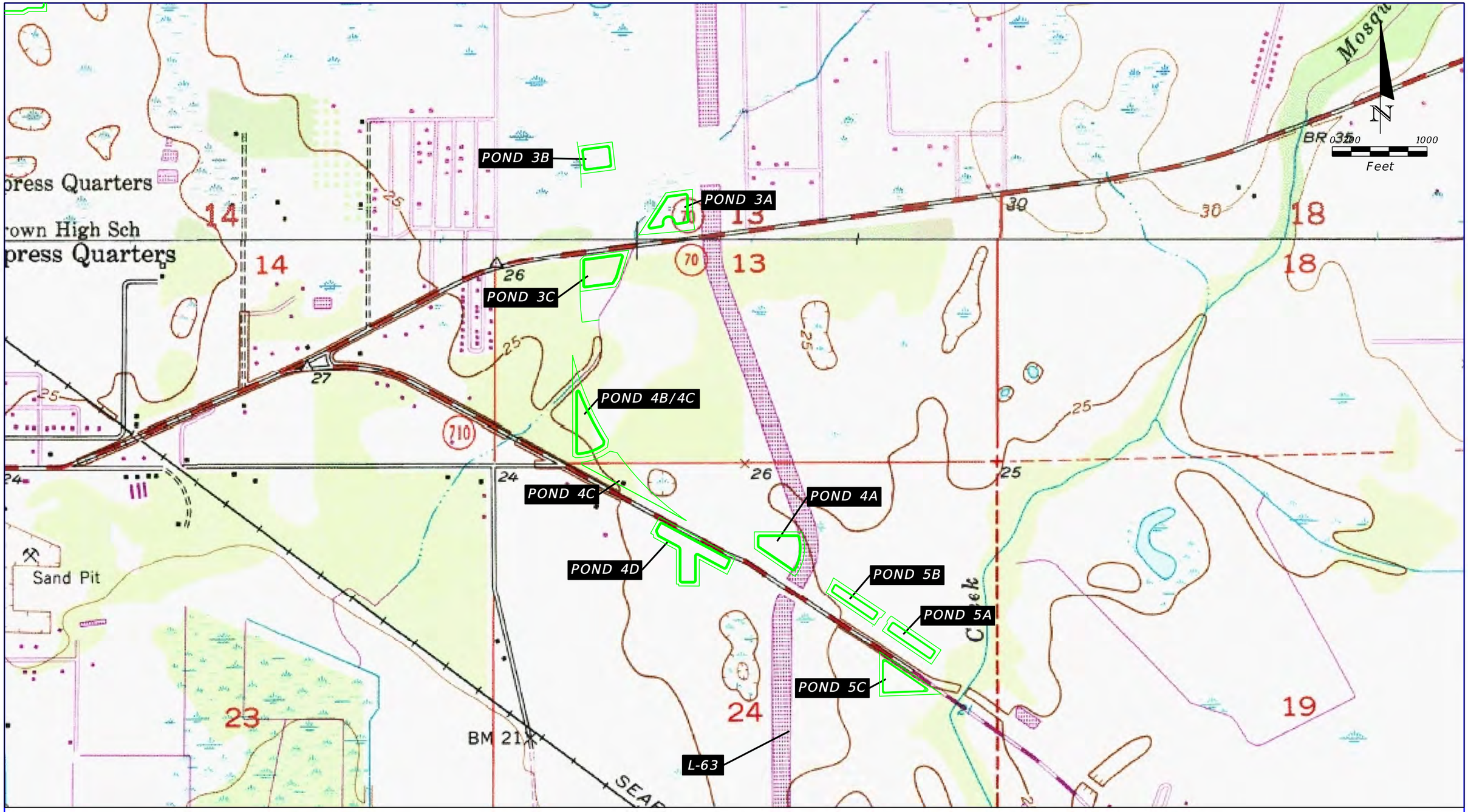


SOURCE: USGS 7.5-MINUTE "TAYLOR CREEK SE, FLORIDA" DATED 1983

USGS TOPOGRAPHIC MAP

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		C-1

$USERS $DATES $TIMES $FILES



SOURCE: USGS 7.5-MINUTE "TAYLOR CREEK SE, FLORIDA" DATED 1983

USGS TOPOGRAPHIC MAP

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		C-2

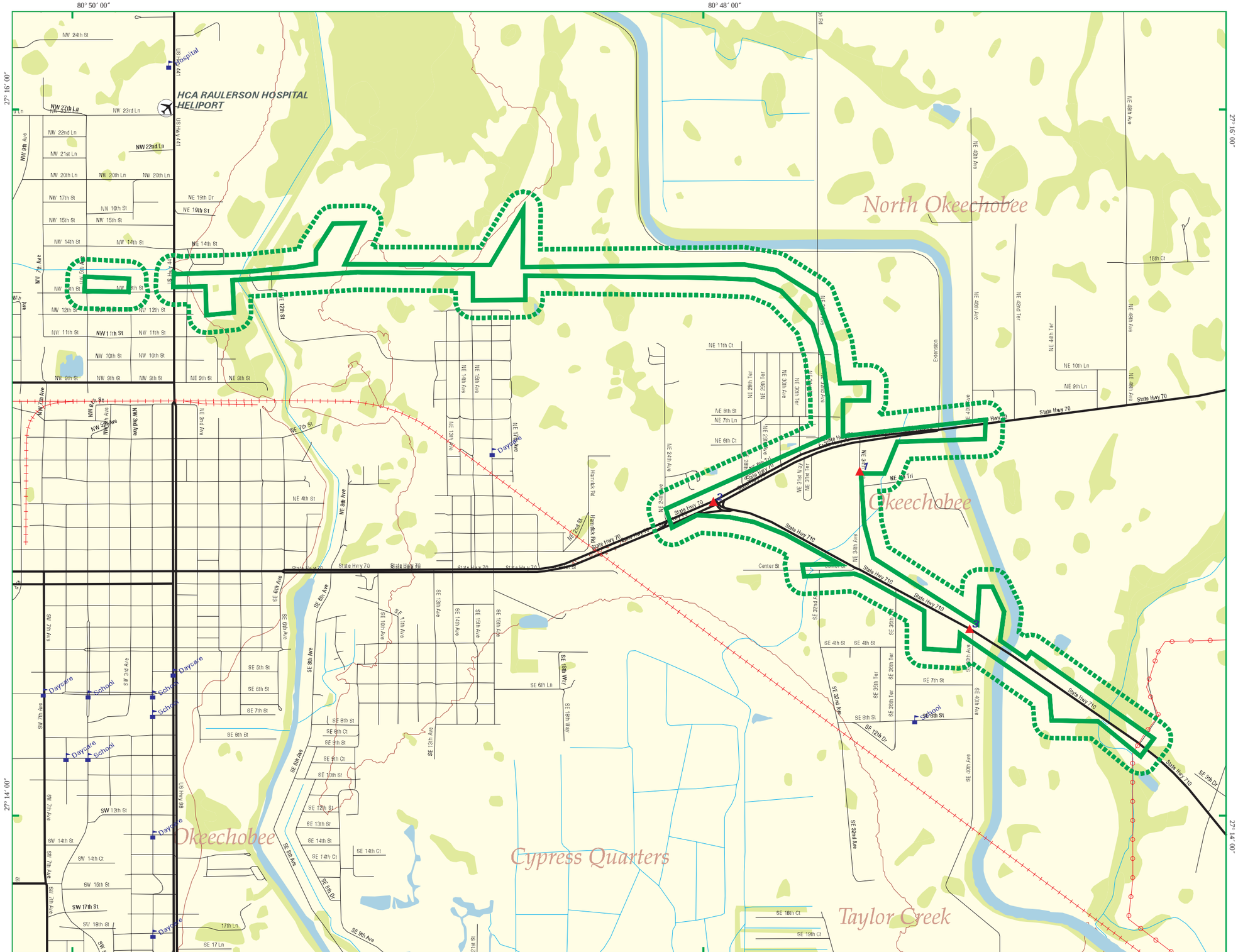
bsawaska 7/16/2014 9:15:59 AM J:\6511\2012 Files\6511-12-054 SR 710\Microstation\pdgeoEnvTopo02.dgn

CSER-Appendix D

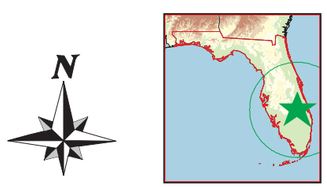
EDR® DataMap™ Report

EDR DataMap® Area Study

SR 710 Okeechobee FL



- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Sinkholes
- Search Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- Federal DOD Sites
- Indian Reservations BIA
- Florida Brownfields
- National Wetland Inventory



Okeechobee, FL

0 1/4 1/2

Scale in Miles

EDR® Environmental Data Resources Inc

SR 710 Okeechobee FL
Okeechobee, FL 34974

Inquiry Number: 3760673.1s
October 18, 2013

EDR DataMap™ Area Study

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

OKEECHOBEE, FL 34974
OKEECHOBEE, FL 34974

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Treatment, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators
RCRA-SQG	RCRA - Small Quantity Generators
RCRA NonGen / NLR	RCRA - Non Generators
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System

PADS PCB Activity Database System
MLTS Material Licensing Tracking System
RADINFO Radiation Information Database
RAATS RCRA Administrative Action Tracking System
RMP Risk Management Plans
COAL ASH EPA Coal Combustion Residues Surface Impoundments List
SCRD DRYCLEANERS State Coalition for Remediation of Drycleaners Listing
US HIST CDL National Clandestine Laboratory Register
PCB TRANSFORMER PCB Transformer Registration Database
FEDERAL FACILITY Federal Facility Site Information listing
US FIN ASSUR Financial Assurance Information
EPA WATCH LIST EPA WATCH LIST
PRP Potentially Responsible Parties
2020 COR ACTION 2020 Corrective Action Program List
COAL ASH DOE Steam-Electric Plant Operation Data
FEMA UST Underground Storage Tank Listing
LEAD SMELTERS Lead Smelter Sites
US AIRS Aerometric Information Retrieval System Facility Subsystem

STATE AND LOCAL RECORDS

SHWS Florida's State-Funded Action Sites
SWF/LF Solid Waste Facility Database
UIC Underground Injection Wells Database Listing
SWRCY Recycling Centers
LAST Leaking Aboveground Storage Tank Listing
Fl Sites Sites List
SPILLS Oil and Hazardous Materials Incidents
ENG CONTROLS Institutional Controls Registry
INST CONTROL Institutional Controls Registry
VCP Voluntary Cleanup Sites
PRIORITYCLEANERS Priority Ranking List
DRYCLEANERS Drycleaning Facilities
DEDB Ethylene Dibromide Database Results
BROWNFIELDS Brownfield Areas
NPDES Wastewater Facility Regulation Database
AIRS Permitted Facilities Listing
FL Cattle Dip. Vats Cattle Dipping Vats
FF TANKS Federal Facilities Listing

TRIBAL RECORDS

INDIAN RESERV Indian Reservations
INDIAN ODI Report on the Status of Open Dumps on Indian Lands
INDIAN LUST Leaking Underground Storage Tanks on Indian Land
INDIAN UST Underground Storage Tanks on Indian Land
INDIAN VCP Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

EDR MGP EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners EDR Exclusive Historic Dry Cleaners

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

EXECUTIVE SUMMARY

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 07/11/2013 has revealed that there is 1 RCRA-CESQG site within the searched area.

Site	Address	Map ID	Page
FPL OKEECHOBEE SERVICE CENTER	***825 NE 34 AVE***	***1***	***5***

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 03/08/2013 has revealed that there are 3 FINDS sites within the searched area.

Site	Address	Map ID	Page
FPL OKEECHOBEE SERVICE CENTER	***825 NE 34 AVE***	***1***	***5***
FPL OKEECHOBEE SERVICE CENTER	825 NE 34TH AVE	1	7
TOWN STAR # 40	3993 HWY 710 E	3	24

STATE AND LOCAL RECORDS

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Environmental Protection's PCTO1--Petroleum Contamination Detail Report.

A review of the LUST list, as provided by EDR, and dated 07/15/2013 has revealed that there are 3 LUST sites within the searched area.

Site	Address	Map ID	Page
FL POWER & LIGHT CO-OKEECHOBE	***825 NE 34TH AVE***	***1***	***7***
Facility-Site Id: 8519987			
Discharge Cleanup Status: RA - RA ONGOING			

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
CHEVRON #47761	***2768 SR 710***	***2***	***13***
Facility-Site Id: 8512544			
Discharge Cleanup Status: SRCR - SRCR COMPLETE			
Discharge Cleanup Status: NREQ - CLEANUP NOT REQUIRED			
TOWN STAR #40	***3990 HWY 710***	***3***	***18***
Facility-Site Id: 8630309			
Discharge Cleanup Status: RA - RA ONGOING			

UST: The Underground Storage Tank database contains registered USTs. Shortly after the September 11 event, the DEP was instructed to remove the detail about some of the storage tank facilities in the state from their reports. Federal-owned facilities and bulk storage facilities are included in that set.

A review of the UST list, as provided by EDR, and dated 07/15/2013 has revealed that there are 3 UST sites within the searched area.

Site	Address	Map ID	Page
FL POWER & LIGHT CO-OKEECHOBE	***825 NE 34TH AVE***	***1***	***7***
Facility-Site Id: 8519987			
CHEVRON #47761	***2768 SR 710***	***2***	***13***
Facility-Site Id: 8512544			
TOWN STAR #40	***3990 HWY 710***	***3***	***18***
Facility-Site Id: 8630309			

AST: Shortly after the Sept 11 event, the DEP was instructed to remove the detail about some of the storage tank facilities in the state from their reports. Federal-owned facilities and bulk storage facilities are included in that set.

A review of the AST list, as provided by EDR, and dated 07/15/2013 has revealed that there is 1 AST site within the searched area.

Site	Address	Map ID	Page
FL POWER & LIGHT CO-OKEECHOBE	***825 NE 34TH AVE***	***1***	***7***
Facility-Site Id: 8519987			

TIER 2: A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

A review of the TIER 2 list, as provided by EDR, and dated 12/31/2011 has revealed that there is 1 TIER 2 site within the searched area.

Site	Address	Map ID	Page
FLORIDA POWER AND LIGHT - OKEE	825 NORTHEAST 34 AVENUE	1	3

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

Database	Total Plotted
FEDERAL RECORDS	
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL LIENS	0
CERCLIS	0
CERC-NFRAP	0
LIENS 2	0
CORRACTS	0
RCRA-TSDF	0
RCRA-LQG	0
RCRA-SQG	0
RCRA-CESQG	1
RCRA NonGen / NLR	0
US ENG CONTROLS	0
US INST CONTROL	0
ERNS	0
HMIRS	0
DOT OPS	0
US CDL	0
US BROWNFIELDS	0
DOD	0
FUDS	0
LUCIS	0
CONSENT	0
ROD	0
UMTRA	0
DEBRIS REGION 9	0
ODI	0
US MINES	0
TRIS	0
TSCA	0
FTTS	0
HIST FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
RADINFO	0
FINDS	3
RAATS	0
RMP	0
COAL ASH EPA	0
SCRD DRYCLEANERS	0
US HIST CDL	0
PCB TRANSFORMER	0
FEDERAL FACILITY	0
US FIN ASSUR	0
EPA WATCH LIST	0

MAP FINDINGS SUMMARY

Database	Total Plotted
PRP	0
2020 COR ACTION	0
COAL ASH DOE	0
FEMA UST	0
LEAD SMELTERS	0
US AIRS	0
STATE AND LOCAL RECORDS	
SHWS	0
SWF/LF	0
UIC	0
SWRCY	0
LUST	3
UST	3
LAST	0
AST	1
Fl Sites	0
SPILLS	0
ENG CONTROLS	0
INST CONTROL	0
VCP	0
PRIORITYCLEANERS	0
DRYCLEANERS	0
DEDB	0
BROWNFIELDS	0
NPDES	0
AIRS	0
TIER 2	1
FL Cattle Dip. Vats	0
FF TANKS	0
TRIBAL RECORDS	
INDIAN RESERV	0
INDIAN ODI	0
INDIAN LUST	0
INDIAN UST	0
INDIAN VCP	0
EDR PROPRIETARY RECORDS	
EDR MGP	0
EDR US Hist Auto Stat	0
EDR US Hist Cleaners	0

NOTES:

Sites may be listed in more than one database

1 FLORIDA POWER AND LIGHT - OKEECHOBEE SERVICE CENTER **TIER 2** **S109615339**
825 NORTHEAST 34 AVENUE **N/A**
OKEECHOBEE, FL 34972

TIER 2:

Year:	2011
Facility Id:	3990915
Active Date:	Not reported
Inactive Date:	Not reported
Sale Pending:	Not reported
Original Date:	Not reported
PLOT Source:	Not reported
Latitude:	27.25052
Longitude:	-80.792920
LEPC District:	Not reported
Counties:	Not reported
SERC:	Not reported
Program Level:	Not reported
PRIME:	Not reported
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS Code:	Not reported
Last Modified Date:	11/12/2012
First Submit Date:	11/09/2012
Data Submitted By:	Florida Division of Emergency Management
Company Name:	FLORIDA POWER AND LIGHT
Comments:	Not reported
Contact1 Name:	PAT COYLE
Contact1 Type:	Tier II Emergency 24 Hour Contact
Contact1 EMail:	Not reported
Contact1 Telephone:	800-741-2650
Contact2 Name:	PAT COYLE
Contact2 Type:	Tier II Emergency Contact
Contact2 EMail:	Not reported
Contact2 Telephone:	561-722-4486
Contact3 Name:	PAT COYLE
Contact3 Type:	Tier II Secondary 24 Hour Contact
Contact3 EMail:	Not reported
Contact3 Telephone:	561-722-4486
Contact4 Name:	JEFF WADE
Contact4 Type:	Tier II Secondary Contact
Contact4 EMail:	Not reported
Contact4 Telephone:	954-599-0317
Contact5 Name:	Not reported
Contact5 Type:	Not reported
Contact5 EMail:	Not reported
Contact5 Telephone:	Not reported
Chemical Code:	Not reported
Chemical Name:	Not reported
Chemical State:	Not reported
Location Name:	Not reported
Container Code:	Not reported
Pressure Code:	Not reported
Temperature Code:	Not reported
Average Quantity:	Not reported
Maximum Quantity:	Not reported

FLORIDA POWER AND LIGHT - OKEECHOBEE SERVICE CENTER (Continued) **S109615339**

Days On Site:	Not reported
Year:	Not reported
Facility Id:	Not reported
Active Date:	Not reported
Inactive Date:	Not reported
Sale Pending:	False
Original Date:	Not reported
PLOT Source:	Not reported
Latitude:	27.250520
Longitude:	-80.792920
LEPC District:	7
Counties:	Polk,Okeechobee,Highlands,Hardee,DeSoto,
SERC:	36108
Program Level:	Not reported
PRIME:	72
SIC Code:	4911
SIC Code 2:	Not reported
NAICS Code:	221122

Other Chemical Data:

Report Year:	2008
Tier 2 Report ID:	106083
Chemical ID:	318057
CAS Number:	8006619
Chemical Name:	GASOLINE
Chemical Date:	6/2/2009
Average Amount:	3
Maximum Amount:	9600
Location ID:	519133
Chemical State:	Liquid
Mixture:	False
Mixture Percent:	100.00
Containter:	A - ABOVE GROUND TANK
Pressure:	1 - AMBIENT PRESSURE
Temperature:	4 - AMBIENT TEMPERATURE
Average Amount:	3
Maximum Amount:	9600
Days on Site:	365
Site Plan:	True
Site Plan Document:	Not reported
Private Location:	False
Location:	SEE ENCLOSED DIAGRAM

Report Year:	2008
Tier 2 Report ID:	106083
Chemical ID:	318056
CAS Number:	68476346
Chemical Name:	DIESEL FUEL OIL (HIGH SULFUR)
Chemical Date:	6/2/2009
Average Amount:	4
Maximum Amount:	14800
Location ID:	519132
Chemical State:	LIQUID
Mixture:	True
Mixture Percent:	.00
Containter:	A - ABOVE GROUND TANK

FLORIDA POWER AND LIGHT - OKEECHOBEE SERVICE CENTER (Continued) **S109615339**

Pressure:	1 - AMBIENT PRESSURE
Temperature:	4 - AMBIENT TEMPERATURE
Average Amount:	4
Maximum Amount:	14800
Days on Site:	365
Site Plan:	True
Site Plan Document:	Not reported
Private Location:	False
Location:	SEE ENCLOSED DIAGRAM

Company Info:

Company Name:	FLORIDA POWER AND LIGHT
Company Address:	2455 PORT WEST BOULEVARD
Company City,St,Zip:	WEST PALM BEACH, FL 33407
Company Phone:	561-845-3344
Company Fax:	Not reported
Company Email:	Not reported
FEI Number:	590247775
Comany Contact Name:	DAN RAWSON
Cmpny Contact Phone:	561-845-3344
Reduced Fees:	False
Exempt Fees:	False
Electronic Filing:	True
Employee:	Not reported
Comments:	Not reported

Contact:

Contact ID:	30478
Contact Type:	Tier II Emergency Contact
Contact Name:	JEFF WADE
Contact Title:	ENVIRONMENTAL COORDINATOR
Contact Phone:	954-599-0317
Contact 24Hr Phone:	561-616-1702

Contact ID:	30479
Contact Type:	Tier II Secondary Contact
Contact Name:	PAT COYLE
Contact Title:	FLEET SUPERVISOR
Contact Phone:	561-722-4486
Contact 24Hr Phone:	561-616-1702

---

1 **FPL OKEECHOBEE SERVICE CENTER** **RCRA-CESQG** **1004682782**
825 NE 34 AVE **FINDS** **FLD000733881**
OKEECHOBEE, FL

RCRA-CESQG:

Date form received by agency:	02/08/1996
Facility name:	FPL OKEECHOBEE SERVICE CENTER
Facility address:	825 NE 34TH AVE OKEECHOBEE, FL 349743540
EPA ID:	FLD000733881
Mailing address:	PO BOX 78768 WEST PALM BEACH, FL 33407-0768

FPL OKEECHOBEE SERVICE CENTER (Continued) **1004682782**

Contact:	CHARLES D HENDERSON
Contact address:	PO BOX 078768 WEST PALM BEACH, FL 33407
Contact country:	US
Contact telephone:	4076976930
Contact email:	Not reported
EPA Region:	04
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	CHARLES HENDERSON
Owner/operator address:	PO BOX 78768 WEST PALM BEACH, FL 33407
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	10/18/1996
Owner/Op end date:	Not reported

Owner/operator name:	HENDERSON CHARLES
Owner/operator address:	PO BOX 78768 WEST PALM BEACH, FL 33407
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	10/18/1996
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No

FPL OKEECHOBEE SERVICE CENTER (Continued) **1004682782**

Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

FINDS:

Registry ID: 110008320110

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

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1 **FPL OKEECHOBEE SERVICE CENTER** **FINDS** **1011437914**
825 NE 34TH AVE **N/A**
OKEECHOBEE, FL

FINDS:

Registry ID: 110035623769

Environmental Interest/Information System
Florida Environmental System Today Application (FIESTA) Data Maintenance (FDM) system maintains entity, environmental interest and affiliation data for the State of Florida.

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1 **FL POWER & LIGHT CO-OKEECHOBE SRVC CTR** **LUST** **U002313644**
825 NE 34TH AVE **UST** **N/A**
OKEECHOBEE, FL 34972 **AST**

LUST:
Region: STATE
Facility Id: 8519987
Facility Status: OPEN
Facility Type: C - Fuel user/Non-retail
Facility Phone: (772)223-4255
Facility Cleanup Rank: 4370
District: Southeast District

FL POWER & LIGHT CO-OKEECHOBE SRVC CTR (Continued) **U002313644**

Lat/Long (dms):	27 14 52.6124 / 80 47 41.9811
Section:	013
Township:	37S
Range:	35E
Feature:	Not reported
Method:	UNVR
Datum:	0
Score:	45
Score Effective Date:	10/03/2011
Score When Ranked:	36
Operator:	PAT COYLE
Name Update:	05/14/2002
Address Update:	02/28/2008

Petroleum Cleanup PCT Facility Score:

Facility Cleanup Status:	ONGO - ONGOING
Contact:	ANDREW DAUGHERTY
Contact Company:	FL POWER & LIGHT CO
Contact Address:	7200 NW 4TH ST
Contact City/State/Zip:	PLANTATION, FL 33317
Phone:	(954)581-3014
Bad Address Ind:	N
State:	FL
Zip:	34972
Score:	45
Score Effective Date:	2011-10-03 00:00:00
Related Party ID:	27028
Primary RP Role:	ACCOUNT OWNER
RP Begin Date:	04/26/1994
RP Zip:	Not reported
RP Extension:	Not reported

Discharge Cleanup Summary:

Discharge Date:	06/25/1992
PCT Discharge Combined:	Not reported
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	RA - RA ONGOING
Disch Cleanup Status Date:	08/26/2008
Cleanup Work Status:	INACTIVE
Information Source:	I - PLIRP (INSURANCE)
Other Source Description:	Not reported
Eligibility Indicator:	E - ELIGIBLE
Site Manager:	PERRY_H
Site Mgr End Date:	04/23/2013
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM 6

Petroleum Cleanup Program Eligibility:

Facility ID:	8519987
Discharge Date:	25-Jun-1992
Pct Discharge Combined With:	Not reported
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	RA - RA ONGOING
Disch Cleanup Status Date:	08/26/2008
Cleanup Work Status:	INACTIVE
Information Source:	I - PLIRP (INSURANCE)
Other Source Description:	Not reported
Application Received Date:	7/7/1992
Cleanup Program:	P - PETROLEUM LIABILITY AND RESTORATION INSURANCE PROGRAM

FL POWER & LIGHT CO-OKEECHOBE SRVC CTR (Continued) **U002313644**

Eligibility Status:	1/27/1993
Elig Status Date:	1/27/1993
Letter Of Intent Date:	07/07/1992
Redetermined:	No
Inspection Date:	07/21/1992
Site Manager:	PERRY_H
Site Mgr End Date:	04/23/2013
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM 6
Deductible Amount:	500
Deductible Paid To Date:	500
Co-Pay Amount:	0
Co-Pay Paid To Date:	0
Cap Amount:	1200000

Contaminated Media:

Discharge Date:	06/25/1992
Pct Discharge Combined With:	Not reported
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	RA - RA ONGOING
Disch Cleanup Status Date:	08/26/2008
Cleanup Work Status:	INACTIVE
Information Source:	I - PLIRP (INSURANCE)
Other Source Description:	Not reported
Elig Indicator:	E - ELIGIBLE
Site Manager:	PERRY_H
Site Mgr End Date:	04/23/2013
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM
Contaminated Drinking Wells:	0
Contaminated Monitoring Well:	Yes
Contaminated Soil:	No
Contaminated Surface Water:	No
Contaminated Ground Water:	Yes
Pollutant:	B - UNLEADED GAS
Pollutant Other Description:	Not reported
Gallons Discharged:	Not reported

Task Information:

District:	SED
Facility ID:	8519987
Facility Status:	OPEN
Facility Type:	C - Fuel user/Non-retail -
County:	OKEECHOBEE
County ID:	47
Cleanup Eligibility Status:	E
Source Effective Date:	Not reported
Discharge Date:	06-25-1992
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	RA - RA ONGOING
Disch Cleanup Status Date:	08-26-2008
SRC Action Type:	-
SRC Submit Date:	Not reported
SRC Review Date:	Not reported
SRC Completion Status:	-
SRC Issue Date:	Not reported
SRC Comment:	Not reported
Cleanup Work Status:	INACTIVE
Site Mgr:	PERRY_H
Site Mgr End Date:	04-23-2013

FL POWER & LIGHT CO-OKEECHOBE SRVC CTR (Continued) **U002313644**

Tank Office:	PCTM6 - Team 6
SR Task ID:	35916
SR Cleanup Responsible:	-
SR Funding Eligibility Type:	-
SR Actual Cost:	Not reported
SR Completion Date:	12-29-1992
SR Payment Date:	Not reported
SR Oral Date:	Not reported
SR Written Date:	Not reported
SR Soil Removal:	Y
SR Free Product Removal:	Not reported
SR Soil Tonnage Removed:	784
SR Soil Treatment:	Not reported
SR Other Treatment:	Not reported
SR Alternate Proc Received Date:	Not reported
SR Alternate Procedure Status:	Not reported
SR Alternate Procedure Status Date:	Not reported
SR Alternate Procedure Comments:	Not reported
SA Task ID:	35917
SA Cleanup Responsible:	-
SA Funding Eligibility Type:	-
SA Actual Cost:	Not reported
SA Completion Date:	03-08-1994
SA Payment Date:	Not reported
RAP Task ID:	67618
RAP Cleanup Responsible ID:	-
RAP Funding Eligibility Type:	-
RAP Actual Cost:	Not reported
RAP Completion Date:	Not reported
RAP Payment Date:	Not reported
RAP Last Order Approved:	Not reported
RA Task ID:	75630
RA Cleanup Responsible:	-
RA Funding Eligibility Type:	-
RA Years to Complete:	Not reported
RA Actual Cost:	Not reported

Click here for Florida Oculus:

UST:

Facility Id:	8519987
Facility Status:	OPEN
Type Description:	Fuel user/Non-retail
Facility Phone:	(772) 223-4255
Region:	STATE
Positioning Method:	UNVR
Lat/Long (dms):	27 14 42 / 80 47 44

Owner:

Owner Id:	27028
Owner Name:	FL POWER & LIGHT CO
Owner Address:	7200 NW 4TH ST
Owner Address 2:	ATTN: ANDREW DAUGHERTY
Owner City,St,Zip:	PLANTATION, FL 33317
Owner Contact:	ANDREW DAUGHERTY
Owner Phone:	(954) 581-3014

FL POWER & LIGHT CO-OKEECHOBE SRVC CTR (Continued) **U002313644**

Tank Info:

Tank Id:	1
Status:	Removed
Status Date:	31-DEC-1992
Install Date:	01-JUN-1974
Substance:	Vehicular diesel
Content Description:	Vehicular Diesel
Gallons:	5000
Vessel Indicator:	TANK
Tank Location:	UNDERGROUND
DEP Contractor:	No

Click here for Florida Oculus:

AST:

Facility ID:	8519987
Facility Status:	OPEN
Type Description:	Fuel user/Non-retail
Facility Phone:	(772) 223-4255
DEP Contractor Own:	No
Region:	STATE
Positioning Method:	UNVR
Lat/Long (dms):	27 14 42 / 80 47 44

Owner:

Owner Id:	27028
Owner Name:	FL POWER & LIGHT CO
Owner Address:	7200 NW 4TH ST
Owner Address 2:	ATTN: ANDREW DAUGHERTY
Owner City,St,Zip:	PLANTATION, FL 33317
Owner Contact:	ANDREW DAUGHERTY
Owner Phone:	(954) 581-3014

Tank Id:	2
Status:	Removed
Status Date:	Removed
Install Date:	Not reported
Substance:	Vehicular diesel
Content Description:	Vehicular Diesel
Gallons:	1000
Tank Location:	ABOVEGROUND

Tank Id:	3
Status:	Removed
Status Date:	Removed
Install Date:	Not reported
Substance:	Unleaded gas
Content Description:	Unleaded Gas
Gallons:	280
Tank Location:	ABOVEGROUND

Tank Id:	4
Status:	In service
Status Date:	In service
Install Date:	01-NOV-2007

FL POWER & LIGHT CO-OKEECHOBE SRVC CTR (Continued) **U002313644**

Substance: Unleaded gas
Content Description: Unleaded Gas
Gallons: 3000
Tank Location: ABOVEGROUND

Construction:
Tank Id: 4
Construction Category: Primary Construction
Construction Description: Steel

Tank Id: 4
Construction Category: Secondary Containment
Construction Description: Double wall

Tank Id: 4
Construction Category: Overfill/Spill
Construction Description: Spill containment bucket

Tank Id: 4
Construction Category: Overfill/Spill
Construction Description: Level gauges/alarms

Tank Id: 4
Construction Category: Miscellaneous Attributes
Construction Description: Compartmented

Monitoring:
Tank ID: 4
Monitoring Description: Monitor dbl wall tank space

Tank ID: 4
Monitoring Description: Visual inspection of ASTs

Tank ID: 4
Monitoring Description: Continuous electronic sensing

Tank ID: 4
Monitoring Description: External piping monitoring

Piping:
Tank ID: 4
Piping Category: Miscellaneous Attributes
Piping Description: Abv, no soil contact

Tank ID: 4
Piping Category: Miscellaneous Attributes
Piping Description: Suction piping system

Tank ID: 4
Piping Category: Primary Construction
Piping Description: Steel/galvanized metal

Tank Id: 5
Status: Deleted
Status Date: Deleted
Install Date: 01-NOV-2007

FL POWER & LIGHT CO-OKEECHOBE SRVC CTR (Continued) **U002313644**

Substance: Vehicular diesel
Content Description: Vehicular Diesel
Gallons: 1500
Tank Location: ABOVEGROUND

Click here for Florida Oculus:

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2 **CHEVRON #47761** **LUST U001363551**
2768 SR 710 **UST N/A**
OKEECHOBEE, FL 34974

LUST:

Region:	STATE
Facility Id:	8512544
Facility Status:	CLOSED
Facility Type:	A - Retail Station
Facility Phone:	(863)763-4522
Facility Cleanup Rank:	Not reported
District:	Southeast District
Lat/Long (dms):	27 14 46.2312 / 80 47 57.672
Section:	Not reported
Township:	Not reported
Range:	Not reported
Feature:	Not reported
Method:	UNVR
Datum:	0
Score:	71
Score Effective Date:	02/23/2000
Score When Ranked:	Not reported
Operator:	DOUGLAS,ROY MALCOLM
Name Update:	Not reported
Address Update:	Not reported

Discharge Cleanup Summary:

Discharge Date:	06/01/1992
PCT Discharge Combined:	Not reported
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	SRCR - SRCR COMPLETE
Disch Cleanup Status Date:	12/27/2002
Cleanup Work Status:	COMPLETED
Information Source:	A - ABANDONED TANK RESTORATION
Other Source Description:	Not reported
Eligibility Indicator:	E - ELIGIBLE
Site Manager:	ALLEN_T
Site Mgr End Date:	01/06/2003
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM 6
Discharge Date:	12/27/1988
PCT Discharge Combined:	Not reported
Cleanup Required:	N - NO CLEANUP REQUIRED
Discharge Cleanup Status:	NREQ - CLEANUP NOT REQUIRED
Disch Cleanup Status Date:	09/18/2001
Cleanup Work Status:	COMPLETED
Information Source:	E - EDI
Other Source Description:	Not reported
Eligibility Indicator:	I - INELIGIBLE
Site Manager:	ALLEN_T
Site Mgr End Date:	01/06/2003

CHEVRON #47761 (Continued) **U001363551**

Tank Office: PCTM6 - PETROLEUM CLEANUP TEAM 6

Petroleum Cleanup Program Eligibility:
Facility ID: 8512544
Discharge Date: 01-Jun-1992
Pct Discharge Combined With: Not reported
Cleanup Required: R - CLEANUP REQUIRED
Discharge Cleanup Status: SRCR - SRCR COMPLETE
Disch Cleanup Status Date: 12/27/2002
Cleanup Work Status: COMPLETED
Information Source: A - ABANDONED TANK RESTORATION
Other Source Description: Not reported
Application Received Date: 6/12/1992
Cleanup Program: A - ABANDONED TANK RESTORATION PROGRAM
Eligibility Status: 8/19/1992
Elig Status Date: 8/19/1992
Letter Of Intent Date: Not reported
Redetermined: No
Inspection Date: 06/10/1992
Site Manager: ALLEN_T
Site Mgr End Date: 01/06/2003
Tank Office: PCTM6 - PETROLEUM CLEANUP TEAM 6
Deductible Amount: 500
Deductible Paid To Date: 500
Co-Pay Amount: 0
Co-Pay Paid To Date: 0
Cap Amount: Not reported

Contaminated Media:
Discharge Date: 06/01/1992
Pct Discharge Combined With: Not reported
Cleanup Required: R - CLEANUP REQUIRED
Discharge Cleanup Status: SRCR - SRCR COMPLETE
Disch Cleanup Status Date: 12/27/2002
Cleanup Work Status: COMPLETED
Information Source: A - ABANDONED TANK RESTORATION
Other Source Description: Not reported
Elig Indicator: E - ELIGIBLE
Site Manager: ALLEN_T
Site Mgr End Date: 01/06/2003
Tank Office: PCTM6 - PETROLEUM CLEANUP TEAM
Contaminated Drinking Wells: Not reported
Contaminated Monitoring Well: Not reported
Contaminated Soil: Not reported
Contaminated Surface Water: Not reported
Contaminated Ground Water: Not reported
Pollutant: B - UNLEADED GAS
Pollutant Other Description: Not reported
Gallons Discharged: Not reported
Discharge Date: 12/27/1988
Pct Discharge Combined With: Not reported
Cleanup Required: N - NO CLEANUP REQUIRED
Discharge Cleanup Status: NREQ - CLEANUP NOT REQUIRED
Disch Cleanup Status Date: 09/18/2001
Cleanup Work Status: COMPLETED
Information Source: E - EDI
Other Source Description: Not reported
Elig Indicator: I - INELIGIBLE

CHEVRON #47761 (Continued) **U001363551**

Site Manager:	ALLEN_T
Site Mgr End Date:	01/06/2003
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM
Contaminated Drinking Wells:	6
Contaminated Monitoring Well:	Yes
Contaminated Soil:	No
Contaminated Surface Water:	No
Contaminated Ground Water:	Yes
Pollutant:	A - LEADED GAS
Pollutant Other Description:	Not reported
Gallons Discharged:	Not reported
Discharge Date:	12/27/1988
Pct Discharge Combined With:	Not reported
Cleanup Required:	N - NO CLEANUP REQUIRED
Discharge Cleanup Status:	NREQ - CLEANUP NOT REQUIRED
Disch Cleanup Status Date:	09/18/2001
Cleanup Work Status:	COMPLETED
Information Source:	E - EDI
Other Source Description:	Not reported
Elig Indicator:	I - INELIGIBLE
Site Manager:	ALLEN_T
Site Mgr End Date:	01/06/2003
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM
Contaminated Drinking Wells:	6
Contaminated Monitoring Well:	Yes
Contaminated Soil:	No
Contaminated Surface Water:	No
Contaminated Ground Water:	Yes
Pollutant:	B - UNLEADED GAS
Pollutant Other Description:	Not reported
Gallons Discharged:	Not reported

Task Information:

District:	SED
Facility ID:	8512544
Facility Status:	CLOSED
Facility Type:	A - Retail Station -
County:	OKEECHOBEE
County ID:	47
Cleanup Eligibility Status:	E
Source Effective Date:	12-27-2002
Discharge Date:	06-01-1992
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	SRCR - SRCR COMPLETE
Disch Cleanup Status Date:	12-27-2002
SRC Action Type:	SRCR - SITE REHABILITATION COMPLETION REPORT
SRC Submit Date:	10-15-2002
SRC Review Date:	10-21-2002
SRC Completion Status:	A - APPROVED
SRC Issue Date:	12-27-2002
SRC Comment:	Not reported
Cleanup Work Status:	COMPLETED
Site Mgr:	ALLEN_T
Site Mgr End Date:	01-06-2003
Tank Office:	PCTM6 - Team 6
SR Task ID:	Not reported
SR Cleanup Responsible:	-
SR Funding Eligibility Type:	-

CHEVRON #47761 (Continued) **U001363551**

SR Actual Cost:	Not reported
SR Completion Date:	Not reported
SR Payment Date:	Not reported
SR Oral Date:	Not reported
SR Written Date:	Not reported
SR Soil Removal:	Not reported
SR Free Product Removal:	Not reported
SR Soil Tonnage Removed:	Not reported
SR Soil Treatment:	Not reported
SR Other Treatment:	Not reported
SR Alternate Proc Received Date:	Not reported
SR Alternate Procedure Status:	Not reported
SR Alternate Procedure Status Date:	Not reported
SR Alternate Procedure Comments:	Not reported
SA Task ID:	36117
SA Cleanup Responsible:	-
SA Funding Eligibility Type:	-
SA Actual Cost:	Not reported
SA Completion Date:	Not reported
SA Payment Date:	Not reported
RAP Task ID:	36118
RAP Cleanup Responsible ID:	ST - STATE
RAP Funding Eligibility Type:	-
RAP Actual Cost:	Not reported
RAP Completion Date:	Not reported
RAP Payment Date:	Not reported
RAP Last Order Approved:	Not reported
RA Task ID:	36119
RA Cleanup Responsible:	ST - STATE
RA Funding Eligibility Type:	-
RA Years to Complete:	0
RA Actual Cost:	Not reported
District:	SED
Facility ID:	8512544
Facility Status:	CLOSED
Facility Type:	A - Retail Station -
County:	OKEECHOBEE
County ID:	47
Cleanup Eligibility Status:	I
Source Effective Date:	Not reported
Discharge Date:	12-27-1988
Cleanup Required:	N - NO CLEANUP REQUIRED
Discharge Cleanup Status:	NREQ - CLEANUP NOT REQUIRED
Disch Cleanup Status Date:	09-18-2001
SRC Action Type:	-
SRC Submit Date:	Not reported
SRC Review Date:	Not reported
SRC Completion Status:	-
SRC Issue Date:	Not reported
SRC Comment:	Not reported
Cleanup Work Status:	COMPLETED
Site Mgr:	ALLEN_T
Site Mgr End Date:	01-06-2003
Tank Office:	PCTM6 - Team 6
SR Task ID:	36120
SR Cleanup Responsible:	ST - STATE
SR Funding Eligibility Type:	-

CHEVRON #47761 (Continued) **U001363551**

SR Actual Cost:	Not reported
SR Completion Date:	Not reported
SR Payment Date:	Not reported
SR Oral Date:	Not reported
SR Written Date:	Not reported
SR Soil Removal:	Not reported
SR Free Product Removal:	Not reported
SR Soil Tonnage Removed:	Not reported
SR Soil Treatment:	Not reported
SR Other Treatment:	Not reported
SR Alternate Proc Received Date:	Not reported
SR Alternate Procedure Status:	Not reported
SR Alternate Procedure Status Date:	Not reported
SR Alternate Procedure Comments:	Not reported
SA Task ID:	36121
SA Cleanup Responsible:	ST - STATE
SA Funding Eligibility Type:	-
SA Actual Cost:	Not reported
SA Completion Date:	Not reported
SA Payment Date:	Not reported
RAP Task ID:	36122
RAP Cleanup Responsible ID:	ST - STATE
RAP Funding Eligibility Type:	-
RAP Actual Cost:	Not reported
RAP Completion Date:	Not reported
RAP Payment Date:	Not reported
RAP Last Order Approved:	Not reported
RA Task ID:	36123
RA Cleanup Responsible:	ST - STATE
RA Funding Eligibility Type:	-
RA Years to Complete:	Not reported
RA Actual Cost:	Not reported

Click here for Florida Oculus:

UST:

Facility Id:	8512544
Facility Status:	CLOSED
Type Description:	Retail Station
Facility Phone:	(863) 763-4522
Region:	STATE
Positioning Method:	UNVR
Lat/Long (dms):	27 14 47 / 80 48 47

Owner Records Not Found for this facility id:

Tank Info:

Tank Id:	1
Status:	Removed
Status Date:	31-MAY-1990
Install Date:	01-JUL-1963
Substance:	Unleaded gas
Content Description:	Unleaded Gas
Gallons:	1000
Vessel Indicator:	TANK
Tank Location:	UNDERGROUND
DEP Contractor:	No

CHEVRON #47761 (Continued) **U001363551**

Tank Id:	2
Status:	Removed
Status Date:	31-MAY-1990
Install Date:	01-JUL-1975
Substance:	Leaded gas
Content Description:	Leaded Gas
Gallons:	3000
Vessel Indicator:	TANK
Tank Location:	UNDERGROUND
DEP Contractor:	No

Tank Id:	3
Status:	Removed
Status Date:	31-MAY-1990
Install Date:	01-JUL-1982
Substance:	Unleaded gas
Content Description:	Unleaded Gas
Gallons:	2000
Vessel Indicator:	TANK
Tank Location:	UNDERGROUND
DEP Contractor:	No

Tank Id:	4
Status:	Removed
Status Date:	31-MAY-1990
Install Date:	01-JUL-1982
Substance:	Vehicular diesel
Content Description:	Vehicular Diesel
Gallons:	2000
Vessel Indicator:	TANK
Tank Location:	UNDERGROUND
DEP Contractor:	No

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3 **TOWN STAR #40** **LUST U004138146**
3990 HWY 710 **UST N/A**
OKEECHOBEE, FL 34974

LUST:

Region:	STATE
Facility Id:	8630309
Facility Status:	OPEN
Facility Type:	A - Retail Station
Facility Phone:	(863)763-0907
Facility Cleanup Rank:	3987
District:	Southeast District
Lat/Long (dms):	27 14 27.2 / 80 47 17.8
Section:	Not reported
Township:	Not reported
Range:	Not reported
Feature:	UST'S
Method:	AGPS
Datum:	0
Score:	36
Score Effective Date:	05/24/2012
Score When Ranked:	41

TOWN STAR #40 (Continued) **U004138146**

Operator:	ROSEMARY HERRON
Name Update:	07/29/2009
Address Update:	07/29/2009

Petroleum Cleanup PCT Facility Score:

Facility Cleanup Status:	ONGO - ONGOING
Contact:	JOHN TIFFANY
Contact Company:	TIME SAVER FOOD STORES
Contact Address:	2178 RESERVE PARK TRACE
Contact City/State/Zip:	PORT SAINT LUCIE, FL 34986
Phone:	(772)466-8585
Bad Address Ind:	N
State:	FL
Zip:	34974, 3516
Score:	36
Score Effective Date:	2012-05-24 00:00:00
Related Party ID:	54445
Primary RP Role:	ACCOUNT OWNER
RP Begin Date:	07/10/2003
RP Zip:	Not reported
RP Extension:	Not reported

Discharge Cleanup Summary:

Discharge Date:	11/22/1988
PCT Discharge Combined:	Not reported
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	RA - RA ONGOING
Disch Cleanup Status Date:	11/02/2009
Cleanup Work Status:	INACTIVE
Information Source:	E - EDI
Other Source Description:	Not reported
Eligibility Indicator:	E - ELIGIBLE
Site Manager:	PERRY_H
Site Mgr End Date:	Not reported
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM 6

Petroleum Cleanup Program Eligibility:

Facility ID:	8630309
Discharge Date:	22-Nov-1988
Pct Discharge Combined With:	Not reported
Cleanup Required:	R - CLEANUP REQUIRED
Discharge Cleanup Status:	RA - RA ONGOING
Disch Cleanup Status Date:	11/02/2009
Cleanup Work Status:	INACTIVE
Information Source:	E - EDI
Other Source Description:	Not reported
Application Received Date:	12/30/1988
Cleanup Program:	E - EARLY DETECTION INCENTIVE
Eligibility Status:	8/30/1990
Elig Status Date:	8/30/1990
Letter Of Intent Date:	Not reported
Redetermined:	No
Inspection Date:	07/25/1990
Site Manager:	PERRY_H
Site Mgr End Date:	Not reported
Tank Office:	PCTM6 - PETROLEUM CLEANUP TEAM 6
Deductible Amount:	Not reported
Deductible Paid To Date:	0

TOWN STAR #40 (Continued) **U004138146**

Co-Pay Amount: Not reported
Co-Pay Paid To Date: 0
Cap Amount: Not reported

Contaminated Media:
Discharge Date: 11/22/1988
Pct Discharge Combined With: Not reported
Cleanup Required: R - CLEANUP REQUIRED
Discharge Cleanup Status: RA - RA ONGOING
Disch Cleanup Status Date: 11/02/2009
Cleanup Work Status: INACTIVE
Information Source: E - EDI
Other Source Description: Not reported
Elig Indicator: E - ELIGIBLE
Site Manager: PERRY_H
Site Mgr End Date: Not reported
Tank Office: PCTM6 - PETROLEUM CLEANUP TEAM
Contaminated Drinking Wells: 0
Contaminated Monitoring Well: Yes
Contaminated Soil: No
Contaminated Surface Water: No
Contaminated Ground Water: No
Pollutant: Y - UNKNOWN/NOT REPORTED
Pollutant Other Description: Not reported
Gallons Discharged: Not reported

Task Information:
District: SED
Facility ID: 8630309
Facility Status: OPEN
Facility Type: A - Retail Station -
County: OKEECHOBEE
County ID: 47
Cleanup Eligibility Status: E
Source Effective Date: Not reported
Discharge Date: 11-22-1988
Cleanup Required: R - CLEANUP REQUIRED
Discharge Cleanup Status: RA - RA ONGOING
Disch Cleanup Status Date: 11-02-2009
SRC Action Type: -
SRC Submit Date: Not reported
SRC Review Date: Not reported
SRC Completion Status: -
SRC Issue Date: Not reported
SRC Comment: Not reported
Cleanup Work Status: INACTIVE
Site Mgr: PERRY_H
Site Mgr End Date: Not reported
Tank Office: PCTM6 - Team 6
SR Task ID: 36042
SR Cleanup Responsible: ST - STATE
SR Funding Eligibility Type: -
SR Actual Cost: Not reported
SR Completion Date: Not reported
SR Payment Date: Not reported
SR Oral Date: Not reported
SR Written Date: Not reported
SR Soil Removal: Not reported

TOWN STAR #40 (Continued) **U004138146**

SR Free Product Removal:	Not reported
SR Soil Tonnage Removed:	Not reported
SR Soil Treatment:	Not reported
SR Other Treatment:	Not reported
SR Alternate Proc Received Date:	Not reported
SR Alternate Procedure Status:	Not reported
SR Alternate Procedure Status Date:	Not reported
SR Alternate Procedure Comments:	Not reported
SA Task ID:	36043
SA Cleanup Responsible:	ST - STATE
SA Funding Eligibility Type:	-
SA Actual Cost:	Not reported
SA Completion Date:	Not reported
SA Payment Date:	Not reported
RAP Task ID:	36044
RAP Cleanup Responsible ID:	ST - STATE
RAP Funding Eligibility Type:	-
RAP Actual Cost:	Not reported
RAP Completion Date:	Not reported
RAP Payment Date:	Not reported
RAP Last Order Approved:	Not reported
RA Task ID:	36045
RA Cleanup Responsible:	ST - STATE
RA Funding Eligibility Type:	-
RA Years to Complete:	Not reported
RA Actual Cost:	Not reported

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UST:

Facility Id:	8630309
Facility Status:	OPEN
Type Description:	Retail Station
Facility Phone:	(863) 763-0907
Region:	STATE
Positioning Method:	AGPS
Lat/Long (dms):	27 14 27.1999999 / 80 47 17.8000000

Owner:

Owner Id:	54445
Owner Name:	TIME SAVER FOOD STORES
Owner Address:	2178 RESERVE PARK TRACE
Owner Address 2:	ATTN: JOHN TIFFANY
Owner City,St,Zip:	PORT SAINT LUCIE, FL 34986
Owner Contact:	JOHN TIFFANY
Owner Phone:	(772) 466-8585

Tank Info:

Tank Id:	1
Status:	Removed
Status Date:	29-JUL-2009
Install Date:	01-MAY-1986
Substance:	Unleaded gas
Content Description:	Unleaded Gas
Gallons:	10000
Vessel Indicator:	TANK
Tank Location:	UNDERGROUND

TOWN STAR #40 (Continued) **U004138146**

DEP Contractor: No

Tank Id: 2
Status: Removed
Status Date: 29-JUL-2009
Install Date: 01-MAY-1986
Substance: Unleaded gas
Content Description: Unleaded Gas
Gallons: 10000
Vessel Indicator: TANK
Tank Location: UNDERGROUND
DEP Contractor: No

Tank Id: 3
Status: Removed
Status Date: 29-JUL-2009
Install Date: 01-MAY-1986
Substance: Vehicular diesel
Content Description: Vehicular Diesel
Gallons: 10000
Vessel Indicator: TANK
Tank Location: UNDERGROUND
DEP Contractor: No

Tank Id: 4
Status: In service
Status Date: 01-AUG-2009
Install Date: 01-JUL-2009
Substance: Vehicular diesel
Content Description: Vehicular Diesel
Gallons: 22000
Vessel Indicator: TANK
Tank Location: UNDERGROUND
DEP Contractor: No

Construction:
Tank Id: 4
Construction Category: Primary Construction
Construction Description: Fiberglass

Tank Id: 4
Construction Category: Overfill/Spill
Construction Description: Ball check valve

Tank Id: 4
Construction Category: Overfill/Spill
Construction Description: Spill containment bucket

Tank Id: 4
Construction Category: Overfill/Spill
Construction Description: Flow shut-Off

Tank Id: 4
Construction Category: Overfill/Spill
Construction Description: Tight fill

Tank Id: 4
Construction Category: Overfill/Spill

TOWN STAR #40 (Continued) **U004138146**

Construction Description: Level gauges/alarms

Tank Id: 4
Construction Category: Secondary Containment
Construction Description: Double wall

Tank Id: 4
Construction Category: Miscellaneous Attributes
Construction Description: Compartmented

Monitoring:
Tank ID: 4
Monitoring Description: Monitor dbl wall tank space

Tank ID: 4
Monitoring Description: Mechanical line leak detector

Tank ID: 4
Monitoring Description: Monitor dbl wall pipe space

Tank ID: 4
Monitoring Description: Continuous electronic sensing

Tank ID: 4
Monitoring Description: Electronic monitor pipe sumps

Tank ID: 4
Monitoring Description: Visual inspect dispenser liners

Piping:
Tank ID: 4
Piping Category: Secondary Containment
Piping Description: Double wall

Tank ID: 4
Piping Category: Miscellaneous Attributes
Piping Description: Dispenser liners

Tank ID: 4
Piping Category: Primary Construction
Piping Description: Fiberglass

Tank ID: 4
Piping Category: Miscellaneous Attributes
Piping Description: Pressurized piping system

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3 **TOWN STAR # 40** **FINDS** **1012070869**
3993 HWY 710 E **N/A**
OKEECHOBEE, FL

FINDS:

Registry ID: 110038370367

Environmental Interest/Information System

US National Pollutant Discharge Elimination System (NPDES) module of the Compliance Information System (ICIS) tracks surface water permits issued under the Clean Water Act. Under NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a permit. The permit will likely contain limits on what can be discharged, impose monitoring and reporting requirements, and include other provisions to ensure that the discharge does not adversely affect water quality.

PCS (Permit Compliance System) is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Count: 72 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BUCKHEAD RIDGE	S109418011	BUCKHEAD RIDGE PUMP STATION S-129	SR 78	34974	AIRS
BUCKHEAD RIDGE	S101264716	SOUTH FL WATER MGMT DIST S-127	P S S-127 L-48 @BUCKHEAD RIDGE	34974	LUST, LAST, AST
LAKEPORT	S108634871	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION S- 12	JUNCTION L-49 AND LAKE OKEECHOBEE (SR 78 7MI NORTH	34974	TIER 2
OKEECHOBEE	S108978858	OKEECHOBEE COUNTY FIRE RESCUE #4	1199 NORTHEAST 168TH STREET	34972	AST, TIER 2
OKEECHOBEE	1010500312	TOWNS OF OKEECHOBEE	NW 23RD LN		FINDS
OKEECHOBEE	A100359004	OKEECHOBEE ACHIEVEMENT ACADEMY	1000 NW 34TH ST	34972	AST
OKEECHOBEE	S102848128	PRIMROSE RV PARK	US 441 SOUTH		NPDES
OKEECHOBEE	1012049922	SUPERIOR WATER WORKS, INC.	4072 HWY 441 N	34972	SSTS
OKEECHOBEE	S107714788	BELLSOUTH TELECOMMUNICATIONS - E6093	26800 HIGHWAY 441 NORTH	34972	TIER 2
OKEECHOBEE	S102848106	BLUE CYPRESS WWTF	13801 S.R. 441 S.E.		NPDES
OKEECHOBEE	S103616416	MCARTHUR FARMS DAIRY BARNS 1 & 2	HIGHWAY 441 NORTH		NPDES
OKEECHOBEE	U004053726	MCARTHUR FARMS INC - BARN 1	18116 HWY 441 N	34972	AST
OKEECHOBEE	S109352831	BUREAU OF INDIAN AFFAIRS-BRIGHTON	RT 6 BOX 666		FF TANKS
OKEECHOBEE	1008157577	SR 70 - SLOPE STABILIZATION	SR 70 /CSX OVERPASS -OKEECHOBE		FINDS
OKEECHOBEE	1011437516	THE ESTATES AT OKEECHOBEE PINES	SR 70 WEST OF BERMAN ROAD		FINDS
OKEECHOBEE	1015908899	DOLLAR GENERAL OKEECHOBEE	1620 HIGHWAY 70 W		FINDS
OKEECHOBEE	S104492290	PINE RIDGE PARK	SR 70		NPDES
OKEECHOBEE	1014388955	TIRE KINGDOM LLC #955	1595 HIGHWAY 70 E	34972	RCRA NonGen / NLR
OKEECHOBEE	U001352545	HITCHING POST-BRIGHTON SEMINOLE	HWY 721 S	34974	UST
OKEECHOBEE	1014468614	SEMINOLE TRIBE OF FLORIDA	RT 721A/RED BARN ROAD	34974	RCRA-CESQG
OKEECHOBEE	S108787777	E-1G20	SR 78 TO CR 78B		NPDES
OKEECHOBEE	U001363571	PARRISH SEPTIC TANK INC	HWY 78 W	34974	UST
OKEECHOBEE	S102848105	BIG "O" CAMPGROUND	SR 78 WEST OF SR 441		NPDES
OKEECHOBEE	S113426883	HHD CULVERT 7,9 & TAYLOR CREEK CULVERT ADANDONMENT	900 HWY 78 W		NPDES
OKEECHOBEE	S111443947	BUCKHEAD RIDGE MOSQUITO CONTROL DISTRICT	30052 HIGHWAY 78 WEST		NPDES
OKEECHOBEE	S102848116	OKEE-TANTI REC AREA	SR 78, 7.6 MI SW OF OKEECHOBEE		NPDES
OKEECHOBEE	U001363546	OKEECHOBEE COUNTY AIRPORT	RT 8 BOX 510 HWY 98N	34972	UST
OKEECHOBEE	S108516481	MILKING R DAIRY	6300 HIGHWAY 98 NORTH		NPDES
OKEECHOBEE	1011436696	OKEECHOBEE, CITY OF - COMMERCE CENTER	APPROX. 1250 W OF US 441 ON NE 9TH ST		FINDS
OKEECHOBEE	1008156964	CITY OF OKEECHOBEE COMMERCE CE	APPROX. 1250' W OF US 441 ON N		FINDS
OKEECHOBEE	1012091239	CANE FIELDS SITE	BIA HWY 1305 AND RED BARN ROAD	34974	US BROWNFIELDS, FINDS
OKEECHOBEE	S108634844	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - OKEECHOBEE	1000 NORTH EAST 40 TH AVENUE	34972	TIER 2
OKEECHOBEE	S103616415	MCARTHUR FARMS DAIRY - BARN 4	U.S. HIGHWAY 441		NPDES
OKEECHOBEE	1012240141	SOUTH FLORIDA WATER MANAGEMENT DISTRICT	2780 SE HWY 441	34974	FINDS, US AIRS
OKEECHOBEE	S107936806	PUMP STATION S-133	2780 SE HWY 441	34974	AIRS
OKEECHOBEE	S102848135	VILLA MARGARET	4648 US HWY 441N		NPDES
OKEECHOBEE	1011406635	OKEECHOBEE NEW EVERGLADES SCHOOL	3 MI.EAST OF CITY OF OKEE.		FINDS
OKEECHOBEE	S102848118	OKEECHOBEE CORRECTIONAL WWTF	9 MILES NORTH OF OKEECHOBEE		NPDES
OKEECHOBEE	1011403233	OKEECHOBEE CORRECTIONAL WWTF	9 MILES NORTH OF OKEECHOBEE		FINDS
OKEECHOBEE	1007994023	OKEECHOBEE UTILITY AUTHORITY GWTP	1200 N.E.12TH ST.		FINDS

Count: 72 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
OKEECHOBEE	1011833496	OKEECHOBEE UTILITY AUTHORITY GWTP	1200 N.E.12TH ST.	34974	RMP
OKEECHOBEE	S107723813	SOUTHEAST MILK - OKEECHOBEE SUPPLY	1005 WEST NORTH PARK STREET	34972	TIER 2
OKEECHOBEE	U001377776	SOUTH FL WATER MGMT DIST-S 72	C-40 NW HWY 78-20 MI FROM OKEE		UST
OKEECHOBEE	S109996606	DR FRED BROWN CHILDREN'S HEALTH CENTER	NWC OF NW 20TH LN & US-441		NPDES
OKEECHOBEE	1012091140	BOWLEGS PASTURE SITE	WEST OF BIA HWY 283	34974	US BROWNFIELDS, FINDS
OKEECHOBEE	A100347398	SOUTH FL WATER MGMT DIST-LYKES BROS WWTR PAST	S SIDE C-39A CANAL, 10 MILES E HWY 27	34974	AST
OKEECHOBEE	S111310925	APPLEBEES	SR-70		NPDES
OKEECHOBEE	S112805034	GLADES BUCKHEAD RIDGE RESORT	670 STATE ROAD 78B	34974	SWF/LF
OKEECHOBEE	S102846708	LAKEPORT MOTEL AND RESTAURANT WWTP	11700 E STATE ROAD 78 NE		NPDES
OKEECHOBEE	1012216316	FLORIDA GAS TRANSMISSION COMPANY	STATE HIGHWAY 70	34974	FINDS, US AIRS
OKEECHOBEE	S109996282	VENTURE INN	3095 E STATE ROAD 60		NPDES
OKEECHOBEE	1014694113	OKEECHOBEE LANDFILL CELLS 33-3	UNKNOWN		FINDS
OKEECHOBEE	1011976946	OKEECHOBEE COUNTY SCHOOL - OKE	UNKNOWN		FINDS
OKEECHOBEE	1011925550	LAKE OKEECHOBEE S-65ESTRUCTURE	UNKNOWN		FINDS
OKEECHOBEE	1014688425	OKEECHOBEE ASPHALT AND READY M	UNKNOWN		FINDS
OKEECHOBEE	1014690796	OKEECHOBEE LANDFILL FLARE COMP	UNKNOWN		FINDS
OKEECHOBEE	1014694564	OKEECHOBEE CONTRACTOR YARD	UNKNOWN		FINDS
OKEECHOBEE	1014883086	OKEECHOBEE DRIVERS ED LOT IMPROVEMENTS	UNKNOWN		FINDS
OKEECHOBEE	1004458180	OKEECHOBEE COUNTY SCHOOL DISTRICT	1090 SOUTH WEST 5TH AVENUE	34974	FTTS, HIST FTTS, FINDS
OKEECHOBEE - NEG SOD	S113388221	SOUTHEAST MILK - OKEECHOBEE SUPPLY	1005 WEST NORTH PARK STREET -NEG SODNEG SOD- 2008	34972	TIER 2
OKEECHOBEE COUNTY	S111750490	CYPRESS ENERGY LP	STATE ROAD ROUTE 98		UIC
UNICORP	S108634881	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION S-135	US 441 WEST SIDE 7 MILE NORTH OF STATE ROAD 76(BEH	34974	TIER 2
UNICORP	S111751167	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION S-135	US 441 (WEST SIDE) 7 MILE NORTH OF SR 76 (BEHIND J&S FISH CA	34974	TIER 2
UNICORP	S108634882	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION S-140	57005 ALLIGATOR ALLEY (APPROX. 25 MI. W OF US 27)	34974	TIER 2
UNICORP	S111751159	SOUTH FLORIDA WATER MANAGEMENT - LYKES BROTHERS	CANAL C39A SOUTH OF STATE ROAD 70 - 21 MILES WEST OF US HIGH	34974	TIER 2
UNICORP	S113388213	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION S-135	US HIGHWAY 441 - 7 MILE NORTH OF STATE ROAD 76BEHIND J AND S	34974	TIER 2
UNICORP	S113388212	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION G - 3	US HIGHWAY 27 - 5 MILES NORTH OF PALM BEACH / BROWARD COUNTY	34974	TIER 2
UNICORP	S108634891	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION G 310	SIX MILE SOUTH STATE 880, (SOUTHERN TIP OF 1 WEST)	34974	TIER 2
UNICORP	S108634892	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION G 310	SIX MILES SOUTH OF STATE ROAD 880(SOUTHERN TIP OF	34974	TIER 2
UNICORP	S108634893	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION G-335	THREE NORTH EAST OF US 27(PALM BEACH/BROWARD COUNT	34974	TIER 2
UNICORP	S111751164	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION G-335	THREE MILES NORTHEAST OF US 27 (PALM BEACH/BROWARD COUNTY LI	34974	TIER 2
UNICORP	S108634899	SOUTH FLORIDA WATER MANAGEMENT DISTRICT - PUMP STATION G - 3	ON US 27, 5 MILE NORTH OF PALM BEACH/BROWARD CO. LINE	34974	TIER 2

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 05/09/2013
Date Made Active in Reports: 07/10/2013
Number of Days to Update: 62

Source: EPA
Telephone: N/A
Last EDR Contact: 10/11/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 05/09/2013
Date Made Active in Reports: 07/10/2013
Number of Days to Update: 62

Source: EPA
Telephone: N/A
Last EDR Contact: 10/11/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 05/09/2013
Date Made Active in Reports: 07/10/2013
Number of Days to Update: 62

Source: EPA
Telephone: N/A
Last EDR Contact: 10/11/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 05/29/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 72

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 10/18/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 05/29/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 72

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 10/18/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 04/25/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 07/11/2013
Date Data Arrived at EDR: 08/08/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 36

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 10/02/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 07/11/2013
Date Data Arrived at EDR: 08/08/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 10/02/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 07/11/2013
Date Data Arrived at EDR: 08/08/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 10/02/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 07/11/2013
Date Data Arrived at EDR: 08/08/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 10/02/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 07/11/2013
Date Data Arrived at EDR: 08/08/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 10/02/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Varies

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 07/11/2013
Date Data Arrived at EDR: 08/08/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 10/02/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 06/17/2013
Date Data Arrived at EDR: 06/21/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 104

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/10/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 06/17/2013
Date Data Arrived at EDR: 06/21/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 104

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/10/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 29

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 10/01/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 55

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/01/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/05/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/06/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 22

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 09/04/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 06/24/2013
Date Data Arrived at EDR: 06/25/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/24/2013
Next Scheduled EDR Contact: 01/08/2014
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/18/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/10/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 08/15/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 06/30/2013
Date Data Arrived at EDR: 08/07/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 57

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 09/30/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 03/13/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 09/13/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/26/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 09/05/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 28

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/05/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 08/30/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 09/24/2013
Next Scheduled EDR Contact: 01/08/2014
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/22/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/22/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 10/09/2014
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2012
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 114

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/18/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/20/2013
Date Made Active in Reports: 07/10/2013
Number of Days to Update: 112

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 09/10/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/09/2013
Date Data Arrived at EDR: 04/11/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 29

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 10/09/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 03/08/2013
Date Data Arrived at EDR: 03/21/2013
Date Made Active in Reports: 07/10/2013
Number of Days to Update: 111

Source: EPA
Telephone: (404) 562-9900
Last EDR Contact: 09/11/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/08/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/10/2012
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 08/26/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Biennially

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 09/13/2013
Next Scheduled EDR Contact: 12/23/2013
Data Release Frequency: Varies

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 10/09/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 10/11/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/29/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 09/24/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 10/17/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 10/15/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 08/02/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 09/27/2013
Next Scheduled EDR Contact: 12/02/2013
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 06/30/2013
Date Data Arrived at EDR: 08/13/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 08/07/2013
Next Scheduled EDR Contact: 11/25/2013
Data Release Frequency: Quarterly

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/30/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 09/30/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/01/2013
Next Scheduled EDR Contact: 11/04/2013
Data Release Frequency: Varies

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/16/2013
Next Scheduled EDR Contact: 11/25/2013
Data Release Frequency: Varies

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 07/03/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 72

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 10/04/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Quarterly

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/30/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 09/30/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Annually

STATE AND LOCAL RECORDS

SHWS: Florida's State-Funded Action Sites
State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 07/24/2013
Date Data Arrived at EDR: 08/27/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: 850-488-0190
Last EDR Contact: 08/27/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Semi-Annually

SWF/LF: Solid Waste Facility Database
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 07/22/2013
Date Data Arrived at EDR: 07/22/2013
Date Made Active in Reports: 08/12/2013
Number of Days to Update: 21

Source: Department of Environmental Protection
Telephone: 850-922-7121
Last EDR Contact: 07/22/2013
Next Scheduled EDR Contact: 11/04/2013
Data Release Frequency: Semi-Annually

UIC: Underground Injection Wells Database Listing
A listing of Class I wells. Class I wells are used to inject hazardous waste, nonhazardous waste, or municipal waste below the lowermost USDW.

Date of Government Version: 07/29/2013
Date Data Arrived at EDR: 07/30/2013
Date Made Active in Reports: 08/22/2013
Number of Days to Update: 23

Source: Department of Environmental Protection
Telephone: 850-245-8655
Last EDR Contact: 07/26/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

SWRCY: Recycling Centers

A listing of recycling centers located in the state of Florida.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 11/13/2012
Date Made Active in Reports: 12/05/2012
Number of Days to Update: 22

Source: Department of Environmental Protection
Telephone: 850-245-8718
Last EDR Contact: 07/26/2013
Next Scheduled EDR Contact: 11/04/2013
Data Release Frequency: Varies

LUST: Petroleum Contamination Detail Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 08/05/2013
Date Made Active in Reports: 08/08/2013
Number of Days to Update: 3

Source: Department of Environmental Protection
Telephone: 850-245-8839
Last EDR Contact: 08/05/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Quarterly

UST: Storage Tank Facility Information

Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 08/05/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 59

Source: Department of Environmental Protection
Telephone: 850-245-8839
Last EDR Contact: 08/05/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Quarterly

LAST: Leaking Aboveground Storage Tank Listing

A statewide listing of leaking aboveground storage tank site locations.

Date of Government Version: 09/05/2013
Date Data Arrived at EDR: 09/05/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: 850-245-8799
Last EDR Contact: 08/15/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Varies

AST: Storage Tank Facility Information

Registered Aboveground Storage Tanks.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 08/05/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 59

Source: Department of Environmental Protection
Telephone: 850-245-8839
Last EDR Contact: 08/05/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Quarterly

FL SITES: Sites List

This summary status report was developed from a number of lists including the Eckhardt list, the Moffit list, the EPA Hazardous Waste Sites list, EPA's Emergency & Remedial Response information System list (RCRA Section 3012) & existing department lists such as the obsolete uncontrolled Hazardous Waste Sites list. This list is no longer updated.

Date of Government Version: 12/31/1989
Date Data Arrived at EDR: 05/09/1994
Date Made Active in Reports: 08/04/1994
Number of Days to Update: 87

Source: Department of Environmental Protection
Telephone: 850-245-8705
Last EDR Contact: 03/24/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS: Oil and Hazardous Materials Incidents
Statewide oil and hazardous materials inland incidents.

Date of Government Version: 07/17/2013
Date Data Arrived at EDR: 07/18/2013
Date Made Active in Reports: 08/12/2013
Number of Days to Update: 25
Source: Department of Environmental Protection
Telephone: 850-245-2010
Last EDR Contact: 10/09/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Semi-Annually

ENG CONTROLS: Institutional Controls Registry
The registry is a database of all contaminated sites in the state of Florida which are subject to engineering controls. Engineering Controls encompass a variety of engineered remedies to contain and/or reduce contamination, and/or physical barriers intended to limit access to property. ECs include fences, signs, guards, landfill caps, provision of potable water, slurry walls, sheet pile (vertical caps), pumping and treatment of groundwater, monitoring wells, and vapor extraction systems.

Date of Government Version: 07/01/2013
Date Data Arrived at EDR: 07/08/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 32
Source: Department of Environmental Protection
Telephone: 850-245-8927
Last EDR Contact: 10/08/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Semi-Annually

Inst Control: Institutional Controls Registry
The registry is a database of all contaminated sites in the state of Florida which are subject to institutional and engineering controls.

Date of Government Version: 07/01/2013
Date Data Arrived at EDR: 07/08/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 32
Source: Department of Environmental Protection
Telephone: 850-245-8927
Last EDR Contact: 10/08/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Semi-Annually

VCP: Voluntary Cleanup Sites
Listing of closed and active voluntary cleanup sites.

Date of Government Version: 06/27/2013
Date Data Arrived at EDR: 07/08/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 32
Source: Department of Environmental Protection
Telephone: 850-245-8705
Last EDR Contact: 10/10/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Varies

PRIORITYCLEANERS: Priority Ranking List
The Florida Legislature has established a state-funded program to cleanup properties that are contaminated as a result of the operations of a drycleaning facility.

Date of Government Version: 07/01/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 44
Source: Department of Environmental Protection
Telephone: 850-245-8927
Last EDR Contact: 08/19/2013
Next Scheduled EDR Contact: 12/02/2013
Data Release Frequency: Varies

DRYCLEANERS: Drycleaning Facilities
The Drycleaners database, maintained by the Department of Environmental Protection, provides information about permitted dry cleaner facilities.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 07/30/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 10
Source: Department of Environmental Protection
Telephone: 850-245-8927
Last EDR Contact: 07/30/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Semi-Annually

DEDB: Ethylene Dibromide Database Results

Ethylene dibromide (EDB), a soil fumigant, that has been detected in drinking water wells. The amount found exceeds the maximum contaminant level as stated in Chapter 62-550 or 520. It is a potential threat to public health when present in drinking water.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 07/16/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 24

Source: Department of Environmental Protection
Telephone: 850-245-8335
Last EDR Contact: 09/23/2013
Next Scheduled EDR Contact: 01/08/2014
Data Release Frequency: Varies

BROWNFIELDS: Brownfield Areas

Brownfields are abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. Florida's Brownfields Redevelopment Acti primary goals are to reduce health and environmental hazards on existing commercial and industrial sites that are abandoned or underused due to these hazards and create financial and regulatory incentives to encourage voluntary cleanup and redevelopment of sites.

Date of Government Version: 07/08/2013
Date Data Arrived at EDR: 07/08/2013
Date Made Active in Reports: 08/07/2013
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: 850-245-8927
Last EDR Contact: 10/08/2013
Next Scheduled EDR Contact: 01/20/2014
Data Release Frequency: Semi-Annually

WASTEWATER: Wastewater Facility Regulation Database

Domestic and industrial wastewater facilities.

Date of Government Version: 08/02/2013
Date Data Arrived at EDR: 08/14/2013
Date Made Active in Reports: 10/01/2013
Number of Days to Update: 48

Source: Department of Environmental Protection
Telephone: 850-245-8600
Last EDR Contact: 08/14/2013
Next Scheduled EDR Contact: 11/25/2013
Data Release Frequency: Quarterly

AIRS: Permitted Facilities Listing

A listing of Air Resources Management permits.

Date of Government Version: 07/31/2013
Date Data Arrived at EDR: 08/01/2013
Date Made Active in Reports: 08/09/2013
Number of Days to Update: 8

Source: Department of Environmental Protection
Telephone: 850-921-9558
Last EDR Contact: 07/31/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Varies

TIER 2: Tier 2 Facility Listing

A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 04/23/2013
Number of Days to Update: 20

Source: Department of Environmental Protection
Telephone: 850-413-9970
Last EDR Contact: 09/16/2013
Next Scheduled EDR Contact: 12/30/2013
Data Release Frequency: Varies

FL Cattle Dip. Vats: Cattle Dipping Vats

From the 1910's through the 1950's, these vats were filled with an arsenic solution for the control and eradication of the cattle fever tick. Other pesticides, such as DDT, were also widely used. By State law, all cattle, horses, mules, goats, and other susceptible animals were required to be dipped every 14 days. Under certain circumstances, the arsenic and other pesticides remaining at the site may present an environmental or public health hazard.

Date of Government Version: 02/04/2005
Date Data Arrived at EDR: 06/29/2007
Date Made Active in Reports: 07/11/2007
Number of Days to Update: 12

Source: Department of Environmental Protection
Telephone: 850-488-3601
Last EDR Contact: 10/09/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: No Update Planned

FF TANKS: Federal Facilities Listing
A listing of federal facilities with storage tanks.

Date of Government Version: 06/26/2013
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 08/07/2013
Number of Days to Update: 37
Source: Department of Environmental Protection
Telephone: 850-245-8250
Last EDR Contact: 10/09/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Quarterly

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34
Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 10/18/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/31/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/01/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 162
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/02/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/07/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 156

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/02/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 08/02/2012
Date Data Arrived at EDR: 08/03/2012
Date Made Active in Reports: 11/05/2012
Number of Days to Update: 94

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/21/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 45

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/24/2013
Next Scheduled EDR Contact: 11/11/2013
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 10/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 14

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 10/01/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALACHUA COUNTY:

Facility List
List of all regulated facilities in Alachua County.

Date of Government Version: 04/01/2013
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 04/23/2013
Number of Days to Update: 20

Source: Alachua County Environmental Protection Department
Telephone: 352-264-6800
Last EDR Contact: 09/30/2013
Next Scheduled EDR Contact: 01/13/2014
Data Release Frequency: Annually

BROWARD COUNTY:

Aboveground Storage Tanks
Aboveground storage tank locations in Broward County.

Date of Government Version: 06/05/2013
Date Data Arrived at EDR: 06/12/2013
Date Made Active in Reports: 08/06/2013
Number of Days to Update: 55

Source: Broward County Environmental Protection Department
Telephone: 954-818-7509
Last EDR Contact: 09/06/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Varies

Underground Storage Tanks
All known regulated storage tanks within Broward County, including those tanks that have been closed

Date of Government Version: 06/05/2013
Date Data Arrived at EDR: 06/12/2013
Date Made Active in Reports: 08/06/2013
Number of Days to Update: 55

Source: Broward County Environmental Protection Department
Telephone: 954-818-7509
Last EDR Contact: 06/12/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Annually

HILLSBOROUGH COUNTY:

HILLSBOROUGH CO LF
Hillsborough county landfill sites.

Date of Government Version: 06/01/2010
Date Data Arrived at EDR: 01/18/2012
Date Made Active in Reports: 02/21/2012
Number of Days to Update: 34

Source: Hillsborough County Environmental Protection Commission
Telephone: 813-627-2600
Last EDR Contact: 10/09/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Varies

MIAMI-DADE COUNTY:

Air Permit Sites

Facilities that release or have a potential to release pollutants.

Date of Government Version: 09/04/2013
Date Data Arrived at EDR: 09/04/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 28

Source: Department of Environmental Resources Management
Telephone: 305-372-6755
Last EDR Contact: 09/04/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Semi-Annually

Marine Facilities Operating Permit

What is this permit used for? Miami-Dade County Ordinance 89-104 and Section 24-18 of the Code of Miami-Dade County require the following types of marine facilities to obtain annual operating permits from DERM: All recreational boat docking facilities with ten (10) or more boat slips, moorings, davit spaces, and vessel tie-up spaces. All boat storage facilities contiguous to tidal waters in Miami-Dade County with ten (10) or more dry storage spaces including boatyards and boat manufacturing facilities.

Date of Government Version: 09/04/2013
Date Data Arrived at EDR: 09/04/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 28

Source: DERM
Telephone: 305-372-3576
Last EDR Contact: 09/04/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Quarterly

Maimi River Enforcement

The Miami River Enforcement database files were created for facilities and in some instances vessels that were inspected by a workgroup within the Department that was identified as the Miami River Enforcement Group. The files do not all necessarily reflect enforcement cases and some were created for locations that were permitted by other Sections within the Department.

Date of Government Version: 06/05/2013
Date Data Arrived at EDR: 06/06/2013
Date Made Active in Reports: 08/06/2013
Number of Days to Update: 61

Source: DERM
Telephone: 305-372-3576
Last EDR Contact: 09/03/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Quarterly

Industrial Waste Permit Sites

Facilities that either generate more than 25,000 of wastewater per day to sanitary sewers or are pre-defined by EPA.

Date of Government Version: 09/04/2013
Date Data Arrived at EDR: 09/04/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 28

Source: Department of Environmental Resources Management
Telephone: 305-372-6700
Last EDR Contact: 09/04/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Semi-Annually

Enforcement Case Tracking System Sites

Enforcement cases monitored by the Dade County Department of Environmental Resources Management.

Date of Government Version: 09/04/2013
Date Data Arrived at EDR: 09/04/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 28

Source: Department of Environmental Resources Management
Telephone: 305-372-6755
Last EDR Contact: 09/04/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Semi-Annually

Fuel Spills Cases

DERM documents fuel spills of sites that are not in a state program.

Date of Government Version: 01/08/2009
Date Data Arrived at EDR: 01/13/2009
Date Made Active in Reports: 02/05/2009
Number of Days to Update: 23

Source: Department of Environmental Resources Management
Telephone: 305-372-6755
Last EDR Contact: 09/03/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Semi-Annually

Storage Tanks

A listing of aboveground and underground storage tank site locations.

Date of Government Version: 09/04/2013
Date Data Arrived at EDR: 09/04/2013
Date Made Active in Reports: 10/02/2013
Number of Days to Update: 28

Source: Department of Environmental Resource Management
Telephone: 305-372-6700
Last EDR Contact: 09/04/2013
Next Scheduled EDR Contact: 12/16/2013
Data Release Frequency: Semi-Annually

PALM BEACH COUNTY:

PALM BEACH CO. LF

Palm Beach County Inventory of Solid Waste Sites.

Date of Government Version: 09/01/2011
Date Data Arrived at EDR: 09/20/2011
Date Made Active in Reports: 10/10/2011
Number of Days to Update: 20

Source: Palm Beach County Solid Waste Authority
Telephone: 561-640-4000
Last EDR Contact: 09/16/2013
Next Scheduled EDR Contact: 12/30/2013
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/19/2013
Next Scheduled EDR Contact: 12/02/2013
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 10/18/2013
Next Scheduled EDR Contact: 01/27/2014
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 08/07/2013
Date Made Active in Reports: 09/10/2013
Number of Days to Update: 34

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/07/2013
Next Scheduled EDR Contact: 11/18/2013
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 07/24/2013
Date Made Active in Reports: 08/19/2013
Number of Days to Update: 26

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/18/2013
Next Scheduled EDR Contact: 11/04/2013
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 06/21/2013
Date Made Active in Reports: 08/05/2013
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 08/23/2013
Next Scheduled EDR Contact: 12/09/2013
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 08/09/2013
Date Made Active in Reports: 09/27/2013
Number of Days to Update: 49

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 09/16/2013
Next Scheduled EDR Contact: 12/30/2013
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Department of Children & Families
Source: Provider Information
Telephone: 850-488-4900

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

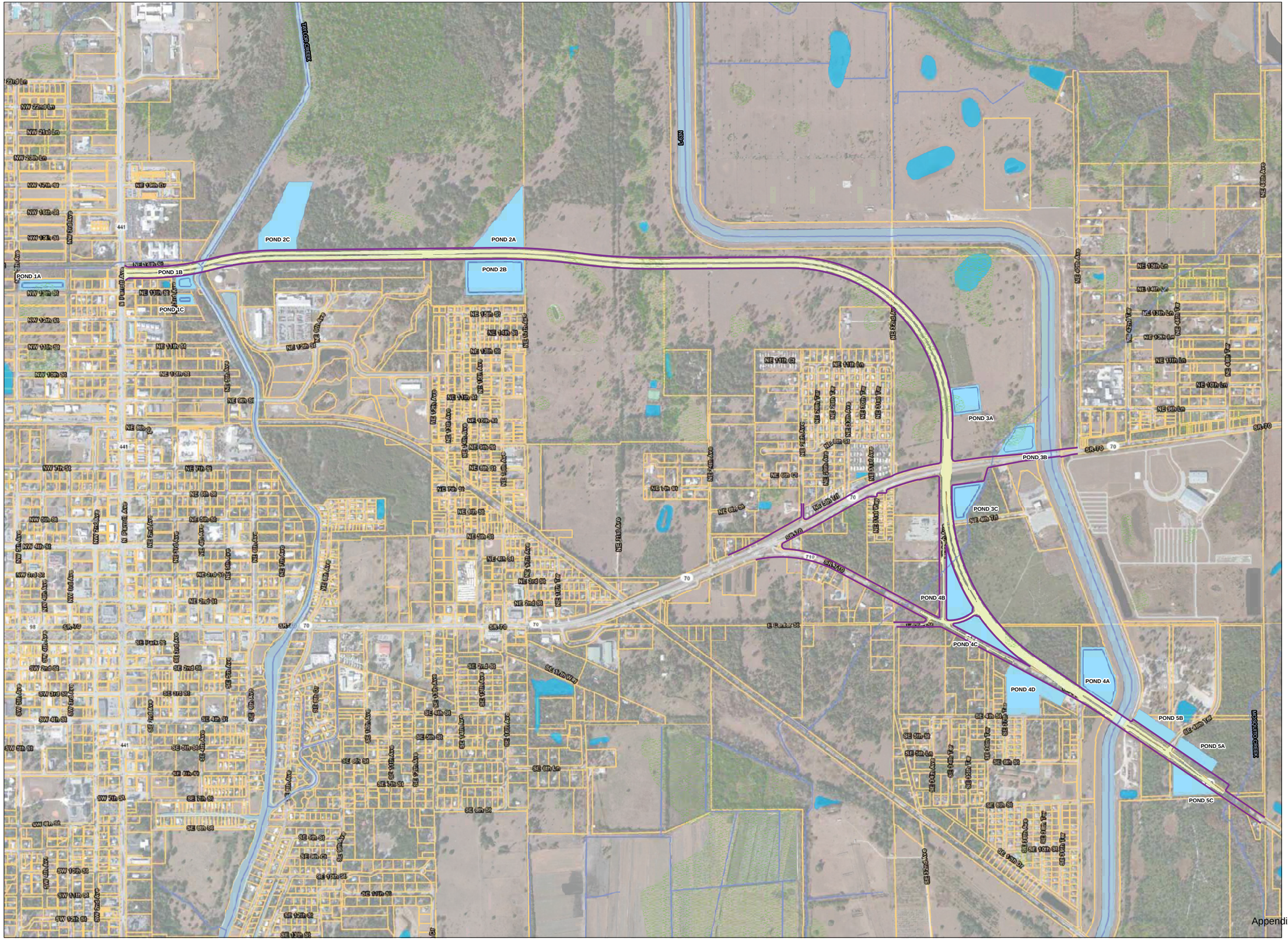
NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Department of Environmental Protection
Telephone: 850-245-8238

STREET AND ADDRESS INFORMATION

CSER-Appendix E

Supplemental Information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SE 694th St
SE 695th St
SE 696th St
SE 697th St
SE 698th St
SE 699th St
SE 700th St
SE 701st St
SE 702nd St
SE 703rd St
SE 704th St
SE 705th St
SE 706th St
SE 707th St
SE 708th St
SE 709th St
SE 710th St
SE 711th St
SE 712th St
SE 713th St
SE 714th St
SE 715th St
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SE 717th St
SE 718th St
SE 719th St
SE 720th St
SE 721st St
SE 722nd St
SE 723rd St
SE 724th St
SE 725th St
SE 726th St
SE 727th St
SE 728th St
SE 729th St
SE 730th St
SE 731st St
SE 732nd St
SE 733rd St
SE 734th St
SE 735th St
SE 736th St
SE 737th St
SE 738th St
SE 739th St
SE 740th St
SE 741st St
SE 742nd St
SE 743rd St
SE 744th St
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SE 747th St
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SE 749th St
SE 750th St
SE 751st St
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SE 760th St
SE 761st St
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SE 768th St
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SE 777th St
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SE 780th St
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SE 792nd St
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SE 799th St
SE 800th St
SE 801st St
SE 802nd St
SE 803rd St
SE 804th St
SE 805th St
SE 806th St
SE 807th St
SE 808th St
SE 809th St
SE 810th St
SE 811th St
SE 812th St
SE 813th St
SE 814th St
SE 815th St
SE 816th St
SE 817th St
SE 818th St
SE 819th St
SE 820th St
SE 821st St
SE 822nd St
SE 823rd St
SE 824th St
SE 825th St
SE 826th St
SE 827th St
SE 828th St
SE 829th St
SE 830th St
SE 831st St
SE 832nd St
SE 833rd St
SE 834th St
SE 835th St
SE 836th St
SE 837th St
SE 838th St
SE 839th St
SE 840th St
SE 841st St
SE 842nd St
SE 843rd St
SE

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 1A Aerial
Figure 12A

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 1B Aerial
Figure 12B

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

SR 710 from US 441 to
the L-63N Canal

Revised:

Map Date:
February, 2014

Map Prepared by:
The Balmoral Group

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 1C Aerial
Figure 12C

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
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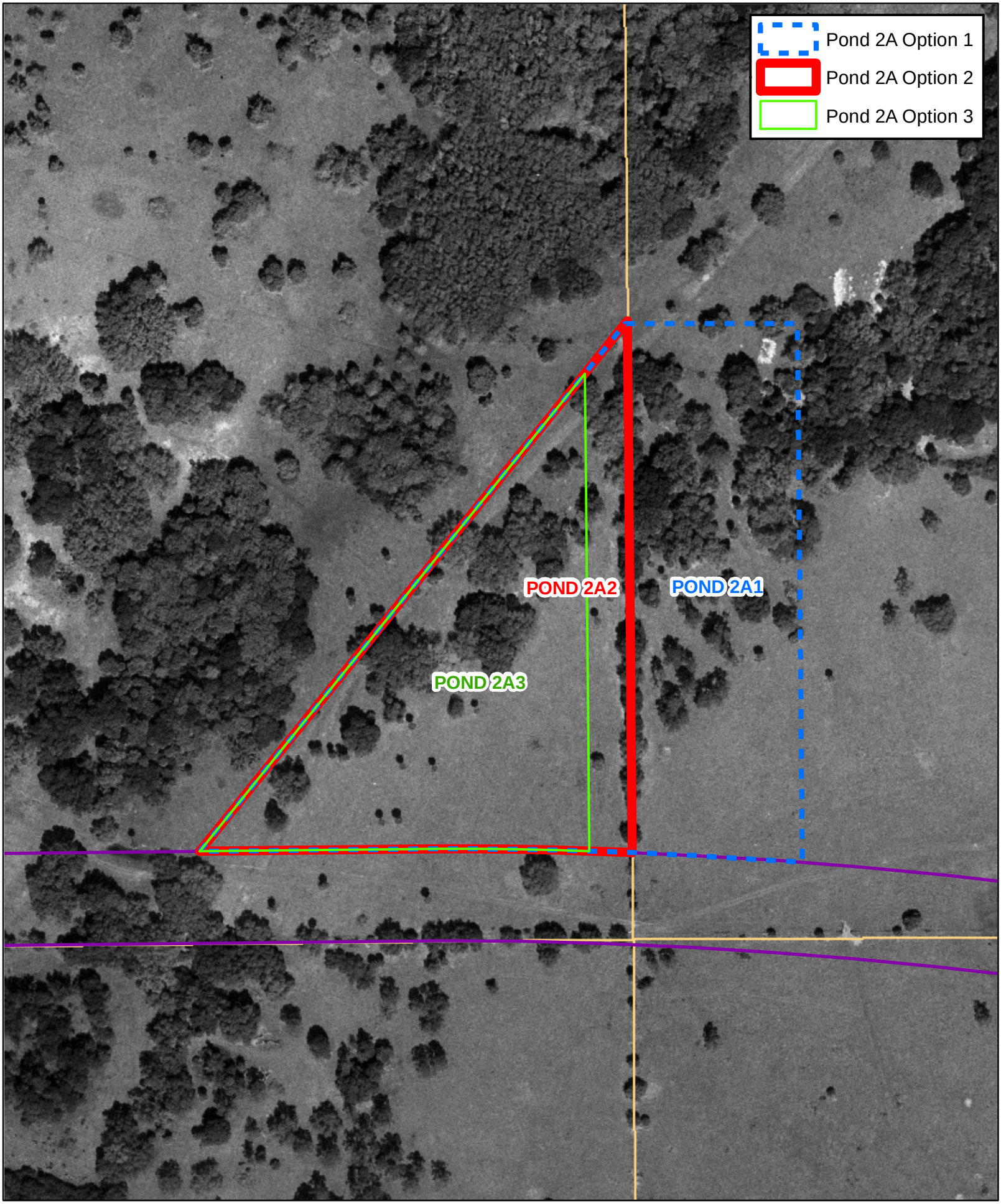
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

SR 710 from US 441 to
the L-63N Canal



Project Location

Legend

Proposed ROW

Parcels

N W E S

0 50 100 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 2A Aerial
Figure 12D

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Legend

- Proposed ROW
- Parcels

Project Location

N W E S

0 50 100 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 2B Aerial
Figure 12E

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

Proposed ROW

Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 2C Aerial
Figure 12F

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 3A Aerial
Figure 12G

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
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Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 3B Aerial
Figure 12H

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
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Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

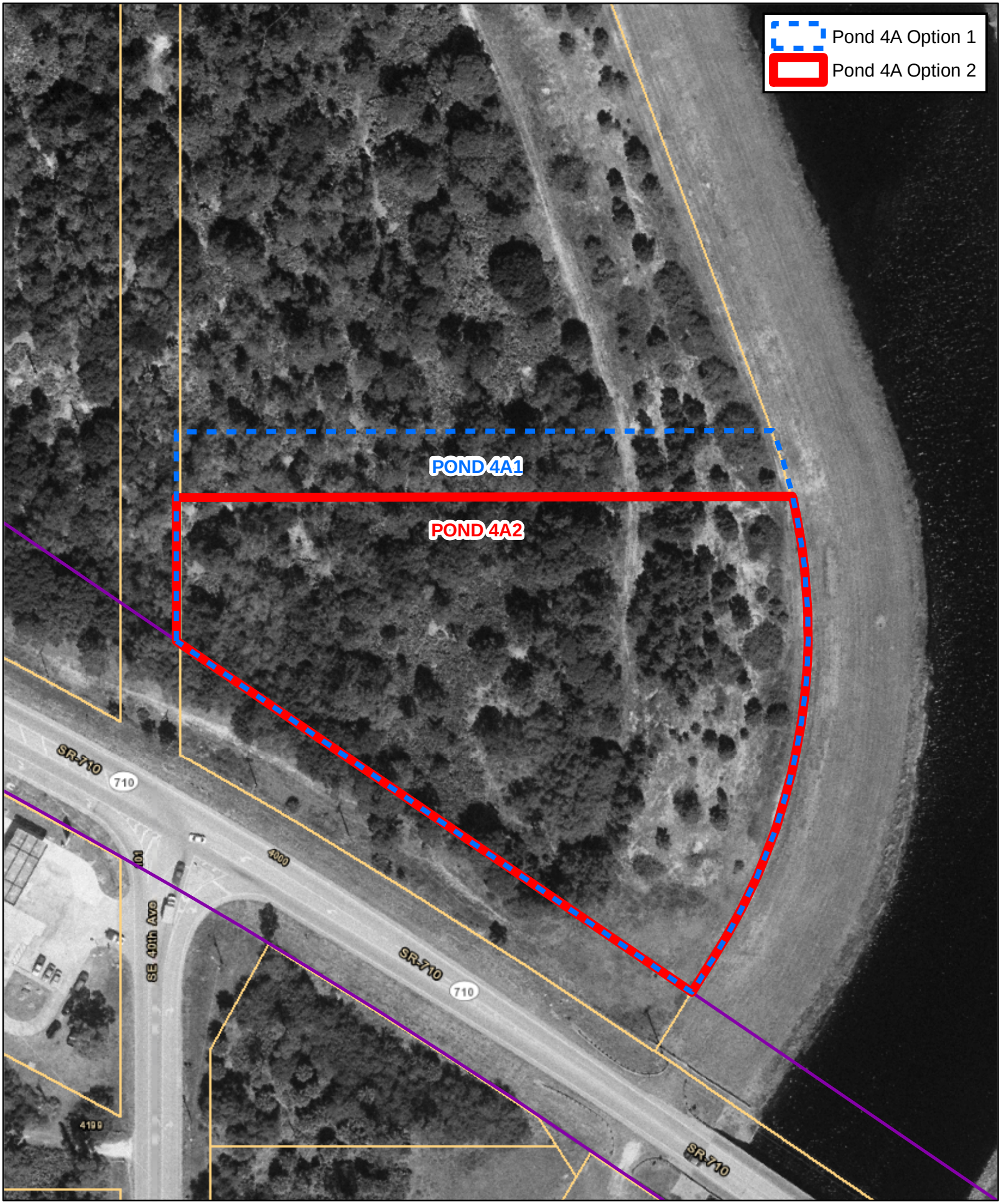
Pond 3C Aerial
Figure 12I

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida



Project Location

Legend

Proposed ROW

Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

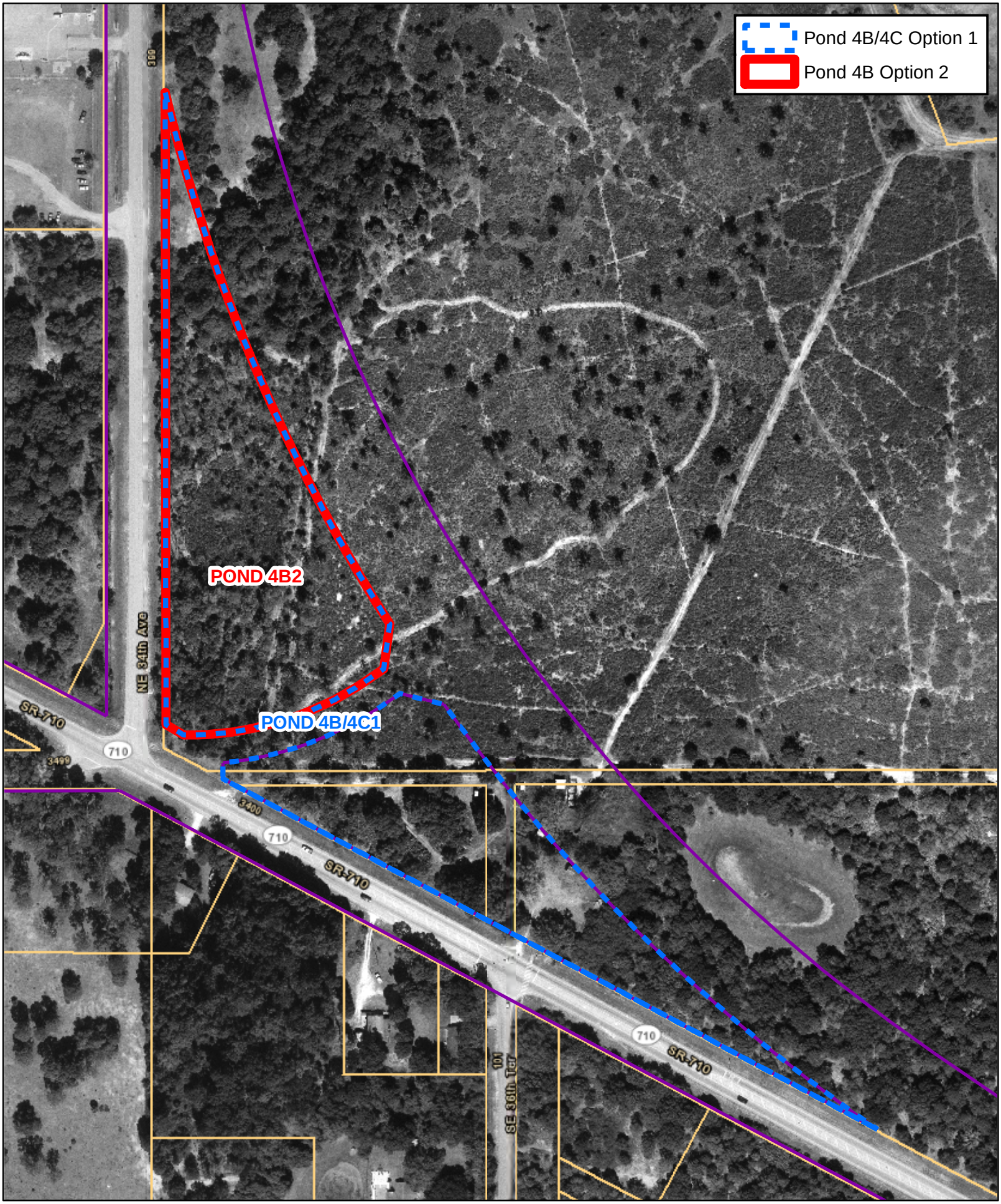
Pond 4A Aerial
Figure 12J

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida



Legend

- Proposed ROW
- Parcels

Project Location

N W E S

0 25 50 Feet

Notes:

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2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 4B/4C Aerial
Figure 12K

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
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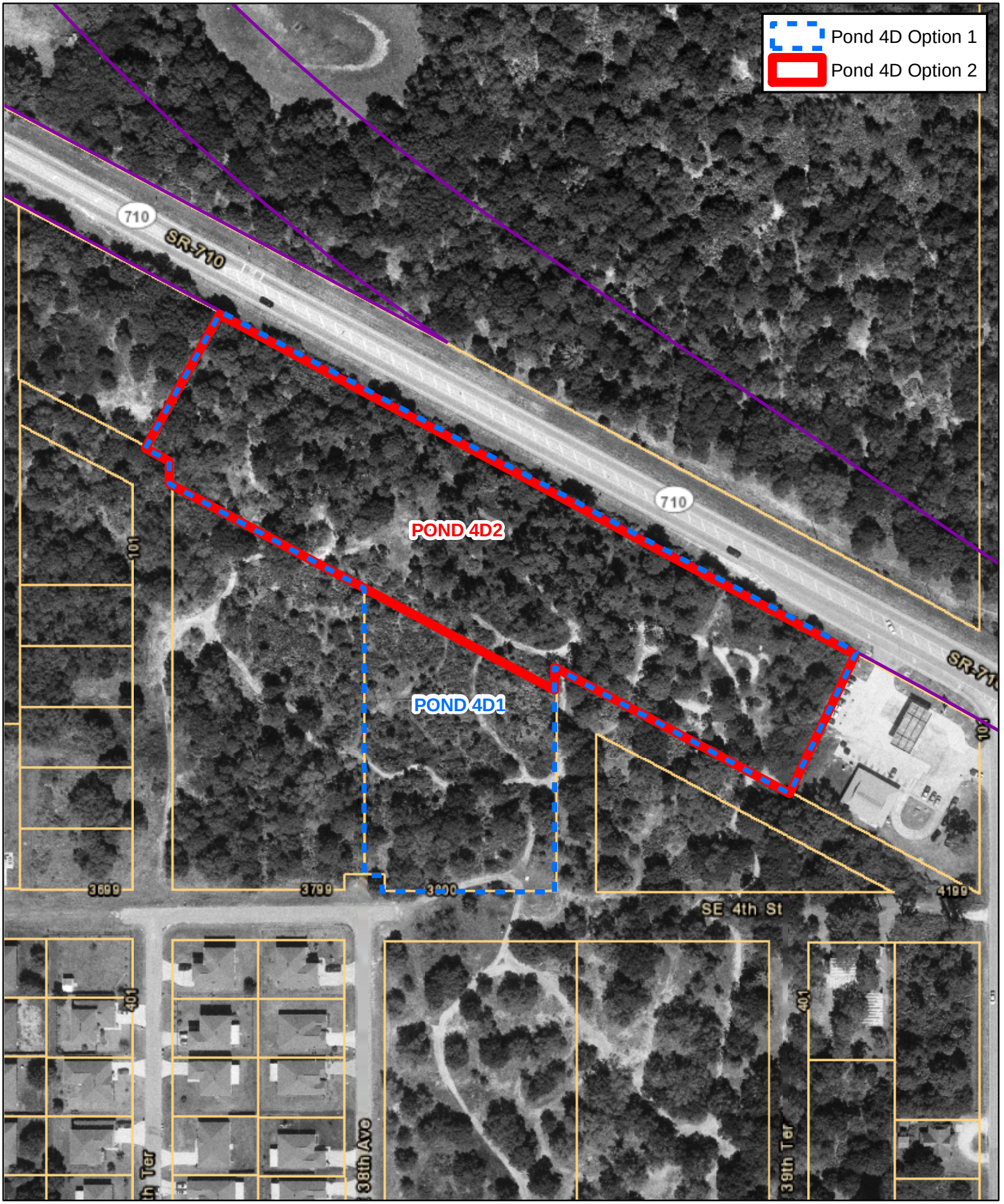
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida



Legend

- Proposed ROW
- Parcels

Project Location

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 4D Aerial
Figure 12L

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 5A Aerial
Figure 12M

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida

Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

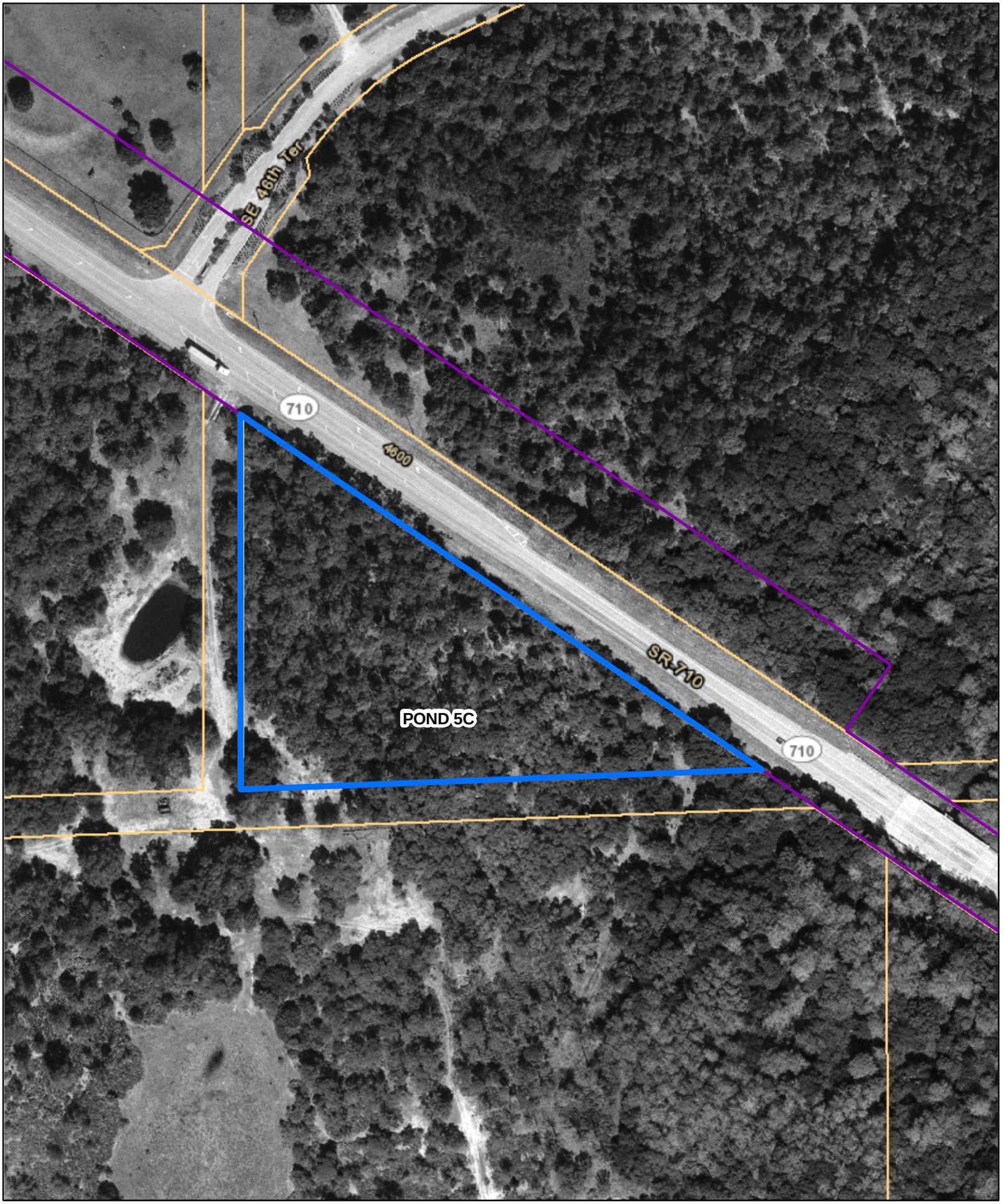
Pond 5B Aerial
Figure 12N

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to
the L-63N Canal

Okeechobee County, Florida



Project Location

Legend

- Proposed Pond
- Proposed ROW
- Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

Pond 5C Aerial
Figure 12O

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

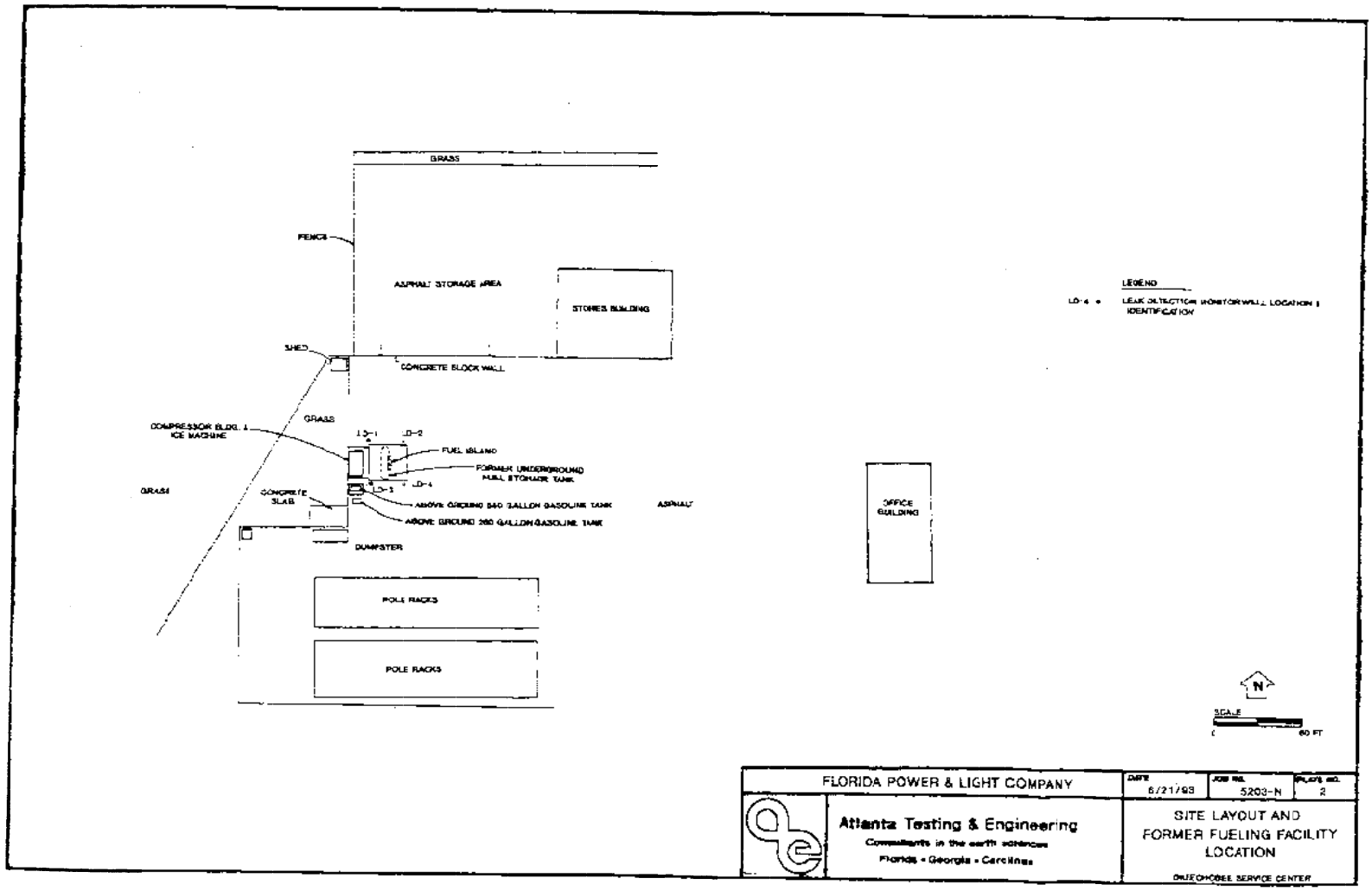
Okeechobee County, Florida

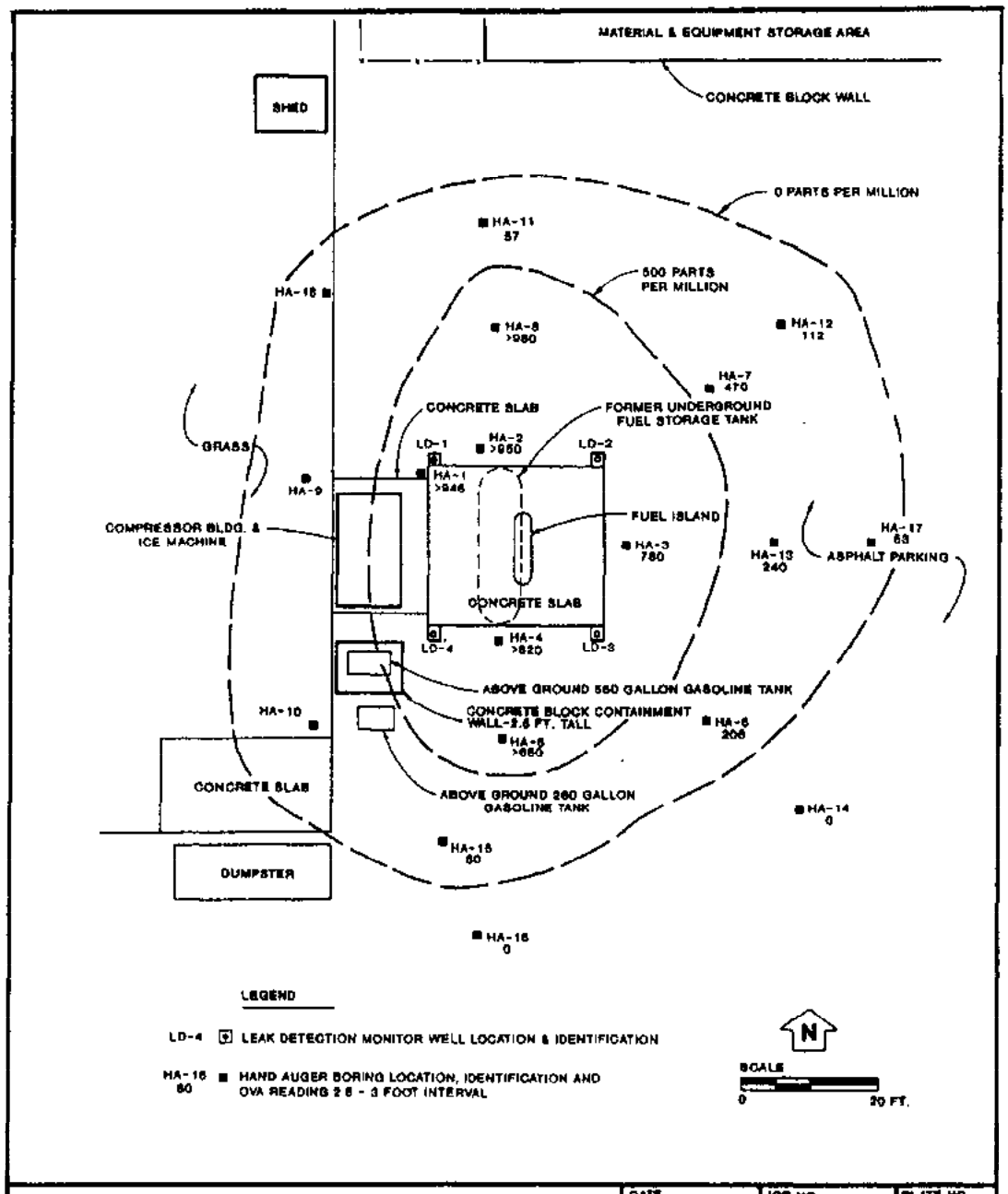
SR 710 from US 441 to
the L-63N Canal

SR 710 Pond Areas
FPID # 419344-3-32-01

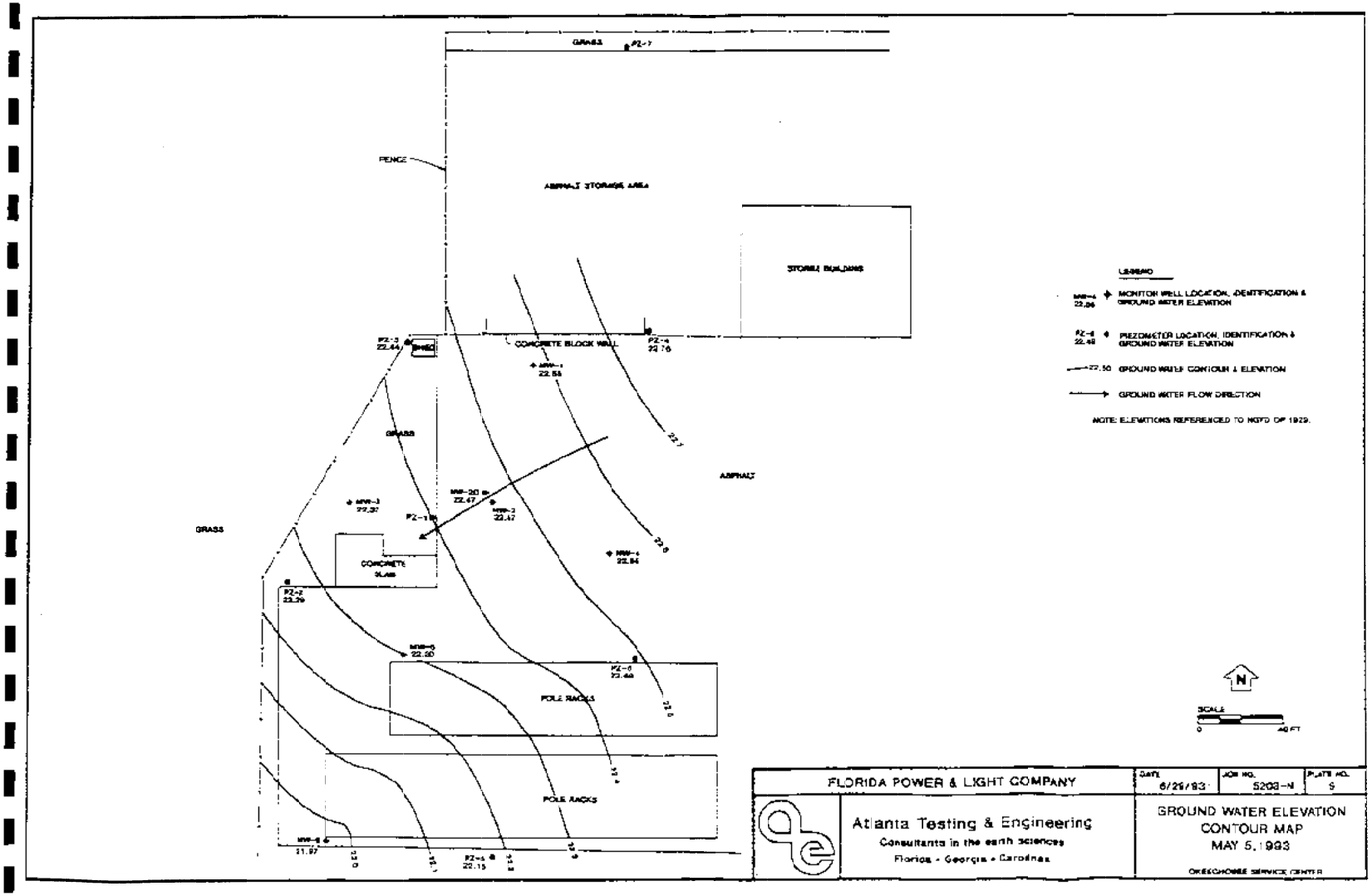
Pond ID	Area (ac.)
1A	2.32
1B	1.20
1C	0.88
2As-s Options 1	14.23
2As-s Options 2	7.93
2As-s Options 3	6.42
2B-Options 1	15.37
2B-Options 2	10.00
2B-Options 3	7.08
2C-Options 1	6.86
2C-Options 2	6.14
3A	4.18
3B	2.44
3C	3.81
4A-Options 1	3.98
4A-Options 2	3.34
4B/4Cs-s Options 1	8.17
4Bs-s Options 2	4.59
4Ds-s Options 1	6.08
4Ds-s Options 2	4.33
5A	2.62
5B	2.53
5C	3.53

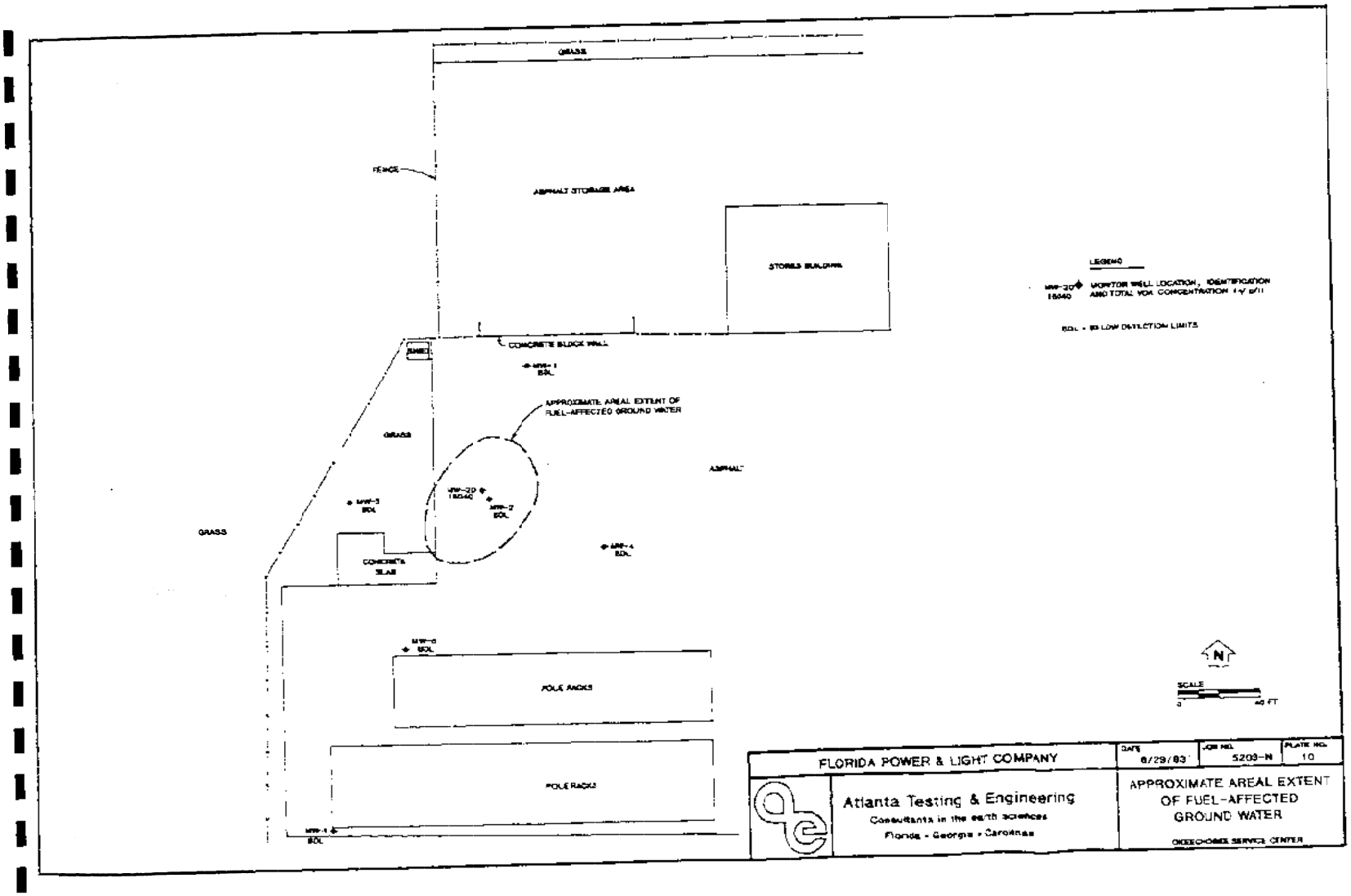
Florida Power and Light Co. (FPL)
(Fac. ID 8519987)
Contamination Assessment Report 1993

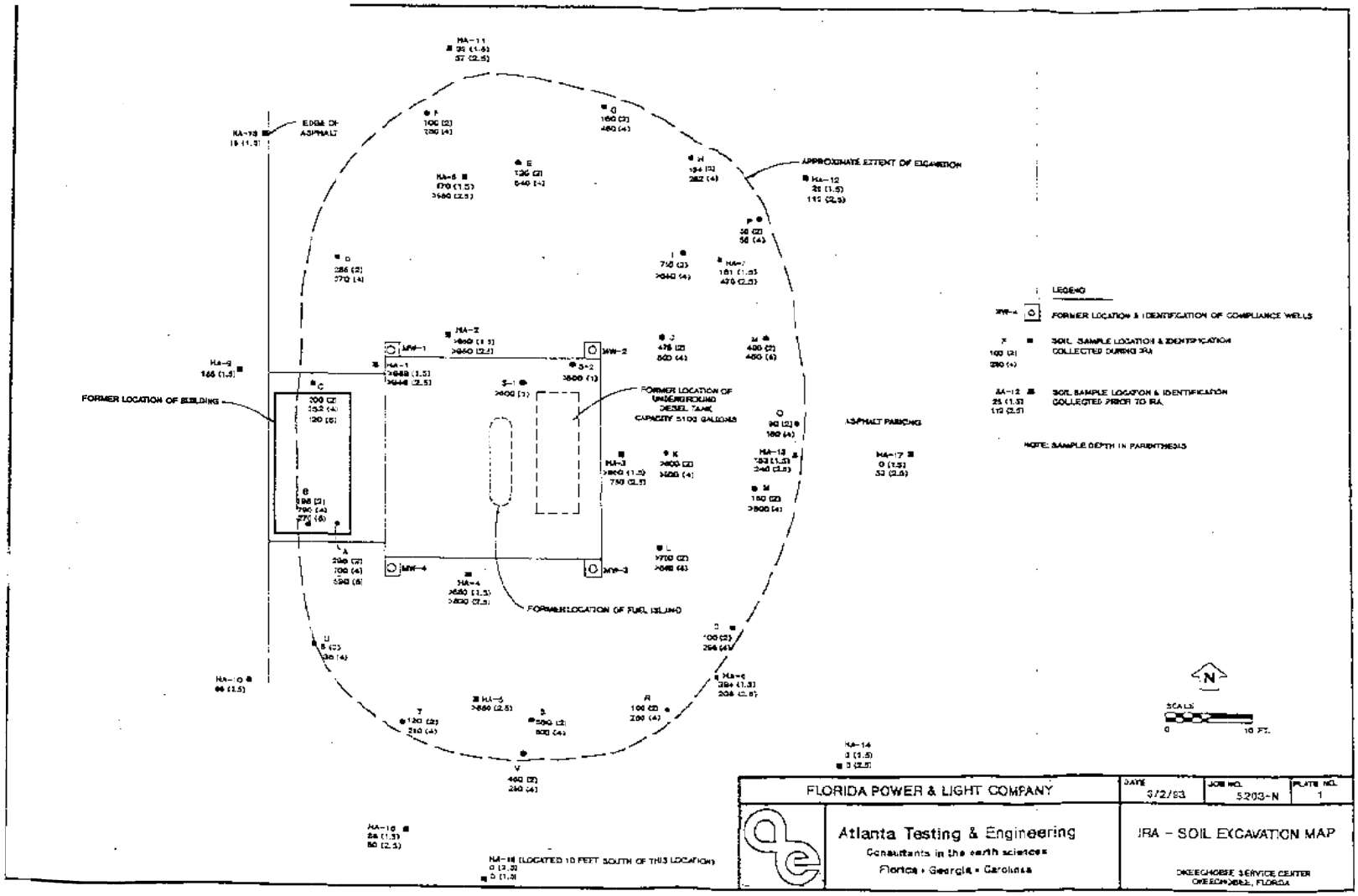

GRASS
FENCE
ASPHALT STORAGE AREA
STORES BUILDING
SHED
CONCRETE BLOCK WALL
GRASS
COMPRESSOR BLDG. &
ICE MACHINE
LD-1
LD-2
FUEL ISLAND
FORMER UNDERGROUND
FUEL STORAGE TANK
LD-4
GRASS
CONCRETE
SLAB
LD-3
ABOVE GROUND 540 GALLON GASOLINE TANK
ASPHALT
ABOVE GROUND 280 GALLON GASOLINE TANK
DUMPSTER
POLE RACKS
POLE RACKS
OFFICE
BUILDING
LEGEND
LD-4 •
LEAK DETECTION MONITOR WELL LOCATION &
IDENTIFICATION
N
SCALE
0
60 FT
FLORIDA POWER & LIGHT COMPANY
DATE
6/21/93
JOB NO.
5203-N
PLATE NO.
2
Atlanta Testing & Engineering
Consultants in the earth sciences
Florida • Georgia • Carolinas
SITE LAYOUT AND
FORMER FUELING FACILITY
LOCATION
ORLEO-OBEE SERVICE CENTER



FLORIDA POWER & LIGHT COMPANY	DATE 6/29/93	JOB NO. 5203-N	PLATE NO. 6
Atlanta Testing & Engineering Consultants in the earth sciences Florida • Georgia • Carolinas	APPROXIMATE AREAL EXTENT OF FUEL AFFECTED SOIL 2.5 - 3 FOOT INTERVAL OKEECHOBEE SERVICE CENTER		


GRASS
PZ-7
FENCE
ASPHALT STORAGE AREA
STORAGE BUILDING
CONCRETE BLOCK WALL
PZ-3
22.44
PZ-4
22.76
MW-1
22.55
GRASS
ASPHALT
MW-3
22.37
MW-20 R
22.47
MW-2
22.47
PZ-1R
MW-4
22.84
GRASS
CONCRETE SLAB
PZ-2
23.39
MW-5
22.20
PZ-5
22.48
POLE RACKS
POLE RACKS
MW-6
21.97
PZ-6
22.15
LEGEND
MW-4 22.86 MONITOR WELL LOCATION, IDENTIFICATION & GROUND WATER ELEVATION
PZ-6 22.48 PIEZOMETER LOCATION, IDENTIFICATION & GROUND WATER ELEVATION
22.50 GROUND WATER CONTOUR & ELEVATION
GROUND WATER FLOW DIRECTION
NOTE: ELEVATIONS REFERENCED TO NGVD OF 1929.
N
SCALE
0
40 FT
FLORIDA POWER & LIGHT COMPANY
DATE 6/25/93
JOB NO. 5208-N
PLATE NO. 9
Atlanta Testing & Engineering
Consultants in the earth sciences
Florida • Georgia • Carolinas
GROUND WATER ELEVATION CONTOUR MAP
MAY 5, 1993
OKEECHOBEE SERVICE CENTER


GRASS
FENCE
ASPHALT STORAGE AREA
STORES BUILDING
CONCRETE BLOCK WALL
APPROXIMATE AREAL EXTENT OF FUEL-AFFECTED GROUND WATER
ASPHALT
GRASS
GRASS
CONCRETE SLAB
POLE RACKS
POLE RACKS
LEGEND
MONITOR WELL LOCATION, IDENTIFICATION AND TOTAL VOA CONCENTRATION (+/- ppb)
BDL = BELOW DETECTION LIMITS
SCALE
0
40 FT
FLORIDA POWER & LIGHT COMPANY
DATE 6/29/93
JOB NO. 5203-N
PLATE NO. 10
Atlanta Testing & Engineering
Consultants in the earth sciences
Florida • Georgia • Carolinas
APPROXIMATE AREAL EXTENT OF FUEL-AFFECTED GROUND WATER
OKEECHOBEE SERVICE CENTER


EDGE OF ASPHALT
APPROXIMATE EXTENT OF EXCAVATION
FORMER LOCATION OF BUILDING
FORMER LOCATION OF UNDERGROUND DIESEL TANK CAPACITY 5100 GALLONS
FORMER LOCATION OF FUEL ISLAND
ASPHALT PARKING
MW-1
MW-2
MW-3
MW-4
LEGEND
FORMER LOCATION & IDENTIFICATION OF COMPLIANCE WELLS
SOIL SAMPLE LOCATION & IDENTIFICATION COLLECTED DURING IRA
SOIL SAMPLE LOCATION & IDENTIFICATION COLLECTED PRIOR TO IRA
NOTE: SAMPLE DEPTH IN PARENTHESIS
N
SCALE
0
10 FT.
FLORIDA POWER & LIGHT COMPANY
DATE 3/2/93
JOB NO. 5203-N
PLATE NO. 1
Atlanta Testing & Engineering
Consultants in the earth sciences
Florida • Georgia • Carolinas
IRA – SOIL EXCAVATION MAP
OKEECHOBEE SERVICE CENTER
OKEECHOBEE, FLORIDA

Townstar #40/BP gas station
(Fac. ID 8630309)
Source Removal Report 2009

1.0 SITE DESCRIPTION

Gator Engineering & Aquifer Restoration, Inc. (GEAR), on behalf of TimeSaver Properties, Inc. (Timesaver) has recently completed Limited Source Removal Initiative (LSRI) activities in conjunction with Underground Storage Tank (UST) upgrade activities at the Townstar #40 facility (Site).

The Site is located at 3993 Highway 710 East in Okeechobee, Okeechobee County, Florida and is in the Pre-Approval program (PAP) (FDEP FAC ID No. 47/8630309) with a priority score of 42. The site location is illustrated on **Figure 1**, *USGS Topographical Map*. The facility layout is depicted on **Figure 2**, *Site Plan*.

2.0 HISTORICAL ACTIVITIES

According to the OCULUS database, a discharge was reported on December 30, 1988 based upon laboratory results collected on November 22, 1988. No discharge reporting form was available for review. However, the EDI program application listed the cause and type of discharge as "unknown".

The site owners retained MACTEC as the remediation contractor and on October 27, 2006, MACTEC submitted the first of two Supplemental Site Assessment Reports (SSARs). During the field work portion of the assessment, MACTEC oversaw the advancement of eight (8) soil borings (via DPT), the installation and subsequent sampling of five (5) additional on-site monitoring wells and the collection of three (3) soil samples. As a result of this assessment, MACTEC recommended the installation of three (3) additional wells to the west of the subject property (off-site wells).

On November 21, 2007, MACTEC submitted the second SSAR. This report document the installation of the three (3) off-site wells and an additional round of groundwater sampling. The report concluded that there were no vadose zone impacts at the sampling locations and that the groundwater impacts were contained on-site. Based on these results, MACTEC recommended that the site be placed in a NAM program. The site owner then selected GEAR to perform the monitoring and move the site to closure.

In the first quarter of 2008, GEAR submitted a pre-approval proposal to the FDEP to conduct the first year of NAM monitoring. However, due to a lack of available funding, this work order was not implemented.

According to the FDEP Bureau of Petroleum Storage Systems website (STCM Database), the current facility layout contains three (3) 10,000 gallon underground storage tanks (USTs) that were installed in May 1986. Timesaver is the storage tank owner and is conducting the required 2009 upgrades to the USTs and product piping under the LSRI. GEAR submitted an LSRI proposal for this site on February 17, 2009. However, the proposal lacked sufficient soil exploration to substantiate evidence of a soil source for the LSRI. Therefore, Timesaver requested GEAR to conduct a soil investigation in the exclusion zone.

Therefore, Timesavers' contractor Wilson's petroleum (Wilson's) sawcut areas around the USTs and GEAR's field technician reported that the highest organic vapor concentrations were encountered in the trench near the center of the USTs and that the top of the water table was located at approximately 7.0 feet bls. Therefore, GEAR's technician was instructed to collect one (1) soil sample from this location for

laboratory analysis. The collected soil sample was analyzed by EPA methods 8260 (BTEX + MTBE), 8270 (PAHs) and by laboratory method FL-PRO (TRPH). The laboratory results indicated the presence of impacted soils at concentrations that exceeded their applicable Chapter 62-777 Soil Cleanup Target Levels (SCTLs) and therefore, the LSRI work order was approved for up to 600 tons of contaminated soil. These results also further supported the need for dewatering effluent treatment.

3.0 NPDES PERMITING

Due to an average water table depth of approximately seven (7) feet below land surface (ft bls), dewatering was required to conduct the replacement of the existing UST system. In order to discharge the dewatering effluent to the storm sewer system, TimeSaver was required to obtain a National Pollutant Discharge Elimination System (NPDES) permit.

Therefore, on December 23, 2008, GEAR mobilized to the site to complete the required groundwater sampling to obtain the NPDES permit for the Townstar #40 facility. One (1) groundwater sample was collected from Monitoring Well MW-10. Monitoring Well MW-10 was chosen based upon its proximity to the tank farm, accessibility and history of contamination. All groundwater sampling was conducted in accordance with FDEP Standard Operating Procedure DEP-SOP-001/01.

The groundwater samples collected were appropriately preserved and forwarded to a NELAP certified and FDEP-approved laboratory for analyses. The groundwater samples were analyzed for Benzene, Naphthalene, Total Organic Carbon, Hardness, Alkalinity, for Hexavalent Chromium, and for total recoverable Mercury, Cadmium, Copper, Lead, Zinc, and Chromium. The turbidity and pH of the samples were determined in the field.

The laboratory analytical results revealed that all tested parameters met the FDEP screening values for surface water discharge to fresh waters described in FAC Chapter 62-621.300(1), Table 4.

Since the results of the groundwater analyses met the screening parameters, the discharge of groundwater from this location was authorized under the *Generic Permit for Discharges from Petroleum Contaminated Sites* FAC Chapter 62-621.300(1) as long as proper treatment of the dewatering effluent was provided. See **Attachment A** for the NPDES permit approval letter.

4.0 SOURCE REMOVAL ACTIVITIES

The source removal activities consisted of dewatering and the excavation of impacted soils that were located above and below the water table. The site activities were conducted from July 13th, 2009 (date of the pre-burn sample) through July 30th, 2009 (final soil loadout). TimeSaver's petroleum installation contractor (Wilson's Petroleum) then continued with UST installation activities. The activities that GEAR observed are detailed below.

4.1 Source Removal - Dewatering System

On July 13th, 2009, GEAR personnel mobilized to the subject site to collect a "pre-burn" sample to facilitate soil disposal. Wilson's Petroleum was on-site removing the old dispensers when GEAR arrived on-site. After the pre-burn sample was collected, GEAR's technician transported the sample to the laboratory for analysis.

On July 24th, 2009, GEAR personnel returned to the subject site to perform soil screening activities as the concrete over the USTs was being removed. When GEAR arrived, Wilson's was removing the remaining USTs. After the tanks were removed, GEAR began mapping out a grid pattern for soil sampling. At each

point on the grid (illustrated on **Figure 3**, *Area of Excavation*), GEAR's technician advanced a soil boring to an approximate depth of six (6) feet below land surface (ft-bls). The technician then collected soil samples at two (2) foot intervals from each boring for analysis of organic vapors utilizing an organic vapor analyzer (OVA) equipped with a photo ionization detector (PID). After the OVA readings were completed, GEAR's technician left the site. Based on this analysis, GEAR concluded that there was approximately 259 cubic yards (363 tons) of impacted soils based on an OVA of 35 ppm from grid area 8 (See Figure 3 and field notes from July 24, 2009 for details).

Also on July 24th, 2009, GEAR personnel oversaw the connection of the "sparge barge" to the dewatering system and collected the first effluent sample from the dewatering treatment system. After collecting the sample, GEAR's technician transported the collected sample to Genapure Laboratories of Boca Raton, Florida. The collected sample was laboratory analyzed by EPA methods 8260 (BTEX + MTBE + Naphthalene) and 6010 (Lead). After receiving the analytical results demonstrating the systems' ability to remediate the dewatering effluent, the dewatering activities began on July 25th, 2009 and continued until July 28th, 2009.

In order to comply with the NPDES permit, GEAR sampled the dewatering effluent daily. The collected groundwater samples were analyzed by EPA Methods 8260 (BTEX + MTBE + Naphthalene), and 6010 (Lead). A total of three (3) effluent grab samples (1 for start-up, and 2 daily) were obtained for the Daily Monitor Reports (DMR) completed for each day as per NPDES requirements. The sample results are presented in **Table 1** *Effluent Analytical Summary – VOCs and Metals*, and **Table 2** *Effluent Analytical Summary – PAHs and TRPHs*. The field notes and calibration documentation are presented in **Attachment B**. The complete laboratory analytical report and chain of custody documentation are presented in **Attachment C**. The DMRs for the Generic Permit are provided in **Attachment D**. It should be noted that there was no sample collected on July 27, 2009. The sample was scheduled to be collected during the afternoon. However, due to problems with the dewatering pump, there was not enough water extracted from the ground to collect a sample.

The treated groundwater water was discharged into the storm water swale located adjacent to Highway 710 East as illustrated on **Figure 2**. The water infiltrated back into the ground within 50 feet of that location.

4.2 Source Removal – Soil Excavation

After the water table had been sufficiently depressed, GEAR provided soil segregating and confirmatory sampling activities during the tank upgrade activities. These activities were conducted on July 27th, 2009 through July 28th, 2009. Prior to starting work each day, GEAR attended a tailgate safety meeting conducted by Wilson. GEAR used an OVA response of 35 ppm as the threshold for determining what soils were clean and what soils need disposal. Soils that were either dug from the locations were previous impacted soils were encountered (See **Figure 3** *Area of Soil Excavation*) or registered an OVA reading of greater than 35 ppm were placed in one pile while "clean" soils were placed in another pile. At the time an estimated 500 – 600 tons were stockpiled.

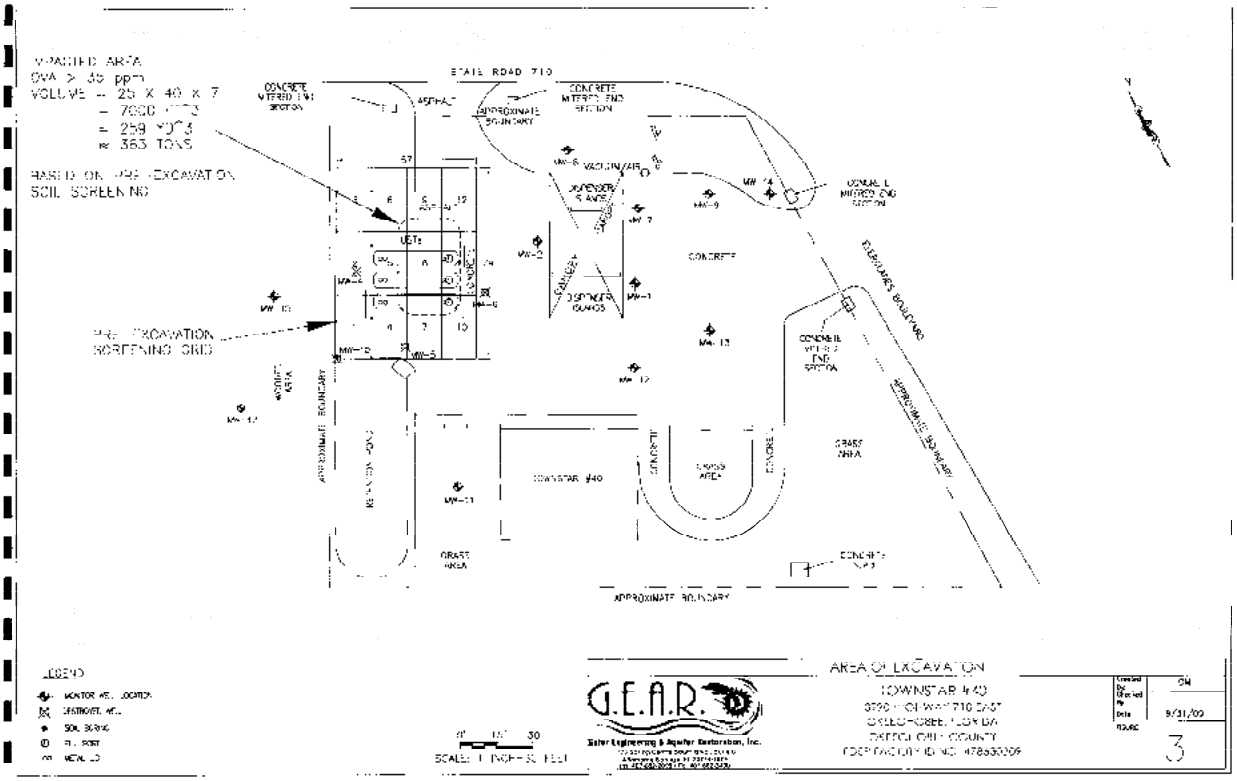
After the UST area was excavated, GEAR personnel returned on July 30th, 2009 to oversee the soil load out. Due to the low readings, the soil pile was re-screened to ensure that only impacted soils were removed. It should be noted that some of the OVA readings that were collected during this re-screening were below 35 ppm. GEAR attributes this to the aeration effect and still believes that the removed soils were impacted. The impacted soils (greater than 35 ppm) were then loaded into trucks, manifested and transported to Waste Management's Okeechobee Landfill for proper disposal. According to the manifests and weigh tickets, 345.5 tons were excavated from the UST area and removed from the site for proper disposal. The Non-Hazardous Waste Manifests and Weigh Tickets are provided in **Attachment B.**

After the impacted soils were excavated and the pit was expanded to accommodate the new USTs, GEAR personnel collected four (4) sidewall samples (north, east, south and west) and one (1) tank pit bottom soil sample. The samples were collected from a depth of approximately 5 ft bls. The collected soil samples were analyzed by EPA Method 8260 (BTEX + MTBE), EPA Method 8310 (PAHs), and by laboratory method FL-PRO (TRPH). The sampling locations are illustrated on **Figure 4** *Area of Excavation with New Tank location*. The analytical results are provided in **Table 3** *Soil Analytical Summary – VOCs and Metals*, **Table 4** *Soil Analytical Summary – Non-Carcinogenic PAHs* and **Table 5** *Soil Analytical Summary – Carcinogenic PAHs*. The complete laboratory analytical report is provided in **Attachment C.**

As the laboratory results indicate, there were no petroleum related hydrocarbon constituents detected in the samples collected from the bottom of the pit, or the north, south east or west side walls that exceeded their respective Chapter 62-777 SCTLs for leachability or Residential Direct Exposure.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The laboratory analytical results indicated that no impacted soils remain either in or adjacent to the excavated area. Additionally, the latest groundwater assessment results (collected by MACTEC in October 2007) did not reveal any exceedances of the Chapter 62-777 Groundwater Cleanup Target Levels (GCTLs) in any of the site's monitor wells except for MW-5, MW-12 and MW-14. In those wells, low levels of benzene (3.1 µg/L in MW-6 and 7.5 µg/L in MW-4) and MTBE (55 µg/L in MW-12 and 38 µg/L in MW-14) were detected. Based on these low groundwater contaminant concentrations, and the large amount of soil and groundwater that was either treated and/or removed during the upgrade activities. GEAR recommends that a Site Rehabilitation Completion Order (SRCO) be issued for the site.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ASPHALT
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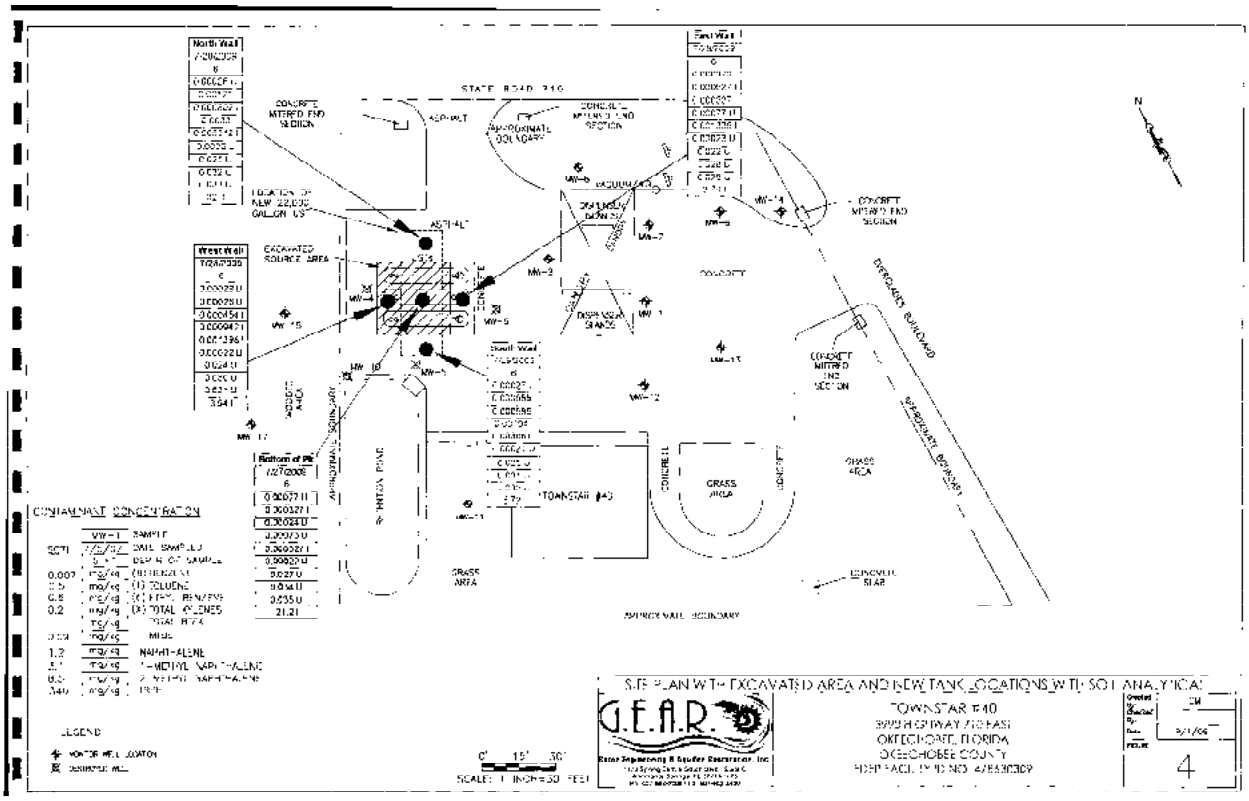
CONCRETE
DISPENSER ISLANDS
CANOPY
CONCRETE
GRASS AREA
APPROXIMATE BOUNDARY
LEGEND
AREA OF EXCAVATION
TOWNSTAR #40
SCALE: 1 INCH = 30 FEET
G.E.A.R.
Gator Engineering & Aquifer Restoration, Inc.



SITE PLAN WITH EXCAVATED AREA AND NEW TANK LOCATIONS WITH SOIL ANALYTICAL

Townstar #40/BP gas station
(Fac. ID 8630309)
Supplemental Site Assessment Report 2007

MACTEC

DUPLICATE

engineering and constructing a better tomorrow

RECEIVED BY

NOV 26 2007

TEAM 5

November 21, 2007

Mr. Ian K. Tiang
Florida Department of Environmental Protection
Bureau of Petroleum Storage Systems
2600 Blair Stone Road, MS 4585
Tallahassee, Florida 32399-2400

RECEIVED
07 NOV 26 PM 1:29
BUREAU OF PETROLEUM STORAGE SYSTEMS
TEAM 5
BPSS - BUREAU OF PETROLEUM STORAGE SYSTEMS
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

SUBJECT: **Supplemental Site Assessment Report**
Townstar 40
3393 State Road 710 E, Okeechobee, Okeechobee County, Florida
Priority Score: 41
FDEP Facility ID No. 47/8630309
Work Order: 2007-95-W59048

Dear Mr. Tiang:

MACTEC Engineering and Consulting Inc. (MACTEC) is pleased to submit this Supplemental Site Assessment Report for the Townstar 40 site in Okeechobee, Florida (Figure 1). This report summarizes the site assessment activities conducted at the referenced location and serves as the final deliverable for Work Order: 2007-95-W59048.

SITE BACKGROUND

MACTEC submitted a Supplemental Site Assessment Report on October 25, 2006. The report concluded that Methyl Tertiary Butyl Ether (MTBE), Benzene and Xylenes were present in groundwater above Groundwater Contamination Target Level (GCTL). Since the contaminants plume were not completely established, MACTEC recommended the installation of off site monitoring wells at the adjacent property to the west. MACTEC also recommended re-sampling monitoring well MW-14 since the concentration of Benzene and MTBE were detected in the above the GCTL which was inconsistent with values obtained in the surrounding monitoring wells during the groundwater assessment.

In a letter dated December 27, 2006, the Bureau of Petroleum Storage Systems (BPSS) reviewed the Supplemental Site Assessment Report dated October 25, 2006 and the Response to Comment Letter dated November 21, 2006. The report including the addendum was acceptable and demonstrated that the work

MACTEC Engineering and Consulting, Inc.
4150 N. John Young Parkway • Orlando, FL 32804-2620 • Phone: 407.522.7570 • 407.522.7576
www.mactec.com

outlined in Work Order #2006-95-W13495 was satisfactory performed. The BPSS agreed with the recommendations to collect confirmatory groundwater samples from monitoring well MW-14 and also to install additional monitoring wells to the west of monitoring well MW-10 to delineate the horizontal extent of groundwater contaminations.

SUMMARY OF CURRENT SITE ASSESSMENT ACTIVITIES

Monitoring Well Installation

On October 12, 2007 MACTEC's subcontractor, Preferred Drilling, installed three shallow monitoring wells (MW-15 through MW- 17) using a drill rig equipped with a hollow stem auger (Figure 2). Monitoring well MW-16 was installed to an approximate depth of 13 feet below land surface (bls). Monitoring wells MW-15 and MW-17 were installed to an approximate depth of 14 feet bls.

The wells were constructed of 10 feet of 2 inch diameter 0.010-inch slotted PVC screen and five feet of 2-inch PVC risers. The borehole diameter was 8 inches. A 20/30 silica sand filter pack was placed in the annular space between the well screen and the borehole and was extended to a height of approximately 1.5 feet bls at each location. The remaining space was grouted with Portland cement to approximately 0.5 bls. Each monitoring well was capped with a flush mount casing, set in a two-foot by two-foot by six-inch concrete pad. All casings were secured with a two-inch "expando-cap". Table 1 summarizes the well construction data and Appendix A includes the monitoring well construction logs. The monitoring wells were developed using a centrifugal/peristaltic pump until the extracted groundwater was clear of sediment.

The soil boring was continuously screened every two feet using an OVA to the water table. OVA soil screening is a State of Florida Department of Environmental Protection (FDEP) approved screening method for detecting the presence of hydrocarbons in soils. Headspace analyses were conducted on the soil samples in general accordance with the guidelines set forth in Chapter 62-770, Florida Administrative Code (F.A.C.). The headspace analysis was performed by half filling two clear 16-ounce glass jar with soil, covering the jars with aluminum foil, and allowing a minimum period of five minutes for volatile organic vapors to collect in the headspace above the soil in the jar. A charcoal filter was used to assist in distinguishing vapors between petroleum and methane. The net measurement (unfiltered minus filtered) is an indication of the presence of hydrocarbon vapors in the soil sample. Table 2 summarized the OVA

results. A pre-burn/disposal sample was collected and was placed on ice and transported to Southern Research Laboratory in Orlando, Florida. The sample was analyzed for BTEX/MTBE by USEPA Method 8021, TRPHs by FL-PRO, Arsenic, Cadmium, Lead and Chromium. The laboratory result of pre-burn soil analysis is attached in Appendix B. The soil cuttings and development water were drummed. The drums will be properly disposed of by Greenleaf Treatment Corp. The manifest will be forwarded following drum disposal.

Groundwater Quality Assessment

On October 16, 2007, MACTEC personnel collected groundwater samples from monitoring wells MW-1, MW-5, MW-6, MW-7, MW-10, MW-12, and MW-14 through MW-17. The sampling event was conducted in accordance with the Petroleum Cleanup Preapproval Program Standard Operating Procedures. During purging, stabilization parameters (pH, temperature, conductivity, turbidity, and dissolved oxygen) were measured until stabilized. Copies of the Groundwater Sampling Logs and calibration information are included in Appendix C.

Groundwater samples were placed on ice and transported to Southern Research Laboratory in Orlando, Florida. The samples were analyzed for BTEX/MTBE by USEPA Method 8021, PAHs by USEPA Method 8310 and TRPHs by FL-PRO.

Groundwater Flow Direction

Depth-to-groundwater measurements were collected on October 16, 2007 from monitoring wells MW-1 through MW-17 to evaluate the groundwater flow direction in the upper zone of the surficial aquifer. Groundwater elevations were measured in the wells using an electronic measuring tape to an accuracy of 0.01 feet (Table 3). Based on the water level data, the groundwater flow direction was toward the ~~west~~ SSW (Figure 3).

Analytical Results

Based on groundwater laboratory analytical results, some petroleum contaminants were detected above the Chapter 62-777, Florida Administrative Code (F.A.C.) GCTLs. The following parameters and respective concentrations were detected above the laboratory detection limits.

Sample from MW-1

- Total Xylenes was estimated at 0.5 µg/l below GCTL of 20 µg/l
- MTBE was detected at 4.5 µg/l below GCTL of 20 µg/l

Sample from MW-5

- No parameters were detected above laboratory detection limits.

Sample from MW-6

- Benzene was detected at 3.1 µg/l which exceeds the GCTL of 1 µg/l.
- Total Xylene was estimated at 1.7 µg/l below GCTL of 20 µg/l.
- MTBE was detected at 17 µg/l below GCTL of 20 µg/l
- TRPH was detected at 0.8 mg/l below GCTL of 5 mg/l

Sample from MW-7

- Benzene was estimated at 0.5 µg/l below GCTL of 1 µg/l.
- Total Xylene was detected at 3.1 µg/l below GCTL of 20 µg/l.
- MTBE was detected at 8.1 µg/l below GCTL of 20 µg/l
- Naphthalene was estimated at 0.88 µg/l below GCTL of 14 µg/l.

Sample from MW-10

- No parameters were detected above laboratory detection limits.

Sample from MW-12

- MTBE was detected at 55 µg/l which exceeds the GCTL of 20 µg/l

Sample from MW-14

- Benzene was detected at 7.5 µg/l which exceeds the GCTL of 1 µg/l
- MTBE was detected at 38 µg/l which exceeds the GCTL of 20 µg/l

Sample from MW-15

- No parameters were detected above laboratory detection limits.

Sample from MW-16

- No parameters were detected above laboratory detection limits.

Sample from MW-17

- No parameters were detected above laboratory detection limits.

A summary of groundwater analytical data is presented in Table 4. Laboratory analytical data is presented as Appendix B.

CONCLUSIONS AND RECOMMENDATIONS

No parameters were detected above the laboratory detection limits in monitor wells MW-15, MW-16, and MW-17. Based on these analytical results, MACTEC concludes that the extent of contamination has been delineated on the western portion of the site. In addition, the adjacent property to the west has not been impacted by the release at the Townstar #40 facility.

The monitoring wells exhibiting elevated concentrations were within the interior of the site, with the exception of MW-14. Contaminants of concern (7.5 µg/L for Benzene and 38 µg/L MTBE) were confirmed above the GCTLs in the monitoring well MW-14. However, these concentrations were below the Natural Attenuation Default Concentrations of 100 µg/L and 200 µg/L as provided in Table V of Chapter 62-777. MACTEC recommends conducting a Natural Attenuation Monitoring Plan for this site based on the recent analytical results.

CLOSING

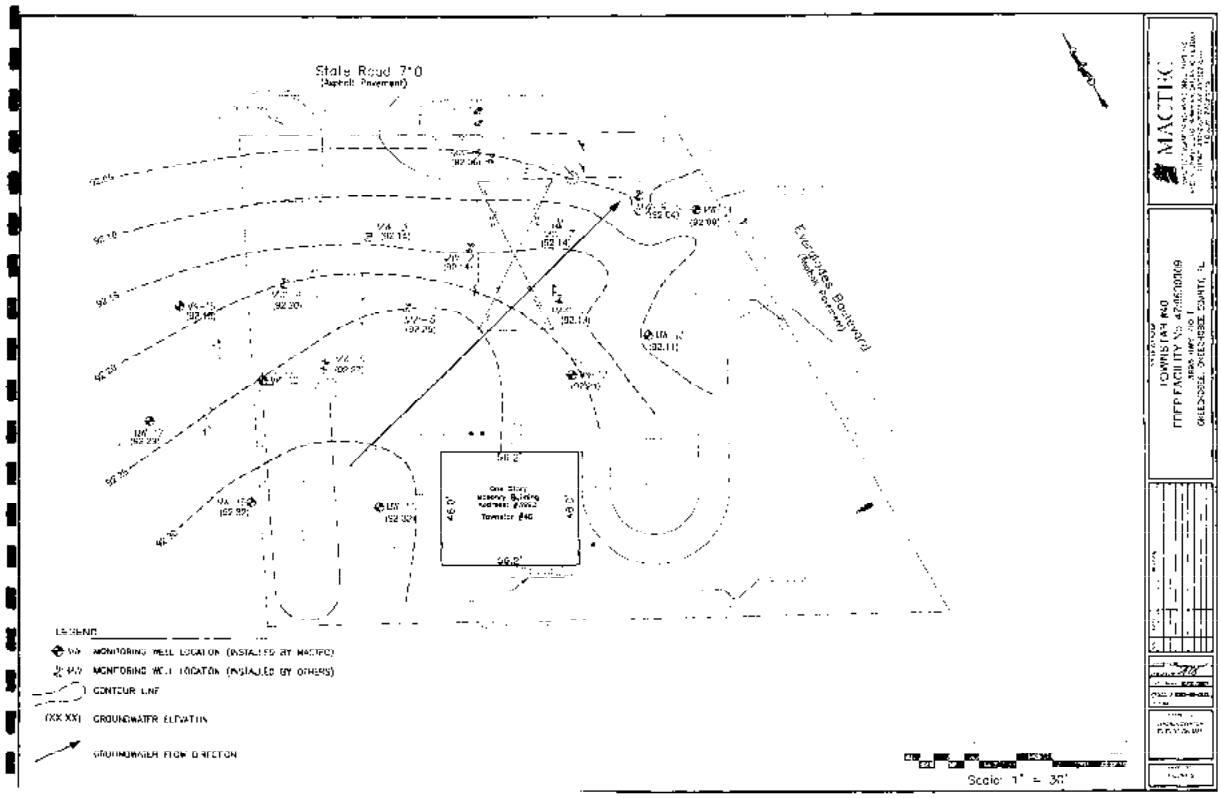
MACTEC appreciates the opportunity to provide these services and submit this data to Florida Department of Environmental Protection, Protection Cleanup Section 5(31), on behalf of TimeSaver Food Stores, LLC. Should you have any questions concerning the contents of this report, please do not hesitate to contact us at (407) 522-7570.

Sincerely,

MACTEC Engineering and Consulting Inc.

Angelique Kong
for Mahesh Krishnamoorthy "with permission"
Staff Engineer

Florinari Blackburn, P.E.
Principal Engineer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Everglades Boulevard
(North Portion)
LEGEND
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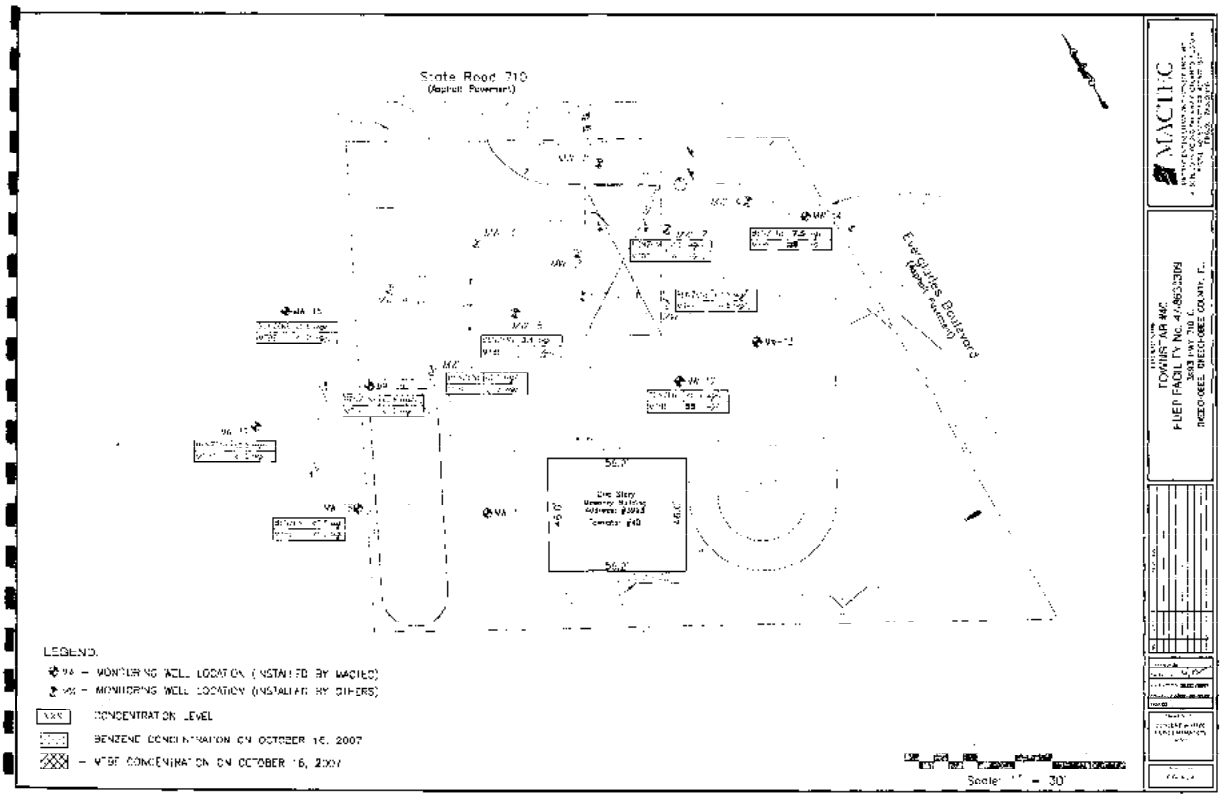
MW MONITORING WELL LOCATION (INSTALLED BY OTHERS)
CONTOUR LINE
(XX.XX) GROUNDWATER ELEVATION
GROUNDWATER FLOW DIRECTION
Scale: 1" = 30'
MACTEC


State Road 710
(Asphalt Pavement)
Everglades Boulevard
(Asphalt Pavement)
LEGEND:
= MONITORING WELL LOCATION (INSTALLED BY MACTEC)
= MONITORING WELL LOCATION (INSTALLED BY OTHERS)
XXX CONCENTRATION LEVEL
BENZENE CONCENTRATION ON OCTOBER 16, 2007
MTBE CONCENTRATION ON OCTOBER 16, 2007
Scale: 1" = 30'
MACTEC
TOWLES AR #66
FUEL FACILITY No. 47/8653/09
3983 HWY 710
RECORDED RECORDS COUNTY, FL

January 13, 2017

Wantman Group, Inc.
213 South Dillard St, Suite 210
Winter Garden, Florida 34787

Attn: Mr. Alfredo Rodriguez, PE
Project Manager

RE: DRAFT Level II Field Screening Report (FSR) – Preferred Ponds
SR 710 from US 441 to the L-63 Canal
Okeechobee County, Florida
FPN: 419344-3-32-01
Tierra Project No.: 6511-12-054A

Mr. Rodriguez:

Tierra, Inc. (Tierra) has prepared this Level II Soil and Groundwater Field Screening Report (FSR) for your use as part of the design submittal documents. This report provides results of Level II field screening activities completed at the Preferred Pond locations for the project referenced above.

The Final Level I PSR-CSER for Proposed Ponds dated August 18, 2014 identified the following risk rankings for the selected Preferred Pond sites: Pond 1B "Low", Pond 2A-Option 1 "Low", Pond 3B "No", Pond 4B-Option 2 "No", and Pond 5A "No". Tierra received notification of the Preferred Pond sites in September 2016. The Level II Scope of Services was reviewed and approved by Mr. Jeffery James, DCIC on November 21, 2016.

Should you have any questions, please contact our office at (813) 989-1354.

Respectfully Submitted,

TIERRA, INC.

Clare E. Kramer, PG
Senior Scientist

Donald R. Polanis, CGC, PSSC
Chief Scientist

DRAFT Level II Field Screening Report – Preferred Ponds

SR 710 from US 441 to the L-63 Canal
Okeechobee County, Florida

FDOT District I
FPN: 419344-3-32-01

Prepared for:

Wantman Group, Inc.
2910 Maguire Road, Suite 2008
Ocoee, Florida 34761

Prepared by:

Tierra, Inc.
7351 Temple Terrace Highway
Tampa, Florida 33637

Tierra Project No.: 6511-12-054A

January 13, 2017

Table of Contents

1.0 INTRODUCTION

The Florida Department of Transportation, District One, is conducting a Project Development and Environmental (PD&E) Study regarding the proposed new road construction (extension to the northwest of existing SR 710) of SR 710 from US 441 to L-63 Canal in Okeechobee County, Florida. The project includes constructing an extension of SR 710 around the northeast side of Okeechobee. The new roadway will have a design speed of 50 mph and will be a high-speed urban four-lane roadway, including a 12-foot multi-use path on one side and five foot sidewalk on the other. A Project Location Map is presented on Sheet A-1 in **Appendix A**.

Initially, sixteen (16) Proposed Pond Alternatives were received from the client by email in October 2013. Updated Proposed Pond Alternatives were received from the client in March 2014. A total of twenty-three (23) pond site options were evaluated and the Final Level I PSR-CSER dated August 18, 2014 was submitted to the FDOT. Additionally, Regional Pond 2D was evaluated and a Tech Memo was prepared (as an addendum to the CSER) and dated May 12, 2015. The final pond locations were received by email from the client on September 29, 2016

This report provides Level II soil field screening results for five (5) Preferred Pond sites identified in the 2014 Final Level I PSR-CSER for the Proposed Ponds. The Level II contamination screening evaluation has resulted in the Post-Level II risk rankings for the final pond locations:

Risk Ranking Summary		
Preferred Pond	**Pre-Level II Risk Rank**	**Post-Level II Risk Rank**
Pond 1B	LOW	NO
1.20-Acres. Located west of Taylor Creek, east of North Parrott Avenue (US Highway 441), and north of NW 13th Street. Use as construction staging area in 1994. Current and historic woodlands with an apiary (bee hives). Level II field screening did not indicate arsenic contamination in the tested locations. *Undesirable buried debris was not encountered in the borings completed during Level II field activities.*		
Preferred Pond	**Pre-Level II Risk Rank**	**Post-Level II Risk Rank**
Pond 2A – Option 1	LOW	NO
14.23-Acres. Located north of NE 9th Street, east of Taylor Creek, and west of the L-63 Canal. Current and historic pastureland and woodlands. Level II field screening did not indicate arsenic contamination in the tested locations. *Undesirable buried debris was not encountered in the borings completed during Level II field activities.*		
Preferred Pond	**Pre-Level II Risk Rank**	**Post-Level II Risk Rank**
Pond 3B	NO	NO
2.44-Acres. Located east of NE 32nd Avenue, north and south of SR 70, and west of the L-63 Canal. Current and historic pastureland and wetlands. Level II field screening did not indicate arsenic contamination in the tested locations. *Undesirable buried debris was not encountered in the borings completed during Level II field activities.*		
Preferred Pond	**Pre-Level II Risk Rank**	**Post-Level II Risk Rank**
Pond 4B – Option 2	NO	NO
4.59-Acres. Located west of the L-63 Canal, and north of the existing SR 710. Current and historic woodlands with unpaved trails. Level II field screening did not indicate arsenic contamination in the tested locations. *Undesirable buried debris was not encountered in the borings completed during Level II field activities.*		
Preferred Pond	**Pre-Level II Risk Rank**	**Post-Level II Risk Rank**
Pond 5A	NO	NO
2.62-Acres. Located west of L-63 Canal, and north of SR 710. Current and historic woodlands/wetlands/pastureland. Level II field screening did not indicate arsenic contamination in the tested locations. *Undesirable buried debris was not encountered in the borings completed during Level II field activities.*		

Testing for arsenic in soils at each pond location is required to identify areas of elevated arsenic levels (above the SCTLs), to establish proper management techniques and to determine disposal options of impacted soils. If sites were to receive a risk ranking of “Medium” or “High”, Tierra would recommend further Level II testing by the Contamination Assessment and Remediation (CAR) contractor, if required by the DCIC.

For sites post-ranked “No” or “Low”, no additional work is recommended at this time. Should a facility’s permitting or regulatory status change between now and the time acquisitions are initiated, additional screening should be conducted.

2.0 SCOPE AND METHODOLOGY

The field screening activities at the Preferred Pond sites were conducted in December 2016 and were based on the site specific Level II Scope of Services that included the number of soil samples, boring locations, and analysis testing, reviewed and approved by the DCIC in November 2016, prior to initiating the field activities.

Arsenic based pesticides and herbicides were historically used for vegetation and weed control on farmland such as citrus groves and/or row crops. Based on the current and historical presence of row crops and/or citrus groves at the pond locations, Level II soil screening activities were performed to provide information on the presence or absence of the tested contaminant at the specified sample locations. The sample locations are indicated on the Sample Location Map presented on Sheets A-2 and A-3 in **Appendix A.**

Equipment decontamination, sample collection, field documentation, sample custody, and laboratory analyses were performed in general accordance with the latest version of the “Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOP) for Field Activities.” All field services were conducted and overseen by Tierra personnel.

All samples collected for analytical testing were stored in ice and shipped under COC to a Florida certified NELAP environmental laboratory (Pace Analytical Services, LLC – Laboratory Certification ID# E83079). The full laboratory analytical report is included in **Appendix C**.

The methodology of the Level II field screening activities at the Preferred Pond sites identified for this project, are described below.

Boring Installation and Soil Sampling

Utilizing a stainless-steel hand auger, a total of twenty-two (22) auger borings were completed within the designed pond boundaries at five (5) Preferred Pond site locations. Each boring was advanced to a maximum depth of 10 feet below land surface (BLS) or to the groundwater water-table, to visually check for buried debris.

Four (4) soil samples were collected from 0 to 2 feet BLS at each pond site. A total of twenty (20) soil samples were sent for laboratory analysis of *Arsenic by EPA Method 6010.*

Groundwater sampling and analysis at the Preferred Ponds sites was not scoped for this project based on the typical screening protocols (lack of evidence to suggest impact to the groundwater) and approval by the FDOT District One DCIC, Mr. Jeffery James. The potential for contamination impact to the groundwater was not considered to be a concern in this locale and therefore groundwater sampling was not warranted.

3.0 FINDINGS

Tierra analyzed the data collected to determine whether levels of target analytes exceeded the FDEPs Soil Cleanup Target Levels (SCTL) contained in Chapter 62-777 FAC. The results of the laboratory analysis were compared to the SCTL for both Residential and Commercial/Industrial Direct Exposure (RDE and C/IDE) limits.

The sample locations at the Preferred Pond sites are illustrated on the Sample Location Map presented in **Appendix A**. The Soil Analytical Summary is presented in Table 1 of **Appendix B**. GPS Coordinates for the SBs were recorded and are tabulated in Table 2 of **Appendix B**. The full laboratory report and copy of the COC are included in **Appendix C**. Field notes describing the soil lithology; any buried debris or petroleum odors were documented on Soil Boring Logs and copies are included in **Appendix D**.

Soil Sampling and Analysis

Twenty (20) soil samples (SB-1 through SB-20) were collected between 0 and 2 feet BLS and analyzed for *Arsenic by EPA Method 6010*. The laboratory results indicate:

- None of the 20 samples analyzed were detected in exceedance of the RDE (2.1 mg/kg) or CIDE (12 mg/kg) SCTLs.

- Low levels of Arsenic were detected between the PQL and MDL, in SB-8 (0.39 mg/kg), SB-12 (0.38 mg/kg), and SB-13 (0.45 mg/kg); and above the MDL in SB-10 (0.69 mg/kg). However, all are below the SCTLs.

Visual Observations

The groundwater table was encountered at 4 to 5 feet depths in each of the borings completed.

A small amount of discarded material was encountered in borings SB-13, SB-13A, SB-14, and SB-14A located in the central area of the southern portion of Pond 4B-Option 2. Fragments of glass and pieces of metal rods where noted from 0 to 2 feet depth in these boring locations.

4.0 CONCLUSIONS

Based on the methodology and findings discussed in this report, Level II field screening indicates that contaminants of concern within the soils in the tested locations have not been identified.

- Arsenic was not detected in exceedance of the RDE (2.1 mg/kg) or CIDE (12 mg/kg) SCTLs in the 20 samples analyzed.

- Groundwater samples were not collected for laboratory analysis.

- No undesirable buried debris or petroleum odors were encountered in the borings completed during Level II field screening activities.

- In Pond 4B-Option 2, de minimis amounts of discarded material was observed from 0 to 1 feet depth in borings SB-13, SB-13A, SB-14, and SB-14A.

5.0 RECOMMENDATIONS

For sites ranked “No” or “Low”, no additional work is recommended at this time. Should a facility’s permitting or regulatory status change between now and the time acquisitions are initiated, additional screening should be conducted.

Testing for arsenic in soils at each pond location is required to identify areas of elevated arsenic levels (above the SCTLs), to establish proper management techniques and to determine disposal options of impacted soils.

- Soils that are identified to contain less than 2.1 mg/kg total arsenic RDE SCTL are unrestricted in the reuse and placement.

- The material observed in the southern portion of Pond 4B-Option 2 is not considered to be a contamination concern but should be removed and properly disposed of prior to construction activities.

No additional assessment is recommended.

6.0 LIMITATIONS

This study was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our course of work and under the scope of work authorized by the client. This report provides analytical results for a limited number of sample locations and should not be used to represent an assessment, but rather a Level II field screening that identifies the presence or absence of a tested contaminant. The information contained in this report is relevant to the date on which this survey was performed, and should not be relied upon to represent conditions at a later date. This report has been prepared on behalf of and exclusively for use by our client for specific application to their project as discussed above. Contractors or consultants reviewing this report must draw their own conclusions regarding further investigation or remediation deemed necessary. Tierra does not warrant the work of reporting agencies, laboratories or other third parties supplying information which may have been used in the preparation of this report. No warranty, expressed or implied is made.

Appendix A

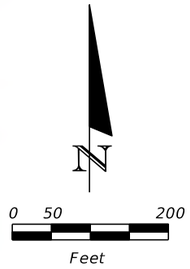
Sheet 1 – Project Location Map
Sheet 2 – Sample Location Map

PROJECT LOCATION MAP

SOURCE: FDOT SURVEY AND MAPPING DATED 2011

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		A-1

bsawaska 1/10/2017 11:34:11 AM J:\6511\2012 Files\6511-12-054 SR 710\Microstation\pdgeoEnvProjLocs01.dgn



SOURCE: FDOT SURVEY AND MAPPING DATED 2011

SAMPLE LOCATION MAP

● SAMPLE LOCATION

REVISIONS				TIERRA, INC.	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		A-2
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		

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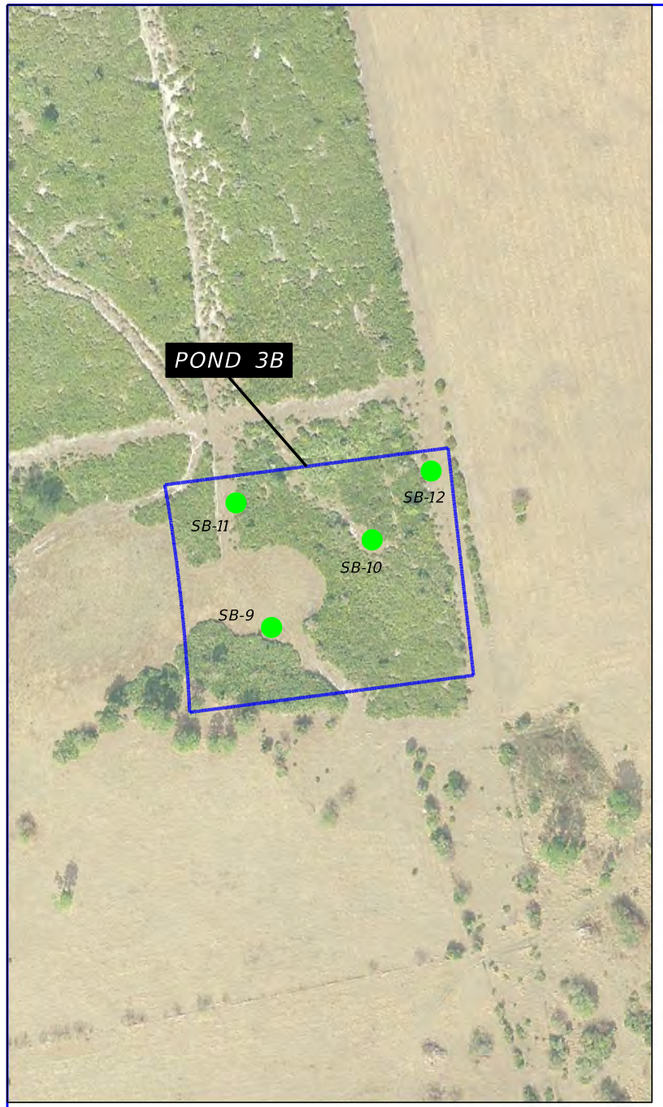

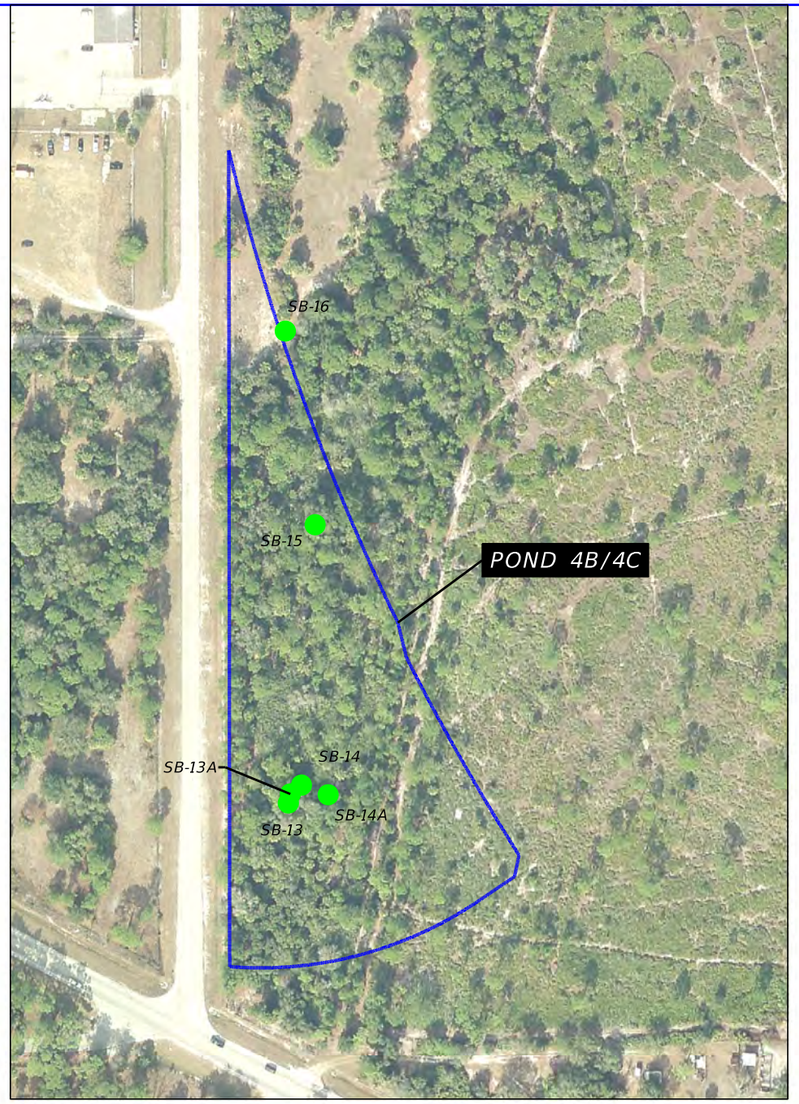

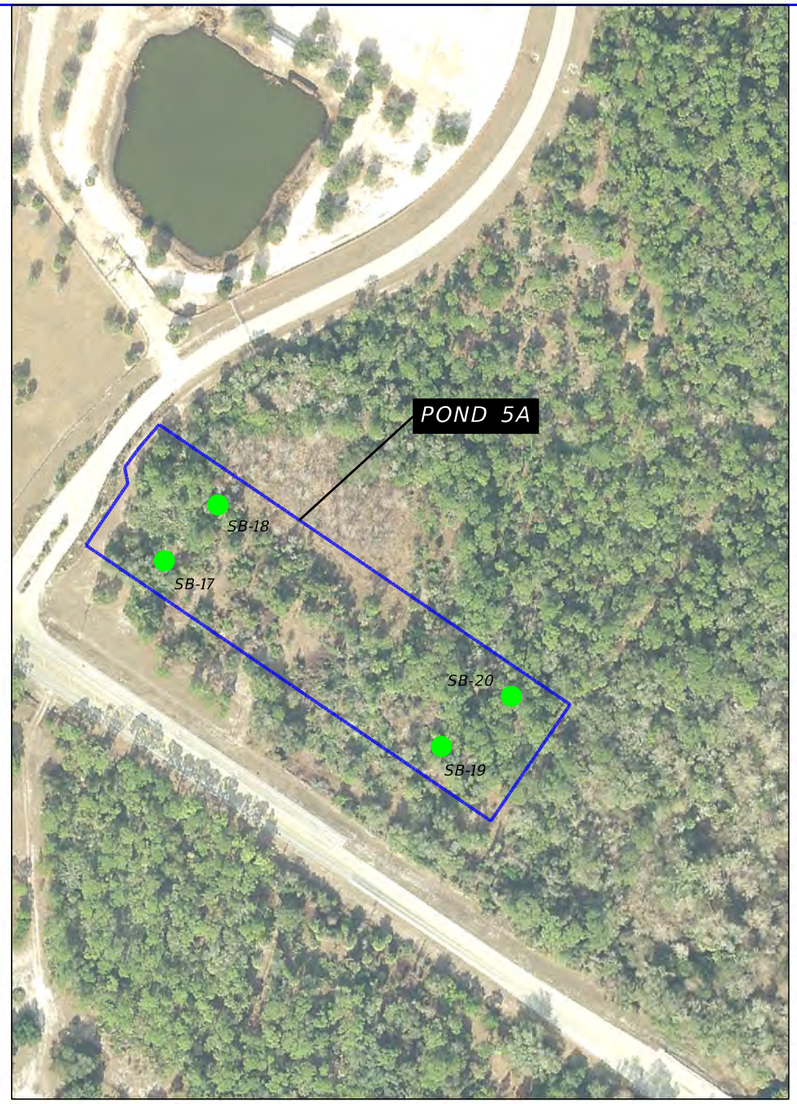

N

0 50 200

Feet

SAMPLE LOCATION MAP

SOURCE: FDOT SURVEY AND MAPPING DATED 2011

● SAMPLE LOCATION

REVISIONS				TIERRA, INC. 7351 TEMPLE TERRACE HIGHWAY TAMPA, FLORIDA 33637 CERTIFICATE OF AUTHORIZATION 6486	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 710 FROM US 441 TO L-63 CANAL	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
			TIERRA PROJECT NO.: 6511-12-054A		SR 710	OKEECHOBEE	419344-3-32-01		A-3

bsawaska 1/10/2017 11:31:17 AM J:\6511\2012 Files\6511-12-054 SR 710\Microstation\pdgeoEnvBLP02.dgn

Appendix B

Table 1 – Soil Analytical Summary
Table 2 – GPS Coordinates

TABLE 1 – SOIL ANALYTICAL SUMMARY

TIERRA PROJECT NO: 6511-12-054A

SAMPLE INFORMATION				EPA METHOD 6010 (mg/kg)
Pond Name	**Sample ID**	**Sample Depth**	**Date Collected**	**Arsenic**
			Residential Direct Exposure SCTL (mg/kg) →	*2.1*
			Commercial/Industrial Direct Exposure SCTL (mg/kg) →	*12.0*
			Leachability SCTL (mg/kg) →	*SPLP*
Pond 1B	**SB-1**	0-2 feet	12/6/16	0.35 U
Pond 1B	**SB-2**	0-2 feet	12/6/16	0.30 U
Pond 1B	**SB-3**	0-2 feet	12/6/16	0.35 U
Pond 1B	**SB-4**	0-2 feet	12/6/16	0.30 U
Pond 2A-Option 1	**SB-5**	0-2 feet	12/6/16	0.28 U
Pond 2A-Option 1	**SB-6**	0-2 feet	12/6/16	0.27 U
Pond 2A-Option 1	**SB-7**	0-2 feet	12/6/16	0.36 U
Pond 2A-Option 1	**SB-8**	0-2 feet	12/6/16	**0.39 I**
Pond 3B	**SB-9**	0-2 feet	12/6/16	0.32 U
Pond 3B	**SB-10**	0-2 feet	12/6/16	**0.69**
Pond 3B	**SB-11**	0-2 feet	12/6/16	0.27 U
Pond 3B	**SB-12**	0-2 feet	12/6/16	**0.38 I**
Pond 4B-Option 2	**SB-13**	0-2 feet	12/6/16	**0.45 I**
Pond 4B-Option 2	**SB-14**	0-2 feet	12/6/16	0.29 U
Pond 4B-Option 2	**SB-15**	0-2 feet	12/6/16	0.32 U
Pond 4B-Option 2	**SB-16**	0-2 feet	12/6/16	0.27 U
Pond 5A	**SB-17**	0-2 feet	12/6/16	0.27 U
Pond 5A	**SB-18**	0-2 feet	12/6/16	0.29 U
Pond 5A	**SB-19**	0-2 feet	12/6/16	0.31 U
Pond 5A	**SB-20**	0-2 feet	12/6/16	0.31 U

NOTES:
mg/kg = milligrams per kilogram
SCTL = Soil Cleanup Target Level per Ch. 62-777, F.A.C.
U = Analyte not detected above noted concentration
I = Analyte detected between PQL and MDL; see lab report
BOLD concentration exceeds MDL
Highlighted concentration exceeds SCTL

TABLE 2 – GPS COORDINATES FOR BORINGS

TIERRA PROJECT NO: 6511-12-054A

Pond Name	Boring No.	Latitude	Longitude
Pond 1B	**SB-1**	27.2571243	-80.8274177
Pond 1B	**SB-2**	27.2570954	-80.8267112
Pond 1B	**SB-3**	27.2574110	-80.8273652
Pond 1B	**SB-4**	27.2574774	-80.8268771
Pond 2A-Option 1	**SB-5**	27.2587891	-80.8140458
Pond 2A-Option 1	**SB-6**	27.2587737	-80.8123055
Pond 2A-Option 1	**SB-7**	27.2600076	-80.8129738
Pond 2A-Option 1	**SB-8**	27.2603979	-80.8125652
Pond 3B	**SB-9**	27.2524804	-80.7929520
Pond 3B	**SB-10**	27.2527881	-80.7925552
Pond 3B	**SB-11**	27.2529194	-80.7930908
Pond 3B	**SB-12**	27.2530302	-80.7923218
Pond 4B-Option 2	**SB-13**	27.2446320	-80.7933240
Pond 4B-Option 2	**SB-13A**	27.2446640	-80.7933160
Pond 4B-Option 2	**SB-14**	27.2446950	-80.7932720
Pond 4B-Option 2	**SB-14A**	27.2446610	-80.7931670
Pond 4B-Option 2	**SB-15**	27.2456123	-80.7932164
Pond 4B-Option 2	**SB-16**	27.2462946	-80.7933328
Pond 5A	**SB-17**	27.2388684	-80.7832076
Pond 5A	**SB-18**	27.2390651	-80.7829964
Pond 5A	**SB-19**	27.2382126	-80.7821163
Pond 5A	**SB-20**	27.2383891	-80.7818402

NOTES:

Geographic Coordinate System:	GCS_WGS_84
Geodetic Datum:	D_WGS_84
Prime Meridian:	Greenwich
Angular Unit:	Degree

The World Geodetic System 1984 (WGS84) is the reference coordinate system used by the Global Positioning System (GPS). WGS 84 was established in 1984 and last revised in 2004. The latitude and longitude of a point are reported in the Decimal Degrees format.

Appendix C

Laboratory Analytical Report

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

December 22, 2016

Clare Kramer
Tierra, Inc.
7351 Temple Terrace Highway
Tampa, FL 33637

RE: Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Dear Clare Kramer:
Enclosed are the analytical results for sample(s) received by the laboratory on December 07, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

LA Palmer

Lori Palmer
lori.palmer@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

CERTIFICATIONS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
Wyoming Certification: FL NELAC Reciprocity
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

SAMPLE SUMMARY

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35281680001	**SB-1**	Solid	12/06/16 11:56	12/07/16 12:07
35281680002	**SB-2**	Solid	12/06/16 12:10	12/07/16 12:07
35281680003	**SB-3**	Solid	12/06/16 12:23	12/07/16 12:07
35281680004	**SB-4**	Solid	12/06/16 12:40	12/07/16 12:07
35281680005	**SB-5**	Solid	12/06/16 13:25	12/07/16 12:07
35281680006	**SB-6**	Solid	12/06/16 13:40	12/07/16 12:07
35281680007	**SB-7**	Solid	12/06/16 13:56	12/07/16 12:07
35281680008	**SB-8**	Solid	12/06/16 14:08	12/07/16 12:07
35281680009	**SB-9**	Solid	12/06/16 14:36	12/07/16 12:07
35281680010	**SB-10**	Solid	12/06/16 14:47	12/07/16 12:07
35281680011	**SB-11**	Solid	12/06/16 14:58	12/07/16 12:07
35281680012	**SB-12**	Solid	12/06/16 15:11	12/07/16 12:07
35281680013	**SB-13**	Solid	12/07/16 08:12	12/07/16 12:07
35281680014	**SB-14**	Solid	12/07/16 08:36	12/07/16 12:07
35281680015	**SB-15**	Solid	12/07/16 08:50	12/07/16 12:07
35281680016	**SB-16**	Solid	12/07/16 09:12	12/07/16 12:07
35281680017	**SB-17**	Solid	12/07/16 09:32	12/07/16 12:07
35281680018	**SB-18**	Solid	12/07/16 09:47	12/07/16 12:07
35281680019	**SB-19**	Solid	12/07/16 10:01	12/07/16 12:07
35281680020	**SB-20**	Solid	12/07/16 10:17	12/07/16 12:07

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

SAMPLE ANALYTE COUNT

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35281680001	**SB-1**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680002	**SB-2**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680003	**SB-3**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680004	**SB-4**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680005	**SB-5**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680006	**SB-6**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680007	**SB-7**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680008	**SB-8**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680009	**SB-9**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680010	**SB-10**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680011	**SB-11**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680012	**SB-12**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680013	**SB-13**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680014	**SB-14**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680015	**SB-15**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680016	**SB-16**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680017	**SB-17**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680018	**SB-18**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O
35281680019	**SB-19**	EPA 6010	JTJ	1	PASI-O

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

SAMPLE ANALYTE COUNT

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974-87	DRC	1	PASI-O
35281680020	**SB-20**	EPA 6010	JTJ	1	PASI-O
		ASTM D2974-87	DRC	1	PASI-O

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-1 **Lab ID: 35281680001** Collected: 12/06/16 11:56 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.35 U**	mg/kg	0.70	0.35	1	12/14/16 06:50	12/17/16 01:33	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**16.1**	%	0.10	0.10	1		12/14/16 11:00		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-2 **Lab ID: 35281680002** Collected: 12/06/16 12:10 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.30 U**	mg/kg	0.60	0.30	1	12/14/16 06:50	12/17/16 01:51	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**2.3**	%	0.10	0.10	1		12/14/16 11:00		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-3 **Lab ID: 35281680003** Collected: 12/06/16 12:23 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.35 U**	mg/kg	0.69	0.35	1	12/14/16 06:50	12/17/16 01:55	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**11.4**	%	0.10	0.10	1		12/14/16 11:00		J(D6)

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-4 **Lab ID: 35281680004** Collected: 12/06/16 12:40 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.30 U**	mg/kg	0.61	0.30	1	12/14/16 06:50	12/17/16 02:00	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**5.0**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-5 **Lab ID: 35281680005** Collected: 12/06/16 13:25 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.28 U**	mg/kg	0.57	0.28	1	12/14/16 06:50	12/17/16 02:04	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**6.6**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-6 **Lab ID: 35281680006** Collected: 12/06/16 13:40 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.27 U**	mg/kg	0.54	0.27	1	12/14/16 06:50	12/17/16 02:18	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**3.4**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-7 **Lab ID: 35281680007** Collected: 12/06/16 13:56 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.36 U**	mg/kg	0.71	0.36	1	12/14/16 06:50	12/17/16 02:22	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**18.1**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
Oldsmar , FL 34677
(813)881-9401

ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-8 **Lab ID: 35281680008** Collected: 12/06/16 14:08 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.39 I**	mg/kg	0.60	0.30	1	12/14/16 06:50	12/17/16 02:27	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**9.9**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-9 **Lab ID: 35281680009** Collected: 12/06/16 14:36 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.32 U**	mg/kg	0.64	0.32	1	12/14/16 06:50	12/17/16 02:31	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**8.7**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-10 **Lab ID: 35281680010** Collected: 12/06/16 14:47 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.69**	mg/kg	0.54	0.27	1	12/14/16 06:50	12/17/16 02:36	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**15.5**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-11 **Lab ID: 35281680011** Collected: 12/06/16 14:58 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.27 U**	mg/kg	0.53	0.27	1	12/14/16 06:50	12/17/16 02:40	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**10.4**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-12 **Lab ID: 35281680012** Collected: 12/06/16 15:11 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.38 I**	mg/kg	0.71	0.35	1	12/14/16 06:50	12/17/16 02:45	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**27.1**	%	0.10	0.10	1		12/14/16 11:01		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-13 **Lab ID: 35281680013** Collected: 12/07/16 08:12 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.45 I**	mg/kg	0.57	0.29	1	12/14/16 06:50	12/17/16 02:49	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**5.7**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-14 **Lab ID: 35281680014** Collected: 12/07/16 08:36 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.29 U**	mg/kg	0.59	0.29	1	12/14/16 06:50	12/17/16 02:54	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**3.2**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-15 **Lab ID: 35281680015** Collected: 12/07/16 08:50 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.32 U**	mg/kg	0.63	0.32	1	12/14/16 06:50	12/17/16 02:59	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**3.1**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-16 **Lab ID: 35281680016** Collected: 12/07/16 09:12 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.27 U**	mg/kg	0.54	0.27	1	12/14/16 06:50	12/17/16 03:12	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**2.5**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-17 **Lab ID: 35281680017** Collected: 12/07/16 09:32 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.27 U**	mg/kg	0.55	0.27	1	12/14/16 06:50	12/17/16 03:17	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**7.9**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-18 **Lab ID: 35281680018** Collected: 12/07/16 09:47 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.29 U**	mg/kg	0.58	0.29	1	12/14/16 06:50	12/17/16 03:21	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**8.1**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-19 **Lab ID: 35281680019** Collected: 12/07/16 10:01 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.31 U**	mg/kg	0.61	0.31	1	12/14/16 06:50	12/17/16 03:26	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**8.3**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Sample: SB-20 **Lab ID: 35281680020** Collected: 12/07/16 10:17 Received: 12/07/16 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**0.31 U**	mg/kg	0.62	0.31	1	12/14/16 12:24	12/22/16 10:07	7440-38-2	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**9.5**	%	0.10	0.10	1		12/14/16 11:02		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 South Bayview Blvd.
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(813)881-9401

QUALITY CONTROL DATA

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

QC Batch: 338388 Analysis Method: EPA 6010
QC Batch Method: EPA 3050 Analysis Description: 6010 MET Solid
Associated Lab Samples: 35281680001, 35281680002, 35281680003, 35281680004, 35281680005, 35281680006, 35281680007, 35281680008, 35281680009, 35281680010, 35281680011, 35281680012, 35281680013, 35281680014, 35281680015, 35281680016, 35281680017, 35281680018, 35281680019

METHOD BLANK: 1813684 Matrix: Solid
Associated Lab Samples: 35281680001, 35281680002, 35281680003, 35281680004, 35281680005, 35281680006, 35281680007, 35281680008, 35281680009, 35281680010, 35281680011, 35281680012, 35281680013, 35281680014, 35281680015, 35281680016, 35281680017, 35281680018, 35281680019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	0.31 U	0.62	0.31	12/17/16 01:24	

LABORATORY CONTROL SAMPLE: 1813685

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	13.7	12.7	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1813686 1813687

Parameter	Units	35281680001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	0.35 U	16.9	17.8	13.3	13.8	78	77	75-125	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

QC Batch: 338516
QC Batch Method: EPA 3050
Analysis Method: EPA 6010
Analysis Description: 6010 MET Solid
Associated Lab Samples: 35281680020

LABORATORY CONTROL SAMPLE: 1814148

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	13.9	12.7	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1814149 1814150

Parameter	Units	35281816006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	9.3	21.4	16.2	26.1	18.6	79	58	75-125	34	20	J(M1), J(R1)

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1814256 1814257

Parameter	Units	35281816007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	5.0	22.9	27.5	26.9	31.6	96	97	75-125	16	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

QC Batch: 338449 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 35281680001, 35281680002, 35281680003, 35281680004, 35281680005, 35281680006, 35281680007, 35281680008, 35281680009, 35281680010, 35281680011, 35281680012, 35281680013, 35281680014, 35281680015, 35281680016, 35281680017, 35281680018, 35281680019, 35281680020

SAMPLE DUPLICATE: 1813914

Parameter	Units	35279909001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	95.7	94.7	1	10	

SAMPLE DUPLICATE: 1813915

Parameter	Units	35281680003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.4	9.8	15	10	J(D6)

SAMPLE DUPLICATE: 1813916

Parameter	Units	35281680012 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	27.1	25.2	7	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.
J(D6)	Estimated Value. The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
J(R1)	Estimated Value. RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: SR710 Ponds- 6511-12054A
Pace Project No.: 35281680

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35281680001	**SB-1**	EPA 3050	338388	EPA 6010	338508
35281680002	**SB-2**	EPA 3050	338388	EPA 6010	338508
35281680003	**SB-3**	EPA 3050	338388	EPA 6010	338508
35281680004	**SB-4**	EPA 3050	338388	EPA 6010	338508
35281680005	**SB-5**	EPA 3050	338388	EPA 6010	338508
35281680006	**SB-6**	EPA 3050	338388	EPA 6010	338508
35281680007	**SB-7**	EPA 3050	338388	EPA 6010	338508
35281680008	**SB-8**	EPA 3050	338388	EPA 6010	338508
35281680009	**SB-9**	EPA 3050	338388	EPA 6010	338508
35281680010	**SB-10**	EPA 3050	338388	EPA 6010	338508
35281680011	**SB-11**	EPA 3050	338388	EPA 6010	338508
35281680012	**SB-12**	EPA 3050	338388	EPA 6010	338508
35281680013	**SB-13**	EPA 3050	338388	EPA 6010	338508
35281680014	**SB-14**	EPA 3050	338388	EPA 6010	338508
35281680015	**SB-15**	EPA 3050	338388	EPA 6010	338508
35281680016	**SB-16**	EPA 3050	338388	EPA 6010	338508
35281680017	**SB-17**	EPA 3050	338388	EPA 6010	338508
35281680018	**SB-18**	EPA 3050	338388	EPA 6010	338508
35281680019	**SB-19**	EPA 3050	338388	EPA 6010	338508
35281680020	**SB-20**	EPA 3050	338516	EPA 6010	338661
35281680001	**SB-1**	ASTM D2974-87	338449		
35281680002	**SB-2**	ASTM D2974-87	338449		
35281680003	**SB-3**	ASTM D2974-87	338449		
35281680004	**SB-4**	ASTM D2974-87	338449		
35281680005	**SB-5**	ASTM D2974-87	338449		
35281680006	**SB-6**	ASTM D2974-87	338449		
35281680007	**SB-7**	ASTM D2974-87	338449		
35281680008	**SB-8**	ASTM D2974-87	338449		
35281680009	**SB-9**	ASTM D2974-87	338449		
35281680010	**SB-10**	ASTM D2974-87	338449		
35281680011	**SB-11**	ASTM D2974-87	338449		
35281680012	**SB-12**	ASTM D2974-87	338449		
35281680013	**SB-13**	ASTM D2974-87	338449		
35281680014	**SB-14**	ASTM D2974-87	338449		
35281680015	**SB-15**	ASTM D2974-87	338449		
35281680016	**SB-16**	ASTM D2974-87	338449		
35281680017	**SB-17**	ASTM D2974-87	338449		
35281680018	**SB-18**	ASTM D2974-87	338449		
35281680019	**SB-19**	ASTM D2974-87	338449		
35281680020	**SB-20**	ASTM D2974-87	338449		

REPORT OF LABORATORY ANALYSIS

WO# : 35281680

35281680

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Required Client Information:	Required Project Information:	Section C Invoice Information:	
Company: Tierra, Inc.	Report To: Awad, Sammy	Attention:	
Address: 7351 Temple Terrace Highway	Copy To:	Company Name:	
Tampa, FL 33637		Address:	Regulatory Agency
Email: CKramer@tierraeng.com	Purchase Order #:	Pace Quote:	
Phone: Fax:	Project Name: SR710 Ponds - 6511-12-054A	Pace Project Manager: lori.palmer@pacelabs.com,	State / Location
Requested Due Date:	Project #:	Pace Profile #: 7064-4	FL

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Arsenic - 6010	Residual Chlorine (Y/N)
1	SB-1	SL	C	12/6/16		12/6/16	1156		1	✓									✓	
2	SB-2						1210		1	✓									✓	
3	SB-3						1225		1	✓									✓	
4	SB-4						1240		1	✓									✓	
5	SB-5						1325		1	✓									✓	
6	SB-6						1340		1	✓									✓	
7	SB-7						1356		1	✓									✓	
8	SB-8						1408		1	✓									✓	
9	SB-9						1436		1	✓									✓	
10	SB-10						1447		1	✓									✓	
11	SB-11						1458		1	✓									✓	
12	SB-12						1511		1	✓									✓	

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Empty Containers	B. Doss Pace	11-30	1745	Sam Awad Tierra	11-30	1745				
	Sam Awad Tierra	12-7-16	1207	Client to Pace	12/7/16	1207	21.9	N	N	
	Client to Pace	12/7/16	2000	FLX	12/7/16	2000				
				JM T-177	12/7/16	23:40	26.2	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Sammy Awad

SIGNATURE of SAMPLER: Sammy Awad DATE Signed: 12/7/16

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Tierra, Inc.	Report To:	Awad, Sammy	Attention:	
Address:	7351 Temple Terrace Highway	Copy To:		Company Name:	
Tampa, FL 33637				Address:	Regulatory Agency
Email:	CKramer@tierraeng.com	Purchase Order #:		Pace Quote:	
Phone:	Fax:	Project Name:	SR710 Ponds - 6511-12-054A	Pace Project Manager:	lori.palmer@pacelabs.com, State / Location
Requested Due Date:		Project #:		Pace Profile #:	7064-4 FL

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analyses Test: Arsenic - 6010	Residual Chlorine (Y/N)
1	SB-13	SL	C			12/7/16	0812		1	✓									✓	
2	SB-14						0836		1	✓									✓	
3	SB-15						0850		1	✓									✓	
4	SB-16						0912		1	✓									✓	
5	SB-17						0932		1	✓									✓	
6	SB-18						0947		1	✓									✓	
7	SB-19						1001		1	✓									✓	
8	SB-20						1017		1	✓									✓	
9																				
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Empty Containers	[illegible] DAL	11-30	1548	Sammy Awad / Tierra	11-30	1548				
	Sammy Awad / Tierra	11-7-16	1207	Michael Pace	12/7/16	1207	21.9	N	N	
	Michael Pace	12/7/16	2000	FLX	12/7/16	2000				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Sammy Awad

SIGNATURE of SAMPLER: Sammy Awad DATE Signed: 12/7/16

Pace Analytical	Document Name: Sample Condition Upon Receipt Form	Document Revised: August 10, 2016
	Document No.: F-FL-C-007 rev. 10	Issuing Authority: Pace Florida Quality Office

Sam

WO# : 35281680

PM: LAP Due Date: 12/14/16

CLIENT: 37-TIETPA

Project #

Project Manager:

Client:

Date and Initials of person:
Examining contents:
Label:
Deliver:
pH:

Thermometer Used: T-277 Date 12/7/16 Time 2340 Initials: AS

Samples shorted to lab (If Yes, complete) Shorted Date: Shorted Time: Qty:

Cooler #1 Temp. °C	2.6 (Visual)	+0.1 (Correction Factor)	2.7 (Actual)	☐ Samples on ice, cooling process has begun
Cooler #2 Temp. °C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #3 Temp. °C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #4 Temp. °C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #5 Temp. °C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #6 Temp. °C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☑ Commercial ☐ Pace ☐ Other

Shipping Method: ☐ First Overnight ☐ Priority Overnight ☐ Standard Overnight ☐ Ground ☐ Other

Billing: ☐ Recipient ☐ Sender ☐ Third Party ☐ Unknown

Tracking #

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☑ No Ice: Wet Blue (None)

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

		Comments:
Chain of Custody Present	☑Yes ☐No ☐N/A	
Chain of Custody Filled Out	☑Yes ☐No ☐N/A	
Relinquished Signature & Sampler Name COC	☑Yes ☐No ☐N/A	
Samples Arrived within Hold Time	☑Yes ☐No ☐N/A	
Rush TAT requested on COC	☐Yes ☑No ☐N/A	
Sufficient Volume	☑Yes ☐No ☐N/A	
Correct Containers Used	☑Yes ☐No ☐N/A	
Containers Intact	☑Yes ☐No ☐N/A	
Sample Labels match COC (sample IDs & date/time of collection)	☑Yes ☐No ☐N/A	
All containers needing acid/base preservation have been checked.	☐Yes ☐No ☑N/A	Preservation Information:
All Containers needing preservation are found to be in compliance with EPA recommendation: Exceptions: VOA, Coliform, TOC, O&G, Carbamates	☐Yes ☐No ☑N/A	Preservative Lot #/Trace # Date Time Initials
Headspace in VOA Vials? (>6mm).	☐Yes ☐No ☑N/A	
Trip Blank Present:	☐Yes ☐No ☑N/A	

Client Notification/ Resolution:

Person Contacted: Date/Time

Comments/ Resolution (use back for additional comments):

Project Manager Review: Date:

Appendix D

Soil Boring Logs

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 18

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 1	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16 End Date: 12/6/16	Borehole Start Time: 1150 End Time: 1156	☑ AM ☐ PM ☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal			

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4/12	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-1						1	Br F/S w/organics		D	SB-1@ 0-2 ft
							2	Br/grey F/S			
							3				
							4	Br silty sand		W	
							5				
							6	EOB		S	
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 1B

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 2	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/12	Borehole Start Time: 1200	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/12	End Time: 1210	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4 1/2	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-2						1	Br F/S		D	SB-2@0-2Ft
							2				
							3	Lgt Br F/S			
							4			M	
							5	Br. F/S			
							6	EOB		S	
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 1B

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 3	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1215	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1225	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4 1/2	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-3						1	Dr Br F/S w/ Organics		D	SB-3@0-2ft
							2	Br F/S			
							3				
							4	Br Silty Sand			
							5			W	
							6	EOB		S	
							7				
							8				
							9				
							10	No debris encountered			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 13

Boring/Well Number: SB- 4 Pond 3A	Permit Number: NA		FDEP Facility Identification Number: NA
Site Name: 6511-12-054A SR 710 from US 441 to the L-63 Canal	Borehole Start Date: 12/6/16 End Date: 12/6/16	Borehole Start Time: 1230 End Time: 1240	☐ AM ☑ PM ☐ AM ☑ PM
Environmental Contractor: TIERRA, INC.	Geologist's Name: Clare Kramer		Environmental Technician's Name: Sammy Awad
Drilling Company: TIERRA, INC.	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 6
Drilling Method(s): HA	Apparent Borehole DTW (in feet from soil moisture content): 4 1/2	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-4						1	Br F/S		D	SB-4@0-2ft
							2	L,d Br F/S			
							3				
							4	Br F/S		W	
							5	▼			
							6	EOB		S	
							7				
							8				
							9				
							10	No debris encountered			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 2A, Option 1

Page 1 of 1

Boring/Well Number: SB- 5	Permit Number: NA	FDEP Facility Identification Number: NA
Site Name: 6511-12-054A SR 710 from US 441 to the L-63 Canal	Borehole Start Date: 12/6/16 End Date: 12/6/16	Borehole Start Time: 1315 End Time: 1325 ☐ AM ☑ PM ☐ AM ☑ PM
Environmental Contractor: TIERRA, INC.	Geologist's Name: Clare Kramer	Environmental Technician's Name: Sammy Awad
Drilling Company: TIERRA, INC.	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3.25 / Borehole Depth (feet): 5
Drilling Method(s): HA	Apparent Borehole DTW (in feet from soil moisture content): 4	Measured Well DTW (in feet after water recharges in well): NA
OVA (list model and check type): NA ☐ FID ☐ PID		

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-5						1	Br. F/S		D	SB-5@0-2ft
							2	Gr F/S			
							3				
							4	▼ Grad Br F/S		W	
							5	EOB		5	
							6				
							7				
							8				
							9				
							10	No debris encountered			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 2A, Option 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 6	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1330	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1340	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-6						1	Br F/S		D	SB-6@0-2ft
							2	Gr F/S			
							3	Br F/S			
							4	▼		W	
							5	EOB		S	
							6				
							7				
							8				
							9				
							10	No debris encountered			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond 2A, option 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 7	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1345	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1350	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-7						1	Br F/S		D	SB-7@0-2FT
↓	↓						2	Br and Gr F/S		↓	
							3	Gr F/S			
							4	▼ Br F/S		M	
							5	SOB		↓	
							6				
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 2A, option 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 8	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1400	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1408	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked);

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-8						1	Br F/S		D	SB-8 0.0-5.0
							2	Gr F/S			
							3	slightly Br Silty Sand			
							4	Br F/S		W	
							5	EOB		S	
							6				
							7				
							8	No debris encountered			
							9				
							10				
							11				
							12				

Sample Type Codes: PH = Post Hole; HA = Hand Auger; SS = Split Spoon; ST = Shelby Tube; DP = Direct Push; SC = Sonic Core; DC = Drill Cuttings

Moisture Content Codes: D = Dry; M = Moist; W = Wet; S = Saturated

BORING LOG

Pond site SB

Page 1 of 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 9	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1430	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1436	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4'12	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked);

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-9						1	Br. F/S		D	SB-9@0-2FT
							2	Gr F/S			
							3				
							4	Br. silty Sand			
							5			S	
							6	EOB			
							7				
							8				
							9	No odors encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Road Site 38

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 10	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1440	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1449	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4 1/2	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-10						1	Br F/S		D	SB-1000-2A
							2	Gr F/S			
							3	Lgt Br F/S			
							4	Br Silty Sand		M	
							5	▼			
							6	EOB		S	
							7				
							8				
							9				
							10	No debris encountered			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond site SB

Page 1 of 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 11	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/6/16	Borehole Start Time: 1452	☐ AM ☑ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/6/16	End Time: 1458	☐ AM ☑ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4 1/2	NA	NA ☐ PID ☐ FID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked);

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-11						1	Br F/S		D	SB-11@0-2ft
							2	Gr F/S			
							3	Br F/S			
							4	Lgt. br. F/S			
							5	Br Silty Sand		M	
							6	EOB		S	
							7				
							8				
							9				
							10	No debris encountered			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 38

Boring/Well Number: SB- 12	Permit Number: NA		FDEP Facility Identification Number: NA
Site Name: 6511-12-054A SR 710 from US 441 to the L-63 Canal	Borehole Start Date: 12/6/16 End Date: 12/6/16	Borehole Start Time: 1504 End Time: 1511	☐ AM ☑ PM ☐ AM ☑ PM
Environmental Contractor: TIERRA, INC.	Geologist's Name: Clare Kramer		Environmental Technician's Name: Sammy Awad
Drilling Company: TIERRA, INC.	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 6
Drilling Method(s): HA	Apparent Borehole DTW (in feet from soil moisture content): 4' 12	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-12						1	Br F/S		D	SB/12@0-3ft
							2	Gr F/S			
							3				
							4	Br S:14 Sand			
							5			W	
							6	EOB		S	
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 48, option 2

Page 1 of 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 13	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/7/16	Borehole Start Time: 0810	☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/7/16	End Time: 0817	☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (Inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	5	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-13						1	Gr F/S Glass fragments		D	SB-13@0-2ft
							2	Lt Br F/S			
							3				
							4	Br F/S			
							5	▼		M	
							6	EOB		S	
							7				
							8	Glass fragment debris			
							9	encountered from			
							10	surface to 1ft			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 4B, Option 2

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 13A	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12-7-14	Borehole Start Time: 1025	☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12-7-14	End Time: 1027	☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	2

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	Glue	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA							1	Br. Fb w/ glass fragment debris		D	
							2	Br/Gr. Fb			
								EOB			
							3				
							4				
							5				
							6				
							7				
							8				
							9	Glass fragment debris			
							10	found from surface to 10"BLS			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 4B, option 2

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 14	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/7/16	Borehole Start Time: 0825	☐ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/7/16	End Time: 0836	☐ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	5	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-A						1	Gr F/S Glassfragments Sm. Metal Rod		D	SB-W@0-2ft
							2	Lgt Br F/S			
							3				
							4	Br F/S			
							5			W	
							6	EOB		S	
							7				
							8	Glass fragment debris			
							9	and small metal rod			
							10	encountered from surface to 1ft.			
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 4B, option 2

Page 1 of 1

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 14A	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12-2-14 End Date: 12-2-14	Borehole Start Time: 1030 End Time: 1032	☑ AM ☐ PM ☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal			

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	2

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	GWE	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA							1	Br. FIS		D	
							2	Br./Gr. FIS			
							3	EOB			
							4				
							5				
							6				
							7				
							8				
							9	No odors encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond Site 4B, option 2

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 15	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/7/16	Borehole Start Time: 0842	☐ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/7/16	End Time: 0850	☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	5	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-15						1	Gr F/S		D	SB-B@0-2ft
							2	Lgt Br F/S			
							3				
							4	Br F/S			
							5			W	
							6	EOB		S	
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 4B, option 2

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 16	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/9/16	Borehole Start Time: 0902	☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/9/16	End Time: 0912	☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	5	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-16						1	Gr F/S		D	SB-16@2-3'
							2	Lt Br F/S			
							3	Tn F/S			
							4				
							5	Br F/S		W	
							6	EOB		S	
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: PH = Post Hole; HA = Hand Auger; SS = Split Spoon; ST = Shelby Tube; DP = Direct Push; SC = Sonic Core; DC = Drill Cuttings

Moisture Content Codes: D = Dry; M = Moist; W = Wet; S = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 59

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 17	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/7/16	Borehole Start Time: 0921	☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/7/16	End Time: 0932	☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-17						1	Gr F/S		D	SB-17@0-2ft
							2	Br F/S			
							3	Lt Br F/S			
							4	▼ Lt Br Silty Sand		M	
							5	EOB		W	
							6				
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: PH = Post Hole; HA = Hand Auger; SS = Split Spoon; ST = Shelby Tube; DP = Direct Push; SC = Sonic Core; DC = Drill Cuttings

Moisture Content Codes: D = Dry; M = Moist; W = Wet; S = Saturated

BORING LOG

Pond Site SA

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 18	NA	NA

Site Name: 6511-12-054A SR 710 from US 441 to the L-63 Canal	Borehole Start Date: 12/7/16 End Date: 12/7/16	Borehole Start Time: 0938 ☑ AM ☐ PM End Time: 0947 ☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB 18						1	Gr F/S		D	SB-18 0-2 P A
							2	Br F/S			
							3	Lgt Br F/S			
							4	Br Slightly Silty Sand		W	
							5	EOB		S	
							6				
							7				
							8				
							9	No debris encountered			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Pond site SP1

Boring/Well Number: SB- 19	Permit Number: NA		FDEP Facility Identification Number: NA
Site Name: 6511-12-054A SR 710 from US 441 to the L-63 Canal	Borehole Start Date: 12/7/14 End Date: 12/2/14	Borehole Start Time: 0953 End Time: 1001	☑ AM ☐ PM ☑ AM ☐ PM
Environmental Contractor: TIERRA, INC.	Geologist's Name: Clare Kramer		Environmental Technician's Name: Sammy Awad
Drilling Company: TIERRA, INC.	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 5
Drilling Method(s): HA	Apparent Borehole DTW (in feet from soil moisture content): 4	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-19						1	Gr Fls		D	SB-19 @0-2ft
							2	Br Fls			
							3	Dk Br Fls			
							4	▼ Lgt Br Fls		W	
							5	T_{10} EOB		W-S	
							6				
							7				
							8	No debris encountered			
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

BORING LOG

Pond Site 5A

Boring/Well Number:	Permit Number:	FDEP Facility Identification Number:
SB- 20	NA	NA

Site Name: 6511-12-054A	Borehole Start Date: 12/7/16	Borehole Start Time: 1006	☑ AM ☐ PM
SR 710 from US 441 to the L-63 Canal	End Date: 12/7/16	End Time: 1017	☑ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
TIERRA, INC.	Clare Kramer	Sammy Awad

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
TIERRA, INC.	NA	3.25	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
HA	4	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☑ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

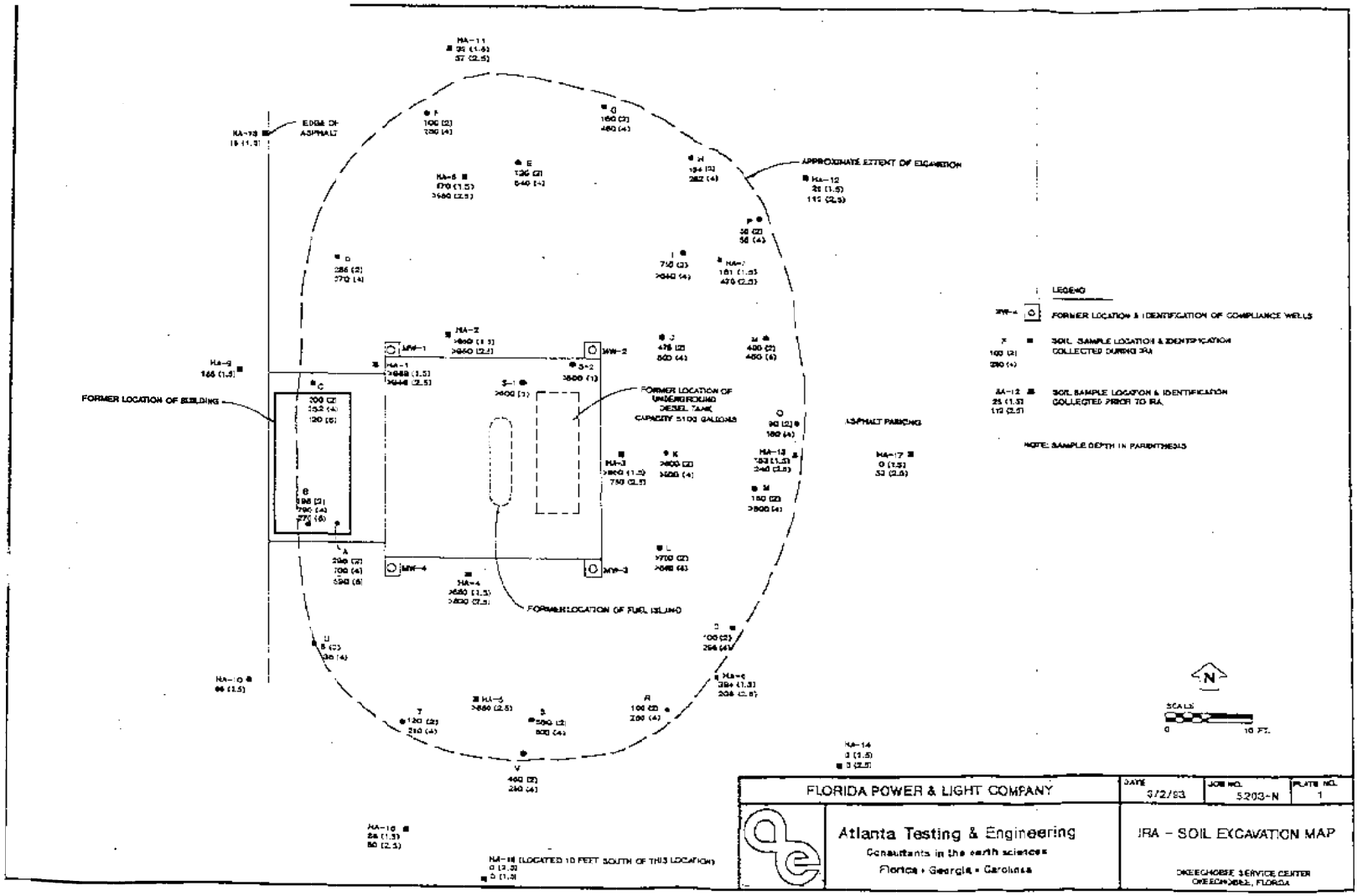
Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☑ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	SB-20						1	Gr F/S		D	SB-20 @0-5FT
							2	Br F/S			
							3	Lgt Br F/S			
							4	Gr F/S		M	
							5	EOB		S	
							6				
							7				
							8	No debris encountered			
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

END


EDGE OF ASPHALT
APPROXIMATE EXTENT OF EXCAVATION
FORMER LOCATION OF BUILDING
FORMER LOCATION OF UNDERGROUND DIESEL TANK CAPACITY 5100 GALLONS
FORMER LOCATION OF FUEL ISLAND
ASPHALT PAVING
MW-1
MW-2
MW-3
MW-4
LEGEND
FORMER LOCATION & IDENTIFICATION OF COMPLIANCE WELLS
SOIL SAMPLE LOCATION & IDENTIFICATION COLLECTED DURING IRA
SOIL SAMPLE LOCATION & IDENTIFICATION COLLECTED PRIOR TO IRA
NOTE: SAMPLE DEPTH IN PARENTHESIS
N
SCALE
0
10 FT.
FLORIDA POWER & LIGHT COMPANY
DATE 3/2/93
JOB NO. 5203-N
PLATE NO. 1
Atlanta Testing & Engineering
Consultants in the earth sciences
Florida • Georgia • Carolinas
IRA - SOIL EXCAVATION MAP
OKEECHOBEE SERVICE CENTER
OKEECHOBEE, FLORIDA

Appendix 5
Cultural Resource Assessment Survey (CRAS) of Proposed Pond Sites (April 2015) & Cultural Resource Assessment Survey (CRAS) of Preferred Pond Sites (November 2016)

CULTURAL RESOURCE ASSESSMENT SURVEY OF PREFERRED POND SITES SR 710 FROM US 441 TO THE L-63N CANAL OKEECHOBEE COUNTY, FLORIDA

Financial Project No.: 419344-3-32-01
Federal Project No.: NA

Prepared for:

Federal Highway Administration
545 John Knox Road
Suite 200
Tallahassee, Florida 32303

and the:

Florida Department of Transportation
District One
P.O. Box
Bartow, Florida 33830-1249

April 2015

CULTURAL RESOURCE ASSESSMENT SURVEY
OF PREFERRED POND SITES
SR 710 FROM US 441 TO THE L-63N CANAL
OKEECHOBEE COUNTY, FLORIDA

Financial Project No.: 419344-3-32-01
Federal Project No.: NA

Prepared for:

Federal Highway Administration
545 John Knox Road
Suite 200
Tallahassee, Florida 32303

and the:

Florida Department of Transportation
District One
P.O. Box
Bartow, Florida 33830-1249

On Behalf of:

Wantman Group, Inc.
213 South Dillard Street, Suite 210
Winter Garden, Florida 34787

Prepared by:

Archaeological Consultants, Inc.
8110 Blaikie Court, Suite A
Sarasota, Florida 34240

Marion Almy - Project Manager
Lee Hutchinson - Project Archaeologist
Katie Baar - Archaeologist
Patricia Slovinac - Historian

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PHOTOS

CULTURAL RESOURCE ASSESSMENT SURVEY OF
PREFERRED POND SITES
SR 710 FROM US 441 TO THE L-63N CANAL
OKEECHOBEE COUNTY, FLORIDA
Financial Project ID.: 419344-3-32-01
Federal Aid Project ID: NA

1. Executive Summary

Archaeological Consultants, Inc. (ACI) conducted a cultural resource assessment survey (CRAS) of 17 pond sites along the new SR 710 proposed alignment, from the intersection with US 441 to south of the L-63N Canal (Interceptor Creek), Okeechobee County, Florida (**Figure 1**). The purpose was to locate and identify any cultural resources within the area of potential effects (APE), and to assess their significance in terms of eligibility for listing at the national level in the National Register of Historic Places (NRHP). The CRAS was conducted in February 2014.

Background research indicated that no historic or prehistoric archaeological sites or historic structures were recorded within the APE, which was defined as the area contained in each pond site. As a result of field investigations, no prehistoric archaeological sites or historic structures were identified within the APE.

Based on the results of the CRAS, this undertaking will have no effect on resources listed, determined eligible, or potentially eligible for listing in the NRHP.

2. Introduction

The purpose of the survey was to locate and identify any archaeological sites and historic resources located within the APE and to assess their significance in terms of eligibility for listing in the NRHP. This work was conducted in compliance with the provision of the National Historic Preservation Act of 1966 (Public Law 89-665), as amended; The Archaeological and Historic Preservation Act (Public Law 93-291) as amended; Executive Order 11593; and Chapter 267, *Florida Statutes* (*FS).* All work was carried out in conformity with Part 2, Chapter 12 (Archaeological and Historical Resources) of the Florida Department of Transportation's (FDOT) *Project Development and Environment (PD&E) Manual* (FDOT 1999) and complies with the standards contained in the Florida Division of Historic Resources' (FDHR) *Cultural Resource Management Standards and Operational Manual* (FDHR 2003).

3. Project Description

The project is located on SR 710, in Okeechobee County, Florida. The proposed project is a new alignment that begins at the intersection with US 441 and extends south easterly to

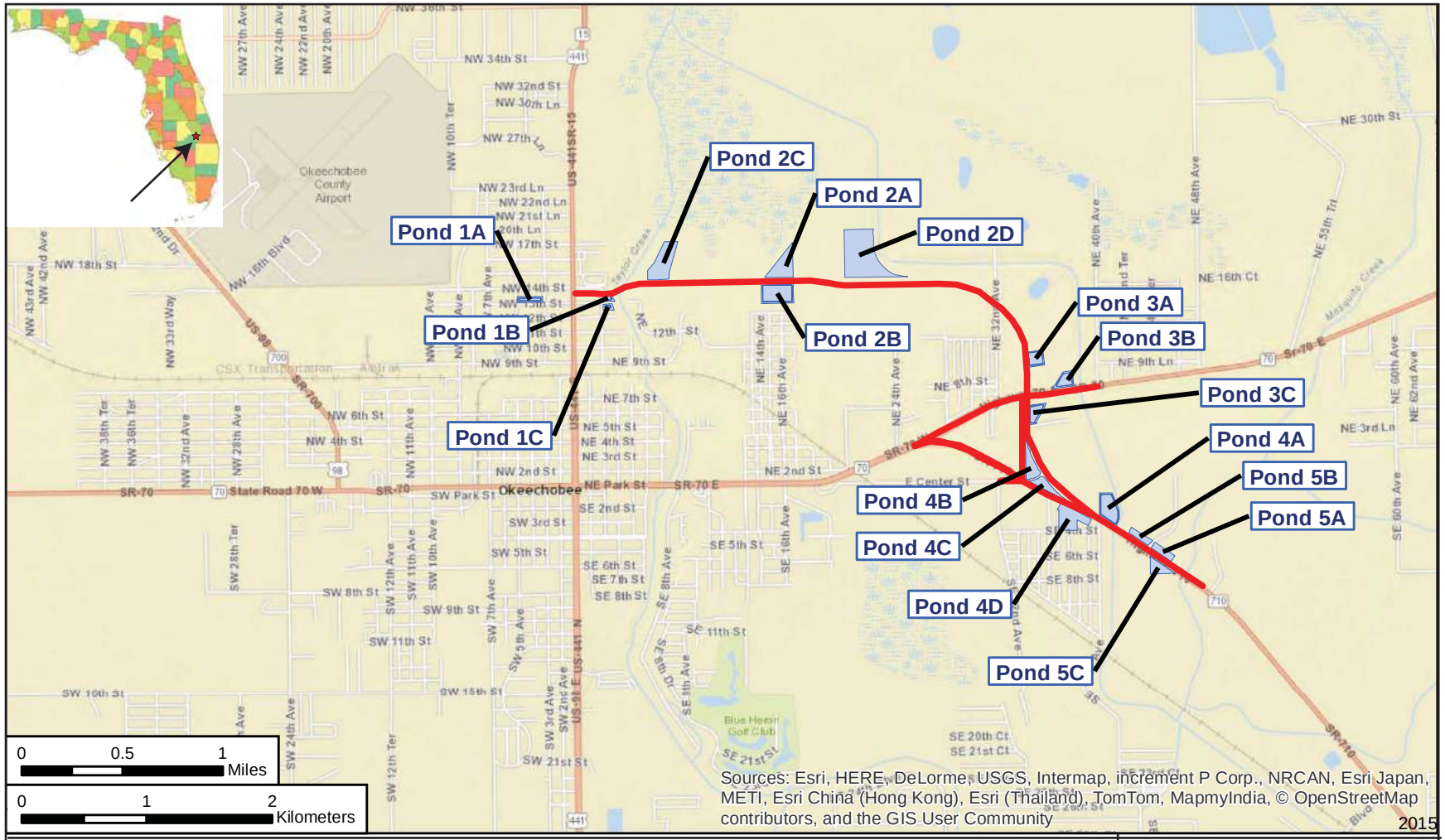


Figure 1. Location of the SR 710 preferred pond sites, Okeechobee County.

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

2

south of the L-63N Canal (Interceptor Creek), where it ties into the existing SR 710, in Okeechobee, Florida.

The new alignment of SR 710 has a total project length of approximately 3.8 miles (mi), and it is designated as an Urban and Rural Principal Arterial and a Strategic Intermodal System (SIS) facility. The existing SR 710 is currently classified by FDOT as an Access Management Class four facility. The proposed access classification for the new roadway extension is class three from US 441 to Taylor Creek and class two from Taylor Creek to SR 70, the remainder of the corridor would be classified as class three from SR 70 to Mosquito Creek. The design speed for the entire facility is 50 miles-per-hour (mph).

A four-lane high speed suburban typical section is proposed. The roadway will consist of two 12-foot (ft) wide travel lanes in each direction, separated by a raised 30-ft wide grassed median. This roadway section will also include 4-ft shoulders to the inside of the travel lanes and 6.5-ft (8-ft useable) shoulders adjacent to the outside travel lanes. Type E curb and gutter will be provided along the median and outside edges of the roadway along with a closed storm-water conveyance system. A continuous 5-ft wide concrete sidewalk will be provided on the south side of the roadway and a 10-ft wide shared-use path will be provided on the north side of the roadway. Appropriate left and/or right turn lanes will be provided at major intersections. This high-speed urban typical section has a 29-ft border width and is to be constructed within 160 ft minimum of right-of-way (ROW). The surrounding land uses consist primarily of large areas of rangeland, pastureland, residential developments, and rural residences (Wantman Group 2014).

4. Environmental Overview

This proposed undertaking is located in portions of Sections 13-16, and 24, Township 37 South, Range 35 East (**Figure 2**). Elevation of the general area is 20-25 ft above mean sea level (amsl).

Examination of the Okeechobee and Taylor Creek SE, Florida USGS quadrangle maps (USGS 1952, 1953), the *Okeechobee County Soil Survey* (United States Department of Agriculture [USDA] 1971, 2003), and a visual reconnaissance of the area revealed that the natural landscape of the survey area has somewhat been altered by development as a result of agriculture, commercial, and residential development (**Photos 1 and 2**). Based on a review of soil data prior to development (USDA 1971), the most common local soil types in the survey area was poorly drained soil of the broad flatwoods and open prairies (USDA 1971:3-4). The soil in the project APE is part of the Myakka-Basinger general soil association.

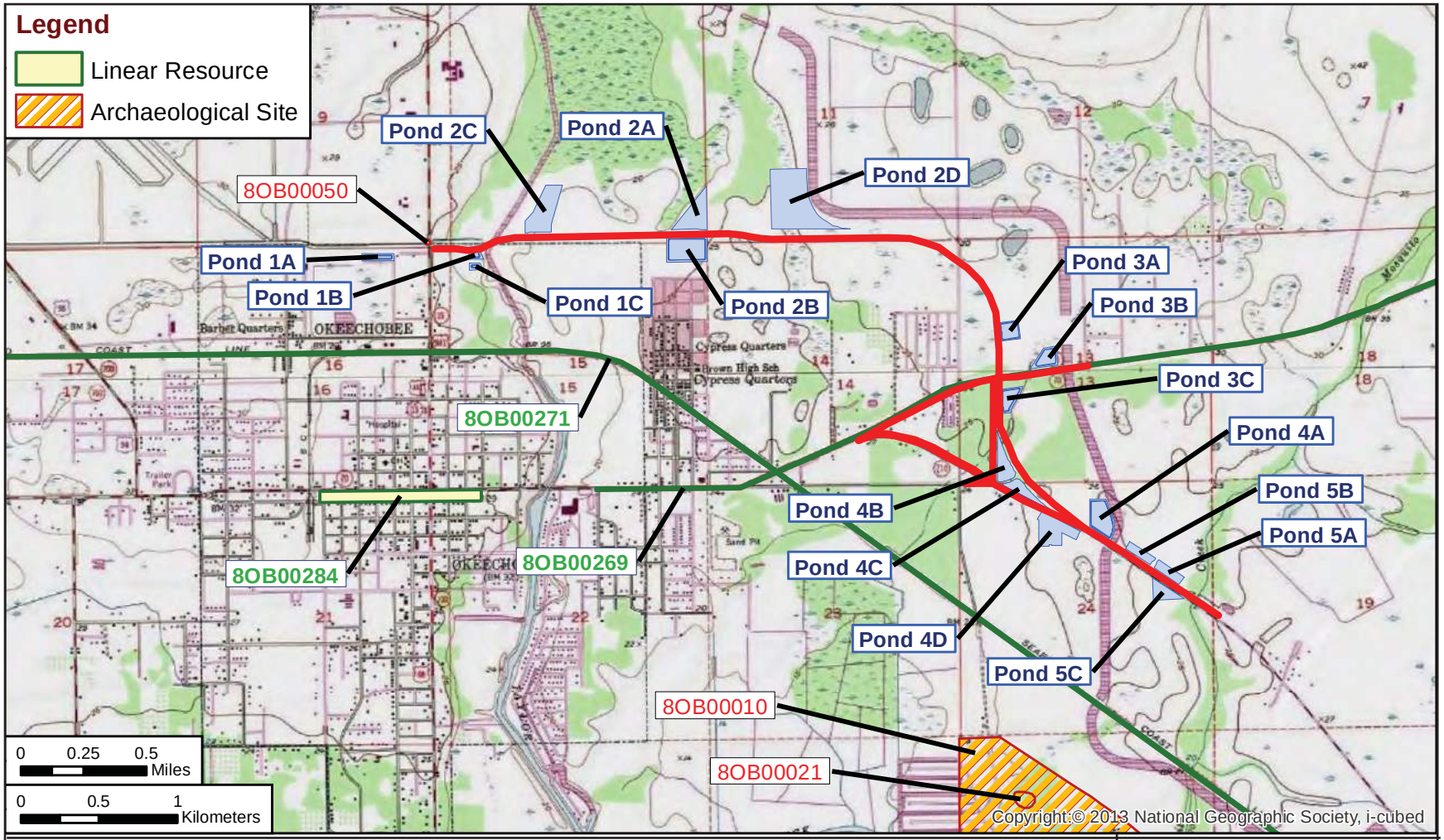


Figure 2. Environmental setting and the location of the previously recorded cultural resources within one mile of the SR 710 preferred pond sites, Township 37 South, Range 35 East, Sections 13-16 and 24; USGS Taylor Creek SE and Okeechobee.

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

Photo 1. Looking north at Pond 2A.

Photo 2. Looking southeast towards Pond 4D.

5. Prehistoric Overview

An extensive prehistoric overview was included in the CRAS for the SR 710 PD&E Study from US 441 to CR 714 (SW Martin Avenue) in Okeechobee and Martin Counties (Janus Research 2010). Therefore, the prehistory is not repeated here.

6. Archaeological Background and Considerations

Archaeological: Prior to initiating the archaeological and historical survey for this project, ACI reviewed information at the Florida Master Site File (FMSF). This was followed by a review of previous archaeological surveys in the vicinity (ACI 2005, 2006, 2007a/b, 2010; Arbuthnot and Savage 2006; Beiter 2003; Coughlin 2010; Estabrook 1992; Janus Research 2000, 2001; PBS&J 2010) including the CRAS conducted for the project area (Janus Research 2010)

and the Preliminary Pond Memorandum (ACI 2013). Although several historic and prehistoric archaeological sites are recorded within one mile of the APE (**Figure 2; Table 1**), as a result of these surveys, no significant (NRHP eligible) prehistoric or historic archaeological sites were found within the project APE.

The research also revealed that archaeological sites in the Okeechobee Basin are quite different from those in other parts of peninsula Florida. Typically, the types of sites found within the Okeechobee Basin include earthworks, burial mounds, and habitation mounds or middens. Among the more spectacular sites are large earthworks found in the open savannah, often bordering creeks or major environmental zones. Earthwork types include circular ditches, linear embankments, and combined mound and midden embankments. However, this research identified no prehistoric archaeological resources within or near the proposed undertaking.

The data demonstrated that archaeological sites in Okeechobee County near and within the APE would most likely be located on better drained to somewhat poorly drained soils near a permanent or semi-permanent source of potable water such as seasonal depressions, sloughs, and ponds where foods such as fish, shellfish, and aquatic plants are readily accessible. The data also suggested that because of the urban setting and disturbances caused by the infrastructure, including buried cables, ditches, and other utilities, the potential for sites was very low.

Table 1. Previously recorded cultural resources within one mile.

Site No.	Site Name	Site Type	Cultural Period	NRHP Eligible	Recorder
8OB10	Okeechobee Battlefield	Military	American Historic 1821-45	NRHP Eligible	Carr 1975
8OB21	Hazelieff	Artifact Scatter; Historic Refuse	Belle Glade; American Late 19th, Early 20 Century	Not Evaluated	AHC 1987
8OB50	City Limits	Single Artifact	Unknown	Ineligible	Janus Research 1995
8OB269	Okeechobee Road	Linear Resource	American 19th Century	Ineligible	ACI 2007a, b, 2010; Janus Research 2010
8OB271	Seaboard Airline Railroad	Railroad	American 20th Century	NRHP Eligible	Janus Research 2010
8OB284	Flagler Park	Historic Landscape	American 20th Century	Ineligible	PBS&J 2010

Historic: Finally, although no historic archaeological sites were anticipated, portions of SR 70, adjacent to the APE, has been recorded in the FMSF (Okeechobee Road, 8OB269). As noted in **Figure 2**, Proposed Pond 3B is adjacent to 8OB269, and Proposed Pond 3C is south of the resource **(Figure 2; Table 1;** ACI 2006, 2007). The FMSF form for 8OB269 was updated in 2010 (Janus Research 2010), and the State Historic Preservation Office (SHPO) determined the resource was not eligible for listing in the NRHP. Therefore, no update was required during this survey.

7. Methods

Archaeological field survey methods: included both ground surface reconnaissance and judgmental subsurface shovel testing. To the extent possible, each shovel test pit measured .5 m

(20 inches [in]) in diameter and was dug to a depth of 1 m (3.3 ft) unless impeded by water. Soil from each test pit was screened through a 6.3 millimeter (mm) (.25 in) mesh hardware cloth to maximize the recovery of artifacts. The location of all shovel tests was plotted on the aerials, and, following the recording of relevant data such as stratigraphic profile, all test pits were refilled.

Interviews: One informant interview was conducted with the property owners of the area contained in Pond 5B, Jerry and Nancy Jolicoeur. They stated no archaeological material has ever been recovered from their land and they have not heard of anyone else finding artifacts on their property or in the general area (Jolicoeur 2014).

Laboratory Methods: No artifacts were found, therefore no laboratory or curation methods are included.

Curation of all project related materials (field notes, photos, maps, etc.) will take place at ACI in Sarasota, pending transfer to a FDOT designated repository. In addition, a copy of the CRAS report and Survey Log will be curated and on file at the FDHR in Tallahassee.

Unexpected Discoveries: If human burial sites such as Indian mounds, lost historic and prehistoric cemeteries, or other unmarked burials or associated artifacts were found, then the provisions and guidelines set forth in Chapter 872.05, *F.S.* (Florida's Unmarked Burial Law) would be followed. However, it was not anticipated that such sites would be found during survey.

8. Results and Summary

Archaeological Results: As a result of the archaeological field survey, 54 shovel test pits (TP) were placed judgmentally in 16 of the 17 pond sites (**Figures 3, 4; Table 2**). None of the TPs was positive and the soil stratigraphy was variable. Sample stratigraphy consisted of: 0-30 cm (0-12 in) of grey sand, 30-80 cm (12-31 in) of light grey/tan sand, and 80-100 cm (31-39 in) of dark brown hardpan; 0-50 cm (0-20 in) of black sandy-clay muck, 50-70 cm (20-28 in) of wet grey sand, and 70-100+ cm (28-39 in) of water; and 0-35 cm (0-14 in) of very dark grey/brown loam; 35-70 cm (13-28 in) of mottled grey/brown sandy loam, and 70-100 cm (28-39 in) of mottled light grey/brown sandy loam. The one pond (2D) not tested will be once the preferred ponds are chosen.

Historical Results: As a result of field survey and a visual reconnaissance, no historic structures were found to be located within the APE. This is in keeping with the background research.

Summary: As a result of background results and archaeological field survey, no prehistoric or historic sites were found within any of the 16 pond sites tested (APE). In addition, the proposed undertaking also will not impact that portion of SR 70 (8OB269) previously recorded adjacent to the project APE; this resource is not considered eligible for listing in the NRHP.

Table 2. Archaeological data.

Pond ID.	Acres	Soil Type, Elevation, Drainage, and Environmental Association	*ZAPs/Comments	Test Pits
1A	2.238	Immokalee fine sand: Nearly level, poorly drained in broad flatwoods	Low	2
1B	1.203	Manatee, Delray, and Okeelanta soils Nearly level, very poorly drained on marshy plains	Low	1
1C	.9290	Manatee, Delray, and Okeelanta soils Nearly level, very poorly drained on marshy plains	Low	1
2A	14.227	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate	6
2B	15.372	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate	8
2C	6.864	Pompano fine sand Nearly level, poorly drained in grassy sloughs and depressions	Low	4
2D	28	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate	0
3A	4.181	Basinger and Pompano fine sands Nearly level, poorly drained, in sloughs and isolated depressions in the flatwoods Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Low	3
3B	7.244	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Low	3
3C	5.778	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Low; a portion previously tested with negative results (Janus Research 2010)	2
4A	7.882	Myakka fine sand: Nearly level, poorly drained in broad flatwoods Placid fine sand: Nearly level, very poorly drained in low areas	Low	3
4B	8.168	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate	4
4C	Combined with 4B	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate; dilapidated sheds, ca. 1990 (not historic)	4
4D	8.616	Myakka fine sand: Nearly level, poorly drained in broad flatwoods Immokalee fine sand: Nearly level, poorly drained in broad flatwoods	Low	4
5A	2.624	Immokalee fine sand: Nearly level, poorly drained in broad flatwoods	Low	2
5B	2.534	Immokalee fine sand: Nearly level, poorly drained in broad flatwoods	Moderate	4
5C	3.528	Immokalee fine sand: Nearly level, poorly drained in broad flatwoods	Low	3

* Zone of Archaeological Potential

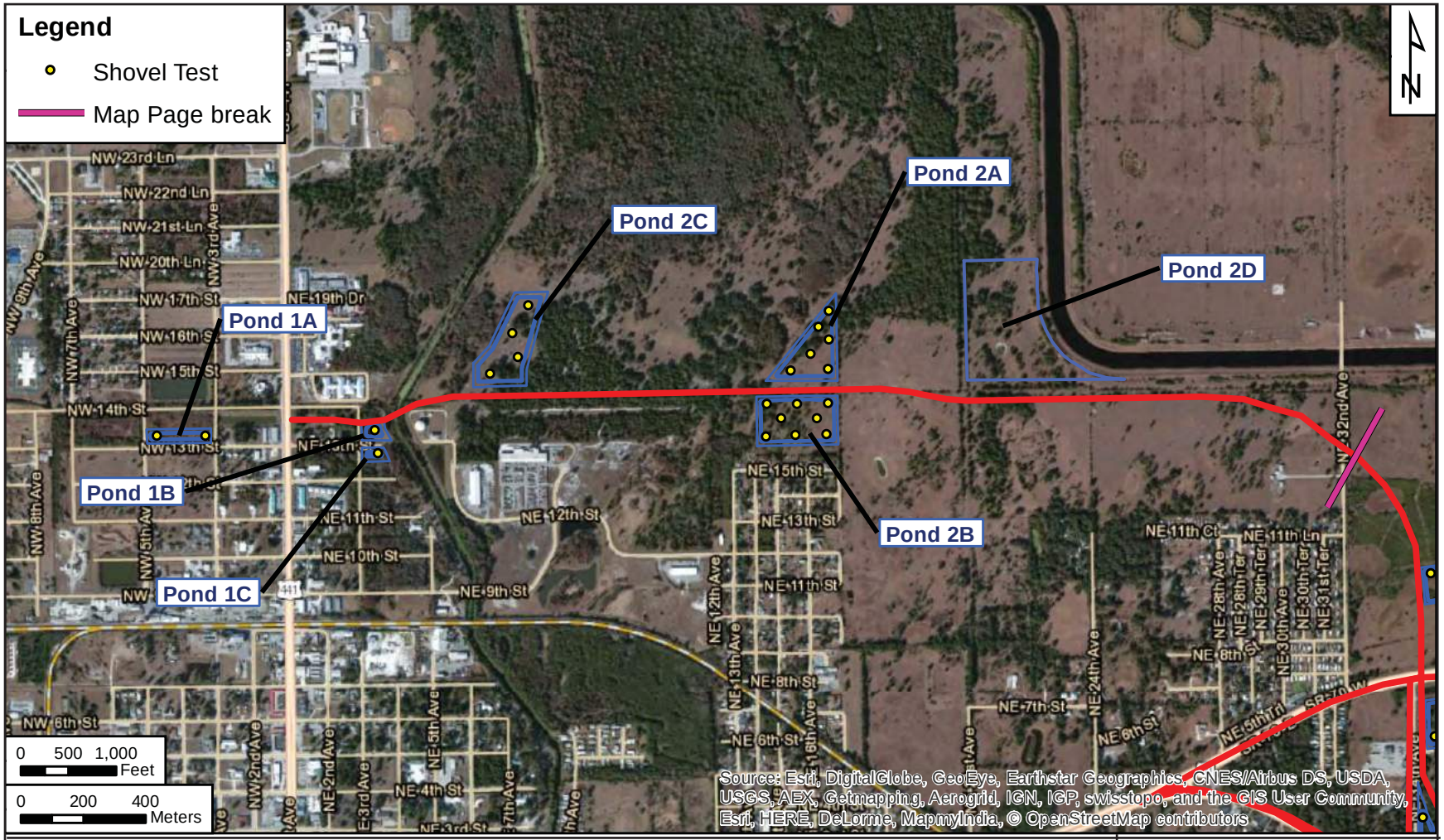


Figure 3. Location of shovel tests (not to scale) within the SR 710 preferred pond sites. Pond 2D will be tested after preferred ponds are chosen.

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

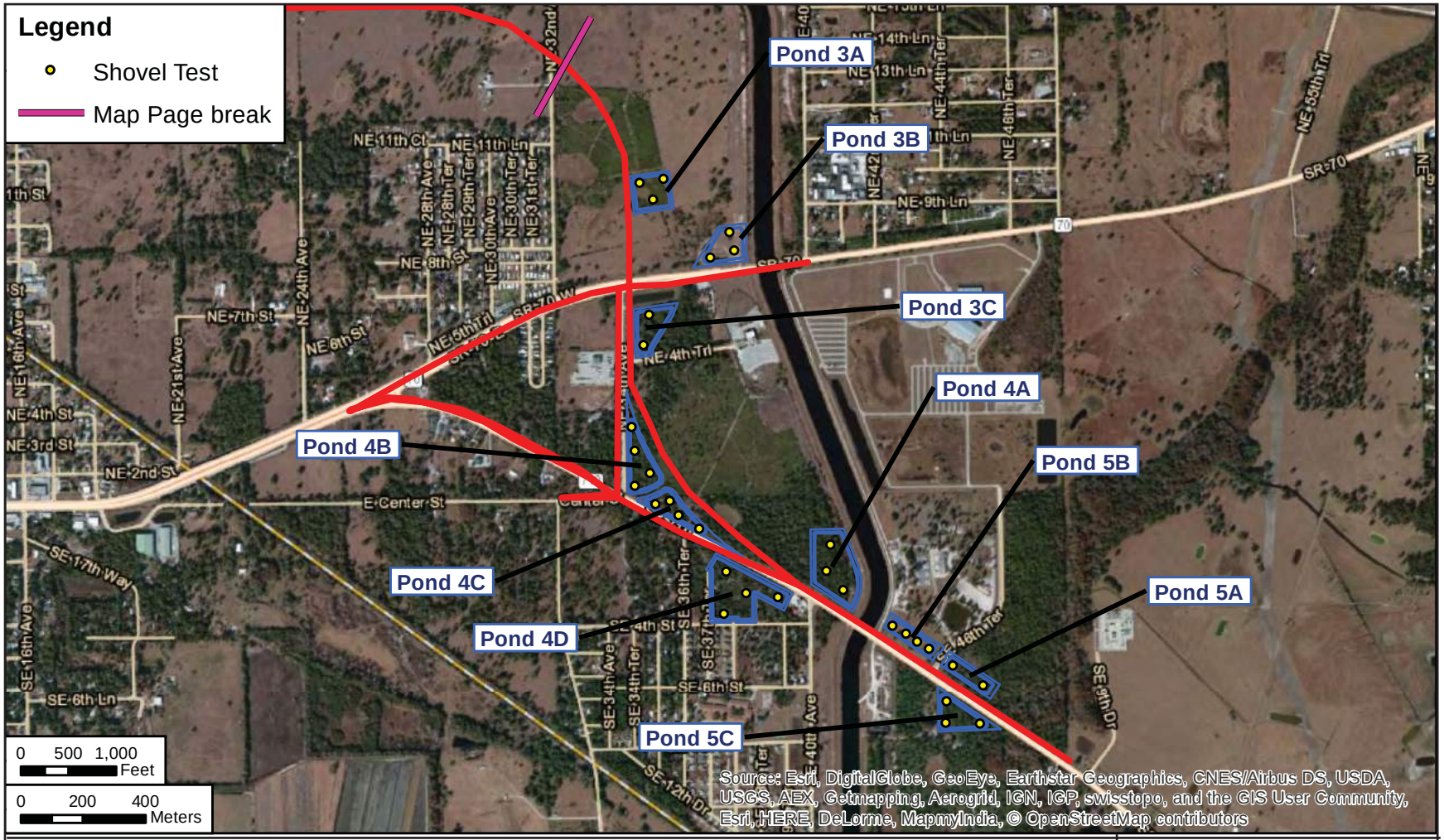


Figure 4. Location of shovel tests (not to scale) within the SR 710 preferred pond sites.

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

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Wantman Group, Inc.
2014 Project Description for Pond Sites Provided to ACI, Sarasota.

Ent D (FMSF only)_____

Survey Log Sheet

Florida Master Site File
Version 4.1 1/07

Survey # (FMSF only) _____

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (name and project phase) SR 710 Ponds, Phase I

Report Title (exactly as on title page) Cultural Resource Assessment Survey of Preferred Pond Sites, SR 710 from US 441 to the L-63N Canal, Okeechobee County, Florida; FPID No.: 419344-3-32-01; FAP No.: NA

Report Authors (as on title page, last names first) 1. ACI 3. _____ 2. _____ 4. _____

Publication Date (year) 2014 **Total Number of Pages in Report** (count text, figures, tables, not site forms) 15

Publication Information (Give series, number in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)
P12087, ACI, Sarasota

Supervisors of Fieldwork (even if same as author) Names Almy, Marion

Affiliation of Fieldworkers: Organization Archaeological Consultants Inc City Sarasota

Key Words/Phrases (Don't use county name, or common words like *archaeology*, *structure*, *survey, architecture, etc.*)

1. _____ 3. _____ 5. _____ 7. _____
2. _____ 4. _____ 6. _____ 8. _____

Survey Sponsors (corporation, government unit, organization or person directly funding fieldwork)

Name Wantman Group Organization _____

Address/Phone/E-mail 213 South Dillard Street, Suite 210 Winter Garden, Florida 34787

Recorder of Log Sheet Lee Hutchinson **Date Log Sheet Completed** 3-4-2014

Is this survey or project a continuation of a previous project? ☒ No ☐ Yes: **Previous survey #s (FMSF only)** _____

Mapping

Counties (List each one in which field survey was done; attach additional sheet if necessary)

1. Okeechobee 3. _____ 5. _____
2. _____ 4. _____ 6. _____

USGS 1:24,000 Map Names/Year of Latest Revision (attach additional sheet if necessary)

1. Name SEARS Year 1958 4. Name _____ Year _____
2. Name _____ Year _____ 5. Name _____ Year _____
3. Name _____ Year _____ 6. Name _____ Year _____

Description of Survey Area

Dates for Fieldwork: Start 2-26-2014 End 2-28-2014 **Total Area Surveyed** (fill in one) _____ hectares 116.38 acres

Number of Distinct Tracts or Areas Surveyed 17

If Corridor (fill in one for each) **Width:** _____ meters _____ feet **Length:** _____ kilometers _____ miles

Survey Log Sheet

Survey #_____

Research and Field Methods

Types of Survey (check all that apply): ☒archaeological ☒architectural ☒historical/archival ☐underwater
☐damage assessment ☐monitoring report ☐other(describe): _____

Scope/Intensity/Procedures background research, systematic and judgmental subsurface testing, 1 m deep, 50 cm diameter, 6.4 mm mesh screen; all sterile; photos taken, tech memo prepared

Preliminary Methods (check as many as apply to the project as a whole)

☐Florida Archives (Gray Building)	☐library research- *local public*	☐local property or tax records	☒other historic maps
☐Florida Photo Archives (Gray Building)	☐library-special collection - *nonlocal*	☐newspaper files	☒soils maps or data
☒Site File property search	☒Public Lands Survey (maps at DEP)	☒literature search	☒windshield survey
☒Site File survey search	☐local informant(s)	☐Sanborn Insurance maps	☒aerial photography

☐other (describe): _____

Archaeological Methods (check as many as apply to the project as a whole)

☐Check here if **NO** archaeological methods were used.

☐surface collection, controlled	☐shovel test-other screen size	☐block excavation (at least 2x2 m)
☐surface collection, **un**controlled	☐water screen	☐soil resistivity
☒shovel test-1/4"screen	☐posthole tests	☐magnetometer
☐shovel test-1/8" screen	☐auger tests	☐side scan sonar
☐shovel test 1/16"screen	☐coring	☒pedestrian survey
☐shovel test-unscreened	☐test excavation (at least 1x2 m)	☐unknown

☐other (describe): _____

Historical/Architectural Methods (check as many as apply to the project as a whole)

☐Check here if **NO** historical/architectural methods were used.

☐building permits	☐demolition permits	☐neighbor interview	☐subdivision maps
☐commercial permits	☒exposed ground inspected	☐occupant interview	☐tax records
☐interior documentation	☐local property records	☐occupation permits	☐unknown

☐other (describe): _____

Survey Results (cultural resources recorded)

Site Significance Evaluated? ☐Yes ☒No

Count of Previously Recorded Sites 0 **Count of Newly Recorded Sites** 0

Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8". Attach additional pages if necessary.) n/a

Newly Recorded Site #'s (Are all originals and not updates? List site #'s without "8". Attach additional pages if necessary.) n/a

Site Forms Used: ☐Site File Paper Form ☒Site File Electronic Recording Form

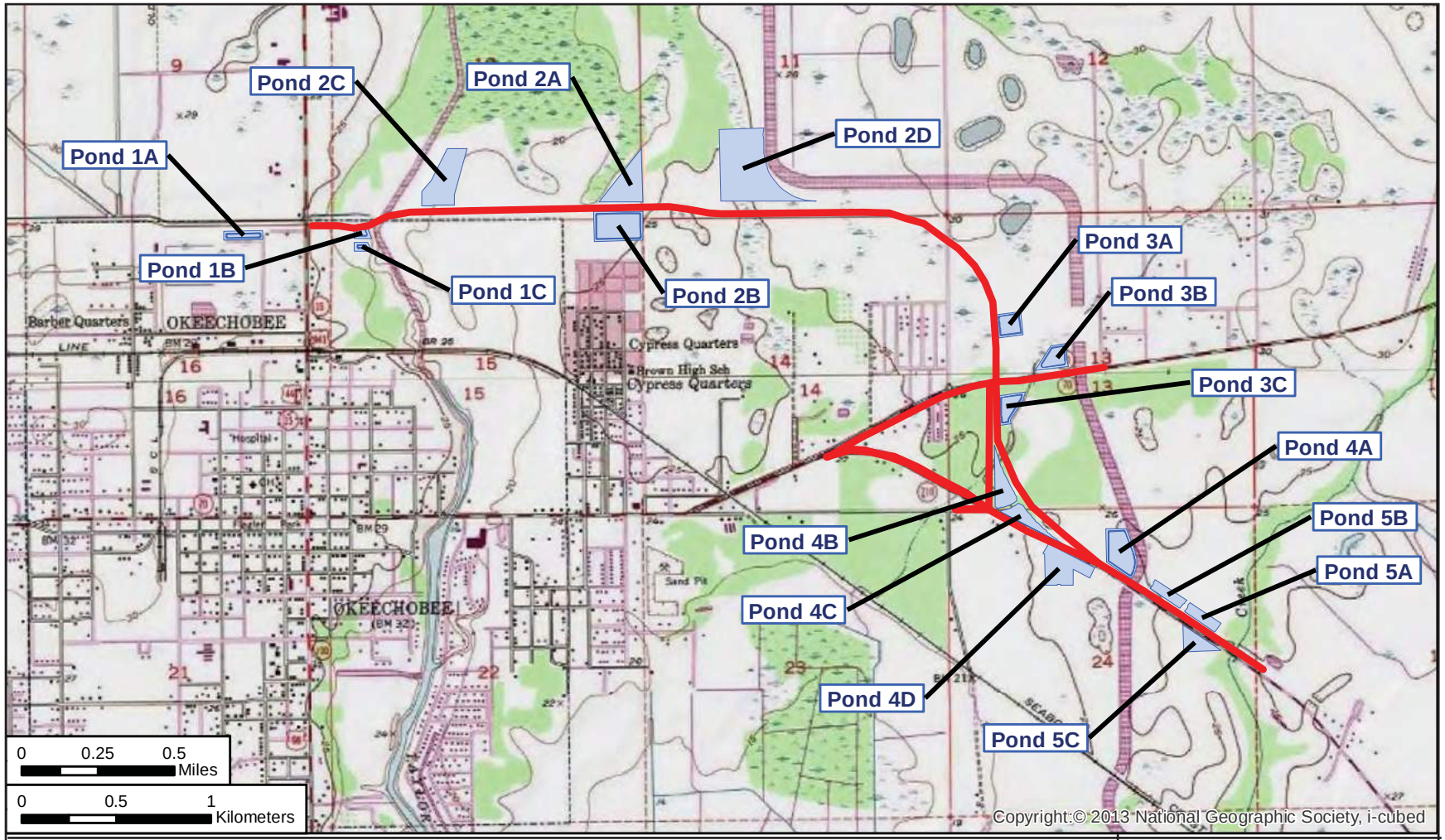
*****REQUIRED: ATTACH PLOT OF SURVEY AREA ON PHOTOCOPY OF USGS 1:24,000 MAP(S)*****

SHPO USE ONLY	SHPO USE ONLY	SHPO USE ONLY

Origin of Report: ☐872 ☐CARL ☐UW ☐1A32 # _____ ☐Academic ☐Contract ☐Avocational
☐Grant Project # _____ ☐Compliance Review: CRAT # _____

Type of Document: ☐Archaeological Survey ☐Historical/Architectural Survey ☐Marine Survey ☐Cell Tower CRAS ☐Monitoring Report
☐Overview ☐Excavation Report ☐Multi-Site Excavation Report ☐Structure Detailed Report ☐Library, Hist. or Archival Doc
☐MPS ☐MRA ☐TG ☐Other: _____

Document Destination: _____ **Plotability:** _____



SR 710 preferred pond sites
Township 37 South, Range 35 East, Sections 13-16 and 24
USGS Taylor Creek SE and Okeechobee
Okeechobee County

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

CULTURAL RESOURCE ASSESSMENT SURVEY OF PREFERRED POND SITES SR 710 FROM US 441 TO THE L-63N CANAL OKEECHOBEE COUNTY, FLORIDA

Financial Project No.: 419344-3-32-01
Federal Project No.: NA

Prepared for:

Federal Highway Administration
545 John Knox Road
Suite 200
Tallahassee, Florida 32303

and the:

Florida Department of Transportation
District One
P.O. Box
Bartow, Florida 33830-1249

November 2016

CULTURAL RESOURCE ASSESSMENT SURVEY OF PREFERRED POND SITES SR 710 FROM US 441 TO THE L-63N CANAL OKEECHOBEE COUNTY, FLORIDA

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District One
P.O. Box
Bartow, Florida 33830-1249

On Behalf of:

Wantman Group, Inc.
213 South Dillard Street, Suite 210
Winter Garden, Florida 34787

Prepared by:

Archaeological Consultants, Inc.
8110 Blaikie Court, Suite A
Sarasota, Florida 34240

Marion Almy - Project Manager
Lee Hutchinson - Project Archaeologist
Katie Baar - Archaeologist
Thomas Wilson - Historian

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PHOTOS

CULTURAL RESOURCE ASSESSMENT SURVEY OF
PREFERRED POND SITES
SR 710 FROM US 441 TO THE L-63N CANAL
OKEECHOBEE COUNTY, FLORIDA
Financial Project ID.: 419344-3-32-01
Federal Aid Project ID: NA

1. Executive Summary

Archaeological Consultants, Inc. (ACI) conducted a cultural resource assessment survey (CRAS) of five preferred pond sites located along a new SR 710 proposed alignment, from the intersection with US 441 to south of the L-63N Canal (Interceptor Creek), Okeechobee County, Florida (**Figure 1**). The purpose of the assessment was to locate and identify any cultural resources within the area of potential effects (APE), and to assess their significance in terms of eligibility for listing at the national level in the National Register of Historic Places (NRHP).

Background research indicated that no historic or prehistoric archaeological sites or historic structures were recorded within the APE. The archaeological and historic APE is defined as the area contained within each pond site. As a result of field investigations, no prehistoric archaeological sites or historic buildings or structures were identified within the APE.

Based on the results of the CRAS, this undertaking will have no effect on resources listed, determined eligible, or potentially eligible for listing in the NRHP.

2. Introduction

The purpose of the survey was to locate and identify any archaeological sites and historic resources located within the APE and to assess their significance in terms of eligibility for listing in the NRHP. This work was conducted in compliance with the provision of the National Historic Preservation Act of 1966 (Public Law 89-665), as amended; The Archaeological and Historic Preservation Act (Public Law 93-291) as amended; Executive Order 11593; and Chapter 267, *Florida Statutes* (*FS).* All work was carried out in conformity with Part 2, Chapter 12 (Archaeological and Historical Resources) of the Florida Department of Transportation's (FDOT) *Project Development and Environment (PD&E) Manual* (FDOT 2016) and complies with the standards contained in the Florida Division of Historic Resources' (FDHR) *Cultural Resource Management Standards and Operational Manual* (FDHR 2003).

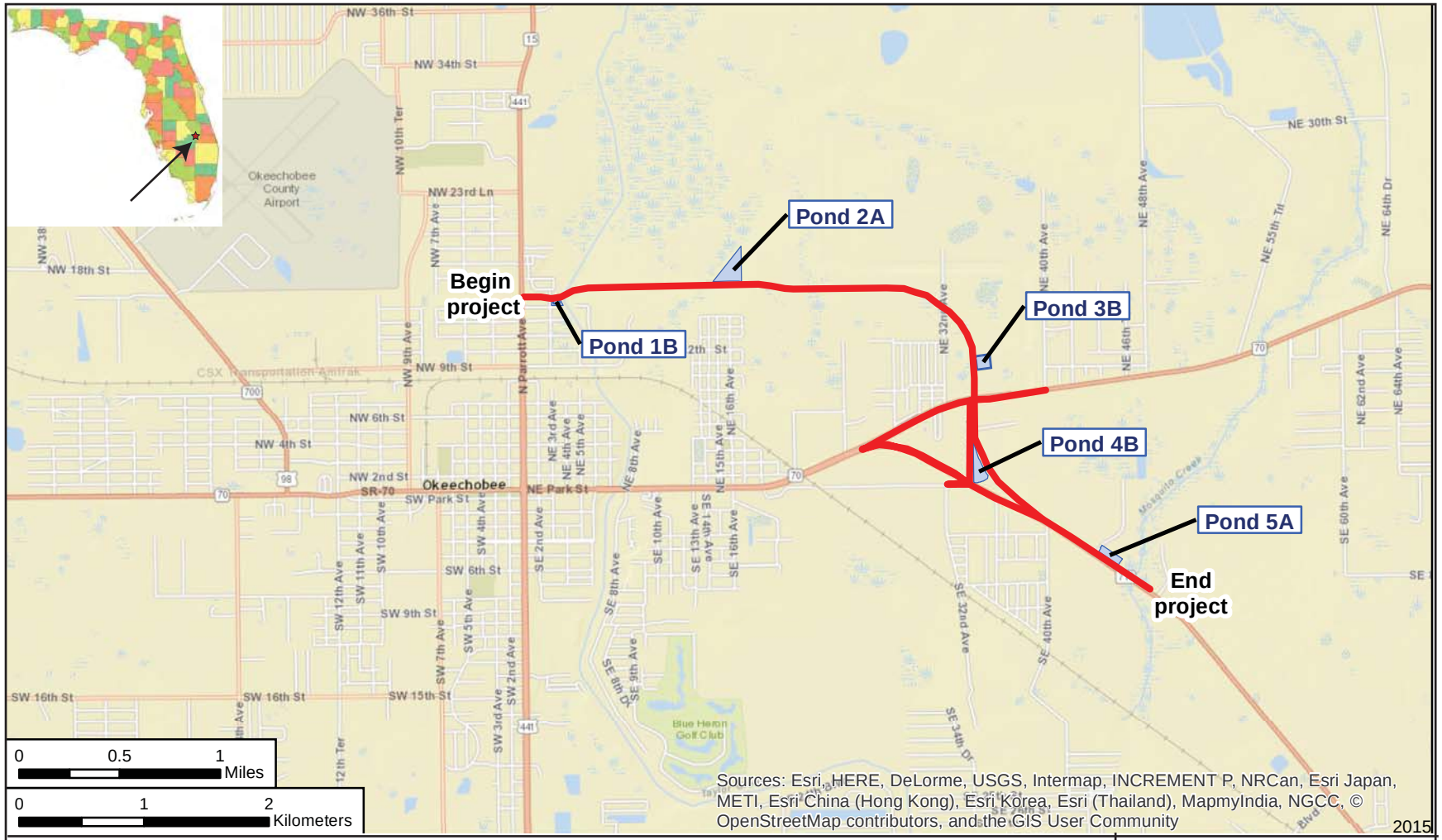

Figure 1. Location of the SR 710 preferred pond sites, Okeechobee County.

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

2

3. Project Description

The project is located on SR 710 in Okeechobee County, Florida. The proposed project is a new alignment that begins at the intersection with US 441 and extends south easterly to south of the L-63N Canal (Interceptor Creek), where it ties into the existing SR 710 in Okeechobee, Florida.

The new alignment of SR 710 is approximately 3.8 miles (mi) in length, and it is designated as an Urban and Rural Principal Arterial and a Strategic Intermodal System (SIS) facility. The existing SR 710 is currently classified by FDOT as an Access Management Class four facility. The proposed access classification for the new roadway extension is class three from US 441 to Taylor Creek and class two from Taylor Creek to SR 70, the remainder of the corridor would be classified as class three from SR 70 to Mosquito Creek. The design speed for the entire facility is 50 miles-per-hour (mph).

A four-lane high speed suburban typical section is proposed. The roadway will consist of two 12-foot (ft) wide travel lanes in each direction, separated by a raised 30-ft wide grassed median. This roadway section will also include 4-ft shoulders to the inside of the travel lanes and 6.5-ft (8-ft useable) shoulders adjacent to the outside travel lanes. Type E curb and gutter will be provided along the median and outside edges of the roadway along with a closed storm-water conveyance system. A continuous 5-ft wide concrete sidewalk will be provided on the south side of the roadway and a 10-ft wide shared-use path will be provided on the north side of the roadway. Appropriate left and/or right turn lanes will be provided at major intersections. This high-speed urban typical section has a 29-ft border width and is to be constructed within 160 ft minimum of right-of-way (ROW). The surrounding land uses consist primarily of large areas of rangeland, pastureland, residential developments, and rural residences (Wantman Group 2014).

4. Environmental Overview

The proposed undertaking is located in portions of Sections 13-16, and 24, Township 37 South, Range 35 East (**Figure 2**). Elevation of the general area is 20-25 ft above mean sea level (amsl).

Examination of the Okeechobee and Taylor Creek SE, Florida United States Geological Survey (USGS) quadrangle maps (USGS 1952, 1953), the *Okeechobee County Soil Survey* (United States Department of Agriculture [USDA] 1971, 2003), and a visual reconnaissance of the area revealed that the natural landscape of the survey area has somewhat been altered by development as a result of agriculture, commercial, and residential development (**Photos 1 and 2**). Based on a review of soil data prior to development (USDA 1971), the most common local soil types in the survey area was poorly drained soil of the broad flatwoods and open prairies (USDA 1971:3-4). The soil in the project APE is part of the Myakka-Basinger general soil association.

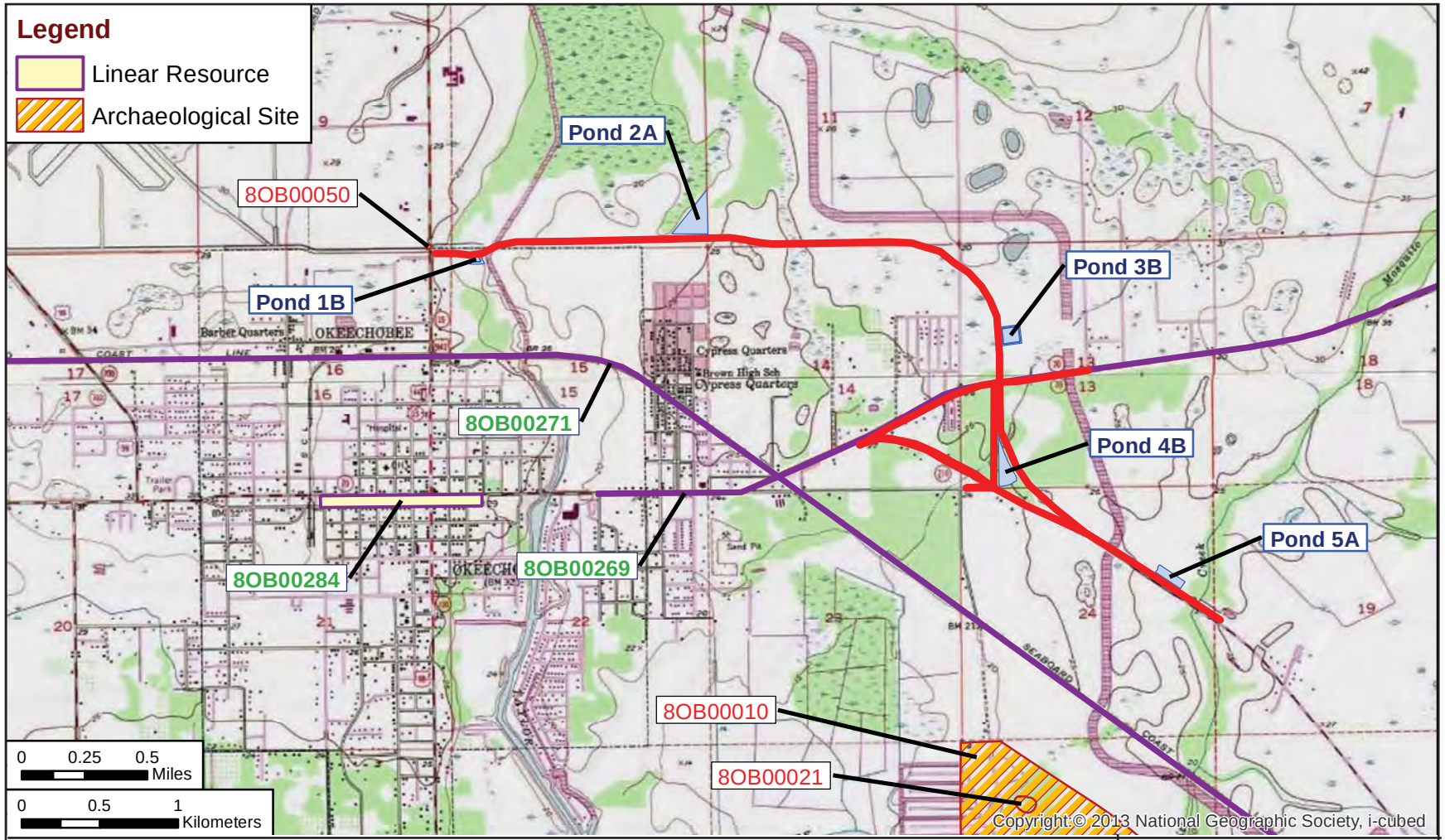

Figure 2. Environmental setting and the location of the previously recorded cultural resources within one mile of the SR 710 preferred pond sites, Township 37 South, Range 35 East, Sections 13-16 and 24; USGS Taylor Creek SE and Okeechobee.

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
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FPID No. 419344-3-32-01
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Photo 1. Looking north at Pond 2A.

Photo 2. Looking northwest at Pond 5A.

5. Prehistoric Overview

An extensive prehistoric overview was included in the CRAS for the SR 710 PD&E Study from US 441 to CR 714 (SW Martin Avenue) in Okeechobee and Martin Counties (Janus Research 2010). Therefore, the prehistory is not repeated here.

6. Archaeological Background and Considerations

Archaeological: Prior to initiating the archaeological and historical survey for this project, ACI reviewed information at the Florida Master Site File (FMSF). This was followed by a review of previous archaeological surveys in the vicinity (ACI 2005, 2006, 2007a/b, 2010; Arbuthnot and Savage 2006; Beiter 2003; Coughlin 2010; Estabrook 1992; Janus Research 2000, 2001; PBS&J 2010) including the CRAS conducted for the project area (Janus Research 2010) the Preliminary Pond Memorandum (ACI 2013), and a technical memorandum of 17 pond sites (ACI 2015). Although several historic and prehistoric archaeological sites are recorded within one mile of the APE (**Figure 2; Table 1**), as a result of these surveys, no significant (NRHP eligible) prehistoric or historic archaeological sites were found within the project APE.

The research also revealed that archaeological sites in the Okeechobee Basin are quite different from those in other parts of peninsula Florida. Typically, the types of sites found within the Okeechobee Basin include earthworks, burial mounds, and habitation mounds or middens. Among the more spectacular sites are large earthworks found in the open savannah, often bordering creeks or major environmental zones. Earthwork types include circular ditches, linear embankments, and combined mound and midden embankments. However, this research identified no prehistoric archaeological resources within or near the proposed undertaking.

Prehistoric settlement data demonstrates that archaeological sites in Okeechobee County near and within the APE would most likely be located on better drained to somewhat poorly drained soils near a permanent or semi-permanent source of potable water such as seasonal depressions, sloughs, and ponds where foods such as fish, shellfish, and aquatic plants are readily accessible. The data also suggest that because of the urban setting and disturbances caused by the infrastructure, including buried cables, ditches, and other utilities, the potential for sites was very low.

Table 1. Previously recorded cultural resources within one mile.

Site No.	Site Name	Site Type	Cultural Period	NRHP Eligible	Recorder
8OB00010	Okeechobee Battlefield	Military	American Historic 1821-45	NRHP Eligible	Carr 1975
8OB00021	Hazelieff	Artifact Scatter; Historic Refuse	Belle Glade; American Late 19th, Early 20 Century	Not Evaluated	AHC 1987
8OB00050	City Limits	Single Artifact	Unknown	Ineligible	Janus Research 1995
8OB00269	Okeechobee Road	Linear Resource	American 19th Century	Ineligible	ACI 2007a, b, 2010; Janus Research 2010
8OB00271	Seaboard Airline Railroad	Railroad	American 20th Century	NRHP Eligible	Janus Research 2010
8OB00284	Flagler Park	Historic Landscape	American 20th Century	Ineligible	PBS&J 2010

Historic: Although no historic archaeological sites were anticipated, portions of SR 70, adjacent to the APE, have been recorded in the FMSF (Okeechobee Road, 8OB00269). As noted in **Figure 2**, Pond 3C is south of this linear resource **(Figure 2; Table 1;** ACI 2006, 2007). The FMSF form for 8OB00269 was updated in 2010 (Janus Research 2010), and the State Historic Preservation Office (SHPO) determined the resource was not eligible for listing in the NRHP. Therefore, no update was required during this survey.

7. Methods

Archaeological field survey methods: included both ground surface reconnaissance and judgmental subsurface shovel testing. To the extent possible, each shovel test pit measured .5 meter (m) (20 inches [in]) in diameter and was dug to a depth of 1 m (3.3 ft) unless impeded by water. Soil from each test pit was screened through a 6.3 millimeter (mm) (.25 in) mesh hardware cloth to maximize the recovery of artifacts. The location of all shovel tests was plotted on the aerials, and, following the recording of relevant data such as stratigraphic profile, all test pits were refilled.

Interviews: No interviews were conducted in relation to any of the five preferred pond sites.

Laboratory Methods: No artifacts were found, therefore no laboratory or curation methods are included.

Curation of all project related materials (field notes, photos, maps, etc.) will take place at ACI (P12087) in Sarasota, pending transfer to a FDOT designated repository. In addition, a copy of the CRAS report and Survey Log will be curated and on file at the FDHR in Tallahassee.

Unexpected Discoveries: If human burial sites such as Indian mounds, lost historic and prehistoric cemeteries, or other unmarked burials or associated artifacts were found, then the provisions and guidelines set forth in Chapter 872.05, *FS* (Florida's Unmarked Burial Law) would be followed. However, it was not anticipated that such sites would be found during survey.

8. Results and Summary

Archaeological Results: As a result of the archaeological field survey, 16 shovel test pits (TP) were placed judgmentally in the pond sites (**Figures 3, 4; Table 2**). None of the TPs was positive and the soil stratigraphy was variable. Sample stratigraphy consisted of: 0-30 cm (0-12 in) of grey sand, 30-80 cm (12-31 in) of light grey/tan sand, and 80-100 cm (31-39 in) of dark brown hardpan; 0-50 cm (0-20 in) of black sandy-clay muck, 50-70 cm (20-28 in) of wet grey sand, and 70-100+ cm (28-39 in) of water; and 0-35 cm (0-14 in) of very dark grey/brown loam; 35-70 cm (13-28 in) of mottled grey/brown sandy loam, and 70-100 cm (28-39 in) of mottled light grey/brown sandy loam.

Historical Results: As a result of field survey, including a visual reconnaissance, no historic structures were found to be located within the APE. This is in keeping with the background research.

Summary: As a result of background results and archaeological field survey, no prehistoric or historic sites were found within any of the five pond sites tested (APE). In addition, the proposed undertaking also will not impact that portion of SR 70 (8OB00269) previously recorded adjacent to the project APE; this resource is not considered eligible for listing in the NRHP.

Table 2. Archaeological data.

Pond ID.	Acres	Soil Type, Elevation, Drainage, and Environmental Association	*ZAPs/Comments	Test Pits
1B	1.203	Manatee, Delray, and Okeelanta soils Nearly level, very poorly drained on marshy plains	Low	1
2A	14.227	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate	6
3B	4.181	Basinger and Pompano fine sands Nearly level, poorly drained, in sloughs and isolated depressions in the flatwoods Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Low	3
4B	8.168	Immokalee fine sand Nearly level, poorly drained in broad flatwoods	Moderate	4
5A	2.624	Immokalee fine sand: Nearly level, poorly drained in broad flatwoods	Low	2

* Zone of Archaeological Potential

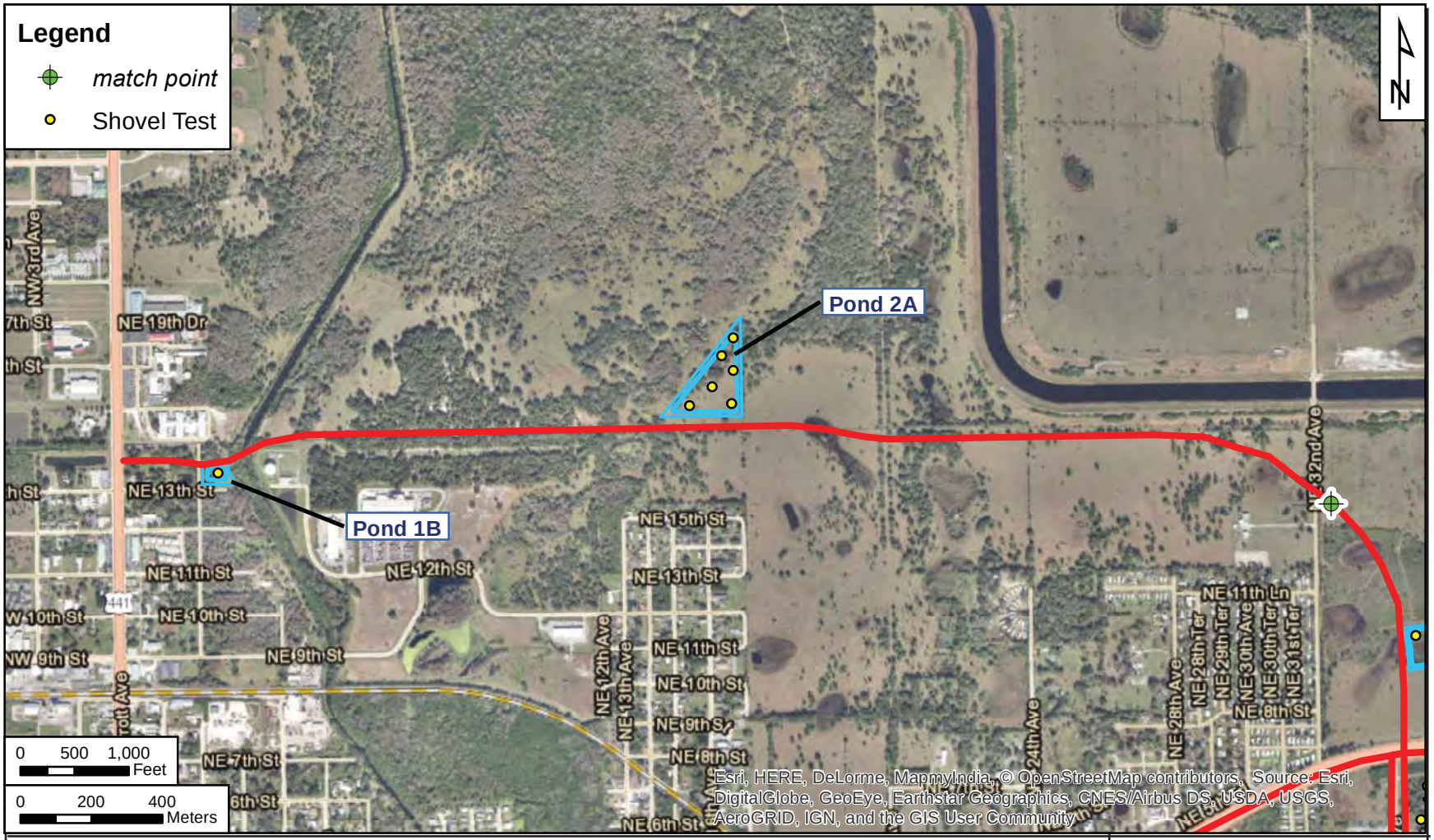

Figure 3. Location of shovel tests (not to scale) within the SR 710 preferred pond sites.

CRAS
Preferred Pond Sites
SR 710 from US 441
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Okeechobee County
FPID No. 419344-3-32-01
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Figure 4. Location of shovel tests (not to scale) within the SR 710 preferred pond sites.

CRAS
Preferred Pond Sites
SR 710 from US 441
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Wantman Group, Inc.

2014 Project Description for Pond Sites Provided to ACI, Sarasota.

APPENDIX: Survey Log

Ent D (FMSF only)_____

Survey Log Sheet

Florida Master Site File
Version 4.1 1/07

Survey # (FMSF only) _____

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (name and project phase) SR 710 Ponds, Phase I

Report Title (exactly as on title page) Cultural Resource Assessment Survey of Preferred Pond Sites, SR 710 from US 441 to the L-63N Canal, Okeechobee County, Florida; FPID No.: 419344-3-32-01; FAP No.: NA

Report Authors (as on title page, last names first) 1. ACI 3. _____ 2. _____ 4. _____

Publication Date (year) 2016 **Total Number of Pages in Report** (count text, figures, tables, not site forms) 15

Publication Information (Give series, number in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)
P12087, ACI, Sarasota

Supervisors of Fieldwork (even if same as author) Names Almy, Marion

Affiliation of Fieldworkers: Organization Archaeological Consultants Inc City Sarasota

Key Words/Phrases (Don't use county name, or common words like *archaeology*, *structure*, *survey, architecture, etc.*)

1. _____ 3. _____ 5. _____ 7. _____
2. _____ 4. _____ 6. _____ 8. _____

Survey Sponsors (corporation, government unit, organization or person directly funding fieldwork)

Name Wantman Group Organization _____

Address/Phone/E-mail 213 South Dillard Street, Suite 210 Winter Garden, Florida 34787

Recorder of Log Sheet Lee Hutchinson **Date Log Sheet Completed** 11-2-2016

Is this survey or project a continuation of a previous project? ☒ No ☐ Yes: **Previous survey #s (FMSF only)** _____

Mapping

Counties (List each one in which field survey was done; attach additional sheet if necessary)

1. Okeechobee 3. _____ 5. _____
2. _____ 4. _____ 6. _____

USGS 1:24,000 Map Names/Year of Latest Revision (attach additional sheet if necessary)

1. Name SEARS Year 1958 4. Name _____ Year _____
2. Name _____ Year _____ 5. Name _____ Year _____
3. Name _____ Year _____ 6. Name _____ Year _____

Description of Survey Area

Dates for Fieldwork: Start 10-1-2016 End 10-1-2016 **Total Area Surveyed** (fill in one) _____ hectares 31 acres

Number of Distinct Tracts or Areas Surveyed 5

If Corridor (fill in one for each) **Width:** _____ meters _____ feet **Length:** _____ kilometers _____ miles

Survey Log Sheet

Survey #_____

Research and Field Methods

Types of Survey (check all that apply): ☒archaeological ☒architectural ☒historical/archival ☐underwater
☐damage assessment ☐monitoring report ☐other(describe): _____

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Archaeological Methods (check as many as apply to the project as a whole)

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☐other (describe): _____

Historical/Architectural Methods (check as many as apply to the project as a whole)

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Survey Results (cultural resources recorded)

Site Significance Evaluated? ☐Yes ☒No

Count of Previously Recorded Sites 0 **Count of Newly Recorded Sites** 0

Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8". Attach additional pages if necessary.) n/a

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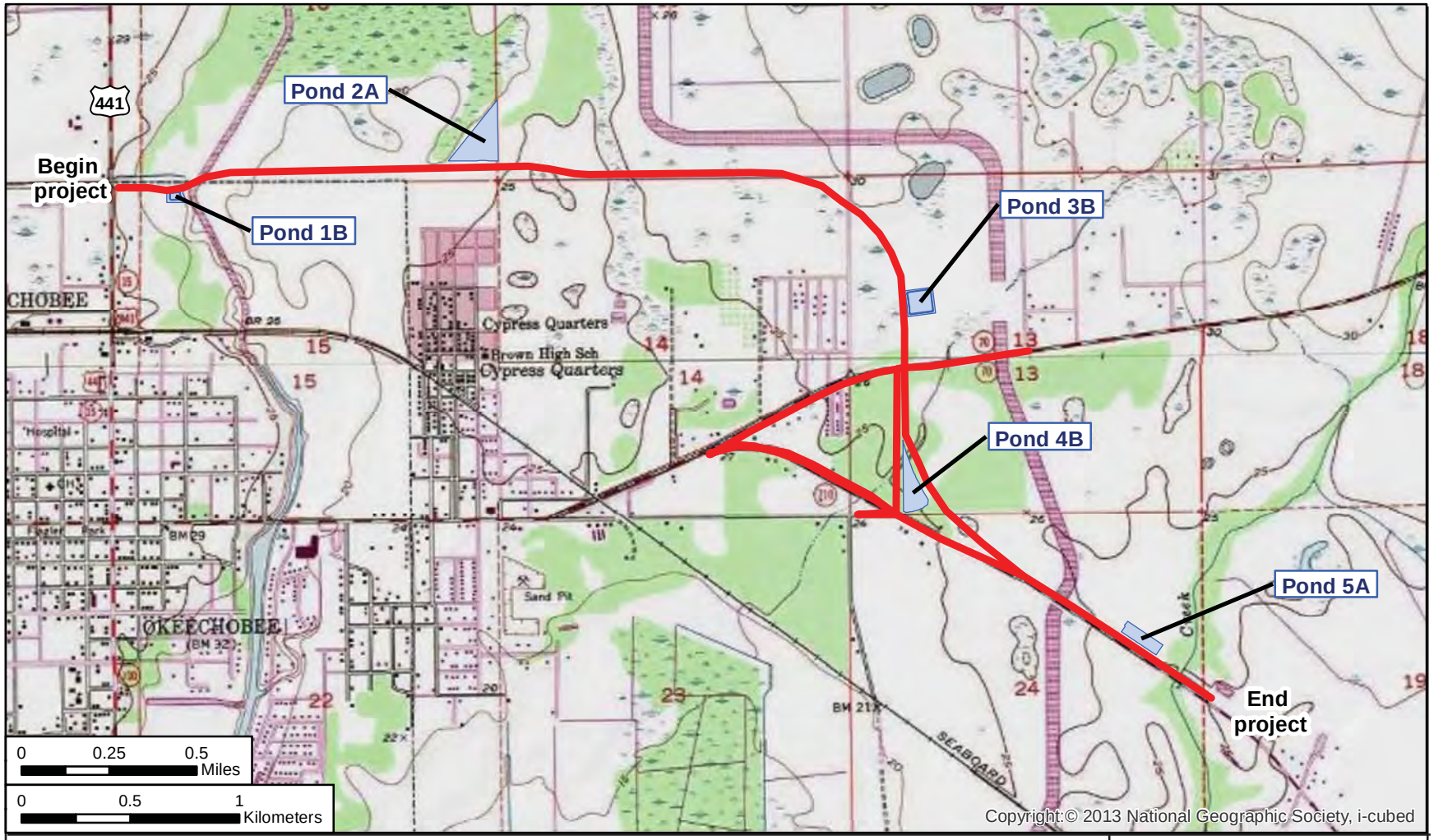
SHPO USE ONLY	SHPO USE ONLY	SHPO USE ONLY

Origin of Report: ☐872 ☐CARL ☐UW ☐1A32 # _____ ☐Academic ☐Contract ☐Avocational
☐Grant Project # _____ ☐Compliance Review: CRAT # _____

Type of Document: ☐Archaeological Survey ☐Historical/Architectural Survey ☐Marine Survey ☐Cell Tower CRAS ☐Monitoring Report
☐Overview ☐Excavation Report ☐Multi-Site Excavation Report ☐Structure Detailed Report ☐Library, Hist. or Archival Doc
☐MPS ☐MRA ☐TG ☐Other: _____

Document Destination: _____ **Plotability:** _____



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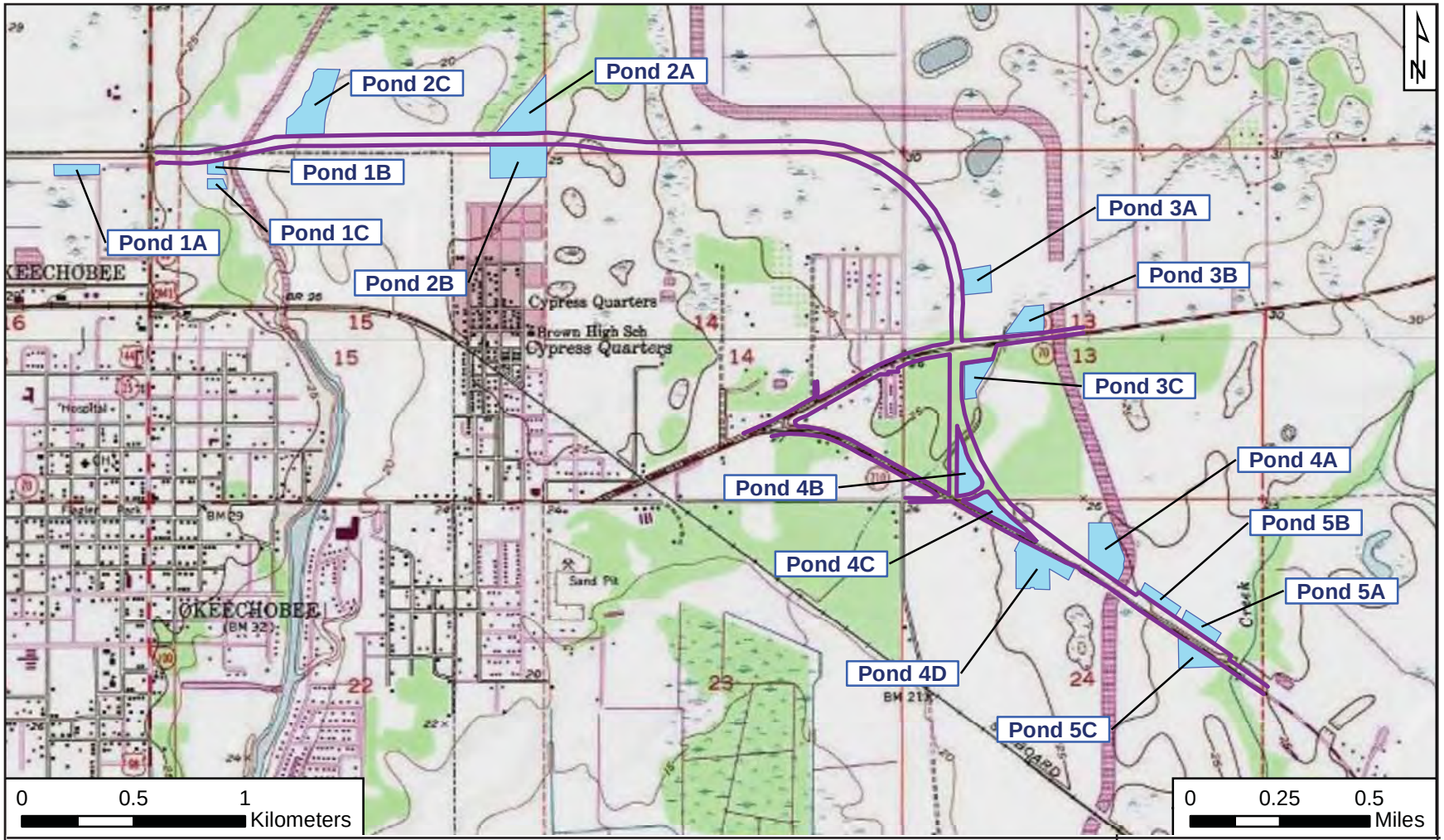
FPID No. 419344-3-32-01
Federal Project No.: NA



SR 710 preferred pond sites
Township 37 South, Range 35 East, Sections 13-16 and 24
USGS Taylor Creek SE and Okeechobee
Okeechobee County
National Geographic Society 2013 - *USA Topo Maps*

CRAS
Preferred Pond Sites
SR 710 from US 441
to the L-63N Canal
Okeechobee County
FPID No. 419344-3-32-01
Federal Project No.: NA

Appendix 6
Preliminary Pond Right-of-Way & Construction Cost Estimates

Pond Costs

Pond Site	Construction Cost*	Wetland Mitigation Cost	Protected Species Mitigation	Mainline R/W & Construction Cost Increase for Raising Road	R/W Cost	Total Cost
1A	$214,012	$0	$0	N/A	$141,000	$355,012
1B	$144,073	$30,000	$0	N/A	$146,000	$320,073
1C	$166,864	$52,800	$0	N/A	$105,000	$324,664
2A - Option 1	$1,072,314	$0	$0	$0	$265,000	$1,337,314
2A - Option 2	$1,114,607	$0	$0	$317,812	$212,000	$1,644,419
2A - Option 3	$1,148,255	$0	$0	$635,625	$193,000	$1,976,879
2B - Option 1	$925,064	$0	$0	$0	$405,000	$1,330,064
2B - Option 2	$1,005,232	$0	$0	$317,812	$278,000	$1,601,045
2B - Option 3	$1,053,637	$0	$0	$635,625	$209,000	$1,898,262
2C - Option 1	$1,042,526	$0	$0	$0	$297,000	$1,339,526
2C - Option 2	$1,067,257	$0	$0	$317,812	$280,000	$1,665,070
3A	$430,448	$0	$0	N/A	$471,000	$901,448
3B	$300,565	$18,000	$0	N/A	$383,000	$701,565
3C	$408,483	$0	$0	N/A	$365,000	$773,483
4A - Option 1	$635,121	$0	$18,000	$0	$435,000	$1,088,121
4A - Option 2	$637,566	$0	$18,000	$296,392	$391,000	$1,342,958
4B/4C - Option 1	$559,843	$6,000	$0	$0	$658,000	$1,223,843
4B - Option 2	$501,222	$0	$0	$0	$403,000	$904,222
4D - Option 1	$565,066	$0	$15,000	$0	$491,000	$1,071,066
4D - Option 2	$594,761	$0	$15,000	$296,392	$373,000	$1,279,153
5A	$269,696	$48,000	$0	N/A	$127,000	$444,696
5B	$265,083	$30,000	$0	N/A	$171,000	$466,083
5C	$266,723	$0	$0	N/A	$195,000	$461,723
Total Costs for Selected Sites	$2,284,897	$48,000	$0	$0	$1,392,000	$3,724,897

*Construction Costs - Includes the cost savings which occurs when the pond excavations materials can be used for roadway fills thereby the contractor does not have to purchase roadway fill. All ponds sites have suitable fills materials (sand) except for Ponds 1Cs (clays present). Ponds 1Cs requires only fill, sand cannot provide embankment.

Note 1: Pond 2C was assessed a value of $42,000 for wetland mitigation, however, this site has been modified to have a 25 foot buffer from wetlands. Pond 4B was initially assessed a wetland mitigation value of $6,000, however, the field analysis showed no wetland impacts on this site.

Note 2: Pond 3A has utility costs associated with it that are as yet undetermined.

Notes 3: Contamination costs for Ponds 3A and 4C have been estimated at $125,000 for worst cases cleanups of livestock holdings pens. Further investigations is required to determine actual cost.

CONCEPTUAL ESTIMATE, ALTERNATES / SEGMENTS SUMMARY

The costs below are not based on an appraisal!

ITEM SEG: 4193443 - Okeechobee - SR 710 Pond Siting Report - January 2014

COUNTY: Okeechobee

DESCRIPTION: SR 710 from US 441 to L63 Canal

COST ESTIMATE NUMBER: 16012 SMF Alternatives

FOR: A. Rodriguez, P.E., Senior Project Engineer; Wantman Group Inc.

BY: J. Harper, Senior Cost Estimator; FDOT

DATE: May 4, 2016

Alternate / Segment: Five Stormwater Basins, Multiple profiles and storage regs.

Description:	Size Acres:	Phase: 4B	Phase: 41	Phase: 43	Phase: 45	Total:
Pond 1 A	2.238	$23,000	$12,000	$106,000	$0	$141,000
Pond 1 B	1.079	$50,000	$30,000	$66,000	$0	$146,000
Pond 1 C	1.153	$23,000	$12,000	$70,000	$0	$105,000
Pond 2 A Option 1	9.428	$29,000	$12,000	$224,000	$0	$265,000
Pond 2 A Option 2	7.204	$29,000	$12,000	$171,000	$0	$212,000
Pond 2 A Option 3	6.419	$29,000	$12,000	$152,000	$0	$193,000
Pond 2 B Option 1	15.372	$29,000	$12,000	$364,000	$0	$405,000
Pond 2 B Option 2	10.002	$29,000	$12,000	$237,000	$0	$278,000
Pond 2 B Option 3	7.084	$29,000	$12,000	$168,000	$0	$209,000
Pond 2 C Option 1	6.864	$29,000	$12,000	$256,000	$0	$297,000
Pond 2 C Option 2	6.139	$29,000	$12,000	$239,000	$0	$280,000
Pond 3 A	3.471	$29,000	$12,000	$430,000	$0	$471,000
Pond 3 B	2.444	$29,000	$12,000	$342,000	$0	$383,000
Pond 3 C	1.814	$36,000	$12,000	$317,000	$0	$365,000
Pond 4 A Option 1	3.984	$36,000	$12,000	$387,000	$0	$435,000
Pond 4 A Option 2	3.343	$36,000	$12,000	$343,000	$0	$391,000
Pond 4 B + 4 C	7.165	$36,000	$12,000	$610,000	$0	$658,000
Pond 4 B Option 2	4.201	$29,000	$12,000	$362,000	$0	$403,000
Pond 4 D Option 1	6.075	$29,000	$12,000	$450,000	$0	$491,000
Pond 4 D Option 2	4.328	$29,000	$12,000	$332,000	$0	$373,000
Pond 5 A	2.624	$29,000	$12,000	$86,000	$0	$127,000
Pond 5 B	2.534	$29,000	$12,000	$130,000	$0	$171,000
Pond 5 C	3.528	$29,000	$12,000	$154,000	$0	$195,000

Notes:
> Pond 1B reflects corrections to the parcel count in Phases 4B and 41 - revised size is reflected in Phase 43.
> Pond 1C was given at 0.929 acre and its outfall at 0.224 acre / 9,757 square feet.
> Pond 3C includes an exsiting FDOT pond for a net requirement of 1.785 acres, plus outfall of 0.029 = 1.814 acres.
> Pond 4B is 4.201 Acres; 4C is 2.964 Acres.
> Highlighted indicates the sites which have been updated

THE POND AREAS ON THIS SHEET WERE UPDATED BY THE BALMORAL GROUP

CONCEPTUAL ESTIMATE, ALTERNATES / SEGMENTS SUMMARY

The costs below are not based on an appraisal!

ITEM SEG: 4193443 - Okeechobee - SR 710 Road Profile Sensitivity - February 2014

COUNTY: Okeechobee

DESCRIPTION: SR 710 from US 441 to L63 Canal

COST ESTIMATE NUMBER: 14002 (special)

FOR: A. Rodriguez, P.E., Senior Project Engineer; Wantman Group Inc.

BY: J. Harper, Senior Cost Estimator; FDOT

DATE: February 18, 2014

Alternate / Segment: Variable Road Profile + Five Stormwater Basins (six ponds)

Description:	Size Acres:	Phase: 4B	Phase: 41	Phase: 42	Phase: 43	Phase: 45	Total:
Current Design	89.43	$654,000	$168,000	$252,000	$13,546,000	$0	$14,620,000
21 Parcels incl. 6 Ponds	67.35 Mainline; 22.08 Ponds				$3.48/sf		$3.75/sf
One-Foot Profile	105.10	$654,000	$168,000	$252,000	$14,584,000	$0	$15,658,000
21 Parcels incl. 6 Ponds	83.03 Mainline; 22.07 Ponds				$3.19/sf		$3.42/sf
Two-Foot Profile	108.25	$654,000	$168,000	$252,000	$15,015,000	$0	$16,089,000
21 Parcels incl. 6 Ponds	86.17 Mainline; 22.08 Ponds				$3.18/sf		$3.41/sf
Three-Foot Profile	112.96	$654,000	$168,000	$252,000	$15,660,000	$0	$16,734,000
21 Parcels incl. 6 Ponds	90.87 Mainline; 22.09 Ponds				$3.18/sf		$3.40/sf
Average	**103.93**	**$ 654,000**	**168,000**	**252,000**	**$14,701,250**	**0**	**$ 15,775,250**

rev: 2/18/14

S:\ROW\EST\a-Estimates\Okeechobe_91\14002 4193443 SR 710 441 to Canal\[Summary 14002 - 4193443 - Profile Sensitivity Feb 2014 a.xlsx]SUMMARY

> If the alternative pond site abuts proposed mainline, Phase 42 is not included because costs would be included in mainline.
> Pond 1C was given at 0.929 acre and its outfall at 0.224 acre / 9,757 square feet.
> Pond 3C was given at 5.778 acres and its outfall at 0.029 acre / 1,263 square feet.
> Pond 3C includes an exsiting FDOT pond for a net requirement of 3.750 acres, plus outfall of 0.029 = 3.779 acres.
> Pond 4B is 4.591 Acres; 4C is 3.577 Acres.
> Pond Sizes vary between Profile alternatives due to rounding.

FPID: 419344-3-32-01						
from US 441 to south of L-63N Canal						
RIGHT-OF-WAYS AND EARTHWORKS OPTIONS FOR PONDS SITINGS REPORT						
Profiles Options	**Totals Right-of-Way Impacts including Ponds (AC)**	**Totals Right-of-Way Costs including Ponds ($)**	**Roadways Embankments (cubic yards)**	**Roadways Embankments Costs ($6/CY)**	**Totals Costs (with ponds)**	**Differences in Costs**
Current Proposed Profile	89.43	$14,620,000	396,975	$2,381,850	$17,001,850	$0
1' Above Current Proposed Profile	105.10	$15,658,000	511,975	$3,071,850	$18,729,850	$1,728,000
2' Above Current Proposed Profile	108.25	$16,089,000	631,975	$3,791,850	$19,880,850	$1,151,000
3' Above Current Proposed Profile	112.96	$16,743,000	761,375	$4,568,250	$21,311,250	$1,430,400

FDOT included Ponds 1C, 2C, 3C, 4B/4C, and 5A

Price Increase Used for Analysis = Avergaes of $1,430,400 s and $1,151,000 s per s foot s raised s = $1,290,700

NOTE: Current Proposed Profile includes Walls and the increased profiles do not. Therefore, increase is based only average difference going from 1' to 2' and 2' to 3'.

Basin	Basin Length (feet)	Cost Per Basin Per Foot Raised	Is Raising Option Available?	Comments
1	1086	$69,029	No	Controlled by US 441 s Tie-in elevation
2	9900	$629,269	Yes	Only needs to s raise s west s half of s basin
3	2817	$179,056	No	Controlled by SR 70 s Tie-in elevation
4	4663	$296,392	Yes	Raises entire basin
5	1840	$116,955	No	Controlled by s Mosquito Creek s Bridges tie-in elevation
Totals =	20306	$1,290,700.00		

Option	Ponds Area	Heights Raised (Feet)	Lengths Raised s within s Basins (feet)	Mainlines R/Ws and s Consts Costs Increase
Ponds 2 s As Options 1	14.227	0	0	$0.00
Ponds 2 s As Options 2	7.929	1	5000	$317,812.47
Ponds 2 s As Options 3	6.419	2	5000	$635,624.94
Ponds 2 s Bs Options 1	15.372	0	0	$0.00
Ponds 2 s Bs Options 2	10.002	1	5000	$317,812.47
Ponds 2 s Bs Options 3	7.084	2	5000	$635,624.94
Ponds 2 s Cs Options 1	6.864	0	0	$0.00
Ponds 2 s Cs Options 2	6.139	1	5000	$317,812.47
Ponds 4 s As Options 1	3.984	0	0	$0.00
Ponds 4 s As Options 2	3.343	1	4663	$296,391.91
Ponds 4 s Bs + s 4 s Cs Options 1	8.168	0	0	$0.00
Ponds 4 s Bs Options 2	4.591	0	0	$0.00
Ponds 4 s Ds Options 1	6.075	0	0	$0.00
Ponds 4 s Ds Options 2	4.328	1	4663	$296,391.91

Unit Costs (From FDOT) bid Used Statewide Prices except as noted below.

				Unit Price	
Pay Item	Description	Unit Meas	No. of Contracts (Area 9)	Area 9 Avg., 12 mo.	Statewide Avg., 12 mo.
0120 1	REGULAR EXCAVATION	CY	1	$3.25	$4.68
120-6	EMBANKMENT	CY	1	$2.00	$6.48
430175118	PIPE CULV, OPT MATL, ROUND, 18"S/CD	LF	1	$29.71	$47.49
430175124	PIPE CULV, OPT MATL, ROUND, 24"S/CD	LF	1	$34.31	$52.81
430175130	PIPE CULV, OPT MATL, ROUND, 30"S/CD	LF	1	$40.97	$64.20
430175136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF	1	$59.10	$88.90
430175142	PIPE CULV, OPT MATL, ROUND, 42"S/CD	LF	1	$71.70	$111.76
430175148	PIPE CULV, OPT MATL, ROUND, 48"S/CD	LF	1	$99.36	$116.13
430175154	PIPE CULV, OPT MATL, ROUND, 54"S/CD	LF			$149.46
430175160	PIPE CULV, OPT MATL, ROUND, 60"S/CD	LF			$180.88
0440 1 50	UNDERDRAIN, TYPE V	LF			$40.00
0514 72	LINER IMPERMEABLE PVC	SY	1	$14.00	$12.04
530-3-4	RUBBLE RIPRAP, F&I, DITCH LINING	TN			$74.42
550-10-220	FENCING, TYPE B, 5.1' to 6', STD.	LF		$8.90	
570-1-2	PERFORMANCE TURF, SOD	SY		$2.02	

Notes 1: s Fencings & s Soddings units prices added s in 5/2015 s - s Areas 9 s to s 12 s mo. s averages s mores recents than s others units prices. s Rubbles Ripraps (Ditchs Lining) s added s in 5/2016 s (also s mores recent).

Notes 2: s Units Prices of s $4.75/CYs for s Excavation/Fills Placements & s $6/CYs for s Roadway/Ponds Fills provided s by s The s Wantmans Group

Basin 1

Construction Costs

PROJECT: SR 710 - Pond 1A
LOCATION: OKEECHOBEE COUNTY, FLORIDA
PREPARED: LCS 5/19/2016
CHECKED: GS 5/19/2016

Pond 1A

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	369	$47.49	$17,525
24	300	$52.81	$15,821
30	99	$64.20	$6,356
36	1250	$88.90	$111,125
		Totals=	**$150,826**

Pipe Cost for Pond 1A= $150,826

Earthwork:

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
24,674	$4.75	**$117,202**

Import Fill= 24,674 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
24,674	6.00	**$148,044**

Import Savings=	**($30,843)**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	5,538	$2.02	**$11,187**
Clearing & Grubbing	AC	2.24	$7,723.80	**$17,286**
Rubble Riprap (Ditch Lining)	TN	857.90	$74.42	**$63,845**
Sediment Barrier (Silt Fence)	LF	1,645	$1.04	**$1,711**

Total Cost=	**$214,012**

Note: Pipe sizes and lengths assumed from modification of preliminary storm drain tabulations for Pond 1A. Pipe length (270' of 18" pipe) from pond to outfall also included in estimate. Riprap assumed to be 8' wide strip around pond side slopes.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 1A:

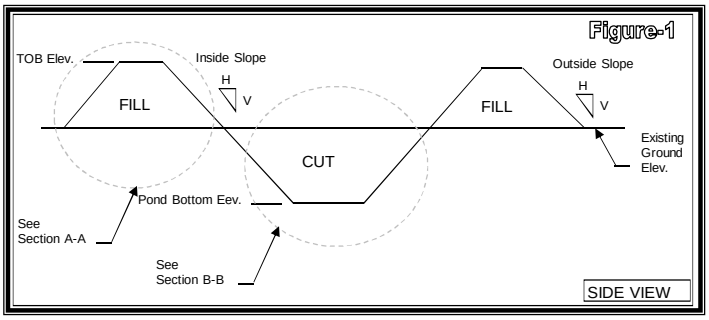
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

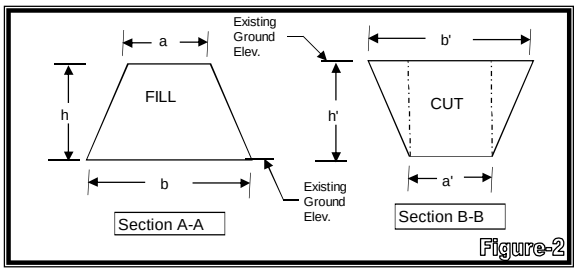
Existing Ground Elev. (ft) = 26.5
Top of Berm Elev. (ft) = 24.5
Pond Bottom Elev. (ft) = 9.5
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 2

Control Elev. (ft) = 21.5



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,426
a (ft) = 20
b (ft) = 8
h (ft) = -2
FILL AREA (S.F.) = 0
Fill VOLUME (C.F.) = 0
Fill VOLUME (C.Y.) = 0



Area Inside Berm (SF) = 9,566
Area Outside Berm (SF) = 11,759
AreaTop of Berm (SF) = 28,520
Sodding (SY) = 5,538

2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area at a' + Area at b')* h' <- Average Area Ratio Method
= 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

From Exist Ground To Berm:
Area Between a' & b' elevations (sf) = 12,113
(Exist Ground to TOP) h' (ft) = 2
CUT VOLUME (C.F.) = 12,113

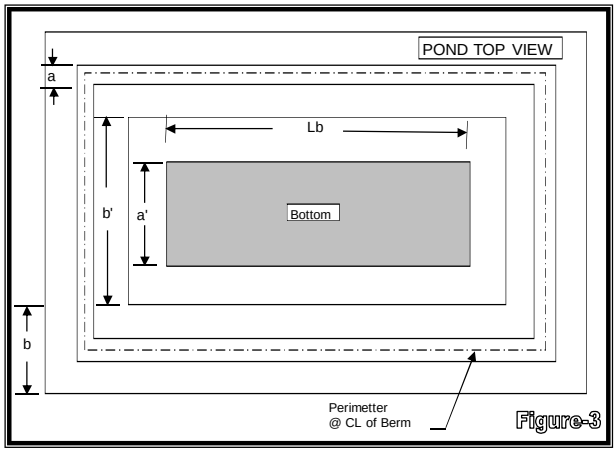
To Berm Elevation:
Area at Outside TOB (sf) = 83,445
(Existing Ground to TOP) h' (ft) = 2
CUT VOLUME (C.F.) = 166,891

Pond Side Slopes From TOB to Pond Bottom:
Area Between a' & b' elevation (sf) = 44,885
(TOP to Pond Bottom) h' (ft) = 15
CUT VOLUME (C.F.) = 336,636

Pond Bottom:
Area of Pond Bottom (sf) = 10,037
(TOP to Pond Bottom) h' (ft) = 15
CUT VOLUME (C.F.) = 150,560

TOTAL CUT VOLUME (C.F.) = 666,199
TOTAL CUT VOLUME (C.Y.) = 24,674

Used 1:2 slopes to pond bottom due to long thin pond



Fencing (ft) = 1,645

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 1B — PREPARED: LCS 5/5/2016
LOCATION: OKEECHOBEE COUNTY, FLORIDA — CHECKED: GS 5/5/2016

Pond 1B

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	344	$47.49	$16,338
24	303	$52.81	$15,979
30	380	$64.20	$24,387
		Total =	**$56,704**

Pipe Cost for Pond 1B = **$56,704**

Embankment:

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
3205.0	6.00	**$19,230**

Underdrain:

Length of Underdrain (ft)	Unit Price ($/CY)	Cost ($)
1232.0	40.00	**$49,280**

Estimated by measurements - 14s @ 88' lengths

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	4,703	$2.02	**$9,500**
Clearing & Grubbing	AC	1.08	$7,723.80	**$8,342**
Sediment Barrier (Silt Fence)	LF	978	$1.04	**$1,017**

Total Cost =	**$144,073**

Note: Pipe Sizes and Lengths from preliminary storm drain tabulations for Pond 1B. Pipe length (140' of 18" pipe) from pond to outfall also included in estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

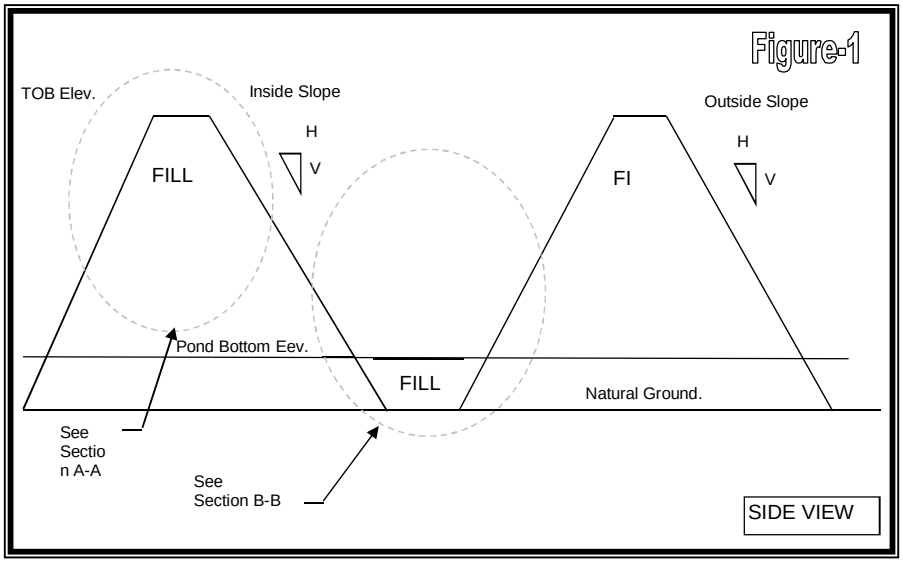
Pond Site 1B:

Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

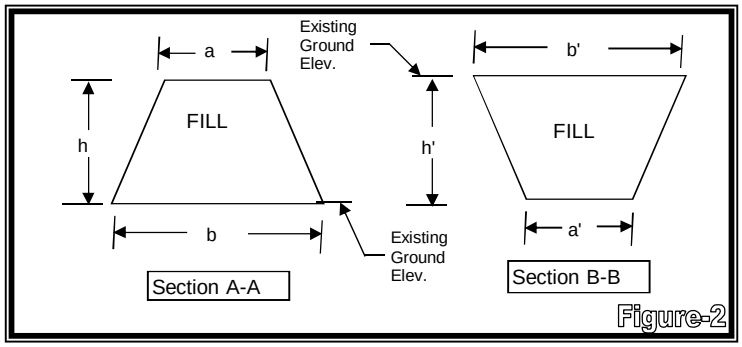
Existing Ground Elev. (ft) = 18
Top of Berm Elev. (ft) = 21.28
Pond Bottom Elev. (ft) = 18.28
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4



B. Berm Fill Calculations.

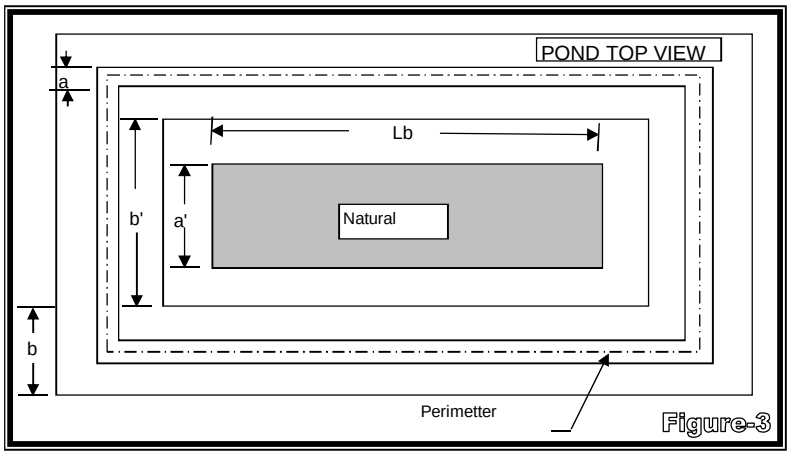
FILL AREA (S.F.) = 0.5 (a + b) h
Perimeter @ CL of the Berm (ft) = 700
a (ft) = 20
b (ft) = 52
h (ft) = 3.28
FILL AREA (S.F.) = 118.08
Fill VOLUME (C.F.) = 82,656
Fill VOLUME (C.Y.) = 3,061

Sodding (SY) = 4,703



2. Embankment Fill Calculations:

FILL AREA (S.F.) = 0.5 (a' + b') h'
Pond bottom Length (ft) = 147
a' (ft) = 92.76
b' (ft) = 95
h' (ft) = 0.28
FILL AREA (S.F.) = 26.2864
FILL VOLUME (C.F.) = 3,867
FILL VOLUME (C.Y.) = 143



Total Fill:	**3,205 C.Y.**

Note: b' and Lb are the length and width of pond bottom.
The a' is the width of natural ground elevation

Fencing (ft) = 978

Note: Sodding quantity taken as entire dry pond & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 1C — PREPARED: LCS 5/11/2015
LOCATION: OKEECHOBEE COUNTY, FLORIDA — CHECKED: GS 5/11/2015

Pond 1C

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	419	$47.49	$19,899
24	303	$52.81	$15,979
30	794	$64.20	$50,966
		Total =	**$86,844**

Pipe Cost for Pond 1C = $86,844

Embankment:

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
7159.0	6.00	**$42,954**

Underdrain:

Length of Underdrain (ft)	Unit Price ($/ft)	Cost ($)
480.0	40.00	**$19,200**

Estimated by measurements - 12 @ 40' lengths

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	4,010	$2.02	**$8,100**
Clearing & Grubbing	AC	1.15	$7,723.80	**$8,906**
Sediment Barrier (Silt Fence)	LF	827	$1.04	**$860**

Total Cost =	$166,864

Note: Pipe Sizes and Lengths from preliminary storm drain tabulation for Pond 1B. Measured and extra 414' of 30 inch pipe due to distance from last structure to Pond 1C. Pipe length (215' of 18" pipe) from pond to outfall also included in estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

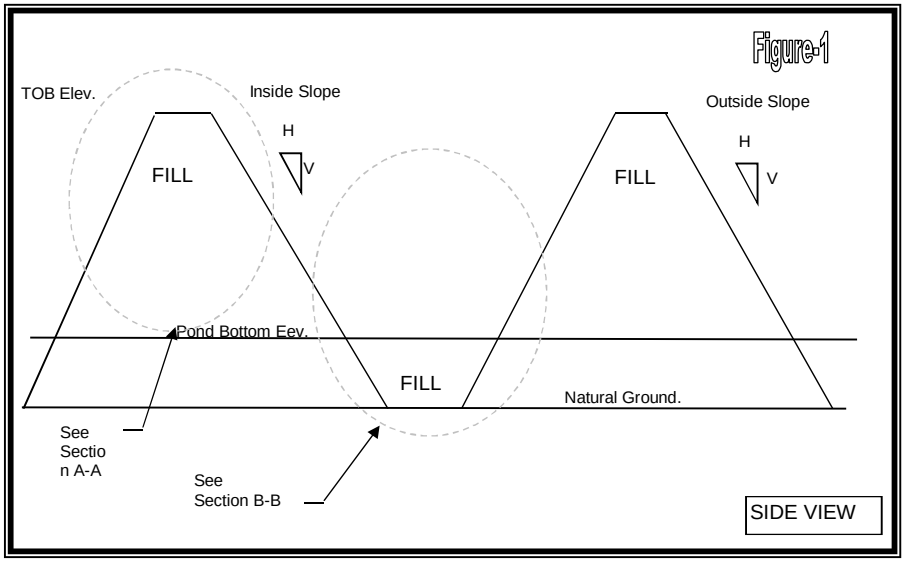
Pond Site 1C:

Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

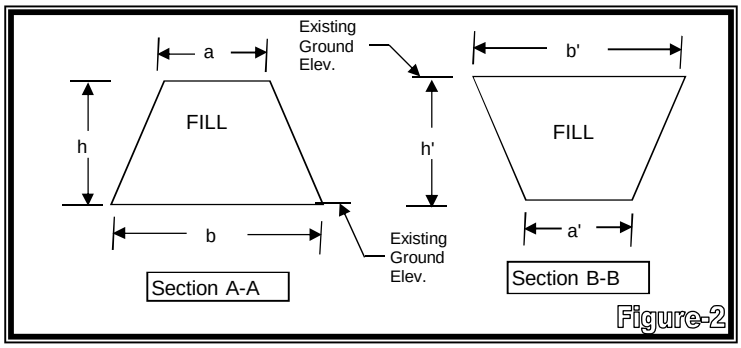
Existing Ground Elev. (ft) = 15
Top of Berm Elev. (ft) = 22
Pond Bottom Elev. (ft) = 16.5
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4



B. Berm Fill Calculations.

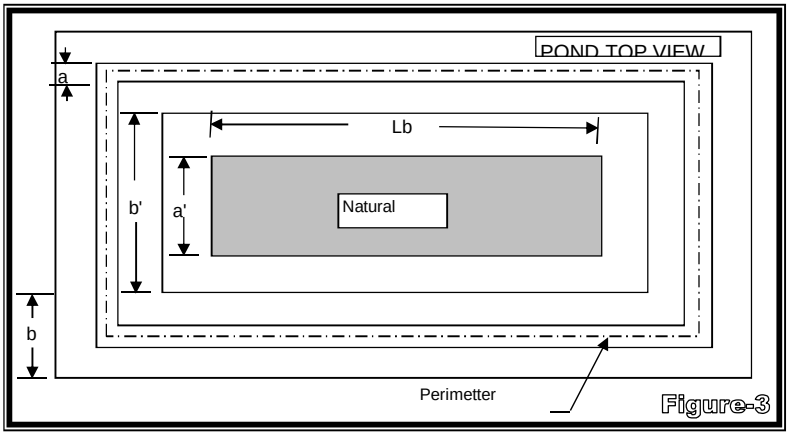
FILL AREA (S.F.) = 0.5 (a + b) h
Perimeter @ CL of the Berm (ft) = 634
a (ft) = 20
b (ft) = 65
h (ft) = 7
FILL AREA (S.F.) = 297.5
Fill VOLUME (C.F.) = 188,466
Fill VOLUME (C.Y.) = 6,980

Sodding (SY) = 4010



2. Embankment Fill Calculations:

FILL AREA (S.F.) = 0.5 (a' + b') h'
Pond bottom Length (ft) = 120
a' (ft) = 21
b' (ft) = 33
h' (ft) = 1.5
FILL AREA (S.F.) = 40.5
FILL VOLUME (C.F.) = 4,840
FILL VOLUME (C.Y.) = 179



Total Fill:	**7,159 C.Y.**

Note: b' and Lb are the length and width of pond bottom.
The a' is the width of natural ground elevation

Fencing (ft) = 827

Note: Sodding quantity taken as entire dry pond & fencing measured at R/W line

Basin 2

Construction Costs

PROJECT: SR 710 - Pond 2A PREPARED: LCS 5/5/2016
LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/5/2016

Pond 2A

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	2231	$47.49	$105,950
24	1170	$52.81	$61,788
30	2045	$64.20	$131,289
36	0	$88.90	$0
42	4548	$111.76	$508,284
48	1707	$116.13	$198,234
60	95	$180.88	$17,184
		Total =	**$1,022,729**

Pipe Cost for Pond 2A = **$1,022,729**

Note: 300' of 24" pipe added for pond outfall

Earthwork:-Option 1

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
97,405	$4.75	**$462,674**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
11,191	0.00	**$0**

Import Fill = **86,214** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
86,214	6.00	**$517,284**

Earthwork Cost/Savings =	**($54,610)**

Note: Red types & parenthesis indicates costs savings

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	13,980	$2.02	**$28,240**
Clearing & Grubbing	AC	9.43	$7,723.80	**$72,835**
Sediment Barrier (Silt Fence)	LF	3,000	$1.04	**$3,120**

Earthwork:-Option 2

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
58,638	$4.75	**$278,531**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
13,265	0.00	**$0**

Import Fill = **45,373** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
45,373	6.00	**$272,238**

Earthwork Cost/Savings =	**$6,293**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	13,434	$2.02	**$27,137**
Clearing & Grubbing	AC	7.20	$7,723.80	**$55,611**
Sediment Barrier (Silt Fence)	LF	2,728	$1.04	**$2,837**

Earthwork:-Option 3

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
44,423	$4.75	**$211,009**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
16,663	0.00	**$0**

Import Fill = **27,760** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
27,760	6.00	**$166,560**

Earthwork Cost/Savings =	**$44,449**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	14,267	$2.02	**$28,819**
Clearing & Grubbing	AC	6.42	$7,723.80	**$49,579**
Sediment Barrier (Silt Fence)	LF	2,575	$1.04	**$2,678**

Total Construction Cost:

Option #1 = **$1,072,314**

Option #2 = **$1,114,607**

Option #3 = **$1,148,255**

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2A - Option 1:

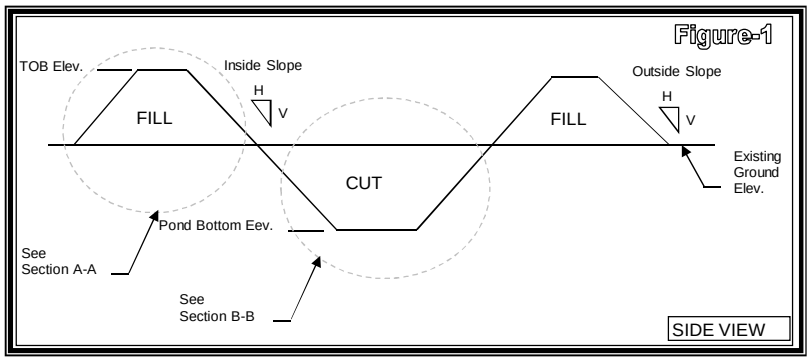
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

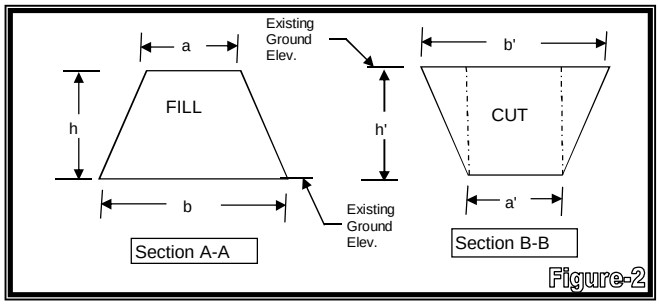
Existing Ground Elev. (ft) = 21
Top of Berm Elev. (ft) = 24.43
Pond Bottom Elev. (ft) = 9.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 21.03



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,613
a (ft) = 20
b (ft) = 47.44
h (ft) = 3.43
FILL AREA (S.F.) = 115.6596
Fill VOLUME (C.F.) = 302,168
Fill VOLUME (C.Y.) = **11,191**



Area Inside Berm (SF) = 36624
Area Outside Berm (SF) = 36948
AreaTop of Berm (SF) = 52251
Sodding (SY) = 13980

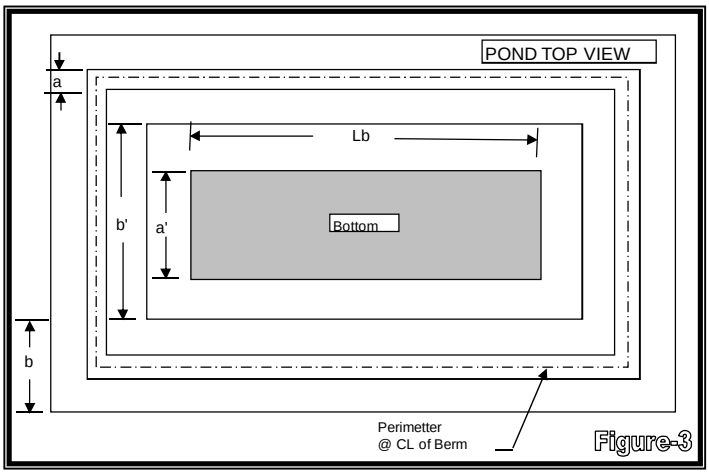
2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 107,067
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 640,796

Pond Bottom:
Area of Pond Bottom (sf) = 166,177
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 1,989,144

TOTAL CUT VOLUME (C.F.) = 2,629,940
TOTAL CUT VOLUME (C.Y.) = **97,405**



Fencing (ft) = 3000

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2A - Option 2:

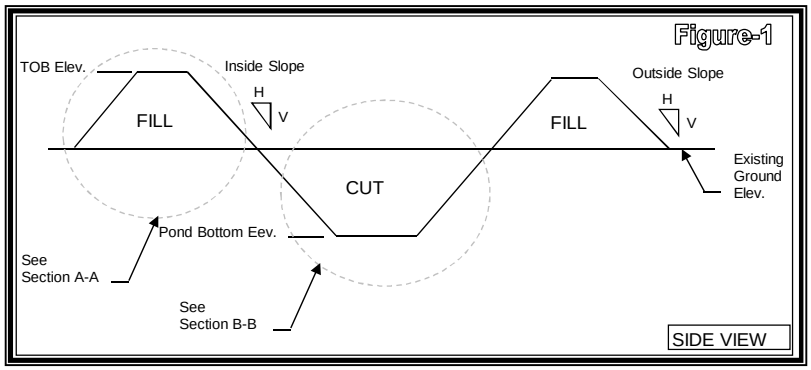
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 21
Top of Berm Elev. (ft) = 25.43
Pond Bottom Elev. (ft) = 9.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

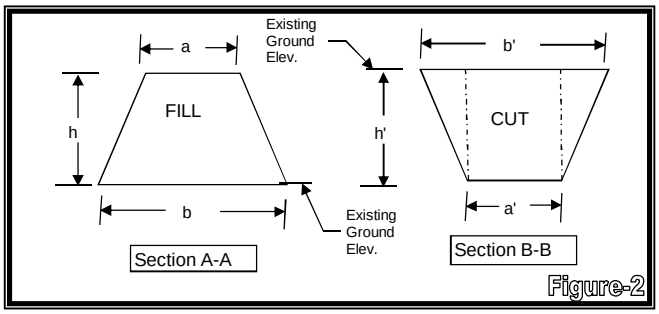
Control Elev. (ft) = 21.03



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,143
a (ft) = 20
b (ft) = 55.44
h (ft) = 4.43
FILL AREA (S.F.) = 167.10
Fill VOLUME (C.F.) = 358,160
Fill VOLUME (C.Y.) = **13,265**

Area Inside Berm (SF) = 38885
Area Outside Berm (SF) = 39150
AreaTop of Berm (SF) = 42868
Sodding (SY) = 13,434



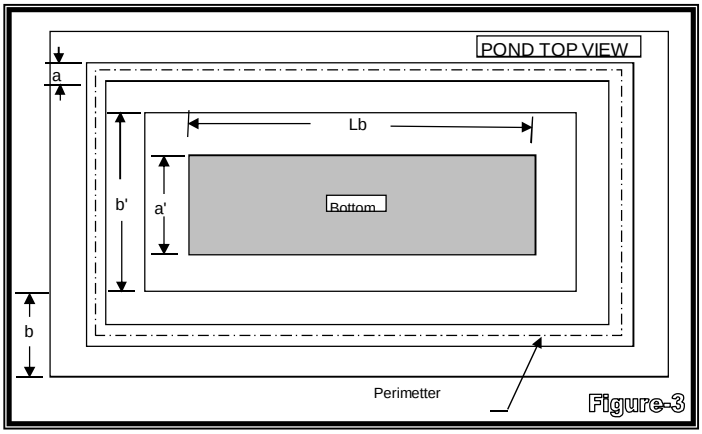
2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 82,477
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 493,626

Pond Bottom:
Area of Pond Bottom (sf) = 91,026
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 1,089,586

TOTAL CUT VOLUME (C.F.) = 1,583,213
TOTAL CUT VOLUME (C.Y.) = **58,638**



Fencing (ft) = 2728

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2A - Option 3:

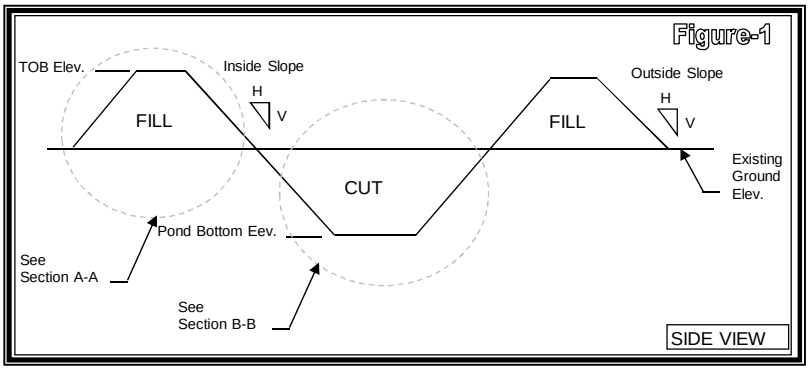
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

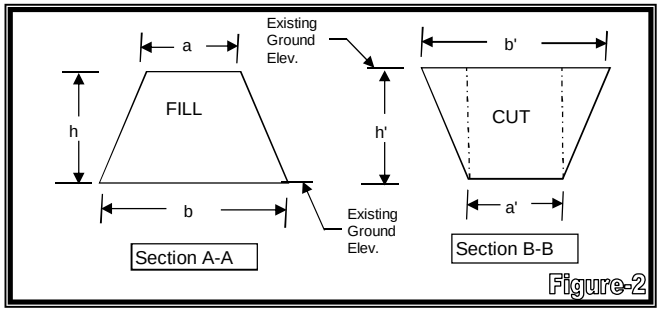
Existing Ground Elev. (ft) = 21
Top of Berm Elev. (ft) = 26.43
Pond Bottom Elev. (ft) = 9.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 21.03



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,986
a (ft) = 20
b (ft) = 63.44
h (ft) = 5.43
FILL AREA (S.F.) = 226.5396
Fill VOLUME (C.F.) = 449,908
Fill VOLUME (C.Y.) = 16,663



Area Inside Berm (SF) = 44218
Area Outside Berm (SF) = 44463
AreaTop of Berm (SF) = 39720
Sodding (SY) = 14267

2. Earthwork Cut Calculations:

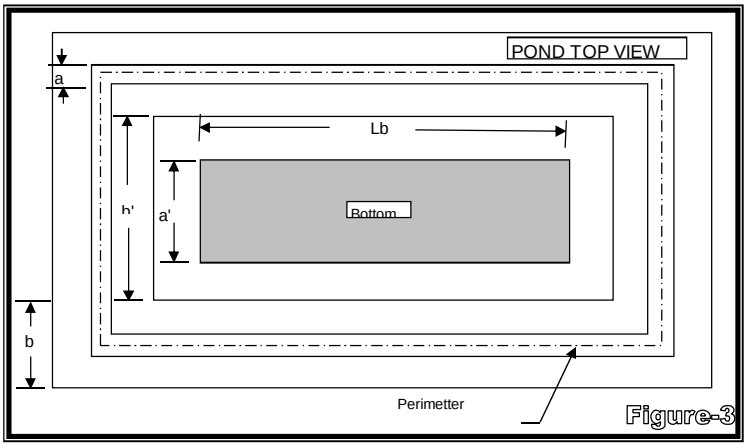
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 71,283
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 426,631

Pond Bottom:
Area of Pond Bottom (sf) = 64,561
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 772,797

TOTAL CUT VOLUME (C.F.) = 1,199,429
TOTAL CUT VOLUME (C.Y.) = **44,423**



Fencing (ft) = 2575

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 2B PREPARED: LCS 5/11/2015
LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/11/2015

Pond 2B

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	2433	$47.49	$115,543
24	870	$52.81	$45,945
30	2045	$64.20	$131,289
36	0	$88.90	$0
42	4548	$111.76	$508,284
48	1707	$116.13	$198,234
60	95	$180.88	$17,184
		Total =	**$1,016,479**

Pipe Cost for Pond 2B = **$1,016,479**

Note: 202' of 18" pipe added for pond outfall

Earthwork:-Option 1

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
215,527	$4.75	**$1,023,753**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
4,641	0.00	**$0**

Import Fill = **210,886** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
210,886	6.00	**$1,265,316**

Earthwork Cost/Savings = **($241,563)**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	13,674	$2.02	**$27,621**
Clearing & Grubbing	AC	15.37	$7,723.80	**$118,730**
Sediment Barrier (Silt Fence)	LF	3,650	$1.04	**$3,796**

Earthwork:-Option 2

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
123,621	$4.75	**$587,200**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
6,500	0.00	**$0**

Import Fill = **117,121** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
117,121	6.00	**$702,726**

Earthwork Cost/Savings = **($115,526)**

Note: Reds types & parenthesis indicates costs savings

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	11,979	$2.02	**$24,198**
Clearing & Grubbing	AC	10.00	$7,723.80	**$77,253**
Sediment Barrier (Silt Fence)	LF	2,720	$1.04	**$2,829**

Earthwork:-Option 3

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
74,296	$4.75	**$352,906**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
8,336	0.00	**$0**

Import Fill = **65,960** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
65,960	6.00	**$395,760**

Earthwork Cost/Savings = **($42,854)**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	11,376	$2.02	**$22,980**
Clearing & Grubbing	AC	7.08	$7,723.80	**$54,715**
Sediment Barrier (Silt Fence)	LF	2,228	$1.04	**$2,317**

Total Construction Cost:

Option #1 = **$925,064**

Option #2 = **$1,005,232**

Option #3 = **$1,053,637**

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2B - Option 1:

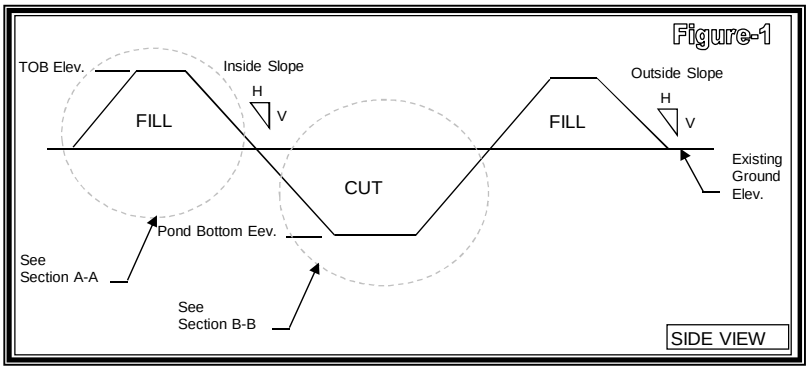
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

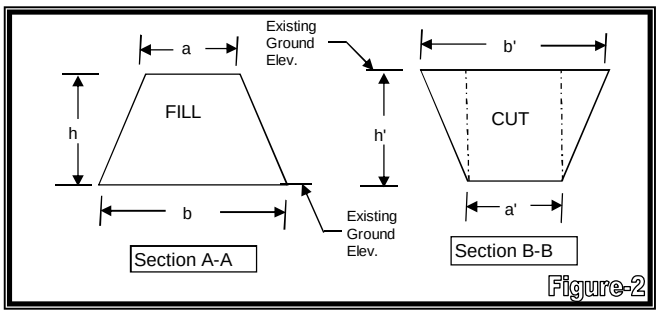
Existing Ground Elev. (ft) = 23
Top of Berm Elev. (ft) = 24.43
Pond Bottom Elev. (ft) = 10.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 21.95



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 3,407
a (ft) = 20
b (ft) = 31.44
h (ft) = 1.43
FILL AREA (S.F.) = 36.7796
Fill VOLUME (C.F.) = 125,308
Fill VOLUME (C.Y.) = 4,641



Area Inside Berm (SF) = 34838
Area Outside Berm (SF) = 20088
AreaTop of Berm (SF) = 68140
Sodding (SY) = 13674

2. Earthwork Cut Calculations:

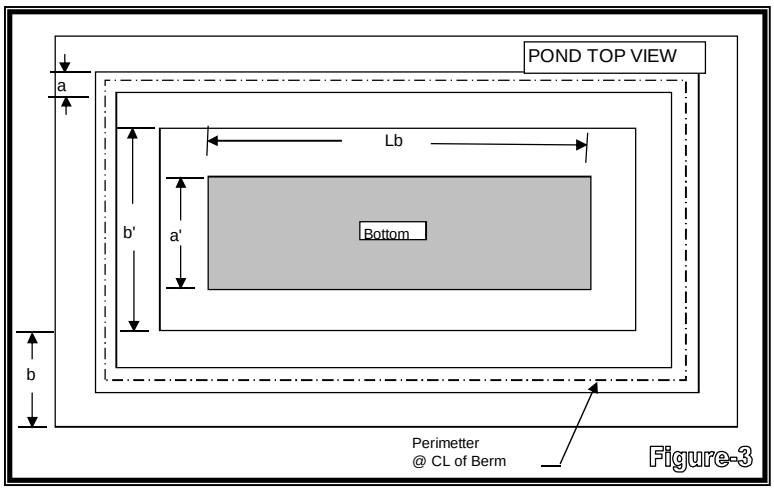
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 162,791
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.1
CUT VOLUME (C.F.) = 1,062,213

Pond Bottom:
Area of Pond Bottom (sf) = 364,522
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.1
CUT VOLUME (C.F.) = 4,757,011

TOTAL CUT VOLUME (C.F.) = 5,819,224
TOTAL CUT VOLUME (C.Y.) = **215,527**



Fencing (ft) = 3650

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2B - Option 2:

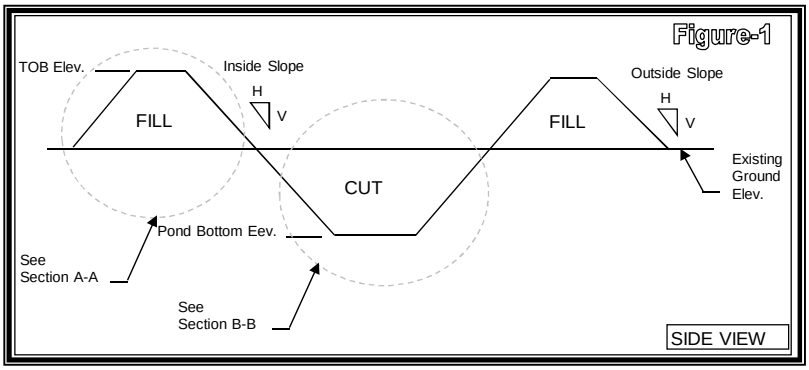
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

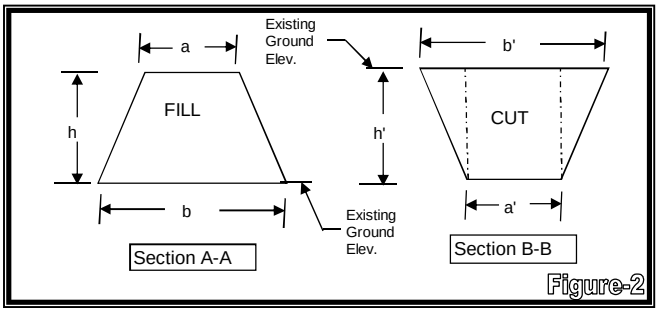
Existing Ground Elev. (ft) = 23
Top of Berm Elev. (ft) = 25.43
Pond Bottom Elev. (ft) = 10.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 21.95



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,430
a (ft) = 20
b (ft) = 39.44
h (ft) = 2.43
FILL AREA (S.F.) = 72.2196
Fill VOLUME (C.F.) = 175,494
Fill VOLUME (C.Y.) = **6,500**



Area Inside Berm (SF) = 34867
Area Outside Berm (SF) = 24347
Area Top of Berm (SF) = 48600
Sodding (SY) = 11979

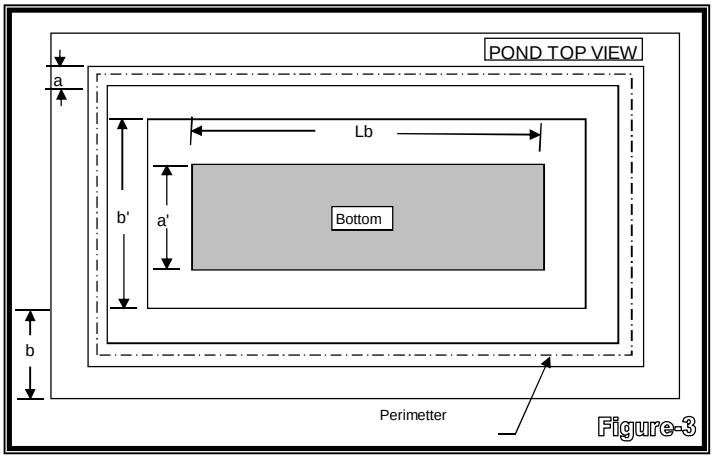
2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 110,199
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.1
CUT VOLUME (C.F.) = 719,050

Pond Bottom:
Area of Pond Bottom (sf) = 200,667
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.1
CUT VOLUME (C.F.) = 2,618,709

TOTAL CUT VOLUME (C.F.) = 3,337,759
TOTAL CUT VOLUME (C.Y.) = **123,621**



Fencing (ft) = 2720

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2B - Option 3:

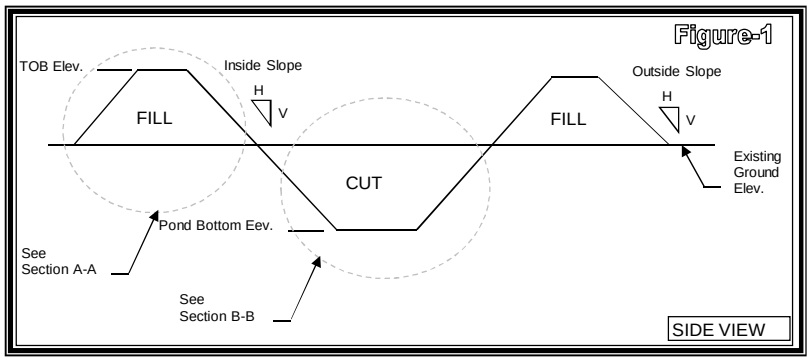
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

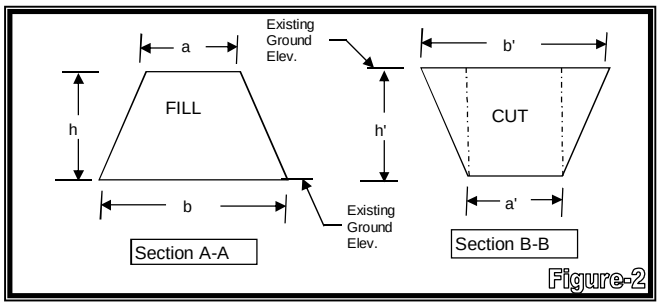
Existing Ground Elev. (ft) = 23
Top of Berm Elev. (ft) = 26.43
Pond Bottom Elev. (ft) = 10.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 21.95



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,946
a (ft) = 20
b (ft) = 47.44
h (ft) = 3.43
FILL AREA (S.F.) = 115.6596
Fill VOLUME (C.F.) = 225,074
Fill VOLUME (C.Y.) = 8,336



Area Inside Berm (SF) = 35946
Area Outside Berm (SF) = 27521
AreaTop of Berm (SF) = 38920
Sodding (SY) = 11376

2. Earthwork Cut Calculations:

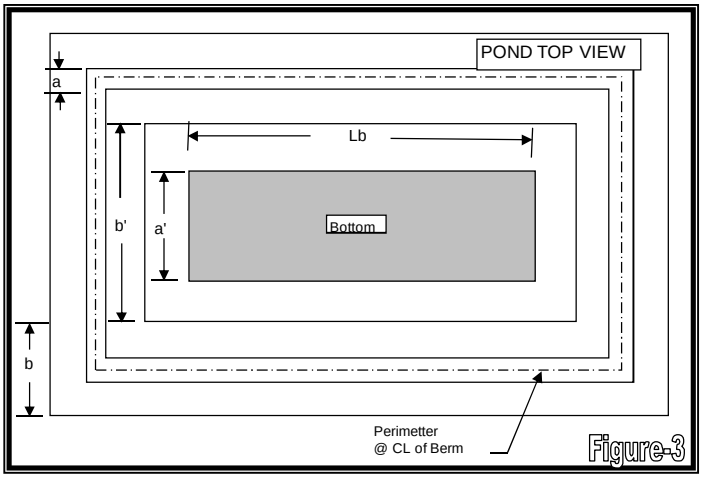
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 81,323
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.1
CUT VOLUME (C.F.) = 530,631

Pond Bottom:
Area of Pond Bottom (sf) = 113,055
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.1
CUT VOLUME (C.F.) = 1,475,361

TOTAL CUT VOLUME (C.F.) = 2,005,993
TOTAL CUT VOLUME (C.Y.) = **74,296**



Fencing (ft) = 2228

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 2C PREPARED: LCS 5/19/2016
LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/19/2016

Pond 2C

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
60	4236	$180.88	$766,208
18	1322	$47.49	$62,782
		Totals=	**$828,989**

Pipe Cost for Pond 2C = $828,989

Note: 868' of 18" pipe added for pond outfall

Earthwork:-Option 1

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
54,038	$4.75	**$256,681**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
14,346	0.00	**$0**

Import Fill = 39,692 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
39,692	6.00	**$238,152**

Earthwork Cost/Savings =	**$18,529**

Earthwork:-Option 2

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
35,992	$4.75	**$170,962**

Pond Fill (CY)	Unit Price ($/ft)	Cost ($)
17,460	0.00	**$0**

Import Fill = 18,532 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
18,532	6.00	**$111,192**

Earthwork Cost/Savings =	**$59,770**

Note: Red stypes & s parenthesis indicates s costs savings

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	16,333	$2.02	**$32,993**
Clearing & Grubbing	AC	6.86	$ 7,723.80	**$53,016**
Rubble Riprap (Ditch Lining)	TN	1,427.70	$74.42	**$106,249**
Sediment Barrier (Silt Fence)	LF	2,644	$1.04	**$2,750**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	16,570	$2.02	**$33,471**
Clearing & Grubbing	AC	6.14	$ 7,723.80	**$47,416**
Rubble Riprap (Ditch Lining)	TN	1,277.25	$74.42	**$95,053**
Sediment Barrier (Silt Fence)	LF	2,459	$1.04	**$2,557**

Total Construction Cost:

Option #1 = $1,042,526 **Option #2 = $1,067,257**

Note: Riprap assumed to be 8' s trip around pond s ide s lopes.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2C - Option 1:

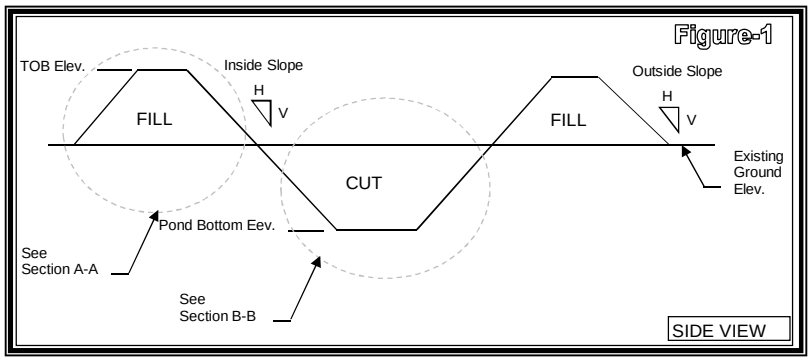
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

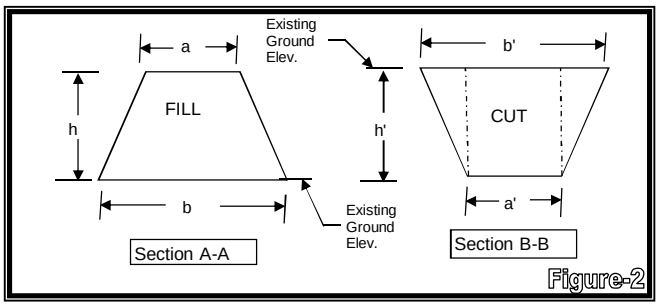
Existing Ground Elev. (ft) = 20
Top of Berm Elev. (ft) = 24.43
Pond Bottom Elev. (ft) = 6.3
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 18.33



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,318
a (ft) = 20
b (ft) = 55.44
h (ft) = 4.43
FILL AREA (S.F.) = 167.0996
Fill VOLUME (C.F.) = 387,337
Fill VOLUME (C.Y.) = 14,346



Area Inside Berm (SF) = 58300
Area Outside Berm (SF) = 42339
AreaTop of Berm (SF) = 46360
Sodding (SY) = 16333

2. Earthwork Cut Calculations:

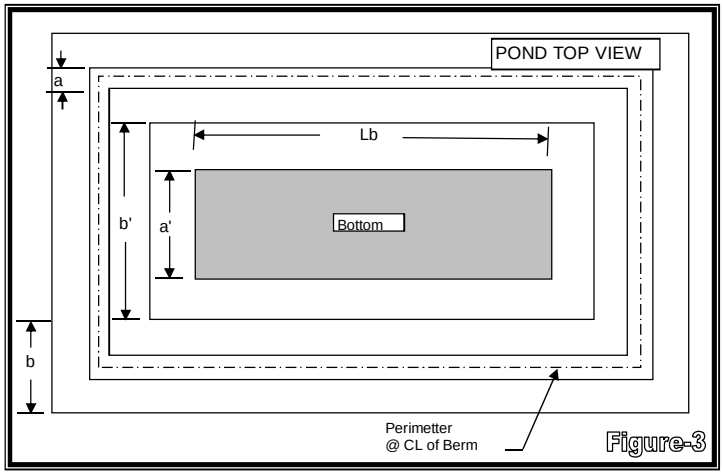
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 105,716
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.7
CUT VOLUME (C.F.) = 722,567

Pond Bottom:
Area of Pond Bottom (sf) = 53,873
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.7
CUT VOLUME (C.F.) = 736,447

TOTAL CUT VOLUME (C.F.) = 1,459,014
TOTAL CUT VOLUME (C.Y.) = **54,038**



Fencing (ft) = 2644

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2C - Option 2:

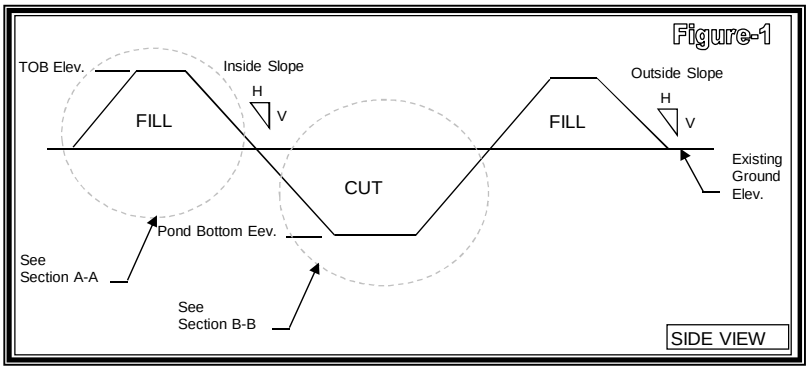
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

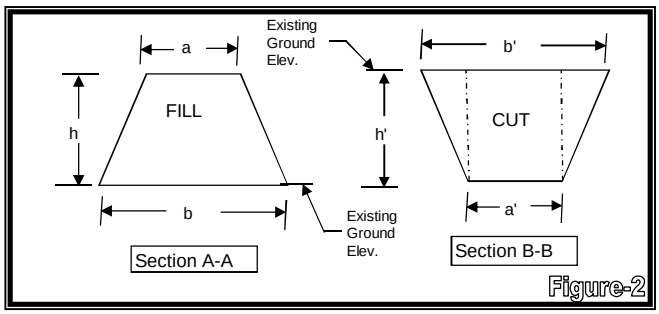
Existing Ground Elev. (ft) = 20
Top of Berm Elev. (ft) = 25.43
Pond Bottom Elev. (ft) = 6.3
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 18.33



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,081
a (ft) = 20
b (ft) = 63.44
h (ft) = 5.43
FILL AREA (S.F.) = 226.5396
Fill VOLUME (C.F.) = 471,429
Fill VOLUME (C.Y.) = **17,460**



Area Inside Berm (SF) = 60919
Area Outside Berm (SF) = 46590
Area Top of Berm (SF) = 41620
Sodding (SY) = 16570

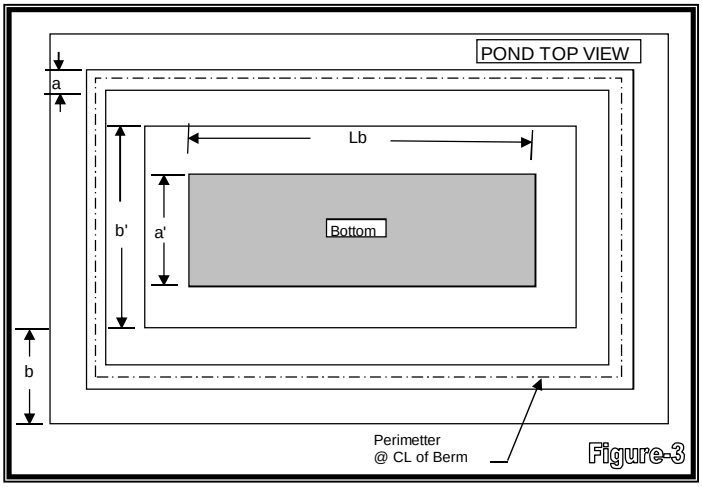
2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 88,826
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.7
CUT VOLUME (C.F.) = 607,127

Pond Bottom:
Area of Pond Bottom (sf) = 26,675
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.7
CUT VOLUME (C.F.) = 364,647

TOTAL CUT VOLUME (C.F.) = 971,774
TOTAL CUT VOLUME (C.Y.) = **35,992**



Fencing (ft) = 2459

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Basin 3

Construction Costs

PROJECT: SR 710 - Pond 3A — PREPARED: LCS 5/5/2016
LOCATION: OKEECHOBEE COUNTY, FLORIDA — CHECKED: GS 5/6/2016

Pond 3A

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	1161	$47.49	$55,116
24	410	$52.81	$21,668
30	0	$64.20	$0
36	1035	$88.90	$92,037
42	1511	$111.76	$168,883
		Totals=	**$337,704**

Pipe Cost for Pond 3A = **$337,704**

Earthwork:

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
39,249	$4.75	**$186,433**

Import Fill = **39,249** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
39,249	6.00	**$235,494**

Earthwork Cost/Savings =	**($49,061)**

Note: Reds types & parenthesis indicates costs savings

Clay Liner:

Area at Pond Peak Stage (SY)	Unit Price ($/SY)	Cost ($)
9,885	$10.00	**$98,851**

*Assumed units prices of clay liners at $10/SY

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	7,052	$2.02	**$14,245**
Clearing & Grubbing	AC	3.47	$7,723.80	**$26,802**
Sediment Barrier (Silt Fence)	LF	1,834	$1.04	**$1,907**

Total Construction Cost:

= $430,448

Note: Pipe sizes and lengths assumed from modification of preliminary storm drain tabulations for Pond 3A and 3B (added extra 65' from measurement). Pipe length (140' of 18" pipe) from pond to outfall also included in estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 3A:

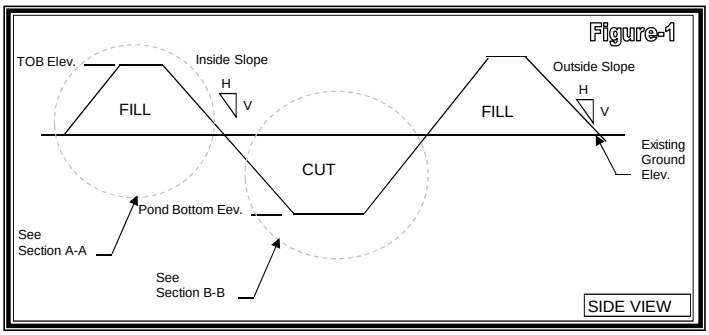
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 30
Top of Berm Elev. (ft) = 29.73
Pond Bottom Elev. (ft) = 12.73
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

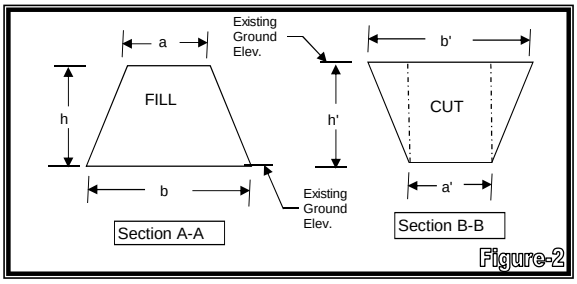
Control Elev. (ft) = 24.73
*Assume Pond Bottom 12' depth below NW



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimeter @ CL of the Berm (ft) = 1,521
a (ft) = 20
b (ft) = 17.84
h (ft) = -0.27
FILL AREA (S.F.) = 0
Fill VOLUME (C.F.) = 0
Fill VOLUME (C.Y.) = 0

Area Inside Berm (SF) = 31,356
Area Outside Berm (SF) = 1,693
Area Top of Berm (SF) = 30,420
Sodding (SY) = 7,052



2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

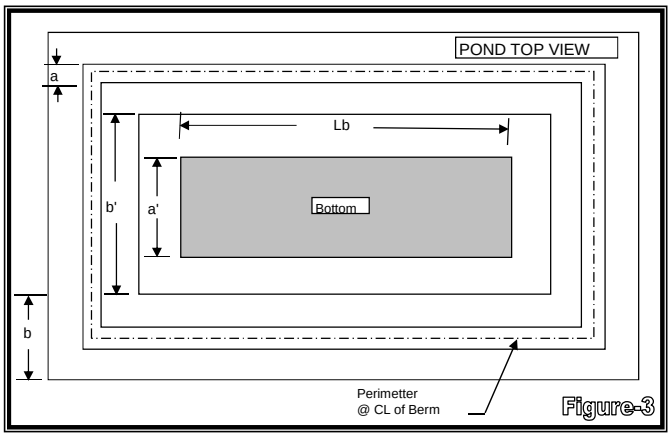
From Exist Ground To Berm:
Area Between a' & b' elevations (sf) = 1,714
(Exist Ground to TOP) h' (ft) = 0.27
CUT VOLUME (C.F.) = 231

To Berm Elevation:
Area at Outside TOB (sf) = 130,851
(Existing Ground to TOP) h' (ft) = 0.27
CUT VOLUME (C.F.) = 35,330

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 80,371
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 17.0
CUT VOLUME (C.F.) = 683,151

Pond Bottom:
Area of Pond Bottom (sf) = 20,060
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 17.0
CUT VOLUME (C.F.) = 341,023

TOTAL CUT VOLUME (C.F.) = 1,059,736
TOTAL CUT VOLUME (C.Y.) = **39,249**



Fencing (ft) = 1834

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 3B | PREPARED: LCS 5/11/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA | CHECKED: GS 5/11/2015

Pond 3B

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	2232	$47.49	$105,978
24	970	$52.81	$51,227
30	0	$64.20	$0
36	1137	$88.90	$101,105
42	101	$111.76	$11,313
		Total =	**$269,624**

Pipe Cost for Pond 3B = **$269,624**

Earthwork:

	Earthwork (CY)	Unit Price ($/CY)	Cost ($)
Excavation	18,810	$4.75	**$89,348**
Fill	3,591	$0.00	**$0**

Import Fill = **15,219** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
15,219	6.00	**$91,314**

Earthwork Cost/Savings =	**($1,967)**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	6,267	$2.02	**$12,659**
Clearing & Grubbing	AC	2.44	$7,723.80	**$18,877**
Sediment Barrier (Silt)	LF	1,319	$1.04	**$1,372**

Total Construction Cost:

= **$300,565**

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 3B:

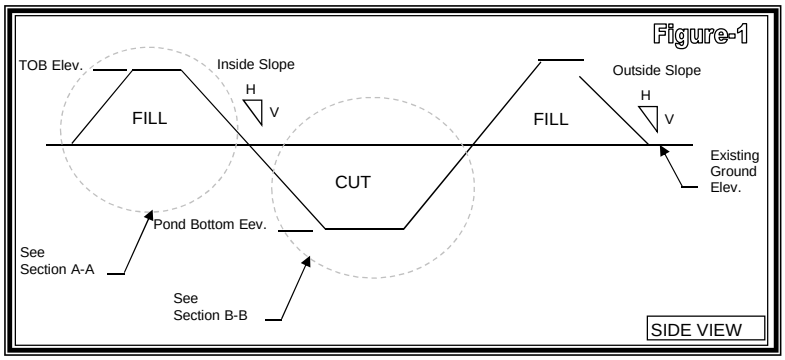
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

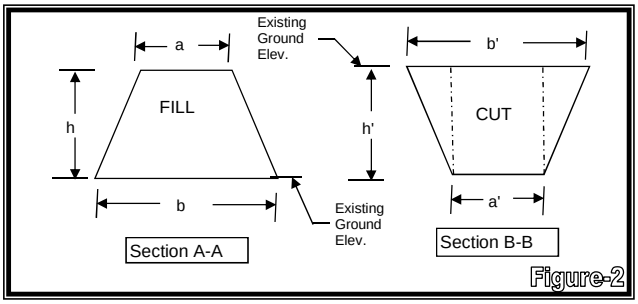
Existing Ground Elev. (ft) = 27
Top of Berm Elev. (ft) = 29.73
Pond Bottom Elev. (ft) = 13.4
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 25.4
*Assume Pond Bottom 12' depth below NW



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,149
a (ft) = 20
b (ft) = 41.84
h (ft) = 2.73
FILL AREA (S.F.) = 84.4116
Fill VOLUME (C.F.) = 96,955
Fill VOLUME (C.Y.) = 3,591



Area Inside Berm (SF) = 20,506
Area Outside Berm (SF) = 12,929
Area Top of Berm (SF) = 22,972
Sodding (SY) = 6,267

2. Earthwork Cut Calculations:

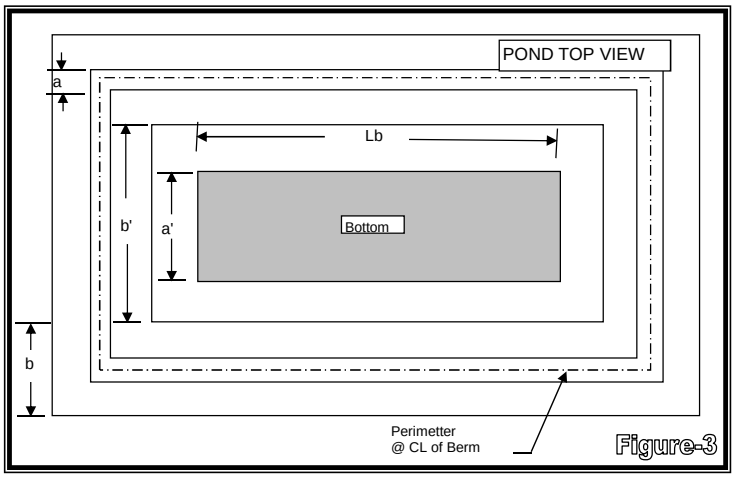
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 40,699
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.6
CUT VOLUME (C.F.) = 276,754

Pond Bottom:
Area of Pond Bottom (sf) = 16,995
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.6
CUT VOLUME (C.F.) = 231,130

TOTAL CUT VOLUME (C.F.) = 507,883
TOTAL CUT VOLUME (C.Y.) = **18,810**



Fencing (ft) = 1,319

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 3C | PREPARED: LCS 5/11/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA | CHECKED: GS 5/11/2015

Pond 3C

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	1106	$47.49	$52,504
24	410	$52.81	$21,668
30	0	$64.20	$0
36	1035	$88.90	$92,037
42	1803	$111.76	$201,517
48	95	$116.13	$11,032
		Total =	**$378,759**

Pipe Cost for Pond 3C = **$378,759**

Earthwork:

	Earthwork (CY)	Unit Price ($/CY)	Cost ($)
Excavation	18,874	$4.75	**$89,652**
Fill	3,175	$0.00	**$0**

Import Fill = **15,699** **CY**

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/ft)	Cost ($)
15,699	6.00	**$94,194**

Earthwork Cost/Savings =	**($4,543)**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	9,175	$2.02	**$18,534**
Clearing & Grubbing	AC	1.81	$7,723.80	**$14,011**
Sediment Barrier (Silt)	LF	1,656	$1.04	**$1,722**

Total Construction Cost:

= **$408,483**

Note: Pipe Sizes and Lengths from preliminary storm drain tabulations for Pond 3B. Assumed an extra 292' of 72 inch pipe and 95' of 48 inch pipe due to extra distance to Pond 3C. Pipe length (85' of 18" pipe) from pond to outfall also included in estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 3C:

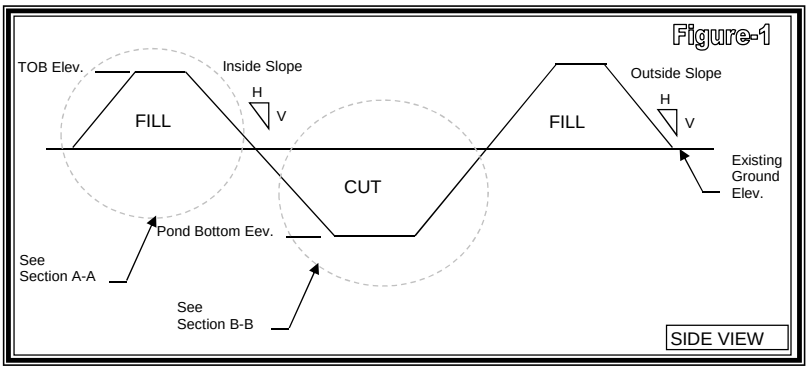
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 24.5
Top of Berm Elev. (ft) = 28
Pond Bottom Elev. (ft) = 10.45
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 22.45
*Assume Pond Bottom 12' depth below NW

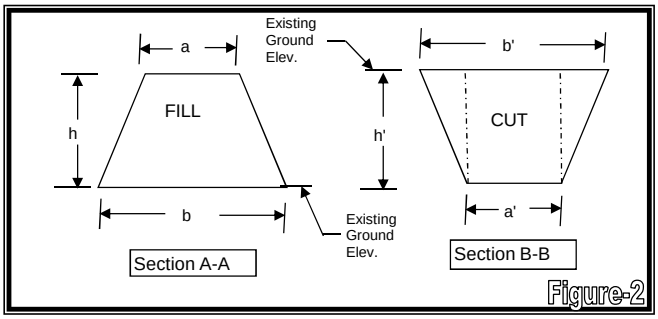


B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,441
a (ft) = 20
b (ft) = 48
h (ft) = 3.5
FILL AREA (S.F.) = 119
Fill VOLUME (C.F.) = 171,455
Fill VOLUME (C.Y.) = 6,350
Fill VOLUME (C.Y.) = 3,175

*Assumed half fill volume due to existing pond

Area Inside Berm (SF) = 32,970
Area Outside Berm (SF) = 20,792
Area Top of Berm (SF) = 28,816
Sodding (SY) = 9,175



2. Earthwork Cut Calculations:

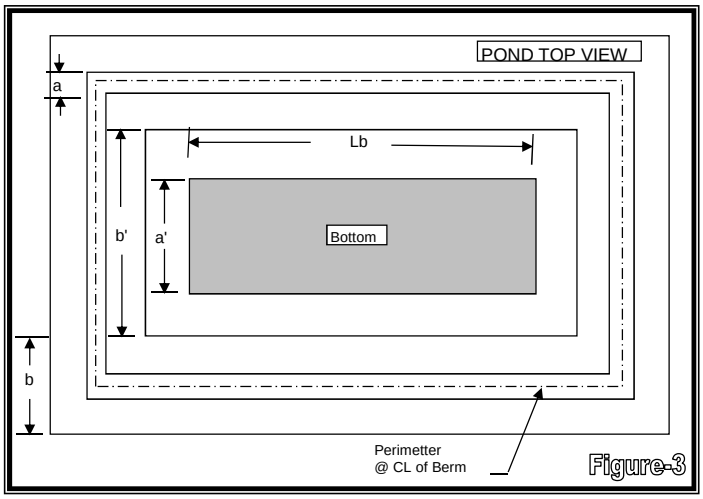
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 60,785
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 14.1
CUT VOLUME (C.F.) = 427,012

Pond Bottom:
Area of Pond Bottom (sf) = 42,148
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 14.1
CUT VOLUME (C.F.) = 592,173

TOTAL CUT VOLUME (C.F.) = 1,019,185
TOTAL CUT VOLUME (C.Y.) = **37,748**
TOTAL CUT VOLUME (C.Y.) = **18,874**

*Assumed half excavation volume due to existing pond



Fencing (ft) = 1656

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Basin 4

Construction Costs

PROJECT: SR 710 - Pond 4A
LOCATION: OKEECHOBEE COUNTY, FLORIDA

PREPARED: LCS 5/11/2015
CHECKED: GS 5/11/2015

Pond 4A

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	1207	$47.49	$57,320
24	0	$52.81	$0
30	0	$64.20	$0
36	96	$88.90	$8,534
42	1490	$111.76	$166,522
48	2780	$116.13	$322,841
60	0	$180.88	$0
		Totals=	**$555,219**

Pipe Cost for Pond 4A= $555,219

Note: 200' of 18" pipe added for pond outfall

Earthwork:-Option 1

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
31,090	$4.75	**$147,678**

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
10,978	0.00	**$0**

Import Fill = 20,112 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/CY)	Cost ($)
20,112	6.00	**$120,672**

Earthwork Cost/Savings =	**$27,006**

Earthwork:-Option 2

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
20,481	$4.75	**$97,285**

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
10,244	0.00	**$0**

Import Fill = 10,237 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/CY)	Cost ($)
10,237	6.00	**$61,422**

Earthwork Cost/Savings =	**$35,863**

Note: Reds types & parenthesis indicates costs savings

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	10,083	$2.02	**$20,368**
Clearing & Grubbing	AC	3.98	$ 7,723.80	**$30,772**
Sediment Barrier (Silt Fence)	LF	1,690	$1.04	**$1,758**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	9,409	$2.02	**$19,006**
Clearing & Grubbing	AC	3.34	$ 7,723.80	**$25,821**
Sediment Barrier (Silt Fence)	LF	1,594	$1.04	**$1,658**

Total Construction Cost:

Option #1 =	**$635,121**

Option #2 =	**$637,566**

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 4A - Option 1:

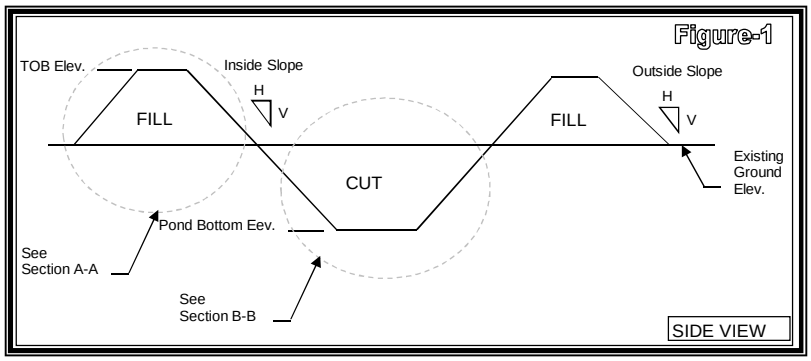
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

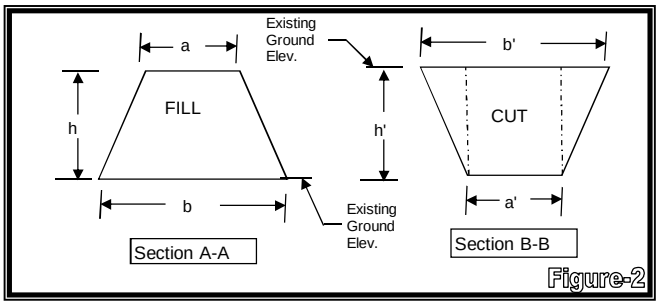
Existing Ground Elev. (ft) = 24
Top of Berm Elev. (ft) = 29
Pond Bottom Elev. (ft) = 12
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 24



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,482
a (ft) = 20
b (ft) = 60
h (ft) = 5
FILL AREA (S.F.) = 200
Fill VOLUME (C.F.) = 296,400
Fill VOLUME (C.Y.) = **10,978**



Area Inside Berm (SF) = 30,552
Area Outside Berm (SF) = 30,552
Area Top of Berm (SF) = 29,640
Sodding (SY) = 10,083

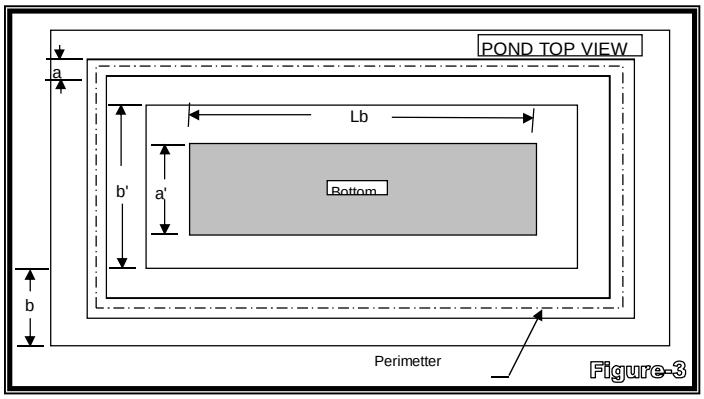
2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 53,889
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 323,335

Pond Bottom:
Area of Pond Bottom (sf) = 43,008
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 516,095

TOTAL CUT VOLUME (C.F.) = 839,429
TOTAL CUT VOLUME (C.Y.) = **31,090**



Fencing (ft) = 1,690

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 4A - Option 2:

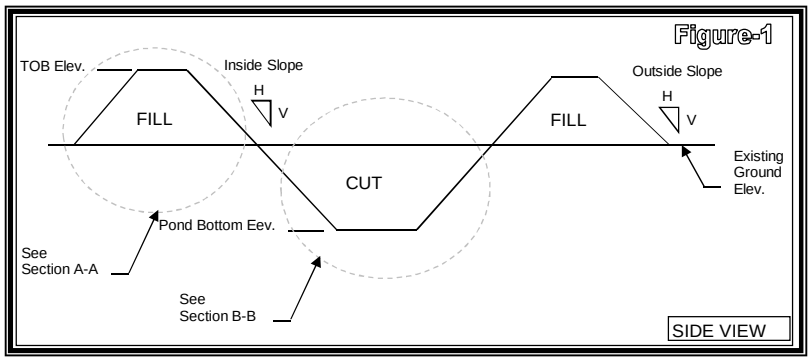
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

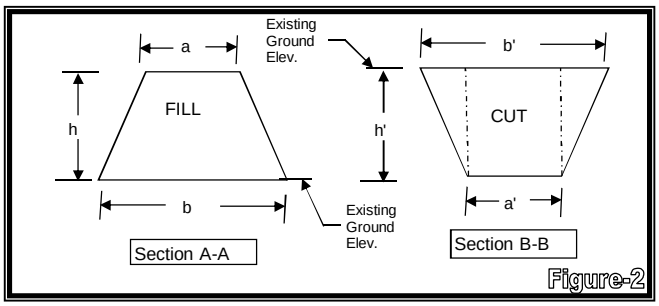
Existing Ground Elev. (ft) = 24
Top of Berm Elev. (ft) = 29
Pond Bottom Elev. (ft) = 12
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 24



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,383
a (ft) = 20
b (ft) = 60
h (ft) = 5
FILL AREA (S.F.) = 200
Fill VOLUME (C.F.) = 276,600
Fill VOLUME (C.Y.) = **10,244**



Area Inside Berm (SF) = 28,511
Area Outside Berm (SF) = 28,511
Area Top of Berm (SF) = 27,660
Sodding (SY) = 9,409

2. Earthwork Cut Calculations:

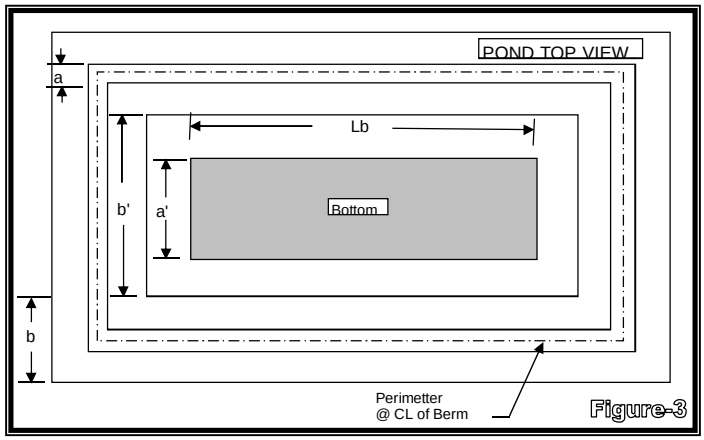
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 46,628
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 279,767

Pond Bottom:
Area of Pond Bottom (sf) = 22,769
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 12.0
CUT VOLUME (C.F.) = 273,229

TOTAL CUT VOLUME (C.F.) = 552,996
TOTAL CUT VOLUME (C.Y.) = **20,481**



Fencing (ft) = 1,594

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 4B/4C
LOCATION: OKEECHOBEE COUNTY, FLORIDA

PREPARED: LCS 5/5/2016
CHECKED: GS 5/5/2016

Pond 4B/4C

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	1096	$47.49	$52,049
24	224	$52.81	$11,829
30	1849	$64.20	$118,706
36	707	$88.90	$62,852
42	0	$111.76	$0
48	1698	$116.13	$197,189
60	0	$180.88	$0
		Totals=	**$442,625**

Pipe Costs for Pond 4B/4C = $442,625

Note: ss 100's of s 18" s pipes added s for s pond s outfall

Earthwork:-Option 1

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
50,379	$4.75	**$239,300**

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
13,344	0.00	**$0**

Import Fill = 37,035 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/CY)	Cost ($)
37,035	6.00	**$222,210**

Earthwork Cost/Savings =	**$17,090**

Earthwork:-Option 2

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
33,471	$4.75	**$158,987**

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
7,320	0.00	**$0**

Import Fill = 26,151 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/CY)	Cost ($)
26,151	6.00	**$156,906**

Earthwork Cost/Savings =	**$2,081**

Note: s Red s types & s parenthesis s indicates s costs s savings

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	19,464	$2.02 s	**$39,317 b**
Clearing & Grubbing	AC	7.17	$ s s s 7,723.80	**$55,380 b**
Sediment Barrier (Silt Fence)	LF	5,222	$1.04 s	**$5,431 b**

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	10,621	$2.02 s	**$21,454 b**
Clearing & Grubbing	AC	4.20	$ s s s 7,723.80	**$32,448 b**
Sediment Barrier (Silt Fence)	LF	2,513	$1.04 s	**$2,614 b**

Total Construction Cost:

Option #1 =	**$559,843 b**

Option #2 =	**$501,222 b**

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 4B/4C - Option 1:

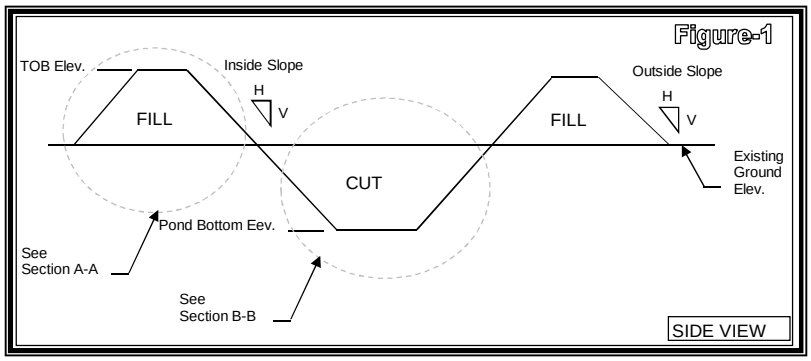
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

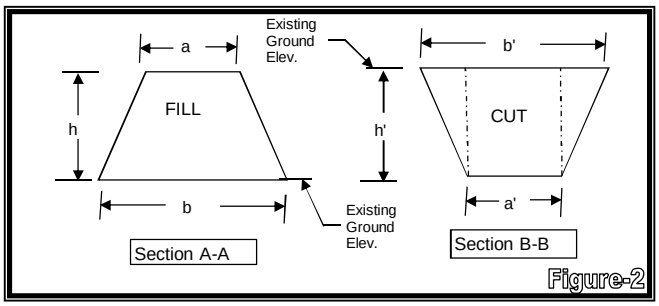
Existing Ground Elev. (ft) = 24
Top of Berm Elev. (ft) = 27.38
Pond Bottom Elev. (ft) = 10.25
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Contol El. (ft) = 22.25



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 3,180
a (ft) = 20
b (ft) = 47.04
h (ft) = 3.38
FILL AREA (S.F.) = 113.2976
Fill VOLUME (C.F.) = 360,286
Fill VOLUME (C.Y.) = **13,344**



Area Inside Berm (SF) = 67,262
Area Outside Berm (SF) = 44,317
Area Top of Berm (SF) = 63,600
Sodding (SY) = 19,464

2. Earthwork Cut Calculations:

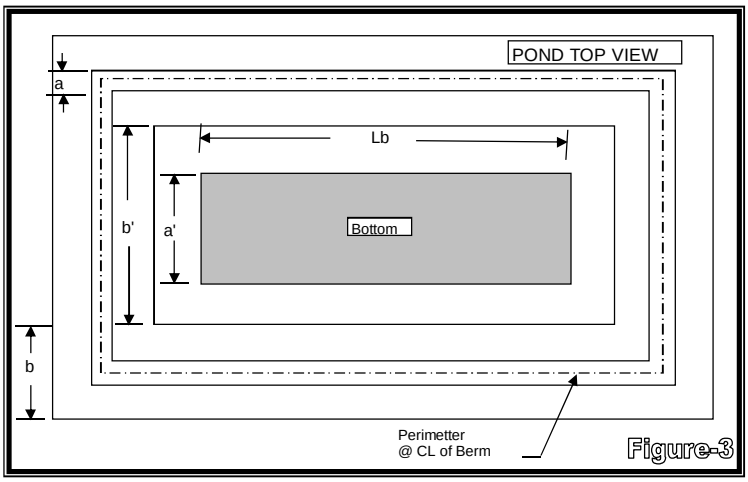
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 121,368
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.8
CUT VOLUME (C.F.) = 834,406

Pond Bottom:
Area of Pond Bottom (sf) = 38,241
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.8
CUT VOLUME (C.F.) = 525,819

TOTAL CUT VOLUME (C.F.) = 1,360,225
TOTAL CUT VOLUME (C.Y.) = **50,379**



Fencing (ft) = 5,222

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 4B - Option 2:

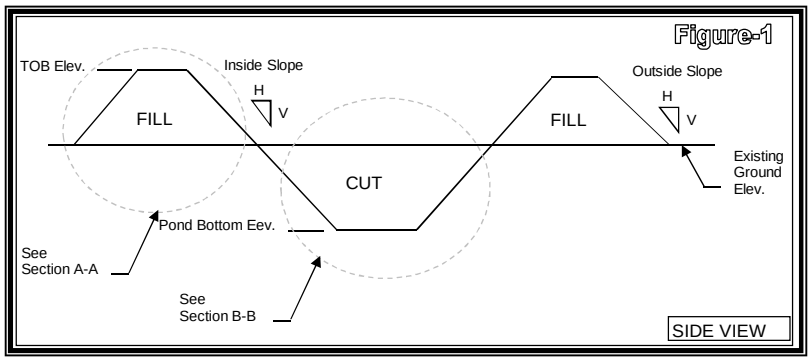
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 24
Top of Berm Elev. (ft) = 27.4
Pond Bottom Elev. (ft) = 10.25
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

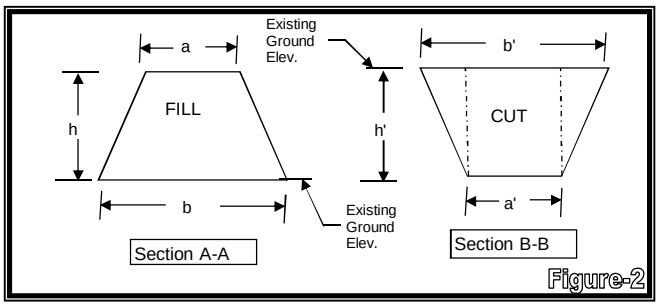
Contol El. (ft) = 22.25



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,730
a (ft) = 20
b (ft) = 47.2
h (ft) = 3.4
FILL AREA (S.F.) = 114.24
Fill VOLUME (C.F.) = 197,635
Fill VOLUME (C.Y.) = **7,320**

Area Inside Berm (SF) = 36,735
Area Outside Berm (SF) = 24,252
Area Top of Berm (SF) = 34,600
Sodding (SY) = 10,621



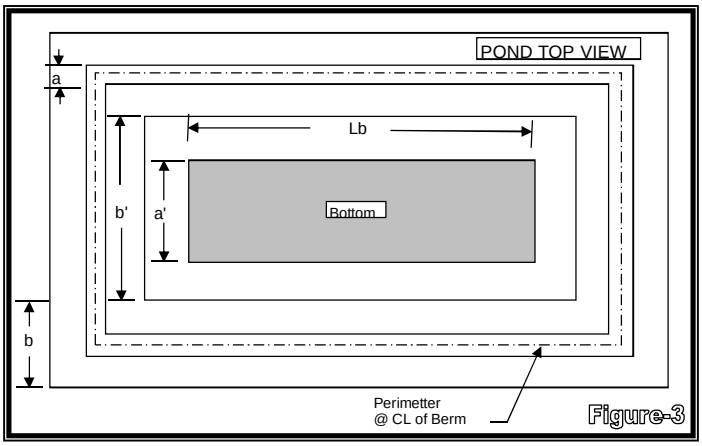
2. Earthwork Cut Calculations:

CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:
Area Between a' & b' elevations (sf) = 70,057
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.8
CUT VOLUME (C.F.) = 481,640

Pond Bottom:
Area of Pond Bottom (sf) = 30,696
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 13.8
CUT VOLUME (C.F.) = 422,071

TOTAL CUT VOLUME (C.F.) = 903,712
TOTAL CUT VOLUME (C.Y.) = **33,471**



Fencing (ft) = 2,513

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Construction Costs

PROJECT: SR 710 - Pond 4D
LOCATION: OKEECHOBEE COUNTY, FLORIDA

PREPARED: LCS 5/11/2015
CHECKED: GS 5/11/2015

Pond 4D

Pipe Costs:

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	2909	$47.49	$138,148
24	224	$52.81	$11,829
30	1849	$64.20	$118,706
36	803	$88.90	$71,387
42	1490	$111.76	$166,522
48	0	$116.13	$0
60	0	$180.88	$0
		Totals=	**$506,593**

Pipe Costs for Pond 4D= $506,593

Note: s 1800's of s 18" s pipes added s for s pond s outfall

Earthwork:-Option 1

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
46,216	$4.75	**$219,526**

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
7,065	0.00	**$0**

Import Fill = 39,151 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/CY)	Cost ($)
39,151	6.00	**$234,906**

Earthwork Cost/Savings =	**($15,380)**

Note: s Reds types & s parenthesis s indicates s costs s savings

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	11,853	$2.02 s	**$23,943 b**
Clearing & Grubbing	AC	6.08	$ s s s 7,723.80	**$46,922 b**
Sediment Barrier (Silt Fence)	LF	2,873	$1.04 s	**$2,988 b**

Earthwork:-Option 2

Pond Excavation (CY)	Unit Price ($/CY)	Cost ($)
28,710	$4.75	**$136,373**

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
9,401	0.00	**$0**

Import Fill = 19,309 CY

Savings by Importing Fill to Roadway:

Road Fill (CY)	Unit Price ($/CY)	Cost ($)
19,309	6.00	**$115,854**

Earthwork Cost/Savings =	$20,519

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	15,772	$2.02 s	**$31,859 b**
Clearing & Grubbing	AC	4.33	$ s s s 7,723.80	**$33,429 b**
Sediment Barrier (Silt Fence)	LF	2,271	$1.04 s	**$2,362 b**

Total Construction Cost:

Option #1 = $565,066 b

Option #2 = $594,761 b

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 4D - Option 1:

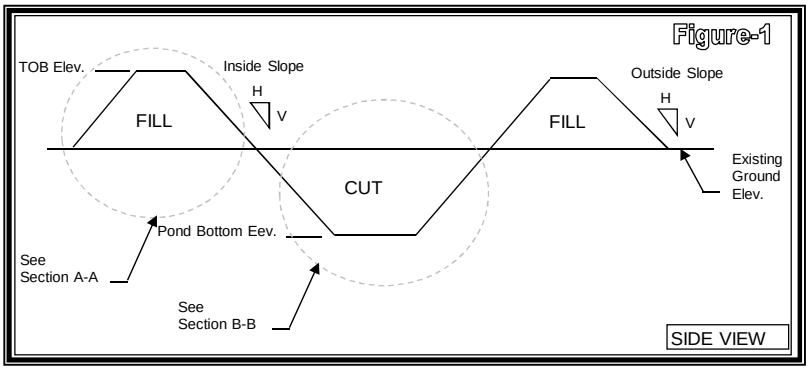
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 26
Top of Berm Elev. (ft) = 29
Pond Bottom Elev. (ft) = 11.83
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

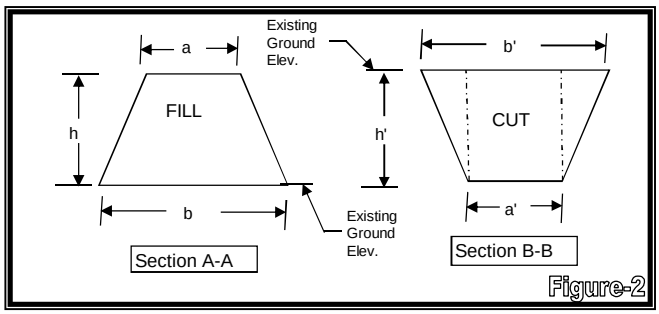
Contol El. (ft) = 23.83



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,987
a (ft) = 20
b (ft) = 44
h (ft) = 3
FILL AREA (S.F.) = 96
Fill VOLUME (C.F.) = 190,752
Fill VOLUME (C.Y.) = **7,065**

Area Inside Berm (SF) = 42,356
Area Outside Berm (SF) = 24,578
Area Top of Berm (SF) = 39,740
Sodding (SY) = 11,853



2. Earthwork Cut Calculations:

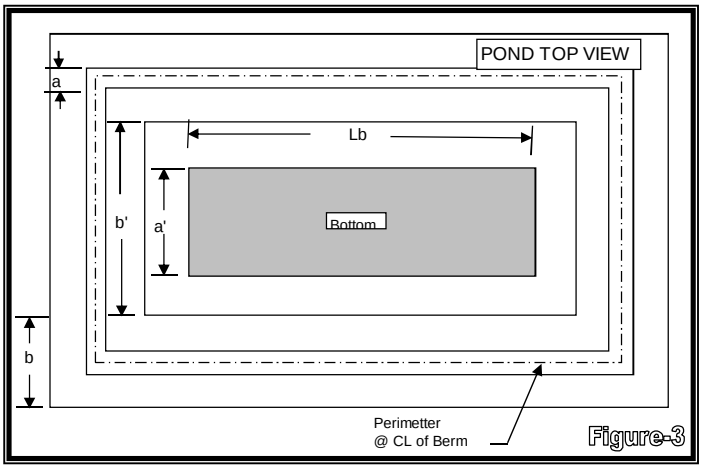
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 126,421
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 14.2
CUT VOLUME (C.F.) = 895,693

Pond Bottom:
Area of Pond Bottom (sf) = 24,851
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 14.2
CUT VOLUME (C.F.) = 352,137

TOTAL CUT VOLUME (C.F.) = 1,247,830
TOTAL CUT VOLUME (C.Y.) = **46,216**



Fencing (ft) = 2,873

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 4D - Option 2:

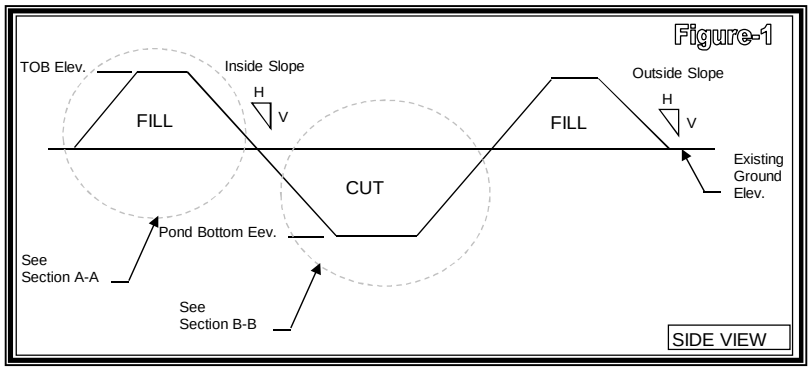
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 26
Top of Berm Elev. (ft) = 29
Pond Bottom Elev. (ft) = 11.83
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

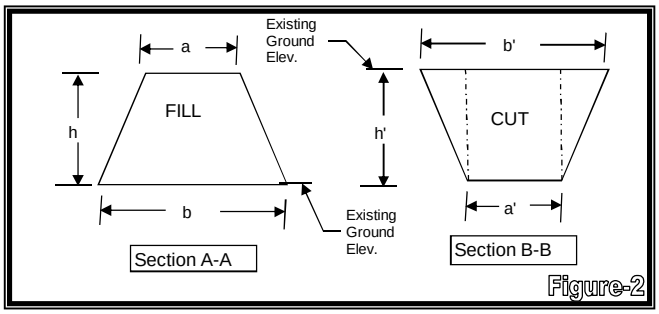
Contol El. (ft) = 23.83



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,644
a (ft) = 20
b (ft) = 44
h (ft) = 3
FILL AREA (S.F.) = 96
Fill VOLUME (C.F.) = 253,824
Fill VOLUME (C.Y.) = **9,401**

Area Inside Berm (SF) = 56,361
Area Outside Berm (SF) = 32,704
Area Top of Berm (SF) = 52,880
Sodding (SY) = 15,772



2. Earthwork Cut Calculations:

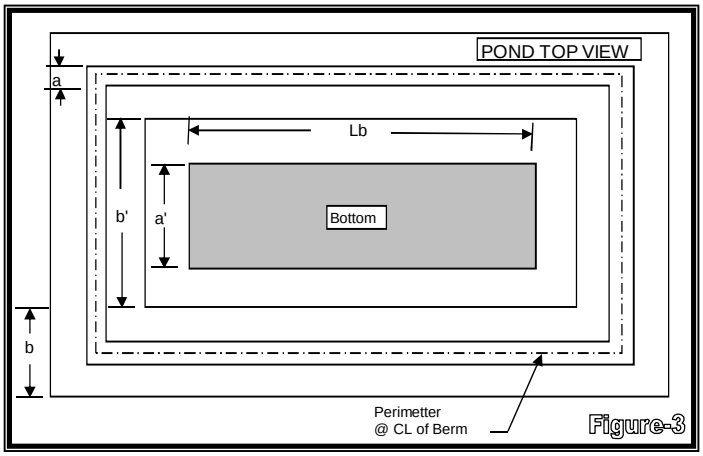
CUT VOLUME (C.F.) = 0.5 (Area between a' & b') * h' <- Area of Cut along Side slope
= (Area of specified elevation a') * h' <- Area of Cut to specified elevation

Pond Side Slopes From Inside Pond Contour at Exist. Ground Elev. to Pond Bottom:

Area Between a' & b' elevations (sf) = 92,573
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 14.2
CUT VOLUME (C.F.) = 655,878

Pond Bottom:
Area of Pond Bottom (sf) = 8,418
(Exist. Ground Elev. to Pond Bottom)
h' (ft) = 14.2
CUT VOLUME (C.F.) = 119,282

TOTAL CUT VOLUME (C.F.) = 775,161
TOTAL CUT VOLUME (C.Y.) = **28,710**



Fencing (ft) = 2,271

Note: Sodding quantity taken to control elevation & fencing measured at R/W line

Basin 5

Construction Costs

PROJECT:	SR 710 - Pond 5A	PREPARED:	LCS	5/11/2015
LOCATION:	OKEECHOBEE COUNTY, FLORIDA	CHECKED:	GS	5/11/2015

Pond 5A

Pipe Costs: Outfall Pipe Only

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	595	$47.49	$28,257
		Totals=	**$28,257**

Pipe Cost for Pond 5A = **$28,257**

Embankment:

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
8,628	$6.00	**$51,768**

Underdrain:

Length of Underdrain (ft)	Unit Price ($/ft)	Cost ($)
3,570	$40.00	**$142,800**

Estimated by measurements - 51 @ 70' lengths

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	12,330	$2.02	**$24,907**
Clearing & Grubbing	AC	2.62	$7,723.80	**$20,267**
Sediment Barrier (Silt Fence)	LF	1,632	$1.04	**$1,697**

Total Construction Cost:

= $269,696

Note: Outfall Pipe length (595' of 18" pipe) is included in the estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 5A:

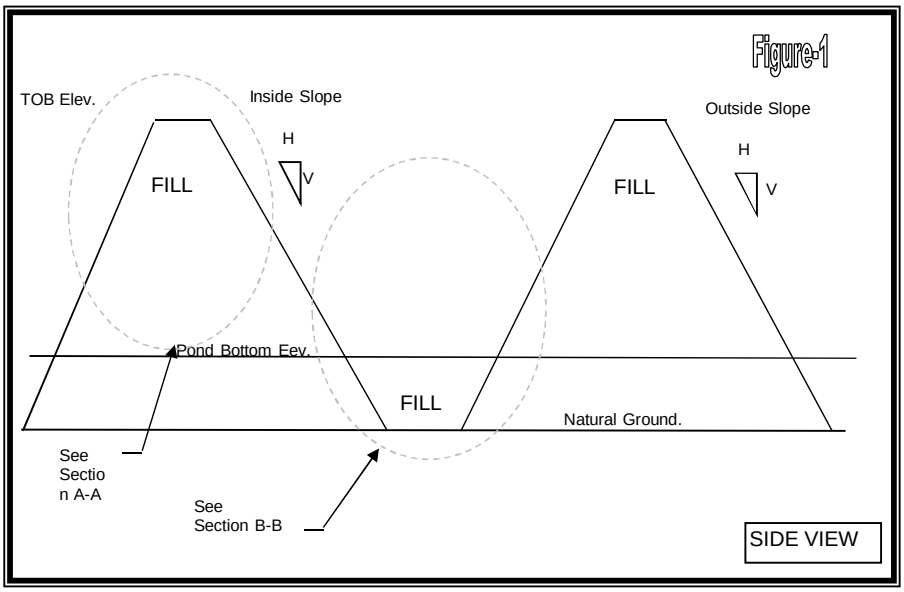
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 23
Top of Berm Elev. (ft) = 27
Pond Bottom Elev. (ft) = 24
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

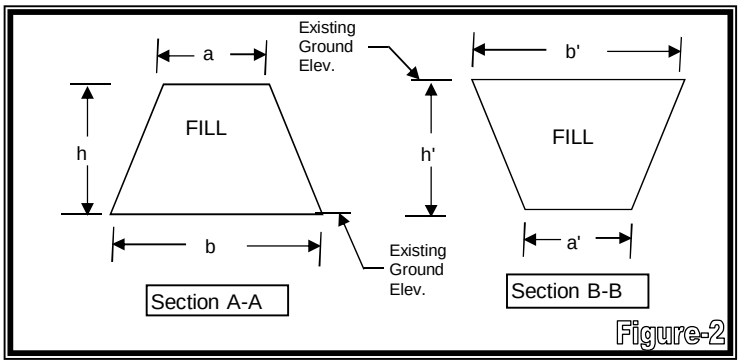
Pond Bottom (ft) = 24



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,408
a (ft) = 20
b (ft) = 47.5
h (ft) = 4
FILL AREA (S.F.) = 135
Fill VOLUME (C.F.) = 190,134
Fill VOLUME (C.Y.) = **7,042**

Sodding (SY) = 12,330



2. Embankment Fill Calculations:

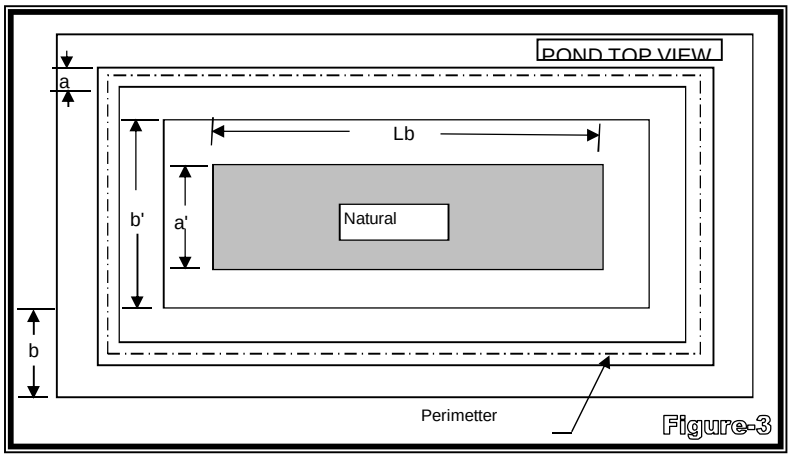
FILL AREA (S.F.) = 0.5 (a' + b') h'
Pond bottom Length (ft) = 532
a' (ft) = 76.5
b' (ft) = 84.5
h' (ft) = 1
FILL AREA (S.F.) = 80.5
FILL VOLUME (C.F.) = 42,826
FILL VOLUME (C.Y.) = 1,586

Sodding (SY) = 545,097,574

Total Fill:	**8,628 C.Y.**

Note: b' and Lb are the length and width of pond bottom.
The a' is the width of natural ground elevation

Fencing (ft) = 1,632



Note: Sodding quantity taken as entire dry pond & fencing measured at R/W line

Construction Costs

PROJECT:	SR 710 - Pond 5B	PREPARED:	LCS	5/11/2015
LOCATION:	OKEECHOBEE COUNTY, FLORIDA	CHECKED:	GS	5/11/2015

Pond 5B

Pipe Costs: (Outfall Pipe Only

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	125.00	$47.49	$5,936
		Total =	**$5,936**

Pipe Cost for Pond 5B = **$5,936**

Embankment:

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
10,020	$6.00	**$60,120**

Underdrain:

Length of Underdrain (ft)	Unit Price ($/ft)	Cost ($)
3,848	$40.00	**$153,920**

Estimated by measurements - 52s @ 74' lengths

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	11,800	$2.02	**$23,836**
Clearing & Grubbing	AC	2.53	$7,723.80	**$19,572**
Sediment Barrier (Silt Fence)	LF	1,633	$1.04	**$1,698**

Total Construction Cost:

= $265,083

Note: Outfall Pipe length (125' of 18" pipe) is included in the estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 5B:

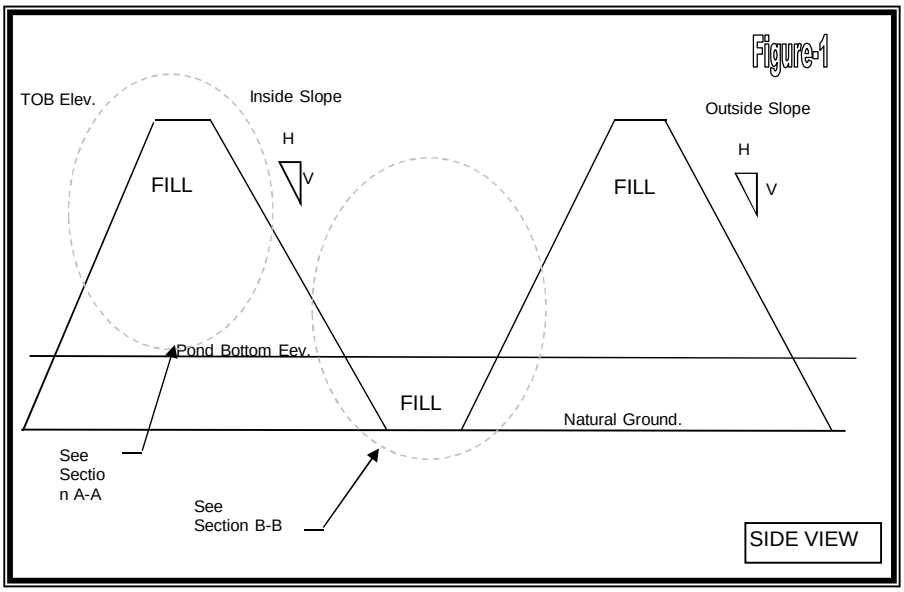
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 22.5
Top of Berm Elev. (ft) = 27
Pond Bottom Elev. (ft) = 24
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

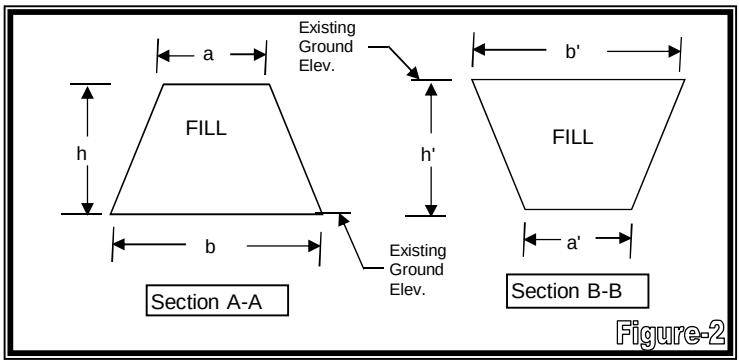
Pond Bottom (ft) = 24



B. Berm Fill Calculations.

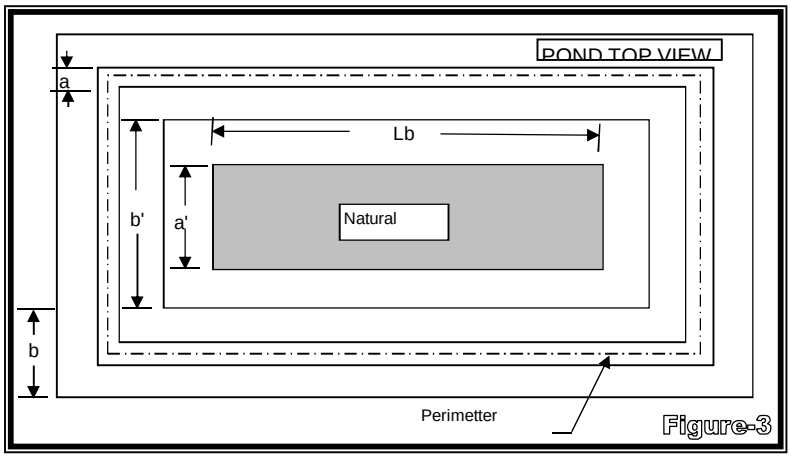
FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,376
a (ft) = 20
b (ft) = 50
h (ft) = 4.5
FILL AREA (S.F.) = 157.5
Fill VOLUME (C.F.) = 216,720
Fill VOLUME (C.Y.) = **8,027**

Sodding (SY) = 11,800



2. Embankment Fill Calculations:

FILL AREA (S.F.) = 0.5 (a' + b') h'
Pond bottom Length (ft) = 523
a' (ft) = 62.6
b' (ft) = 74.6
h' (ft) = 1.5
FILL AREA (S.F.) = 102.9
FILL VOLUME (C.F.) = 53,817
FILL VOLUME (C.Y.) = **1,993**



Total Fill:	**10,020 C.Y.**

Note: b' and Lb are the length and width of pond bottom.
The a' is the width of natural ground elevation

Fencing (ft) = 1,633

Note: Sodding quantity taken as entire dry pond & fencing measured at R/W line

Construction Costs

PROJECT:	SR 710 - Pond 5C	PREPARED:	LCS	5/11/2015
LOCATION:	OKEECHOBEE COUNTY, FLORIDA	CHECKED:	GS	5/11/2015

Pond 5C

Pipe Costs: (Outfall Pipe Only)

Pipe Size (inch)	Pipe Length (ft)	Unit Price ($/ft)	Cost ($)
18	400.00	$47.49	$18,996
		Total =	**$18,996**

Pipe Cost for Pond 5C = **$18,996**

Embankment:

Pond Fill (CY)	Unit Price ($/CY)	Cost ($)
5,878	$6.00	**$35,268**

Underdrain:

Length of Underdrain (ft)	Unit Price ($/ft)	Cost ($)
3,750	$40.00	**$150,000**

Estimated by measurements - 25s @ 150' lengths

Item	Unit	Quantity	Unit Price	Cost ($)
Sodding	SY	16,444	$2.02	**$33,217**
Clearing & Grubbing	AC	3.53	$7,723.80	**$27,250**
Sediment Barrier (Silt Fence)	LF	1,916	$1.04	**$1,993**

Total Construction Cost:

= $266,723

Note: Outfall Pipe length (400' of 18" pipe) is included in estimate.

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 5C:

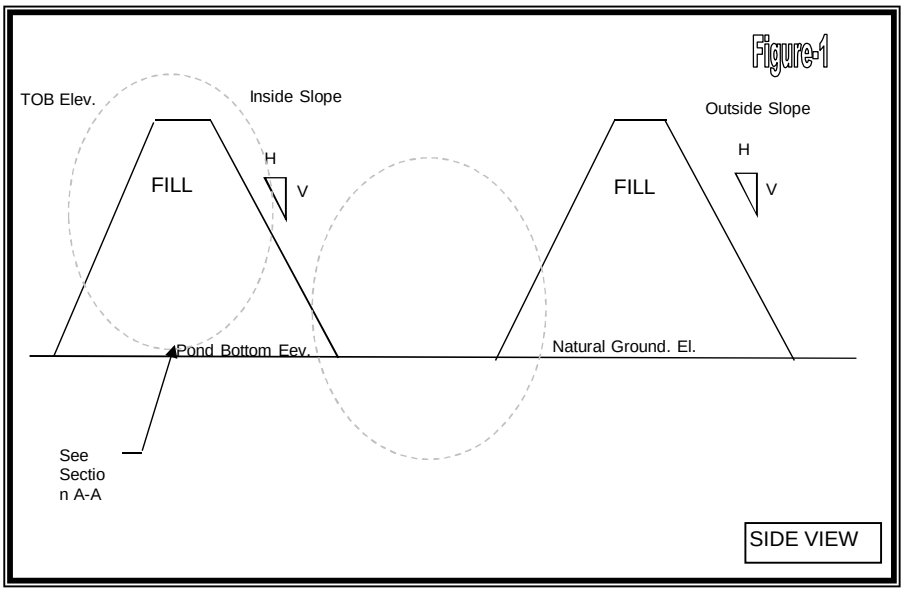
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

Existing Ground Elev. (ft) = 24
Top of Berm Elev. (ft) = 27
Pond Bottom Elev. (ft) = 24
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

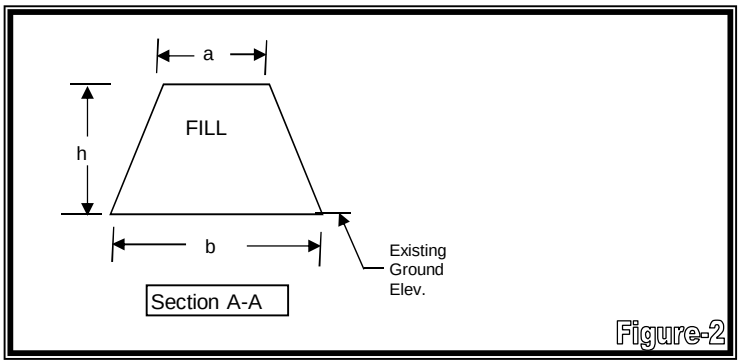
Pond Bottom (ft) = 24



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 1,653
a (ft) = 20
b (ft) = 44
h (ft) = 3
FILL AREA (S.F.) = 96
Fill VOLUME (C.F.) = 158,707
Fill VOLUME (C.Y.) = **5,878**

Sodding (SY) = 16,444



Fencing (ft) = 1,916

Note: Sodding quantity taken as entire dry pond & fencing measured at R/W line

Total Fill:	**5,878 C.Y.**

ENGINEERS OPINION OF PROBABLE COSTS - Regional Pond Option B

Estimated Cost for Construction Services

SR-710 (FPID 419344-3-52-01)

Item			Description	Unit	Quantity	Unit Price	Amount
			General Conditions				
POND							
0104	10	3	Sediment Barrier (Silt Fence Staked)	LF	5,446	$ 1.04	$ 5,663.84
0110	1	1	Clearing and Grubbing	AC	26.00	$ 7,723.80	$ 200,818.80
0120	1		Excavation Regular	CY	385,180	$ 4.75	$ 1,829,605.00
0120	6		Embankment	CY	30,430	$ -	$ -
0530	3	4	Riprap, Rubble, F&I, Ditch Lining - (8' wide around pond)*	TN	80	$ 94.33	$ 7,549.04
0570	1	1	Performance Turf (Seed and Mulch for dry bottom)	SY	0	$ 0.49	$ -
0570	1	2	Performance Turf, Sod	SY	18,153	$ 2.02	$ 36,669.73
Pump Station							
0448	73		Pumping Station - Drainage	LS	1	$500,000.00	$ 500,000.00
			Pond Accessories for Treatment	LS	1	$200,000.00	$ 200,000.00
						Sub-Total:	$ 2,780,306.41
0101	1		Mobilization (L.S.) - 15%	L.S.	1	$417,045.96	$ 417,045.96
						Grand Total:	$ 3,197,352.38

* Estimated at 100 SY $ 3,198,000.00

Note:

This opinion of costs is based on the best available information and on the opinion of the engineer. The items in the opinion of costs require proposals from other contractors and consultants. Some of the work stated in this opinion of costs requires investigative work that has not been completed . Although every effort has been made to provide a reasonable budget number it should be noted that the actual costs could be significantly more or less that stated in the opinion of costs. This opinion should be used to determine an order of magnitude for the costs . It is recommended that the owner obtain firm quotes from the various contractors in order to obtain a more accurate number. The costs stated in the opinion can also be influenced by market conditions, legal and regulatory conditions which are unforeseen.

Estimated Reduction in cost for use of excavation as embankment -				$ (2,128,500)
Pipe Cost - Storm Sewer (from total pipe cost of selected pond sites)				$ 1,914,061
Total Pond Construction Cost				**$ 2,983,561**
Estimated Right-of-Way Acquisition Cost from FDOT				$ 586,000
Wetland Mitigation				$ 211,200
Total Pond Cost				**$ 3,781,200**
Pond Maint Cost (30 Years)	Ac	26	$ 1,485.00	$ 1,158,300
Pump Maint Cost	EA Year	30	$ 15,000.00	$ 450,000
Pump replacement Cost	EA	1	$300,000.00	$ 300,000
Pump Electical Cost	EA Year	30	$ 7,200.00	$ 216,000
Total Maintenance Cost				**$ 2,124,300**
Total Pond Cost (30 Year Life Cycle)				**$ 5,905,500**
Postage Stamp Pond Option				$ 3,610,939
Pond Maint Cost (30 Years)	Ac	18.76	$ 1,485.00	$ 835,758
Total Postage Stamp Pond Cost (30 Year Life Cycle)				**$ 4,446,697**
Cost Comparison				
Pond Initial Cost Comparison (Regional minus Postage Stamp)				**$ 170,261**
Pond 30 Year Life Cycle Cost Comparison (Regional minus Postage Stamp)				**$ 1,458,803**

SR-710 POND SITE REPORT
Estimated Earthwork Calculations

Pond Site 2D - Regional Pond:

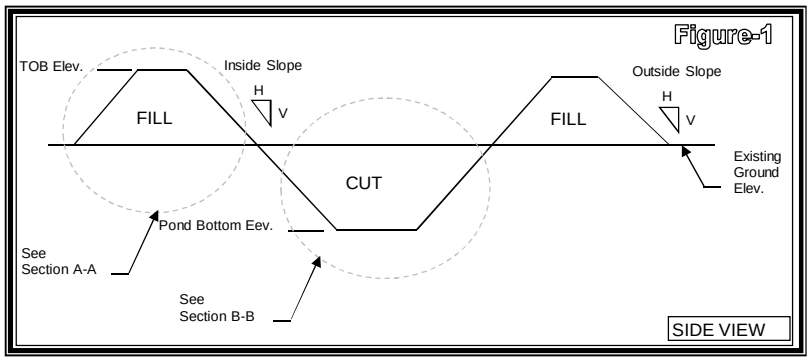
Earthwork Calculations:

1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

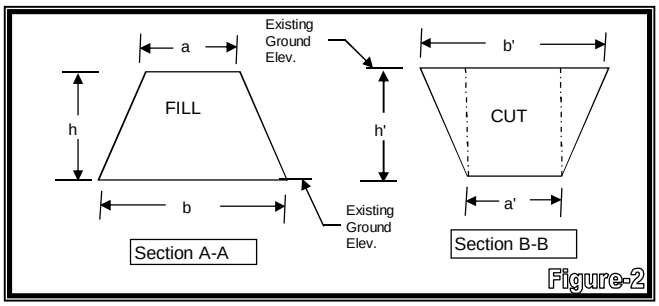
Existing Ground Elev. (ft) = 23
Top of Berm Elev. (ft) = 28
Pond Bottom Elev. (ft) = 23.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 23



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 3,100
a (ft) = 20
b (ft) = 60
h (ft) = 5
FILL AREA (S.F.) = 200
Fill VOLUME (C.F.) = 620,000
Fill VOLUME (C.Y.) = 22,963

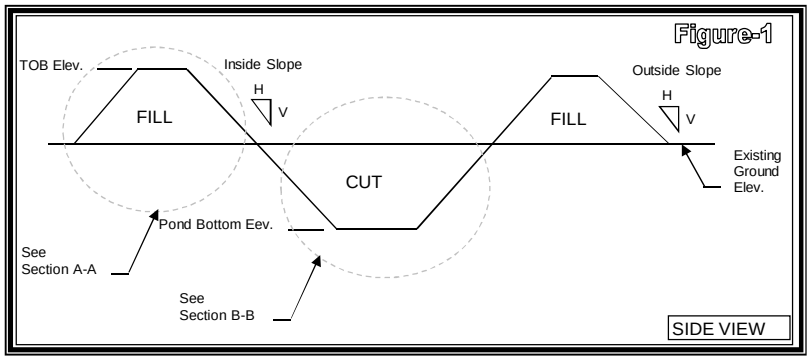


1. Earthwork Fill Calculations:

A. Proposed Slopes and Elevations.

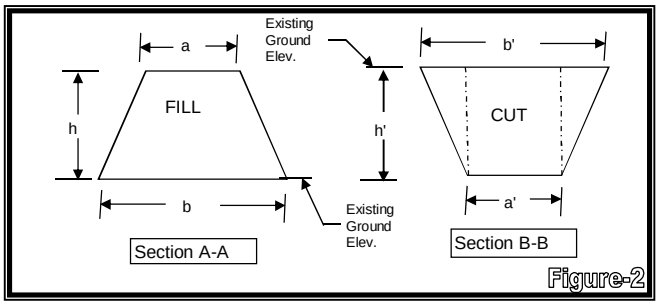
Existing Ground Elev. (ft) = 23
Top of Berm Elev. (ft) = 26
Pond Bottom Elev. (ft) = 23.0
Outside Slope (V:H) - 1: 4
Inside Slope (V:H) - 1: 4

Control Elev. (ft) = 23



B. Berm Fill Calculations.

FILL AREA (S.F.) = 0.5 (a + b) h
Perimetter @ CL of the Berm (ft) = 2,100
a (ft) = 20
b (ft) = 44
h (ft) = 3
FILL AREA (S.F.) = 96
Fill VOLUME (C.F.) = 201,600
Fill VOLUME (C.Y.) = 7,467



Total Embankment (Fill) (CY) = 30,430

Appendix 7
Pollutant Loading Calculations

Note: Water landuse used for runoff generation only, not pollutant loading.

Y:_Eng Misc\D1-SR 710\GIS\generated\trd\nutrientloading_Tdes\SR710_NutrientLoading_Post1.mxd eradford 1/31/2017

FDOT DISTRICT 1

Service Layer Credits:

0 165 330 Feet

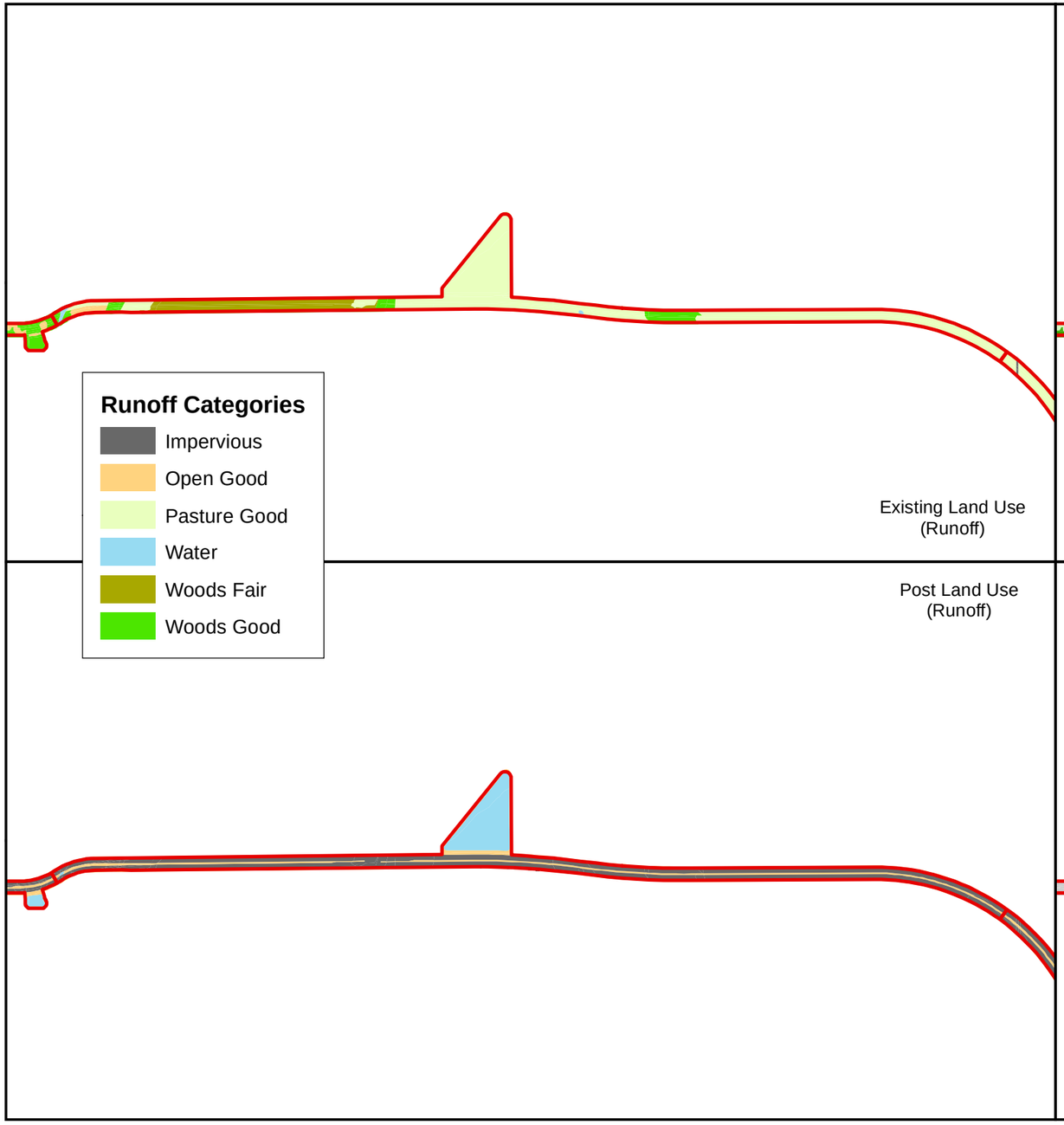
N

The Balmoral Group

Figure 1

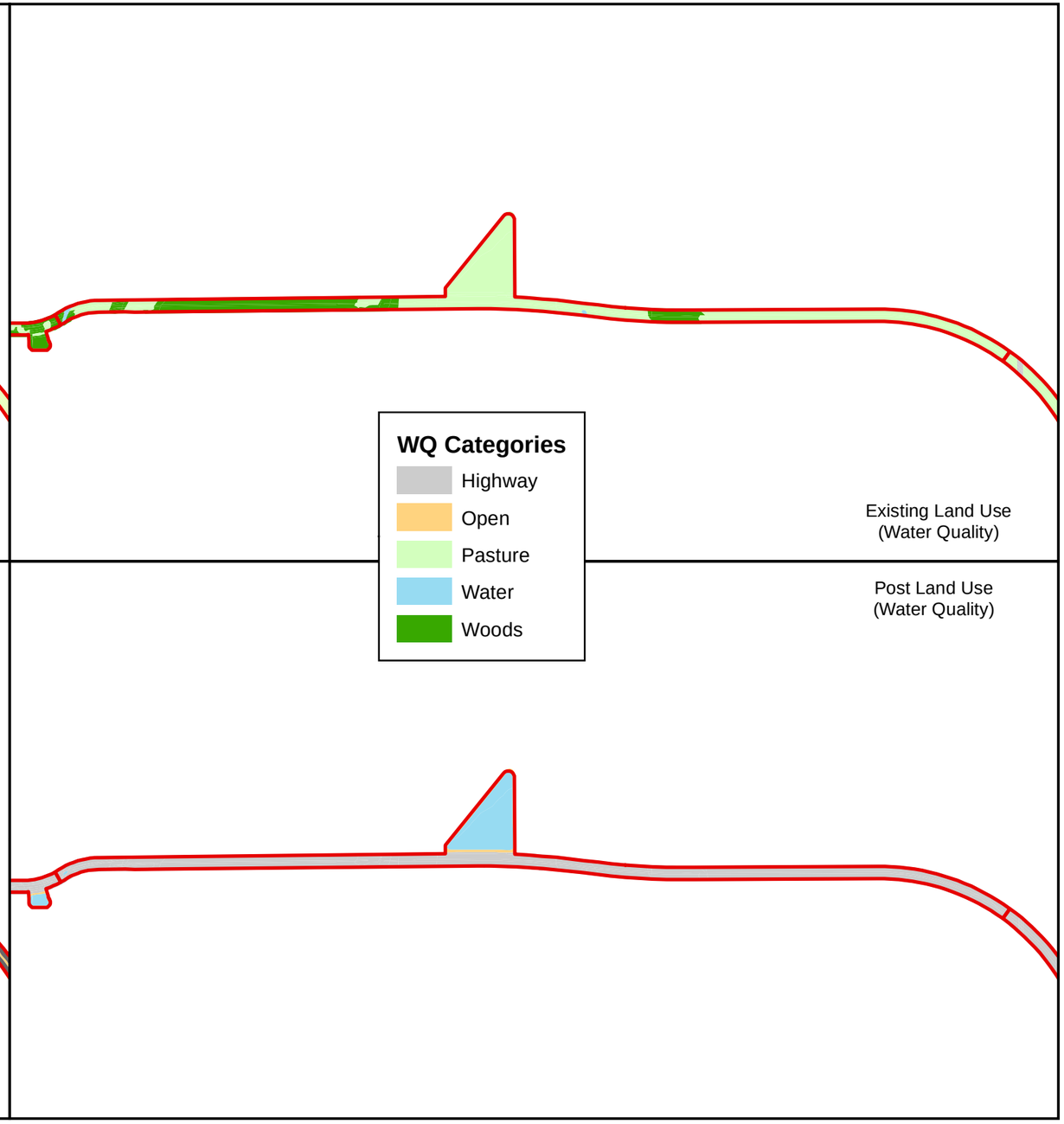
Project Name
Project Location
Client Project Info

Existing & Post Land Use
Post Basin 1



Existing Land Use
(Runoff)

Post Land Use
(Runoff)



Existing Land Use
(Water Quality)

Post Land Use
(Water Quality)

Note: Water landuse used for runoff generation only, not pollutant loading.

Y:_Eng Misc\D1-SR 710\GIS\generated\trd\nutrientloading_Tdes\SR710_NutrientLoading_Post2.mxd eradford 1/31/2017

FDOT DISTRICT 1

Service Layer Credits:

0 700 1,400 Feet

N

Project Name
Project Location
Client Project Info

The Balmoral Group

Figure 2

Existing & Post Land Use
Post Basin 2

Note: Water landuse used for runoff generation only, not pollutant loading.

Y:_Eng Misc\D1-SR 710\GIS\generated\trd\nutrientloading_Tdes\SR710_NutrientLoading_Post3.mxd eradford 1/31/2017

FDOT DISTRICT 1

Service Layer Credits:

0 345 690 Feet

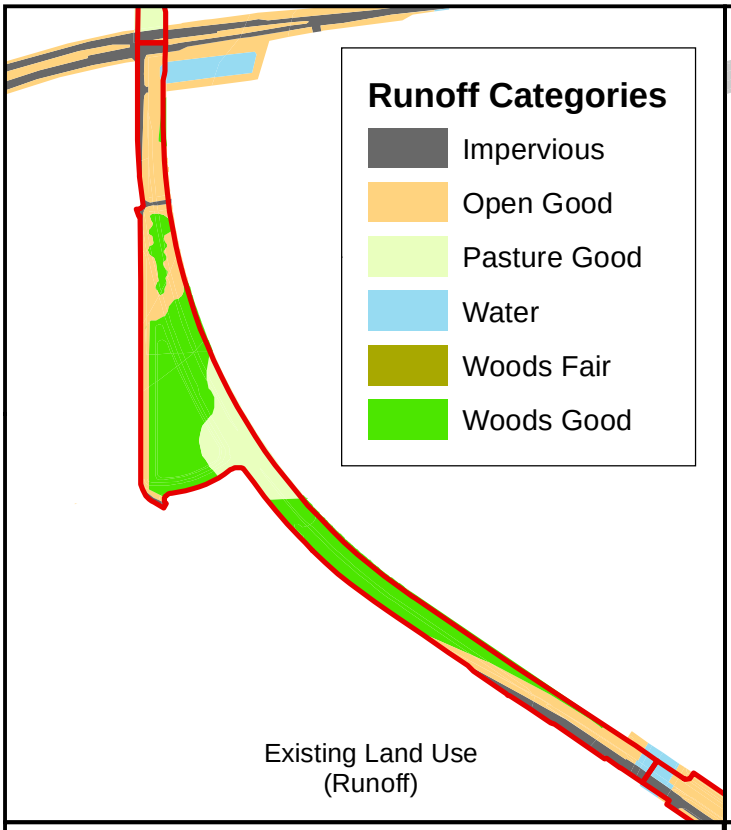
N

The Balmoral Group

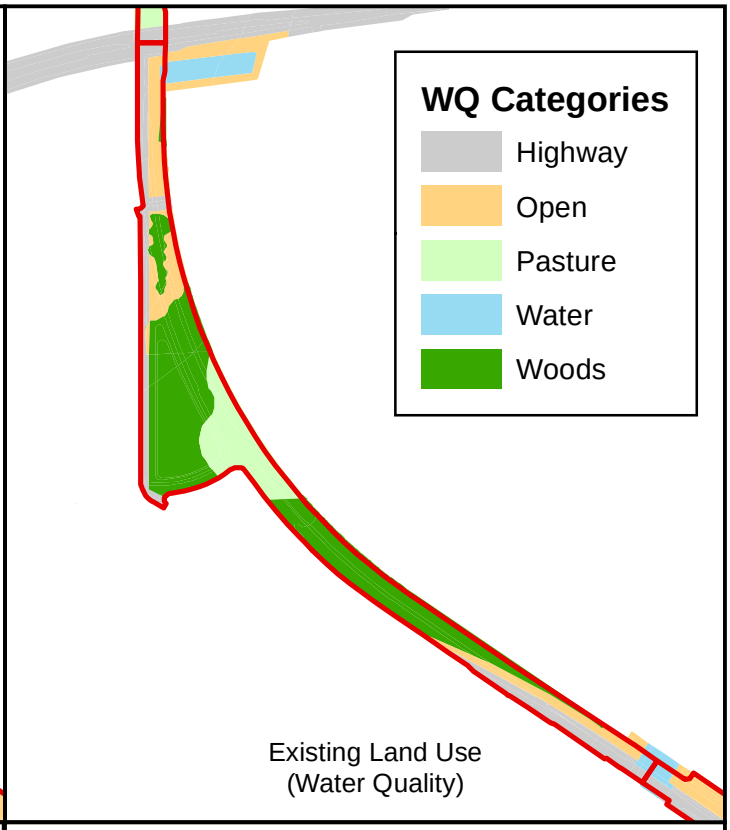
Figure 3

Project Name
Project Location
Client Project Info

Existing Land Use
Existing Basin 3



Existing Land Use
(Runoff)



Existing Land Use
(Water Quality)

Note: Water landuse used for runoff generation only, not pollutant loading.

Y:_Eng Misc\D1-SR 710\GIS\generated\trd\nutrientloading_Tdes\SR710_NutrientLoading_Post4.mxd eradford 1/31/2017

FDOT DISTRICT 1

Service Layer Credits:

0 487.5 975 Feet

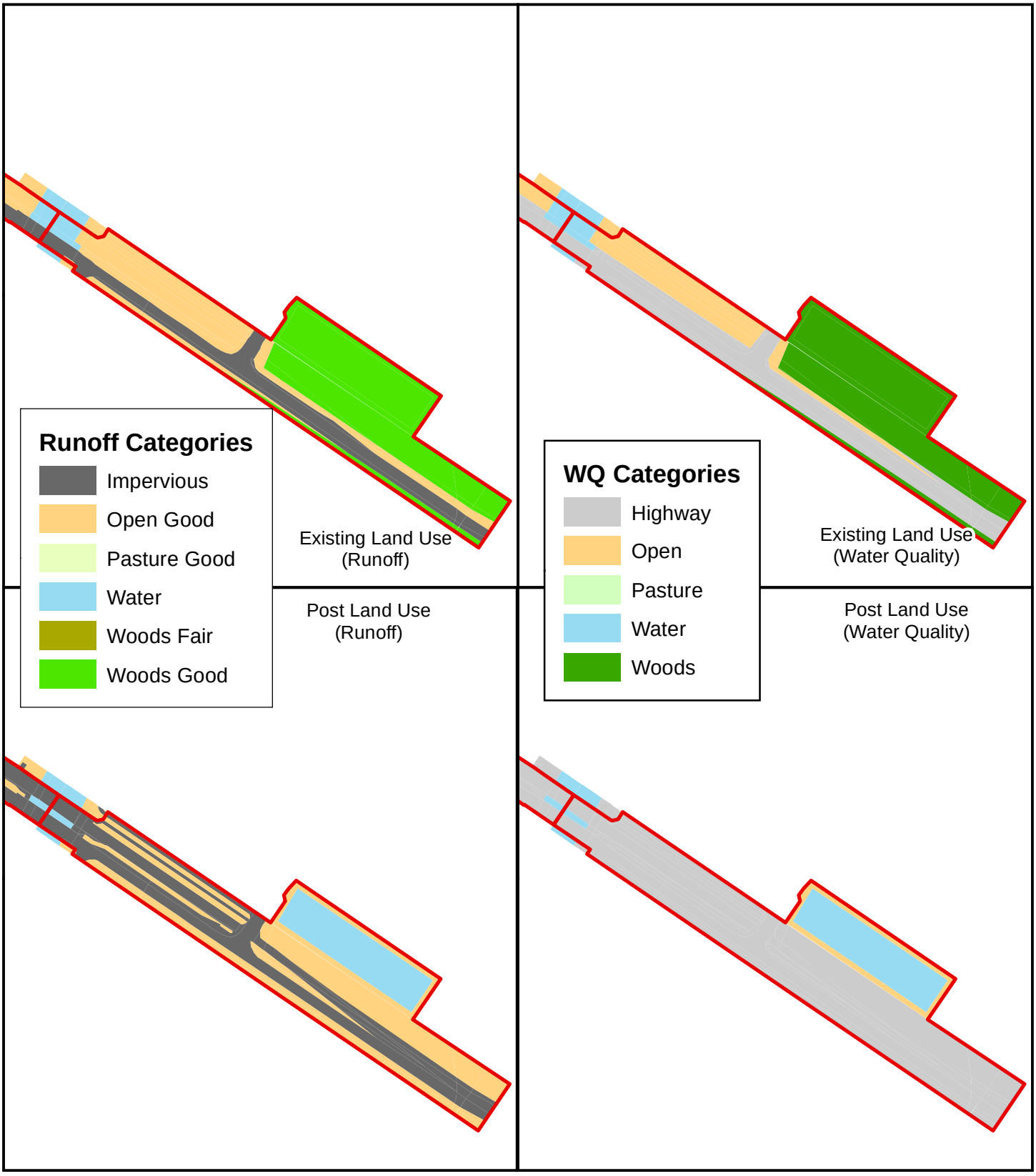
N

The Balmoral Group

Figure 4

Project Name
Project Location
Client Project Info

Existing Land Use
Existing Basin 4



Note: Water landuse used for runoff generation only, not pollutant loading.

Y:_Eng Misc\D1-SR 710\GIS\generated\trd\nutrientloading_Tdes\SR710_NutrientLoading_Post5_.mxd eradford 1/31/2017

FDOT DISTRICT 1

Service Layer Credits:

0 255 510 Feet

N

The Balmoral Group

Figure 5

Project Name
Project Location
Client Project Info

Existing & Post Land Use Post Basin 5

Table 1a. Curve Number Calculation Existing Condtions

BasinID	Exist Land Use for CN Tables	Hydrologic Soil Group	CN[1]	Area (ac)	Percent DCIA
	Impervious	B/D	*	0.00	100
	Open Good	B/D	61	1.54	5
	Water	B/D	*	0.00	100
Pre1	Woods Good	B/D	55	3.23	5
	Open Good	B/D	61	0.74	5
	Pasture Good	A/D	39	3.18	5
	Pasture Good	B/D	61	24.51	5
	Pasture Good	C/D	74	4.81	5
	Water	A/D	*	0.04	100
	Water	B/D	*	0.24	100
	Woods Fair	A/D	36	0.26	5
	Woods Fair	C/D	73	6.25	5
	Woods Good	A/D	30	0.19	5
	Woods Good	B/D	55	0.85	5
Pre2	Woods Good	C/D	70	3.68	5
	Impervious	A/D	*	0.04	100
	Impervious	B/D	*	0.26	100
	Open Good	B/D	61	0.03	5
	Pasture Good	A/D	39	1.80	5
	Pasture Good	B/D	61	10.38	5
Pre3	Water	A/D	*	0.00	100
	Impervious	A/D	*	0.08	100
	Impervious	B/D	*	1.91	100
	Impervious	W	*	0.05	100
	Open Good	A/D	39	0.84	5
	Open Good	B/D	61	5.02	5
	Pasture Good	B/D	61	3.16	5
	Water	B/D	*	0.14	100
	Water	W	*	0.16	100
	Woods Good	A/D	30	1.84	5
Pre4	Woods Good	B/D	55	9.54	5
	Impervious	B/D	*	2.23	100
	Impervious	C/D	*	0.11	100
	Impervious	W	*	0.16	100
	Open Good	B/D	61	3.13	5
	Open Good	C/D	74	0.11	5
	Open Good	W	*	0.10	5
	Water	W	*	0.37	100
	Woods Good	B/D	55	4.94	5
Pre5	Woods Good	C/D	70	0.53	5
	Impervious	A/D	*	0.26	100
	Impervious	B/D	*	3.15	100
	Open Good	A/D	39	0.98	5
	Open Good	B/D	61	3.45	5
	Water	A/D	*	0.42	100
EX 4	Water	B/D	*	0.68	100

[1]Non-DCIA Curve Number. Impervious areas and water were assumed to be DCIA and were removed from the CN calculations.

Table 1b. Curve Number Calculation Post Conditions

BasinID	Post Land Use for CN Tables	Hydrologic Soil Group	CN[1]	Area (ac)	Percent DCIA
Post1	Impervious	B/D	*	2.55	100
	Open Good	B/D	61	1.76	5
	Water	B/D	*	0.46	100
Post2	Impervious	A/D	*	2.43	100
	Impervious	B/D	*	13.09	100
	Impervious	C/D	*	8.44	100
	Open Good	A/D	39	1.24	5
	Open Good	B/D	61	7.71	5
	Open Good	C/D	74	4.66	5
	Water	B/D	*	5.54	100
	Water	C/D	*	1.65	100
Post5	Impervious	B/D	*	3.70	100
	Impervious	C/D	*	0.27	100
	Impervious	W	*	0.36	100
	Open Good	B/D	61	4.69	5
	Open Good	C/D	74	0.48	5
	Open Good	W	*	0.06	5
	Water	B/D	*	2.12	100

[1]Non-DCIA Curve Number. Impervious areas and water were assumed to be DCIA and were removed from the CN calculations.

Table 2a. Breakdown of Existing Conditions Land Use for Event Mean Concentration Lookup

BasinID	Existing Land Use for EMC Tables	Area (ac)	Event Mean Concentration (mg/L)	
			TP	TN
Pre1	Highway	0.00	0.155	1.19
	Pasture	1.54	0.7	2.48
	Water	0.00	0	0
	Woods	3.23	0.055	1.15
Pre2	Pasture	33.25	0.7	2.48
	Water	0.28	0	0
	Woods	11.23	0.055	1.15
Pre3	Highway	0.56	0.155	1.19
	Pasture	11.96	0.7	2.48
	Water	0.00	0	0
Pre4	Highway	4.22	0.155	1.19
	Open	3.69	0.055	1.15
	Pasture	3.16	0.7	2.48
	Water	0.30	0	0
	Woods	11.38	0.055	1.15
Pre5	Highway	3.78	0.155	1.19
	Open	2.07	0.055	1.15
	Water	0.37	0	0
	Woods	5.47	0.055	1.15
EX 4	Highway	6.57	0.155	1.19
	Open	1.34	0.055	1.15
	Water	1.04	0	0

Table 2b. Breakdown of Proposed Conditions Land Use for Event Mean Concentration Lookup

BasinID	Post Land Use for EMC Tables	Area (ac)	Event Mean Concentration (mg/L)	
			TP	TN
Post1	Highway	4.05	0.155	1.19
	Open	0.26	0.055	1.15
	Water	0.46	0	0
Post2	Highway	36.29	0.155	1.19
	Open	1.28	0.055	1.15
	Water	7.19	0	0
Post5	Highway	8.21	0.155	1.19
	Open	0.95	0.055	1.15
	Water	2.44	0	0

Table 3a. Summary of Values used for Existing Conditions Calculation

BasinID	Area (ac)	Non-DCIA CN	Percent DCIA	Runoff Coefficient	TP EMC (mg/L)	TN EMC (mg/L)
Pre1	4.77	56.94	5.00	0.06	0.26	1.58
Pre2	44.76	62.87	5.59	0.08	0.53	2.13
Pre3	12.52	57.76	7.34	0.08	0.68	2.42
Pre4	22.75	54.50	14.79	0.14	0.16	1.33
Pre5	11.68	58.31	28.37	0.24	0.09	1.13
EX 4	8.95	56.13	52.93	0.44	0.12	1.05
Total	105.43					

Table 3b. Summary of Values used for Proposed Conditions Calculation

BasinID	Area (ac)	Non-DCIA CN	Percent DCIA	Runoff Coefficient	TP EMC (mg/L)	TN EMC (mg/L)
Post1	4.77	61.00	65.01	0.54	0.13	1.07
Post2	44.76	63.44	71.12	0.59	0.13	1.00
Post5	11.68	62.20	57.46	0.47	0.12	0.97
Total	61.21					

Table 4. BMP Treatment Summary

Basin	Method	Annual Runoff (ac/ft/yr)	Retention Depth (in)*	Permanent Pool Volume (ac-ft)	Hydraulic Residence Time (days), Wet Detention Only
Post1	Dry Retention	10.9	1.08	--	--
Post2	Wet Detention	111.6	--	37.47	122.52
Post5	Dry Retention	23.2	0.98	--	--
EX 4	Wet Detention	16.7	--	4.85	105.79

*Treatment volume provided / basin acreage

GENERAL SITE INFORMATION: V7.4

GO TO INTRODUCTION PAGE

Blue Numbers = Input data

Red Numbers = Calculated or Carryover

HELP

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

SR 710 - Taylor Creek

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 2

VIEW MEAN ANNUAL RAINFALL MAP

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

GO TO WATERSHED CHARACTERISTICS

Treatment efficiency (N, P) (leave empty if net improvement or BMP analysis is used): % %

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

Model documentation and example problems.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Underdrain Biofiltration
Greenroof
Rainwater Harvesting
Floating Island with Wet Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Lined reuse pond
User Defined BMP

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V7.4

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

HELP - LAND USES/EMC

SELECT CATCHMENT CONFIGURATION

CLICK ON CELL BELOW TO SELECT CONFIGURATION
L - 4 Catchment-Parallel

VIEW CATCHMENT CONFIGURATION

Basin 1

CATCHMENT NO.1 CHARACTERISTICS: \ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:	4.77	AC
Total post-development catchment or BMP analysis area:	4.77	AC
Pre-development Non DCIA CN:	56.94	
Pre-development DCIA percentage:	5.00	%
Post-development Non DCIA CN:	61.00	
Post-development DCIA percentage:	65.01	%
Estimated Area of BMP (used for rainfall excess not loadings)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:	POST:
EMC(N):	1.580 mg/L	1.070 mg/L
EMC(P):	0.260 mg/L	0.130 mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	1.300	ac-ft/year
Average annual post runoff volume:	10.904	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	2.532	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	0.417	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	14.389	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	1.748	kg/year

Basin 2

CATCHMENT NO.2 CHARACTERISTICS: \ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:	44.76	AC
Total post-development catchment or BMP analysis area:	44.76	AC
Pre-development Non DCIA CN:	62.87	
Pre-development DCIA percentage:	5.59	%
Post-development Non DCIA CN:	63.44	
Post-development DCIA percentage:	71.12	%
Estimated Area of BMP (used for rainfall excess not loadings)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:	POST:
EMC(N):	2.130 mg/L	1.000 mg/L
EMC(P):	0.530 mg/L	0.130 mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	15.202	ac-ft/year
Average annual post runoff volume:	111.627	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	39.934	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	9.937	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	137.665	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	17.896	kg/year

BMP Area set to zero because EMCs already weighted to include no pollutant loading from water bodies (applies to all catchments)

Basin 3

CATCHMENT NO.3 CHARACTERISTICS: \ **If mixed land uses (side calculation**

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:	12.52	AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:	57.76	
Pre-development DCIA percentage:	7.34	%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated Area of BMP (used for rainfall excess not loadings)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):	2.420	mg/L	1.040	mg/L
EMC(P):	0.680	mg/L	0.130	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	4.463	ac-ft/year
Average annual post runoff volume:		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	13.320	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	3.743	kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

Basin 4

CATCHMENT NO.4 CHARACTERISTICS: \ **If mixed land uses (side calculation**

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:	22.75	AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:	54.50	
Pre-development DCIA percentage:	14.79	%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated Area of BMP (used for rainfall excess not loadings)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):	1.330	mg/L	0.000	mg/L
EMC(P):	0.160	mg/L	0.000	mg/L

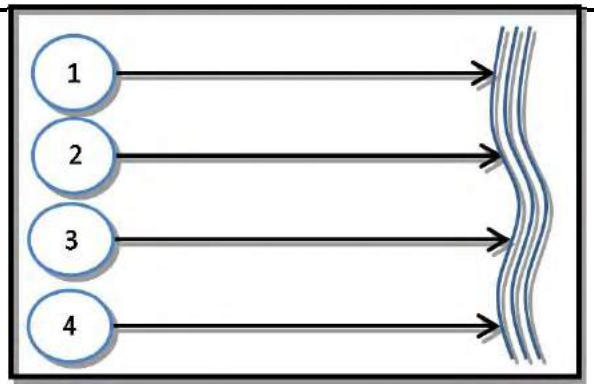
OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	13.320	ac-ft/year
Average annual post runoff volume:		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	21.848	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	2.628	kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

STORMWATER TREATMENT ANALYSIS:	V7.4	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

If not done, specify pre- and post-development watershed characteristics.

GO TO WATERSHED CHARACTERISTICS



Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	48.943	%
Required Treatment Eff (**Phosphorus**):	14.864	%

Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION	EXFILTRATION TRENCH	RAIN (BIO) GARDEN	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION including Up-Flow Filters	LINED REUSE POND & UNDERDRAIN INPUT		
GREENROOF	RAINWATER HARVESTING	FLOATING ISLANDS WITH WET DETENTION			
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	VEGETATED AREA Example tree well			

NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.

CATCHMENT AND TREATMENT SUMMARY RESULTS

WET DETENTION: V7.4

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

WET DETENTION POND SERVING: SR 710 - Taylor Creek

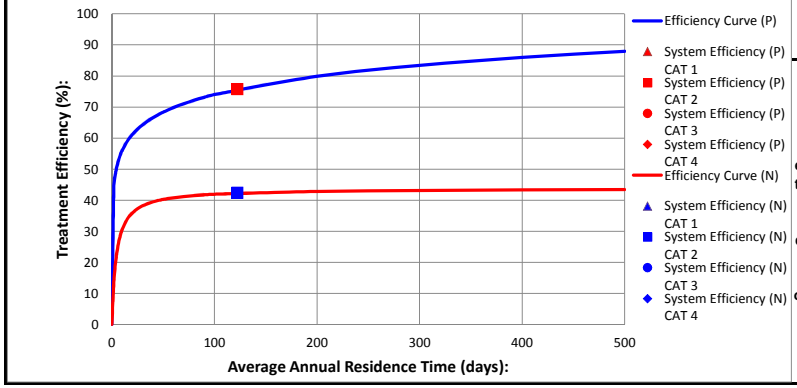
GO TO STORMWATER TREATMENT ANALYSIS

HELP - EXAMPLE PROBLEM 4

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	4.770	44.760	12.520	22.750	ac
Total post-development catchment area:	4.770	44.760	0.000	0.000	ac
Average annual residence time (between 1 and 500 days):		122.52			days
Littoral Zone or other improvements used?		NO			
Littoral Zone or other improvement efficiency credit:					%
Total **Nitrogen** removal required:		70.992			%
Total **Phosphorus** removal required:		44.477			%
Total **Nitrogen** removal efficiency provided:		42.240			%
Total **Phosphorous** removal efficiency provided:		75.693			%
Is the wet detention sufficient:		NO			
Average annual runoff volume:	10.904	111.627			ac-ft/yr

To Achieve the Treatment Efficiency Shown in the Graph Below, the Following Must Hold

Minimum Pond Permanent Pool Volume:		37.470			ac-ft

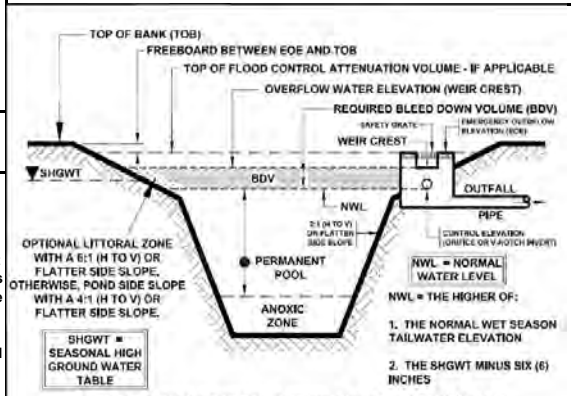


NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. The lines are produced from the conditions of catchment one, thus other catchments are shown with the data points.

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION.

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Remaining treatment efficiency needed (**Nitrogen**):		49.778			%
Remaining treatment efficiency needed (**Phosphorus**):		0.000			%



TYPICAL X-SECTION OF A WET DETENTION SYSTEM

Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater, March 2010

RETENTION BASIN: V7.4

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

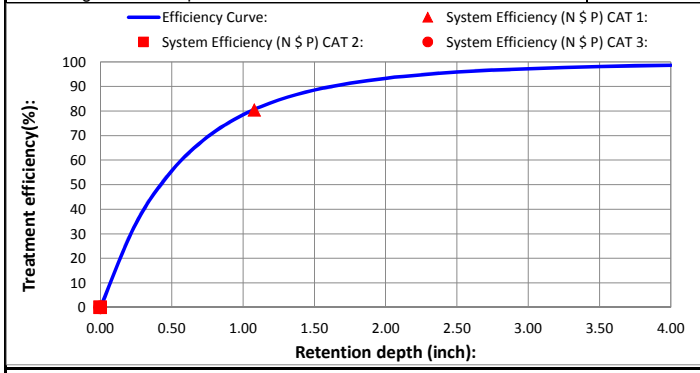
RETENTION BASIN SERVING: SR 710 - Taylor Creek

GO TO STORMWATER TREATMENT ANALYSIS

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Watershed area:	4.770	44.760	0.000	0.000	ac
Required Treatment Eff (**Nitrogen**):	82.402	70.992			%
Required Treatment Eff (**Phosphorus**):	76.164	44.477			%
Required retention depth over the watershed to meet required efficiency:	1.163	0.794	0.000	0.000	in
Required water quality retention volume:	0.462	2.962	0.000	0.000	ac-ft

RETENTION BASIN FOR MULTIPLE TREATMENT SYSTEMS (if there is a need for additional removal efficiencies in a series of BMPs):

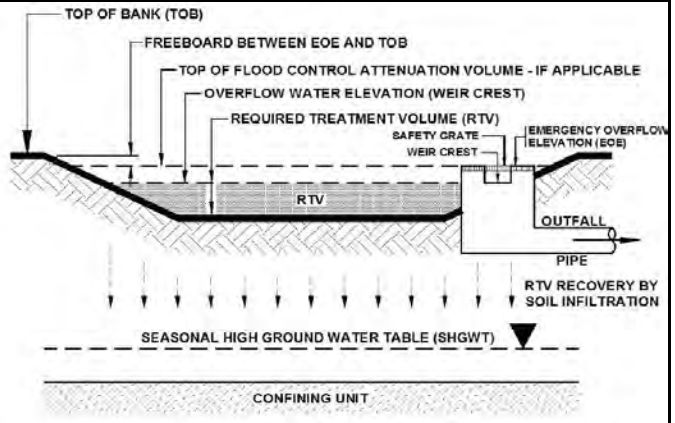
Retention volume based on retention depth	0.429	0.000	0.000	0.000	ac-ft
Provided retention depth (inches over the watershed area):	1.080	0.000	0.000	0.000	in
Provided treatment efficiency (**Nitrogen**):	80.389	0.000	0.000	0.000	%
Provided treatment efficiency (**Phosphorus**):	80.389	0.000	0.000	0.000	%
Remaining treatment efficiency (**Nitrogen**):	10.261	70.992			%
Remaining treatment efficiency (**Phosphorus**):	0.000	44.477			%
Remaining retention depth needed:	0.083	0.794	0.000	0.000	in



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of this graph is to help illustrate the treatment efficiency of the retention system as the function of retention depth **for a single BMP and in a single catchment**. The graph illustrates that there is a diminished return as the retention depth is increased. Thus evaluations of other alternatives in "treatment trains" and compensatory treatment should be considered.

HELP - EXAMPLE PROBLEM 3



TYPICAL CROSS SECTION OF A "DRY" RETENTION SYSTEM

View Media Mixes

	Catchment 1	Catchment 2	Catchment 3	Catchment 4
If using media mix as a filter before water enters the ground, specify type				
Nitrogen mass reduction in groundwater discharge (%)				
Phosphorus mass reduction in groundwater discharge (%)				

Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater, March 2010.

CATCHMENTS AND TREATMENT SUMMARY RESULTS V7.4

CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. ...been evaluated and in practice they are at this time not used,
3. If multiple BMPs are used in a single catchment and one of them is detention, then it is assumed to be last in series.

Total Nitrogen Pre Load = 77.63+12.56 = 90.19 kg/yr
Total Phosphorus Pre Load = 16.72+0.63 = 17.35 kg/yr

PROJECT TITLE	SR 710 - Taylor Creek	Optional Identification		
	Catchment 1:	Catchment 2:	Catchment 3:	Catchment 4:
BMP Name	Retention Basin	Wet Detention		
BMP Name				
BMP Name				

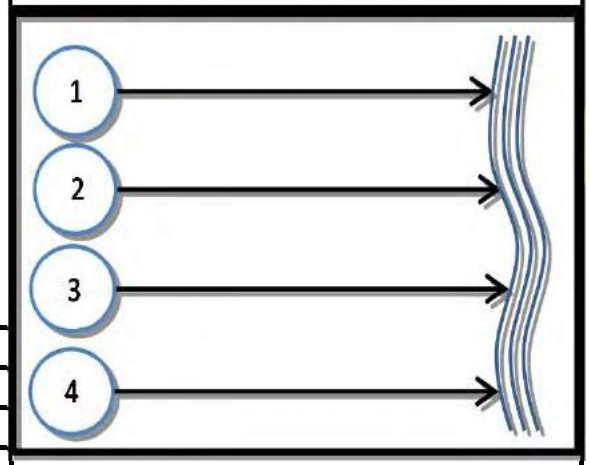
ERROR, ONE OR MORE CATCHMENT HAS BEEN SPECIFIED WITH

Note: Taylor Creek is continued on the next 4 pages to include the existing FDOT pond. BMPTRAINS only allows input of 4 catchments.

Summary Performance of Entire Watershed

Catchment Configuration	L - 4 Catchment-Parallel		1/31/2017
			BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	77.63		
Phosphorus Pre Load (kg/yr)	16.72		
Nitrogen Post Load (kg/yr)	152.05		
Phosphorus Post Load (kg/yr)	19.64		
Target Load Reduction (N) %	49		
Target Load Reduction (P) %	15		
Target Discharge Load, N (kg/yr)	77.63		
Target Discharge Load, P (kg/yr)	16.72		
Provided Overall Efficiency, N (%):	46		
Provided Overall Efficiency, P (%):	76		
Discharged Load, N (kg/yr & lb/yr):	82.34	181.36	
Discharged Load, P (kg/yr & lb/yr):	4.69	10.34	
Load Removed, N (kg/yr & lb/yr):	69.72	153.56	
Load Removed, P (kg/yr & lb/yr):	14.95	32.93	

Treatment Objectives Not Met



GENERAL SITE INFORMATION: V7.4

GO TO INTRODUCTION PAGE

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

SR 710 - Taylor Creek Continued, Existing FDOT Pond

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 2

VIEW MEAN ANNUAL RAINFALL MAP

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

Type of analysis: CLICK ON CELL BELOW TO SELECT — BMP analysis

GO TO WATERSHED CHARACTERISTICS

Treatment efficiency (N, P) (leave empty if net improvement or BMP analysis is used): % %

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

Model documentation and example problems.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
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Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
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Greenroof
Rainwater Harvesting
Floating Island with Wet Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Lined reuse pond
User Defined BMP

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RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

EX 4

WATERSHED CHARACTERISTICS V7.4

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

HELP - LAND USES/EMC

SELECT CATCHMENT CONFIGURATION

CLICK ON CELL BELOW TO SELECT CONFIGURATION

L - 4 Catchment-Parallel

VIEW CATCHMENT CONFIGURATION

CATCHMENT NO.1 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:	8.95	AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:	56.13	
Post-development DCIA percentage:	52.93	%
Estimated Area of BMP (used for rainfall excess not loadings)		AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):		mg/L	1.050	mg/L
EMC(P):		mg/L	0.120	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume:	16.727	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**	21.661	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	2.475	kg/year

CATCHMENT NO.2 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume:		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

Note: this is actually the pre-development condition. FDOT pond is routed to L-63 in the post-development condition. However, BMPTRAINS can only include removals associated with post catchments.

EX 4

WET DETENTION: V7.4

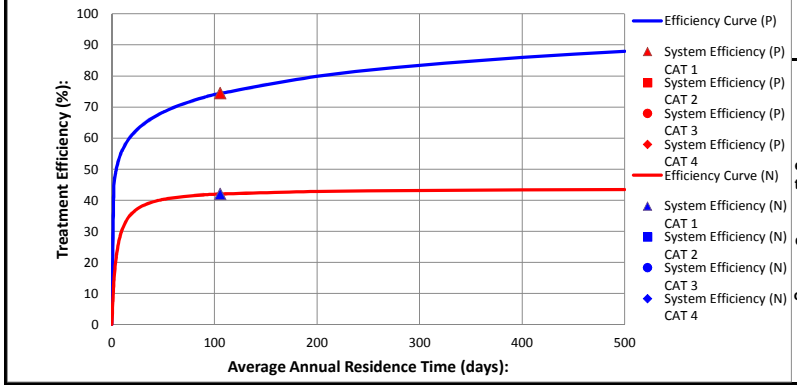
Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

WET DETENTION POND SERVING: SR 710 \ Taylor Creek Continued, Existing FDOT Pond

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	0.000	0.000	0.000	0.000	ac
Total post-development catchment area:	8.950	0.000	0.000	0.000	ac
Average annual residence time (between 1 and 500 days):	105.79				days
Littoral Zone or other improvements used?	NO				
Littoral Zone or other improvement efficiency credit:					%
Total **Nitrogen** removal required:	TBD				%
Total **Phosphorus** removal required:	TBD				%
Total **Nitrogen** removal efficiency provided:	42.011				%
Total **Phosphorous** removal efficiency provided:	74.461				%
Is the wet detention sufficient:	NO				
Average annual runoff volume:	16.727				ac-ft/yr

To Achieve the Treatment Efficiency Shown in the Graph Below, the Following Must Hold

Minimum Pond Permanent Pool Volume:	4.848				ac-ft



NOTE FOR TREATMENT EFFICIENCY GRAPH:

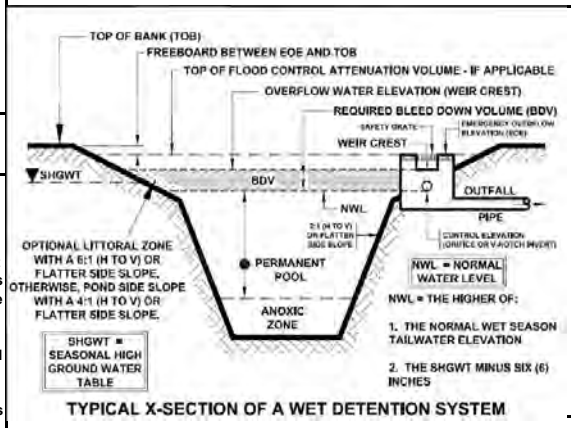
The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. The lines are produced from the conditions of catchment one, thus other catchments are shown with the data points.

GO TO STORMWATER TREATMENT ANALYSIS

HELP - EXAMPLE PROBLEM 4

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH WET DETENTION.

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Remaining treatment efficiency needed (**Nitrogen**):					%
Remaining treatment efficiency needed (**Phosphorus**):					%



TYPICAL X-SECTION OF A WET DETENTION SYSTEM

Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater, March 2010

CATCHMENTS AND TREATMENT SUMMARY RESULTS V7.4

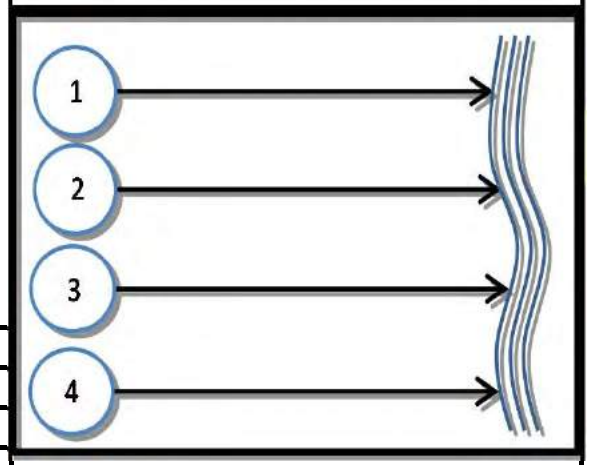
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. If multiple BMPs are used in a single catchment and one of them is detention, then it is assumed to be last in series.

PROJECT TITLE	0 - Taylor Creek Continued, Existing FDOT	Optional Identification		
	Catchment 1:	Catchment 2:	Catchment 3:	Catchment 4:
BMP Name	Wet Detention			
BMP Name				
BMP Name				

Summary Performance of Entire Watershed

Catchment Configuration	L - 4 Catchment-Parallel		1/31/2017
Nitrogen Pre Load (kg/yr)	0.00		BMPTRAINS MODEL
Phosphorus Pre Load (kg/yr)	0.00		
Nitrogen Post Load (kg/yr)	21.66		
Phosphorus Post Load (kg/yr)	2.48		
Target Load Reduction (N) %	TBD		
Target Load Reduction (P) %	TBD		
Target Discharge Load, N (kg/yr)			
Target Discharge Load, P (kg/yr)			
Provided Overall Efficiency, N (%):	42		
Provided Overall Efficiency, P (%):	74		
Discharged Load, N (kg/yr & lb/yr):	12.56	27.67	
Discharged Load, P (kg/yr & lb/yr):	0.63	1.39	
Load Removed, N (kg/yr & lb/yr):	9.10	20.04	
Load Removed, P (kg/yr & lb/yr):	1.84	4.06	



GENERAL SITE INFORMATION: V7.4

GO TO INTRODUCTION PAGE

Blue Numbers = Input data
Red Numbers = Calculated or Carryover

HELP

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

SR 710 - Mosquito Creek

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 2

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL MAP

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (leave empty if net improvement or BMP analysis is used): % %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

Model documentation and example problems.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Underdrain Biofiltration
Greenroof
Rainwater Harvesting
Floating Island with Wet Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Lined reuse pond
User Defined BMP

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

Basin 5

WATERSHED CHARACTERISTICS V7.4

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

HELP - LAND USES/EMC

SELECT CATCHMENT CONFIGURATION

CLICK ON CELL BELOW TO SELECT CONFIGURATION
A - Single Catchment

VIEW CATCHMENT CONFIGURATION

CATCHMENT NO.1 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use: User Defined (must over write concentrations)				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use: User Defined (must over write concentrations)				
with default EMCs	Total			

Total pre-development catchment area:	11.68	AC
Total post-development catchment or BMP analysis area:	11.68	AC
Pre-development Non DCIA CN:	58.31	
Pre-development DCIA percentage:	28.37	%
Post-development Non DCIA CN:	62.20	
Post-development DCIA percentage:	57.46	%
Estimated Area of BMP (used for rainfall excess not loadings)	0.00	AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.130	mg/L	0.970	mg/L
EMC(P):	0.090	mg/L	0.120	mg/L

OVERWRITE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:	12.373	ac-ft/year
Average annual post runoff volume:	23.836	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	17.243	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	1.373	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	28.514	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	3.527	kg/year

CATCHMENT NO.2 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use:				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use:				
with default EMCs	Total			

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated Area of BMP (used for rainfall excess not loadings)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

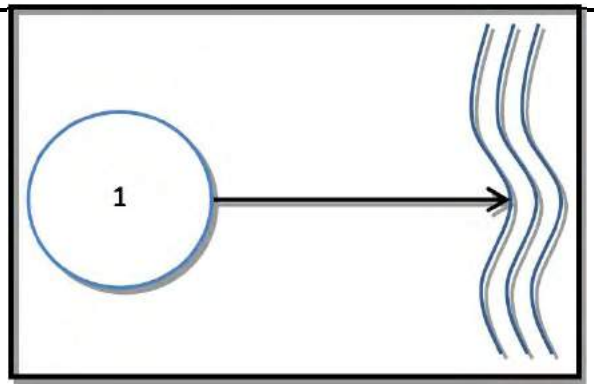
Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume:		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

BMP Area set to zero because EMCs already weighted to include no pollutant loading from water bodies

STORMWATER TREATMENT ANALYSIS:	V7.4	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

If not done, specify pre- and post-development watershed characteristics.

GO TO WATERSHED CHARACTERISTICS



Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	39.527 %
Required Treatment Eff (**Phosphorus**):	61.067 %

Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION	EXFILTRATION TRENCH	RAIN (BIO) GARDEN	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION including Up-Flow Filters	LINED REUSE POND & UNDERDRAIN INPUT		
GREENROOF	RAINWATER HARVESTING	FLOATING ISLANDS WITH WET DETENTION			
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	VEGETATED AREA Example tree well			

NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.

CATCHMENT AND TREATMENT SUMMARY RESULTS

RETENTION BASIN: V7.4

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

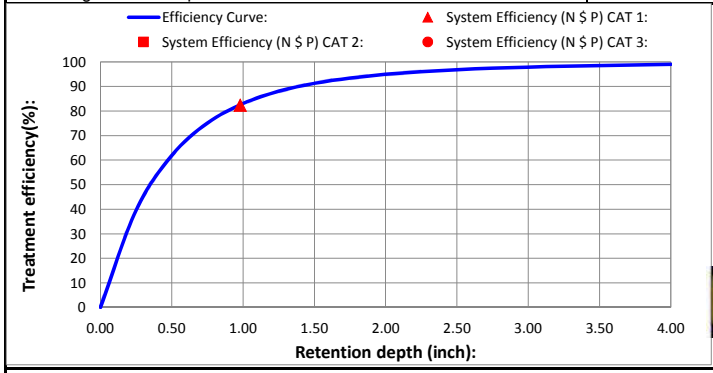
RETENTION BASIN SERVING: SR 710 - Mosquito Creek

GO TO STORMWATER TREATMENT ANALYSIS

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Watershed area:	11.680	0.000	0.000	0.000	ac
Required Treatment Eff (**Nitrogen**):	39.527				%
Required Treatment Eff (**Phosphorus**):	61.067				%
Required retention depth over the watershed to meet required efficiency:	0.491	0.000	0.000	0.000	in
Required water quality retention volume:	0.478	0.000	0.000	0.000	ac-ft

RETENTION BASIN FOR MULTIPLE TREATMENT SYSTEMS (if there is a need for additional removal efficiencies in a series of BMPs):

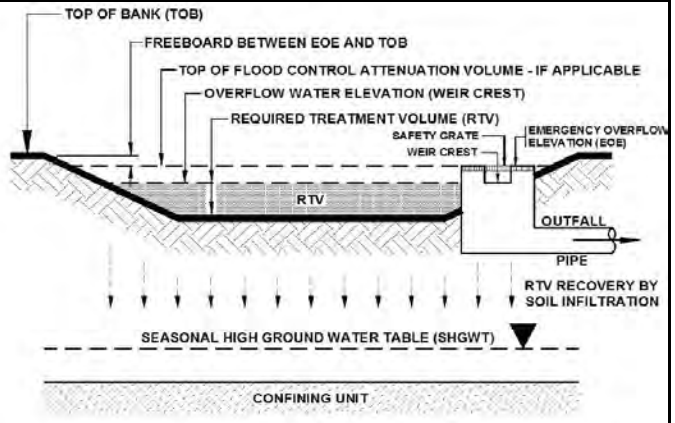
Retention volume based on retention depth	0.954	0.000	0.000	0.000	ac-ft
Provided retention depth (inches over the watershed area):	0.980				in
Provided treatment efficiency (**Nitrogen**):	82.370	0.000	0.000	0.000	%
Provided treatment efficiency (**Phosphorus**):	82.370	0.000	0.000	0.000	%
Remaining treatment efficiency (**Nitrogen**):	0.000				%
Remaining treatment efficiency (**Phosphorus**):	0.000				%
Remaining retention depth needed:	0.000	0.000	0.000	0.000	in



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of this graph is to help illustrate the treatment efficiency of the retention system as the function of retention depth **for a single BMP and in a single catchment**. The graph illustrates that there is a diminished return as the retention depth is increased. Thus evaluations of other alternatives in "treatment trains" and compensatory treatment should be considered.

HELP - EXAMPLE PROBLEM 3



TYPICAL CROSS SECTION OF A "DRY" RETENTION SYSTEM

View Media Mixes

	Catchment 1	Catchment 2	Catchment 3	Catchment 4
If using media mix as a filter before water enters the ground, specify type				
Nitrogen mass reduction in groundwater discharge (%)				
Phosphorus mass reduction in groundwater discharge (%)				

Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater, March 2010.

CATCHMENTS AND TREATMENT SUMMARY RESULTS V7.4

CALCULATION METHODS:

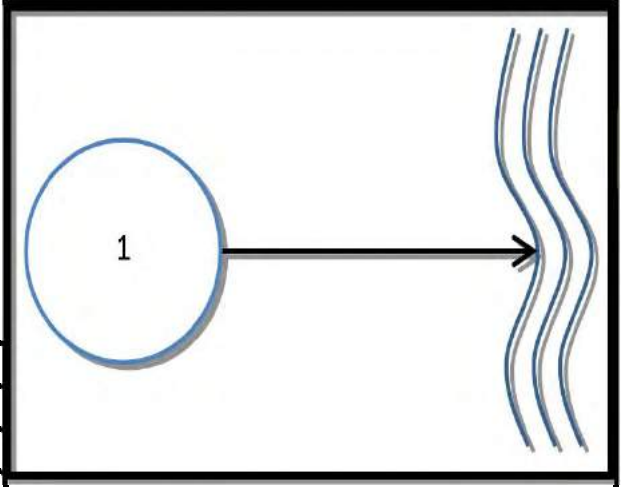
1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. If multiple BMPs are used in a single catchment and one of them is detention, then it is assumed to be last in series.

PROJECT TITLE	SR 710 - Mosquito Creek	Optional Identification		
	Catchment 1:	Catchment 2:	Catchment 3:	Catchment 4:
BMP Name	Retention Basin			
BMP Name				
BMP Name				

Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment		1/31/2017
Nitrogen Pre Load (kg/yr)	17.24		BMPTRAINS MODEL
Phosphorus Pre Load (kg/yr)	1.37		
Nitrogen Post Load (kg/yr)	28.51		
Phosphorus Post Load (kg/yr)	3.53		
Target Load Reduction (N) %	40		
Target Load Reduction (P) %	61		
Target Discharge Load, N (kg/yr)	17.24		
Target Discharge Load, P (kg/yr)	1.37		
Provided Overall Efficiency, N (%):	82		
Provided Overall Efficiency, P (%):	82		
Discharged Load, N (kg/yr & lb/yr):	5.03	11.07	
Discharged Load, P (kg/yr & lb/yr):	0.62	1.37	
Load Removed, N (kg/yr & lb/yr):	23.49	51.73	
Load Removed, P (kg/yr & lb/yr):	2.91	6.40	

Treatment Objectives Met



Appendix 8
Engineering Calculations

Basin 1

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/11/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 1 - PRE DEVELOPMENT - R/W Only

Drainage Area: From Station 500+34 to Station 511+20
Basin Length = 1086 feet (measured from roll plot)
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Open Space - Good Condition (Perv R/W)		D	80	3.99	319
Area to become Water Management Area		D	80	2.32	186
			Totals =	6.31	505

CN (weighted) = (total product) / (total area) = 505 / 6.31

= 80

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

Time of Concentration

PROJECT: SR 710 BY: LCS DATE: 10/24/2013

LOCATION: Okeechobee County CHECKED: GSS DATE: 10/24/2013

EXISTING or DEVELOPED / UNDEVELOPED BASIN: 1

Tc or Tt (through subarea)

NOTES: Space for as many as two segments per flow type can be used for each worksheet. Include map, schematic, or description of flow segments.

L = 985 ft

Sheet flow (Applicable to Tc only)

Segment ID	AB	
1. Surface description (Table T-1, FDOT HB)	grass	
2. Mannings roughness coeff., n (Table T-1, FDOT HB) †	0.15	
3. Flow length, L (total L ≤ 100 ft.)	100	
4. Design storm 72 hr. rainfall, P_{72} (in.) ††	9.0	
5. Land slope, s (ft./ft.)	0.057	
6. Compute T_t in hr, $T_t = [0.007(nL)^{0.8}] / [P_{72hr}^{0.5} s^{0.4}]$ †††	0.06	
Subtotal		**0.06**

Shallow concentrated flow

Segment ID	BC	
7. Surface description (Paved or Unpaved)	Unpaved	
8. Flow length, L (ft)	885	
9. Watercourse slope, s (ft/ft)	0.008	
10. Average velocity, $V = k(S)^{0.5}$ (Equ. 5, FDOT HB)	1.47	
11. Compute Tt in hr, $T_t = L / (3600*V)$	0.17	
Subtotal		**0.17**

Shallow concentrated flow

Segment ID	CD	
7. Surface description (Paved or Unpaved)	Unpaved	
8. Flow length, L (ft)	102	
9. Watercourse slope, s (ft/ft)	0.049	
10. Average velocity, $V = k(S)^{0.5}$ (Equ. 5, FDOT HB)	3.57	
11. Compute Tt in hr, $T_t = L / (3600*V)$	0.01	
Subtotal		**0.01**

Channel Flow/Pipe Flow

Segment ID		
12. Type of Flow		
13. Diameter of Pipe (in.)		
14. Cross sectional flow area, A (assumed d=0.5 ft)		
15. Wetted perimeter, P_w		
16. Hydraulic radius, r = A / P_w, Compute r		
17. Channel slope, s (ft./ft.)		
18. Manning's roughness coeff., n		
19. V = 1.486 $(r)^{0.667}(s)^{0.50}$ / n, Compute V ††††		
20. Flow length, L		
21. Tt = L / (3600*V)		
22. Subtotal		**0.00**

Time of Concentration, hr. (summation of subtotals)		
	Hours	0.23
	Minutes	13.9
	Total	**13.9**

Ref. FDOT Hydrology Handbook 2012.

† The use of Table T-1 is the "Overland Flow Manning's n Values" from FDOT Hydrology Handbook (2012).

†† The design storm of the basin is a 25-year storm frequency with a duration of 72-hours. Values found in SFWMD ERP Information Manual Volume IV, Surface Water Management Design Aids Figure C-8 (2012).

††† This equation is derived from the FDOT Hydrology HB overland flow equation which uses intensity instead of precipitation. The original equation mandates a trial and error process of a Type II rainfall distribution to find the correct intensity with the actual time of concentration. This derivative was created to bypass the trial and error process and is inclusive to both Type II and Type III rainfall distributions.

†††† Manning's Coefficient for Artifical Channels were found in FDOT Hydrology Handbook (2012) Table T-3. Manning's Coefficient for Natural Channels where calcuated with USGS Water-Supply Paper 2339.

Tcs-sABs-Firsts100sfeetsfromsweststoseast;sBC-987'stosTaylorsCreek

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 5/14/2015

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 5/14/2015

Basin: BASIN 1A - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 500+34 to Station 511+20
Basin Length = 1086 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	2.40	235
Open Space - Good Condition (Perv R/W)		D	80	1.60	128
Water Management Area (Perv.)		D	80	1.42	114
Water Management Area (Imperv.)			100	0.90	90
			Totals =	6.32	567

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{567}{6.32}$

$= \boxed{90}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 1A PREPARED: LCS 5/14/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/14/2015

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area = 2.40 Ac

Total Drainage area = 6.32 Ac

1" runoff from total drainage area = 0.53 Ac-Ft

2.5" times percent imperviousness = 0.50 Ac-Ft

Treatment Volume = Greater of 1.0" over the total drainage area or 2.5" times the percent imperviousness

Required Treatment Volume (T.V.) = **0.53** **Ac-Ft**

= **22933** **Cu-Ft**

Pond Storage Calculations (Wet Detention - Pond 1A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu Ft.
24.50	1.0	54,922	1.261	1.199	3.136	136,604
23.50	1.0	49,519	1.137	1.075	1.937	84,376
22.50	0.9	44,106	1.013	0.862	0.862	37,549
21.60	0.0	39,318	0.903	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond1A)

Elev.	Storage	Area
21.60	0.000	39,318
22.50	0.862	44,106

Elev. = 22.15 = 0.53 Ac-Ft 22946 Cu-Ft

Provided Treatment Volume (T.V.) = **0.527** Ac-ft

Treatment Depth = 0.55 ft

For Orifice Recovery Calculations (Pond1A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" of the required detention volume = **0.23 Ac-Ft = 9828 Cu-Ft**

Elev.	Storage	Area
21.60	0.000	39,318
22.50	0.862	44,106

Elev. = 21.84 ft. provides 0.230 ac-ft of volume
= 10013 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-1A:

Est. Ground Elevation (at boring location) =	26	feet
Subtract Est. SHGT Depth = -1.5-0.5 =	2	feet
Estimated SHGT Elev. =	24	feet

Note: Used same control elevation as adjacent existing US 441, Pond 1 (orifice elev. At 22.7 feet NGVD or 21.53 feet NAVD

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 PREPARED: LCS DATE: 5/14/2015

LOCATION: Okeechobee County, FL CHECKED: GS DATE: 5/14/2015

Pond 1A Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	9828	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.057 cfs

Elevation of Required Treatment Volume =	21.84	ft
Flow line Elevation =	21.60	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.24 ft

h = 0.24

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.024 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

D = 0.18 ft = 2.10 in dia

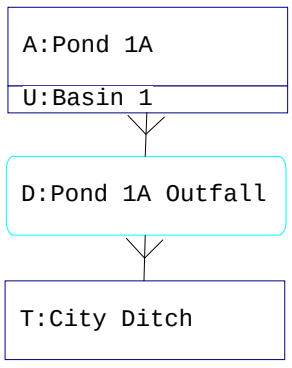
Use 2 inch orifice with elbow

Use 3 inch minimum to prevent clogging

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



==========
==== Basins ====
==========

Name: Basin 1 Node: Pond 1A Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 15.00
Area(ac): 6.320 Time Shift(hrs): 0.00
Curve Number: 90.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ====
==========

Name: City Ditch Base Flow(cfs): 0.000 Init Stage(ft): 21.570
Group: BASE Warn Stage(ft): 22.820
Type: Time/Stage

From SJRWMD Permit Info. for US 441 Pond 1: Permit No. 47-000489-P (2004)
Converted from NGVD to NAVD

Time(hrs)	Stage(ft)
0.00	21.570
336.00	22.820

Name: Pond 1A Base Flow(cfs): 0.000 Init Stage(ft): 21.840
Group: BASE Warn Stage(ft): 23.460
Type: Stage/Area

Stage(ft)	Area(ac)
21.600	0.9030
22.500	1.0130
23.500	1.1370
24.500	1.2610

==========
==== Drop Structures ====
==========

Name: Pond 1A Outfall From Node: Pond 1A Length(ft): 270.00
Group: BASE To Node: City Ditch Count: 1

	UPSTREAM	DOWNSTREAM		
			Friction Equation:	Automatic
Geometry:	Circular	Circular	Solution Algorithm:	Most Restrictive
Span(in):	18.00	18.00	Flow:	Both
Rise(in):	18.00	18.00	Entrance Loss Coef:	0.500
Invert(ft):	19.000	18.460	Exit Loss Coef:	1.000
Manning's N:	0.012000	0.012000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000	Solution Incs:	10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 2 for Drop Structure Pond 1A Outfall ***
TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Circular Orifice Disc Coef: 0.600

Span(in): 3.00 Invert(ft): 21.000
Rise(in): 3.00 Control Elev(ft): 21.600

*** Weir 2 of 2 for Drop Structure Pond 1A Outfall ***
TABLE

Count: 3 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Rectangular Orifice Disc Coef: 0.600

Span(in): 79.00 Invert(ft): 22.150
Rise(in): 36.00 Control Elev(ft): 22.150

==========
==== Hydrology Simulations ====
==========

Name: 1A - 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\1A - 25-72.R32

Override Defaults: Yes
Storm Duration(hrs): 72.00
Rainfall File: Flmod
Rainfall Amount(in): 9.00

Time(hrs) Print Inc(min)
--- ---
72.000 15.00

Name: 1A-5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\1A-5-1.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Flmod
Rainfall Amount(in): 2.98

Time(hrs) Print Inc(min)
--- ---
1.000 15.00

==========
==== Routing Simulations ==========
==========

Name: Pond 1A - 25-72 Hydrology Sim: 1A - 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 1A - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)
--- ---
10.000 15.000
72.000 15.000

Group Run
--- ---
BASE Yes

Name: Pond 1A - 5-1 Hydrology Sim: 1A-5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 1A - 5-1.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 1.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)
--- ---
0.500 15.000
1.000 15.000

Group Run
--- ---
BASE Yes

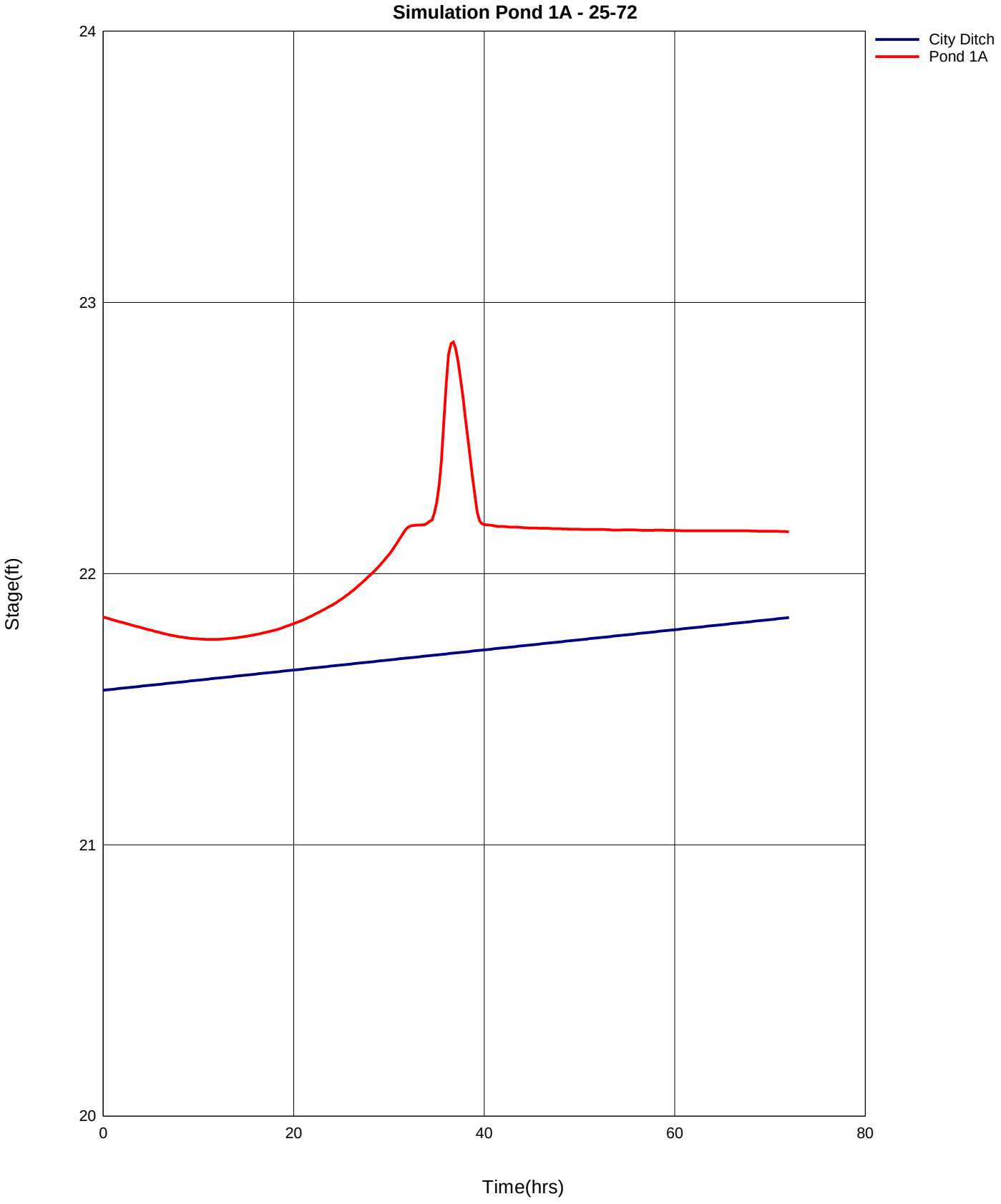
```
            Basin Name: Basin 1
            Group Name: BASE
            Simulation: 1A - 25-72
             Node Name: Pond 1A
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 2.00
  Comp Time Inc (min): 2.00
        Rainfall File: Flmod
Rainfall Amount (in): 9.000
Storm Duration (hrs): 72.00
              Status: Onsite
    Time of Conc (min): 15.00
      Time Shift (hrs): 0.00
             Area (ac): 6.320
Vol of Unit Hyd (in): 1.001
         Curve Number: 90.000
             DCIA (%): 0.000

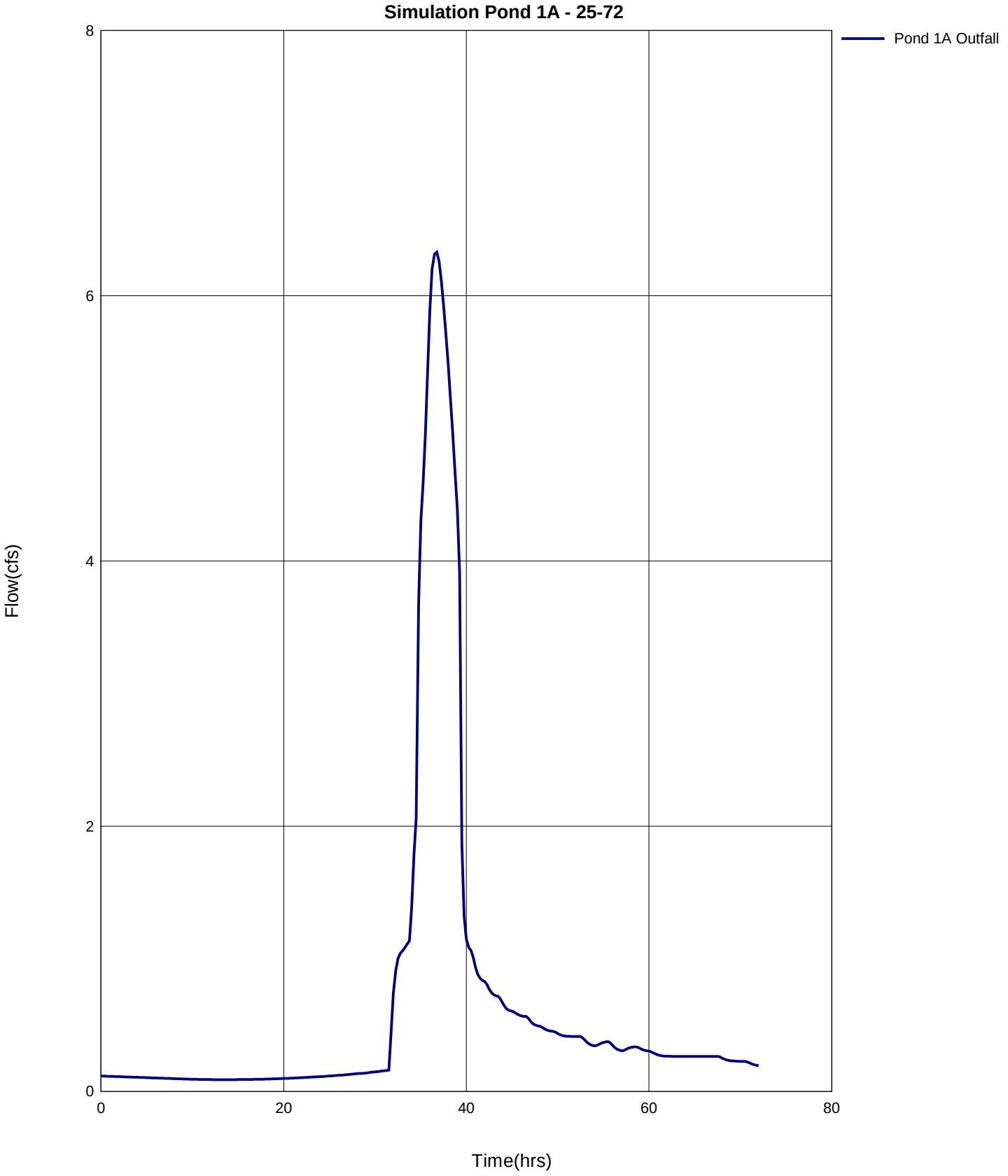
       Time Max (hrs): 36.00
       Flow Max (cfs): 13.44
  Runoff Volume (in): 7.795
 Runoff Volume (ft3): 178826
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
City Ditch	BASE	Pond 1A - 25-72	72.00	21.84	22.82	0.0001	0	36.71	6.33	0.00	0.00
Pond 1A	BASE	Pond 1A - 25-72	36.72	22.85	23.46	-0.0050	46037	35.99	13.42	36.71	6.33

Pond 1A
25 Yr, 72 Hr



Pond 1A
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/11/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 1B - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 500+34 to Station 511+20
Basin Length = 1086 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	2.40	235
Open Space - Good Condition (Perv R/W)		D	80	1.60	128
Water Management Area (Perv.)		D	80	1.20	96
Water Management Area (Imperv.)			100	0.00	0
			Totals =	5.20	459

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{459}{5.20}$

$= \boxed{88}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 1B PREPARED: LCS 2/11/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/24/2014

Dry Retention Online Pond Treatment Calculations:

Proposed impervious area = 2.40 Ac

Total Drainage area = 5.20 Ac

75% of 2.5" runoff from impervious area = 0.38 Ac-Ft

75% of 1" runoff from drainage area = 0.32 Ac-Ft

Treatment Volume = Greater of 75% of 2.50" times percent imperviousness or 75% of 1.0" over drainage area.

*Note: Dry Detention Volume Used If Nutrient Loading Can Be Eliminated

Required Treatment Volume (T.V.) = **0.38** **Ac-ft**

= **16335** **ft^3**

Pond Storage Calculations (Dry Retention - Pond 1B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
21.28	1.0	20,233	0.464	0.440	1.180	51401
20.28	1.0	18,133	0.416	0.393	0.740	32234
19.28	1.0	16,098	0.370	0.347	0.347	15115
18.28	0.0	14,164	0.325	0.000	0.000	0.000

SHGT El. = 16.75 feet

Overflow Weir Elevation (Top of storage volume) (Pond1B)

Elev.	Storage	Area
19.28	0.347	16,098
20.28	0.740	18,133

Elev. = 19.38 = 0.39 Ac-Ft 16827 Cu-Ft

Provided Treatment Volume (T.V.) = **0.386** Ac-ft

Treatment Depth = 1.10 ft

From Geotechnical Information (10/13):

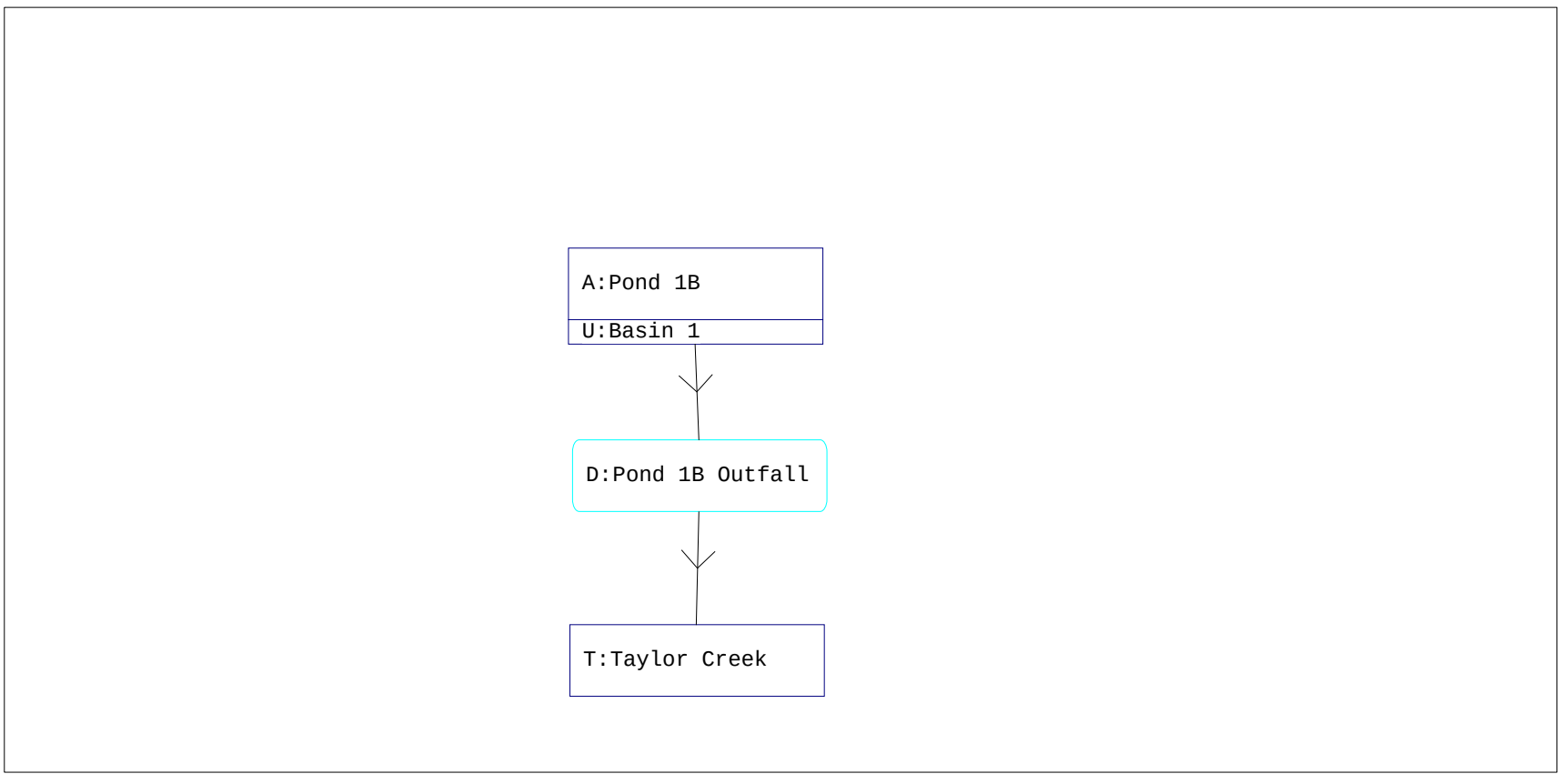
Boring PB-1B:

Est. Ground Elevation (at boring location) =	18	feet
Subtract Est. SHGT Depth = -0.75-0.5 =	1.25	feet
Estimated SHGT Elev. =	16.75	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



Pond 1B
25 Yr, 72 Hr
5 Yr, 1 Hr

```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Basin 1                 Node: Pond 1B               Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 14.15
            Area(ac): 5.190                 Time Shift(hrs): 0.00
       Curve Number: 88.00             Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Pond 1B             Base Flow(cfs): 0.000         Init Stage(ft): 18.280
     Group: BASE                                             Warn Stage(ft): 21.280
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         18.280          0.3250
         19.280          0.3700
         20.280          0.4160
         21.280          0.4640

--------------------------------------------------------------------------------
      Name: Taylor Creek        Base Flow(cfs): 0.000         Init Stage(ft): 12.830
     Group: BASE                                             Warn Stage(ft): 14.830
      Type: Time/Stage

Converted from NGVD to NAVD
FROM Raulerson Hospital Permit

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00          12.830
         999.00          12.830

================================================================================
==== Drop Structures ===========================================================
================================================================================

        Name: Pond 1B Outfall     From Node: Pond 1B            Length(ft): 140.00
       Group: BASE                  To Node: Taylor Creek           Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                                Flow: Both
    Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
   Invert(ft): 16.380        14.000                       Exit Loss Coef: 1.000
  Manning's N: 0.012000      0.012000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure Pond 1B Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 37.00                       Invert(ft): 19.380
              Rise(in): 24.00                Control Elev(ft): 19.380


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

        Name: Post 1B - 25-72
    Filename: T:\00809.00\zTBG\drainage\ICPR\Post 1B - 25-72.R32

     Override Defaults: Yes
   Storm Duration(hrs): 72.00
         Rainfall File: Flmod
   Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
```

72.000	15.00

Name: Post 1B - 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Post 1B - 5-1.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Flmod
Rainfall Amount(in): 2.98

Time(hrs)	Print Inc(min)
1.000	15.00

==== Routing Simulations ====

Name: Pond 1B - 25-72 Hydrology Sim: Post 1B - 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 1B - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

Name: Pond 1B-5-1 Hydrology Sim: Post 1B - 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 1B-5-1.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 1.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
0.500	15.000
1.000	15.000

Group	Run
BASE	Yes

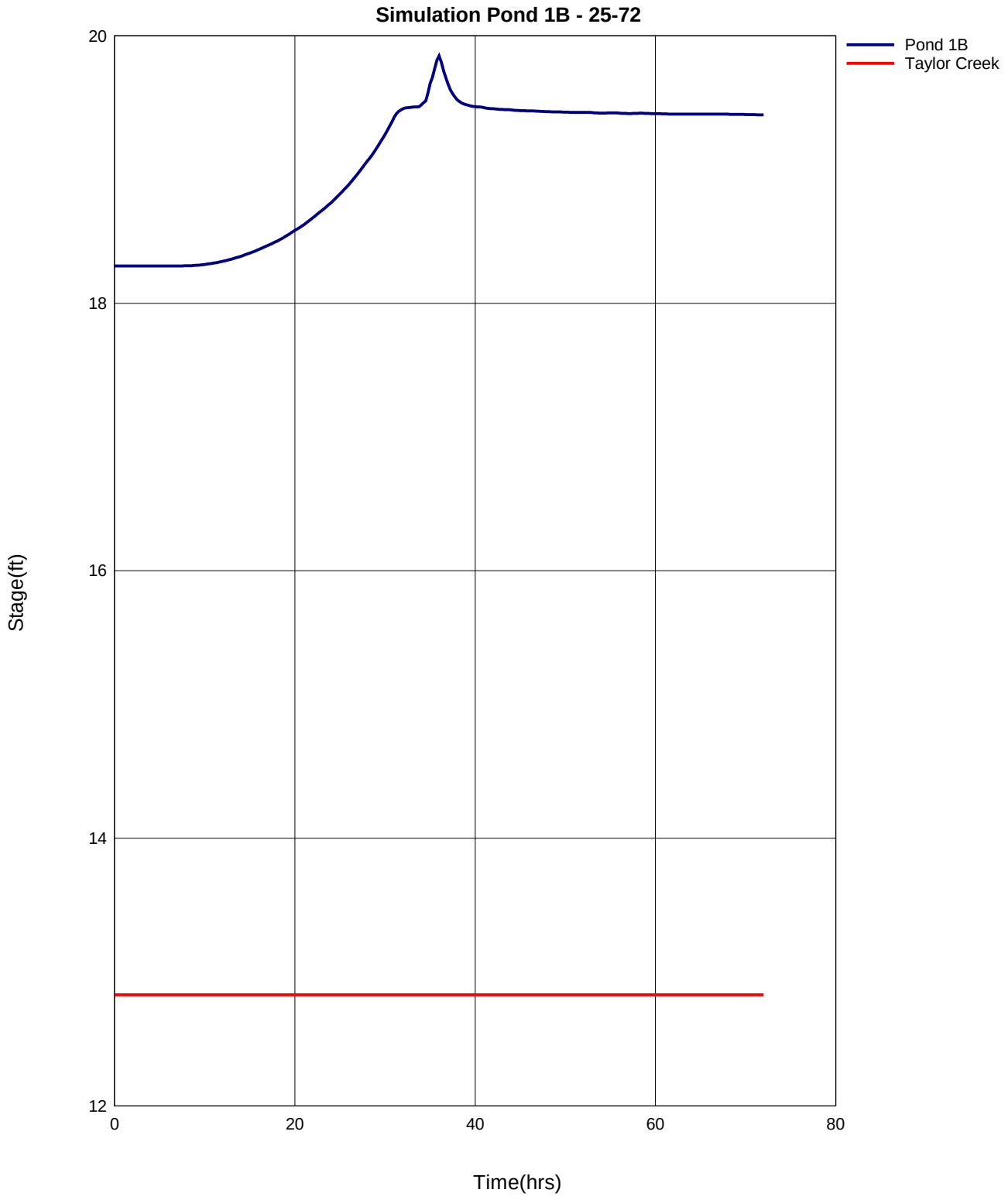
```
            Basin Name: Basin 1
            Group Name: BASE
            Simulation: Post 1B - 25-72
             Node Name: Pond 1B
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 1.89
  Comp Time Inc (min): 1.89
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 14.15
     Time Shift (hrs): 0.00
            Area (ac): 5.190
 Vol of Unit Hyd (in): 1.001
         Curve Number: 88.000
             DCIA (%): 0.000

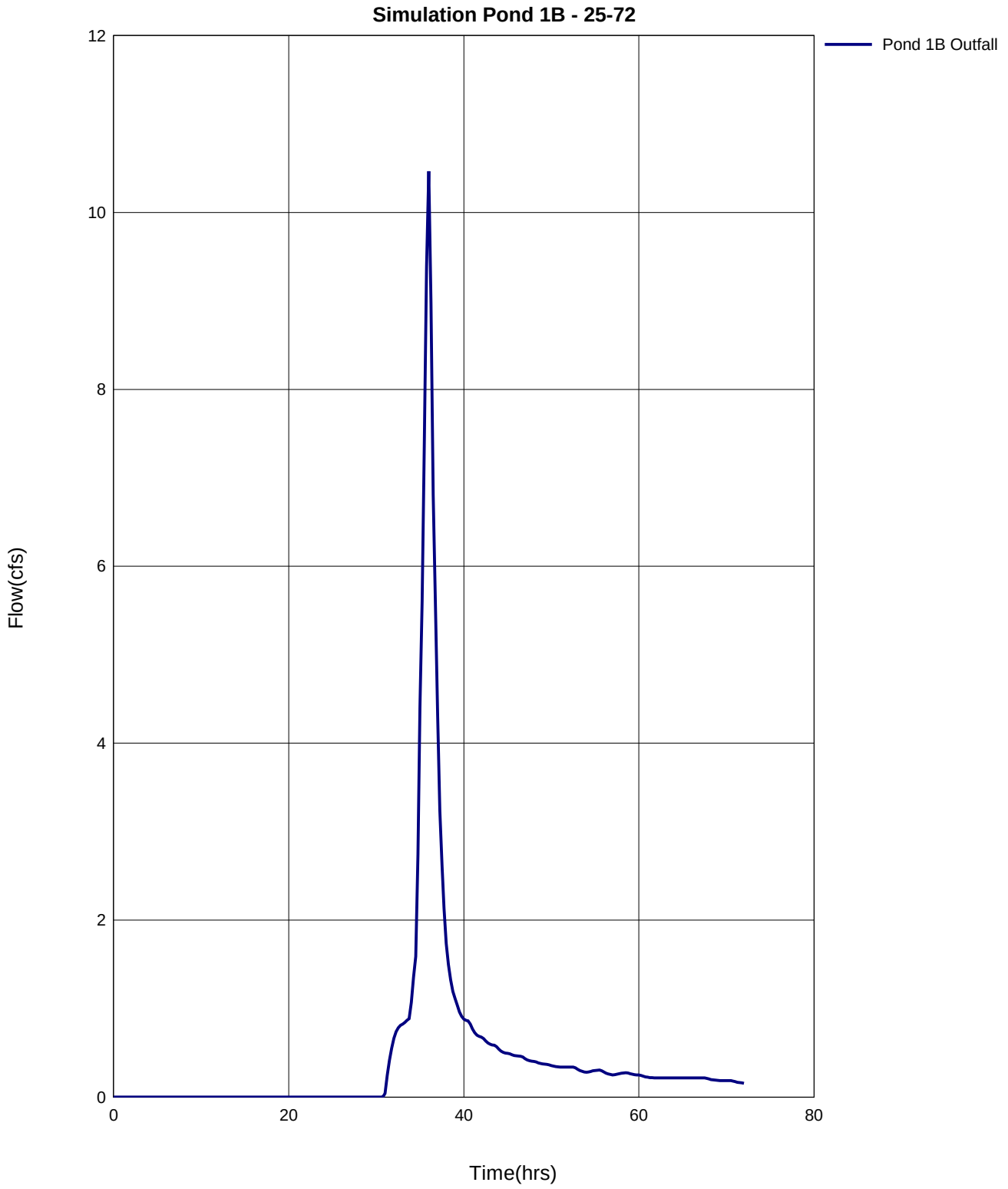
       Time Max (hrs): 36.00
       Flow Max (cfs): 10.92
  Runoff Volume (in): 7.550
 Runoff Volume (ft3): 142248
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 1B	BASE	Pond 1B - 25-72	36.04	19.85	21.28	0.0049	17261	35.99	10.88	36.04	10.50
Taylor Creek	BASE	Pond 1B - 25-72	0.00	12.83	14.83	0.0000	0	36.04	10.50	0.00	0.00

Pond 1B
25 Yr, 72 Hr



Pond 1B
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/11/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 1C - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 500+34 to Station 511+20
Basin Length = 1086 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	2.39	235
Open Space - Good Condition (Perv R/W)		D	80	1.60	128
Water Management Area (Perv.)		D	80	0.88	71
Water Management Area (Imperv.)			100	0.00	0
			Totals =	4.87	433

CN (weighted) = (total product) / (total area) = 433 / 4.87

= 89

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 1C PREPARED: LCS 2/11/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/24/2014

Dry Retention Online Pond Treatment Calculations:

Proposed impervious area = 2.39 Ac

Total Drainage area = 4.87 Ac

75% of 2.5" runoff from impervious area = 0.37 Ac-Ft

75% of 1" runoff from drainage area = 0.30 Ac-Ft

Treatment Volume = Greater of 75% of 2.50" times percent imperviousness or 75% of 1.0" over drainage area.

*Note: Dry Detention Volume Used If Nutrient Loading Can Be Eliminated

Required Treatment Volume (T.V.) = **0.37** **Ac-ft**

= **16290** **ft^3**

Pond Storage Calculations (Dry Retention - Pond 1C):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Ac-ft
22.00	1.0	10,281	0.236	0.217	0.739	32,191
21.00	1.0	8,600	0.197	0.180	0.522	22,738
20.00	1.0	7,067	0.162	0.146	0.342	14,898
19.00	1.0	5,621	0.129	0.113	0.196	8,538
18.00	1.0	4,239	0.097	0.083	0.083	3,615
17.00	0.0	2,984	0.069	0.000	0.000	0.000

SHGT El. = 14.5 feet

Overflow Weir Elevation (Top of storage volume) (Pond1C)

Elev.	Storage	Area
20.00	0.342	7,067
21.00	0.522	8,600

Elev. = **20.18** **=** **0.37 Ac-Ft** **16309 Cu-Ft**

Treatment Depth = 3.18 ft

Provided Treatment Volume (T.V.) = **0.374** **Ac-ft**

From Geotechnical Information (10/13):

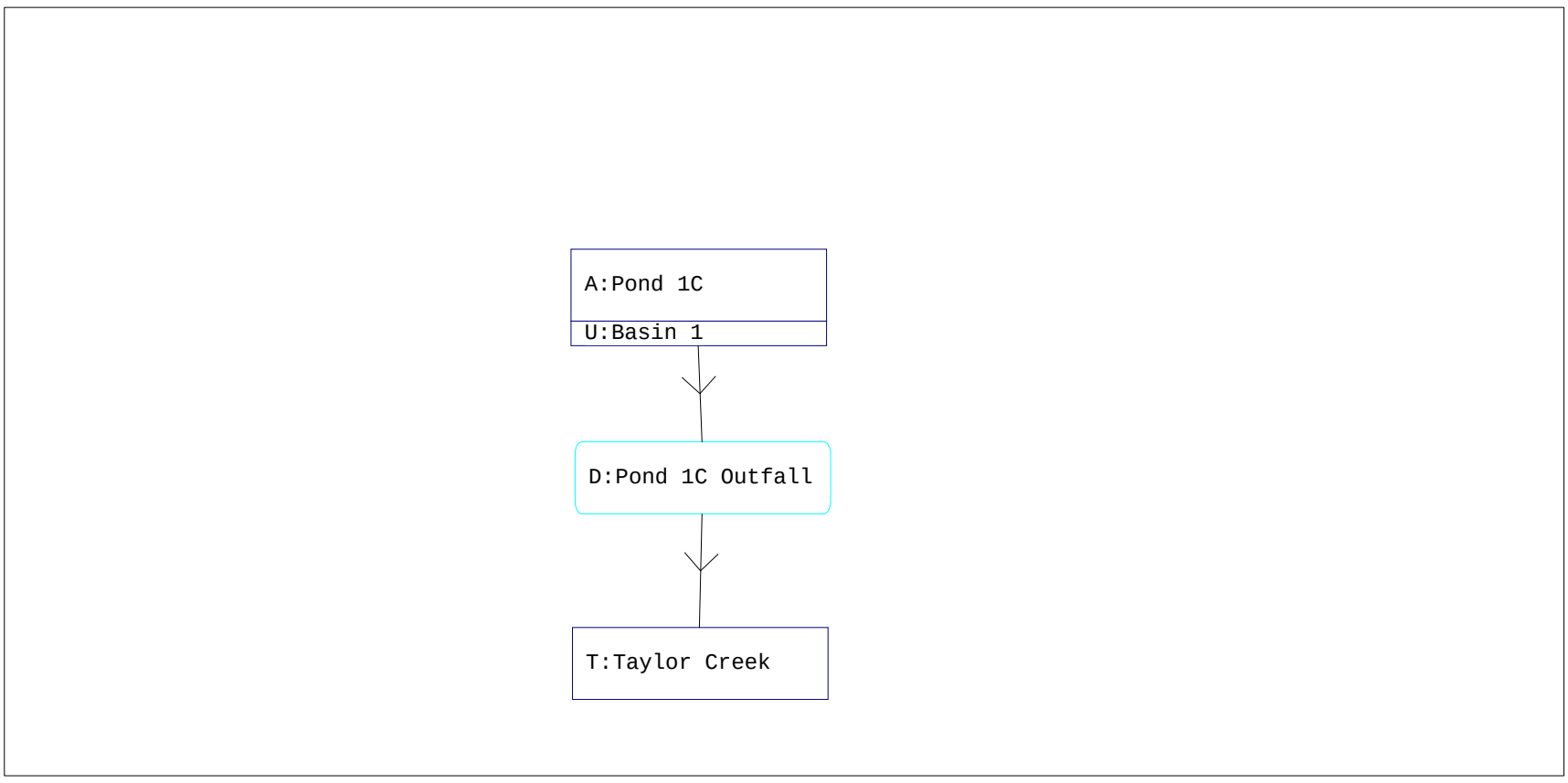
Boring PB-1C:

Est. Ground Elevation (at boring location) =	15	feet
Subtract Est. SHGT Depth = -0.00-0.5 =	0.5	feet
Estimated SHGT Elev. =	14.5	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Basin 1                 Node: Pond 1C               Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 10.00
             Area(ac): 4.870                 Time Shift(hrs): 0.00
        Curve Number: 89.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Pond 1C             Base Flow(cfs): 0.000         Init Stage(ft): 17.000
     Group: BASE                                             Warn Stage(ft): 22.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         17.000          0.0690
         18.000          0.0970
         19.000          0.1290
         20.000          0.1620
         21.000          0.1970
         22.000          0.2360

--------------------------------------------------------------------------------
      Name: Taylor Creek        Base Flow(cfs): 0.000         Init Stage(ft): 12.830
     Group: BASE                                             Warn Stage(ft): 14.830
      Type: Time/Stage

Converted from NGVD to NAVD
FROM RAULERSON HOSPITAL PERMIT


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00          12.830
         999.00          12.830

================================================================================
==== Drop Structures ===========================================================
================================================================================

        Name: Pond 1C Outfall     From Node: Pond 1C           Length(ft): 215.00
       Group: BASE                  To Node: Taylor Creek           Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                                Flow: Both
    Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
  Invert(ft): 17.180         16.750                      Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure Pond 1C Outfall ***
                                                                          TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                  Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 37.00                      Invert(ft): 20.180
              Rise(in): 24.00                Control Elev(ft): 20.180


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 1C - 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 1C - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
```

Rainfall Amount(in): 9.00

Time(hrs)	Print Inc(min)
72.000	15.00

==========
==== Routing Simulations ==========
==========

Name: Pond 1C - 25-72 Hydrology Sim: Post 1C - 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 1C - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 1
            Group Name: BASE
            Simulation: Post 1C - 25-72
             Node Name: Pond 1C
            Basin Type: SCS Unit Hydrograph

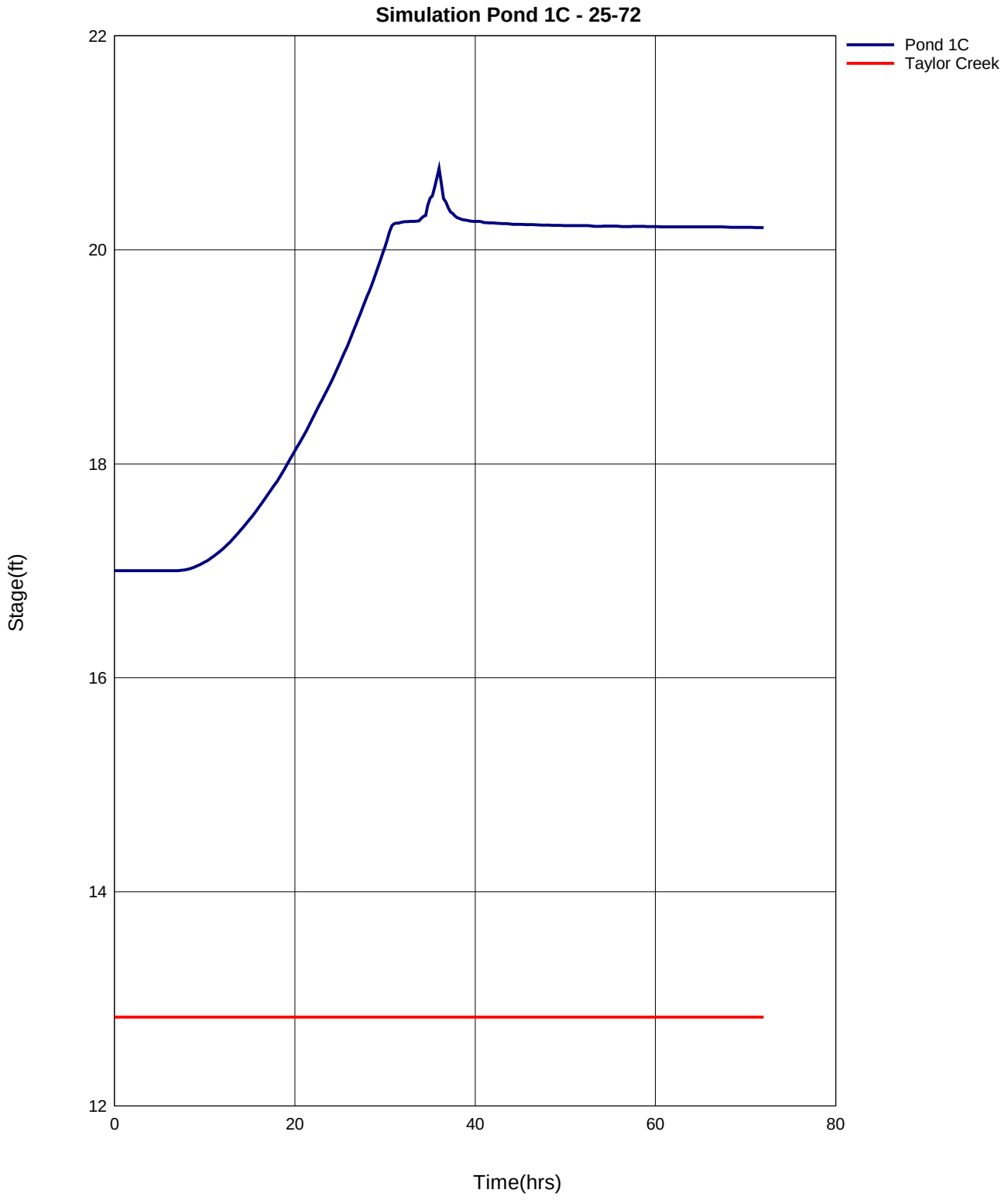
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 1.33
  Comp Time Inc (min): 1.33
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 10.00
     Time Shift (hrs): 0.00
           Area (ac): 4.870
 Vol of Unit Hyd (in): 1.001
         Curve Number: 89.000
             DCIA (%): 0.000

       Time Max (hrs): 36.00
       Flow Max (cfs): 10.55
  Runoff Volume (in): 7.673
 Runoff Volume (ft3): 135645
```

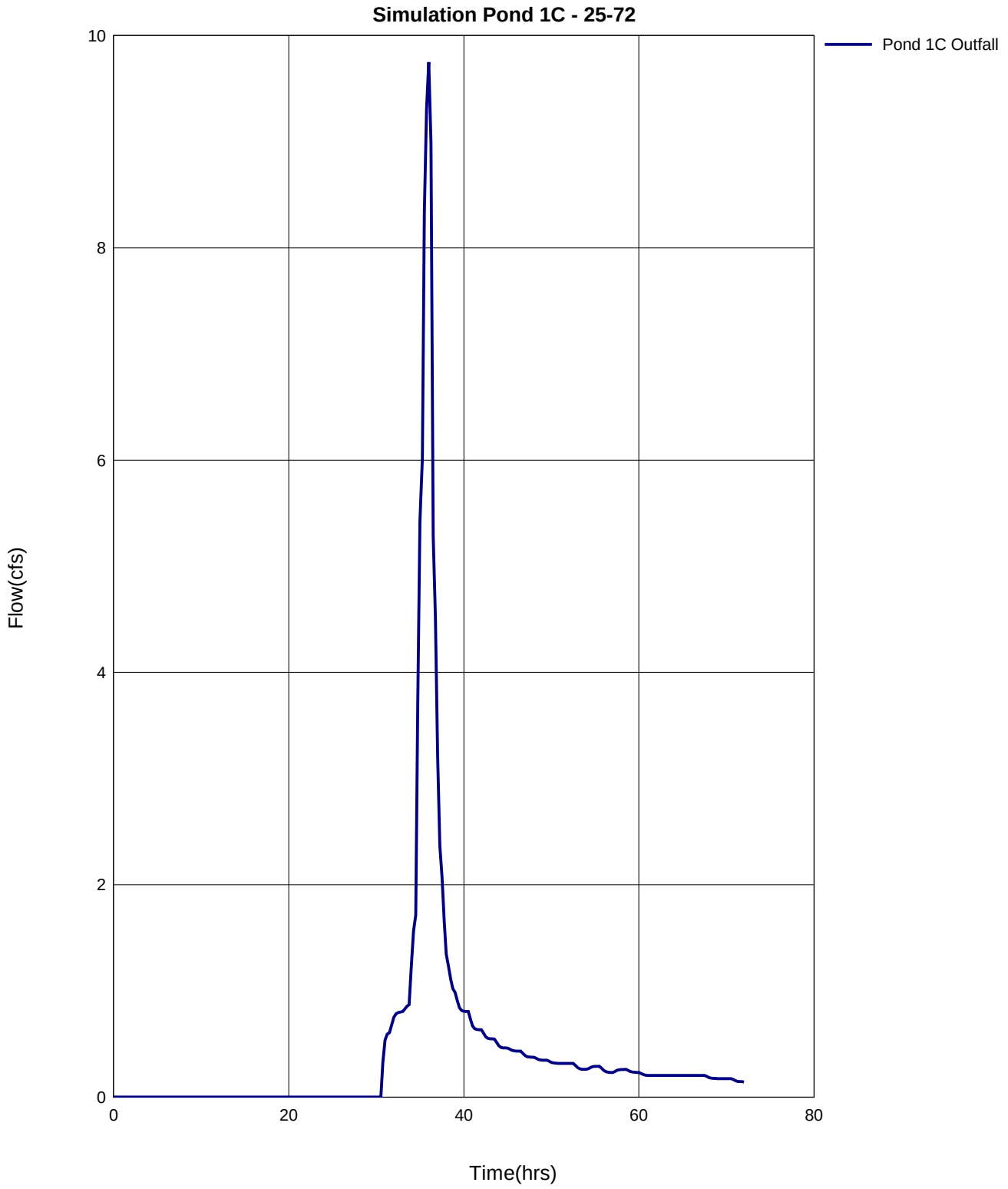
Pond 1C
Pond 1C
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 1C	BASE	Pond 1C - 25-72	36.05	20.77	22.00	0.0050	8226	35.99	10.54	36.05	9.77
Taylor Creek	BASE	Pond 1C - 25-72	0.00	12.83	14.83	0.0000	0	36.05	9.77	0.00	0.00

Pond 1C
25 Yr, 72 Hr



Pond 1C
25 Yr, 72 Hr



Basin 2

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 5/14/2015

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 5/14/2015

Basin: BASIN 2A - Option 1 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	6.28	628
Water Management Area (Perv.)		D	80	3.15	252
			Totals =	46.49	4247

CN (weighted) = (total product) / (total area) = 4,247 / 46.49

= 91

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2A - Option 1 PREPARED: LCS 5/14/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/14/2015

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	**46.49 Ac**
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.87 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **4.66** **Ac-ft**
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
24.43	1.0	308,767	7.088	6.967	22.714	989,422
23.43	1.0	298,215	6.846	6.727	15.747	685,939
22.43	1.0	287,820	6.607	6.490	9.020	392,911
21.43	0.4	277,584	6.372	2.530	2.530	110,207
21.03	0.0	273,534	6.279	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2A)

Elev.	Storage	Area
21.43	2.530	277,584
22.43	9.020	287,820

Elev. = 21.76 = 4.672 203499.252 cu ft of volume
Surface Area @ TV Elev. = 280925 sf

Provided Treatment Volume (T.V.) = **4.672** Ac-ft

Treatment Depth = 0.73 ft

For Orifice Recovery Calculations (Pond2A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.68 Ac-Ft 72985 Cu-Ft

Elev.	Storage	Area
21.03	0.000	273,534
21.43	2.530	277,584

Elev. = 21.31 ft. provides 1.771 ac-ft of volume
77145 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-2A:

Est. Ground Elevation (at boring location) =	22.2	feet
Estimated SHGT Depth = -0.67-0.5 =	1.17	feet
Estimated SHGT Elev. =	21.03	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2A - Option 1 PREPARED: LCS 5/14/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/14/2015

Pond 2A Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	72984.87	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.422 cfs

Elevation of Required Treatment Volume =	21.31	ft
Flow line Elevation =	21.03	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.28 ft

h = 0.28

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.166 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

D = 0.46 ft = 5.51 in dia

Use 5 inch orifice

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 5/14/2015

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 5/14/2015

Basin: BASIN 2A - Option 2 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	3.99	399
Water Management Area (Perv.)		D	80	3.21	257
			Totals =	44.26	4023

CN (weighted) = (total product) / (total area) = 4,023 / 44.26

= 91

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2A - Option 2 PREPARED: LCS 5/14/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/14/2015

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	**44.26 Ac**
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.69 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **4.66** **Ac-ft**
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
25.43	1.0	210,635	4.836	4.733	19.358	843,234
24.43	1.0	201,739	4.631	4.531	14.625	637,065
23.43	1.0	193,032	4.431	4.334	10.094	439,695
22.43	1.0	184,583	4.237	4.149	5.760	250,906
21.43	0.4	176,877	4.061	1.611	1.611	70,175
21.03	0.0	173,937	3.993	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2A)

Elev.	Storage	Area
21.43	1.611	176,877
22.43	5.760	184,583

Elev. = 22.17 = 4.68 Ac-Ft 203916 Cu-Ft

Provided Treatment Volume (T.V.) = **4.681** Ac-ft

Treatment Depth = 1.14 ft

For Orifice Recovery Calculations (Pond2A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.68 Ac-Ft 73087 Cu-Ft

Elev.	Storage	Area
21.03	0.000	173,937
21.43	1.611	176,877

Elev. = 21.45 ft. provides 1.692 ac-ft of volume
73684 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-2A:

Est. Ground Elevation (at boring location) =	22.2	feet
Estimated SHGT Depth = -0.67-0.5 =	1.17	feet
Estimated SHGT Elev. =	21.03	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2A - Option 2 PREPARED: LCS 5/14/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 5/14/2015

Pond 2A Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	73087.29	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.423 cfs

Elevation of Required Treatment Volume =	21.45	ft
Flow line Elevation =	21.03	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.42 ft

h = 0.42

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.136 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

D = 0.42 ft = 4.99 in dia

Use 5.00 inch orifice

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 2A - Option 3 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	3.12	312
Water Management Area (Perv.)		D	80	3.30	264
			Totals =	43.48	3943

CN (weighted) = (total product) / (total area) = 3,943 / 43.48

= 91

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2A - Option 3 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	43.48 Ac
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.62 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **4.66** **Ac-ft**
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
26.43	1.0	177,837	4.083	3.989	19.401	845,108
25.43	1.0	169,681	3.895	3.804	15.412	671,347
24.43	1.0	161,713	3.712	3.623	11.608	505,644
23.43	1.0	153,936	3.534	3.447	7.985	347,827
22.43	1.0	146,348	3.360	3.275	4.538	197,675
21.43	0.4	138,950	3.190	1.263	1.263	55,016
21.03	0.0	136,044	3.123	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2A)

Elev.	Storage	Area
22.43	4.538	146,348
23.43	7.985	153,936

Elev. = 22.47 = 4.68 Ac-Ft 203681 Cu-Ft

Provided Treatment Volume (T.V.) = **4.676** Ac-ft

Treatment Depth = 1.44 ft

For Orifice Recovery Calculations (Pond2A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.68 Ac-Ft 73249 Cu-Ft

Elev.	Storage	Area
21.43	1.263	138,950
22.43	4.538	146,348

Elev. = 21.56 ft. provides 1.689 ac-ft of volume
73562 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-2A:

Est. Ground Elevation (at boring location) =	22.2	feet
Estimated SHGT Depth = -0.67- 0.5 =	1.17	feet
Estimated SHGT Elev. =	21.03	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2A - Option 3 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 02/26/14

Pond 2A Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	73248.90	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.424 cfs

Elevation of Required Treatment Volume =	21.56	ft
Flow line Elevation =	21.03	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.53 ft

h = 0.53

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.121 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

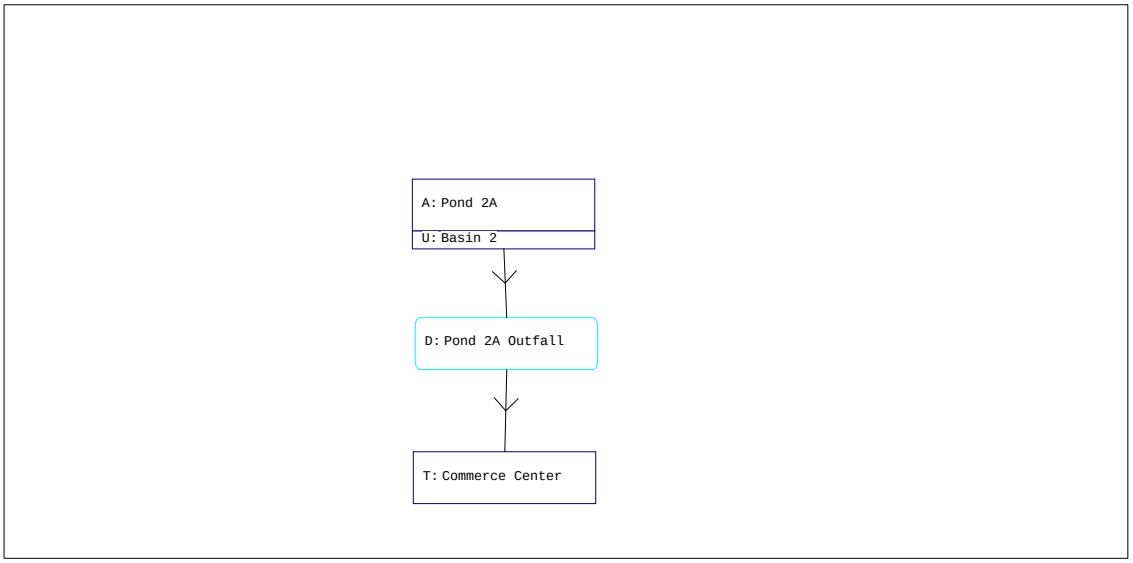
D = 0.39 ft = 4.71 in dia

Use 4 inch orifice

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



==========
==== Basins ====
==========

Name: Basin 2 Node: Pond 2A Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 42.75
Area(ac): 46.490 Time Shift(hrs): 0.00
Curve Number: 91.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ====
==========

Name: Commerce Center Base Flow(cfs): 0.000 Init Stage(ft): 18.330
Group: BASE Warn Stage(ft): 999.000
Type: Time/Stage

From ICPR: Pre-Analysis, Node Time Series for 25/72
Using Commerce Center Permit Information
Converted from NGVD to NAVD

Time(hrs)	Stage(ft)
0.00	18.330
999.00	18.330

Name: Pond 2A Base Flow(cfs): 0.000 Init Stage(ft): 21.310
Group: BASE Warn Stage(ft): 23.430
Type: Stage/Area

Stage(ft)	Area(ac)
21.030	6.2790
21.430	6.3720
22.430	6.6070
23.430	6.8460
24.430	7.0880

==========
==== Drop Structures ====
==========

Name: Pond 2A Outfall From Node: Pond 2A Length(ft): 300.00
Group: BASE To Node: Commerce Center Count: 1

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Friction Equation:	Automatic
Span(in):	24.00	24.00	Solution Algorithm:	Most Restrictive
Rise(in):	24.00	24.00	Flow:	Both
Invert(ft):	18.500	18.200	Entrance Loss Coef:	0.500
Manning's N:	0.012000	0.012000	Exit Loss Coef:	1.000
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Solution Incs:	10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 2 for Drop Structure Pond 2A Outfall ***
TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Circular Orifice Disc Coef: 0.600

Span(in): 5.00 Invert(ft): 20.530
Rise(in): 5.00 Control Elev(ft): 21.030

*** Weir 2 of 2 for Drop Structure Pond 2A Outfall ***
TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200

```
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 79.00                       Invert(ft): 21.760
               Rise(in): 36.00                  Control Elev(ft): 21.760


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2A - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

--------------------------------------------------------------------------------------------------------
         Name: Post 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2A - 5-1.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Flmod
    Rainfall Amount(in): 2.98

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2A - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes


--------------------------------------------------------------------------------------------------------
         Name: Post 5-1            Hydrology Sim: Post 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2A - 5-1.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 1.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
0.500           15.000
1.000           15.000

Group           Run
--------------- -----
BASE            Yes
```

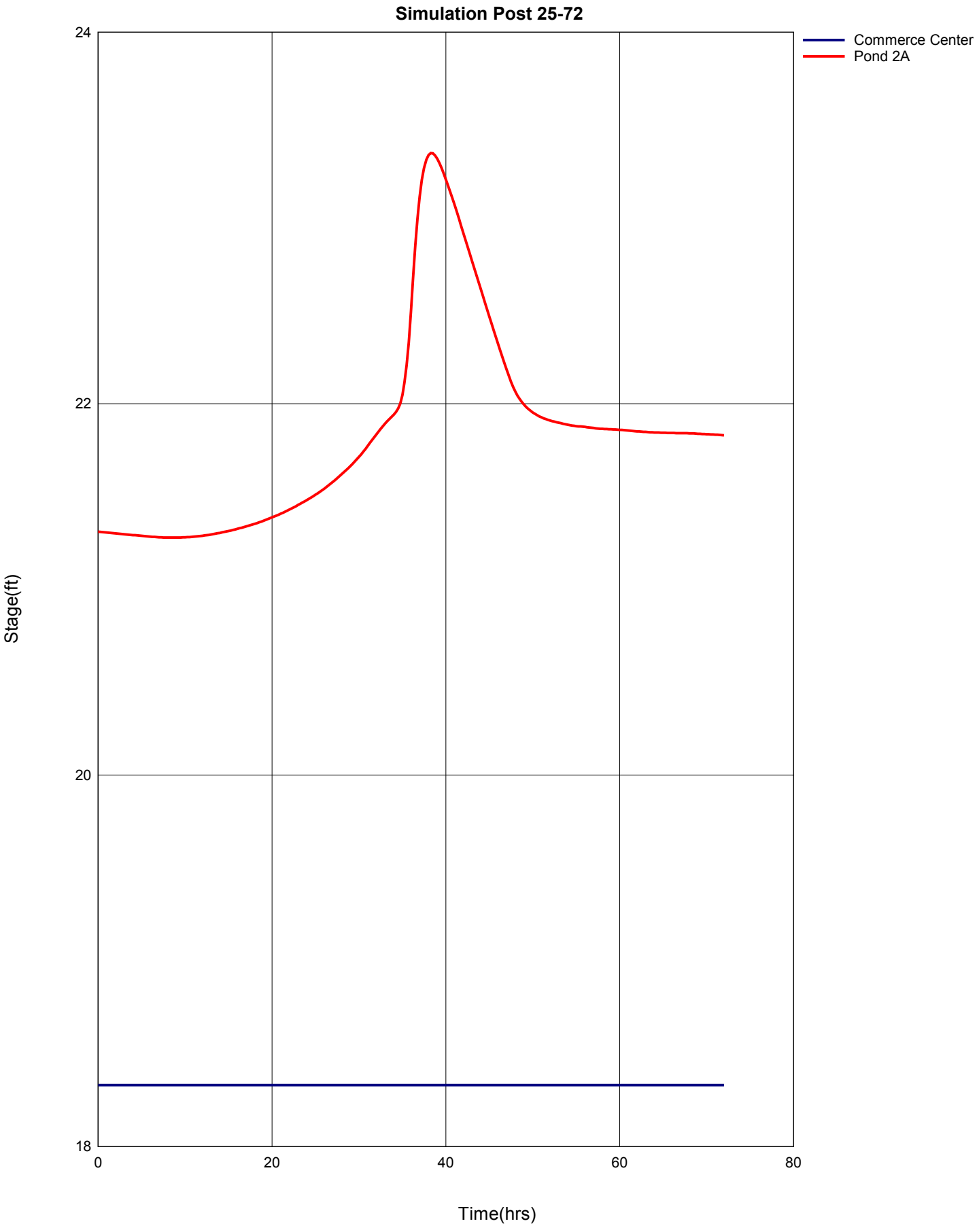
```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 25-72
             Node Name: Pond 2A
            Basin Type: SCS Unit Hydrograph

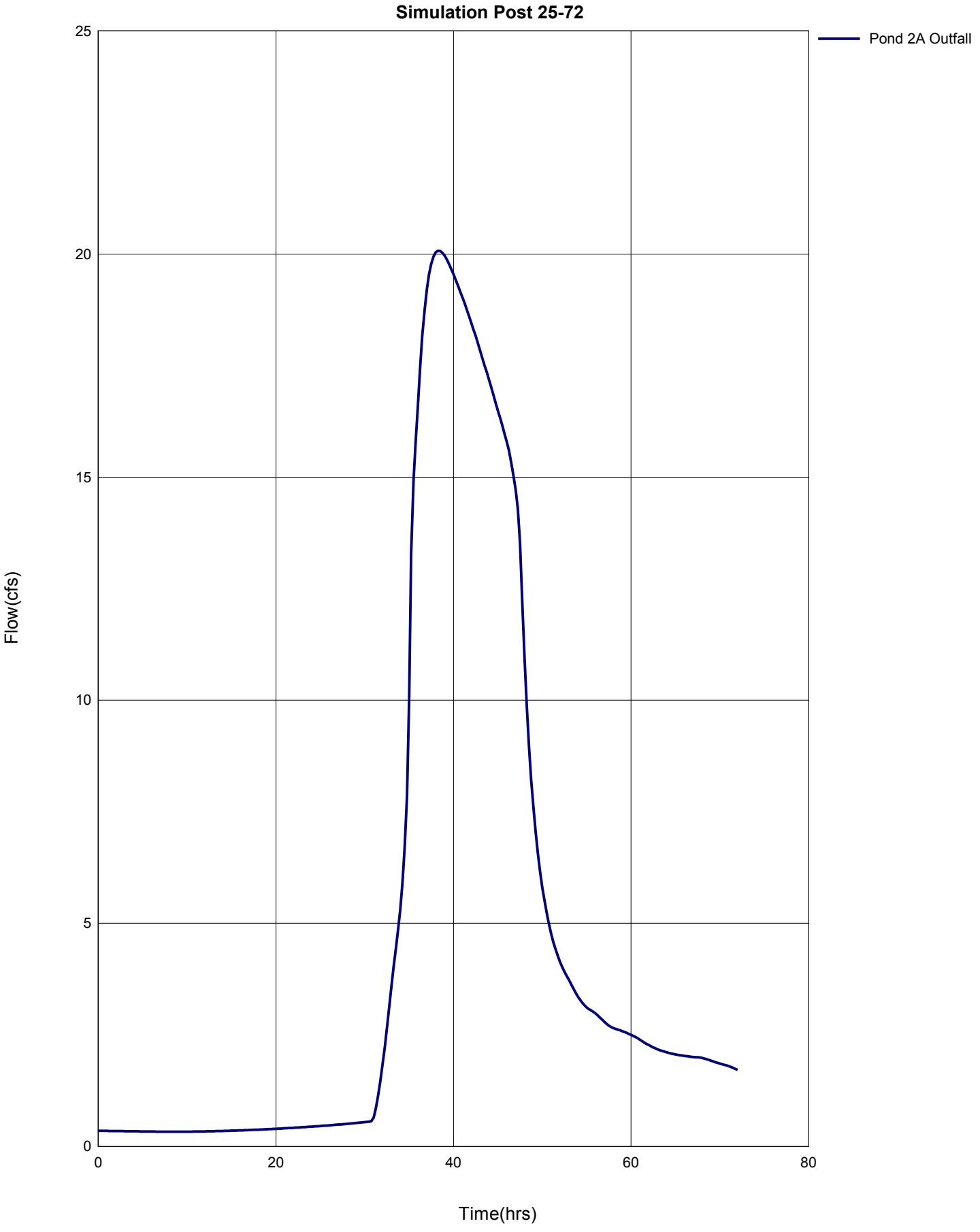
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 5.70
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 42.75
     Time Shift (hrs): 0.00
            Area (ac): 46.490
 Vol of Unit Hyd (in): 1.001
         Curve Number: 91.000
             DCIA (%): 0.000

       Time Max (hrs): 36.17
       Flow Max (cfs): 78.69
   Runoff Volume (in): 7.900
  Runoff Volume (ft3): 1333208
```

Pond 2A - Option 1
25 Year, 72 Hour

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Commerce Center	BASE	Post 25-72	0.00	18.33	999.00	0.0000	0	38.35	20.07	0.00	0.00
Pond 2A	BASE	Post 25-72	38.35	23.35	23.43	0.0050	297372	36.25	78.53	38.35	20.07





```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Basin 2                 Node: Pond 2A               Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                   Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 42.75
             Area(ac): 44.260               Time Shift(hrs): 0.00
         Curve Number: 91.00            Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00



================================================================================
==== Nodes =====================================================================
================================================================================

     Name: Commerce Center     Base Flow(cfs): 0.000         Init Stage(ft): 18.330
    Group: BASE                                            Warn Stage(ft): 999.000
     Type: Time/Stage

From ICPR:  Pre-Analysis, Node Time Series for 25/72
Using Commerce Center Permit Information
Converted from NGVD to NAVD

     Time(hrs)       Stage(ft)
-------------- --------------
          0.00          18.330
        999.00          18.330

--------------------------------------------------------------------------------
     Name: Pond 2A             Base Flow(cfs): 0.000         Init Stage(ft): 21.450
    Group: BASE                                            Warn Stage(ft): 24.430
     Type: Stage/Area



     Stage(ft)        Area(ac)
-------------- --------------
        21.030          3.9930
        21.430          4.0610
        22.430          4.2370
        23.430          4.4310
        24.430          4.6310
        25.430          4.8360

================================================================================
==== Drop Structures ===========================================================
================================================================================

        Name: Pond 2A Outfall     From Node: Pond 2A           Length(ft): 300.00
       Group: BASE                  To Node: Commerce Center         Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
    Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
    Span(in): 24.00          24.00                                Flow: Both
    Rise(in): 24.00          24.00                    Entrance Loss Coef: 0.500
   Invert(ft): 18.500        18.200                       Exit Loss Coef: 1.000
  Manning's N: 0.012000      0.012000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 2 for Drop Structure Pond 2A Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 5.00                       Invert(ft): 20.530
             Rise(in): 5.00                   Control Elev(ft): 21.030

*** Weir 2 of 2 for Drop Structure Pond 2A Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
```

```
                Flow: Both                    Weir Disc Coef: 3.200
            Geometry: Rectangular          Orifice Disc Coef: 0.600

            Span(in): 79.00                      Invert(ft): 22.170
            Rise(in): 36.00                Control Elev(ft): 22.170


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2A - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

--------------------------------------------------------------------------------------------------------
         Name: Post 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2A - 5-1.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Flmod
    Rainfall Amount(in): 2.98

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2A - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes


--------------------------------------------------------------------------------------------------------
         Name: Post 5-1            Hydrology Sim: Post 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2A - 5-1.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 1.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
0.500           15.000
1.000           15.000

Group           Run
--------------- -----
BASE            Yes
```

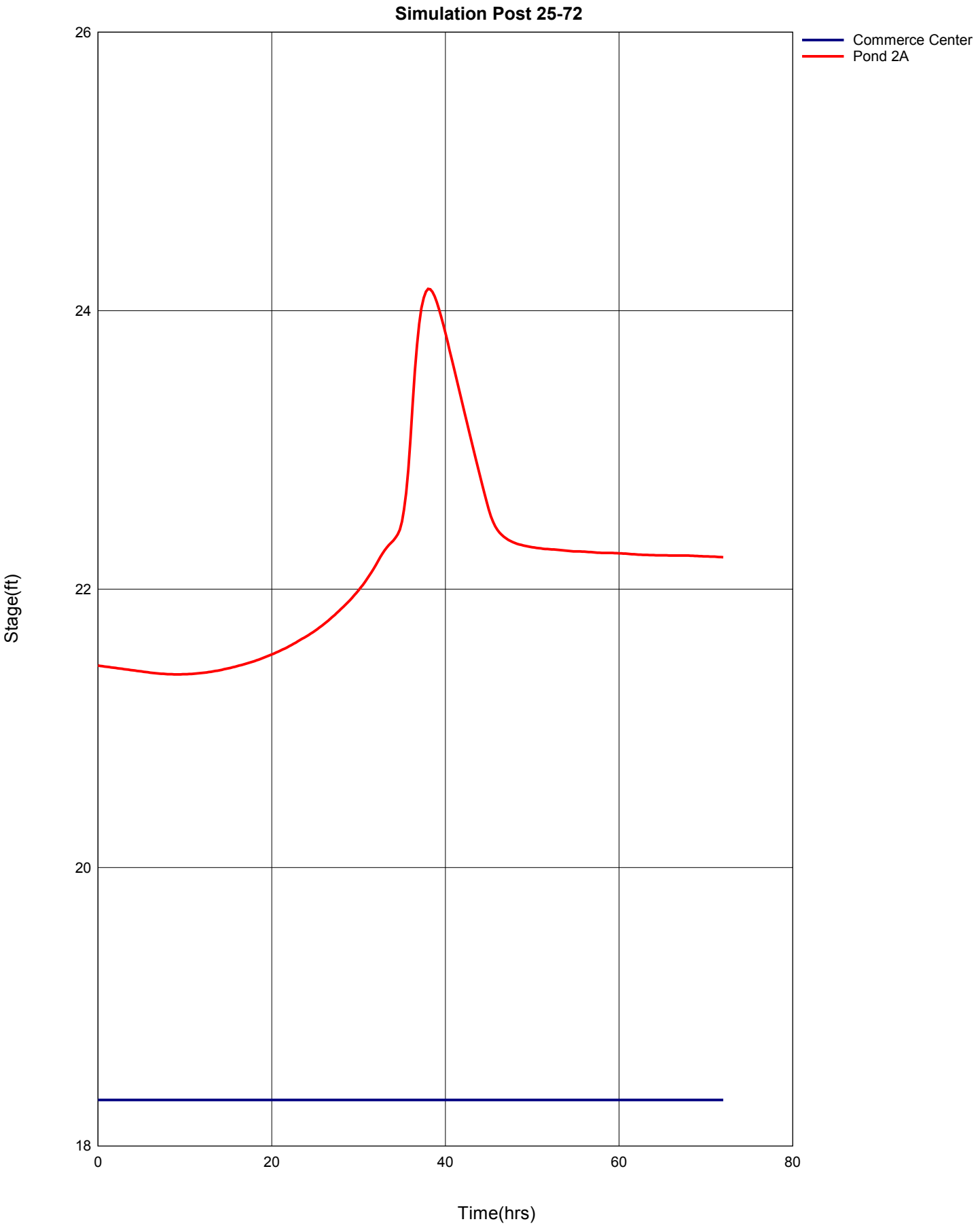
```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 25-72
             Node Name: Pond 2A
            Basin Type: SCS Unit Hydrograph

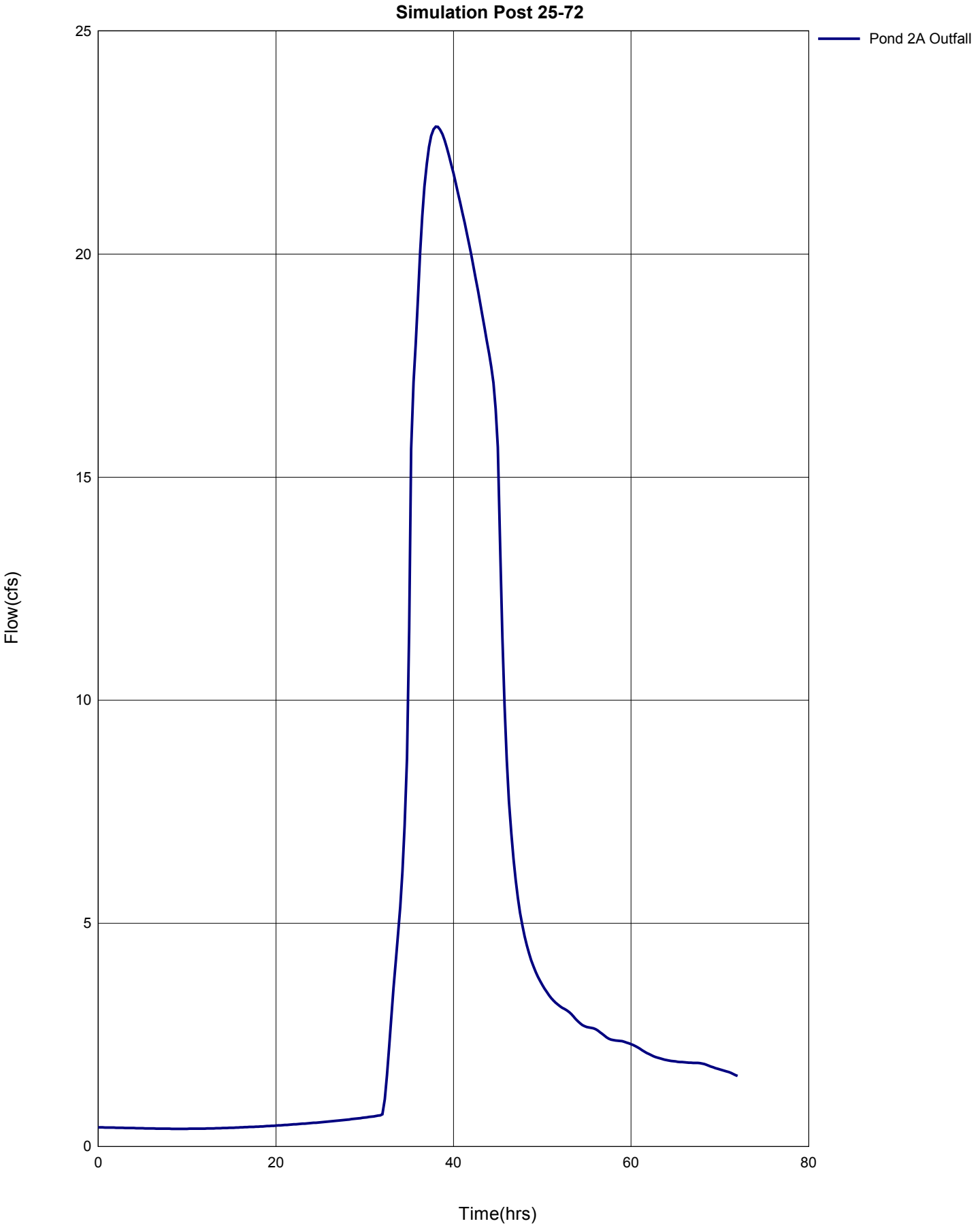
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 5.70
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 42.75
     Time Shift (hrs): 0.00
            Area (ac): 44.260
 Vol of Unit Hyd (in): 1.001
         Curve Number: 91.000
             DCIA (%): 0.000

       Time Max (hrs): 36.17
       Flow Max (cfs): 74.92
  Runoff Volume (in): 7.900
 Runoff Volume (ft3): 1269258
```

Pond 2A - Option 2
25 Year, 72 Hour Storm

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Commerce Center	BASE	Post 25-72	0.00	18.33	999.00	0.0000	0	38.11	22.86	0.00	0.00
Pond 2A	BASE	Post 25-72	38.11	24.16	24.43	0.0050	199346	36.25	74.73	38.11	22.86





==========
==== Basins ====
==========

Name: Basin 2 Node: Pond 2A Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 42.75
Area(ac): 43.480 Time Shift(hrs): 0.00
Curve Number: 91.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ====
==========

Name: Commerce Center Base Flow(cfs): 0.000 Init Stage(ft): 18.330
Group: BASE Warn Stage(ft): 999.000
Type: Time/Stage

From ICPR: Pre-Analysis, Node Time Series for 25/72
Using Commerce Center Permit Information
Converted from NGVD to NAVD

Time(hrs)	Stage(ft)
0.00	18.330
999.00	18.330

Name: Pond 2A Base Flow(cfs): 0.000 Init Stage(ft): 21.560
Group: BASE Warn Stage(ft): 25.430
Type: Stage/Area

Stage(ft)	Area(ac)
21.030	3.1230
21.430	3.1900
22.430	3.3600
23.430	3.5340
24.430	3.7120
25.430	3.8950
26.430	4.0830

==========
==== Drop Structures ====
==========

Name: Pond 2A Outfall From Node: Pond 2A Length(ft): 300.00
Group: BASE To Node: Commerce Center Count: 1

	UPSTREAM	DOWNSTREAM		
			Friction Equation:	Automatic
Geometry:	Circular	Circular	Solution Algorithm:	Most Restrictive
Span(in):	24.00	24.00	Flow:	Both
Rise(in):	24.00	24.00	Entrance Loss Coef:	0.500
Invert(ft):	18.500	18.200	Exit Loss Coef:	1.000
Manning's N:	0.012000	0.012000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000	Solution Incs:	10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 3 for Drop Structure Pond 2A Outfall ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Circular Orifice Disc Coef: 0.600

Span(in): 4.00 Invert(ft): 20.530
Rise(in): 4.00 Control Elev(ft): 21.030

*** Weir 2 of 3 for Drop Structure Pond 2A Outfall ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Rectangular Orifice Disc Coef: 0.600

Span(in): 79.00 Invert(ft): 25.430
Rise(in): 36.00 Control Elev(ft): 25.430

*** Weir 3 of 3 for Drop Structure Pond 2A Outfall ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Vertical: Mavis Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Rectangular Orifice Disc Coef: 0.600

Span(in): 24.00 Invert(ft): 22.470
Rise(in): 35.52 Control Elev(ft): 22.470

==========
==== Hydrology Simulations ==========
==========

Name: Post 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2A - 25-72.R32

Override Defaults: Yes
Storm Duration(hrs): 72.00
Rainfall File: Flmod
Rainfall Amount(in): 9.00

Time(hrs)	Print Inc(min)
72.000	15.00

Name: Post 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2A - 5-1.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Flmod
Rainfall Amount(in): 2.98

Time(hrs)	Print Inc(min)
1.000	15.00

==========
==== Routing Simulations ==========
==========

Name: Post 25-72 Hydrology Sim: Post 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2A - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

Name: Post 5-1 Hydrology Sim: Post 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2A - 5-1.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 1.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
0.500	15.000
1.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 25-72
             Node Name: Pond 2A
            Basin Type: SCS Unit Hydrograph

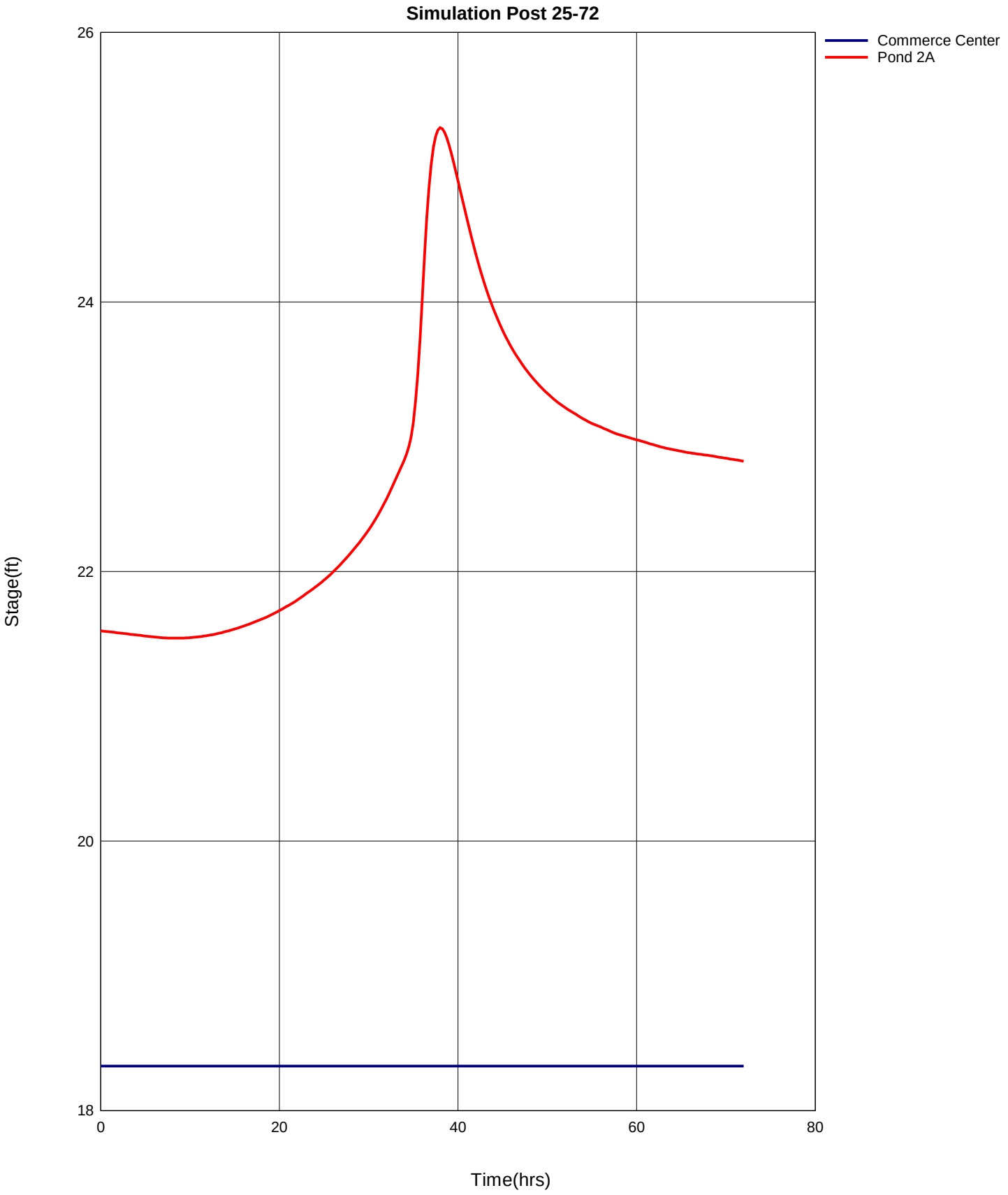
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 5.70
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 42.75
     Time Shift (hrs): 0.00
            Area (ac): 43.480
 Vol of Unit Hyd (in): 1.001
         Curve Number: 91.000
             DCIA (%): 0.000

       Time Max (hrs): 36.17
       Flow Max (cfs): 73.60
  Runoff Volume (in): 7.900
 Runoff Volume (ft3): 1246889
```

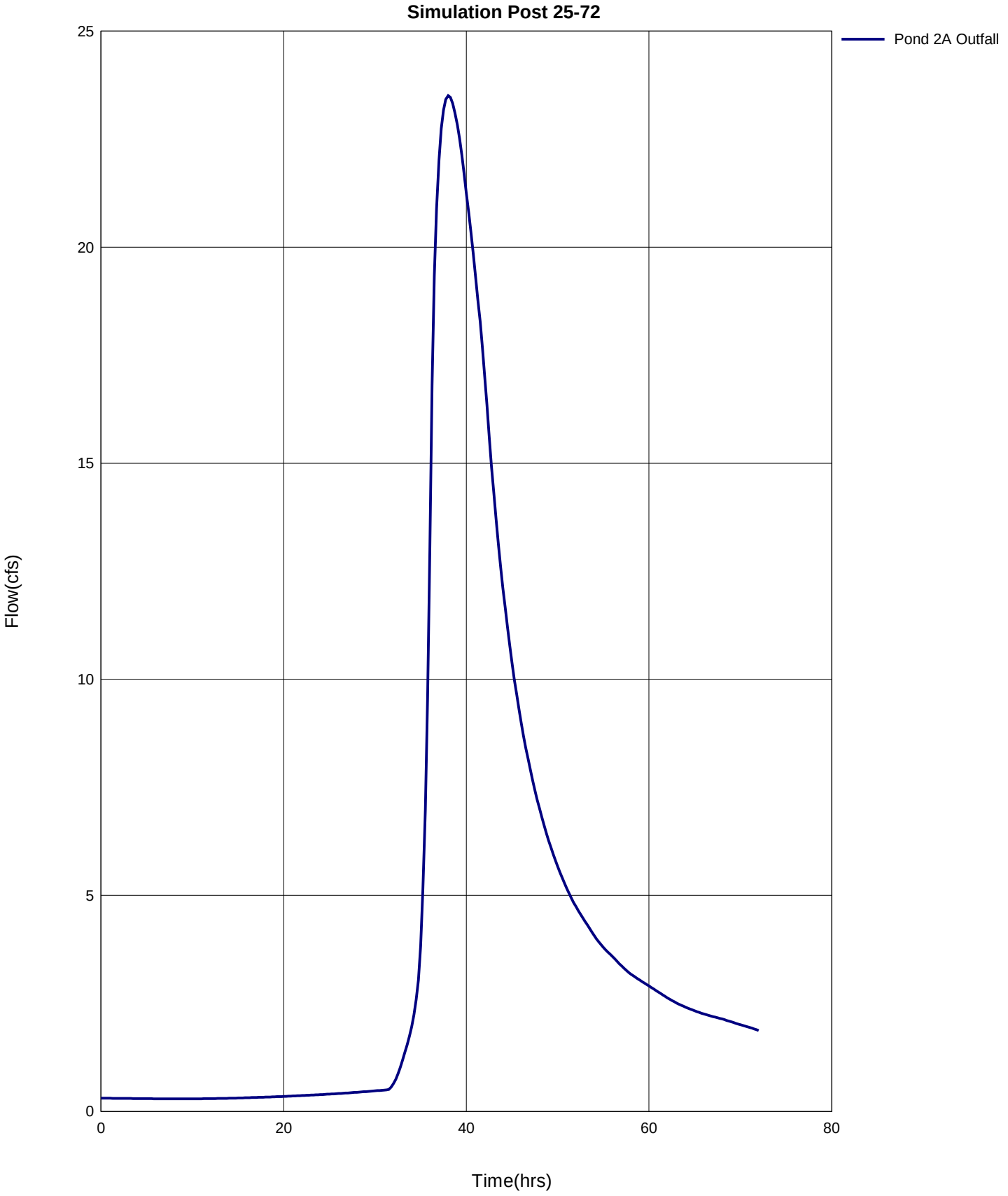
Pond 2A-Option 3
25 Year, 72 hour

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Commerce Center	BASE	Post 25-72	0.00	18.33	999.00	0.0000	0	38.04	23.51	0.00	0.00
Pond 2A	BASE	Post 25-72	38.04	25.29	25.43	0.0050	168578	36.25	73.43	38.04	23.51

Pond 2A-Option 3
25 Year, 72 hour



Pond 2A-Option 3
25 Year, 72 hour



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 2B - Option 1 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	11.78	1178
Water Management Area (Perv.)		D	80	3.59	287
			Totals =	52.43	4833

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{4{,}833}{52.43}$

= **92**

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2B - Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	**52.43 Ac**
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	4.37 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = 4.66 Ac-Ft
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
24.43	1.0	546,326	12.542	12.387	30.154	1,313,508
23.43	1.0	532,823	12.232	12.078	17.767	773,931
22.43	0.5	519,447	11.925	5.689	5.689	247,813
21.95	0.0	513,071	11.778	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2B)

Elev.	Storage	Area
21.95	0.000	513,071
22.43	5.689	519,447

Elev. = 22.35 ft = 4.74 Ac-Ft 206511 Cu-Ft

Provided Treatment Volume (T.V.) = **4.741** Ac-ft

Treatment Depth = 0.40 ft

For Orifice Recovery Calculations (Pond2B)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.69 Ac-Ft 73788 Cu-Ft

Elev.	Storage	Area
21.95	0.000	513,071
22.43	5.689	519,447

Elev. = 22.10 ft. provides 1.778 ac-ft of volume
77442 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-2B:

Est. Ground Elevation (at boring location) =	23.2	feet
Estimated SHGT Depth = -0.75-0.5 =	1.25	feet
Estimated SHGT Elev. =	21.95	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2B - Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 2B Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	73787.99	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.427 cfs

Elevation of Required Treatment Volume =	22.10	ft
Flow line Elevation =	21.95	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.15 ft

h = 0.15

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.229 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

D = 0.54 ft = 6.48 in dia

Use 6 inch orifice

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 2B - Option 2 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	6.91	691
Water Management Area (Perv.)		D	80	3.10	248
			Totals =	47.06	4306

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{4{,}306}{47.06}$

= **91**

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2B - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	**47.06 Ac**
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.92 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **4.66** **Ac-ft**
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
25.43	1.0	333,561	7.658	7.548	25.331	1,103,418
24.43	1.0	323,996	7.438	7.330	17.783	774,627
23.43	1.0	314,558	7.221	7.114	10.453	455,333
22.43	0.5	305,247	7.008	3.339	3.339	145,447
21.95	0.0	300,823	6.906	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2B)

Elev.	Storage	Area
22.43	3.339	305,247
23.43	10.453	314,558

Elev. = 22.62 = 4.69 Ac-Ft 204325 Cu-Ft

Provided Treatment Volume (T.V.) = **4.691** Ac-ft

Treatment Depth = 0.67 ft

For Orifice Recovery Calculations (Pond2B)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.67 Ac-Ft 72885 Cu-Ft

Elev.	Storage	Area
21.95	0.000	300,823
22.43	3.339	305,247

Elev. = 22.20 ft. provides 1.74 Ac-Ft
75754 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-2B:

Est. Ground Elevation (at boring location) =	23.2	feet
Estimated SHGT Depth = -0.75-0.5 =	1.25	feet
Estimated SHGT Elev. =	21.95	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2B - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 2B Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	72885.31	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.422 cfs

Elevation of Required Treatment Volume =	22.20	ft
Flow line Elevation =	21.95	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.25 ft

h = 0.25

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.175 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

D = 0.47 ft = 5.67 in dia

Use 5 inch orifice

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 2B -Option 3 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	4.30	430
Water Management Area (Perv.)		D	80	2.79	223
			Totals =	44.15	4020

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{4{,}020}{44.15}$

$= \boxed{91}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2B - Option 3 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	44.15 Ac
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.68 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **4.66** **Ac-ft**
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
26.43	1.0	219,041	5.029	4.945	20.869	909,054
25.43	1.0	211,741	4.861	4.778	15.924	693,649
24.43	1.0	204,540	4.696	4.614	11.146	485,520
23.43	1.0	197,440	4.533	4.452	6.532	284,534
22.43	0.5	190,440	4.372	2.080	2.080	90,605
21.95	0.0	187,116	4.296	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2B)

Elev.	Storage	Area
22.43	2.080	190,440
23.43	6.532	197,440

Elev. = 23.01 = 4.66 Ac-Ft 203084 Cu-Ft

Provided Treatment Volume (T.V.) = **4.662** Ac-ft

Treatment Depth = 1.06 ft

For Orifice Recovery Calculations (Pond2B)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.66 Ac-Ft 72328 Cu-Ft

Elev.	Storage	Area
21.95	0.000	187,116
22.43	2.080	190,440

Elev. = 22.34 ft. provides 1.69 Ac-Ft
73616 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-2B:

Est. Ground Elevation (at boring location) =	23.2	feet
Subtract Estimated SHGT Depth = -0.75-0.5 =	0.25	feet
Estimated SHGT Elev. =	22.95	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2B -Option 3 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 2B Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	72327.61	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.419 cfs

Elevation of Required Treatment Volume =	22.34	ft
Flow line Elevation =	21.95	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.39 ft

h = 0.39

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.139 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

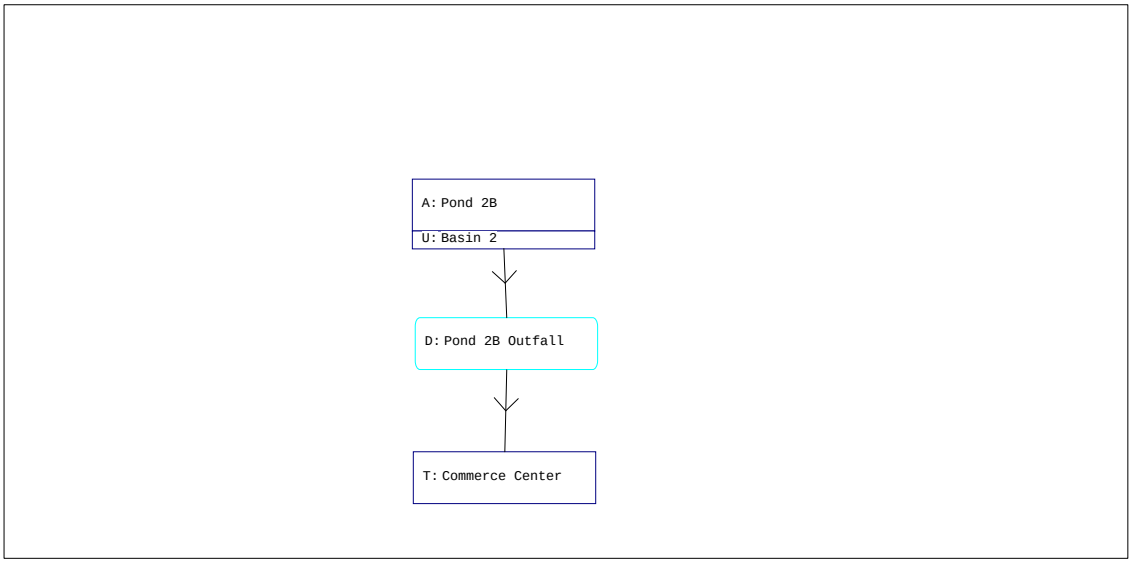
D = 0.42 ft = 5.05 in dia

Use 5 inch orifice

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 2                 Node: Pond 2B               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 42.75
              Area(ac): 52.430                Time Shift(hrs): 0.00
          Curve Number: 92.00             Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00

Tc from preliminary storm sewer tabulations

================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Commerce Center     Base Flow(cfs): 0.000         Init Stage(ft): 18.330
     Group: BASE                                            Warn Stage(ft): 999.000
      Type: Time/Stage

From ICPR:  Pre-Analysis, Node Time Series for 25/72
Using Commerce Center Permit Information
Converted from NGVD to NAVD

      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          18.330
        999.00          18.330

--------------------------------------------------------------------------------
      Name: Pond 2B             Base Flow(cfs): 0.000         Init Stage(ft): 21.950
     Group: BASE                                            Warn Stage(ft): 23.430
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         21.950         11.7780
         22.430         11.9250
         23.430         12.2320
         24.430         12.5420

================================================================================
==== Pipes =====================================================================
================================================================================

         Name:                      From Node:                   Length(ft): 0.00
        Group: BASE                   To Node:                        Count: 1
                                                          Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 0.00           0.00                     Entrance Loss Coef: 0.00
     Rise(in): 0.00           0.00                         Exit Loss Coef: 1.00
   Invert(ft): 0.000          0.000                        Bend Loss Coef: 0.00
  Manning's N: 0.000000       0.000000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 2B Outfall     From Node: Pond 2B           Length(ft): 200.00
        Group: BASE                  To Node: Commerce Center         Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
     Span(in): 30.00          30.00                                 Flow: Both
     Rise(in): 30.00          30.00                    Entrance Loss Coef: 0.500
   Invert(ft): 17.950         17.030                       Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
*** Weir 1 of 3 for Drop Structure Pond 2B Outfall ***                          TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Horizontal                Top Clip(in): 0.000
                   Flow: Both                   Weir Disc Coef: 3.200
               Geometry: Circular             Orifice Disc Coef: 0.600

               Span(in): 6.00                        Invert(ft): 21.450
               Rise(in): 6.00                 Control Elev(ft): 21.950

*** Weir 2 of 3 for Drop Structure Pond 2B Outfall ***                          TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Horizontal                Top Clip(in): 0.000
                   Flow: Both                   Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 79.00                       Invert(ft): 22.950
               Rise(in): 36.00                Control Elev(ft): 22.950

*** Weir 3 of 3 for Drop Structure Pond 2B Outfall ***                          TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Both                   Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 48.00                       Invert(ft): 22.350
               Rise(in): 3.00                 Control Elev(ft): 22.350


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 2B 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2B - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 2B 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2B - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 2B 25-72
             Node Name: Pond 2B
            Basin Type: SCS Unit Hydrograph

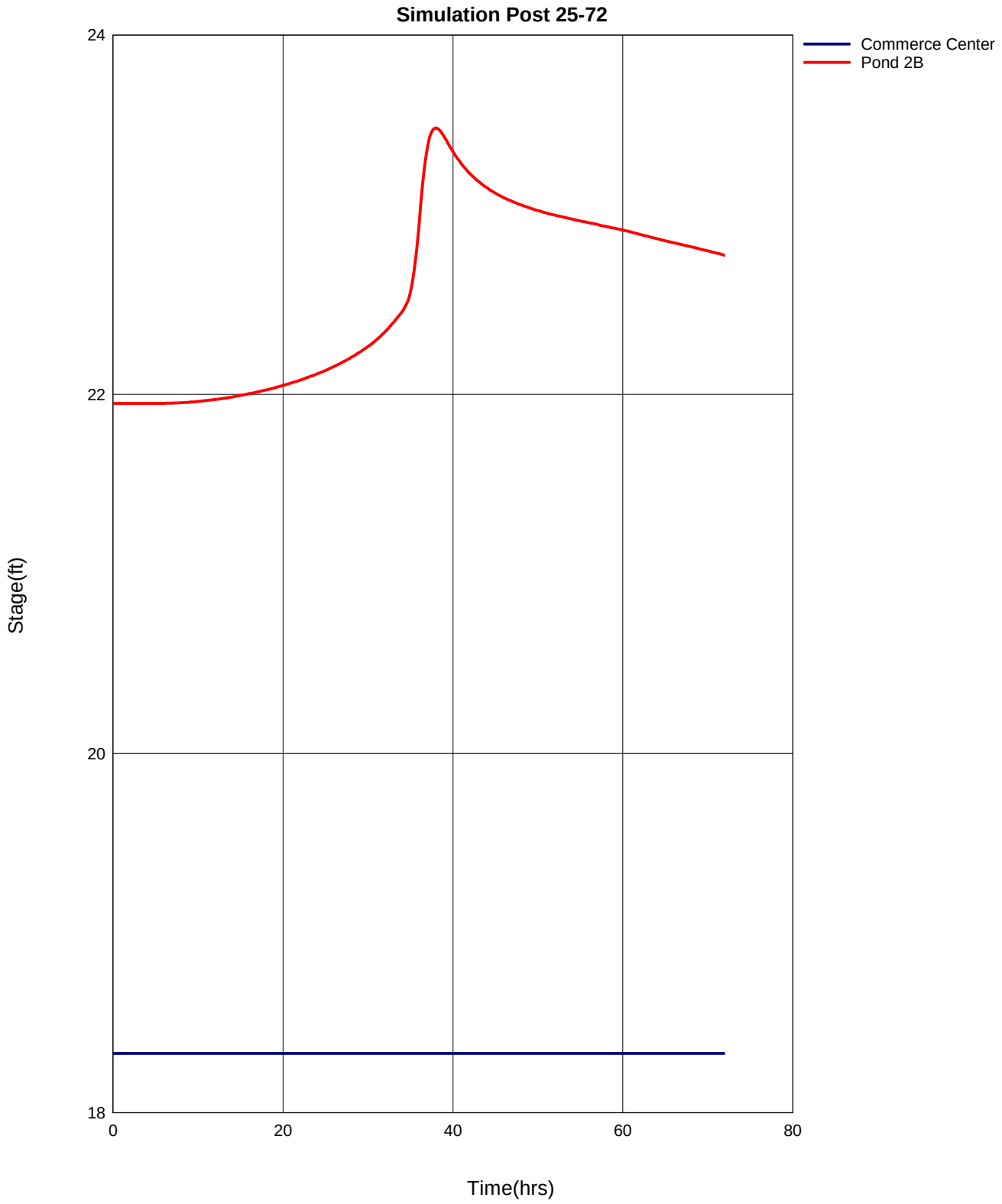
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 5.70
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 42.75
      Time Shift (hrs): 0.00
            Area (ac): 52.430
  Vol of Unit Hyd (in): 1.001
          Curve Number: 92.000
              DCIA (%): 0.000

        Time Max (hrs): 36.17
        Flow Max (cfs): 89.45
    Runoff Volume (in): 8.021
   Runoff Volume (ft3): 1526629
```

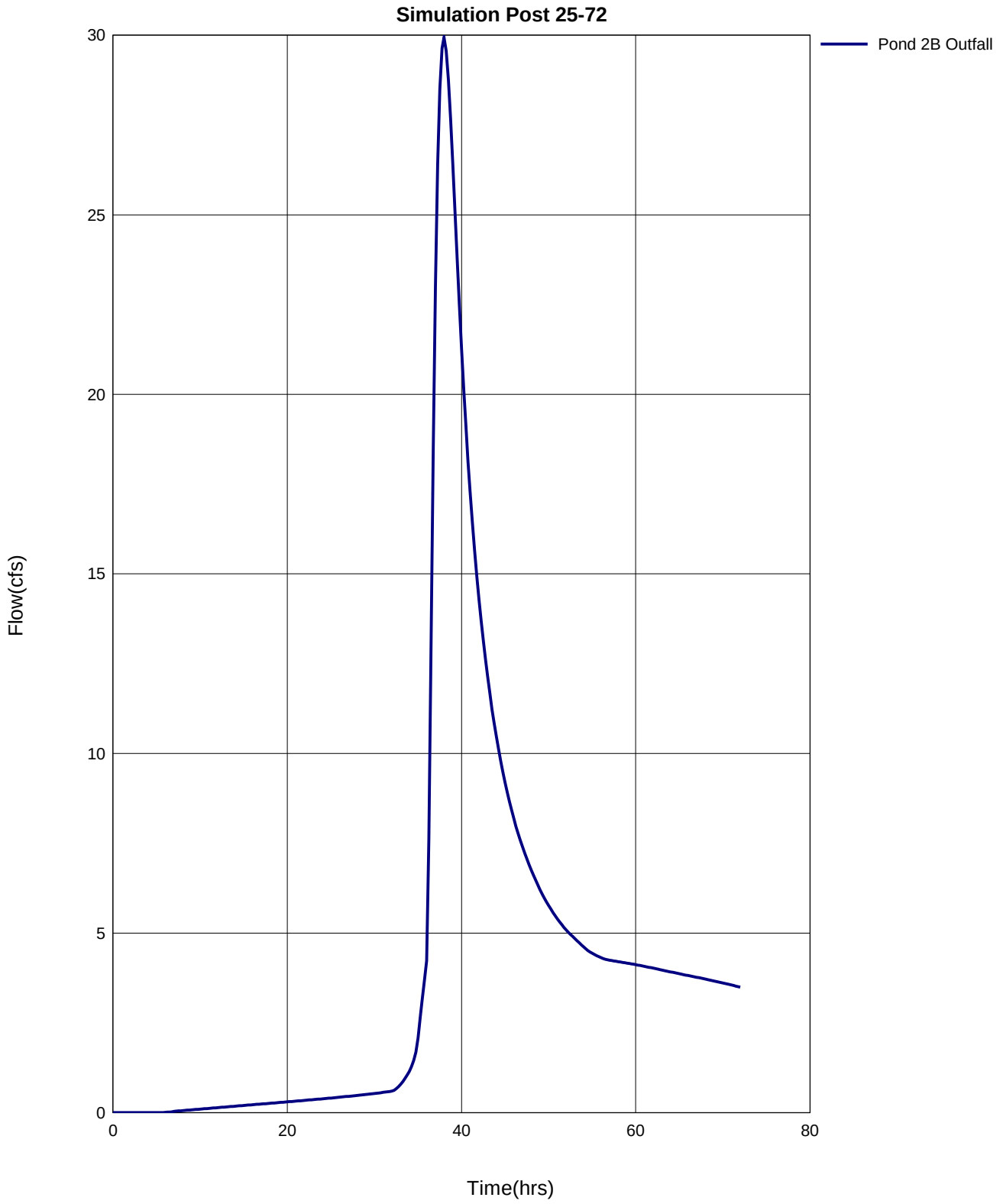
Pond 2B - Option 1
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Commerce Center	BASE	Post 25-72	0.00	18.33	999.00	0.0000	0	37.97	29.94	0.00	0.00
Pond 2B	BASE	Post 25-72	37.97	23.48	23.43	0.0050	533556	36.24	89.15	37.97	29.94

Pond 2B - Option 1
25 Yr, 72 Hr



Pond 2B - Option 1
25 Yr, 72 Hr



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 2                 Node: Pond 2B               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 42.75
              Area(ac): 47.060                Time Shift(hrs): 0.00
          Curve Number: 91.00             Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Commerce Center     Base Flow(cfs): 0.000         Init Stage(ft): 18.330
     Group: BASE                                            Warn Stage(ft): 999.000
      Type: Time/Stage

From ICPR:  Pre-Analysis, Node Time Series for 25/72
Using Commerce Center Permit Information
Converted from NGVD to NAVD

      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          18.330
        999.00          18.330

--------------------------------------------------------------------------------
      Name: Pond 2B             Base Flow(cfs): 0.000         Init Stage(ft): 21.950
     Group: BASE                                            Warn Stage(ft): 24.430
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         21.950          6.9060
         22.430          7.0080
         23.430          7.2210
         24.430          7.4380
         25.430          7.6580

================================================================================
==== Pipes =====================================================================
================================================================================

         Name:                      From Node:                  Length(ft): 0.00
        Group: BASE                   To Node:                       Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Most Restrictive
     Geometry: Circular      Circular                             Flow: Both
     Span(in): 0.00          0.00                      Entrance Loss Coef: 0.00
     Rise(in): 0.00          0.00                          Exit Loss Coef: 1.00
   Invert(ft): 0.000         0.000                         Bend Loss Coef: 0.00
  Manning's N: 0.000000      0.000000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 2B Outfall     From Node: Pond 2B           Length(ft): 200.00
        Group: BASE                  To Node: Commerce Center        Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular      Circular                  Solution Algorithm: Most Restrictive
     Span(in): 30.00         30.00                                Flow: Both
     Rise(in): 30.00         30.00                     Entrance Loss Coef: 0.500
   Invert(ft): 18.950        18.030                        Exit Loss Coef: 1.000
  Manning's N: 0.012000      0.012000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

*** Weir 1 of 3 for Drop Structure Pond 2B Outfall ***
TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Horizontal	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Circular	Orifice Disc Coef:	0.600
Span(in):	5.00	Invert(ft):	21.450
Rise(in):	5.00	Control Elev(ft):	21.950

*** Weir 2 of 3 for Drop Structure Pond 2B Outfall ***
TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Horizontal	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Rectangular	Orifice Disc Coef:	0.600
Span(in):	79.00	Invert(ft):	24.120
Rise(in):	36.00	Control Elev(ft):	24.120

*** Weir 3 of 3 for Drop Structure Pond 2B Outfall ***
TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Vertical: Mavis	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Rectangular	Orifice Disc Coef:	0.600
Span(in):	24.00	Invert(ft):	22.620
Rise(in):	18.00	Control Elev(ft):	22.620

==========
==== Hydrology Simulations ==========
==========

Name: Post 2B 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2B - 25-72.R32

Override Defaults: Yes
Storm Duration(hrs): 72.00
Rainfall File: Flmod
Rainfall Amount(in): 9.00

Time(hrs)	Print Inc(min)
72.000	15.00

==========
==== Routing Simulations ==========
==========

Name: Post 25-72 Hydrology Sim: Post 2B 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2B - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 2B 25-72
             Node Name: Pond 2B
            Basin Type: SCS Unit Hydrograph

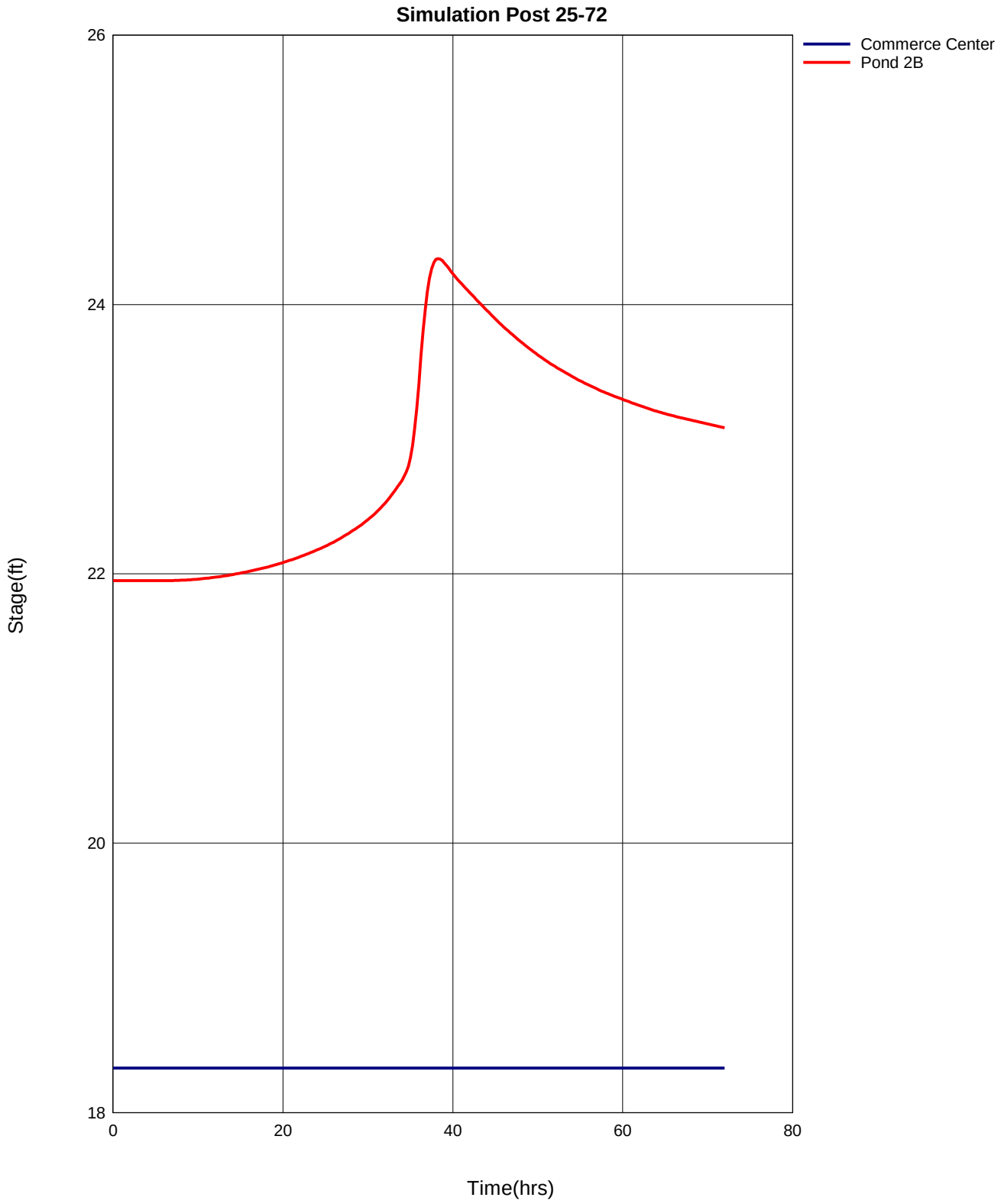
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 5.70
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 42.75
      Time Shift (hrs): 0.00
            Area (ac): 47.060
  Vol of Unit Hyd (in): 1.001
          Curve Number: 91.000
              DCIA (%): 0.000

        Time Max (hrs): 36.17
        Flow Max (cfs): 79.66
    Runoff Volume (in): 7.900
   Runoff Volume (ft3): 1349554
```

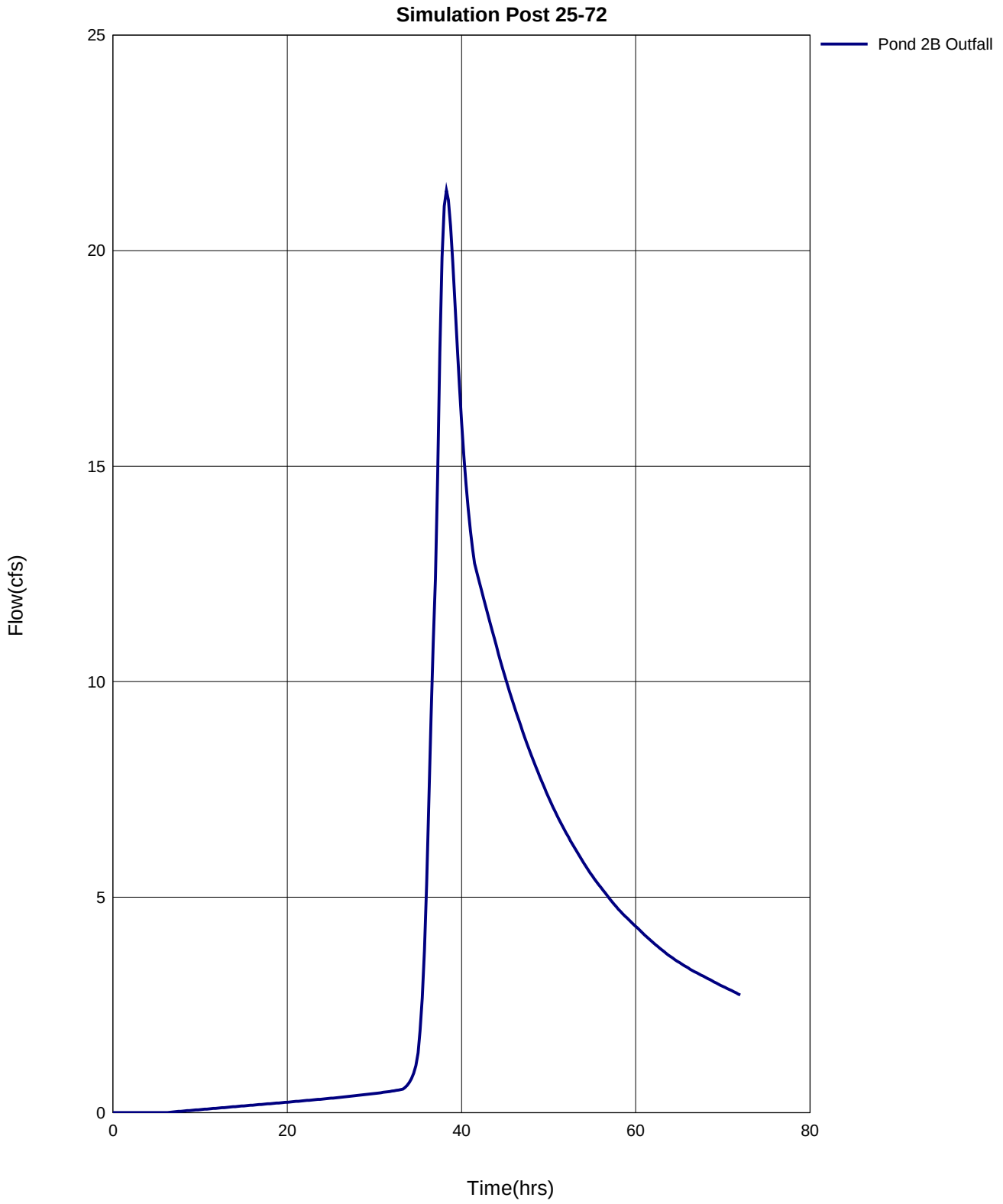
Pond 2B - Option 2
25 Year, 72 Hour

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Commerce Center	BASE	Post 25-72	0.00	18.33	999.00	0.0000	0	38.26	21.40	0.00	0.00
Pond 2B	BASE	Post 25-72	38.26	24.34	24.43	0.0050	323161	36.25	79.45	38.26	21.40

Pond 2B - Option 2
25 Year, 72 Hour



Pond 2B - Option 2
25 Year, 72 Hour



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 2                 Node: Pond 2B               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 42.75
             Area(ac): 44.150                Time Shift(hrs): 0.00
         Curve Number: 91.00            Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Commerce Center     Base Flow(cfs): 0.000         Init Stage(ft): 18.330
     Group: BASE                                            Warn Stage(ft): 999.000
      Type: Time/Stage

From ICPR:  Pre-Analysis, Node Time Series for 25/72
Using Commerce Center Permit Information
Converted from NGVD to NAVD

      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          18.330
        999.00          18.330

--------------------------------------------------------------------------------
      Name: Pond 2B             Base Flow(cfs): 0.000         Init Stage(ft): 21.950
     Group: BASE                                            Warn Stage(ft): 25.430
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         21.950          4.2960
         22.430          4.3720
         23.430          4.5330
         24.430          4.6960
         25.430          4.8610
         26.430          5.0290

================================================================================
==== Pipes =====================================================================
================================================================================

         Name:                      From Node:                  Length(ft): 0.00
        Group: BASE                   To Node:                       Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                             Flow: Both
     Span(in): 0.00           0.00                    Entrance Loss Coef: 0.00
     Rise(in): 0.00           0.00                        Exit Loss Coef: 1.00
   Invert(ft): 0.000          0.000                       Bend Loss Coef: 0.00
  Manning's N: 0.000000       0.000000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 2B Outfall     From Node: Pond 2B            Length(ft): 200.00
        Group: BASE                   To Node: Commerce Center         Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
     Span(in): 30.00          30.00                                Flow: Both
     Rise(in): 30.00          30.00                   Entrance Loss Coef: 0.500
   Invert(ft): 18.950         18.030                      Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
```

Circular Concrete: Square edge w/ headwall

*** Weir 1 of 3 for Drop Structure Pond 2B Outfall ***

TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Horizontal	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Circular	Orifice Disc Coef:	0.600
Span(in):	5.00	Invert(ft):	21.450
Rise(in):	5.00	Control Elev(ft):	21.950

*** Weir 2 of 3 for Drop Structure Pond 2B Outfall ***

TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Horizontal	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Rectangular	Orifice Disc Coef:	0.600
Span(in):	79.00	Invert(ft):	25.180
Rise(in):	36.00	Control Elev(ft):	25.180

*** Weir 3 of 3 for Drop Structure Pond 2B Outfall ***

TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Vertical: Mavis	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Rectangular	Orifice Disc Coef:	0.600
Span(in):	24.00	Invert(ft):	23.010
Rise(in):	26.00	Control Elev(ft):	23.010

==========
==== Hydrology Simulations ==========
==========

Name:	Post 2B 25-72
Filename:	T:\00809.00\zTBG\drainage\ICPR\Post 2B - 25-72.R32
Override Defaults:	Yes
Storm Duration(hrs):	72.00
Rainfall File:	Flmod
Rainfall Amount(in):	9.00

Time(hrs)	Print Inc(min)
72.000	15.00

==========
==== Routing Simulations ==========
==========

Name:	Post 25-72	Hydrology Sim:	Post 2B 25-72
Filename:	T:\00809.00\zTBG\drainage\ICPR\Pond 2B - 25-72.I32		
Execute:	Yes	Restart: No	Patch: No
Alternative:	No		
Max Delta Z(ft):	1.00	Delta Z Factor:	0.00500
Time Step Optimizer:	10.000		
Start Time(hrs):	0.000	End Time(hrs):	72.00
Min Calc Time(sec):	0.5000	Max Calc Time(sec):	60.0000
Boundary Stages:		Boundary Flows:	

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 2B 25-72
             Node Name: Pond 2B
            Basin Type: SCS Unit Hydrograph

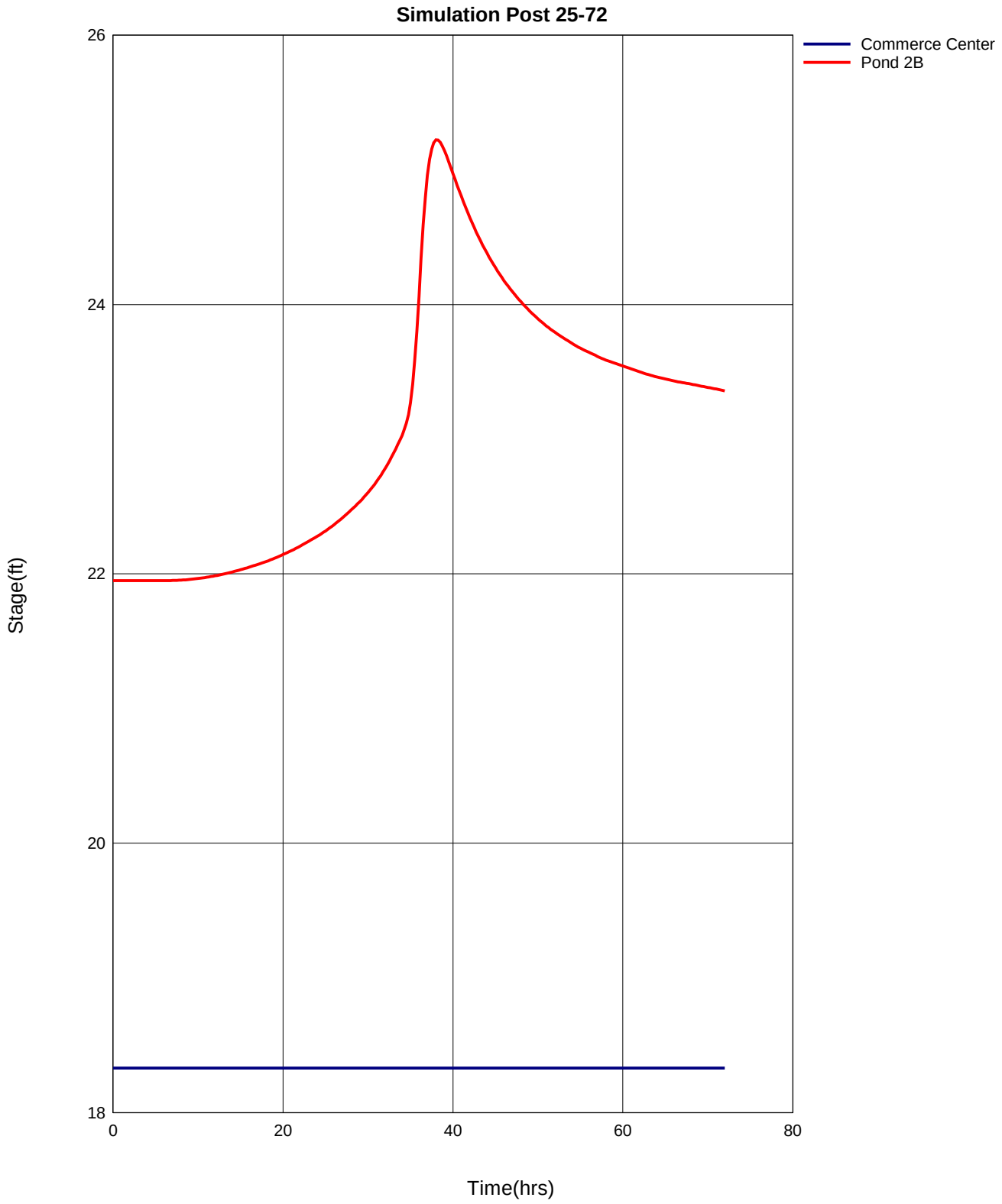
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 5.70
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 42.75
      Time Shift (hrs): 0.00
            Area (ac): 44.150
  Vol of Unit Hyd (in): 1.001
          Curve Number: 91.000
              DCIA (%): 0.000

        Time Max (hrs): 36.17
        Flow Max (cfs): 74.73
    Runoff Volume (in): 7.900
   Runoff Volume (ft3): 1266103
```

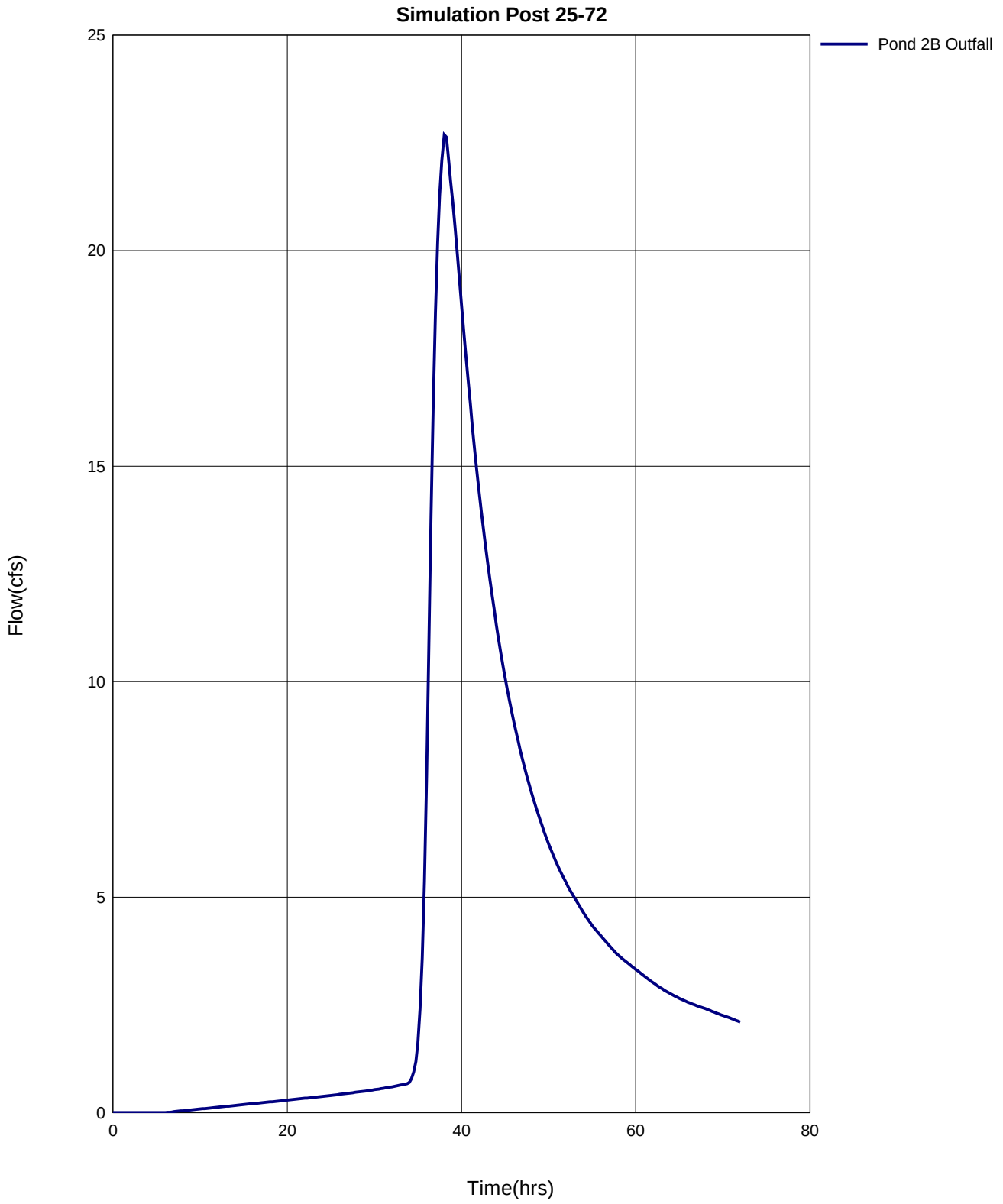
Pond 2B - Option 3
25 Yr, 72 Hour

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Commerce Center	BASE	Post 25-72	0.00	18.33	999.00	0.0000	0	38.11	22.73	0.00	0.00
Pond 2B	BASE	Post 25-72	38.11	25.22	25.43	0.0050	210263	36.25	74.56	38.11	22.73

Pond 2B - Option 3
25 Yr, 72 Hour



Pond 2B - Option 3
25 Yr, 72 Hour



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 2C - Option 1 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	3.34	334
Water Management Area (Perv.)		D	80	3.53	282
			Totals =	43.93	3983

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{3{,}983}{43.93}$

$= \boxed{91}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2C - Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	**43.93 Ac**
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.66 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **4.66** **Ac-ft**
= **202851** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 2C):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
24.43	1.0	198,560	4.558	4.455	24.042	1,047,270
23.43	0.6	189,590	4.352	2.575	19.587	853,210
22.83	1.0	184,257	4.230	4.129	17.012	741,043
21.83	1.0	175,449	4.028	3.928	12.883	561,183
20.83	1.0	166,741	3.828	3.729	8.955	390,080
19.83	1.0	158,133	3.630	3.533	5.226	227,645
18.83	0.5	149,627	3.435	1.693	1.693	73,747
18.33	0.0	145,411	3.338	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2C)

Elev.	Storage	Area
18.83	1.693	149,627
19.83	5.226	158,133

Elev. = 19.67 = 4.66 Ac-Ft 203021 Cu-Ft

Provided Treatment Volume (T.V.) = **4.661** Ac-ft

Treatment Depth = 1.34 ft

For Orifice Recovery Calculations (Pond2C)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.69 Ac-Ft 73666 Cu-Ft

Elev.	Storage	Area
18.33	0.000	145,411
18.83	1.693	149,627

Elev. = 18.83 ft. provides 1.69 Ac-Ft
73747 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-2C:

Est. Ground Elevation (at boring location) =	19.5 feet
Subtract Estimated SHGT Depth = -0.67-0.5 =	1.17 feet
Estimated SHGT Elev. =	18.33 feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2C -Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 2C Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	73666.04	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.426 cfs

Elevation of Required Treatment Volume =	18.83	ft
Flow line Elevation =	18.33	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.50 ft

h = 0.50

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.125 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

D = 0.40 ft = 4.79 in dia

Use 4 inch orifice

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 2C - Option 2 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 509+30 to Station 610+20
Basin Length = 10090 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	22.35	2191
Open Space - Good Condition (Perv R/W)		D	80	14.71	1177
Water Management Area (Imperv.)			100	2.37	237
Water Management Area (Perv.)		D	80	3.77	302
			Totals =	43.20	3906

CN (weighted) = (total product) / (total area) = 3,906 / 43.20

= 90

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2C - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	22.35 Ac
Total Drainage area =	**43.20 Ac**
2.5" times percent imperviousness =	4.66 Ac-Ft
1" runoff from drainage area =	3.60 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) =	**4.66**	**Ac-ft**
=	**202851**	**ft^3**

Pond Storage Calculations (Wet Detention - Pond 2C):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
25.43	1.0	157,870	3.624	3.532	21.199	923,428
24.43	1.0	149,845	3.440	3.349	17.667	769,575
23.43	1.0	141,920	3.258	3.168	14.318	623,692
22.43	1.0	134,095	3.078	2.990	11.150	485,694
21.43	1.0	126,371	2.901	2.814	8.160	355,450
20.43	1.0	118,748	2.726	2.640	5.346	232,872
19.43	1.1	111,227	2.553	2.706	2.706	117,873
18.33	0.0	103,092	2.367	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond2C)

Elev.	Storage	Area
19.43	2.706	111,227
20.43	5.346	118,748

Elev. = 20.17 = 4.66 Ac-Ft 202972 Cu-Ft

Provided Treatment Volume (T.V.) =	**4.660**	Ac-ft
Treatment Depth =	1.84 ft	

For Orifice Recovery Calculations (Pond2C)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.70 Ac-Ft 74113 Cu-Ft

Elev.	Storage	Area
18.33	0.000	103,092
19.43	2.706	111,227

Elev. = 19.03 ft. provides 1.72 Ac-Ft
75010 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-2C:

Est. Ground Elevation (at boring location) =	19.5 feet
Subtract Estimated SHGT Depth = -0.67- 0.5 =	0.67 feet
Estimated SHGT Elev. =	18.33 feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 2C - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 2C Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	74113.45	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.429 cfs

Elevation of Required Treatment Volume =	19.03	ft
Flow line Elevation =	18.33	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.70 ft

h = 0.70

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.106 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

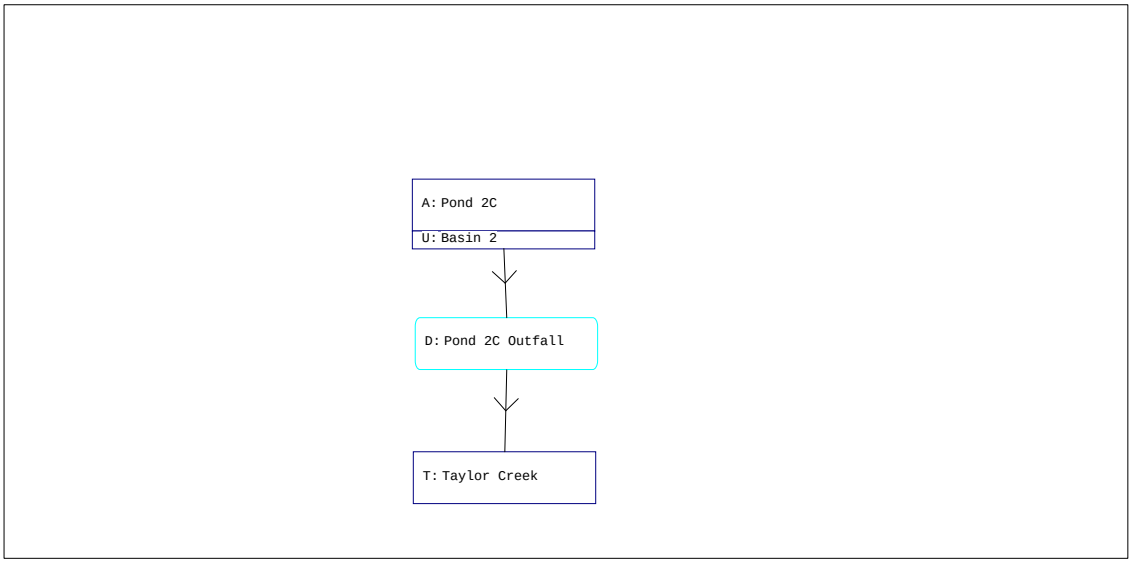
D = 0.37 ft = 4.42 in dia

Use 4 inch orifice

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 2                 Node: Pond 2C               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 59.00
             Area(ac): 43.930                Time Shift(hrs): 0.00
         Curve Number: 91.00            Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Pond 2C             Base Flow(cfs): 0.000         Init Stage(ft): 18.330
     Group: BASE                                             Warn Stage(ft): 23.430
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         18.330          3.3380
         18.830          3.4350
         19.830          3.6300
         20.830          3.8280
         21.830          4.0280
         22.830          4.2300
         23.430          4.3520
         24.430          4.5580

--------------------------------------------------------------------------------
      Name: Taylor Creek        Base Flow(cfs): 0.000         Init Stage(ft): 12.830
     Group: BASE                                             Warn Stage(ft): 999.000
      Type: Time/Stage

Converted from NGVD to NAVD
FROM DOUGLAS PARK PERMIT
REFLECTS THE SAME PEAK STAGE AS COMMERCE CENTER PERMIT

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00          12.830
         999.00          12.830

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 2C Outfall     From Node: Pond 2C           Length(ft): 800.00
        Group: BASE                  To Node: Taylor Creek           Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                                Flow: Both
    Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
  Invert(ft): 14.830         14.030                      Exit Loss Coef: 1.000
Manning's N: 0.012000        0.012000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 2C Outfall ***
                                                                          TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 4.00                        Invert(ft): 17.830
             Rise(in): 4.00                  Control Elev(ft): 18.330

*** Weir 2 of 3 for Drop Structure Pond 2C Outfall ***
                                                                          TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Vertical: Mavis           Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 4.00                        Invert(ft): 19.670
             Rise(in): 4.00                  Control Elev(ft): 19.670

*** Weir 3 of 3 for Drop Structure Pond 2C Outfall ***
```

TABLE

```
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                    Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 37.00                       Invert(ft): 23.000
             Rise(in): 24.00                Control Elev(ft): 23.000


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

        Name: Post 2C 10-24
    Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2C - 10-24.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 8.20

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          15.00

--------------------------------------------------------------------------------------------------------
        Name: Post 2C 25-72
    Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2C - 25-72.R32

     Override Defaults: Yes
   Storm Duration(hrs): 72.00
         Rainfall File: Flmod
   Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

--------------------------------------------------------------------------------------------------------
        Name: Post 2C 5-1
    Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2C - 5-1.R32

     Override Defaults: Yes
   Storm Duration(hrs): 1.00
         Rainfall File: Flmod
   Rainfall Amount(in): 2.98

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

        Name: Post 10-24          Hydrology Sim: Post 2C 10-24
    Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2C - 10-24.I32

     Execute: No          Restart: No           Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
      Start Time(hrs): 0.000                     End Time(hrs): 30.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
      Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
30.000          15.000

Group           Run
--------------- -----
BASE            Yes


--------------------------------------------------------------------------------------------------------
        Name: Post 25-72          Hydrology Sim: Post 2C 25-72
    Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2C - 25-72.I32

     Execute: Yes         Restart: No           Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
      Start Time(hrs): 0.000                     End Time(hrs): 72.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
      Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
```

10.000 15.000
72.000 15.000

Group	Run
BASE	Yes

Name: Post 5-1 Hydrology Sim: Post 2C 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2C - 5-1.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 1.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
0.500	15.000
10.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 2C 25-72
             Node Name: Pond 2C
            Basin Type: SCS Unit Hydrograph

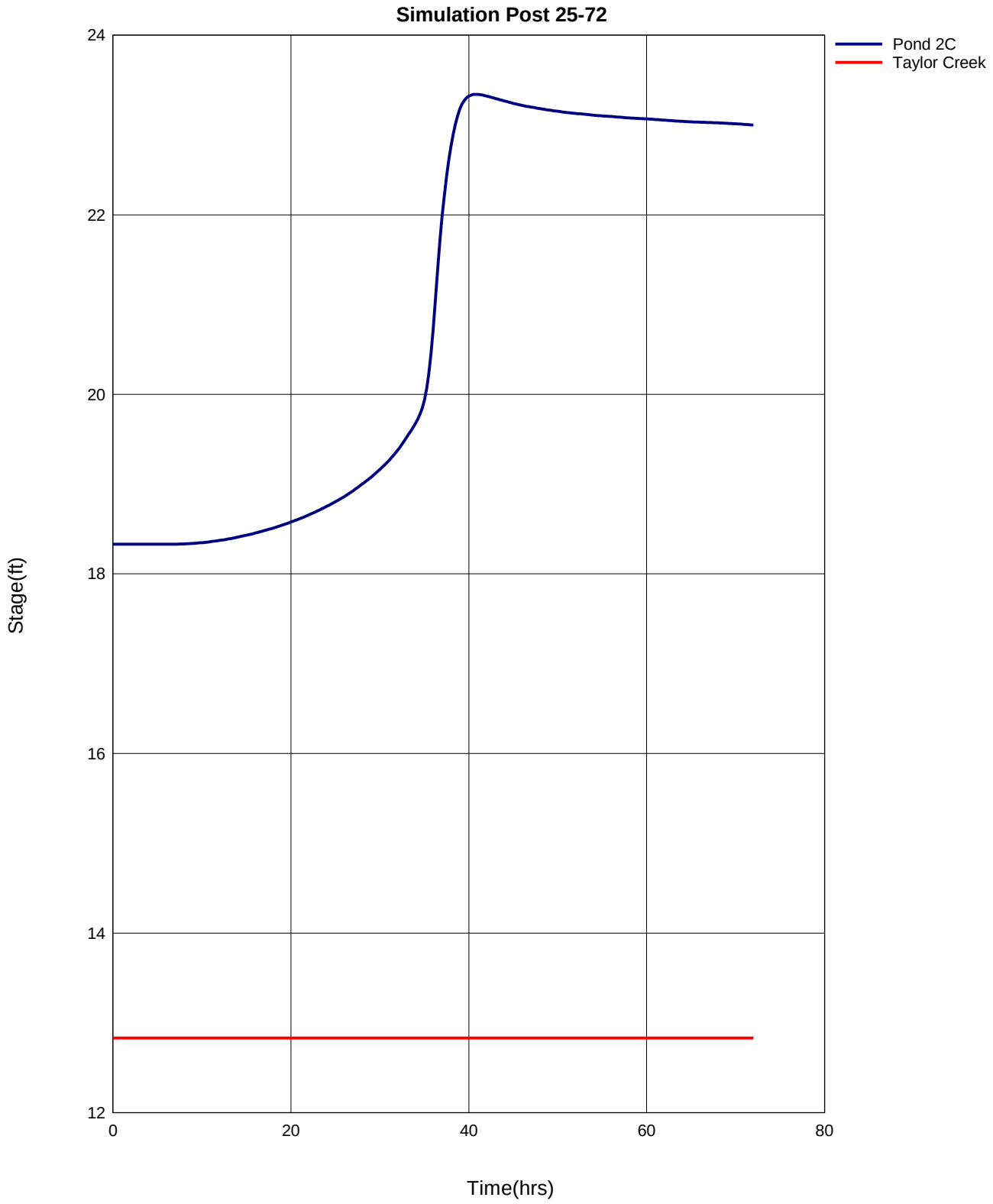
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 7.87
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 59.00
      Time Shift (hrs): 0.00
            Area (ac): 43.930
  Vol of Unit Hyd (in): 1.001
          Curve Number: 91.000
              DCIA (%): 0.000

        Time Max (hrs): 36.33
        Flow Max (cfs): 65.46
    Runoff Volume (in): 7.904
   Runoff Volume (ft3): 1260438
```

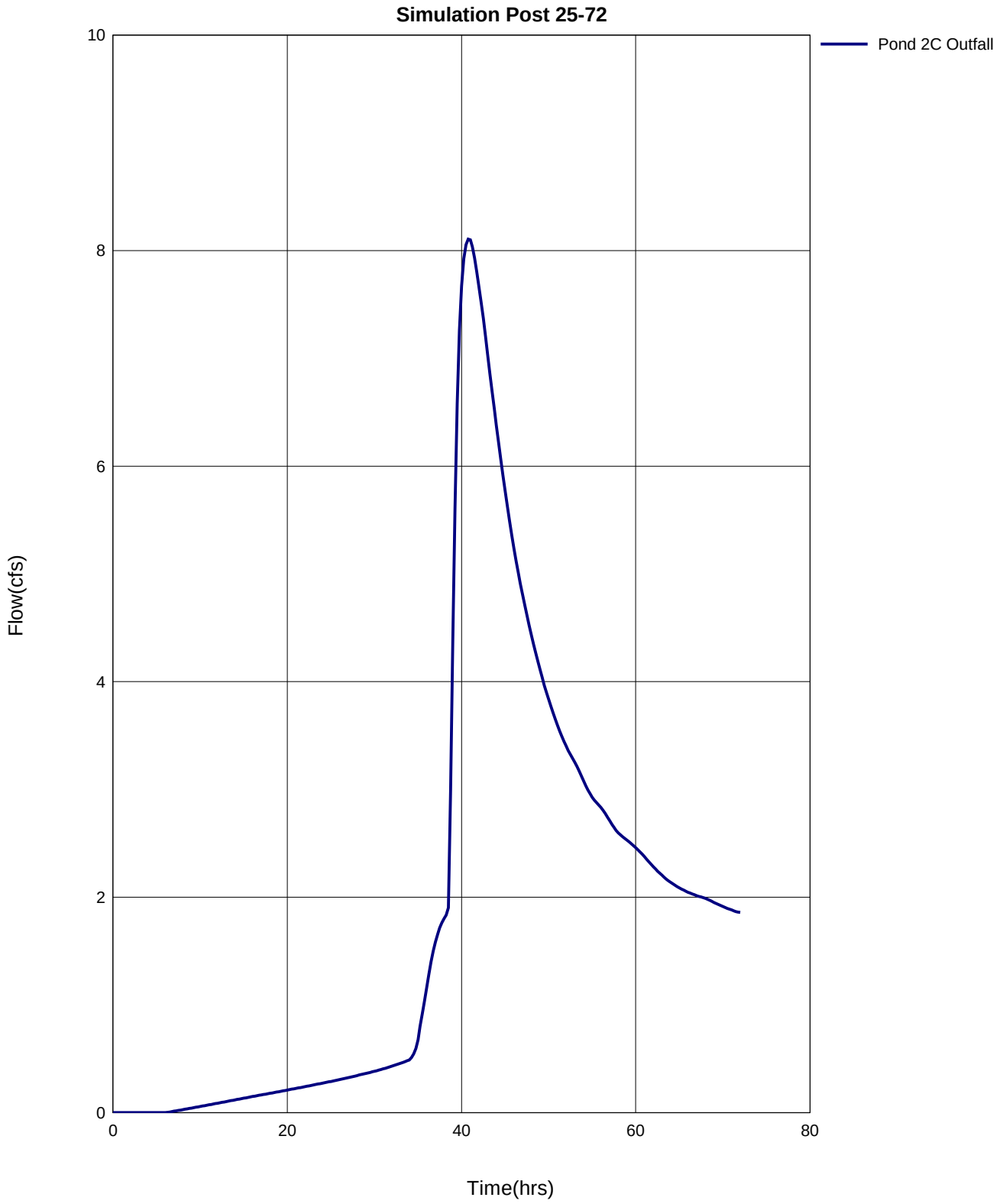
Pond 2C - Option 1
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 2C	BASE	Post 25-72	40.84	23.34	23.43	0.0050	188798	36.25	64.58	40.84	8.11
Taylor Creek	BASE	Post 25-72	0.00	12.83	999.00	0.0000	0	40.84	8.11	0.00	0.00

Pond 2C - Option 1
25 Yr, 72 Hr



Pond 2C - Option 1
25 Yr, 72 Hr



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 2                 Node: Pond 2C               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 59.00
             Area(ac): 43.200                 Time Shift(hrs): 0.00
         Curve Number: 90.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Pond 2C             Base Flow(cfs): 0.000          Init Stage(ft): 18.330
     Group: BASE                                              Warn Stage(ft): 24.430
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         18.330          2.3670
         19.430          2.5530
         20.430          2.7260
         21.430          2.9010
         22.430          3.0780
         23.430          3.2580
         24.430          3.4400
         25.430          3.6240

--------------------------------------------------------------------------------
      Name: Taylor Creek        Base Flow(cfs): 0.000          Init Stage(ft): 12.830
     Group: BASE                                              Warn Stage(ft): 999.000
      Type: Time/Stage

Converted from NGVD to NAVD
FROM DOUGLAS PARK PERMIT
REFLECTS THE SAME PEAK STAGE AS COMMERCE CENTER PERMIT

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00          12.830
         999.00          12.830

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 2C Outfall     From Node: Pond 2C            Length(ft): 800.00
        Group: BASE                  To Node: Taylor Creek           Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                 Flow: Both
     Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
   Invert(ft): 14.830         14.030                      Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 2C Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Circular              Orifice Disc Coef: 0.600

              Span(in): 4.00                         Invert(ft): 17.830
              Rise(in): 4.00                  Control Elev(ft): 18.330

*** Weir 2 of 3 for Drop Structure Pond 2C Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 10.00                        Invert(ft): 20.170
              Rise(in): 8.00                  Control Elev(ft): 20.170
```

*** Weir 3 of 3 for Drop Structure Pond 2C Outfall ***

TABLE

Count:	1	Bottom Clip(in):	0.000
Type:	Horizontal	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Rectangular	Orifice Disc Coef:	0.600
Span(in):	37.00	Invert(ft):	24.000
Rise(in):	24.00	Control Elev(ft):	24.000

==========
==== Hydrology Simulations ====
==========

Name: Post 2C 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2C - 25-72.R32

Override Defaults: Yes
Storm Duration(hrs): 72.00
Rainfall File: Flmod
Rainfall Amount(in): 9.00

Time(hrs)	Print Inc(min)
72.000	15.00

Name: Post 2C 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Post 2C - 5-1.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Flmod
Rainfall Amount(in): 2.98

Time(hrs)	Print Inc(min)
1.000	15.00

==========
==== Routing Simulations ====
==========

Name: Post 25-72 Hydrology Sim: Post 2C 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2C - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

Name: Post 5-1 Hydrology Sim: Post 2C 5-1
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 2C - 5-1.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 1.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
0.500	15.000
10.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 2
            Group Name: BASE
            Simulation: Post 2C 25-72
             Node Name: Pond 2C
            Basin Type: SCS Unit Hydrograph

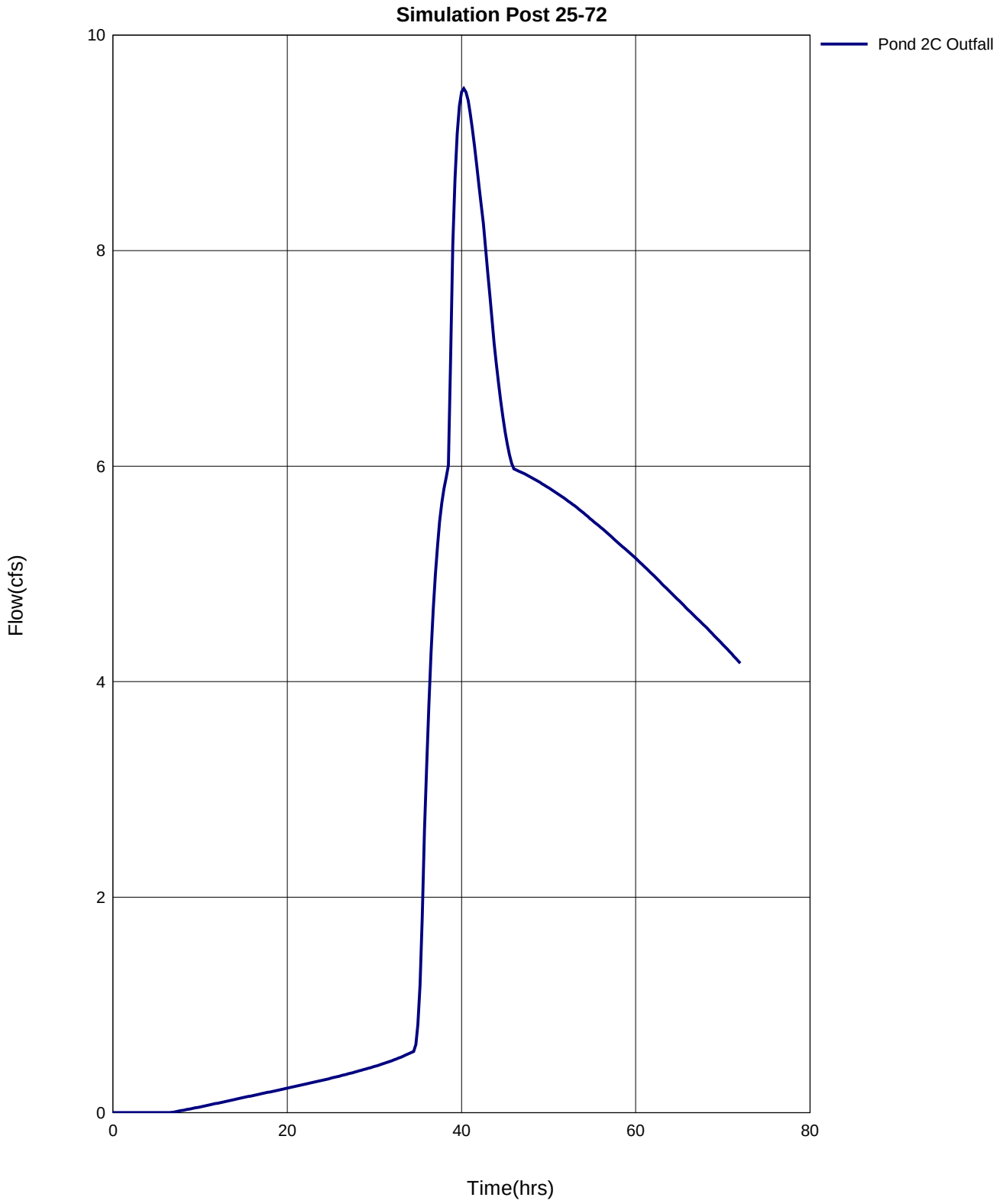
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 7.87
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 59.00
      Time Shift (hrs): 0.00
            Area (ac): 43.200
  Vol of Unit Hyd (in): 1.001
          Curve Number: 90.000
              DCIA (%): 0.000

        Time Max (hrs): 36.33
        Flow Max (cfs): 63.79
    Runoff Volume (in): 7.783
   Runoff Volume (ft3): 1220445
```

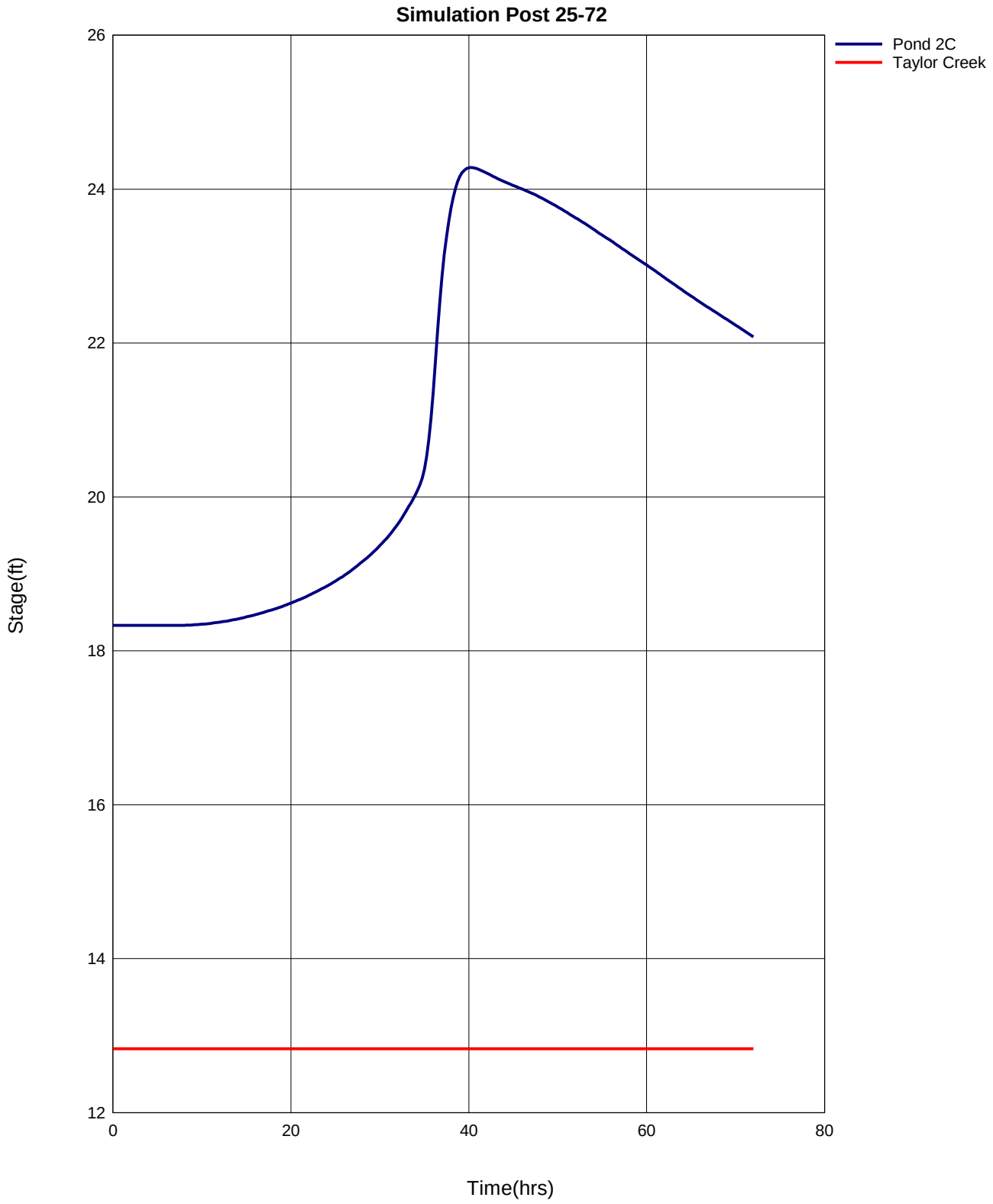
Pond 2C - Option 2
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 2C	BASE	Post 25-72	40.24	24.28	24.43	0.0050	148660	36.25	62.92	40.24	9.51
Taylor Creek	BASE	Post 25-72	0.00	12.83	999.00	0.0000	0	40.24	9.51	0.00	0.00

Pond 2C - Option 2
25 Yr, 72 Hr



Pond 2C - Option 2
25 Yr, 72 Hr



Basin 3

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 3A - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 610+20 to Station 638+46.43
Basin Length = 2826.43 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	6.26	614
Open Space - Good Condition (Perv R/W)		D	80	4.12	330
Water Management Area (Imperv.)			100	1.66	166
Water Management Area (Perv.)		D	80	2.52	201
			Totals =	14.56	1311

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{1{,}311}{14.56}$

$= \boxed{90}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D
Note: Profile at Sta. 638+30 controlled by Kimley Horn (Bridge at SR 70)

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 3A PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	6.26 Ac
Total Drainage area =	**14.56 Ac**
2.5" runoff from impervious area =	1.30 Ac-Ft
1" runoff from drainage area =	1.21 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **1.30** **Ac-ft**
= **56823** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 3A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
29.73	1.0	100,430	2.306	2.239	9.903	431,375
28.73	1.0	94,648	2.173	2.108	7.664	333,844
27.73	1.0	88,966	2.042	1.978	5.556	242,019
26.73	1.0	83,384	1.914	1.851	3.578	155,858
25.73	1.0	77,904	1.788	1.727	1.727	75,228
24.73	0.0	72,523	1.665	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond3A)

Elev.	Storage	Area
24.73	0.000	72,523
25.73	1.727	77,904

Elev. = 25.49 = 1.31 Ac-Ft 57173 Cu-Ft

Provided Treatment Volume (T.V.) = **1.313** Ac-ft

Treatment Depth = 0.76 ft

For Orifice Recovery Calculations (Pond3A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 0.54 Ac-Ft 23409 Cu-Ft

Elev.	Storage	Area
24.73	0.000	72,523
25.73	1.727	77,904

Elev. = 25.05 ft. provides 0.55 Ac-Ft

= 24073 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-3A:

Est. Ground Elevation (at boring location) =	31	feet
Subtract Est. SHGT Depth = -1.92-0.5 =	2.42	feet
Estimated SHGT Elev. =	28.58	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 3A PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 3A Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	23409.03	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.135 cfs

Elevation of Required Treatment Volume =	25.05	ft
Flow line Elevation =	24.73	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.32 ft

h = 0.32

Orifice Equation: $A = \frac{Q}{C\sqrt{2\,g\,h}}$

A = 0.050 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

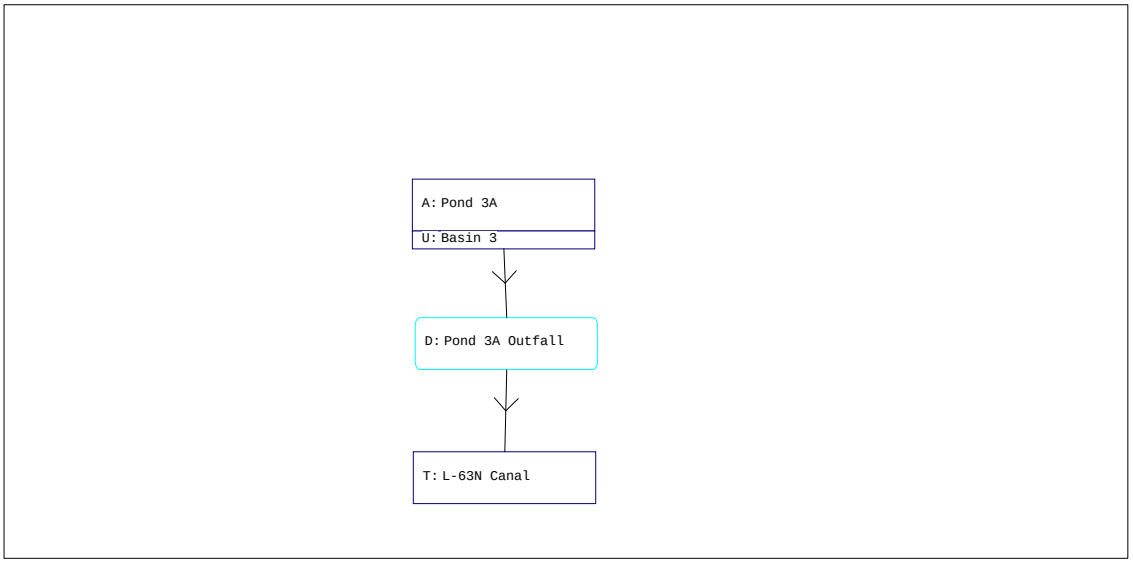
D = 0.25 ft = 3.02 in dia

Use 3 inch orifice

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 3                 Node: Pond 3A               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 21.82
             Area(ac): 14.530                 Time Shift(hrs): 0.00
         Curve Number: 90.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: L-63N Canal         Base Flow(cfs): 0.000         Init Stage(ft): 17.830
     Group: BASE                                             Warn Stage(ft): 28.830
      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          17.830
         14.00          17.930
         40.00          17.950
        100.00          17.930

--------------------------------------------------------------------------------------------
      Name: Pond 3A             Base Flow(cfs): 0.000         Init Stage(ft): 24.730
     Group: BASE                                             Warn Stage(ft): 28.650
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         24.730          1.6650
         25.730          1.7880
         26.730          1.9140
         27.730          2.0420
         28.730          2.1730
         29.730          2.3060

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 3A Outfall     From Node: Pond 3A           Length(ft): 140.00
        Group: BASE                  To Node: L-63N Canal           Count: 1

               UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                Flow: Both
     Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
   Invert(ft): 20.230         19.950                       Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 3A Outfall ***
                                                                          TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Horizontal                Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Circular              Orifice Disc Coef: 0.600

              Span(in): 3.00                        Invert(ft): 24.730
              Rise(in): 3.00                  Control Elev(ft): 24.730

*** Weir 2 of 3 for Drop Structure Pond 3A Outfall ***
                                                                          TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 6.00                        Invert(ft): 25.490
              Rise(in): 24.00                 Control Elev(ft): 25.490

*** Weir 3 of 3 for Drop Structure Pond 3A Outfall ***
                                                                          TABLE
```

```
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                    Weir Disc Coef: 3.200
            Geometry: Rectangular           Orifice Disc Coef: 0.600

            Span(in): 37.00                       Invert(ft): 27.490
            Rise(in): 24.00                 Control Elev(ft): 27.490


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 3A 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 3A - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

------------------------------------------------------------------------------------------------------------
         Name: Post 3A 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 3A - 5-1.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Flmod
    Rainfall Amount(in): 2.98

Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 3A 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 3A - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 72.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes


------------------------------------------------------------------------------------------------------------
         Name: Post 5-1            Hydrology Sim: Post 3A 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 3A - 5-1.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 1.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
0.500           15.000
1.000           15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 3
            Group Name: BASE
            Simulation: Post 3A 25-72
             Node Name: Pond 3A
            Basin Type: SCS Unit Hydrograph

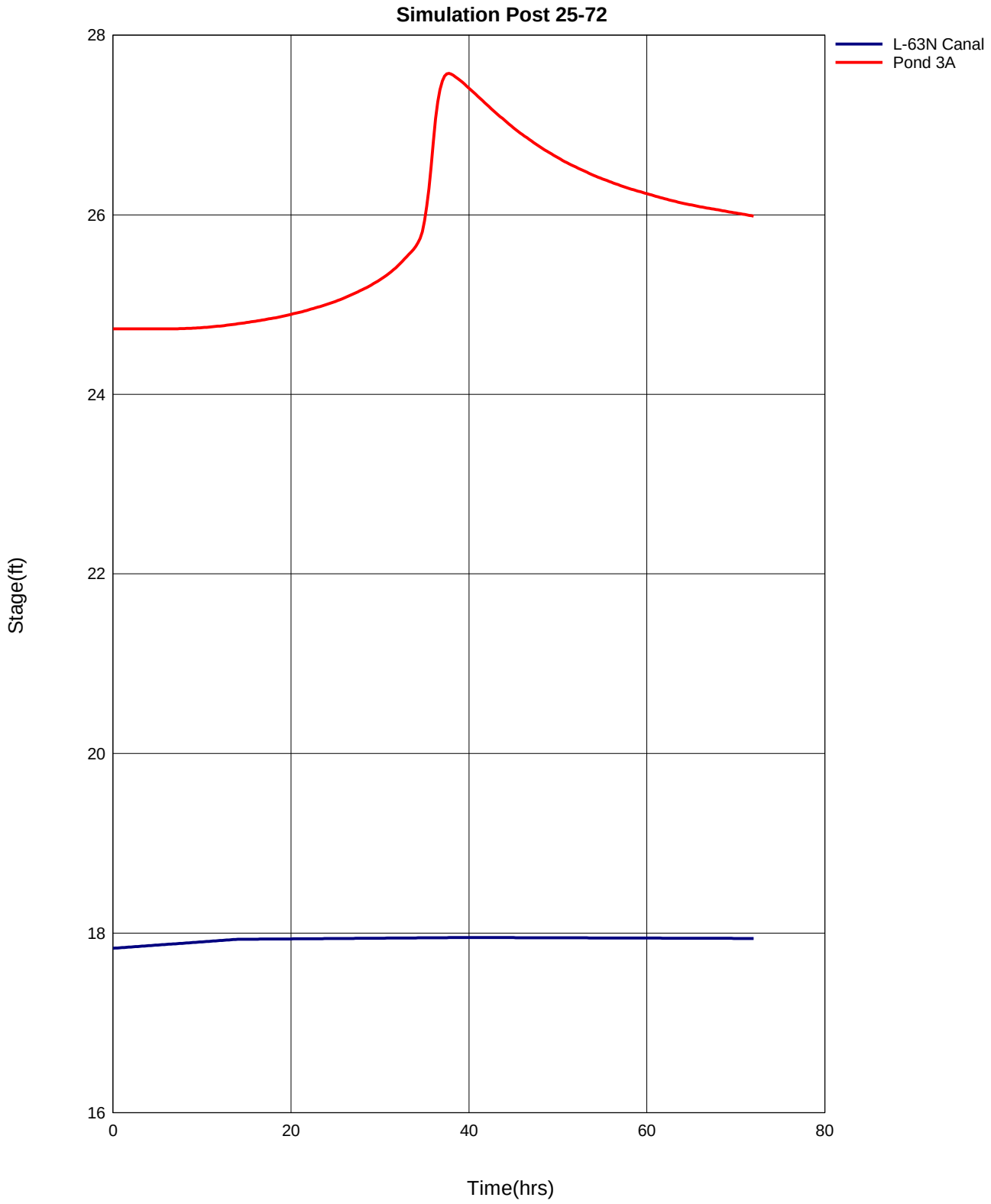
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 2.91
   Comp Time Inc (min): 2.91
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 21.82
      Time Shift (hrs): 0.00
            Area (ac): 14.530
  Vol of Unit Hyd (in): 1.001
          Curve Number: 90.000
              DCIA (%): 0.000

        Time Max (hrs): 36.03
        Flow Max (cfs): 29.37
    Runoff Volume (in): 7.794
   Runoff Volume (ft3): 411063
```

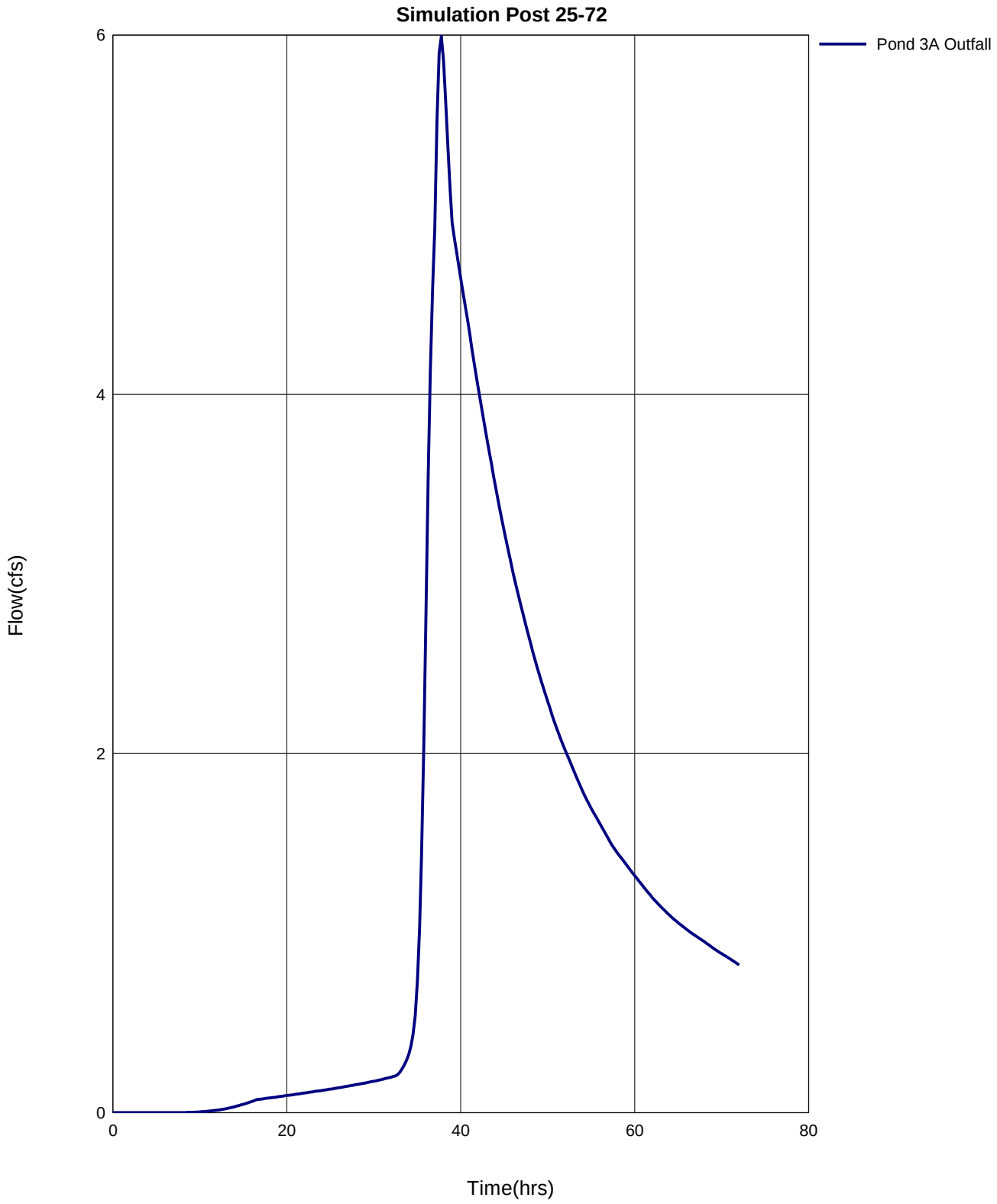
Pond 3A
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
L-63N Canal	BASE	Post 25-72	40.00	17.95	28.83	0.0001	0	37.72	6.00	0.00	0.00
Pond 3A	BASE	Post 25-72	37.72	27.58	28.65	0.0050	88091	36.00	29.22	37.72	6.00

Pond 3A
25 Yr, 72 Hr



Pond 3A
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 3B - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 610+20 to Station 638+46.43
Basin Length = 2826.43 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	6.26	614
Open Space - Good Condition (Perv R/W)		D	80	4.12	330
Water Management Area (Imperv.)			100	1.19	119
Water Management Area (Perv.)		D	80	1.26	101
			Totals =	12.83	1163

CN (weighted) = (total product) / (total area) = 1,163 / 12.83

= 91

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D
Note: Profile at Sta. 638+30 controlled by Kimley Horn (Bridge at SR 70)

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 3B PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	6.26 Ac
Total Drainage area =	**12.83 Ac**
2.5" times percent imperviousness =	1.30 Ac-Ft
1" runoff from drainage area =	1.07 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = 1.30 Ac-Ft
= 56823 Cu-Ft

Pond Storage Calculations (Wet Detention - Pond 3B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
29.73	1.0	68,913	1.58	1.534	5.974	260,227
28.73	1.0	64,710	1.49	1.439	4.440	193,406
27.73	1.0	60,635	1.39	1.347	3.001	130,724
26.73	1.0	56,690	1.30	1.258	1.654	72,048
25.73	0.3	52,875	1.21	0.396	0.396	17,250
25.40	0.0	51,702	1.19	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond3B)

Elev.	Storage	Area
25.73	0.396	52,875
26.73	1.654	56,690

Elev. = 26.46 = 1.31 Ac-Ft 57253 Cu-Ft

Provided Treatment Volume (T.V.) = **1.314** Ac-ft

Treatment Depth = 1.06 ft

For Orifice Recovery Calculations (Pond3B)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 0.48 Ac-Ft 21124 Cu-Ft

Elev.	Storage	Area
25.73	0.396	52,875
26.73	1.654	56,690

Elev. = 25.81 ft. provides 0.50 Ac-Ft
= 21634 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-3B:

Est. Ground Elevation (at boring location) =	26.4	feet
Subtract Estimated SHGT Depth = -0.5-0.5 =	1	feet
Estimated SHGT Elev. =	25.4	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 3B PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 3B Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	21124.48	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.122 cfs

Elevation of Required Treatment Volume =	25.81	ft
Flow line Elevation =	25.40	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.41 ft

h = 0.41

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.040 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

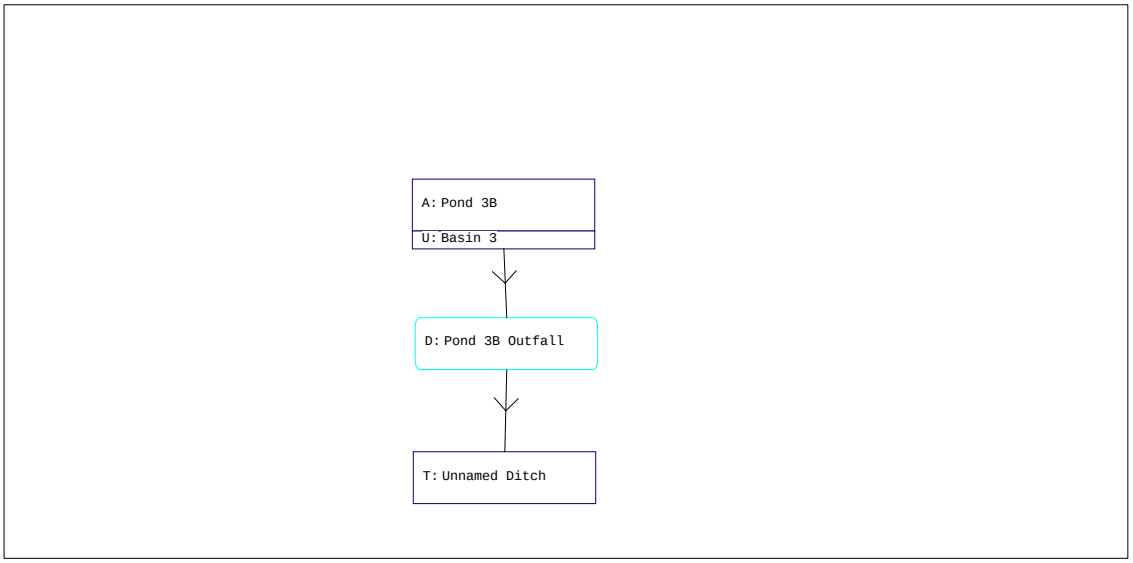
D = 0.22 ft = 2.70 in dia

Use 3 inch orifice

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 3                 Node: Pond 3B               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 24.39
             Area(ac): 12.830                 Time Shift(hrs): 0.00
         Curve Number: 91.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

Tc from preliminary storm drain tabulations.

================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Pond 3B             Base Flow(cfs): 0.000          Init Stage(ft): 25.400
     Group: BASE                                               Warn Stage(ft): 28.650
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         25.400          1.1900
         25.730          1.2100
         26.730          1.3000
         27.730          1.3900
         28.730          1.4900
         29.730          1.5800

--------------------------------------------------------------------------------
      Name: Unnamed Ditch       Base Flow(cfs): 0.000          Init Stage(ft): 21.810
     Group: BASE                                               Warn Stage(ft): 28.730
      Type: Time/Stage

From SR 70 Widening Calcs. - Converted to NAVD

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00          21.810
          12.00          22.740
          30.00          22.080

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 3B Outfall     From Node: Pond 3B            Length(ft): 850.00
        Group: BASE                  To Node: Unnamed Ditch          Count: 1

               UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                Flow: Both
     Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
   Invert(ft): 22.400         21.975                       Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 3B Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
            Geometry: Circular              Orifice Disc Coef: 0.600

            Span(in): 3.00                        Invert(ft): 24.900
            Rise(in): 3.00                  Control Elev(ft): 25.400

*** Weir 2 of 3 for Drop Structure Pond 3B Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
            Geometry: Rectangular           Orifice Disc Coef: 0.600

            Span(in): 6.00                        Invert(ft): 26.460
            Rise(in): 18.00                 Control Elev(ft): 26.460

*** Weir 3 of 3 for Drop Structure Pond 3B Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
```

```
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
            Geometry: Rectangular          Orifice Disc Coef: 0.600

            Span(in): 49.00                      Invert(ft): 27.960
            Rise(in): 37.00                Control Elev(ft): 27.960


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 3B 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 3B - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

--------------------------------------------------------------------------------------------------------
         Name: Post 3B 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 3B - 5-1.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Flmod
    Rainfall Amount(in): 2.98

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 3B 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 3B - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes


--------------------------------------------------------------------------------------------------------
         Name: Post 5-1            Hydrology Sim: Post 3B 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 3B - 5-1.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 1.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
0.500           15.000
1.000           15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 3
            Group Name: BASE
            Simulation: Post 3B 25-72
             Node Name: Pond 3B
            Basin Type: SCS Unit Hydrograph

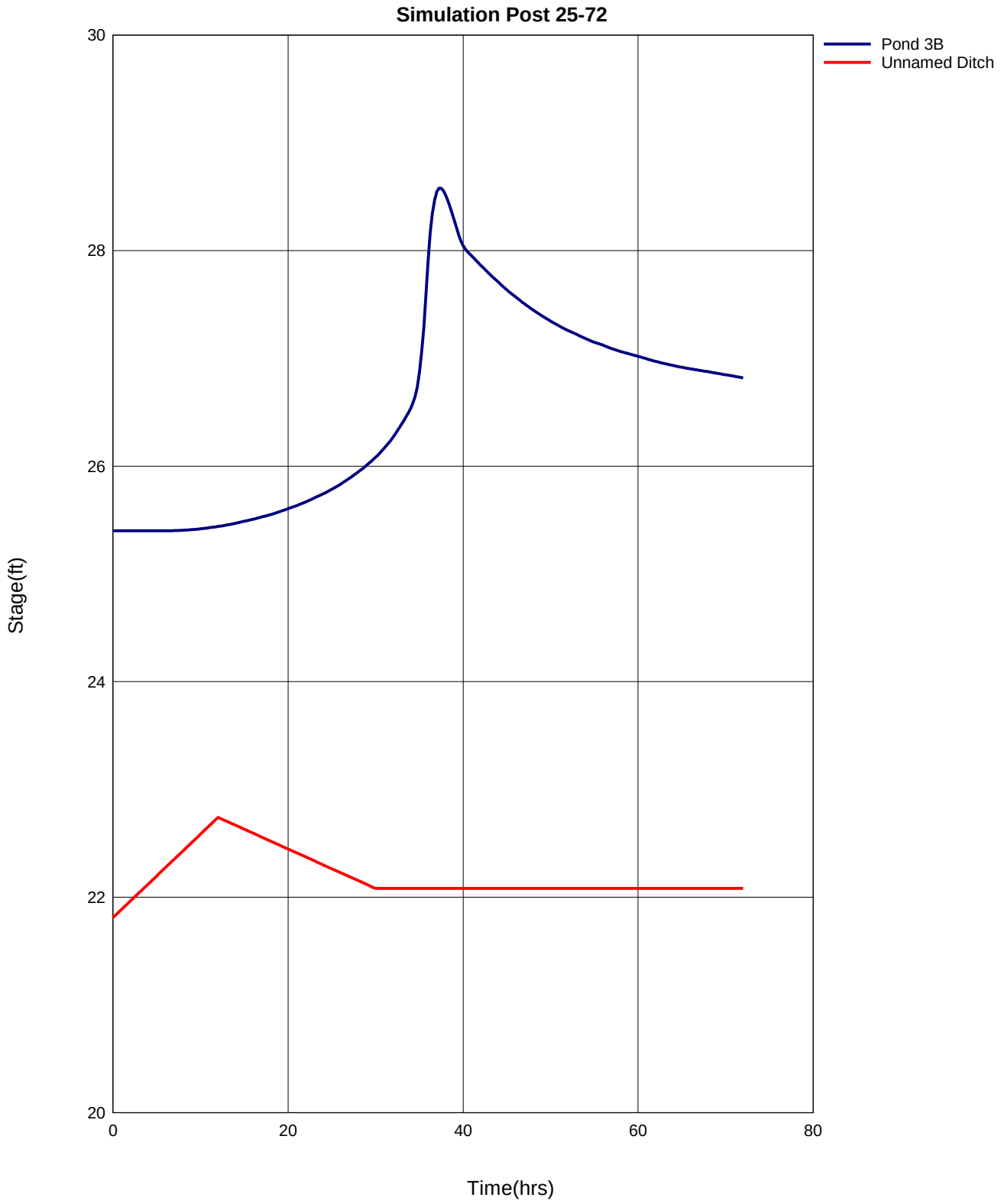
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
  Spec Time Inc (min): 3.25
  Comp Time Inc (min): 3.25
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 24.39
     Time Shift (hrs): 0.00
           Area (ac): 12.830
 Vol of Unit Hyd (in): 1.001
        Curve Number: 91.000
            DCIA (%): 0.000

      Time Max (hrs): 36.04
      Flow Max (cfs): 25.58
  Runoff Volume (in): 7.916
 Runoff Volume (ft3): 368661
```

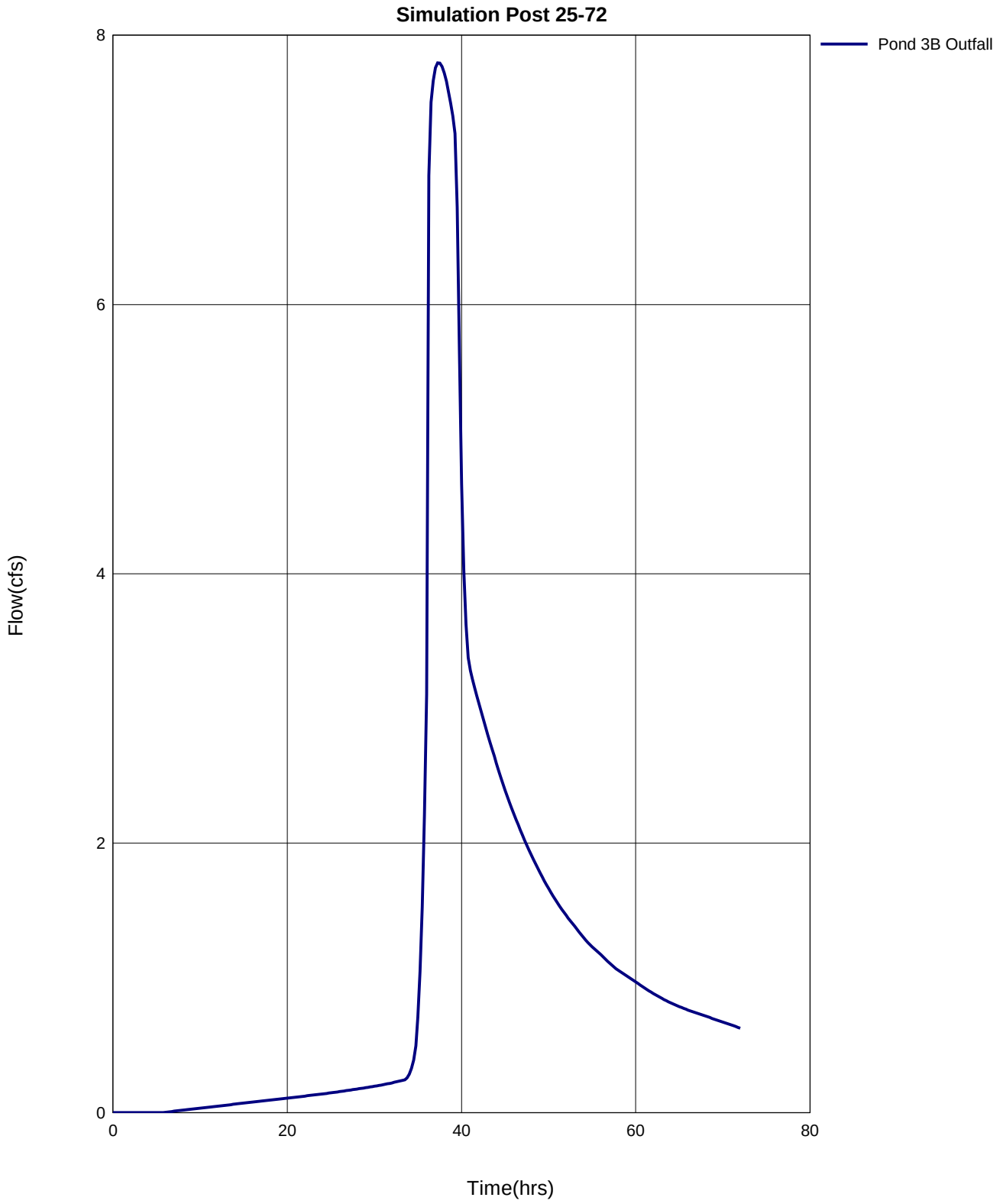
Pond 3B
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 3B	BASE	Post 25-72	37.38	28.58	28.65	0.0050	64263	36.00	25.37	37.38	7.80
Unnamed Ditch	BASE	Post 25-72	12.00	22.74	28.73	0.0013	0	37.38	7.80	0.00	0.00

Pond 3B
25 Yr, 72 Hr



Pond 3B
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 3C - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 610+20 to Station 638+46.43
Basin Length = 2826.43 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & SR 70 to Exist Pond			98	10.44	1023
Open Space - Good Condition (Perv R/W)		D	80	7.47	598
Water Management Area (Imperv.)			100	2.13	213
Water Management Area (Perv.)		D	80	1.69	135
			Totals =	21.72	1968

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{1{,}968}{21.72}$

= **91**

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D
Note: Profile at Sta. 638+30 controlled by Kimley Horn (Bridge at SR 70)
Merged with Proposed Pond 1 (SR 70 Widening Plans - Application #121210-2)
Additional Drainage Area from Drainage Notebook Calcs for Pond 1

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 3C PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.44 Ac
Total Drainage area =	21.72 Ac
2.5" times percent imperviousness =	2.18 Ac-Ft
1" runoff from drainage area =	1.81 Ac-Ft

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **2.18** **Ac-ft**
= **94757** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 3C):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
28.00	1.0	121,608	2.792	2.729	13.612	592,939
27.00	1.0	116,147	2.666	2.605	10.883	474,063
26.00	1.0	110,785	2.543	2.483	8.278	360,590
25.00	1.0	105,524	2.422	2.363	5.795	252,430
24.00	1.0	100,364	2.304	2.246	3.432	149,498
23.00	0.6	95,305	2.188	1.186	1.186	51,662
22.45	0.0	92,565	2.125	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond3C)

Elev.	Storage	Area
23.00	1.186	95,305
24.00	3.432	100,364

Elev. = 23.45 = 2.20 Ac-Ft 95688 Cu-Ft

Provided Treatment Volume (T.V.) = **2.197** Ac-ft

Treatment Depth = 1.00 ft

For Orifice Recovery Calculations (Pond3C)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 0.82 Ac-Ft 35574 Cu-Ft

Elev.	Storage	Area
22.45	0.000	92,565
23.00	1.186	95,305

Elev. = 22.83 ft. provides 0.82 Ac-Ft
35694 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-3C:

Est. Ground Elevation (at boring location) =	24.2	feet
Subtract Estimated SHGT Depth = -1.25- 0.5 =	1.75	feet
Estimated SHGT Elev. =	22.45	feet

ORIFICE SIZING FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 3C PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Pond 3C Orifice Calculations

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

Orifice Equation:

Average Discharge Rate: Drawdown 0.5 in of Required Detention Volume in 24 hrs.

Required Treatment Volume =	35573.54	ft^3
Recovery Time (t) =	24.00	hr
Conversion Factor (CF) =	3600.00	sec/hr

$$Q = \frac{TV}{2\,t\,CF}$$

Q = 0.206 cfs

Elevation of Required Treatment Volume =	22.83	ft
Flow line Elevation =	22.45	ft

Depth of water between top of treatment vol. and flow line (h1) = 0.38 ft

h = 0.38

Orifice Equation: $$A = \frac{Q}{C\sqrt{2\,g\,h}}$$

A = 0.069 ft^2

$$D = \sqrt{\frac{4\,A}{\pi}}$$

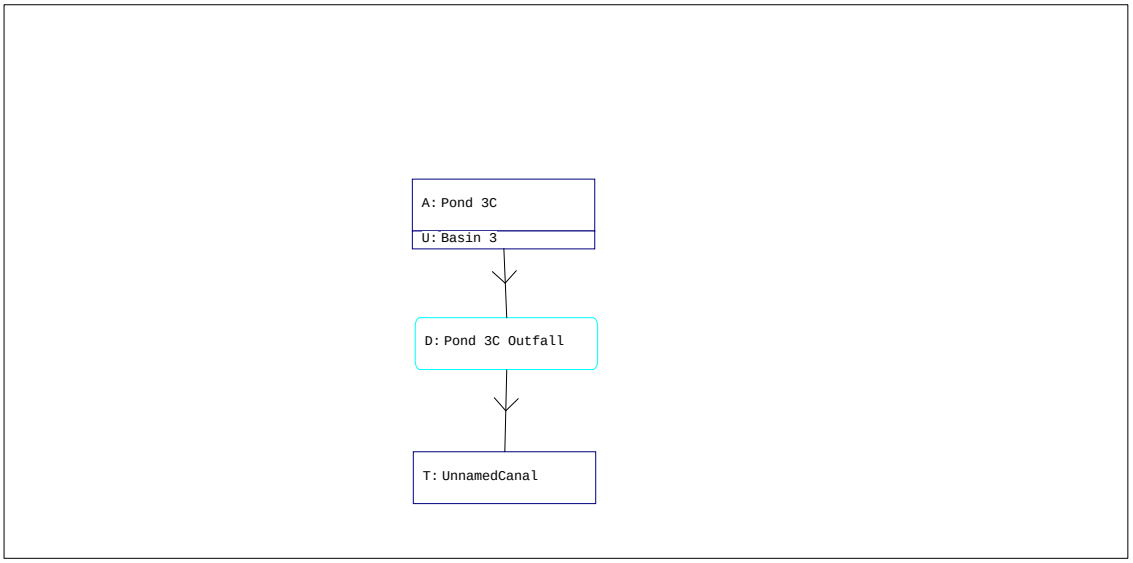
D = 0.30 ft = 3.57 in dia

Use 3 inch orifice

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 3                 Node: Pond 3C               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 24.39
             Area(ac): 21.720                 Time Shift(hrs): 0.00
         Curve Number: 91.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

Tc from preliminary storm drain tabulation

================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Pond 3C            Base Flow(cfs): 0.000         Init Stage(ft): 22.450
     Group: BASE                                             Warn Stage(ft): 28.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         22.450          2.1250
         23.000          2.1880
         24.000          2.3040
         25.000          2.4220
         26.000          2.5430
         27.000          2.6660
         28.000          2.7920

--------------------------------------------------------------------------------
      Name: UnnamedCanal       Base Flow(cfs): 0.000         Init Stage(ft): 21.810
     Group: BASE                                             Warn Stage(ft): 28.730
      Type: Time/Stage

From SR 70 Widening Calcs.- Converted to NAVD

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00          21.810
          12.00          22.740
          30.00          22.080

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 3C Outfall     From Node: Pond 3C           Length(ft): 85.00
        Group: BASE                  To Node: UnnamedCanal          Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                 Flow: Both
     Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
   Invert(ft): 21.500         21.330                      Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 3 for Drop Structure Pond 3C Outfall ***
                                                                          TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Horizontal               Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
            Geometry: Circular             Orifice Disc Coef: 0.600

            Span(in): 3.00                       Invert(ft): 21.950
            Rise(in): 3.00                Control Elev(ft): 22.450

*** Weir 2 of 3 for Drop Structure Pond 3C Outfall ***
                                                                          TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Vertical: Mavis          Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
            Geometry: Rectangular          Orifice Disc Coef: 0.600

            Span(in): 12.00                      Invert(ft): 23.450
            Rise(in): 30.60               Control Elev(ft): 23.450

*** Weir 3 of 3 for Drop Structure Pond 3C Outfall ***
                                                                          TABLE
```

```
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Horizontal                Top Clip(in): 0.000
                   Flow: Both                   Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 49.00                       Invert(ft): 26.000
               Rise(in): 37.00                Control Elev(ft): 26.000


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 3C 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 3C - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 3C 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 3C - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 3
            Group Name: BASE
            Simulation: Post 3C 25-72
             Node Name: Pond 3C
            Basin Type: SCS Unit Hydrograph

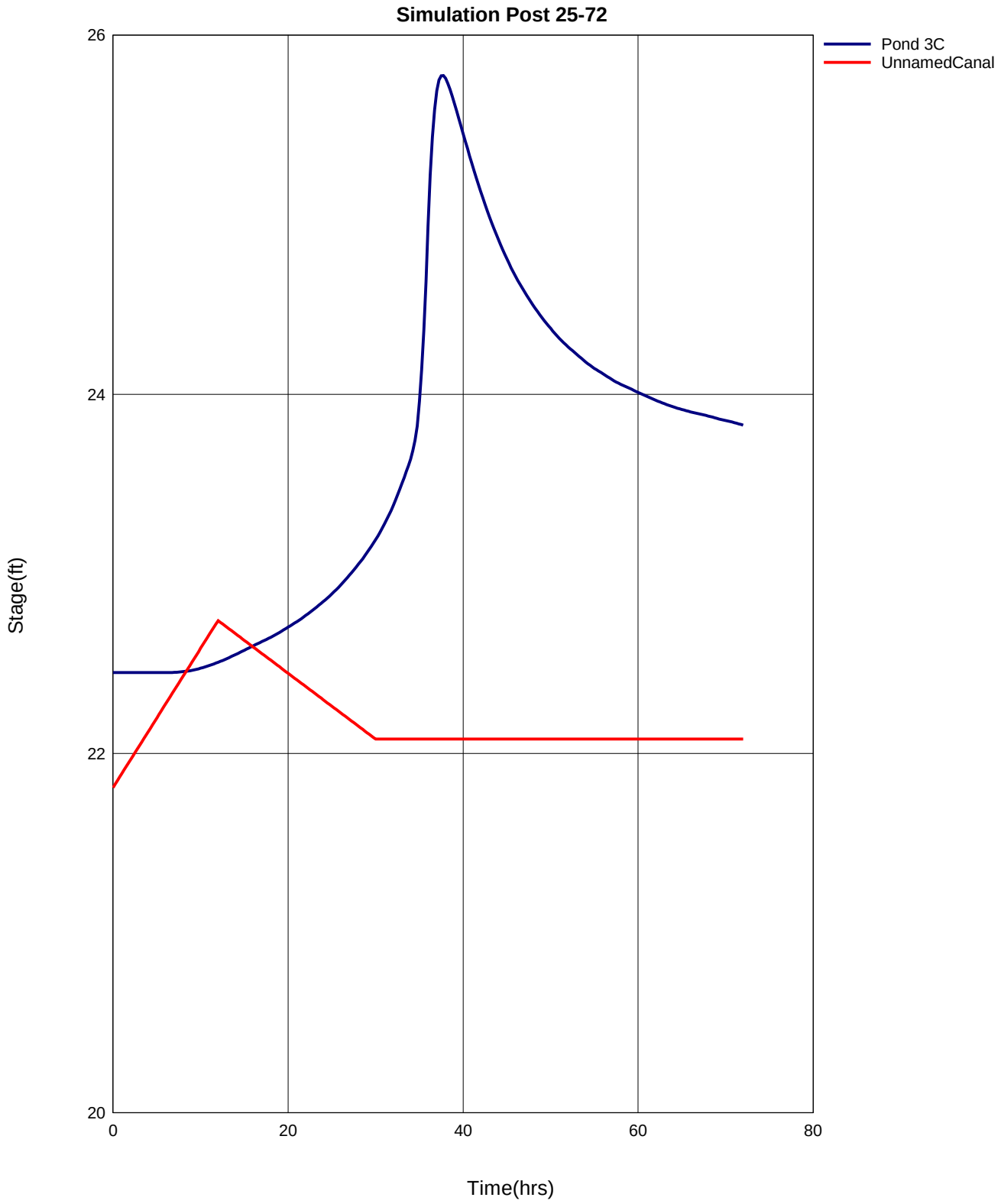
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 3.25
   Comp Time Inc (min): 3.25
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 24.39
      Time Shift (hrs): 0.00
            Area (ac): 21.720
  Vol of Unit Hyd (in): 1.001
          Curve Number: 91.000
              DCIA (%): 0.000

        Time Max (hrs): 36.04
        Flow Max (cfs): 43.30
    Runoff Volume (in): 7.916
   Runoff Volume (ft3): 624109
```

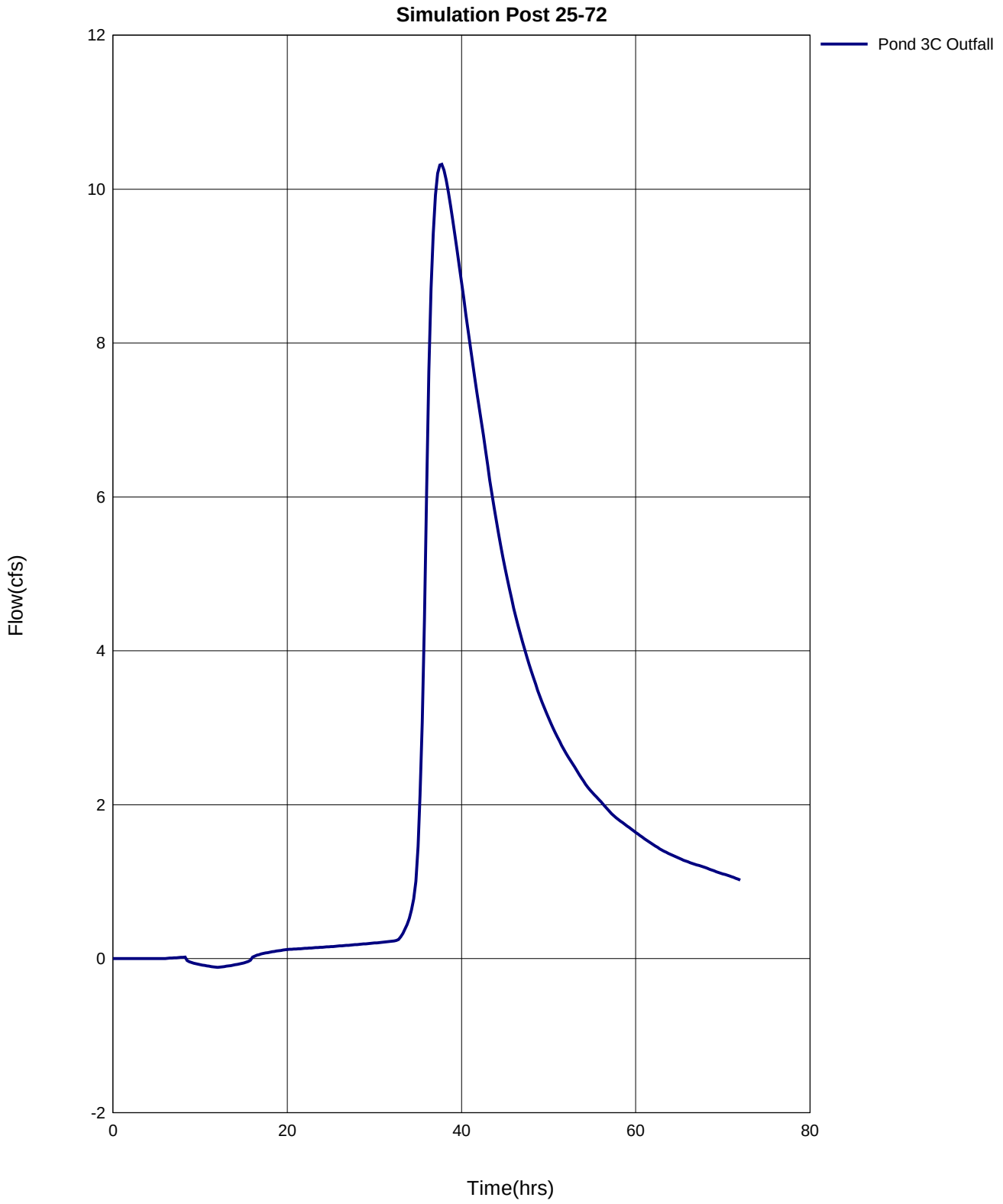
Pond 3C
25 Year, 72 Hour

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 3C	BASE	Post 25-72	37.65	25.78	28.00	0.0050	109600	36.00	42.96	37.65	10.33
UnnamedCanal	BASE	Post 25-72	12.00	22.74	28.73	0.0013	0	37.65	10.33	0.00	0.00

Pond 3C
25 Year, 72 Hour



Pond 3C
25 Year, 72 Hour



Basin 4

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 4A- Option 1 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 638+36.94 to Station 685+00
Basin Length = 4663.06 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & Other Roads			98	15.37	1507
Open Space - Good Condition (Perv R/W)		D	80	11.69	935
Water Management Area (Imperv.)			100	2.22	222
Water Management Area (Perv.)		D	80	1.76	141
			Totals =	31.05	2805

CN (weighted) = (total product) / (total area) = 2,805 / 31.05

= 90

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 4A - Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.06 Ac
Total Drainage area =	**31.05 Ac**
2.5" runoff from impervious area =	2.10 Ac-Ft
1" runoff from drainage area =	2.59 Ac-Ft

*Proposed Impervious Area takes credit for existing pavement (5.309 ac.)
Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **2.59** **Ac-ft**
= **112706** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 4A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
29.00	1.0	124,030	2.847	2.783	12.657	551,339
28.00	1.0	118,401	2.718	2.655	9.874	430,111
27.00	1.0	112,874	2.591	2.529	7.219	314,460
26.00	1.0	107,448	2.467	2.406	4.690	204,296
25.00	1.0	102,122	2.344	2.284	2.284	99,491
24.00	0.0	96,897	2.224	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond4A)

Elev.	Storage	Area
25.00	2.284	102,122
26.00	4.690	107,448

Elev. = 25.13 = 2.60 Ac-Ft 113116 Cu-Ft

Provided Treatment Volume (T.V.) = **2.597** Ac-ft

Treatment Depth = 1.13 ft

For Orifice Recovery Calculations (Pond4A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.20 Ac-Ft 52316 Cu-Ft

Elev.	Storage	Area
24.00	0.000	96,897
25.00	2.284	102,122

Elev. = 24.22 ft. provides 0.502 ac-ft of volume
21888 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-4A: Station 680+40

Est. Ground Elevation (at boring location) =	25	feet
Estimated SHGT Depth = -1.08-0.5 =	1.58	feet
Estimated SHGT Elev. =	23.42	feet

Boring PB-4A: Station 683+15

Est. Ground Elevation (at boring location) =	26	feet
Estimated SHGT Depth = -1.08-0.5 =	1.58	feet
Estimated SHGT Elev. =	24.42	feet

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 4A - Option 2 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 638+36.94 to Station 685+00
Basin Length = 4663.06 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & Other Roads			98	15.37	1507
Open Space - Good Condition (Perv R/W)		D	80	11.69	935
Water Management Area (Imperv.)			100	1.59	159
Water Management Area (Perv.)		D	80	1.75	140
			Totals =	30.41	2741

CN (weighted) = (total product) / (total area) = 2,741 / 30.41

= 90

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 4A - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.06 Ac
Total Drainage area =	**30.41 Ac**
2.5" runoff from impervious area =	2.10 Ac-Ft
1" runoff from drainage area =	2.53 Ac-Ft

*Proposed Impervious Area takes credit for existing pavement (5.309 ac.)
Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **2.53** **Ac-ft**
= **110376** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 4A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
29.00	1.0	94,045	2.159	2.100	9.356	407,547
28.00	1.0	88,914	2.041	1.983	7.256	316,071
27.00	1.0	83,884	1.926	1.869	5.273	229,692
26.00	1.0	78,954	1.813	1.757	3.404	148,278
25.00	1.0	74,125	1.702	1.647	1.647	71,743
24.00	0.0	69,396	1.593	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond4A)

Elev.	Storage	Area
25.00	1.647	74,125
26.00	3.404	78,954

Elev. = 25.51 = 2.54 Ac-Ft 110776 Cu-Ft

Provided Treatment Volume (T.V.) = **2.543** Ac-ft

Treatment Depth = 1.51 ft

For Orifice Recovery Calculations (Pond4A)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.20 Ac-Ft 52296 Cu-Ft

Elev.	Storage	Area
24.00	0.000	69,396
25.00	1.647	74,125

Elev. = 24.73 ft. provides 1.202 ac-ft of volume
52373 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-4A: Station 680+40

Est. Ground Elevation (at boring location) =	25	feet
Estimated SHGT Depth = -1.08-0.5 =	1.58	feet
Estimated SHGT Elev. =	22.92	feet

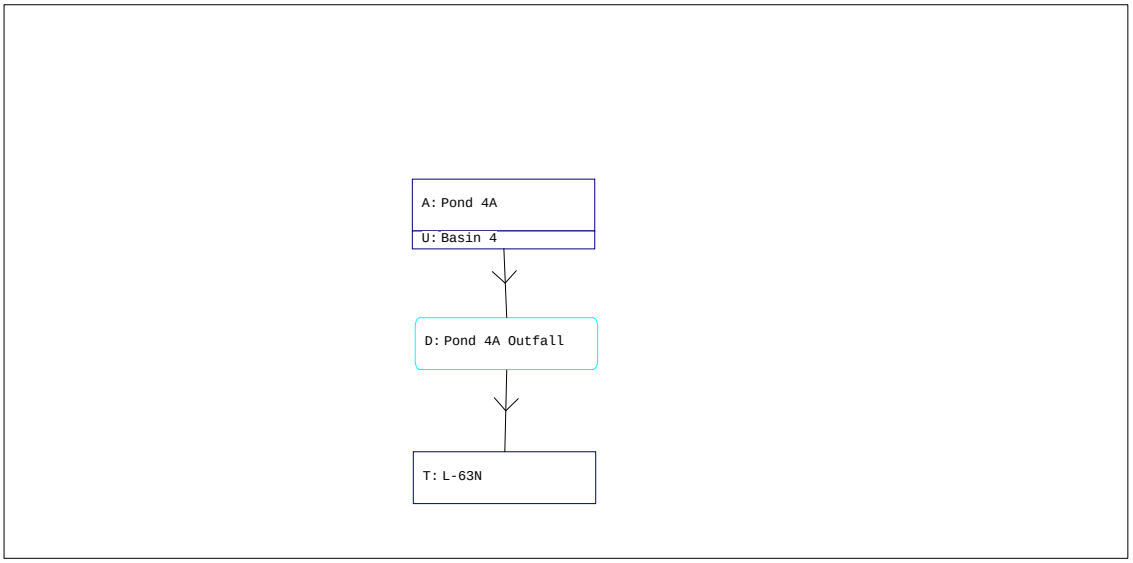
Boring PB-4A: Station 683+15

Est. Ground Elevation (at boring location) =	26	feet
Estimated SHGT Depth = -1.08-0.5 =	1.58	feet
Estimated SHGT Elev. =	24.42	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



==========
==== Basins ====
==========

Name: Basin 4 Node: Pond 4A Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 29.00
Area(ac): 31.050 Time Shift(hrs): 0.00
Curve Number: 90.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: Basin 4-2 Node: Pond 4A-2 Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 29.00
Area(ac): 30.410 Time Shift(hrs): 0.00
Curve Number: 90.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ====
==========

Name: L-63N Base Flow(cfs): 0.000 Init Stage(ft): 17.830
Group: BASE Warn Stage(ft): 28.830
Type: Time/Stage

From SR 70 Widening Plans - Converted to NAVD

Time(hrs)	Stage(ft)
0.00	17.830
14.00	17.930
40.00	17.950
100.00	17.930

Name: L-63N-2 Base Flow(cfs): 0.000 Init Stage(ft): 17.830
Group: BASE Warn Stage(ft): 28.830
Type: Time/Stage

From SR 70 Widening Plans - Converted to NAVD

Time(hrs)	Stage(ft)
0.00	17.830
14.00	17.930
40.00	17.950
100.00	17.930

Name: Pond 4A Base Flow(cfs): 0.000 Init Stage(ft): 24.000
Group: BASE Warn Stage(ft): 28.060
Type: Stage/Area

Stage(ft)	Area(ac)
24.000	2.2240
25.000	2.3440
26.000	2.4670
27.000	2.5910
28.000	2.7180
29.000	2.8470

Name: Pond 4A-2 Base Flow(cfs): 0.000 Init Stage(ft): 24.000
Group: BASE Warn Stage(ft): 29.060
Type: Stage/Area

Stage(ft)	Area(ac)
24.000	1.5930
25.000	1.7020
26.000	1.8130
27.000	1.9260
28.000	2.0410
29.000	2.1590

==========
==== Drop Structures ====
==========

```
        Name: Pond 4A Outfall     From Node: Pond 4A           Length(ft): 150.00
       Group: BASE                  To Node: L-63N                Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                                Flow: Both
    Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
  Invert(ft): 20.500         20.200                       Exit Loss Coef: 1.000
Manning's N: 0.012000        0.012000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 4A Outfall ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 5.00                        Invert(ft): 23.500
             Rise(in): 5.00                 Control Elev(ft): 24.000

*** Weir 2 of 3 for Drop Structure Pond 4A Outfall ***
                                                                                TABLE
                Count: 2                      Bottom Clip(in): 0.000
                 Type: Vertical: Mavis           Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 15.00                       Invert(ft): 25.130
             Rise(in): 10.00                Control Elev(ft): 25.130

*** Weir 3 of 3 for Drop Structure Pond 4A Outfall ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 49.00                       Invert(ft): 27.900
             Rise(in): 37.00                Control Elev(ft): 27.900


-------------------------------------------------------------------------------------------------
        Name: Pond 4A-2 Outfa     From Node: Pond 4A-2         Length(ft): 150.00
       Group: BASE                  To Node: L-63N-2              Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                                Flow: Both
    Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
  Invert(ft): 20.500         20.200                       Exit Loss Coef: 1.000
Manning's N: 0.012000        0.012000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 4A-2 Outfa ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 5.00                        Invert(ft): 23.500
             Rise(in): 5.00                 Control Elev(ft): 24.000

*** Weir 2 of 3 for Drop Structure Pond 4A-2 Outfa ***
                                                                                TABLE
                Count: 2                      Bottom Clip(in): 0.000
                 Type: Vertical: Mavis           Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 15.00                       Invert(ft): 25.510
             Rise(in): 8.00                 Control Elev(ft): 25.510

*** Weir 3 of 3 for Drop Structure Pond 4A-2 Outfa ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
```

```
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
            Geometry: Rectangular          Orifice Disc Coef: 0.600

            Span(in): 49.00                      Invert(ft): 29.000
            Rise(in): 37.00                Control Elev(ft): 29.000


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 4A 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 4A - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 4A 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 4A - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 72.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 4
            Group Name: BASE
            Simulation: Post 4A 25-72
             Node Name: Pond 4A
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 3.87
   Comp Time Inc (min): 3.87
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 29.00
      Time Shift (hrs): 0.00
           Area (ac): 31.050
  Vol of Unit Hyd (in): 1.001
          Curve Number: 90.000
              DCIA (%): 0.000

        Time Max (hrs): 36.09
        Flow Max (cfs): 58.95
    Runoff Volume (in): 7.794
   Runoff Volume (ft3): 878515


--------------------------------------------------------------------------------

            Basin Name: Basin 4-2
            Group Name: BASE
            Simulation: Post 4A 25-72
             Node Name: Pond 4A-2
            Basin Type: SCS Unit Hydrograph

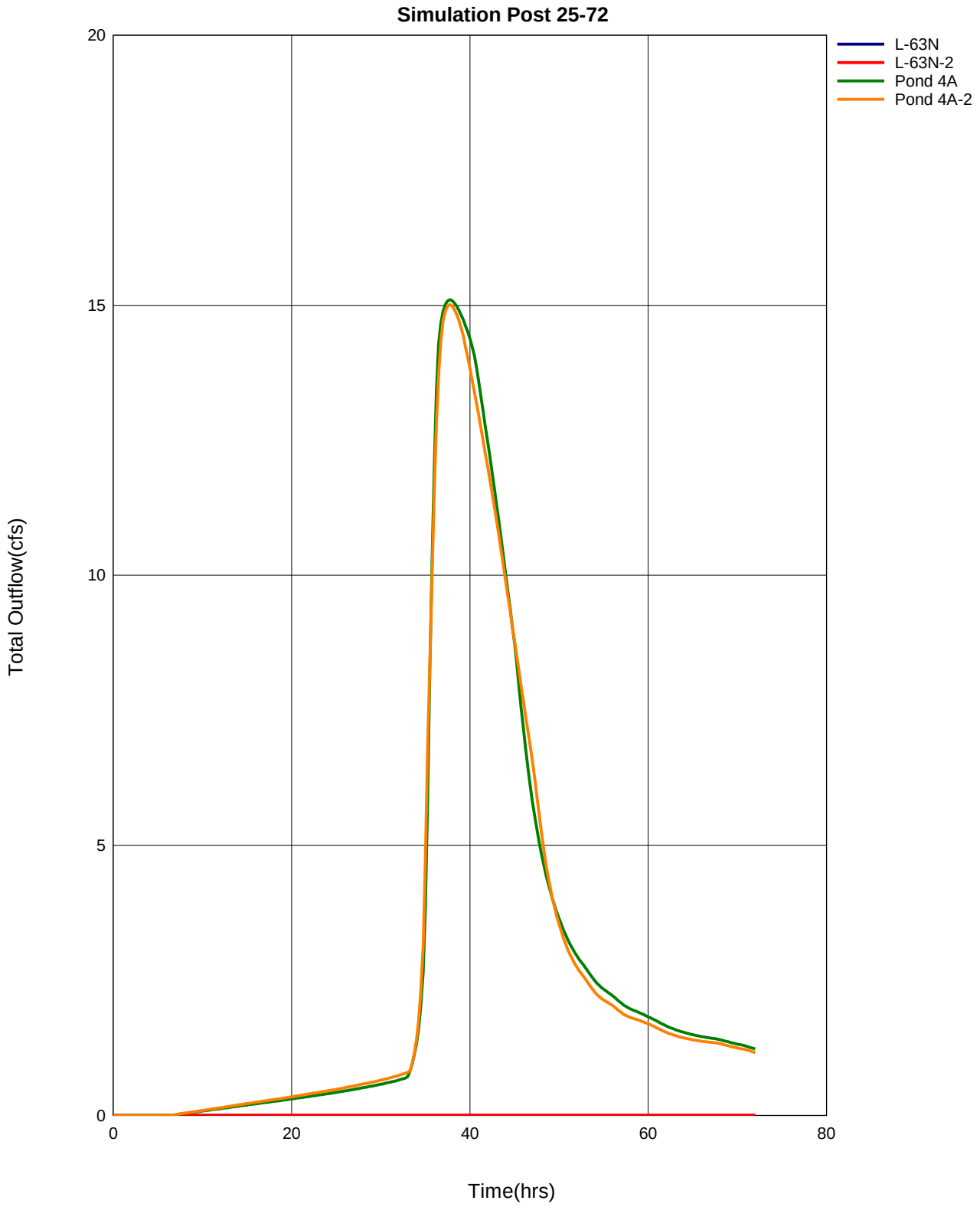
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 3.87
   Comp Time Inc (min): 3.87
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 29.00
      Time Shift (hrs): 0.00
           Area (ac): 30.410
  Vol of Unit Hyd (in): 1.000
          Curve Number: 90.000
              DCIA (%): 0.000

        Time Max (hrs): 36.09
        Flow Max (cfs): 57.73
    Runoff Volume (in): 7.794
   Runoff Volume (ft3): 860407
```

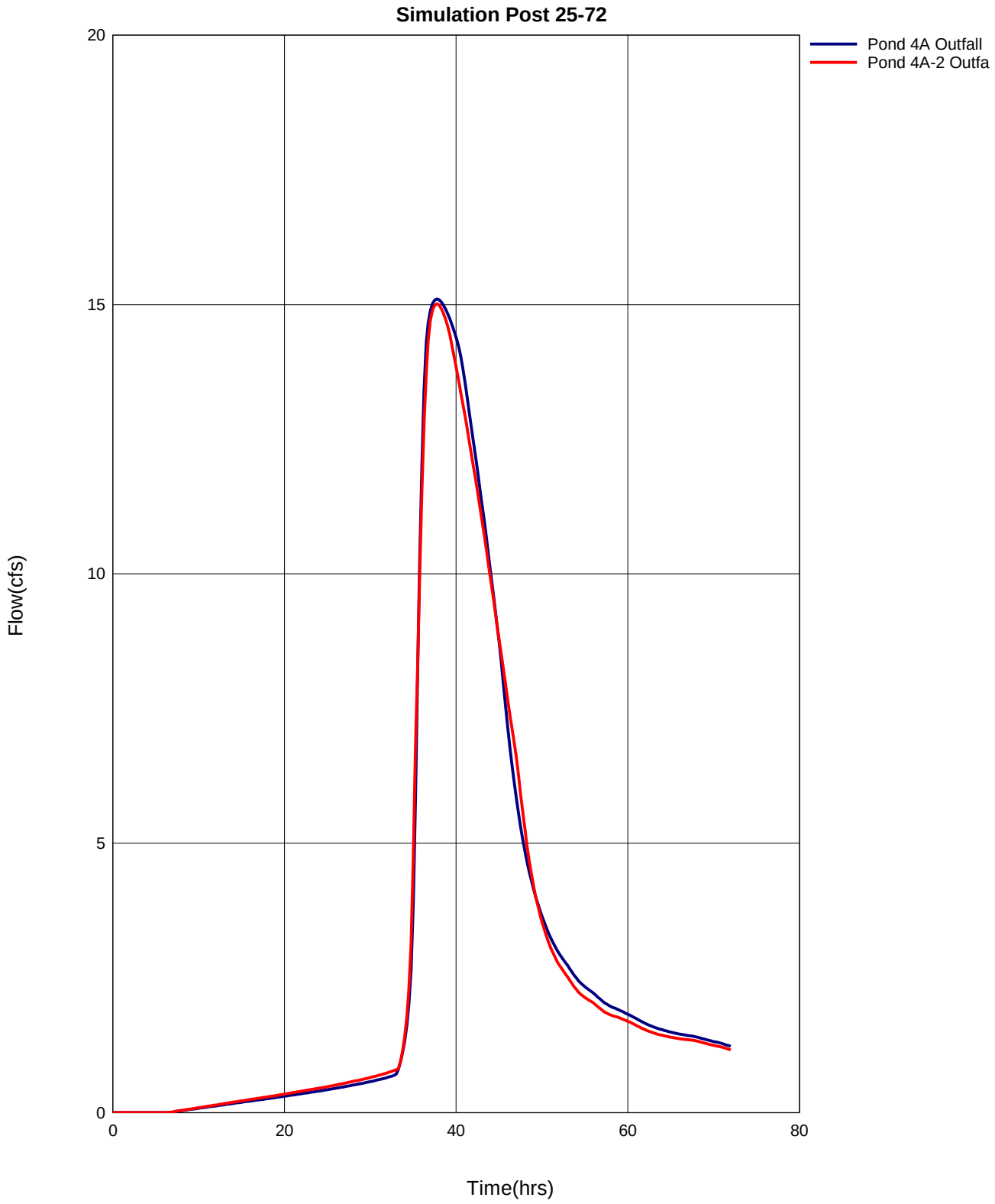
Pond 4A - Options 1 and 2
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
L-63N	BASE	Post 25-72	40.00	17.95	28.83	0.0001	0	37.77	15.11	0.00	0.00
L-63N-2	BASE	Post 25-72	40.00	17.95	28.83	0.0001	0	37.76	15.01	0.00	0.00
Pond 4A	BASE	Post 25-72	37.77	27.89	28.06	0.0040	117764	36.00	58.07	37.77	15.11
Pond 4A-2	BASE	Post 25-72	37.76	28.92	29.06	0.0050	93650	36.00	56.88	37.76	15.01

Pond 4A - Options 1 and 2
25 Yr, 72 Hr



Pond 4A - Options 1 and 2
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 4B/4C - Option 1 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 638+36.94 to Station 685+00
Basin Length = 4663.06 feet (measured from roll plot)
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & Other Roads			98	15.37	1507
Open Space - Good Condition (Perv R/W)		D	80	11.69	935
Water Management Area (Imperv.)			100	3.21	321
Water Management Area (Perv.)		D	80	4.96	397
			Totals =	35.23	3159

CN (weighted) = (total product) / (total area) = 3,159 / 35.23

= 90

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 4B/4C - Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.06 Ac
Total Drainage area =	35.23 Ac
2.5" runoff from impervious area =	2.10 Ac-Ft
1" runoff from drainage area =	2.94 Ac-Ft

*Proposed Impervious Area takes credit for existing pavement (5.309 ac.)
Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) =	**2.94**	**Ac-ft**
=	**127891**	**ft^3**

Pond Storage Calculations (Wet Detention - Pond 4B-4C):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Ac-ft
27.38	0.6	199,404	4.578	2.831	19.938	868,499
26.75	1.0	192,111	4.410	4.273	17.107	745,181
25.75	1.0	180,117	4.135	4.000	12.834	559,049
24.75	1.0	168,323	3.864	3.731	8.834	384,809
23.75	1.0	156,730	3.598	3.467	5.103	222,287
22.75	0.5	145,340	3.337	1.636	1.636	71,264
22.25	0.0	139,719	3.208	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond4B-4C)

Elev.	Storage	Area
22.75	1.636	145,340
23.75	5.103	156,730

Elev. = 23.13 = 2.95 Ac-Ft 128653 Cu-Ft

Provided Treatment Volume (T.V.) =	**2.953**	Ac-ft
Treatment Depth =	0.88	ft

For Orifice Recovery Calculations (Pond4B-4C)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.33 Ac-Ft 58124 Cu-Ft

Elev.	Storage	Area
22.25	0.000	139,719
22.75	1.636	145,340

Elev. = 22.66 ft. provides 1.342 ac-ft of volume
58437 cu ft of volume

From Geotechnical Information (10/13):

Boring PB-4BC:

Est. Ground Elevation (at boring location) =	24	feet
Estimated SHGT Depth = -1.25-0.5 =	1.75	feet
Estimated SHGT Elev. =	22.25	feet

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 4B - Option 2 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 638+36.94 to Station 685+00
Basin Length = 4663.06 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & Other Roads			98	15.37	1507
Open Space - Good Condition (Perv R/W)		D	80	11.69	935
Water Management Area (Imperv.)			100	2.06	206
Water Management Area (Perv.)		D	80	2.53	202
			Totals =	31.65	2850

CN (weighted) = (total product) / (total area) = 2,850 / 31.65

= 90

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 4B - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.06 Ac
Total Drainage area =	**31.65 Ac**
2.5" times percent imperviousness =	2.10 Ac-Ft
1" runoff from drainage area =	2.64 Ac-Ft

*Proposed Impervious Area takes credit for existing pavement (5.309 ac.)

Treatment Volume = Greater of 2.50" times percent imperviousness or 1.0" over drainage area

Required Treatment Volume (T.V.) = **2.64** **Ac-ft**

= **114906** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 4B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
27.38	0.6	122,537	2.813	1.743	12.490	544,064
26.75	1.0	118,552	2.722	2.646	10.747	468,139
25.75	1.0	111,992	2.571	2.497	8.101	352,880
24.75	1.0	105,532	2.423	2.350	5.604	244,110
23.75	1.0	99,172	2.277	2.205	3.254	141,744
22.75	0.5	92,914	2.133	1.049	1.049	45,694
22.25	0.0	89,822	2.062	0.000	0.000	0

Overflow Weir Elevation (Top of storage volume) (Pond4B)

Elev.	Storage	Area
22.75	1.049	92,914
23.75	3.254	99,172

Elev. = 23.50 = 2.70 Ac-Ft 117732 Cu-Ft

Provided Treatment Volume (T.V.) = **2.703** Ac-ft

Treatment Depth = 1.25 ft (prefer 1' treatment depth)

For Orifice Recovery Calculations (Pond4B)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.23 Ac-Ft 53711 Cu-Ft

Elev.	Storage	Area
22.75	1.049	92,914
23.75	3.254	99,172

Elev. = 22.84 ft. provides 1.247 ac-ft of volume
54339 cu ft of volume

From Geotechnical Information (10/13):

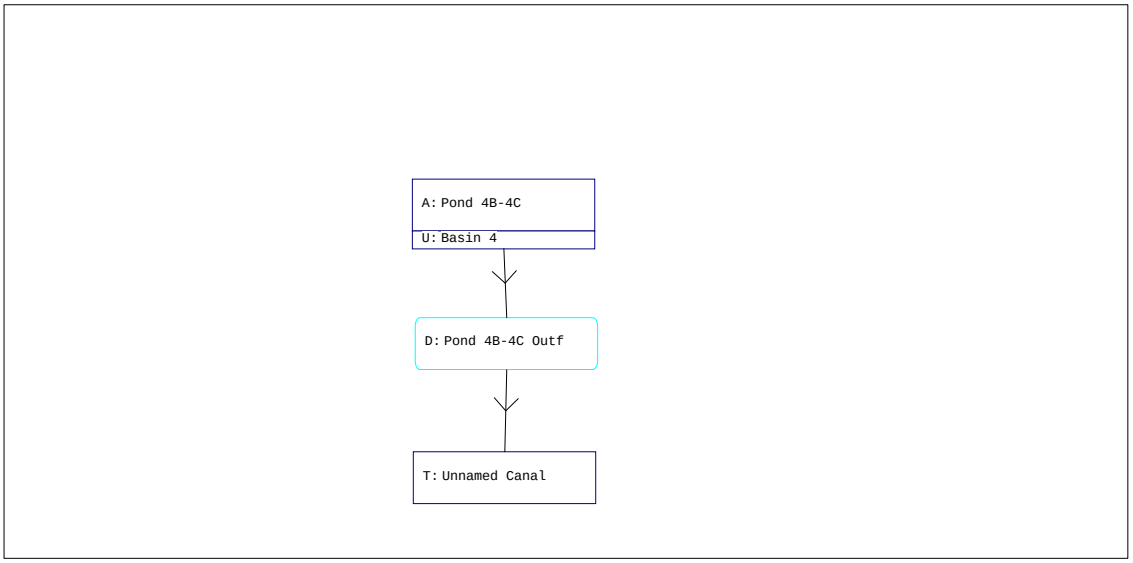
Boring PB-4BC:

Est. Ground Elevation (at boring location) =	24	feet
Subtract Estimated SHGT Depth = -1.25-0.5 =	1.75	feet
Estimated SHGT Elev. =	22.25	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



==========
==== Basins ====
==========

Name: Basin 4 Node: Pond 4B-4C Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 15.00
Area(ac): 35.230 Time Shift(hrs): 0.00
Curve Number: 90.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: Basin 4B Node: Pond 4B Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 15.00
Area(ac): 31.650 Time Shift(hrs): 0.00
Curve Number: 90.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ====
==========

Name: Pond 4B Base Flow(cfs): 0.000 Init Stage(ft): 22.250
Group: BASE Warn Stage(ft): 28.060
Type: Stage/Area

Stage(ft)	Area(ac)
22.250	2.0620
22.750	2.1330
23.750	2.2770
24.750	2.4230
25.750	2.5710
26.750	2.7220
27.380	2.8130

Name: Pond 4B-4C Base Flow(cfs): 0.000 Init Stage(ft): 22.250
Group: BASE Warn Stage(ft): 28.060
Type: Stage/Area

Stage(ft)	Area(ac)
22.250	3.2080
22.750	3.3370
23.750	3.5980
24.750	3.8640
25.750	4.1350
26.750	4.4100
27.380	4.5780

Name: Unnamed - 2 Base Flow(cfs): 0.000 Init Stage(ft): 21.810
Group: BASE Warn Stage(ft): 30.000
Type: Time/Stage

Outfall Ditch converted to NAVD

Time(hrs)	Stage(ft)
0.00	21.810
12.00	22.740
30.00	22.080

Name: Unnamed Canal Base Flow(cfs): 0.000 Init Stage(ft): 21.810
Group: BASE Warn Stage(ft): 30.000
Type: Time/Stage

Outfall Ditch converted to NAVD

Time(hrs)	Stage(ft)
0.00	21.810
12.00	22.740
30.00	22.080

==========
==== Drop Structures ====

```
================================================================================

        Name: Pond 4B Outf        From Node: Pond 4B           Length(ft): 135.00
       Group: BASE                  To Node: Unnamed - 2           Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                               Flow: Both
    Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
  Invert(ft): 18.750         18.480                       Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 4B Outf ***
                                                                              TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 4.00                       Invert(ft): 21.750
             Rise(in): 4.00                 Control Elev(ft): 22.250

*** Weir 2 of 3 for Drop Structure Pond 4B Outf ***
                                                                              TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 15.00                      Invert(ft): 23.500
             Rise(in): 10.00                Control Elev(ft): 23.500

*** Weir 3 of 3 for Drop Structure Pond 4B Outf ***
                                                                              TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 37.00                      Invert(ft): 29.000
             Rise(in): 24.00                Control Elev(ft): 29.000


--------------------------------------------------------------------------------------------------
        Name: Pond 4B-4C Outf     From Node: Pond 4B-4C         Length(ft): 135.00
       Group: BASE                  To Node: Unnamed Canal           Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                               Flow: Both
    Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
  Invert(ft): 18.750         18.480                       Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure Pond 4B-4C Outf ***
                                                                              TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 4.00                       Invert(ft): 21.750
             Rise(in): 4.00                 Control Elev(ft): 22.250

*** Weir 2 of 3 for Drop Structure Pond 4B-4C Outf ***
                                                                              TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 4.00                       Invert(ft): 23.130
             Rise(in): 6.00                 Control Elev(ft): 23.130

*** Weir 3 of 3 for Drop Structure Pond 4B-4C Outf ***
```

TABLE

```
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                    Weir Disc Coef: 3.200
           Geometry: Rectangular           Orifice Disc Coef: 0.600

           Span(in): 37.00                       Invert(ft): 23.630
           Rise(in): 24.00                 Control Elev(ft): 23.630
```

```
==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: Post 4B4C 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 4B4C - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: Post 25-72          Hydrology Sim: Post 4B4C 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 4B4C - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 4
            Group Name: BASE
            Simulation: Post 4B4C 25-72
             Node Name: Pond 4B-4C
            Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh323
          Peaking Fator: 323.0
    Spec Time Inc (min): 2.00
    Comp Time Inc (min): 2.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 72.00
                 Status: Onsite
     Time of Conc (min): 15.00
       Time Shift (hrs): 0.00
              Area (ac): 35.230
   Vol of Unit Hyd (in): 1.001
           Curve Number: 90.000
               DCIA (%): 0.000

         Time Max (hrs): 36.00
         Flow Max (cfs): 74.90
     Runoff Volume (in): 7.795
    Runoff Volume (ft3): 996841


--------------------------------------------------------------------------------

            Basin Name: Basin 4B
            Group Name: BASE
            Simulation: Post 4B4C 25-72
             Node Name: Pond 4B
            Basin Type: SCS Unit Hydrograph

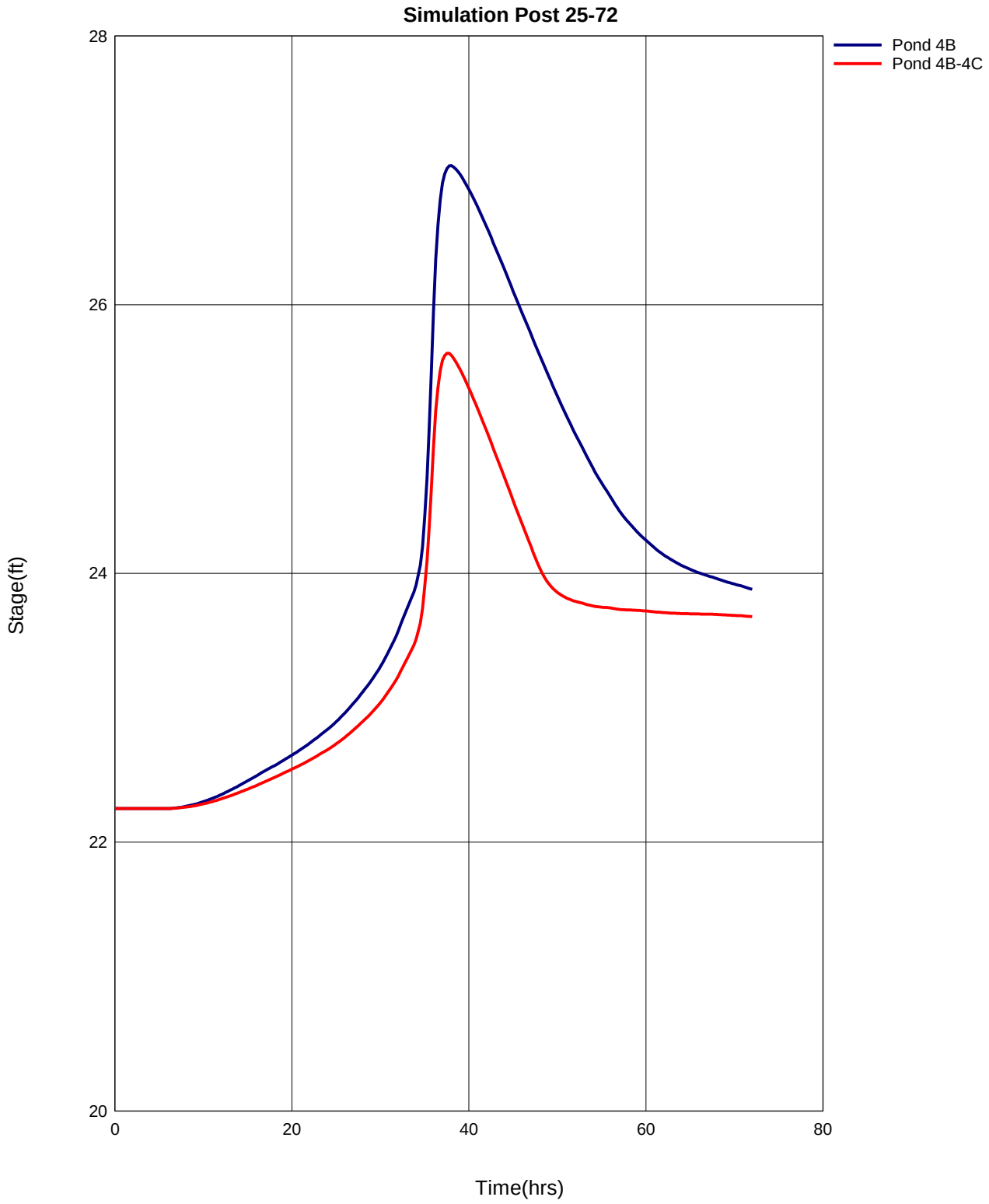
        Unit Hydrograph: Uh323
          Peaking Fator: 323.0
    Spec Time Inc (min): 2.00
    Comp Time Inc (min): 2.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 72.00
                 Status: Onsite
     Time of Conc (min): 15.00
       Time Shift (hrs): 0.00
              Area (ac): 31.650
   Vol of Unit Hyd (in): 1.000
           Curve Number: 90.000
               DCIA (%): 0.000

         Time Max (hrs): 36.00
         Flow Max (cfs): 67.29
     Runoff Volume (in): 7.795
    Runoff Volume (ft3): 895544
```

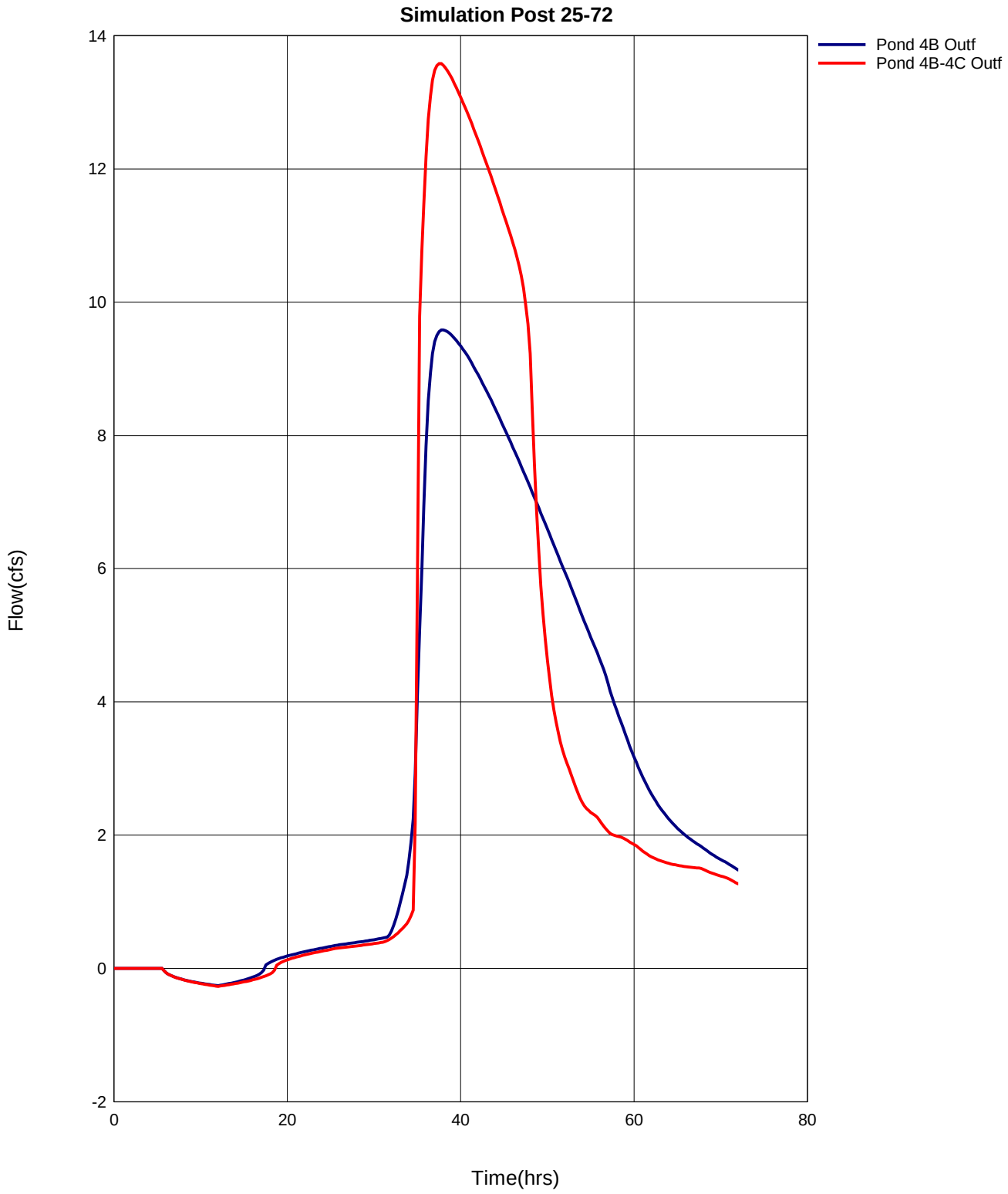
Pond 4B/4C - Option 1
Pond 4B - Option 2
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond 4B	BASE	Post 25-72	37.89	27.04	28.06	0.0050	120367	36.00	67.26	37.89	9.59
Pond 4B-4C	BASE	Post 25-72	37.64	25.64	28.06	0.0041	178822	36.00	74.87	37.64	13.59
Unnamed - 2	BASE	Post 25-72	12.00	22.74	30.00	0.0013	0	37.89	9.59	0.00	0.00
Unnamed Canal	BASE	Post 25-72	12.00	22.74	30.00	0.0013	0	37.64	13.59	0.00	0.00

Pond 4B/4C - Option 1
Pond 4B - Option 2
25 Yr, 72 Hr



Pond 4B/4C - Option 1
Pond 4B - Option 2
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 4D - Option 1 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 638+36.94 to Station 685+00
Basin Length = 4663.06 feet (measured from roll plot)
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & Other Roads			98	15.37	1507
Open Space - Good Condition (Perv R/W)		D	80	11.69	935
Water Management Area (Imperv.)			100	3.02	302
Water Management Area (Perv.)		D	80	3.05	244
			Totals =	33.14	2988

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{2{,}988}{33.14}$

$= \boxed{90}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 4D - Option 1 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.06 Ac
Total Drainage area =	33.14 Ac
2.5" runoff from impervious area =	2.10 Ac-Ft
1" runoff from drainage area =	2.76 Ac-Ft

*Proposed Impervious Area takes credit for existing pavement (5.309 ac.)
Treatment Volume = Greater of 2.50" over Impervious Area or 1.0" over drainage area

Required Treatment Volume (T.V.) = **2.76** **Ac-ft**
= **120295** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 4D):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
29.00	1.0	181,309	4.162	4.046	18.476	804,815
28.00	1.0	171,196	3.930	3.815	14.430	628,571
27.00	1.0	161,183	3.700	3.586	10.615	462,389
26.00	1.0	151,270	3.473	3.360	7.029	306,183
25.00	1.17	141,460	3.247	3.669	3.669	159,822
23.83	0.0	131,749	3.025	0.000	0.000	0.000

Overflow Weir Elevation (Top of storage volume) (Pond4D)

Elev.	Storage	Area
23.83	0.000	131,749
25.00	3.669	141,460

Elev. = 24.70 = 2.73 Ac-Ft 118842 Cu-Ft

Provided Treatment Volume (T.V.) = **2.728** **Ac-ft**
Treatment Depth = 0.87 ft

For Orifice Recovery Calculations (Pond4D)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in 24 hours.

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.25 Ac-Ft 54658 Cu-Ft

Elev.	Storage	Area
23.83	0.000	131,749
26.00	7.029	151,270

Elev. = 24.22 ft. provides 1.26 Ac-Ft
55028 Cu-Ft

From Geotechnical Information (10/13):

Boring PB-4D:

Est. Ground Elevation (at boring location) =	25.5	feet
Subtract Estimated SHGT Depth = -1.17- 0.5 =	1.67	feet
Estimated SHGT Elev. =	23.83	feet

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/26/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/26/2014

Basin: BASIN 4D - Option 2 - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 638+36.94 to Station 685+00
Basin Length = 4663.06 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710 & Other Roads			98	15.37	1507
Open Space - Good Condition (Perv R/W)		D	80	11.69	935
Water Management Area (Imperv.)			100	1.95	195
Water Management Area (Perv.)		D	80	2.37	190
			Totals =	31.39	2827

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{2{,}827}{31.39}$

$= \boxed{90}$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 4D - Option 2 PREPARED: LCS 2/26/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/26/2014

Wet Detention Online Pond Treatment Calculations:

Proposed impervious area =	10.06 Ac
Total Drainage area =	**31.39 Ac**
2.5" runoff from impervious area =	2.10 Ac-Ft
1" runoff from drainage area =	2.62 Ac-Ft

*Proposed Impervious Area takes credit for existing pavement (5.309 ac.)
Treatment Volume = Greater of 2.50" over Impervious Area or 1.0" over drainage area

Required Treatment Volume (T.V.) = **2.62** **Ac-ft**
= **113953** **ft^3**

Pond Storage Calculations (Wet Detention - Pond 4D):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
29.00	1.0	123,687	2.839	2.751	12.367	538,706.520
28.00	1.0	116,021	2.663	2.577	9.616	418,872.960
27.00	1.0	108,455	2.490	2.404	7.039	306,618.840
26.00	1.0	100,990	2.318	2.234	4.635	201,900.600
25.00	1.17	93,626	2.149	2.401	2.401	104,587.560
23.83	0.0	85,137	1.954	0.000	0.000	0.000

Overflow Weir Elevation (Top of storage volume) (Pond4D)

Elev.	Storage	Area
23.83	0.000	85,137
25.00	2.401	93,626

Elev. = 25.20 = 2.81 Ac-Ft 122466 Cu-Ft

Provided Treatment Volume (T.V.) = **2.811** Ac-ft
Treatment Depth = 1.37 ft

For Orifice Recovery Calculations (Pond4D)

Size the orifice to discharge no more than 0.5 inch of the required detention volume in

1/2" of the required detention volume = (0.5 in.* (Total DA - Water Area)/12in/ft)

1/2" runoff from drainage area = 1.07 Ac-Ft 46637 Cu-Ft

Elev.	Storage	Area
23.83	0.000	85,137
26.00	4.635	100,990

Elev. = 24.34 ft. provides 1.089 ac ft of volume
47451.29309 cu ft of volume

From Geotechnical Information (10/13):

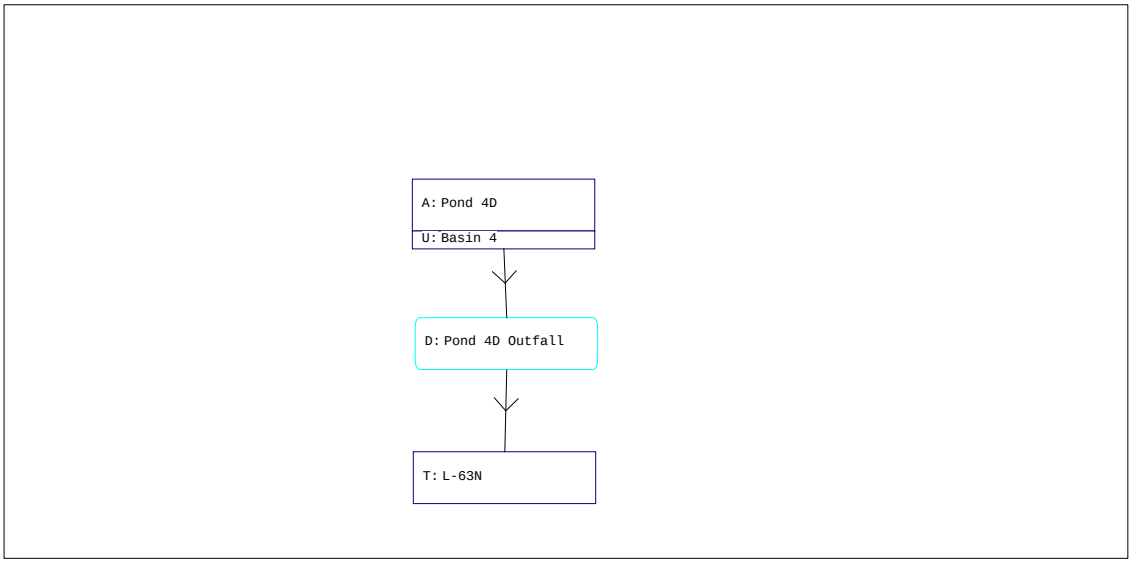
Boring PB-4D:

Est. Ground Elevation (at boring location) =	25.5	feet
Subtract Estimated SHGT Depth = -1.17-0.5 =	1.67	feet
Estimated SHGT Elev. =	23.83	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Basin 4-Opt 1           Node: Pond 4D-Opt 1          Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                 Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000             Time of Conc(min): 27.40
            Area(ac): 33.140               Time Shift(hrs): 0.00
        Curve Number: 91.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------------------------------
        Name: Basin 4-Opt 2           Node: Pond 4D-Opt 2          Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                 Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000             Time of Conc(min): 27.40
            Area(ac): 31.390               Time Shift(hrs): 0.00
        Curve Number: 91.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

     Name: L-63N-2            Base Flow(cfs): 0.000         Init Stage(ft): 17.830
    Group: BASE                                            Warn Stage(ft): 28.830
     Type: Time/Stage


     Time(hrs)       Stage(ft)
-------------- ---------------
          0.00          17.830
         14.00          17.930
         40.00          17.950
        100.00          17.930

--------------------------------------------------------------------------------
     Name: L-63N-3            Base Flow(cfs): 0.000         Init Stage(ft): 17.830
    Group: BASE                                            Warn Stage(ft): 28.830
     Type: Time/Stage


     Time(hrs)       Stage(ft)
-------------- ---------------
          0.00          17.830
         14.00          17.930
         40.00          17.950
        100.00          17.930

--------------------------------------------------------------------------------
     Name: Pond 4D-Opt 1       Base Flow(cfs): 0.000         Init Stage(ft): 23.830
    Group: BASE                                            Warn Stage(ft): 28.060
     Type: Stage/Area


     Stage(ft)        Area(ac)
-------------- ---------------
        23.830          3.0250
        25.000          3.2470
        26.000          3.4730
        27.000          3.7000
        28.000          3.9300
        29.000          4.1620

--------------------------------------------------------------------------------
     Name: Pond 4D-Opt 2       Base Flow(cfs): 0.000         Init Stage(ft): 23.830
    Group: BASE                                            Warn Stage(ft): 28.060
     Type: Stage/Area


     Stage(ft)        Area(ac)
-------------- ---------------
        23.830          1.9540
        25.000          2.1490
        26.000          2.3180
        27.000          2.4900
        28.000          2.6630
        29.000          2.8390

================================================================================
==== Drop Structures ===========================================================
================================================================================
```

```
        Name: Pond 4D-Opt 2 O     From Node: Pond 4D-Opt 2      Length(ft): 860.00
       Group: BASE                  To Node: L-63N-2               Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
    Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
    Span(in): 24.00          24.00                                Flow: Both
    Rise(in): 24.00          24.00                     Entrance Loss Coef: 0.500
  Invert(ft): 20.330         19.040                        Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                    Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 3 for Drop Structure Pond 4D-Opt 2 O ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 4.00                        Invert(ft): 23.330
             Rise(in): 4.00                 Control Elev(ft): 23.830

*** Weir 2 of 3 for Drop Structure Pond 4D-Opt 2 O ***
                                                                                TABLE
                Count: 2                      Bottom Clip(in): 0.000
                 Type: Vertical: Mavis           Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 24.00                       Invert(ft): 25.200
             Rise(in): 6.00                 Control Elev(ft): 25.200

*** Weir 3 of 3 for Drop Structure Pond 4D-Opt 2 O ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 79.00                       Invert(ft): 29.000
             Rise(in): 36.00                Control Elev(ft): 29.000


-------------------------------------------------------------------------------------------------
        Name: Pond 4D-Opt1 Ou     From Node: Pond 4D-Opt 1      Length(ft): 860.00
       Group: BASE                  To Node: L-63N-3               Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
    Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
    Span(in): 24.00          24.00                                Flow: Both
    Rise(in): 24.00          24.00                     Entrance Loss Coef: 0.500
  Invert(ft): 20.330         19.040                        Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                    Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 3 for Drop Structure Pond 4D-Opt1 Ou ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
                 Type: Horizontal                Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular             Orifice Disc Coef: 0.600

             Span(in): 4.00                        Invert(ft): 23.330
             Rise(in): 4.00                 Control Elev(ft): 23.830

*** Weir 2 of 3 for Drop Structure Pond 4D-Opt1 Ou ***
                                                                                TABLE
                Count: 2                      Bottom Clip(in): 0.000
                 Type: Vertical: Mavis           Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 24.00                       Invert(ft): 24.700
             Rise(in): 6.00                 Control Elev(ft): 24.700

*** Weir 3 of 3 for Drop Structure Pond 4D-Opt1 Ou ***
                                                                                TABLE
                Count: 1                      Bottom Clip(in): 0.000
```

```
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 79.00                       Invert(ft): 28.000
              Rise(in): 36.00                  Control Elev(ft): 28.000


==============================================================================================
==== Bridges =================================================================================
==============================================================================================

         Name:                     From Node:                        Flow: Both
        Group: BASE                  To Node:                   Run WSPRO: No

      XSEC TYPE            NAME         INV(ft)        STAT(ft)       SKEW(deg)           EXPAN         CONTRAC
           Exit                           0.000            0.00           0.000           0.500           0.000
    Full Valley                           0.000            0.00           0.000           0.500           0.000
       Approach                           0.000            0.00           0.000           0.500           0.000
        Roadway                           0.000            0.00           0.000

            Road Surface Material: Paved
    Road Embankment Top Width(ft): 0.00
     Road Unsubmerged Weir Q Coef: 0.000


RATING CURVE CONTROL
         TW(ft)       QMin(cfs)       QMax(cfs)       QInc(cfs)
--------------- --------------- --------------- ---------------
          0.000           0.000           0.000           0.000


==============================================================================================
==== Hydrology Simulations ===================================================================
==============================================================================================

         Name: Post 4D 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 4D - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00

----------------------------------------------------------------------------------------------------
         Name: Post 4D 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 4D - 5-1.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Flmod
    Rainfall Amount(in): 2.98

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           15.00

==============================================================================================
==== Routing Simulations =====================================================================
==============================================================================================

         Name: Post 25-72          Hydrology Sim: Post 4D 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 4D - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: Post 5-1            Hydrology Sim: Post 4D 5-1
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 4D - 5-1.I32

      Execute: No          Restart: No            Patch: No
  Alternative: No
```

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 3.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
0.500	5.000
3.000	5.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 4-Opt 1
            Group Name: BASE
            Simulation: Post 4D 25-72
             Node Name: Pond 4D-Opt 1
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 3.65
   Comp Time Inc (min): 3.65
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 27.40
      Time Shift (hrs): 0.00
            Area (ac): 33.140
  Vol of Unit Hyd (in): 1.001
          Curve Number: 91.000
              DCIA (%): 0.000

        Time Max (hrs): 36.05
        Flow Max (cfs): 64.25
    Runoff Volume (in): 7.916
   Runoff Volume (ft3): 952231


--------------------------------------------------------------------------------

            Basin Name: Basin 4-Opt 2
            Group Name: BASE
            Simulation: Post 4D 25-72
             Node Name: Pond 4D-Opt 2
            Basin Type: SCS Unit Hydrograph

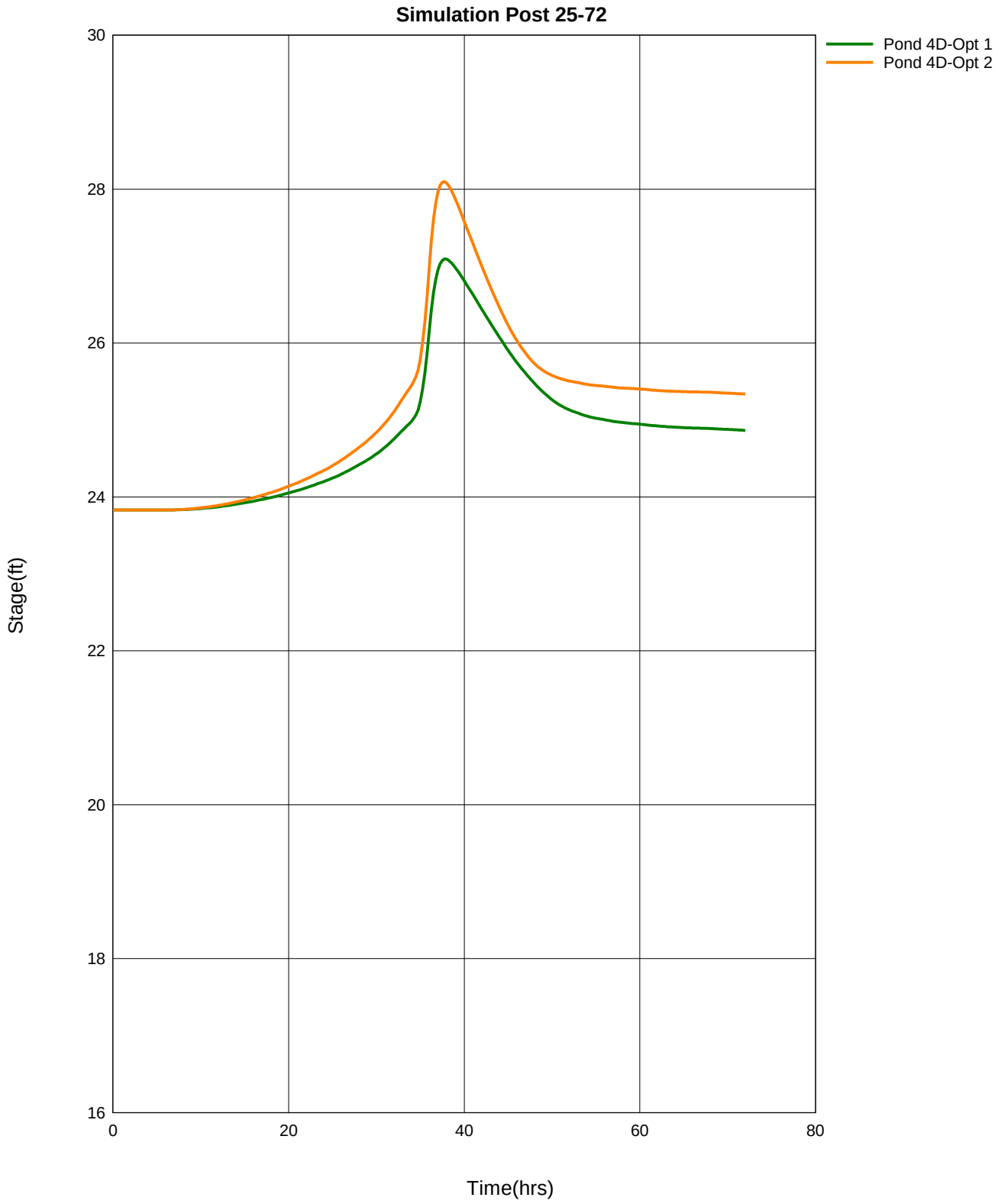
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 3.65
   Comp Time Inc (min): 3.65
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 27.40
      Time Shift (hrs): 0.00
            Area (ac): 31.390
  Vol of Unit Hyd (in): 1.000
          Curve Number: 91.000
              DCIA (%): 0.000

        Time Max (hrs): 36.05
        Flow Max (cfs): 60.85
    Runoff Volume (in): 7.916
   Runoff Volume (ft3): 901947
```

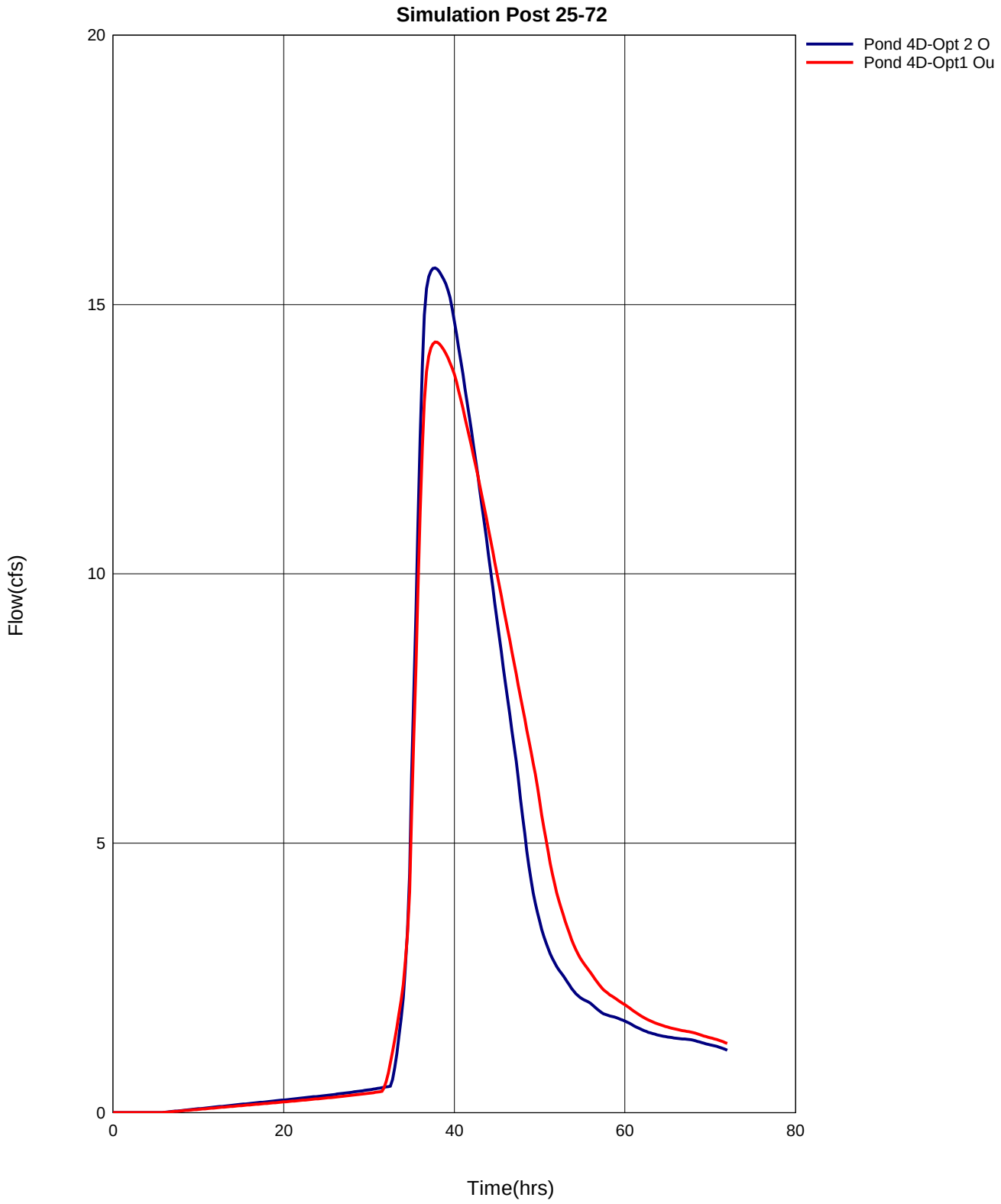
Pond 4D - Options 1 and 2
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
L-63N-2	BASE	Post 25-72	40.01	17.95	28.83	0.0001	0	37.69	15.68	0.00	0.00
L-63N-3	BASE	Post 25-72	40.01	17.95	28.83	0.0001	0	37.84	14.30	0.00	0.00
Pond 4D-Opt 1	BASE	Post 25-72	37.84	27.09	28.06	0.0039	162103	36.00	63.59	37.84	14.30
Pond 4D-Opt 2	BASE	Post 25-72	37.69	28.10	28.06	0.0050	116758	36.00	60.23	37.69	15.68

Pond 4D - Options 1 and 2
25 Yr, 72 Hr



Pond 4D - Options 1 and 2
25 Yr, 72 Hr



Basin 5

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/11/2014

LOCATION OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 5 - PRE DEVELOPMENT - R/W Only

Drainage Area: From Station 685+00 to Station 703+40

Basin Length = 1840 feet (measured from roll plot)

R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Existing Roadway			98	3.64	357
Open Space - Good Condition (Perv R/W)		D	80	4.85	388
Water Management (Existing - Largest Site (5C))		D	80	3.53	282
			Totals =	12.02	1027

CN (weighted) = (total product) / (total area) = 1,027 / 12.02

= 85

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

Time of Concentration

PROJECT: SR 710 BY: LCS DATE: 10/24/2013

LOCATION: Okeechobee County CHECKED: GSS DATE: 10/24/2013

EXISTING or DEVELOPED / UNDEVELOPED BASIN: 5

Tc or Tt (through subarea)

NOTES: Space for as many as two segments per flow type can be used for each worksheet. Include map, schematic, or description of flow segments.

L = 945 ft

Sheet flow (Applicable to Tc only)

Segment ID	AB	
1. Surface description (Table T-1, FDOT HB)	grass	
2. Mannings roughness coeff., n (Table T-1, FDOT HB) †	0.15	
3. Flow length, L (total L ≤ 100 ft.)	100	
4. Design storm 72 hr. rainfall, P_{72} (in.) ††	9.0	
5. Land slope, s (ft./ft.)	0.005	
6. Compute T_t in hr, $T_t = [0.007(nL)^{0.8}] / [P_{72hr}^{0.5} s^{0.4}]$ †††	0.17	
Subtotal		**0.17**

Shallow concentrated flow

Segment ID	BC	
7. Surface description (Paved or Unpaved)	Unpaved	
8. Flow length, L (ft)	845	
9. Watercourse slope, s (ft/ft)	0.001	
10. Average velocity, $V = k(S)^{0.5}$ (Equ. 5, FDOT HB)	0.39	
11. Compute Tt in hr, $T_t = L / (3600*V)$	0.60	
Subtotal		**0.60**

Channel Flow/Pipe Flow

Segment ID		
12. Type of Flow		
13. Diameter of Pipe (in.)		
14. Cross sectional flow area, A (assumed d=0.5 ft)		
15. Wetted perimeter, P_w		
16. Hydraulic radius, $r = A / P_w$, Compute r		
17. Channel slope, s (ft./ft.)		
18. Manning's roughness coeff., n		
19. $V = 1.486 (r)^{0.667}(s)^{0.50} / n$, Compute V ††††		
20. Flow length, L		
21. Tt = L / (3600*V)		
22. Subtotal		**0.00**

Time of Concentration, hr. (summation of subtotals)

Hours	0.77
Minutes	46.1
Total	**46.1**

Ref. FDOT Hydrology Handbook 2012.

† The use of Table T-1 is the "Overland Flow Manning's n Values" from FDOT Hydrology Handbook (2012).

†† The design storm of the basin is a 25-year storm frequency with a duration of 72-hours. Values found in SFWMD ERP Information Manual Volume IV, Surface Water Management Design Aids Figure C-8 (2012).

††† This equation is derived from the FDOT Hydrology HB overland flow equation which uses intensity instead of precipitation. The original equation mandates a trial and error process of a Type II rainfall distribution to find the correct intensity with the actual time of concentration. This derivative was created to bypass the trial and error process and is inclusive to both Type II and Type III rainfall distributions.

†††† Manning's Coefficient for Artifical Channels were found in FDOT Hydrology Handbook (2012) Table T-3. Manning's Coefficient for Natural Channels where calcuated with USGS Water-Supply Paper 2339.

Tcs-sABs-Firsts100sfeetsacrosssProposedsPondss5C;sBC-845'sfromsPondss5Cstosroadsidesditchstos Mosquitos Creek

RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/12/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 5A - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 685+30 to Station 703+50
Basin Length = 1820 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	4.03	395
Open Space - Good Condition (Perv R/W)		D	80	4.46	357
Water Management Area (Imperv.)			100	0.00	0
Water Management Area (Perv.)		D	80	2.62	210
			Totals =	11.12	962

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{962}{11.12}$

$= 87$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 5A PREPARED: LCS 2/12/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/24/2014

Dry Retention Online Pond Treatment Calculations:

Proposed impervious area =	4.03 Ac
Total Drainage area =	11.12 Ac
75% of 2.5" runoff from impervious area =	0.63 Ac-Ft
75% of 1" runoff from drainage area =	0.69 Ac-Ft

Treatment Volume = Greater of 75% of 2.50" times percent imperviousness or 75% of 1.0" over drainage area.

*Note: Dry Detention Volume Used If Nutrient Loading Can Be Eliminated

Required Treatment Volume (T.V.) =	**0.69**	**Ac-ft**
=	**30268**	**ft^3**

Pond Storage Calculations (Dry Retention - Pond 5A):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
27.00	1.0	59,949	1.376	1.317	3.597	156,685
26.00	1.0	54,765	1.257	1.198	2.280	99,317
25.00	1.0	49,643	1.140	1.082	1.082	47,132
24.00	0.0	44,650	1.025	0.000	0.000	0

SHWT El - 21.75'

Overflow Weir Elevation (Top of storage volume) (Pond5A)

Elev.	Storage	Area
24.00	0.000	44,650
25.00	1.082	49,643

Elev. = 24.65 = 0.70 Ac-Ft 30636 Cu-Ft

Provided Treatment Volume (T.V.) =	**0.703**	Ac-ft
Treatment Depth =	**0.650**	ft

From Geotechnical Information (10/13):

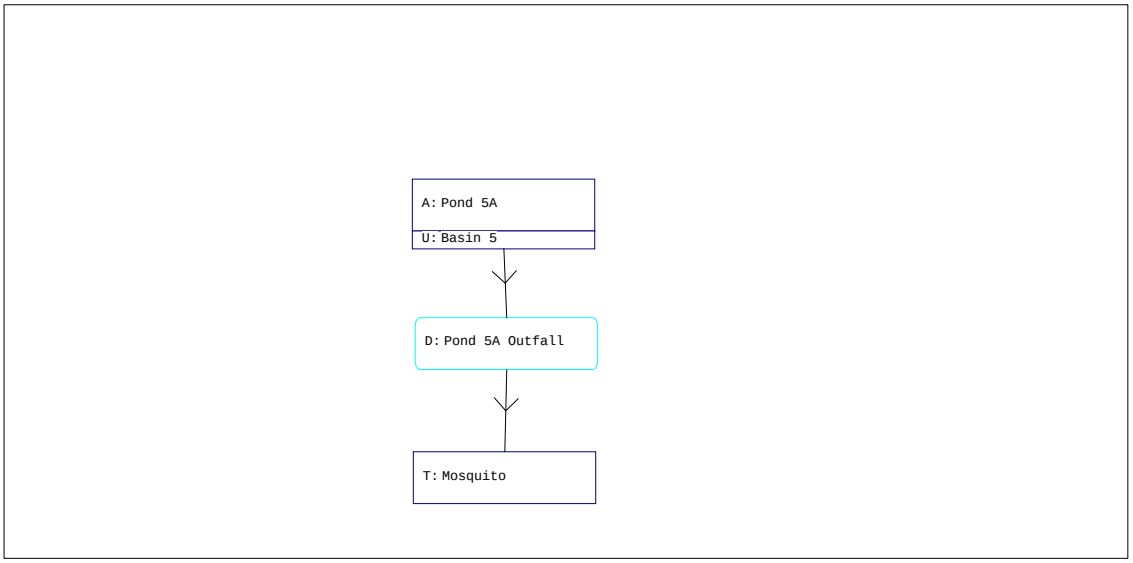
Boring PB-5A:

Est. Ground Elevation (at boring location) =	23	feet
Subtract SHGT Depth = -0.75-0.5 (variation) =	1.25	feet
Estimated SHGT Elev. =	21.75	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 5                 Node: Pond 5A               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 10.00
             Area(ac): 11.120                 Time Shift(hrs): 0.00
         Curve Number: 87.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Mosquito Creek      Base Flow(cfs): 0.000         Init Stage(ft): 18.190
     Group: BASE                                             Warn Stage(ft): 999.000
      Type: Time/Stage

From DHW Memo - NWL = 19.36' NGVD (18.19' NAVD) from SR 710 over Mosquito Creek Bridge Plans (91050-3509).

      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          18.190
        250.00          18.190

--------------------------------------------------------------------------------------------
      Name: Pond 5A             Base Flow(cfs): 0.000         Init Stage(ft): 24.000
     Group: BASE                                             Warn Stage(ft): 27.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         24.000          1.0250
         25.000          1.1400
         26.000          1.2570
         27.000          1.3760

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 5A Outfall     From Node: Pond 5A           Length(ft): 595.00
        Group: BASE                  To Node: Mosquito Creek         Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                               Flow: Both
    Rise(in): 18.00          18.00                    Entrance Loss Coef: 0.500
  Invert(ft): 19.450         18.260                       Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure Pond 5A Outfall ***
                                                                          TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                  Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 37.00                      Invert(ft): 24.650
              Rise(in): 24.00                 Control Elev(ft): 24.650


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 5A 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 5A - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00
```

```
================================================================================
==== Routing Simulations ======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 5A 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 5A - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 5
            Group Name: BASE
            Simulation: Post 5A 25-72
             Node Name: Pond 5A
            Basin Type: SCS Unit Hydrograph

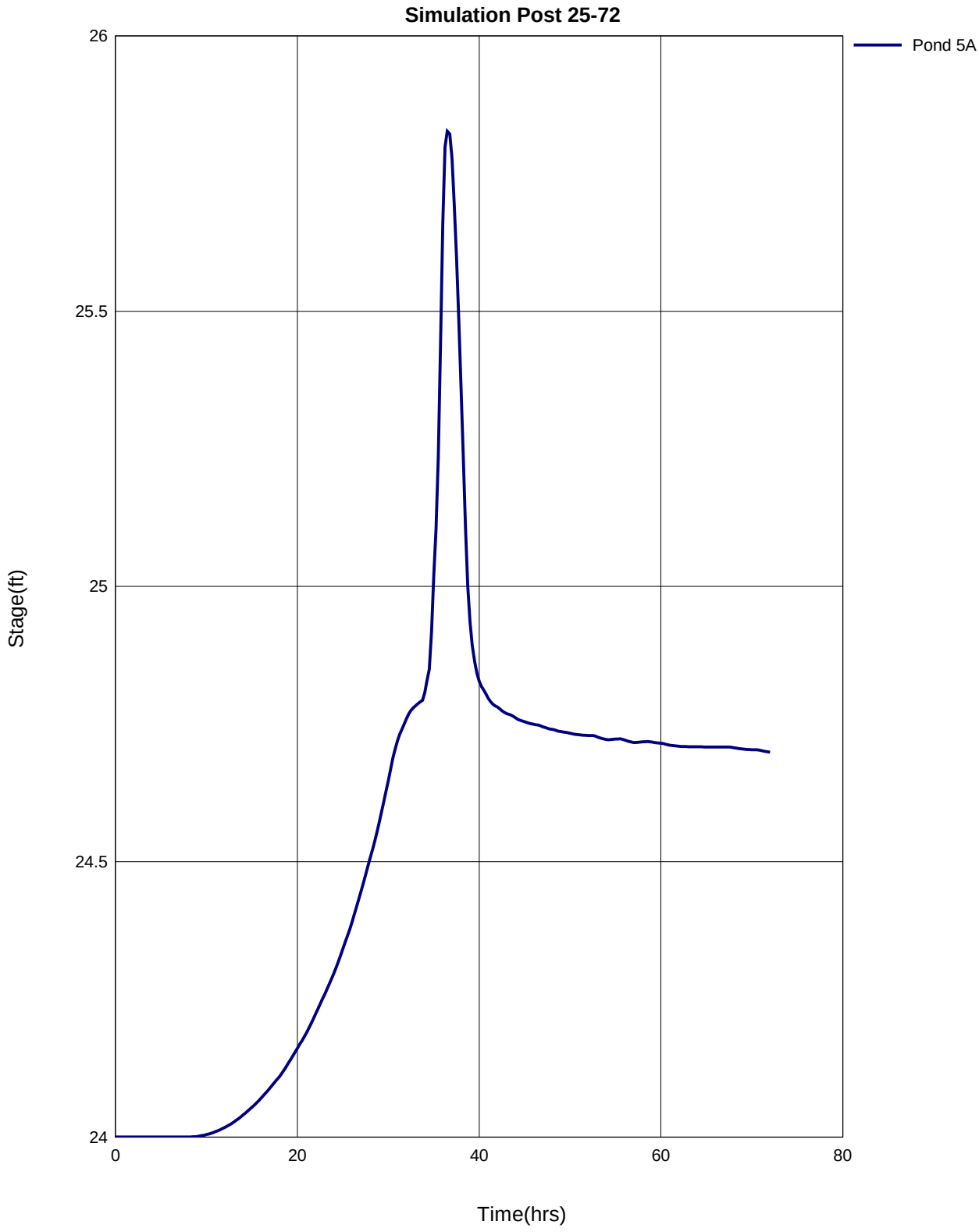
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 1.33
   Comp Time Inc (min): 1.33
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 10.00
      Time Shift (hrs): 0.00
            Area (ac): 11.120
  Vol of Unit Hyd (in): 1.001
          Curve Number: 87.000
              DCIA (%): 0.000

        Time Max (hrs): 36.00
        Flow Max (cfs): 23.70
    Runoff Volume (in): 7.429
   Runoff Volume (ft3): 299878
```

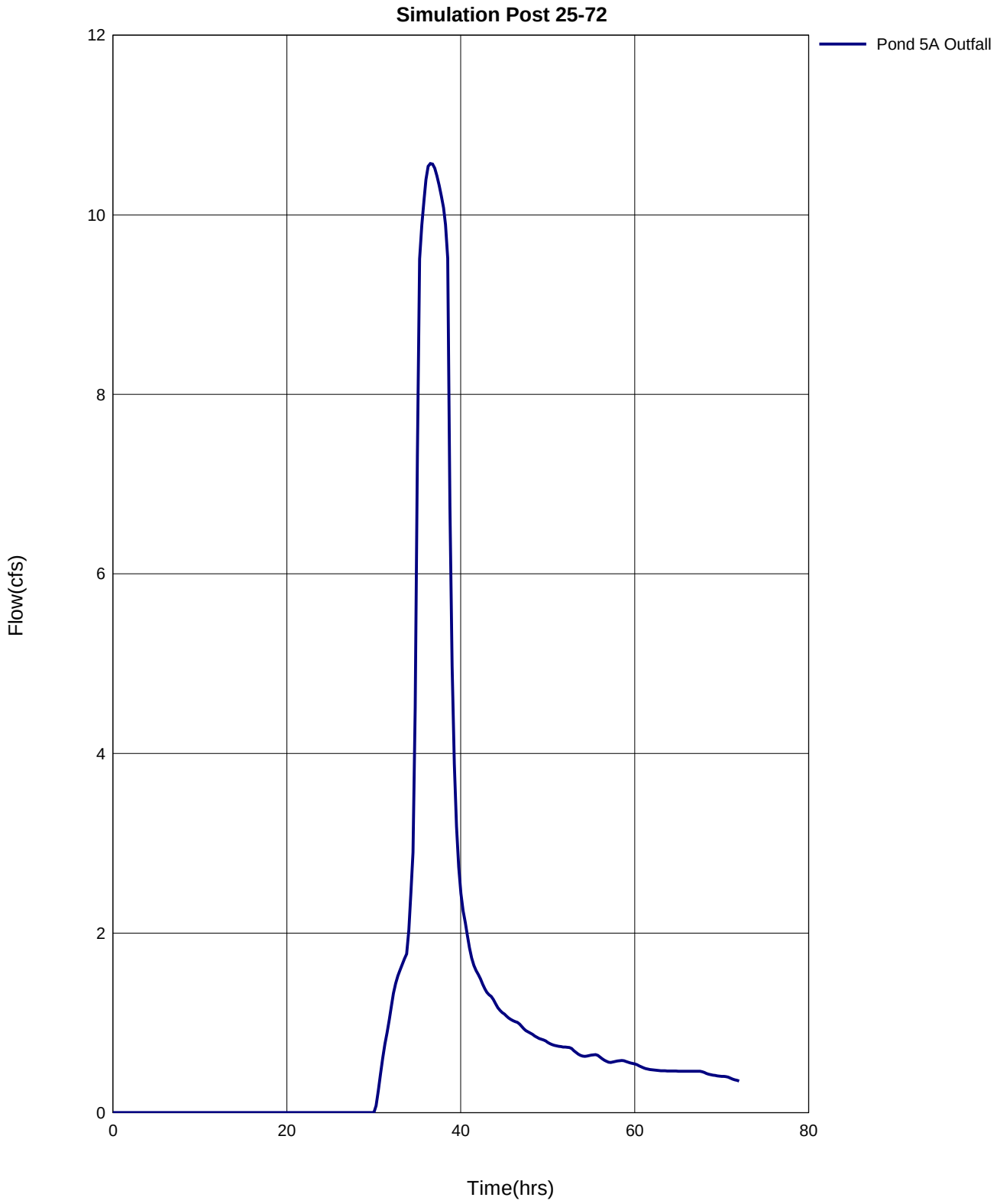
Pond 5A
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Mosquito Creek	BASE	Post 25-72	0.00	18.19	999.00	0.0000	0	36.54	10.57	0.00	0.00
Pond 5A	BASE	Post 25-72	36.54	25.83	27.00	0.0050	53874	36.00	23.68	36.54	10.57

Pond 5A
25 Yr, 72 Hr



Pond 5A
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/12/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 5B - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 685+30 to Station 703+50
Basin Length = 1820 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	4.03	395
Open Space - Good Condition (Perv R/W)		D	80	4.46	357
Water Management Area (Imperv.)			100	0.00	0
Water Management Area (Perv.)		D	80	2.53	203
			Totals =	11.03	955

CN (weighted) = $\frac{\text{(total product)}}{\text{(total area)}} = \frac{955}{11.03}$

$= 87$

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 5B PREPARED: LCS 2/12/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/24/2014

Dry Retention Online Pond Treatment Calculations:

Proposed impervious area =	4.03 Ac
Total Drainage area =	**11.03 Ac**
75 % of 2.5" runoff from impervious area =	0.63 Ac-Ft
75% of 1" runoff from drainage area =	0.69 Ac-Ft

Treatment Volume = Greater of 75% of 2.50" times percent imperviousness or 75% of 1.0" over drainage area.

*Note: Dry Detention Volume Used If Nutrient Loading Can Be Eliminated

Required Treatment Volume (T.V.) = **0.69** **Ac-ft**
= **30022** **ft^3**

Pond Storage Calculations (Dry Retention - Pond 5B):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
27.00	1.0	53,651	1.232	1.174	3.185	138,739
26.00	1.0	48,668	1.117	1.061	2.011	87,599
25.00	1.0	43,786	1.005	0.950	0.950	41,382
24.00	0.0	39,004	0.895	0.000	0.000	0

SHGT El. = 22.0'

Overflow Weir Elevation (Top of storage volume) (Pond5B)

Elev.	Storage	Area
24.00	0.000	43,786
25.00	0.950	48,668

Elev. = 24.73 = 0.69 Ac-Ft 30209 Cu-Ft

Provided Treatment Volume (T.V.) =	**0.69**	Ac-ft
Treatment Depth =	**0.73**	ft

From Geotechnical Information (10/13):

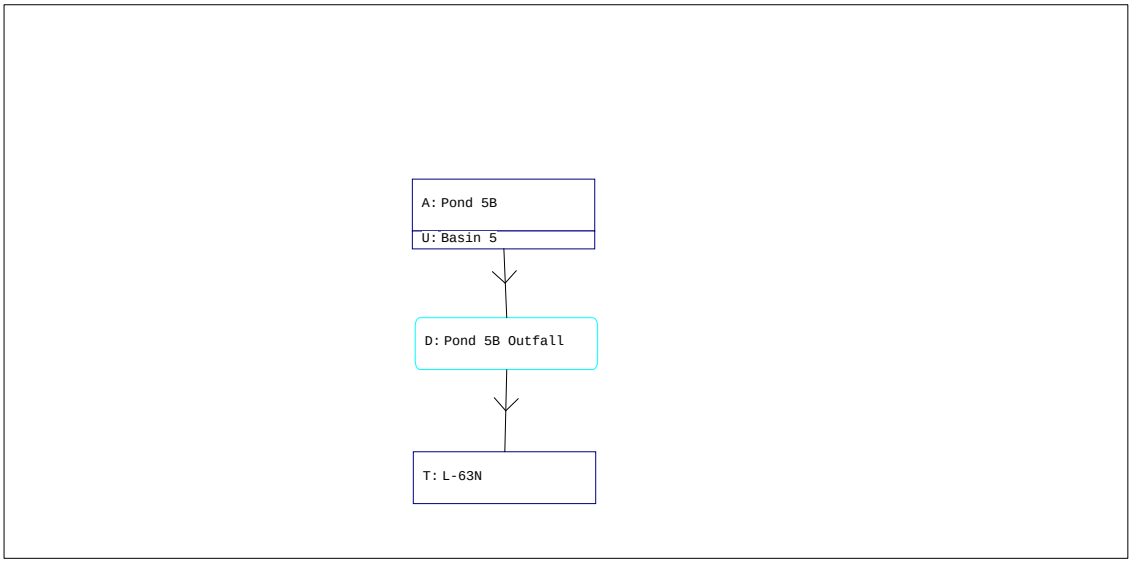
Boring PB-5B:

Est. Ground Elev. (at boring location) =	23	feet
Subtract SHGT Depth = -0.5-0.5 (variation)=	1	feet
Estimated SHGT Elev. =	22	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 5                 Node: Pond 5B               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 10.00
             Area(ac): 11.030                Time Shift(hrs): 0.00
         Curve Number: 87.00            Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: L-63N              Base Flow(cfs): 0.000          Init Stage(ft): 17.830
     Group: BASE                                             Warn Stage(ft): 28.830
      Type: Time/Stage

From Bridge Plans for SR 70 over L-63N Canal: NHW in L-63N Canal = 19.0' NGVD = 17.83' NAVD

      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          17.830
         14.00          17.930
         40.00          17.950
        100.00          17.930

--------------------------------------------------------------------------------------------
      Name: Pond 5B            Base Flow(cfs): 0.000          Init Stage(ft): 24.000
     Group: BASE                                             Warn Stage(ft): 27.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         24.000          0.8950
         25.000          1.0050
         26.000          1.1170
         27.000          1.2320

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 5B Outfall     From Node: Pond 5B            Length(ft): 125.00
        Group: BASE                  To Node: L-63N                 Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                             Flow: Both
     Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
   Invert(ft): 19.730         19.480                      Exit Loss Coef: 1.000
  Manning's N: 0.012000       0.012000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure Pond 5B Outfall ***
                                                                          TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 37.00                       Invert(ft): 24.730
              Rise(in): 24.00                  Control Elev(ft): 24.730


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 5B 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 5B - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
```

72.000	15.00

==== Routing Simulations ====

Name: Post 25-72 Hydrology Sim: Post 5B 25-72
Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 5B - 25-72.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 72.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
10.000	15.000
72.000	15.000

Group	Run
BASE	Yes

```
            Basin Name: Basin 5
            Group Name: BASE
            Simulation: Post 5B 25-72
             Node Name: Pond 5B
            Basin Type: SCS Unit Hydrograph

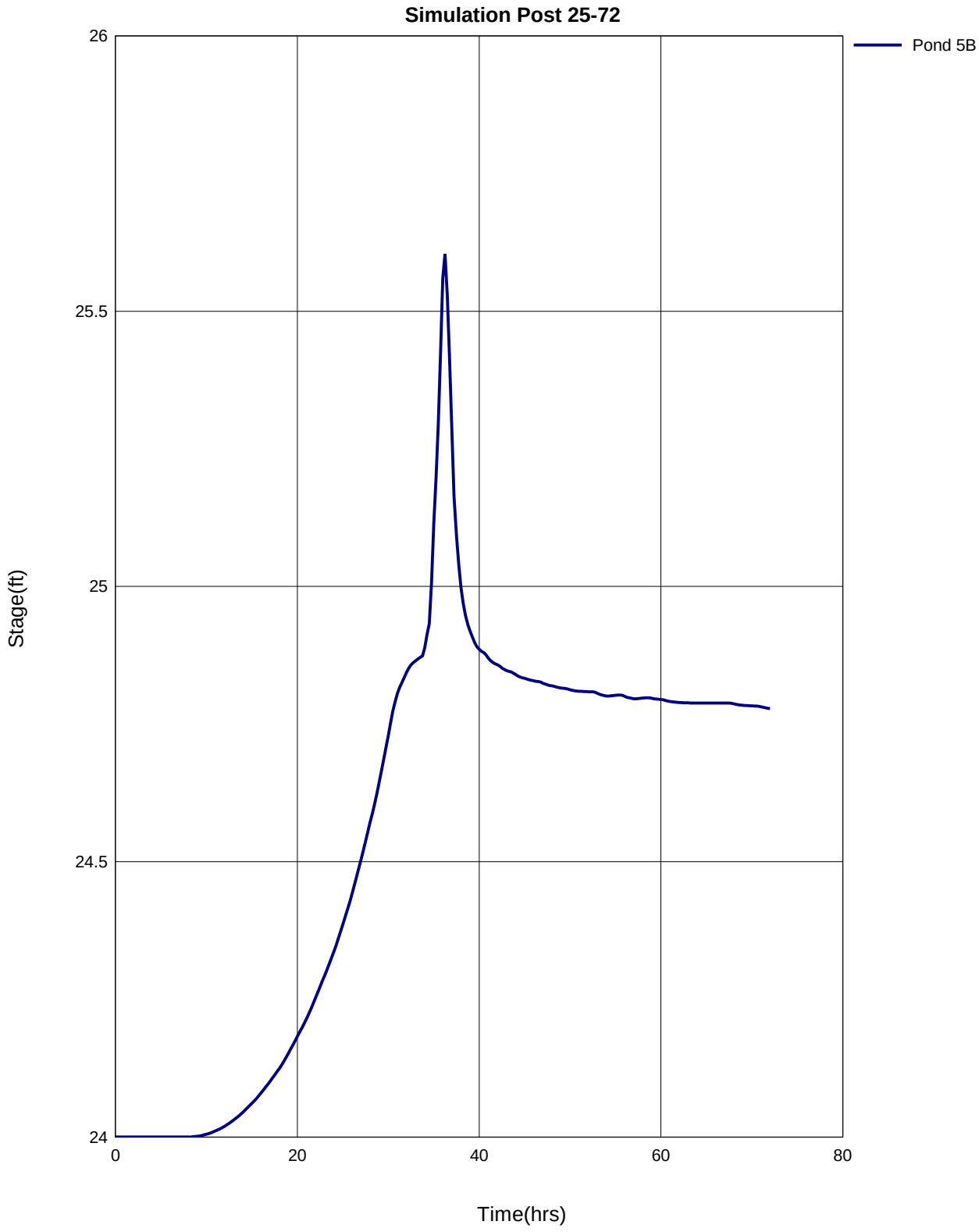
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 1.33
   Comp Time Inc (min): 1.33
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 10.00
      Time Shift (hrs): 0.00
            Area (ac): 11.030
  Vol of Unit Hyd (in): 1.001
          Curve Number: 87.000
              DCIA (%): 0.000

        Time Max (hrs): 36.00
        Flow Max (cfs): 23.50
    Runoff Volume (in): 7.429
   Runoff Volume (ft3): 297451
```

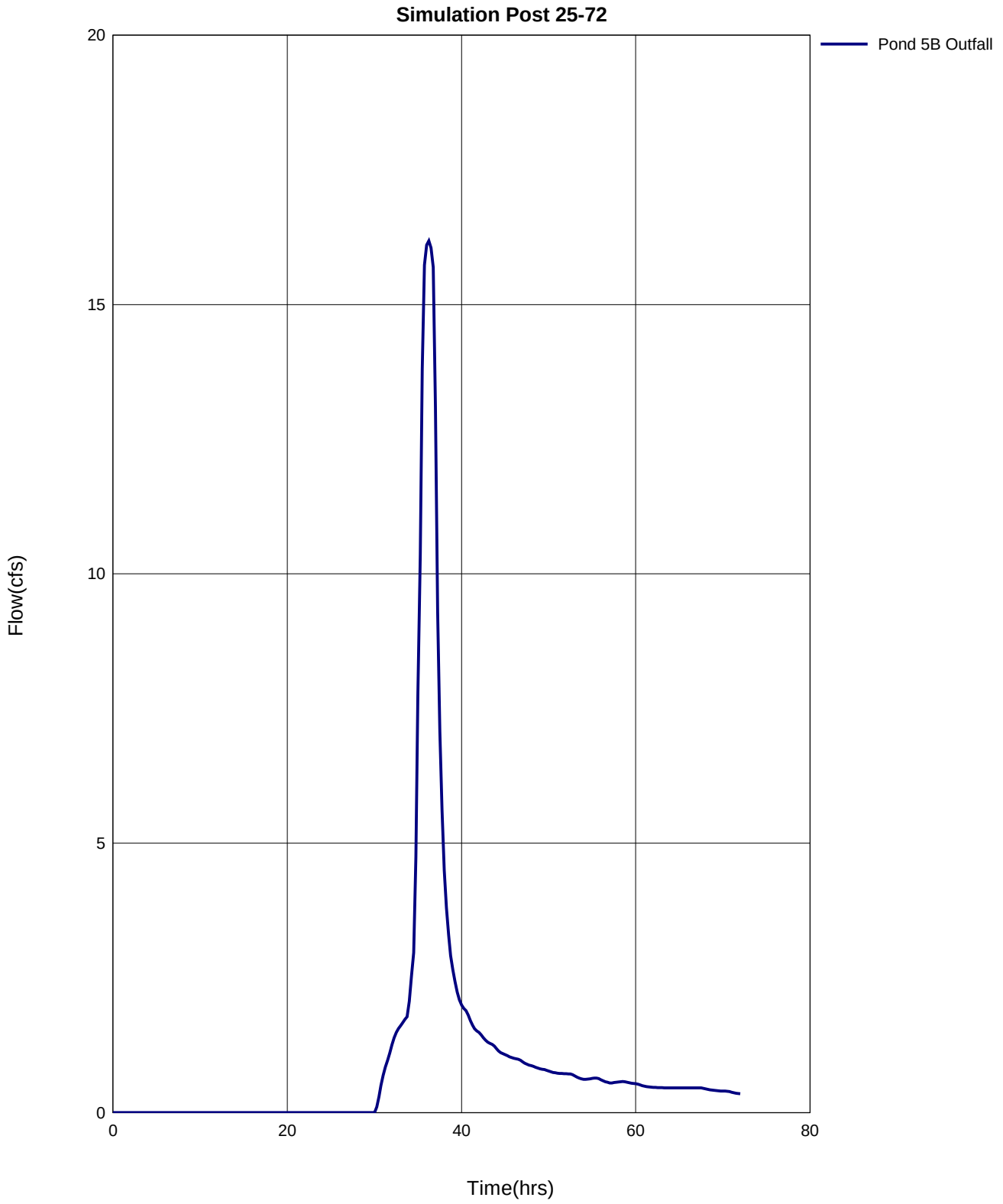
Pond 5B
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
L-63N	BASE	Post 25-72	40.00	17.95	28.83	0.0001	0	36.18	16.19	0.00	0.00
Pond 5B	BASE	Post 25-72	36.18	25.61	27.00	0.0050	46762	36.00	23.48	36.18	16.19

Pond 5B
25 Yr, 72 Hr



Pond 5B
25 Yr, 72 Hr



RUNOFF CURVE NUMBER CALCULATIONS

PROJECT: SR 710 PREPARED: LCS DATE: 2/12/2014

LOCATION: OKEECHOBEE CO., FL CHECKED: GS DATE: 2/24/2014

Basin: BASIN 5C - POST DEVELOPMENT - R/W Only

Drainage Area: From Station 685+30 to Station 703+50
Basin Length = 1820 feet
R/W Width = 160 feet

1. Runoff curve number

Cover description	Soil name	Hydrologic group	CN	Area (Acre)	CN x Area
Pavement - Proposed SR 710			98	4.03	395
Open Space - Good Condition (Perv R/W)		D	80	4.46	357
Water Management Area (Imperv.)			100	0.00	0
Water Management Area (Perv.)		D	80	3.53	282
			Totals =	12.02	1034

CN (weighted) = (total product) / (total area) = 1,034 / 12.02

= 86

Note: Assumed Type D Soil as soil types were predominantly Types B/D & C/D

TREATMENT VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: SR 710 - Pond 5C PREPARED: LCS 2/12/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GS 2/24/2014

Dry Retention Online Pond Treatment Calculations:

Proposed impervious area =	4.03 Ac
Total Drainage area =	**12.02 Ac**
75% of 2.5" runoff from impervious area =	0.63 Ac-Ft
75% of 1" runoff from drainage area =	0.75 Ac-Ft

Treatment Volume = Greater of 75% of 2.50" times percent imperviousness or 75% of 1.0" over drainage area.

*Note: Dry Detention Volume Used If Nutrient Loading Can Be Eliminated

Required Treatment Volume (T.V.) = **0.75** **Ac-ft**

= **32729** **ft^3**

Pond Storage Calculations (Dry Retention - Pond 5C):

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft
27.00	1.0	97,339	2.235	2.165	6.091	265,324
26.00	1.0	91,300	2.096	2.029	3.926	171,017
25.00	1.0	85,452	1.962	1.897	1.897	82,633
24.00	0.0	79,794	1.832	0.000	0.000	0

SHGT El = 22.5

Overflow Weir Elevation (Top of storage volume) (Pond5C)

Elev.	Storage	Area
24.00	0.000	79,794
25.00	1.897	85,452

Elev. = 24.40 = 0.76 Ac-Ft 33053 Cu-Ft

Provided Treatment Volume (T.V.) = **0.759** Ac-ft

Treatment Depth = 0.40 ft

From Geotechnical Information (10/13):

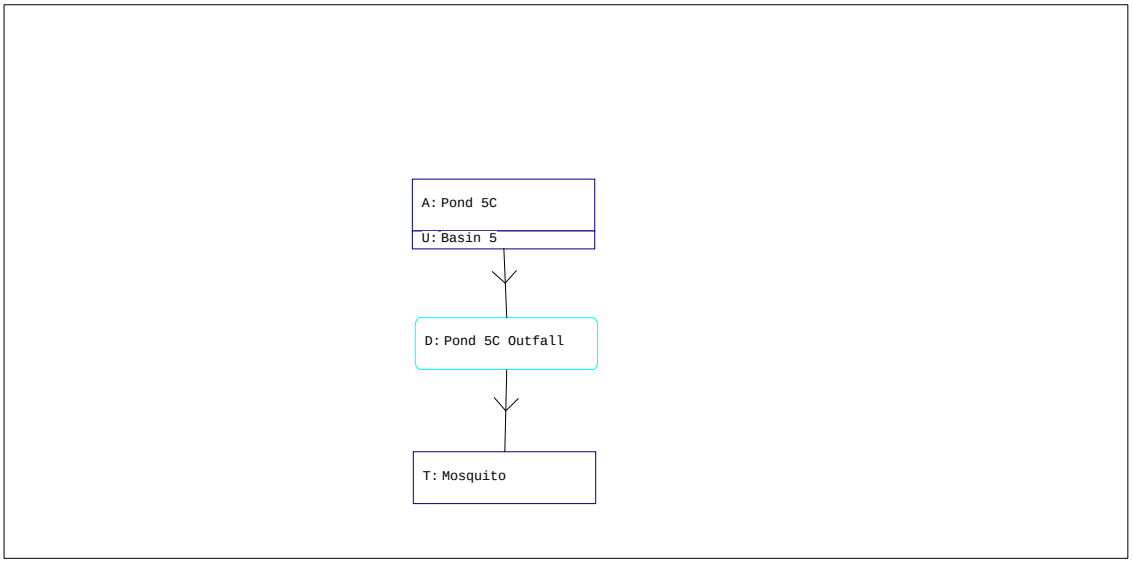
Boring PB-5C:

Est. Ground Elevation (at boring location) =	24	feet
Subtract SHGT Depth = -1.0-0.5 (variation)=	1.5	feet
Estimated SHGT Elev. =	22.5	feet

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



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================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 5                 Node: Pond 5C               Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 10.00
             Area(ac): 12.020                 Time Shift(hrs): 0.00
         Curve Number: 86.00             Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00


================================================================================
==== Nodes =====================================================================
================================================================================

      Name: Mosquito Creek      Base Flow(cfs): 0.000         Init Stage(ft): 18.190
     Group: BASE                                             Warn Stage(ft): 999.000
      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
          0.00          18.190
        250.00          18.190

--------------------------------------------------------------------------------------------
      Name: Pond 5C             Base Flow(cfs): 0.000         Init Stage(ft): 24.000
     Group: BASE                                             Warn Stage(ft): 26.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         24.000          1.8320
         25.000          1.9620
         26.000          2.0960
         27.000          2.2350

================================================================================
==== Drop Structures ===========================================================
================================================================================

         Name: Pond 5C Outfall     From Node: Pond 5C           Length(ft): 400.00
        Group: BASE                  To Node: Mosquito Creek         Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
    Span(in): 18.00          18.00                                Flow: Both
    Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
  Invert(ft): 19.400         18.600                      Exit Loss Coef: 1.000
 Manning's N: 0.012000       0.012000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure Pond 5C Outfall ***
                                                                          TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                  Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 37.00                      Invert(ft): 24.400
              Rise(in): 24.00                 Control Elev(ft): 24.400


================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: Post 5C 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Post 5C - 25-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.00
```

```
================================================================================
==== Routing Simulations ======================================================
================================================================================

         Name: Post 25-72          Hydrology Sim: Post 5C 25-72
     Filename: T:\00809.00\zTBG\drainage\ICPR\Pond 5C - 25-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                    End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
10.000          15.000
72.000          15.000

Group           Run
--------------- -----
BASE            Yes
```

```
            Basin Name: Basin 5
            Group Name: BASE
            Simulation: Post 5C 25-72
             Node Name: Pond 5C
            Basin Type: SCS Unit Hydrograph

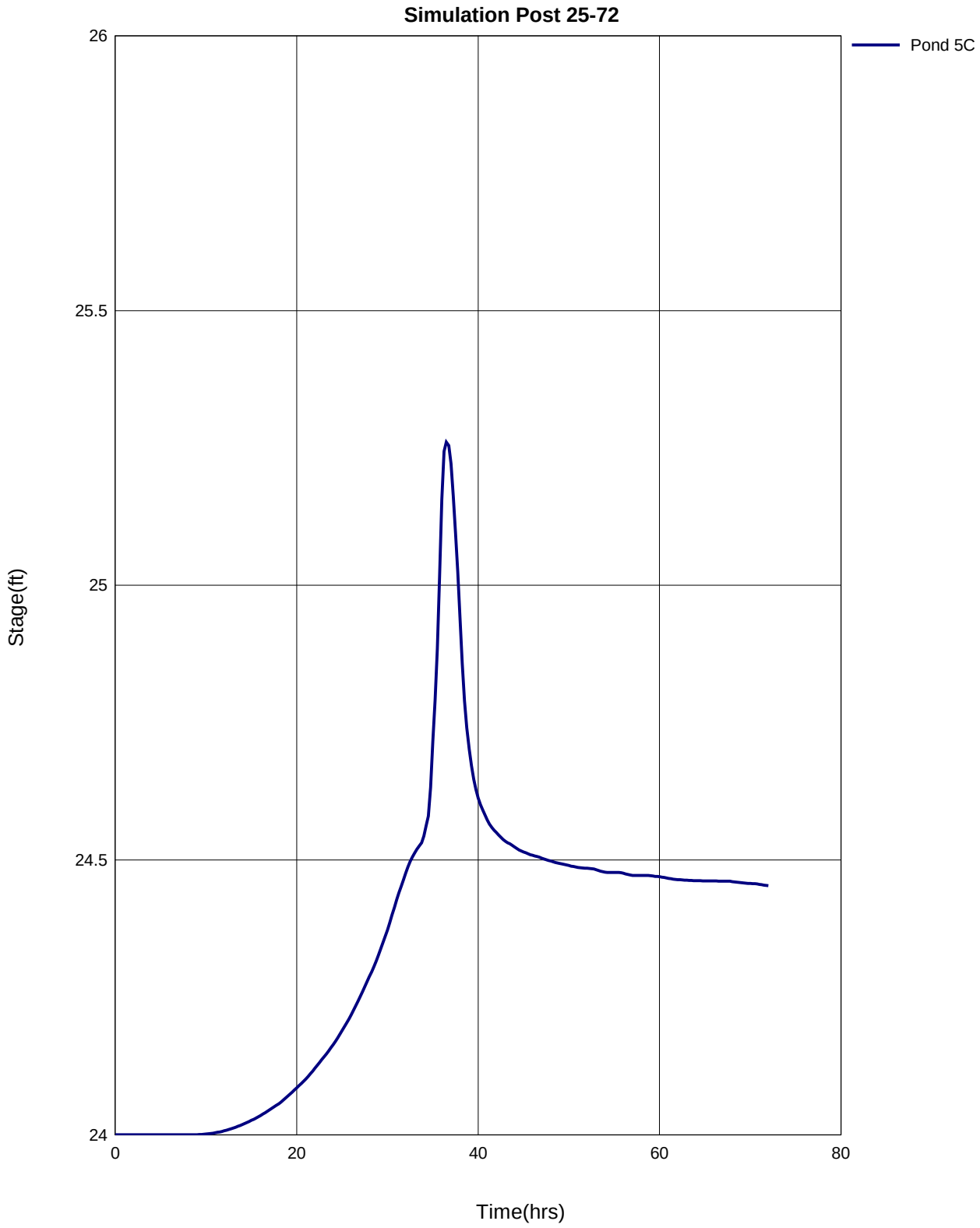
       Unit Hydrograph: Uh323
         Peaking Fator: 323.0
   Spec Time Inc (min): 1.33
   Comp Time Inc (min): 1.33
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 72.00
                Status: Onsite
    Time of Conc (min): 10.00
      Time Shift (hrs): 0.00
            Area (ac): 12.020
  Vol of Unit Hyd (in): 1.001
          Curve Number: 86.000
              DCIA (%): 0.000

        Time Max (hrs): 36.00
        Flow Max (cfs): 25.38
    Runoff Volume (in): 7.307
   Runoff Volume (ft3): 318817
```

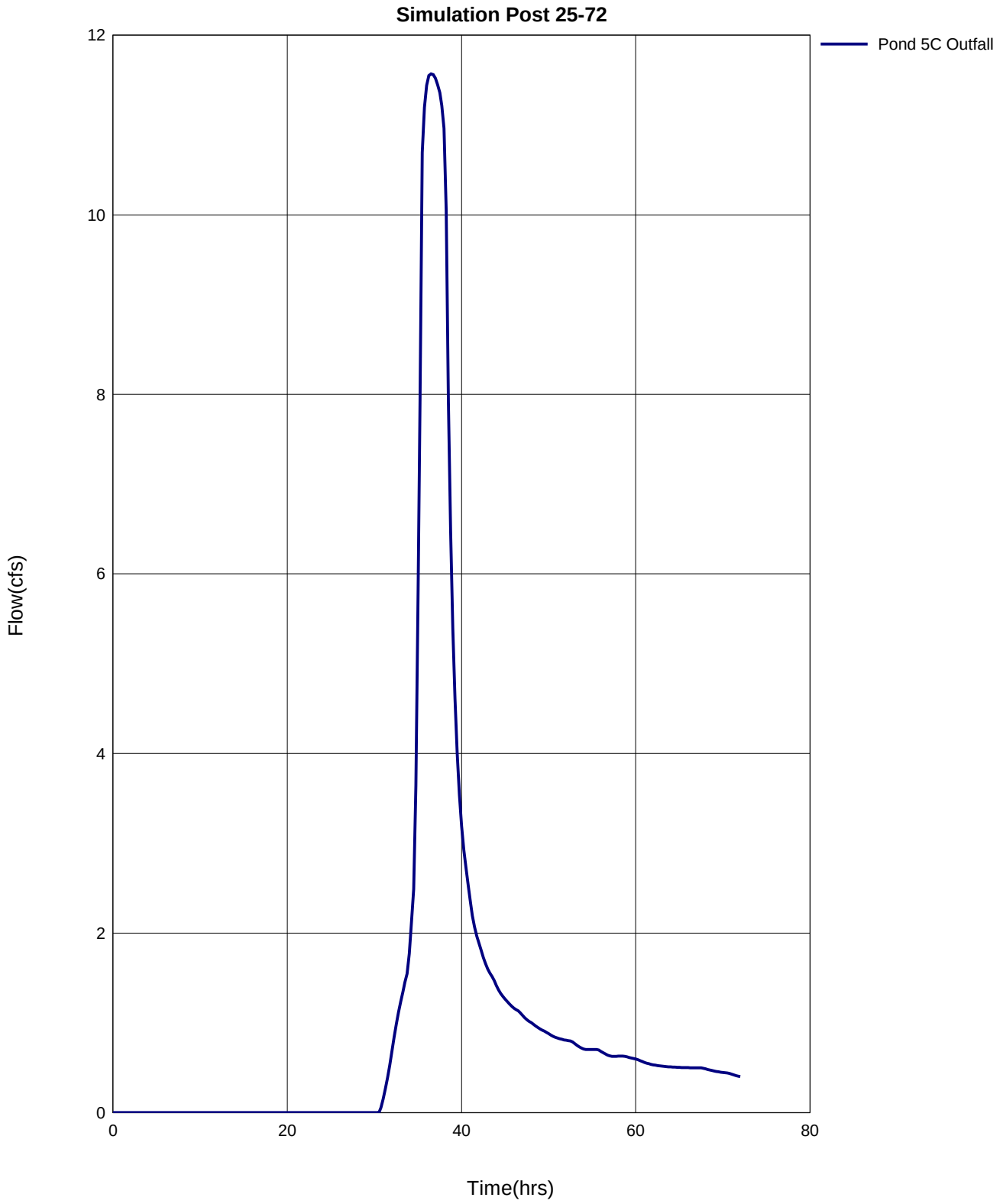
Pond 5C
25 Yr, 72 Hr

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Mosquito Creek	BASE	Post 25-72	0.00	18.19	999.00	0.0000	0	36.49	11.57	0.00	0.00
Pond 5C	BASE	Post 25-72	36.49	25.26	26.00	0.0050	86985	36.00	25.36	36.49	11.57

Pond 5C
25 Yr, 72 Hr



Pond 5C
25 Yr, 72 Hr



Preliminary Storm Drain Tabulations

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND1** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / LS	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
CL710			**S-1**			0.67	0.67	0.64										21.67	21.52	0.15		18.00	0.144	2.44		ZONE: 8
				P-4	102.00	0.10	0.10	0.02	10.00	0.70	6.58	0.66	0.00	**4.32**	0.00	23.85	**2.18**	21.24	21.09		1		0.147		4.43	FREQ. (Yrs): 3
502+47	51.00	Lt.	S-2			0.00	0.00	0.00					0.00					19.74	19.59	0.15		18.00	0.150	2.51		MANNINGS n: 0.0120
CL710			**S-2**			0.53	1.20	0.50										21.52	21.22	0.31		24.00	0.101	2.48		TAILW EL (ft): 19.64
				P-4	302.58	0.25	0.35	0.05	10.70	2.04	6.43	1.21	0.00	**7.78**	0.00	23.85	**2.33**	21.20	20.89		1		0.102		7.88	
502+47	51.00	Rt.	S-4			0.00	0.00	0.00					0.00					19.20	18.89	0.31		24.00	0.102	2.51		
CL710			**S-3**			0.43	0.43	0.41										21.98	21.83	0.15		18.00	0.147	2.66		
				P-3	102.02	0.11	0.11	0.02	10.00	0.64	6.58	0.43	0.00	**2.83**	0.00	25.22	**3.23**	22.61	22.46		1		0.147		4.43	
505+47	51.01	Lt.	S-4			0.00	0.00	0.00					0.00					21.11	20.96	0.15		18.00	0.150	2.51		
CL710			**S-4**			0.40	2.03	0.38										21.22	20.99	0.23		30.00	0.078	2.52		
				P-3	293.36	0.15	0.61	0.03	12.73	1.94	6.03	2.05	0.00	**12.38**	0.00	25.22	**4.00**	21.39	20.99		1		0.136		16.49	
505+47	51.01	Rt.	S-5			0.00	0.00	0.00					0.00					18.89	18.49	0.40		30.00	0.076	3.36		
CL710			**S-5**			0.00	2.03	0.00										20.65	20.59	0.06		30.00	0.070	2.39		
				MH-7	86.50	0.00	0.61	0.00	14.67	0.00	5.72	2.05	0.00	**11.72**	0.00	26.61	**5.96**	20.99	20.59		1		0.462		30.48	
508+36.72	45.50	Rt.	POND1			0.00	0.00	0.00					0.00					18.49	18.09	0.40		30.00	0.076	6.21		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND2** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / L / S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / PHYS	ACTUAL VEL. / VEL. / (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
CL710			**S-200**			0.34	0.65	0.32										23.76	23.65	0.11		24.00	0.029	1.34		ZONE: 8
				P-3	372.82	0.08	0.20	0.02	10.85	3.11	6.39	0.66	0.00	**4.21**	0.00	25.63	**1.87**	21.14	20.76		1		0.102		7.86	FREQ. (Yrs): 3
512+30	51.00	Lt.	S-202			0.00	0.00	0.00					0.00					19.14	18.76	0.38		24.00	0.102	2.50		MANNINGS n: 0.0120
CL710			**S-201**			0.31	0.31	0.29										23.79	23.76	0.03		18.00	0.034	1.18		
				P-3	102.00	0.12	0.12	0.02	10.00	0.85	6.58	0.32	0.00	**2.09**	0.00	25.63	**1.84**	23.02	22.87		1		0.147		4.43	
512+30	51.00	Rt.	S-200			0.00	0.00	0.00					0.00					21.52	21.37	0.15		18.00	0.150	2.51		TAILW EL (ft): 21.50
CL710			**S-202**			0.71	2.06	0.67										23.65	23.46	0.19		30.00	0.082	2.59		
				P-4	227.95	0.46	1.10	0.09	13.96	1.47	5.83	2.18	0.00	**12.69**	0.00	24.03	**0.38**	21.26	21.09		1		0.075		12.22	
516+00	51.00	Lt.	S-204			0.00	0.00	0.00					0.00					18.76	18.59	0.17		30.00	0.076	2.49		
CL710			**S-203**			0.70	0.70	0.66										23.84	23.65	0.19		18.00	0.189	2.80		
				P-4	102.00	0.44	0.44	0.09	10.00	0.61	6.58	0.75	0.00	**4.95**	0.00	24.03	**0.19**	21.42	21.22		1		0.196		5.11	
516+00	51.00	Rt.	S-202			0.00	0.00	0.00					0.00					19.92	19.72	0.20		18.00	0.150	2.89		
CL710			**S-204**			0.00	2.06	0.00										23.46	23.29	0.17		30.00	0.075	2.49		
				MH-7	227.92	0.00	1.10	0.00	15.43	1.53	5.60	2.18	0.00	**12.20**	0.00	24.91	**1.44**	21.09	20.92		1		0.075		12.22	
518+25	50.20	Lt.	S-205			0.00	0.00	0.00					0.00					18.59	18.42	0.17		30.00	0.076	2.49		
CL710			**S-205**			0.00	2.06	0.00										23.29	23.13	0.16		30.00	0.070	2.39		
				MH-7	230.34	0.00	1.10	0.00	16.95	1.60	5.39	2.18	0.00	**11.74**	0.00	25.66	**2.36**	20.92	20.75		1		0.074		12.15	
520+50	50.20	Lt.	S-206			0.00	0.00	0.00					0.00					18.42	18.25	0.17		30.00	0.076	2.48		
CL710			**S-206**			0.00	2.06	0.00										23.13	23.00	0.13		30.00	0.065	2.30		
				MH-7	207.00	0.00	1.10	0.00	18.56	1.50	5.19	2.18	0.00	**11.31**	0.00	24.89	**1.76**	20.75	19.69		1		0.512		32.11	
522+78	50.20	Lt.	S-207			0.00	0.00	0.00					0.00					18.25	17.19	1.06		30.00	0.076	6.54		
CL710			**S-207**			0.93	3.91	0.88										23.00	22.88	0.12		42.00	0.037	2.18		
				J-4	318.00	0.60	2.27	0.12	20.06	2.43	5.02	4.17	0.00	**20.94**	0.00	24.17	**1.17**	20.69	20.54		1		0.047		23.86	
524+85	51.00	Lt.	S-209			0.00	0.00	0.00					0.00					17.19	17.04	0.15		42.00	0.048	2.48		
CL710			**S-208**			0.92	0.92	0.87										23.07	23.00	0.07		24.00	0.071	2.07		
				P-4	102.00	0.58	0.58	0.12	10.00	0.82	6.58	0.99	0.00	**6.51**	0.00	24.17	**1.10**	19.30	19.19		1		0.108		8.21	
524+85	51.00	Rt.	S-207			0.00	0.00	0.00					0.00					17.30	17.19	0.11		24.00	0.102	2.61		
CL710			**S-209**			0.00	3.91	0.00										22.88	22.77	0.11		42.00	0.033	2.07		
				MH-7J	317.00	0.00	2.27	0.00	22.49	2.55	4.77	4.17	0.00	**19.90**	0.00	25.01	**2.13**	20.54	20.39		1		0.047		23.90	
528+03	51.00	Lt.	S-212			0.00	0.00	0.00					0.00					17.04	16.89	0.15		42.00	0.048	2.48		
CL710			**S-212**			0.00	3.91	0.00										22.77	22.68	0.09		42.00	0.030	1.97		
				MH-7J	300.00	0.00	2.27	0.00	25.05	2.50	4.54	4.17	0.00	**18.93**	0.00	25.96	**3.19**	20.39	20.25		1		0.047		23.76	
531+20	51.00	Lt.	S-214			0.00	0.00	0.00					0.00					16.89	16.75	0.14		42.00	0.048	2.47		
CL710			**S-214**			0.26	4.43	0.25										22.68	22.61	0.08		42.00	0.035	2.13		
				J-3	220.00	0.17	2.60	0.03	27.55	1.72	4.34	4.73	0.00	**20.51**	0.00	25.08	**2.40**	20.25	20.15		1		0.045		23.53	
534+20	51.00	Lt.	S-216			0.00	0.00	0.00					0.00					16.75	16.65	0.10		42.00	0.048	2.45		
CL710			**S-215**			0.26	0.26	0.25										22.71	22.68	0.03		18.00	0.026	1.04		
				P-3	102.00	0.16	0.16	0.03	10.00	0.85	6.58	0.28	0.00	**1.84**	0.00	25.08	**2.37**	21.97	21.77		1		0.196		5.15	
534+20	51.00	Rt.	S-214			0.00	0.00	0.00					0.00					20.47	20.27	0.20		18.00	0.150	2.92		
CL710			**S-216**			0.53	5.44	0.50										22.61	22.48	0.12		42.00	0.049	2.52		
				J-4	250.00	0.14	2.92	0.03	29.27	1.66	4.21	5.75	0.00	**24.21**	0.00	24.42	**1.81**	20.15	20.03		1		0.048		24.12	
536+40	51.00	Lt.	S-218			0.00	0.00	0.00					0.00					16.65	16.53	0.12		42.00	0.048	2.51		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND2** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / L / S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / MIN.	ACTUAL VEL. / PHYS. VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS ZONE: 8 / FREQ. (Yrs): 3 / MANNINGS n: 0.0120 / TAILW EL (ft): 21.50
CL710			**S-217**			0.48	0.48	0.46										22.69	22.61	0.08		18.00	0.081	1.83		
				P-4	102.00	0.18	0.18	0.04	10.00	0.85	6.58	0.49	0.00	**3.23**	0.00	24.42	**1.73**	21.31	21.11		1		0.196		5.14	
536+40	51.00	Rt.	S-216			0.00	0.00	0.00					0.00					19.81	19.61	0.20		18.00	0.150	2.91		
CL710			**S-218**			0.00	5.44	0.00										22.48	22.37	0.12		42.00	0.047	2.45		
				MH-7J	250.00	0.00	2.92	0.00	30.92	1.70	4.09	5.75	0.00	**23.55**	0.00	25.17	**2.69**	20.03	19.91		1		0.048		24.12	
538+90	51.00	Lt.	S-219			0.00	0.00	0.00					0.00					16.53	16.41	0.12		42.00	0.048	2.51		
CL710			**S-219**			0.57	6.62	0.54										22.37	22.20	0.17		42.00	0.064	2.87		
				J-4	260.00	0.15	3.17	0.03	32.62	1.51	3.98	6.92	0.00	**27.58**	0.00	24.42	**2.05**	19.91	19.73		1		0.069		28.96	
541+40	51.00	Lt.	S-221			0.00	0.00	0.00					0.00					16.41	16.23	0.18		42.00	0.048	3.01		
CL710			**S-220**			0.61	0.61	0.58										22.49	22.37	0.12		18.00	0.121	2.24		
				P-4	102.00	0.11	0.11	0.02	10.00	0.76	6.58	0.60	0.00	**3.95**	0.00	24.42	**1.93**	21.31	21.11		1		0.196		5.14	
541+40	51.00	Rt.	S-219			0.00	0.00	0.00					0.00					19.81	19.61	0.20		18.00	0.150	2.91		
CL710			**S-221**			0.00	6.62	0.00										22.20	22.05	0.15		42.00	0.061	2.80		
				MH-7J	250.00	0.00	3.17	0.00	34.14	1.49	3.89	6.92	0.00	**26.93**	0.00	25.20	**3.00**	19.73	19.55		1		0.072		29.54	
544+00	51.00	Lt.	S-222			0.00	0.00	0.00					0.00					16.23	16.05	0.18		42.00	0.048	3.07		
CL710			**S-222**			0.56	7.78	0.53										22.05	21.95	0.10		48.00	0.039	2.44		
				J-4	250.00	0.15	3.42	0.03	35.62	1.71	3.80	8.08	0.00	**30.71**	0.00	24.45	**2.40**	20.05	19.87		1		0.072		42.18	
546+50	51.00	Lt.	S-224			0.00	0.00	0.00					0.00					16.05	15.87	0.18		48.00	0.041	3.36		
CL710			**S-223**			0.60	0.60	0.57										22.17	22.05	0.12		18.00	0.117	2.20		
				P-4	102.00	0.10	0.10	0.02	10.00	0.77	6.58	0.59	0.00	**3.89**	0.00	24.45	**2.28**	21.34	21.14		1		0.196		5.14	
546+50	51.00	Rt.	S-222			0.00	0.00	0.00					0.00					19.84	19.64	0.20		18.00	0.150	2.91		
CL710			**S-224**			0.00	7.78	0.00										21.95	21.86	0.09		48.00	0.037	2.38		
				MH-7J	250.00	0.00	3.42	0.00	37.33	1.75	3.71	8.08	0.00	**29.94**	0.00	25.20	**3.25**	19.87	19.69		1		0.072		42.18	
549+00	51.00	Lt.	S-225			0.00	0.00	0.00					0.00					15.87	15.69	0.18		48.00	0.041	3.36		
CL710			**S-225**			0.62	9.00	0.59										21.86	21.72	0.14		48.00	0.047	2.68		
				J-4	300.48	0.16	3.75	0.03	39.08	1.87	3.62	9.30	0.00	**33.62**	0.00	24.45	**2.59**	19.69	19.51		1		0.060		38.44	
551+50	51.00	Lt.	S-227			0.00	0.00	0.00					0.00					15.69	15.51	0.18		48.00	0.041	3.06		
CL710			**S-226**			0.60	0.60	0.57										21.98	21.86	0.12		18.00	0.122	2.25		
				P-4	102.00	0.17	0.17	0.03	10.00	0.76	6.58	0.60	0.00	**3.97**	0.00	24.45	**2.47**	21.34	21.14		1		0.196		5.14	
551+50	51.00	Rt.	S-225			0.00	0.00	0.00					0.00					19.84	19.64	0.20		18.00	0.150	2.91		
CL710			**S-227**			0.34	9.64	0.32										21.72	21.56	0.15		48.00	0.051	2.79		
				J-3	301.83	0.09	3.95	0.02	40.95	1.80	3.52	9.95	0.00	**35.04**	0.00	25.35	**3.63**	19.51	19.33		1		0.060		38.39	
554+50	51.40	Lt.	S-229			0.00	0.00	0.00					0.00					15.51	15.33	0.18		48.00	0.041	3.05		
CL710			**S-228**			0.30	0.30	0.29										22.07	22.04	0.03		18.00	0.032	1.15		
				P-3	102.00	0.11	0.11	0.02	10.00	0.85	6.58	0.31	0.00	**2.02**	0.00	25.35	**3.28**	22.24	22.04		1		0.196		5.15	
554+50	50.60	Rt.	S-227			0.00	0.00	0.00					0.00					20.74	20.54	0.20		18.00	0.150	2.92		
CL710			**S-229**			0.34	20.87	0.32										21.56	21.50	0.06		60.00	0.068	3.74		
				J-3	94.62	0.09	7.60	0.02	42.75	0.00	3.44	21.35	0.00	**73.36**	0.00	26.25	**4.69**	20.33	20.23		1		0.106		93.22	
557+50	51.30	Lt.	POND2			0.00	0.00	0.00					0.00					15.33	15.23	0.10		60.00	0.030	4.75		
CL710			**S-230**			0.30	0.30	0.29										22.61	21.91	0.70		18.00	0.686	4.33		
				P-3	102.00	0.11	0.11	0.02	10.00	0.39	6.58	0.31	0.00	**2.02**	0.00	26.25	**3.64**	23.64	22.94		1		0.686		9.64	
557+50	50.70	Rt.	S-229			0.00	0.00	0.00					0.00					22.14	21.44	0.70		18.00	0.150	5.46		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND2** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / L / S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS ZONE: 8 / FREQ. (Yrs): 3 / MANNINGS n: 0.0120 / TAILW EL (ft): 21.50
CL710			**S-231**			0.34	10.59	0.32										23.45	23.23	0.22		48.00	0.072	3.33		
				J-3	301.83	0.09	3.45	0.02	34.11	1.51	3.89	10.75	0.00	**41.83**	0.00	27.15	**3.70**	23.43	23.23		1		0.066		40.46	
560+50	51.20	Lt.	S-229			0.00	0.00	0.00					0.00					19.43	19.23	0.20		48.00	0.041	3.22		
CL710			**S-232**			0.30	0.30	0.29										23.87	23.84	0.03		18.00	0.032	1.15		
				P-3	102.00	0.11	0.11	0.02	10.00	0.85	6.58	0.31	0.00	**2.02**	0.00	27.15	**3.28**	24.04	23.84		1		0.196		5.15	
560+50	50.80	Rt.	S-231			0.00	0.00	0.00					0.00					22.54	22.34	0.20		18.00	0.150	2.92		
CL710			**S-233**			0.00	9.95	0.00										23.65	23.45	0.20		48.00	0.067	3.21		
				MH-7J	301.83	0.00	3.24	0.00	32.54	1.57	3.99	10.10	0.00	**40.29**	0.00	28.05	**4.40**	23.63	23.43		1		0.066		40.43	
563+50	51.20	Lt.	S-231			0.00	0.00	0.00					0.00					19.63	19.43	0.20		48.00	0.041	3.22		
CL710			**S-234**			0.62	9.95	0.59										23.83	23.65	0.18		48.00	0.070	3.27		
				J-4	251.01	0.16	3.24	0.03	31.27	1.28	4.07	10.10	0.00	**41.13**	0.00	27.30	**3.47**	23.78	23.63		1		0.060		38.43	
566+00	51.00	Lt.	S-233			0.00	0.00	0.00					0.00					19.78	19.63	0.15		48.00	0.041	3.06		
CL710			**S-235**			0.55	0.55	0.52										24.10	23.99	0.11		18.00	0.107	2.11		
				P-4	102.00	0.22	0.22	0.04	10.00	0.81	6.58	0.57	0.00	**3.72**	0.00	27.30	**3.20**	24.19	23.99		1		0.196		5.14	
566+00	51.00	Rt.	S-234			0.00	0.00	0.00					0.00					22.69	22.49	0.20		18.00	0.150	2.91		
CL710			**S-236**			0.00	8.78	0.00										24.17	23.83	0.35		42.00	0.116	3.85		
				MH-7J	298.15	0.00	2.87	0.00	29.98	1.29	4.16	8.91	0.00	**37.08**	0.00	28.20	**4.03**	23.82	23.28		1		0.181		46.78	
569+00	51.00	Lt.	S-234			0.00	0.00	0.00					0.00					20.32	19.78	0.54		42.00	0.048	4.86		
CL710			**S-237**			0.73	8.78	0.69										24.47	24.17	0.30		42.00	0.120	3.92		
				J-4	248.46	0.19	2.87	0.04	28.92	1.06	4.24	8.91	0.00	**37.75**	0.00	27.45	**2.98**	23.94	23.82		1		0.048		24.20	
571+50	51.00	Lt.	S-236			0.00	0.00	0.00					0.00					20.44	20.32	0.12		42.00	0.048	2.52		
CL710			**S-238**			0.65	0.65	0.62										24.62	24.47	0.15		18.00	0.150	2.49		
				P-4	102.00	0.26	0.26	0.05	10.00	0.68	6.58	0.67	0.00	**4.40**	0.00	27.45	**2.83**	24.84	24.14		1		0.686		9.62	
571+50	51.00	Rt.	S-237			0.00	0.00	0.00					0.00					23.34	22.64	0.70		18.00	0.150	5.44		
CL710			**S-239**			0.00	7.40	0.00										24.83	24.47	0.36		42.00	0.091	3.42		
				MH-7J	397.52	0.00	2.42	0.00	26.99	1.94	4.38	7.51	0.00	**32.93**	0.00	28.65	**3.82**	24.13	23.94		1		0.048		23.98	
575+50	51.00	Lt.	S-237			0.00	0.00	0.00					0.00					20.63	20.44	0.19		42.00	0.048	2.49		
CL710			**S-240**			0.68	7.40	0.65										25.12	24.83	0.29		42.00	0.096	3.51		
				J-4	299.04	0.17	2.42	0.03	25.57	1.42	4.50	7.51	0.00	**33.79**	0.00	27.75	**2.63**	24.27	24.13		1		0.047		23.78	
578+50	51.00	Lt.	S-239			0.00	0.00	0.00					0.00					20.77	20.63	0.14		42.00	0.048	2.47		
CL710			**S-241**			0.60	0.60	0.57										25.15	25.12	0.03		24.00	0.027	1.29		
				P-4	102.00	0.23	0.23	0.05	10.00	0.85	6.58	0.62	0.00	**4.06**	0.00	27.75	**2.60**	25.10	24.90		1		0.196		11.07	
578+50	51.00	Rt.	S-240			0.00	0.00	0.00					0.00					23.10	22.90	0.20		24.00	0.102	3.52		
CL710			**S-242**			0.34	6.12	0.32										25.33	25.12	0.21		42.00	0.070	3.00		
				J-3	300.00	0.09	2.01	0.02	23.90	1.67	4.64	6.22	0.00	**28.86**	0.00	28.65	**3.32**	25.17	24.27		1		0.300		60.25	
581+50	51.00	Lt.	S-240			0.00	0.00	0.00					0.00					21.67	20.77	0.90		42.00	0.048	6.26		
CL710			**S-243**			0.30	0.30	0.29										25.37	25.34	0.03		18.00	0.032	1.15		
				P-3	102.00	0.12	0.12	0.02	10.00	0.85	6.58	0.31	0.00	**2.03**	0.00	28.65	**3.28**	26.04	25.34		1		0.686		9.64	
581+50	51.00	Rt.	S-242			0.00	0.00	0.00					0.00					24.54	23.84	0.70		18.00	0.150	5.46		
CL710			**S-244**			0.28	5.48	0.27										25.51	25.33	0.18		42.00	0.060	2.78		
				J-3	300.00	0.07	1.81	0.01	22.10	1.80	4.81	5.57	0.00	**26.79**	0.00	29.55	**4.04**	25.81	25.17		1		0.213		50.85	
584+50	51.00	Lt.	S-242			0.00	0.00	0.00					0.00					22.31	21.67	0.64		42.00	0.048	5.29		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND2** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / L / S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
CL710			**S-245**			0.25	0.25	0.24										26.26	26.24	0.02		18.00	0.022	0.96		ZONE: 8
				P-3	102.00	0.10	0.10	0.02	10.00	0.85	6.58	0.26	0.00	**1.69**	0.00	29.55	**3.29**	26.94	26.24		1		0.686		9.64	FREQ. (Yrs): 3
584+50	51.00	Rt.	S-244			0.00	0.00	0.00					0.00					25.44	24.74	0.70		18.00	0.150	5.46		MANNINGS n: 0.0120
CL710			**S-246**			0.00	4.95	0.00										25.94	25.81	0.13		42.00	0.053	2.60		TAILW EL (ft): 21.50
				MH-7J	250.00	0.00	1.64	0.00	20.50	1.60	4.98	5.03	0.00	**25.03**	0.00	30.30	**4.36**	25.93	25.81		1		0.048		24.15	
587+00	51.00	Lt.	S-244			0.00	0.00	0.00					0.00					22.43	22.31	0.12		42.00	0.048	2.51		
CL710			**S-247**			0.67	4.95	0.64										26.11	25.94	0.17		42.00	0.057	2.71		
				J-4	290.00	0.17	1.64	0.03	18.72	1.79	5.18	5.03	0.00	**26.03**	0.00	29.54	**3.44**	26.07	25.93		1		0.048		24.16	
589+90	51.00	Lt.	S-246			0.00	0.00	0.00					0.00					22.57	22.43	0.14		42.00	0.048	2.51		
CL710			**S-248**			0.59	0.59	0.56										26.36	26.23	0.13		18.00	0.127	2.30		
				P-4	102.00	0.28	0.28	0.06	10.00	0.74	6.58	0.62	0.00	**4.06**	0.00	29.54	**3.18**	26.93	26.23		1		0.686		9.62	
589+90	51.00	Rt.	S-247			0.00	0.00	0.00					0.00					25.43	24.73	0.70		18.00	0.150	5.44		
CL710			**S-249**			0.34	3.69	0.32										26.70	26.11	0.59		30.00	0.197	8.80		
				P-3	300.00	0.09	1.18	0.02	18.15	0.57	5.24	3.74	0.00	**19.62**	0.00	30.73	**4.03**	28.04	25.07		1		0.990		44.51	
592+90	51.00	Lt.	S-247			0.00	0.00	0.00					0.00					25.54	22.57	2.97		30.00	0.076	9.07		
CL710			**S-250**			0.30	0.30	0.29										27.33	27.18	0.15		18.00	0.147	2.45		
				P-3	102.00	0.12	0.12	0.02	10.00	0.69	6.58	0.31	0.00	**2.03**	0.00	30.73	**3.40**	28.12	27.97		1		0.147		4.43	
592+90	51.00	Rt.	S-249			0.00	0.00	0.00					0.00					26.62	26.47	0.15		18.00	0.150	2.51		
CL710			**S-251**			0.21	3.05	0.20										27.95	27.05	0.90		30.00	0.300	5.36		
				P-3	300.00	0.06	0.98	0.01	17.22	0.93	5.36	3.09	0.00	**16.58**	0.00	32.23	**4.28**	28.94	28.04		1		0.300		24.46	
595+90	51.00	Lt.	S-249			0.00	0.00	0.00					0.00					26.44	25.54	0.90		30.00	0.076	4.98		
CL710			**S-252**			0.19	2.84	0.18										29.07	28.94	0.13		30.00	0.124	3.19		
				P-3	102.00	0.07	0.92	0.01	16.68	0.53	5.43	2.88	0.00	**15.65**	0.00	32.23	**3.16**	29.02	28.94		1		0.078		12.63	
595+90	51.00	Rt.	S-251			0.00	0.00	0.00					0.00					26.52	26.44	0.08		30.00	0.076	2.57		
CL710			**S-253**			0.00	2.65	0.00										29.28	29.07	0.21		30.00	0.113	3.05		
				MH-7	183.90	0.00	0.85	0.00	15.68	1.01	5.57	2.69	0.00	**14.96**	0.00	32.70	**3.42**	29.16	29.02		1		0.076		12.36	
597+78	51.00	Rt.	S-252			0.00	0.00	0.00					0.00					26.66	26.52	0.14		30.00	0.076	2.52		
CL710			**S-254**			0.65	0.65	0.62										29.74	29.60	0.15		18.00	0.143	2.43		
				P-4	102.00	0.18	0.18	0.04	10.00	0.70	6.58	0.65	0.00	**4.30**	0.00	32.05	**2.31**	29.44	29.29		1		0.147		4.43	
600+50	51.00	Lt.	S-255			0.00	0.00	0.00					0.00					27.94	27.79	0.15		18.00	0.150	2.51		
CL710			**S-255**			0.57	2.65	0.54										29.60	29.28	0.32		30.00	0.122	3.16		
				P-4	265.66	0.21	0.85	0.04	14.28	1.40	5.78	2.69	0.00	**15.53**	0.00	32.05	**2.45**	29.36	29.16		1		0.075		12.26	
600+50	51.00	Rt.	S-253			0.00	0.00	0.00					0.00					26.86	26.66	0.20		30.00	0.076	2.50		
CL710			**S-256**			0.34	0.34	0.32										30.23	30.19	0.04		18.00	0.039	1.27		
				P-3	102.00	0.09	0.09	0.02	10.00	0.85	6.58	0.34	0.00	**2.25**	0.00	32.95	**2.72**	30.34	30.19		1		0.147		4.43	
603+50	51.00	Lt.	S-257			0.00	0.00	0.00					0.00					28.84	28.69	0.15		18.00	0.150	2.51		
CL710			**S-257**			0.30	1.43	0.29										29.98	29.60	0.38		24.00	0.129	2.80		
				P-3	292.96	0.11	0.46	0.02	12.53	1.74	6.07	1.45	0.00	**8.80**	0.00	32.95	**2.97**	30.30	28.86		1		0.492		17.27	
603+50	51.00	Rt.	S-255			0.00	0.00	0.00					0.00					28.30	26.86	1.44		24.00	0.102	5.50		
CL710			**S-258**			0.42	0.42	0.40										31.15	31.09	0.06		18.00	0.060	1.57		
				P-3	102.00	0.11	0.11	0.02	10.00	0.85	6.58	0.42	0.00	**2.78**	0.00	33.85	**2.70**	31.24	31.09		1		0.147		4.43	
606+50	51.00	Lt.	S-259			0.00	0.00	0.00					0.00					29.74	29.59	0.15		18.00	0.150	2.51		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND2** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# B R L S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS / MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
CL710			**S-259**			0.37	0.79	0.35										30.93	30.34	0.59		18.00	0.203	2.90		ZONE: 8
				P-3	292.96	0.14	0.25	0.03	10.85	1.68	6.39	0.80	0.00	**5.12**	0.00	33.85	**2.92**	31.09	30.34		1		0.256		5.79	FREQ. (Yrs): 3
606+50	51.00	Rt.	S-257			0.00	0.00	0.00					0.00					29.59	28.84	0.75		18.00	0.150	3.27		MANNINGS n: 0.0120
																										TAILW EL (ft): 21.50

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND3** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / L / S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS ZONE: 8 / FREQ. (Yrs): 2 / MANNINGS n: 0.0120 / TAILW EL (ft): 25.92
CL710			**S-300**			0.34	0.64	0.32										30.95	30.59	0.36		18.00	0.118	2.22		
				P-3	306.59	0.09	0.21	0.02	10.85	2.31	6.03	0.65	0.00	**3.91**	0.00	34.06	**3.11**	31.30	30.55		1		0.245		5.66	
613+20	51.00	Lt.	S-302			0.00	0.00	0.00					0.00					29.80	29.05	0.75		18.00	0.150	3.20		
CL710			**S-301**			0.30	0.30	0.29										31.33	31.30	0.03		18.00	0.028	1.08		
				P-3	102.00	0.11	0.11	0.02	10.00	0.85	6.21	0.31	0.00	**1.91**	0.00	34.06	**2.73**	31.45	31.30		1		0.147		4.43	
613+20	51.00	Rt.	S-300			0.00	0.00	0.00					0.00					29.95	29.80	0.15		18.00	0.150	2.51		
CL710			**S-302**			0.34	0.98	0.32										30.59	30.35	0.24		18.00	0.237	3.13		
				P-3	102.00	0.09	0.30	0.02	13.16	0.54	5.59	0.99	0.00	**5.54**	0.00	33.16	**2.57**	30.55	30.35		1		0.196		5.11	
616+20	51.00	Lt.	S-303			0.00	0.00	0.00					0.00					29.05	28.85	0.20		18.00	0.150	2.89		
CL710			**S-303**			0.30	1.28	0.29										30.05	29.87	0.18		24.00	0.085	2.27		
				P-3	208.08	0.11	0.42	0.02	13.70	1.53	5.50	1.30	0.00	**7.14**	0.00	33.16	**3.11**	30.51	29.87		1		0.308		13.69	
616+20	51.00	Rt.	S-305			0.00	0.00	0.00					0.00					28.51	27.87	0.64		24.00	0.102	4.36		
CL710			**S-304**			0.24	0.24	0.23										29.78	29.76	0.02		18.00	0.017	0.85		
				P-3	102.00	0.07	0.07	0.01	10.00	0.85	6.21	0.24	0.00	**1.50**	0.00	32.52	**2.74**	29.91	29.76		1		0.147		4.43	
618+33	51.00	Lt.	S-305			0.00	0.00	0.00					0.00					28.41	28.26	0.15		18.00	0.150	2.51		
CL710			**S-305**			0.22	1.74	0.21										29.43	29.14	0.29		24.00	0.143	2.95		
				P-3	202.22	0.07	0.56	0.01	15.22	1.14	5.26	1.76	0.00	**9.28**	0.00	32.52	**3.09**	29.87	28.17		1		0.841		22.64	
618+33	51.00	Rt.	S-307			0.00	0.00	0.00					0.00					27.87	26.17	1.70		24.00	0.102	7.21		
CL710			**S-306**			0.75	0.75	0.71										29.36	29.19	0.17		18.00	0.164	2.61		
				P-4	102.00	0.14	0.14	0.03	10.00	0.65	6.21	0.74	0.00	**4.60**	0.00	31.90	**2.54**	29.34	29.19		1		0.147		4.43	
620+40	51.00	Lt.	S-307			0.00	0.00	0.00					0.00					27.84	27.69	0.15		18.00	0.150	2.51		
CL710			**S-307**			0.46	2.95	0.44										29.14	29.03	0.11		36.00	0.044	2.15		
				P-4	244.19	0.17	0.87	0.03	16.37	1.90	5.10	2.98	0.00	**15.18**	0.00	31.90	**2.76**	29.17	29.03		1		0.057		17.41	
620+40	51.00	Rt.	S-308			0.00	0.00	0.00					0.00					26.17	26.03	0.14		36.00	0.059	2.46		
CL710			**S-308**			0.00	2.95	0.00										28.98	28.88	0.10		36.00	0.040	2.05		
				MH-7	253.95	0.00	0.87	0.00	18.26	2.07	4.86	2.98	0.00	**14.46**	0.00	32.65	**3.67**	29.03	28.88		1		0.059		17.61	
622+90	51.00	Rt.	S-310			0.00	0.00	0.00					0.00					26.03	25.88	0.15		36.00	0.059	2.49		
CL710			**S-309**			0.57	0.57	0.54										29.21	29.11	0.10		18.00	0.098	2.02		
				P-4	102.00	0.16	0.16	0.03	10.00	0.84	6.21	0.57	0.00	**3.56**	0.00	31.87	**2.66**	29.26	29.11		1		0.147		4.40	
625+50	51.00	Lt.	S-310			0.00	0.00	0.00					0.00					27.76	27.61	0.15		18.00	0.150	2.49		
CL710			**S-310**			0.51	4.03	0.48										28.85	28.68	0.17		36.00	0.068	2.67		
				P-4	244.19	0.19	1.22	0.04	20.33	1.53	4.63	4.07	0.00	**18.84**	0.00	31.87	**3.02**	28.88	28.68		1		0.082		20.74	
625+50	51.00	Rt.	S-311			0.00	0.00	0.00					0.00					25.88	25.68	0.20		36.00	0.059	2.93		
CL710			**S-311**			0.00	4.03	0.00										28.67	28.48	0.19		36.00	0.064	2.58		
				MH-7	292.96	0.00	1.22	0.00	21.86	1.90	4.47	4.07	0.00	**18.21**	0.00	32.62	**3.95**	28.68	28.48		1		0.068		18.98	
628+00	51.00	Rt.	S-313			0.00	0.00	0.00					0.00					25.68	25.48	0.20		36.00	0.059	2.68		
CL710			**S-312**			0.34	6.24	0.32										27.15	26.95	0.20		42.00	0.198	5.22		
				P-3	101.23	0.09	2.52	0.02	24.39	0.00	4.24	6.43	0.00	**27.28**	0.00	31.62	**4.47**	28.78	28.58		1		0.198		48.81	
631+00	51.00	Lt.	POND3			0.00	0.00	0.00					0.00					25.28	25.08	0.20		42.00	0.048	5.07		
CL710			**S-313**			0.30	4.33	0.29										28.35	28.28	0.07		36.00	0.068	2.66		
				P-3	102.00	0.11	1.33	0.02	23.75	0.64	4.30	4.38	0.00	**18.82**	0.00	31.62	**3.27**	28.48	28.28		1		0.196		32.48	
631+00	51.00	Rt.	S-312			0.00	0.00	0.00					0.00					25.48	25.28	0.20		36.00	0.059	4.59		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND3** Designed by **AD** Date: 2/18/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/18/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / LS	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
CL710			**S-314**			0.34	1.57	0.32										27.61	27.15	0.46		24.00	0.154	3.06		ZONE: 8
				P-3	301.72	0.13	1.10	0.03	12.98	1.64	5.62	1.71	0.00	**9.61**	0.00	30.12	**2.51**	26.24	25.93		1		0.103		7.90	FREQ. (Yrs): 2
634+00	51.00	Lt.	S-312			0.00	0.00	0.00					0.00					24.24	23.93	0.31		24.00	0.102	2.51		MANNINGS n: 0.0120
CL710			**S-315**			0.30	0.30	0.29										27.64	27.61	0.03		18.00	0.028	1.08		TAILW EL (ft): 25.92
				P-3	102.00	0.12	0.12	0.02	10.00	0.85	6.21	0.31	0.00	**1.91**	0.00	30.12	**2.48**	27.51	27.36		1		0.147		4.43	
634+00	51.00	Rt.	S-314			0.00	0.00	0.00					0.00					26.01	25.86	0.15		18.00	0.150	2.51		
CL710			**S-316**			0.48	0.93	0.46										27.78	27.61	0.17		24.00	0.067	2.02		
				P-4	258.00	0.15	0.85	0.03	10.85	2.13	6.03	1.05	0.00	**6.35**	0.00	29.15	**1.36**	26.50	26.24		1		0.101		7.83	
636+58	51.00	Lt.	S-314			0.00	0.00	0.00					0.00					24.50	24.24	0.26		24.00	0.102	2.49		
CL710			**S-317**			0.45	0.45	0.43										27.88	27.78	0.10		18.00	0.096	2.00		
				P-4	102.00	0.70	0.70	0.14	10.00	0.85	6.21	0.57	0.00	**3.53**	0.00	29.15	**1.26**	26.54	26.39		1		0.147		4.43	
636+58	51.00	Rt.	S-316			0.00	0.00	0.00					0.00					25.04	24.89	0.15		18.00	0.150	2.51		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND4** Designed by **AD** Date: 2/19/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/19/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# B R L S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / PHYS	ACTUAL VEL. / VEL. / (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS ZONE: 8 / FREQ. (Yrs): 3 / MANNINGS n: 0.0120 / TAILW EL (ft): 24.76
CL710			**S-400**			0.73	1.29	0.69										26.48	26.38	0.10		30.00	0.034	1.67		
				P-4	295.52	0.05	0.28	0.01	10.79	2.46	6.41	1.28	0.00	**8.21**	0.00	28.68	**2.20**	25.99	25.77		1		0.074		12.19	
641+00	51.00	Lt.	S-402			0.00	0.00	0.00					0.00					23.49	23.27	0.22		30.00	0.076	2.48		
CL710			**S-401**			0.56	0.56	0.53										26.59	26.48	0.11		18.00	0.111	2.15		
				P-4	102.00	0.22	0.22	0.04	10.00	0.79	6.58	0.58	0.00	**3.80**	0.00	28.68	**2.09**	26.07	25.92		1		0.147		4.43	
641+00	51.00	Rt.	S-400			0.00	0.00	0.00					0.00					24.57	24.42	0.15		18.00	0.150	2.51		
CL710			**S-402**			0.00	1.29	0.00										26.38	26.33	0.05		30.00	0.029	1.55		
				MH-7	167.93	0.00	0.28	0.00	13.25	1.40	5.94	1.28	0.00	**7.61**	0.00	29.45	**3.07**	25.77	25.64		1		0.077		12.48	
643+98	51.00	Lt.	S-403			0.00	0.00	0.00					0.00					23.27	23.14	0.13		30.00	0.076	2.54		
CL710			**S-403**			0.19	1.94	0.18										26.33	26.24	0.09		30.00	0.063	2.27		
				P-3	143.39	0.05	0.51	0.01	14.65	1.05	5.72	1.95	0.00	**11.13**	0.00	29.10	**2.77**	25.64	25.53		1		0.077		12.44	
645+69	51.00	Lt.	S-405			0.00	0.00	0.00					0.00					23.14	23.03	0.11		30.00	0.076	2.53		
CL710			**S-404**			0.46	0.46	0.44										26.35	26.33	0.02		24.00	0.016	0.99		
				P-4	109.93	0.19	0.19	0.04	10.00	0.92	6.58	0.47	0.00	**3.12**	0.00	28.98	**2.63**	26.33	25.14		1		1.083		25.85	
646+10	51.00	Rt.	S-403			0.00	0.00	0.00					0.00					24.33	23.14	1.19		24.00	0.102	8.23		
CL710			**S-405**			0.16	2.10	0.15										26.24	26.14	0.10		30.00	0.070	2.39		
				P-3	142.40	0.04	0.55	0.01	15.71	0.99	5.56	2.11	0.00	**11.72**	0.00	29.29	**3.06**	25.53	25.42		1		0.077		12.48	
647+15	51.00	Lt.	S-406			0.00	0.00	0.00					0.00					23.03	22.92	0.11		30.00	0.076	2.54		
CL710			**S-406**			0.00	2.10	0.00										26.14	26.01	0.13		30.00	0.066	2.33		
				MH-7	191.49	0.00	0.55	0.00	16.70	1.37	5.43	2.11	0.00	**11.43**	0.00	29.73	**3.59**	25.42	25.21		1		0.110		14.89	
648+60	51.00	Lt.	S-408			0.00	0.00	0.00					0.00					22.92	22.71	0.21		30.00	0.076	3.03		
CL710			**S-407**			0.20	0.20	0.19										26.03	26.01	0.01		18.00	0.014	0.77		
				P-3	102.00	0.08	0.08	0.02	10.00	0.85	6.58	0.21	0.00	**1.35**	0.00	29.14	**3.12**	26.54	25.84		1		0.686		9.64	
650+55	51.00	Rt.	S-408			0.00	0.00	0.00					0.00					25.04	24.34	0.70		18.00	0.150	5.46		
CL710			**S-408**			0.22	2.52	0.21										26.01	25.95	0.06		36.00	0.034	1.88		
				J-3	191.49	0.05	0.69	0.01	18.07	1.60	5.25	2.53	0.00	**13.30**	0.00	29.14	**3.13**	25.71	25.13		1		0.303		40.35	
650+55	51.00	Lt.	S-410			0.00	0.00	0.00					0.00					22.71	22.13	0.58		36.00	0.059	5.71		
CL710			**S-409**			0.50	3.47	0.47										25.90	25.75	0.15		36.00	0.058	2.46		
				J-4	254.37	0.18	0.99	0.04	20.46	1.72	4.98	3.49	0.00	**17.40**	0.00	28.56	**2.66**	25.07	24.92		1		0.059		17.72	
652+50	51.00	Rt.	S-411			0.00	0.00	0.00					0.00					22.07	21.92	0.15		36.00	0.059	2.51		
CL710			**S-410**			0.45	2.97	0.43										25.95	25.90	0.04		36.00	0.044	2.14		
				J-4	102.00	0.12	0.81	0.02	19.67	0.80	5.07	2.98	0.00	**15.11**	0.00	28.56	**2.61**	25.13	25.07		1		0.059		17.97	
652+50	51.00	Lt.	S-409			0.00	0.00	0.00					0.00					22.13	22.07	0.06		36.00	0.059	2.54		
CL710			**S-411**			0.00	3.47	0.00										25.75	25.73	0.03		36.00	0.054	2.37		
				MH-7J	50.99	0.00	0.99	0.00	22.19	0.36	4.80	3.49	0.00	**16.78**	0.00	29.31	**3.55**	24.92	24.89		1		0.059		18.56	
655+00	51.00	Rt.	S-412			0.00	0.00	0.00					0.00					21.92	21.89	0.03		36.00	0.059	2.63		
CL710			**S-412**			0.05	3.52	0.05										25.73	25.69	0.03		36.00	0.055	2.39		
				J-3	60.97	0.01	1.00	0.00	22.54	0.43	4.77	3.54	0.00	**16.90**	0.00	29.16	**3.43**	24.89	24.86		1		0.049		16.88	
655+50.10	51.00	Rt.	S-413			0.00	0.00	0.00					0.00					21.89	21.86	0.03		36.00	0.059	2.39		
CL710			**S-413**			0.06	3.58	0.06										25.69	25.67	0.03		36.00	0.056	2.41		
				J-3	48.01	0.02	1.02	0.00	22.97	0.33	4.73	3.61	0.00	**17.05**	0.00	28.98	**3.29**	24.86	24.84		1		0.042		15.77	
656+09	61.50	Rt.	S-414			0.00	0.00	0.00					0.00					21.86	21.84	0.02		36.00	0.059	2.23		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND4** Designed by **AD** Date: 2/19/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/19/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / L / S	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. / MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
																										ZONE: 8
																										FREQ. (Yrs): 3
																										MANNINGS n: 0.0120
CL710			**S-414**			0.07	3.65	0.07										25.67	25.64	0.03		36.00	0.057	2.44		
				J-3	48.01	0.01	1.04	0.00	23.30	0.33	4.70	3.67	0.00	**17.26**	0.00	28.84	**3.17**	24.84	24.82		1		0.042		15.77	
656+56	61.50	Rt.	S-415			0.00	0.00	0.00					0.00					21.84	21.82	0.02		36.00	0.059	2.23		
CL710			**S-415**			0.07	3.72	0.07										25.64	25.61	0.03		36.00	0.058	2.47		
				J-3	48.01	0.01	1.05	0.00	23.63	0.32	4.67	3.74	0.00	**17.47**	0.00	28.70	**3.06**	24.82	24.58		1		0.500		54.29	
657+03	61.50	Rt.	S-416			0.00	0.00	0.00					0.00					21.82	21.58	0.24		36.00	0.059	7.68		
CL710			**S-416**			0.14	4.41	0.13										25.61	25.59	0.02		42.00	0.036	2.14		
				J-4	48.01	0.02	1.22	0.00	23.95	0.37	4.64	4.43	0.00	**20.56**	0.00	28.56	**2.95**	25.08	25.06		1		0.042		23.64	
657+50	61.50	Rt.	S-418			0.00	0.00	0.00					0.00					21.58	21.56	0.02		42.00	0.048	2.46		
CL710			**S-417**			0.55	0.55	0.52										25.73	25.61	0.11		18.00	0.102	2.06		
				P-4	112.50	0.15	0.15	0.03	10.00	0.91	6.58	0.55	0.00	**3.64**	0.00	28.56	**2.83**	25.95	25.25		1		0.622		9.14	
657+50	51.00	Lt.	S-416			0.00	0.00	0.00					0.00					24.45	23.75	0.70		18.00	0.150	5.17		
CL710			**S-418**			0.07	4.48	0.07										25.59	25.58	0.02		42.00	0.036	2.15		
				J-3	48.01	0.01	1.23	0.00	24.33	0.37	4.60	4.50	0.00	**20.72**	0.00	28.70	**3.11**	25.06	25.04		1		0.042		23.78	
657+97	61.50	Rt.	S-419			0.00	0.00	0.00					0.00					21.56	21.54	0.02		42.00	0.048	2.47		
CL710			**S-419**			0.06	4.54	0.06										25.58	25.43	0.15		42.00	0.037	2.17		
				J-3	414.37	0.00	1.23	0.00	24.70	3.19	4.57	4.56	0.00	**20.84**	0.00	28.84	**3.26**	25.04	24.84		1		0.048		24.11	
658+44	61.50	Rt.	S-420			0.00	0.00	0.00					0.00					21.54	21.34	0.20		42.00	0.048	2.51		
CL710			**S-420**			0.75	5.29	0.71										25.43	25.38	0.05		42.00	0.044	2.39		
				J-4	112.50	0.25	1.48	0.05	27.89	0.79	4.31	5.32	0.00	**22.95**	0.00	28.56	**3.13**	24.84	24.79		1		0.044		23.51	
662+50	61.50	Rt.	S-421			0.00	0.00	0.00					0.00					21.34	21.29	0.05		42.00	0.048	2.44		
CL710			**S-421**			0.72	6.01	0.68										25.38	25.18	0.19		42.00	0.056	2.69		
				J-4	343.56	0.40	1.89	0.08	28.67	2.13	4.25	6.09	0.00	**25.89**	0.00	28.56	**3.18**	24.79	24.63		1		0.047		23.69	
662+50	51.00	Lt.	S-422			0.00	0.00	0.00					0.00					21.29	21.13	0.16		42.00	0.048	2.46		
CL710			**S-422**			0.00	6.01	0.00										25.18	25.07	0.12		42.00	0.053	2.60		
				MH-7J	220.94	0.00	1.89	0.00	30.80	1.42	4.10	6.09	0.00	**24.97**	0.00	29.61	**4.43**	24.63	24.53		1		0.045		23.45	
666+00	51.00	Lt.	S-423			0.00	0.00	0.00					0.00					21.13	21.03	0.10		42.00	0.048	2.44		
CL710			**S-423**			0.62	6.63	0.59										25.07	25.00	0.07		42.00	0.061	2.79		
				J-4	107.52	0.15	2.04	0.03	32.22	0.64	4.01	6.71	0.00	**26.89**	0.00	29.05	**3.98**	24.53	22.80		1		1.609		141.59	
668+25	51.00	Lt.	S-424			0.00	0.00	0.00					0.00					21.03	19.30	1.73		42.00	0.048	14.72		
CL710			**S-424**			0.56	9.43	0.53										25.00	24.76	0.24		42.00	0.124	3.99		
				J-4	194.00	0.28	3.57	0.06	32.86	0.00	3.97	9.68	0.00	**38.40**	0.00	29.05	**4.05**	22.57	23.50		1		-0.479		-75.96	
668+27	56.50	Rt.	POND4			0.00	0.00	0.00					0.00					19.07	20.00	-0.93		42.00	0.048	-7.89		
CL710			**S-425**			0.15	2.24	0.14										25.23	25.00	0.23		30.00	0.070	2.39		
				P-3	327.11	0.06	1.25	0.01	20.98	2.28	4.92	2.38	0.00	**11.73**	0.00	30.36	**5.13**	22.05	21.80		1		0.076		12.36	
671+50	51.00	Rt.	S-424			0.00	0.00	0.00					0.00					19.55	19.30	0.25		30.00	0.076	2.52		
CL710			**S-426**			0.17	0.17	0.16										26.76	26.61	0.15		18.00	0.147	2.10		
				P-3	102.00	0.04	0.04	0.01	10.00	0.81	6.58	0.17	0.00	**1.12**	0.00	30.36	**3.60**	27.75	27.60		1		0.147		4.43	
671+50	51.00	Lt.	S-425			0.00	0.00	0.00					0.00					26.25	26.10	0.15		18.00	0.150	2.51		
CL710			**S-427**			0.00	1.92	0.00										25.31	25.23	0.08		30.00	0.055	2.12		
				MH-7	150.17	0.00	1.15	0.00	19.80	1.18	5.05	2.06	0.00	**10.39**	0.00	30.73	**5.42**	22.16	22.05		1		0.073		12.15	
673+00	58.13	Rt.	S-425			0.00	0.00	0.00					0.00					19.66	19.55	0.11		30.00	0.076	2.47		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION
STORM DRAIN TABULATION FORM

Financial Prj Id: **21151201.00** County: **OKEECHOBEE** Network: **POND4** Designed by **AD** Date: 2/19/2014
Description: **NEW ALIGNMENT** Organization **WANTMAN GROUP** State Road: **SR 710** Checked by: **PAT** Date: 2/19/2014

LOCATION OF UPPER END / ALIGNMENT NAME / STATION	DIST	SD	STR. NO. / UPPER / LOWER	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 / C= 0.20 / C= 0.00 INC	TOTAL	SUB-TOTAL (C*A)	TIME OF CONC (min)	TIME OF FLOW SECT. (min)	INTEN (in/hr)	TOTAL (C*A)	BASE FLOW SUMM BASE (cfs)	TOTAL FLOW (cfs)	MINOR LOSS (ft.)	INLET ELEV. (ft.)	HGL CLEAR (ft.)	HYDRAULIC GRADE CROWN / FLOWLINE UPPER (ft.)	LOWER (ft.)	FALL (ft.)	# BR / LS	PIPE SIZE (in.) / RISE / SPAN	SLOPE % / HGL / PHYS. MIN.	ACTUAL VEL. / PHYS. / VEL. (fps)	FULL FLOW CAP. (cfs)	NOTES & REMARKS
CL710			**S-428**			0.81	1.92	0.77										25.58	25.31	0.27		30.00	0.063	2.28		ZONE: 8
				P-4	432.01	0.43	1.15	0.09	16.64	3.16	5.44	2.06	0.00	**11.18**	0.00	28.63	**3.04**	22.49	22.16		1		0.076		12.32	FREQ. (Yrs): 3
677+32	61.50	Rt.	S-427			0.00	0.00	0.00					0.00					19.99	19.66	0.33		30.00	0.076	2.51		MANNINGS n: 0.0120
CL710			**S-429**			0.75	1.11	0.71										25.67	25.58	0.08		24.00	0.074	2.13		
				P-4	113.85	0.49	0.72	0.10	15.75	0.89	5.56	1.20	0.00	**6.68**	0.00	28.63	**2.96**	22.10	21.99		1		0.097		7.72	
677+32	52.35	Lt.	S-428			0.00	0.00	0.00					0.00					20.10	19.99	0.11		24.00	0.102	2.46		TAILW EL (ft): 24.76
CL710			**S-430**			0.00	0.37	0.00										25.84	25.67	0.17		18.00	0.044	1.36		
				MH-7	388.25	0.00	0.22	0.00	12.51	3.24	6.07	0.39	0.00	**2.40**	0.00	29.72	**3.88**	22.18	21.60		1		0.149		4.42	
681+20	66.16	Lt.	S-429			0.00	0.00	0.00					0.00					20.68	20.10	0.58		18.00	0.150	2.50		
CL710			**S-431**			0.19	0.37	0.18										25.93	25.84	0.09		18.00	0.049	1.42		
				P-3	187.04	0.11	0.22	0.02	10.96	1.56	6.37	0.39	0.00	**2.51**	0.00	31.10	**5.17**	22.46	22.18		1		0.150		4.44	
683+07	62.45	Lt.	S-430			0.00	0.00	0.00					0.00					20.96	20.68	0.28		18.00	0.150	2.51		
CL710			**S-432**			0.18	0.18	0.17										25.95	25.93	0.01		18.00	0.012	0.70		
				P-3	114.72	0.11	0.11	0.02	10.00	0.96	6.58	0.19	0.00	**1.24**	0.00	29.96	**4.01**	22.63	22.46		1		0.148		4.44	
683+24	51.00	Rt.	S-431			0.00	0.00	0.00					0.00					21.13	20.96	0.17		18.00	0.150	2.51		

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

T60v3FDOT.RPT 7/10/2008

Appendix 9
Correspondence

MEETING MINUTES

DRAINAGE KICK-OFF MEETING
SR 710 from US 441 to the L-63 Canal
FPID No. 419344-3-52-01

February 18, 2013, 9:00 am; FDOT, District 1, Bartow Office

Attendees:
Amy Setchell –FDOT, Project Management
Carl Spirio – FDOT, Drainage
Brent Setchell –FDOT, Permitting
Martin Horwitz – FDOT, Permitting
Joel Hobbs – FDOT, PE Trainee
Brian Kirwan – The Wantman Group, PM - Design
Eric Lanning – The Wantman Group, Roadway
Greg Griffith – The Wantman Group, Permitting
Greg Seidel – The Balmoral Group, Drainage
Lori Stanfill – The Balmoral Group, Drainage

1. Brian Kirwan began by giving an overview of the proposed SR 710 project limits and proposed typical sections.

2. Greg Seidel described the proposed drainage design and the potential pond sites. When asked if potential pond sites should be discussed more in-depth at this time, Brent Setchell advised that a Pre-Pond Siting Meeting be scheduled with the R/W Department. Prior to this, a Pre-Application Meeting with SFWMD should also be scheduled. Brent would like to be notified and/or attend this meeting.

   The first drainage basin and the potential pond locations within this area were reviewed. Pond Alternate 1A is located before (800' west) of the Begin Project station). Carl Spirio remarked that it would be more desirable to use the Pond Alternate 1B site which is adjacent to Taylor Creek (west side). The 1A site is adjacent to an existing FDOT pond.

   In proposed Basin 4, look at the remnant parcels (owned by Berman Ranch) for use as an alternate pond site.

   In proposed Basin 5, the parcel on the northeast side of SR 710 was investigated as a potential pond site. Owned by Okeechobee County, this parcel is the Front Entrance to the Agriculture Center. The FDOT has been in recent negotiations with Okeechobee County regarding use of this parcel for a bridge widening project at SR 70 and L-63 N Canal. It is advised that use of this parcel should be avoided. Amy Setchell will search for the plans/BHR for the bridge widening project. Due to R/W issues, the project required 8

months to acquire the SFWMD permit. An access permit was given to the SFWMD.

Brent Setchell noted that for the PSR, pond treatment estimates should continue to incorporate the additional 50% treatment when discharging to impaired water bodies.

3. Permit issues for the project were discussed. Due to the project being located within a pumped basin, the project criterion consists of the Basin S-133 allowable discharge of 15.6 csm (0.024 cfs per acre). This equates to 1.5 cfs for the entire project. Greg Seidel mentioned investigating an outfall to the L-63N Canal which would allow for higher discharge rates.

   Brent mentioned that the first Lake Okeechobee BMAP Meeting is starting on Wednesday, February 20 which he is planning to attend.

   Carl discussed that other options should be explored for this project. As the project progresses, opportunities to receive credit for improving the basin may present themselves. This may include improving pump systems or improving Taylor Creek. Other options may include design of a regional pond instead of multiple ponds under House Bill 599 (Regional Treatment). If there are communities flooding downstream, maybe an option for the FDOT to improve the basin will present itself. TMDL removal should be documented as an opportunity to gain credit also.

   The difficulties with TMDL removal and the proposed typical section were discussed. For the TMDL calculations with the urban typical section, the existing condition DCIA will be 0% while the proposed condition DCIA will be 100% requiring bigger treatment volumes. The wet detentions pond max out at approximately 43% Nitrogen removal and 70% Phosphorus removal. Dry treatment swales are currently proposed on one side of the project to aid in meeting the reduction requirements.

   For seasonal high water determination, Brent mentioned to request that the FDOT Geotechnical Department install piezometers. Also, it will be necessary to scrutinize the seasonal highs as old indicators may be perched, and never achieve this elevation again due to the canal.

   As the existing pond at intersection of SR 70 and proposed SR 710 has been recently modified (weir raised), check the SFWMD website for permit information. Balmoral will research the SFWMD permitting website for this permit.

4. Greg Griffith presented the environmental and permitting concerns for the project. A wetlands discussion ensued. Greg Griffith mentioned that he is awaiting the full R/W to be staked out before delineating wetlands. Brent stated he would like to be notified and/or present when the wetlands are

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flagged. Greg Griffith will investigate which mitigation banks are to be used. Bluefield Ranch was mentioned. Endangered Species surveys are currently ongoing for the PD&E and will be updated/revised at within the appropriate timeframe when the actual permitting has begun.

5. Potential R/W issues regarding the bridge crossings were discussed at this time. The SFWMD owns the R/W for Taylor Creek so R/W permitting will go through the West Palm Office. Initial bridge hydraulics work has been completed for Taylor Creek and a box culvert was analyzed along with a bridge due to the proximity of the location to a hospital. The pile driving needed for bridge construction might be disturbing, therefore, a proposed 8 – 12' x 14' box culvert was analyzed. Carl Spirio thought that a Conspan structure should be further investigated. Although possibly a little more expensive, less boxes could be used. The box culvert option should be discussed with the SFWMD. The SFWMD has a 0.1' head loss criteria. As the crossing is located within a lock area, large boat navigation is not an issue.

   Brent Setchell recommended that the L-63N Canal crossing be purchased as a fee simple transaction and then return an easement to the SFWMD for the canal and canal access requirements. This will be similar to what occurred on the recent SR 70 project.

   The Drainage Kick-Off Meeting ended, and the Roadway Design Meeting started.

c. Attendees
   Peter Rogas, RS&H

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MEETING NOTES

SFWMD PRE-APPLICATION MEETING
SR 710 from US 441 to L-63N Canal
FPID Number 419344-3-52-01

May 29, 2013 10:00 a.m., SFWMD Okeechobee Service Center

The purpose of the meeting is to present the project, present and discuss the approach for the stormwater management facilities and review the permitting requirements. The potential stormwater pond sites will also be presented for review and discussion. The following are highlights of the conversation.

1. Brian Kirwan provided a description of the project which consist of new construction of SR 710 from US 441 to L-63N. The typical section will be a four-lane suburban section with curb and gutter. A sidewalk will be included on the north side of the project and a treatment ditch is currently proposed on the south side

2. Greg Seidel provided a review of the drainage basins utilizing the board from the Wantman presentation which shows the presentation pond sites and the PD&E Pond Sites.

3. A discussion of stormwater management ensued – the following items were noted:

    a. The project is located in the S-133 Basin which has an allowable discharge of 15.6 CSM. It was agreed that the SR 710 project could utilize a pre-post method. Kelly Cranford added the pre-development calculations needed to be reasonable and to review the permit for North Shore Village for additional information. Likewise, the Industrial Park at the beginning of the project has a permitted discharge through the Industrial Park project which would be considered the allowable discharge at that outfall location.
    b. 2 ½ inches over the impervious area will be the controlling factor for water quality. The additional 50% requirements for impaired water bodies will not be needed as the pre-post nutrient loading calculations will show that there are no offsite water quality impacts. Basin will be top of slope to top of slope for the Typical Section.
    c. Pasture is acceptable for EMC values for the areas that are currently pasture.
    d. Drawdown in the wet ponds will be ½" of runoff over the basin in 24 hours. It is expected that the minimum 3" bleeder will be utilized on the control structures.
    e. Mr. Seidel inquired if a new outfall to the L-63N canal would be permittable given that both the L-63N canal and Taylor Creek discharge to Lake Okeechobee. Kelly Cranford responded that coordination with the SFWMD operations would be required to determine if the canal had the available capacity and, if so, the approach would be reasonable. Mr .Seidel mentioned that this would help reduce the

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nitrogen and phosphorous loading to Taylor Creek while still meeting pre-post phosphorous loading in Lake Okeechobee. Brent Setchell asked the Balmoral Group to inquire if the outfall permit could be included in the R/W modification permit for the L-63N bridge work.

f. It was mentioned that reduced discharges to Pine Ridge Park would be beneficial and Cypress Quarter had undertaken several retrofit projects.
g. Mr. Seidel noted the floodplain maps had not been updated and were vague representations, at best, as the impacts of the canals was not included. It was noted that Taylor Engineering was in the process of updating the flood maps. If new maps are not available, Mr. Seidel proposed to evaluate floodplain impacts based on updated modeling based on LiDAR contours of the surrounding area and show no increase in to existing flood stages. This approach was considered reasonable. Carl Spirio added that the roadway should be checked for evacuation route status.

4. A discussion of environmental considerations ensued – the following items were noted:

a. Ponds needed to maintain a 75 foot setback from private wells.
b. A minimum 25 foot buffer should be located between any ponds and wetlands, otherwise, secondary impacts will need to be included. Discharges to the wetland should be low velocity or impacts will be accessed. Secondary impact distances will vary for associated roadway impacts. Wantman Group (WGI) staff conducted a wetland delineation of the proposed alignment on May 22nd and 23rd. At the time of the meeting these wetland lines were being surveyed so an acreage of impacts is not yet available. Wetlands locations depicted in the National Wetlands Inventory (NWI) are fairly consist with actual field conditions. Through the southern and middle sections of the alignment wetland impacts will be mostly depressional features while some Cypress/Cabbage Palm hammocks will be impacted in the middle and western sections. There are some minor Other Surface Waters (OSW) impacts located throughout the pasture and near the SR-710/Mosquito Creek bridge as well.
c. No Threatened & Endangered (T&E) Species were observed while WGI staff were in the field, however more in depth surveys will be conducted prior to construction. It was noted that a Crested Caracara *(Caracara cheriway)* nest was observed at the southern end of the project.
d. The Modified WRAP (M-WRAP) assessment method shall be used for primary and secondary impacts due to the regional mitigation banks being permitted in WRAP and banking being FDOT's preferred mitigation option.
e. It was noted that a conservation easement was recently recorded west of Mosquito Creek and north of SR 710. Additionally, a wetland line was surveyed to the west on a private parcel to evaluate filling operations in the area. The SFWMD will provide this wetland line to the FDOT.

5. The following items from miscellaneous discussion were noted:

a. Carl Spirio inquired about any regional stormwater management projects that my under consideration in the area. The SFWMD was not aware of any and suggested checking with the FDEP. Carl mentioned a possible filter marsh on

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Taylor Creek. Mr. Seidel added that a control structure could be constructed as part of the proposed culvert crossing of Taylor Creek.

b. The ditch north of the proposed Taylor Creek crossing is referred to as the "City Limits Ditch" and has a history of erosion issues.

c. Brent Setchell relayed some of the requirement for the L-63N canal bridge would include a survey of the channel at all faces of the existing and proposed bridge and the original canal width design would need to be restored during construction. He added that 1 method of construction will need to be shown in the plans and to include mixing zones.

ACTION ITEMS

- Balmoral Group to follow up with Taylor Engineering on the status of the updated FEMA maps.
- Balmoral Group to contact SFWMD Operations to determine available capacity in the L-63N canal.
- SFWMD to provide wetland survey of property near Agricultural Center entrance.
- Wantman to schedule a meeting with Brent Setchell to discuss approaches for the SFWMD ROW permit based on the nearby SR 70 Widening project.

ATTACHMENTS

Sign in Sheet

c. Attendees

Amy Setchell, P.E., Project Manager, FDOT

165 Lincoln Avenue | Phone: 407.629.2185
Winter Park, FL 32889 | Fax: 407.629.2183
www.balmoralgroup.us

SIGN IN SHEET

SFWMD PRE-APPLICATION MEETING
SR 710 from US 441 to L-63N Canal
FPID Number 419344-3-52-01

Location: Okeechobee Service Center
Date: May 29, 2013
Time 9:30 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS
GREG SEIDEL	BALMORAL GROUP	PROJECT DRAINAGE ENGINEER	gseidel@balmoralgroup.us
BRIAN KIRWAN	WANTMAN GROUP	DESIGN PROJECT MGR	brian.kirwan ewantmangroup.com
GREG GRIFFITH	WANTMAN GROUP	ENV. PERMITTING	greg.griffith@wantmangroup.com
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CARL SPIRIO	FDOT	DRAINAGE/PERMITTING	carlton.spirio@dot.state.fl.us
KELLY CRANFORD	~~FDOT~~ SFWMD	REGULATION - SECTION LEADER	KCRANFOR@SFWMD.GOV
Eve Raymond	SFWMD	Regulation - Env. Review	eraymon@sfwmd.gov
Carolyn McCreedy	SFWMD	Regulation - Surface Water	cmccreed@sfwmd.gov

MEETING MINUTES

PRE-POND SITING REPORT / RIGHT-OF-WAY MEETING
SR 710 from US 441 to the L-63N Canal
FPID No. 419344-3-52-01

September 9, 2013, 9:30 am; FDOT, District 1, Bartow Office

Attendees:
Amy Setchell –FDOT, Project Management
Kevin Ingle – FDOT, Project Management
Joe Harper – FDOT, Right-of-Way
Brent Setchell –FDOT, Permitting
Carl Spirio – FDOT, Drainage
Brian Kirwan – The Wantman Group, PM - Design
Alfredo Rodriguez – The Wantman Group, Roadway
Greg Griffith – The Wantman Group, Permitting
Greg Seidel – The Balmoral Group, Drainage
Jennifer Nunn – The Balmoral Group, Drainage
Lori Stanfill – The Balmoral Group, Drainage

1. Brian Kirwan began by giving an overview of the proposed SR 710 project limits.

2. Greg Seidel described the proposed pond alternative locations and impacted parcels. Seventeen potential sites within five basins were reviewed. Based on the discussion, four pond alternatives will require minor adjustments. One potential pond site will be removed. After the potential sites have been updated, the geotechnical, cultural resource, contamination, biological, wetland, and economic (right-of-way cost) assessments can be conducted.

3. As time was limited, Brian Kirwan briefly discussed SR 710 road right-of-way impacts before the meeting concluded.

c. Attendees

165 Lincoln Ave | Phone: 407.629.2185
Winter Park, FL 32789 | Fax: 407.629.2183
www.balmoralgroup.us

Memo

To: Bob Hindman, Okeechobee Maintenance

From: Lori Stanfill, Balmoral Group

CC:

Date: January 22, 2014

Re: SR 710 PSR & BHR – Okeechobee County

I spoke with Bob Hindman regarding any flooding or maintenance issues in the vicinity of the SR 710 project. I inquired about specific areas of interest including:

1. The existing pond located west of US 441 and south of the City Ditch – Mr. Hindman stated that he is not aware of any problems with this ponds function. However, there are erosion issues with the City Ditch which is frequently flowing full after heavy rainfall events. He stated that there is not flooding problems in this area, mostly just erosion. He is not aware of any issues with Taylor Creek to the east, but does not maintain Taylor Creek R/W.
2. Existing pond at SE corner of SR 70 & NE 34th Avenue. No problems with this pond, but there has been flooding problem in outfall ditch along SR 70 just east of the Agricultural Park Area. He has had to have crews clean out the outfall ditch.
3. SR 710 from west of L-63N Canal to Mosquito Creek. He is not aware of any flooding issues even adjacent to Mosquito Creek or at the L-63N Canal. He noticed that rubble riprap was installed as channel protection against scour within the L-63N Canal several years ago.

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Stakeholder Meeting Minutes
FPID No. 432644-1-32-01 – D1 DW Drainage

Location: SFWMD Okeechobee Service Center, Okeechobee
Date: July 31, 2014
Time 10:30 am

The purpose of the meeting is to introduce the SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study as an investigation being undertaken by the FDOT District One as a part of the SR 710 new alignment project in Okeechobee.

Attendees: See attached Sign-In Sheet

1. Mr. Brent Setchell gave an introduction on the SR 710 Feasibility Study.

2. Mr. Greg Seidel gave a brief project history explaining how the SR 710 Feasibility Study has progressed to this point.

3. Mr. Greg Seidel introduced the regional pond alternative that is to be constructed by the FDOT for the SR 710. This option would incorporate offsite areas associated with Lower Taylor Creek.
    a. Representatives from Okeechobee County confirmed the airport ditch is owned by the County from Taylor Creek up to airport property.
    b. Mr. Setchell voiced his concern about conveying water from the airport ditch to the regional pond. He mentioned the preferred option on behalf of the FDOT would be to provide the required 1-inch of treatment for the SR 710 roadway and demonstrate that the nutrient removal shows a net benefit to the community.
    c. Mr. Seidel mentioned that a lower treatment depth could be provided. He also indicated that a control structure could be located at Taylor Creek and securing flood rights from the property owners could be an option.
    d. Mr. Setchell explained the SR 710 Regional Pond approach in that Basins 1 and 2 would be treated by the Regional Pond, Basin 3 and a portion of Basin 4 would pre-treat via the existing pond and that the remaining runoff would discharge directly to the L-63N Canal.

4. Ms. Janet Hearn introduced the Stormwater Treatment Area (STA) alternatives which would require interagency cooperation and be hydraulically connected to the L63-N canal and Upper Taylor Creek.
    a. Ms. Hearn said that for planning purposes a 100-acre STA is being evaluated. This is comparable to the Taylor Creek STA which has a treatment area of 118 acres. A 100 acre STA could remove about 1,500 to 1,600 kg of TP per year. An overview of three potential locations for a 100 acre STA within the Hamrick property was presented. These three sites were selected to avoid wetlands.

b. The Lake Okeechobee TMDL requires an in-lake concentration of 40 parts per billion (ppb) TP.
c. FDEP added that the existing Taylor Creek STA provides approximately 1520 kg of removal.
d. The STA 2 option would require some rehabilitation of the existing wetland in order to retain runoff from the surrounding property. This would provide additional storage and remove approximately 180 kg TP per year without additional flow from the L-63N Canal or Upper Taylor Creek.
e. The STA 2 option could provide up to 1000 kg of removal if inflow was augmented with flow from L-63N Canal.
f. Mr. Morris Crady asked if a combination of STA 1 and STA 2 would be possible in order to still use the property (i.e. for walking trails) in the winter. Mr. Seidel responded by saying the final STA choice is not part of the feasibility study and would be coordinated under final design.
g. Mr. Setchell liked the fact that the STA 2 option would provide some treatment and attenuation. However, he expressed some concern for the STA 2 option since the restored wetlands would be limited on the treatment volume depth (storage) provided. Would this option still require a control structure and how would the western bank of Lower Taylor Creek be affected?
h. If an STA option is chosen, FDOT would still need to obtain fill for the SR 710 project and this could be coordinated through agreements.
i. Mr. Hamrick asked if an STA option would impact ranch operations. Ms. Bonnie Wolff Pelaez confirmed that the BMAP manual does not restrict cattle from the wetlands.
j. Mr. Hamrick mentioned that the wetland portion of his property is the emotional piece, and the upland portion of his property is the economic piece.

5. Mr. Seidel mentioned that if an STA option was selected, FDOT would not be taking the lead on this design and this would most likely fall to the FDEP or SFWMD.

6. Mr. Jim Threewits reiterated his concerns with ponds adjacent to the right-of-way. The County has requested from FDOT that the new SR 710 alignment be a main corridor to attract development. The County wants this gateway to be pretty and attractive for development and does not want unattractive ponds or ponds along the roadway frontage. Mr. Threewits feels this is a chance to do something good and doesn't want to miss out and added that this is a very valuable piece of the land to the county.
    a. Mr. Setchell responded by saying that FDOT is evaluating the need for pond fencing. FDOT is open to providing drainage easements for property owners to provide pond maintenance.
    b. Mr. Setchell stated that FDOT does not want to move ponds away from the right-of-way due to the hydraulics and increase in cost.

7. Mr. Seidel commented that the current schedule calls for a decision to be reached by the end of the year.
    a. Ms. Amy Setchell responded that the draft Feasibility report is due Sept. 22nd with the final report due Oct. 22nd.

b. The next step is to review the information presented today individually with the stakeholders and obtain feedback as necessary.
c. Final calculations need to be performed.

End of Minutes

c. Attendees
Carl Spirio, P.E., FDOT Drainage
Alfredo Rodriguez, P.E., Wantman

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Stakeholder Meeting
Sign-In Sheet
FPID No. 432644-1-32-01 - D1 DW Drainage

Location: SFWMD Okeechobee Service Center Auditorium
3800 NW 16th Boulevard, Suite A, Okeechobee, FL 34972
Date: July 31, 2014
Time 10:30 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS	Initials
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Brent Setchell	FDOT	Permitting	Brent.Setchell@dot.state.fl.us	
Amy Setchell	FDOT	PM	Amy.Setchell@dot.state.fl.us	
Kevin Inlge	FDOT		Kevin.Ingle@dot.state.fl.us	
Jeffrey Mednick	FDOT		Jeffrey.Mednick@dot.state.fl.us	
Michael Hamrick	Property Owner	Hamrick & Sons	MHamrick@manateelegal.com	
Morris Crady	Lucido & Assoc.	Hamrick & Sons	mcrady@lucidodesign.com	
Maryann Hamrick	Property Owner	Hamrick & Sons	Annie4UF@aol.com	
Regina Hamrick	Property Owner	Hamrick & Sons		
Gregory Seidel	The Balmoral Group	Project Drainage Engineer	gseidel@balmoralgroup.us	
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Alfredo Rodriguez	Wantman Group	Consultant Asst. PM	Alfredo.rodriguez@wantmangroup.com	
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Jim Threewits	Okeechobee Co.	Admin	jthreewits@co.okeechobee.fl.us	
Kelly Baney	Okeechobee Co.		kbaney@co.okeechobee.fl.us	
Katie Hallas	FDEP	PHONE	Katie.Hallas@dep.state.fl.us	
Elizabeth Alvi	FDEP	PHONE	Elizabeth.Alvi@dep.state.fl.us	
Jim Jeffords	USACE		jim.w.jeffords@usace.army.mil	
David Allen	City of Okeechobee		dallen@cityofokeechobee.com	
Lesley Bertolotti	SFWMD		lbertolo@sfwmd.gov	
Bonnie Wolff Pelaez	FDACS		Bonnie.WolffPelaez@freshfromflorida.com	
Regina Hamrick				

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Stakeholder Meeting
Sign-In Sheet
FPID No. 432644-1-32-01 - D1 DW Drainage

Location: SFWMD Okeechobee Service Center Auditorium
3800 NW 16th Boulevard, Suite A, Okeechobee, FL 34972
Date: July 31, 2014
Time 10:30 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS	Initials
GARY RITTER	SFWMD	INTER GOV	gritter@sfwmd.gov	GR

MEETING NOTES

SFWMD PRE-APPLICATION MEETING #2
SR 710 from US 441 to L-63N Canal
FPID Number 419344-3-52-01

March 24, 2015 10:00 a.m., SFWMD Okeechobee Service Center

The purpose of the meeting is to review the SFWMD comments on the regional pond approach clarify SFWMD permitting requirements and discuss the approach for the stormwater management facilities. The following are highlights of the conversation.

1. Greg Seidel provided a project description showing an overview of the project limits and the current typical section. The project consists of new construction of SR 710 from US 441 to L-63N. The typical section will be a four-lane suburban section with curb and gutter. An asphalt path will be included on the north side of the project and sidewalk on the south side. The previously proposed treatment swale on the south side has been eliminated.

2. Mr. Seidel noted that the 1st Pre-Application meeting was held on May 29, 2013.

3. Mr. Seidel provided a quick overview of drainage basins, flow patterns and water resources issues and summary of Regional Pond/STA study. It was noted that the FDOT had added another option to the study which included a wet detention pond with the water being pumped from the adjacent L-63N canal to the regional pond for treatment and gravity discharge back into the canal.

4. It was noted that the upon completion of the final Pond Siting Report, FDOT will proceed with the preferred option which will likely be the regional pond option to address new SR 710 alignment runoff water quality/quantity requirements Brent Setchell indicated in order for the STA option to move forward an agreement or MOU of participating funds from other stakeholders would be needed by September 4, 2015 in order to meet FDOT's schedule.

5. At FDOT's request, regional pond option B was moved closer to L-63N canal for the following reasons –

    a) Locates the pond outside 10,000-ft range of airport
    b) Eliminates need for costly rubble riprap on pond slopes
    c) Shortens length of pipe needed to pump from L-63N canal

d) Eliminates the mixing of basins. The pumped water from the L-63N will discharge back to the L-63N rather than discharging into Lower Taylor Creek.

However, this change also caused:

a) The regional pond location to move higher ground
b) Lost capability to send large portion of SR 710 runoff to the new pond location due to higher SHWE at new pond location.

Greg Seidel noted that remaining portion of SR 710 not directed to the regional pond would employ minimal Best Management Practices prior to discharge to Lower Taylor Creek or the L-63N.

6. Brent Setchell asked if the reduction of SR 710 runoff being directed to the regional pond without formal treatment would be acceptable. Jesse Markle indicated this would be acceptable since compensatory treatment is provided in the regional pond (ie Ac-ft) and FDOT will demonstrate via Nutrient loading calculations that there is a significant improvement treating water from L-63N canal versus treating runoff from SR 710.

7. It was also confirmed with operations (Zhiming Chen) that the new discharge locations into the L-63N would not impact the capacity of the canal to pass flood discharges. It was noted that the expected discharge rates from the roadway would be around 50 cfs and the canal design flow rates are around 7,000 cfs. Additionally, the roadway discharge would peak well before the canal would reach peak stage. The project will be able to demonstrate that no additional runoff volume will be added to the Lower Taylor Creek pumped discharge to Lake Okeechobee.

8. FDOT will consider bringing the regional pond closer to SR 710 and will weigh this against property access considerations for current property owner (Hamrick).

9. SFWMD will require min 15-ft from toe of levee to top of bank for regional pond.

10. Location of pump station should be coordinated with SFWMD Operations to ensure no impediment to levee access or regional pond access.

11. SFWMD will provide plans/specs for pump station layout constructed along levees.

12. The nutrient loading reduction calculations uses Harper wet detention methodology based on residence time, but using pumping rather than rainfall.

13. Pumping is less efficient than rainfall (shorter residence time), but significantly higher volume results in greater overall benefit.

14. Size of regional pond (26 ac) equates to estimated amount of fill material needed for SR 710 construction. It was noted that the size of pond far exceeds water quality/quantity and nutrient removal requirements for runoff from SR 710.

15. The FDOT is not planning to use vegetative treatment, residence time only. It was suggested that the SFWMD take over maintenance and operation of the pond and the performance of the regional pond should be monitored post-construction (potential pilot project) to determine ideal flow rate. FDOT would prefer to transfer O&M of the proposed pump station to SFWMD or FDEP. The Operation schedule will need to take into consideration dry season water levels in L-63N canal. The nutrient removal estimate was based on the annual average and should be investigated. A variable speed pump should be considered to increase flow rate during wet season, reduce flow rate (or stop pumping operation) during dry season, to meet annual average targets. Brent Setchell will determine if FDOT will accept pump station O&M as fallback position if SFWMD will not accept O&M.

16. Leslie Bertolotti inquired what FDOT was specifically requesting from SFWMD by the Sept 4, 2015 deadline. Brent Setchell stated that FDOT needed to compile the remaining estimated costs and present a proposal to SFWMD (and/or FDEP) to consider.

17. The intake and outfall structures which impact the L-63N canal/levee will require a SFWMD ROW permit and ACOE Section 408 approval.

18. Tom Colios noted that removal of water from L-63N canal will require Water Use permit or MOU from Governing Board. He recommended considering pursuing MOU since regional pond is a potential pilot project and, that once in operation, the pond would switch to a Water Use permit. SFWMD will provide a template MOU. It was added that the Regional Pond Pump Option would not need a consumptive water use permit until operational parameters were determined during the MOU.

19. SFWMD Operations will provide guidance on low water elevation in L-63N canal to determine if/when pumping should stop during certain times of year.

20. Greg Seidel noted that the estimated pump station cost $500,000 was based on 5 cfs flow rate pump from the 2011 SFWMD documents.

21. FDOT is requesting final decision from SFWMD by September 4, 2015 on participation in STA option. The FDOT R/W acquisition is funded over 3 years beginning FY 2017 (July 2016) with final signed & sealed R/W Maps

complete June 2016. SR 710 is not funded for construction yet. July 2019 is the earliest construction funds could be programmed based on R/W acquisition schedule.

22. SFWMD participating funds for STA option could be applied to R/W costs, acceptance of pump station O&M costs or additional construction costs. It was noted that the larger STA option will need the property owner to be willing seller if additional R/W is not subject to eminent domain.

23. A complete review of initial comments from SFWMD on STA/Regional Pond Feasibility Study was not completed as the commenting parties were not all available. It was noted by Kevin Carter that the SFWMD preferred the Regional Pond Option A as presented in the report. However, the cost of the modification to US 441 and the riprap for the airport have made this option not favored by FDOT. It should be noted that the comments are not considered resolved and discussions are ongoing.

24. FDOT will prepare a summary of costs to present to SFWMD for determining if participating funds will be applied. This will include Research and Design costs typically associated with STAs.

Action Items

1. FDOT to prepare final presentation to FDEP and SFWMD with expected costs and proposed alternative.
2. Brent Setchell to determine if FDOT will agree to long term maintenance of pumps.
3. Greg Seidel to check with Janet Hearn for the Research & Design costs for STA facilities.
4. Leslie Bertolotti to provide long term monitoring costs of water quality.

c. Attendees (Via Email)
Amy Setchell, FDOT Project Manager
Carl Spirio – FDOT, Drainage
Greg Griffith – The Wantman Group, Permitting
Jennifer Nunn – The Balmoral Group, Drainage

Attachments – Agenda, Agenda Exhibits

SIGN IN SHEET

SFWMD PRE-APPLICATION MEETING 2
SR 710 from US 441 to L-63N Canal
FPID Number 419344-3-52-01

Location: Okeechobee Service Center
Date: March 24, 2015
Time 10:00 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS
Henri Belrose	Wantman Group	Tampa / Project Manager	Henri.Belrose@wantmangroup.com
Alfredo Rodriguez	Wantman Group	Orlando / Asst. Project Manager	Alfredo.Rodriguez@wantmangroup.com
JESSE MARKLE	SFWMD	OKEECHOBEE / ERP	JMARKLE@SFWMD.GOV
GREG SEIDEL	BALMORAL GROUP	@ WINTER PARK / DRAINAGE	gseidel@balmoralgroup.us
Michelle Reichert	SFWMD	OKFS / Right of Way	Mreicher@SFWMD.gov
Brent Setchell	FDOT	FDOT - Permits	brent.setchell@dot.state.fl.us
~~phone participants?~~			
LESLEE BERTOLOTTI	SFWMD	PRINCIPAL SCIENTIST	lbertolo@sfwmd.gov
KEVIN CARTER	SFWMD	LEAD SCIENTIST	kecarter@sfwmd.gov
TOM COLIOS	SFWMD	SECTION LEADER (CUP)	tcolios@sfwmd.gov
Ceyda Polater	SFWMD	LEAD ENGINEER	cpolatel@sfwmd.gov
Zhiming Chen	SFWMD	PRINCIPAL ENGINEER/ WATER MANAGER	zhchen@sfwmd.gov

MEETING NOTES

SR 710 REGIONAL POND PRESENTATION TO SFWMD
SR 710 from US 441 to L-63N Canal
FPID Number 419344-3-52-01

July 7, 2015, 1:00 P.M.,
SFWMD Headquarters, West Palm Beach - Building B1; Room 3B

The purpose of the meeting is for the FDOT to present a proposed Regional Pond alternative to the traditional FDOT "postage stamp" ponds. FDOT requested SFWMD to take over operation and maintenance of the regional treatment facility after construction. The following are highlights of the conversation.

1. Brent Setchell provided the introduction and background for the project. This included discussions of sizing and locating the proposed Regional Stormwater Pond in its current location. Brent noted that the pond was shown with 4 cells but could be configured differently as long as enough fill material was generated for the roadway project.

2. Brent Setchell presented the cost estimates developed for the standard pond sites versus the regional pond site. He noted that the FDOT was not interested in maintaining the pond site due to the required pump station and long term maintenance costs that exceed that of the postage stamp ponds. He indicated that the FDOT would maintain ownership but have a maintenance agreement with the entity that would maintain the facility.

3. Discussion ensued regarding the cost estimates. SFWMD will review and provide comment. Brent noted that the cost estimate did not include water quality sampling and testing which would likely be a condition of FDOT's ERP permit to demonstrate net improvement.

4. The effectiveness of the facility for removal of phosphorous was discussed. It was noted that the Dr. Harper/Permanent Pool calculations were used based on pumping flow rates for 21 day residence time and a 150 day residence time. It was also noted that the flow and concentrations in the L63-N canal are very seasonal. Greg Seidel added that Janet Hearn with ATM, Inc. had researched the available data and provided the data to Balmoral. It was agreed that Balmoral would share the spreadsheets with the SFWMD to review the calculated removal efficiencies. Beth Alvi noted that there may be a Thirsty Duck project in Pinellas County that utilized continuous flow in a wet detention facility and would check for information on effectiveness.

5. Brent Setchell indicated that a decision was needed by Sept 4, 2015 and that the current R/W funding is for fiscal year 2018 but no construction funding is programmed.

6. Greg Seidel noted that the required phosphorous removal for the project was minimal and that the pond could be constructed as a test facility with multiple cells and still meet the project requirements for nutrient removal.

Action Items

1. Balmoral to provide nutrient loading calculations and phosphorous testing information to the SFWMD.
2. SFWMD to provide comments on cost estimate and removal estimates.
3. Beth Alvi to check into Pinellas County project for data.
4. SFWMD and FDEP to determine if they will be able to provide maintenance for the proposed facility.

c. Attendees (Via Email)
Carl Spirio – FDOT, Drainage
Kevin Carter, SFWMD
Greg Griffith – The Wantman Group, Permitting
Jennifer Nunn – The Balmoral Group, Drainage

Attachments – Sign in Sheet, Agenda, Agenda Exhibits

SIGN IN SHEET

SR 710 REGIONAL POND PRESENTATION TO SFWMD
SR 710 from US 441 to L-63N Canal
FPID Number 419344-3-52-01

Location: SFWMD Headquarter, West Palm Beach
Date: July 7, 2015
Time 1:00 pm

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS
GREG SEIDEL	BACMORAL GROUP	PROJECT DRAINAGE ENG	gseidel@cfl.rr.com
Tom Teets	SFWMD	SFWMD/Everglades Policy	tteets@sfwmd.gov
Lesley Bertolotti	SFWMD	Everglades Policy	lbertolo@sfwmd.gov
Jim Albers	SFWMD	Eng & Const	jalbers@sfwmd.gov
Henri Belrose	WGI	proj. manager, rdwy design	henri.belrose@wantmangroup.com
Alfredo Rodriguez	WGI	Asst. Project Manager, rdwy design	alfredo.rodriguez@wantmangroup.com
Joel Arrieta	SFWMD	O&M	JArrieta@SFWMD.GOV
Joyce Zhang	SFWMD	Lakes River	jzhang@sfwmd.gov
PHONE -			
AMY SETCHELL	FDOT	PROJECT MANAGER	Amy.Setchell@dot.state.fl.us
BETH ALVI	FDEP	PROGRAM ADMINISTRATOR	ELIZABETH.ALVI@dep.state.fl.us
SARA DAVIS	FDEP	GRANTS SPECIALIST	sara.c.davis@dep.state.fl.us
KEVIN COYNE	FDEP	ENVIRONMENTAL ADMINISTRATOR	kevin.coyne@dep.state.fl.us

MEETING MINUTES

PSR POND ALTERNATIVE REVIEW MEETING
SR 710 from US 441 to the L-63 Canal
FPID No. 419344-3-52-01

April 7, 2016 at 1:00 pm; FDOT, District 1, Bartow Office

Attendees:
Brent Setchell –FDOT, Permitting
Nicole Monies– FDOT, Permitting
David Turley – FDOT, Project Management
Alfredo Rodriguez– The Wantman Group, Assistant PM
Greg Seidel – The Balmoral Group, Drainage
Lori Stanfill – The Balmoral Group, Drainage

Greg Seidel described the proposed pond sites from the Draft Pond Siting Report (PSR) (dated March, 2014). During the process of addressing FDOT comments and investigation of the regional pond, these pond sites were updated. The original pond recommendations from the Draft PSR were Ponds 1B, 2C (Option1), 3C, 4B (Option 2), and 5B. Based upon the discussion during this meeting and other project updates, the recommended pond sites remained the same as the original estimates except in Basins 3 and 5. For Basin 3, Pond Site 3B is now preferred, and further investigation is needed in Basin 5 to determine the recommended site.

1. For Basin 1, the costs of Pond 1A ($291,167) and Pond 1B ($301,023) are relatively close. Pond 1B is located closer and just adjacent to the Taylor Creek outfall. It is also in a better location than Pond 1A for conveyance of roadway runoff to the site. Therefore, Pond 1B is still the recommended option in this basin.

2. In Basin 2, Pond Site 2C (Option 1) is still the recommended pond site, however, it is within 10,000 feet of the local airport. Due to this, Brent Setchell suggested that riprap be added to the pond cost estimate and re-evaluate.

3. In Basin 3, Pond 3B is now recommended as compared to Pond 3C. FDOT will expect suitable landscaping on this site particularly due to its location adjacent to the roadway.

4. For Basin 4, Pond 4B (Option 2) remains the recommended option.

5. In Basin 5, all three options are very close in all reviewed parameters including cost, although 5A is now the lowest cost. The costs are $444,696, $466,083 and $461,723 for Ponds 5A, 5B, and 5C, respectively. Further investigation will be needed to determine the best alternative considering the possible extension of the basin to Mosquito Creek and outfall of the pond to

Mosquito Creek. Use of wet or dry ponds will need to be explored. In addition, the use of the access road as the berm for Pond Site 5B should be further examined before final determination of recommended option in this basin.

Greg asked if permitting would be more difficult if proposed ponds outfall to the L-63N Canal, but Brent indicated that it should not as the proposed bridge crossing the L-63N Canal will require the Section 408 USACE review and this was completed in a straightforward fashion on the SR 70 project to the north of this crossing.

Brent also mentioned that it would not be necessary to add 20% to the pond sizes for our pond size estimates for landscaping. In addition, we do not need to include curvilinear pond design into the estimation of site size. However, each potential site should be examined for mature trees which are in good condition, and ponds should be configured around the perimeter trees if possible.

Greg asked if it would be prudent to get updated R/W costs since the initial cost estimates are 2 years old, and Brent agreed that it would. Our team will submit the request to the FDOT R/W Department to receive updated cost estimates.

cc. Attendees
Henri Belrose, Wantman Group PM

Appendix 10
SR 710 Regional Pond Feasibility Study

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Final Submittal

Financial Project ID
432644-1-32-01

Okeechobee County, Florida

Prepared For:
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November 10, 2015

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a registered professional engineer in the State of Florida practicing engineering with **The Balmoral Group** and that I have supervised the preparation of and approve the analysis, findings, opinions, conclusions and technical advice hereby reported for:

PROJECT: **SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study**
Financial Project ID: **432644-1-32-01**
Okeechobee County, Florida

The engineering work represented by this document was performed through the following duly authorized engineering business:

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Certificate of Authorization No. **26123**

This report provides the results of the analysis required for the feasibility study of the SR 710 Regional Pond and Stormwater Treatment Area (STA) in Okeechobee County. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of hydrologic analysis and hydraulic engineering as applied through professional judgment and experience.

Any engineering analysis, documents, conclusions or recommendations relied upon from other professional sources or provided with responsibility by the client are referenced accordingly in the following report.

FLORIDA REGISTERED ENGINEER:

Gregory Seidel, P.E.
Name

REGISTRATION NUMBER: FL #47571

SIGNATURE: _____
DATE: _____

Executive Summary

The proposed Florida Department of Transportation (FDOT) new alignment for State Road (SR) 710 in Okeechobee County and the City of Okeechobee is currently under design by the FDOT. During the development of the Pond Siting Report, Pond Site Location 2B and the surrounding area were identified as a possible location for a regional stormwater treatment facility that could provide greater stormwater treatment benefits to the local area, as opposed to meeting only FDOT's needs. Two teleconferences were held between the FDOT, the Florida Department of Environmental Protection (FDEP) and South Florida Water Management District (SFWMD) to brainstorm the feasibility of regional treatment and possible cooperation between the agencies. At the last meeting, it was decided that the FDOT would perform a feasibility study for two options –

1. A Regional Pond constructed by the FDOT for SR 710 that would incorporate offsite areas associated with Lower Taylor Creek.
2. A Stormwater Treatment Area (STA) with interagency cooperation connected to the L-63N Canal and Upper Taylor Creek.

The goal of the study was to research these two options, including limited data collection, reaching out to stakeholders and discussing the willingness to participate with the property owner. A statement from the property owner is included in the correspondence section (**Appendix E**) as a supplement to the August 12, 2014 Meeting Minutes. The Regional Pond Option was researched as an FDOT-only facility with regard to design and construction and does not require financial assistance from other stakeholders. The STA options were developed for review by the other stakeholders to determine their willingness to participate in the facility. The FDOT would not be the lead agency for the design or construction of the STA facility.

The Regional Pond Option will require a 26-acre pond. There are two proposed sources for offsite water to be treated. The first source is from the Airport Ditch and would require an additional cross drain under US 441. The other source would be from L-63N Canal that would require a pumped connection. The first option reduces the nutrient loading by 496 kilograms per year (kg/yr) within Lower Taylor Creek and Lake Okeechobee, while the second option reduces the nutrient loading by up to 221 kg/yr to Lake Okeechobee. The costs are expected to be similar, since the first option is gravity flow but requires an additional 10-ft-by-6-ft cross drain and right-of-way (ROW) for the Airport Ditch Extension. The STA Option will require a pump station that will have long-term operating and maintenance costs.

Three options for the STA were evaluated. These options included a Stormwater Treatment Area (Option 1), a Biosorption Activated Media (BAM) (Option 2) and Wetland Rehydration Conservation Easement (Option 3). A 50-acre STA will reduce phosphorous by up to 727 kg/yr. The reduction of phosphorous by the BAM is based on the amount used. For this study, the reduction is up to 176 kg/yr for an initial cost of $1.1M. Option 3 may reduce the phosphorous loading by up to 144 kg/yr and includes the purchase of a conservation easement over the wetland areas that will have increased stored water.

Summary of Options

Facility	Area (Acres)	FDOT to provide Design, Const. and Maintenance	Phosphorous Removal (kg/yr)
Regional Pond Opt A	26	Yes	496
Regional Pond Opt B	26	Yes/No	31-221
STA – Option 1	60	No	Up to 727
Biosorption - Option 2	0*	No	Up to 176
Rehydration – Option 3	162.5	No	Up to 144

*May be located in existing SFWMD Easement

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES (Appendix A)

LIST OF PLATES

LIST OF TABLES

1. GENERAL INFORMATION

1.1 PROJECT BACKGROUND

The State Road (SR) 710 new alignment project is located in Okeechobee County, Florida. The project is a segment of the larger SR 710 upgrade project that stretches from U.S. Highway (US) 441 in Okeechobee County to County Road (CR) 714 (S.W. Martin Highway) in Martin County. The upgrading of SR 710 is required to meet the needs of the local community in terms of improved rural connectivity, enhanced emergency capabilities and to accommodate future population and traffic growth [Florida Department of Transportation (FDOT) Project Development and Environment (PD&E) Worksheet, 2010].

The SR 710 new alignment Project in Okeechobee County and the City of Okeechobee is currently under design by the FDOT. During the development of the Pond Siting Report, Pond Site Location 2B and the surrounding area were identified as a possible location for a regional stormwater treatment facility that could provide greater stormwater treatment benefits to the local area. Two teleconferences were held between the FDOT, Florida Department of Environmental Protection (FDEP) and South Florida Water Management District (SFWMD) to brainstorm the feasibility of the regional treatment and possible cooperation between the agencies (See **Appendix E** for minutes). At the last meeting, it was decided that the FDOT would perform a feasibility study for two options:

1. A Regional Pond constructed by the FDOT for SR 710 that would treat offsite areas associated with either Lower Taylor Creek or the L-63N Canal.

2. A Stormwater Treatment Area (STA) with interagency cooperation connected to the L-63N Canal and Upper Taylor Creek.

1.2 PURPOSE OF REPORT

FDOT contracted with The Balmoral Group to prepare a STA/Regional Pond Feasibility Study for the proposed construction of the SR 710 [Financial Project Identification (FPID) 419344-3-32-01].

The purpose of the study is to research whether these two options for stormwater management of SR 710 would provide a significantly greater improvement in water quality than the standard FDOT ponds. The study included limited data collection, reaching out to stakeholders and discussing the willingness to participate with the property owner.

1.3 PROJECT LOCATION AND AREA OF STUDY

The proposed SR 710 will cross Lower Taylor Creek just east of US 441 and north of NW 13th Street located in Okeechobee County, Florida. **Plate 1** shows this specific location and **Figure 1** in **Appendix A** shows the area of study. The project uses the North American Vertical Datum of 1988 (NAVD88), and the horizontal datum for the project is Florida State Plane [North American Datum (NAD) 1983], East Zone. To convert to

NAVD88, 1.17 feet (ft) was subtracted from all National Geodetic Vertical Datum (NGVD) 29 elevations

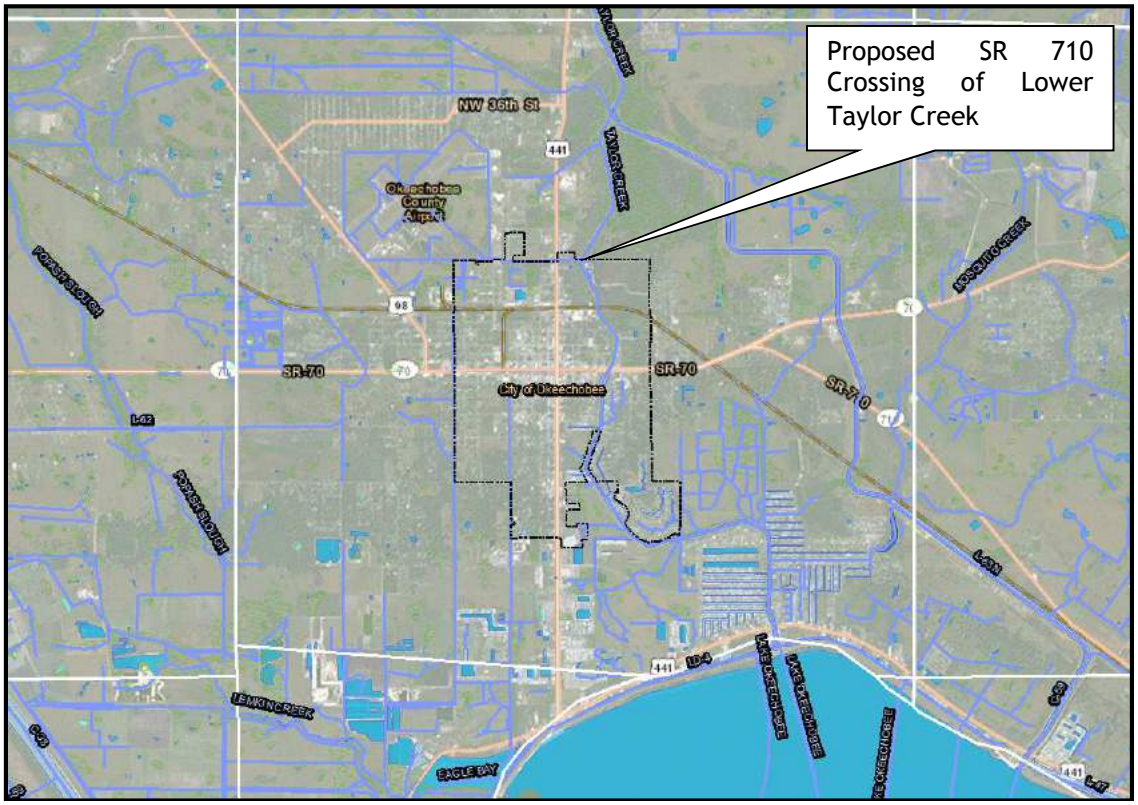


Plate 1: Taylor Creek and the City of Okeechobee

1.4 EXISTING DRAINAGE OVERVIEW

Taylor Creek is part of the Lake Okeechobee watershed **(See Figure 3 in Appendix A)**, which drains to both the Everglades and the Gulf of Mexico through a number of canals and the Caloosahatchee River. Taylor Creek is divided by S-192 into two distinct sections – Upper Taylor Creek, north of S-192, and Lower Taylor Creek, south of S-192. Lower Taylor Creek drains a smaller area than it did historically, due to the construction of the Taylor Creek Levee (referred to as L64). The U.S. Army Corps of Engineers (USACE) built the levee in the 1960s for flood control and to divert flow into L-63N Canal. Both Lower Taylor Creek and the L-63N Canal flow into Lake Okeechobee by means of further canals, pumps and control structures. **Figure 5** in **Appendix A** is an aerial photograph taken in 1953 before canal construction.

Upper Taylor Creek drains an area of approximately 110 square miles (to the start of the L-63N borrow canal) and predominantly drains in a north-to-south direction. Upper Taylor Creek has headwaters in central-west Okeechobee County in the White Hammock locality and flows from there through a number of artificially constructed drainage lines until a natural channel forms. At the intersection with CR 68 (NW 160th St), the creek flows into the Upper Taylor Creek Canal to the point of the Taylor Creek Levee, (S-192), where flow is diverted along the L-63N Canal. Downstream of the Taylor Creek Levee, Lower Taylor Creek, the creek is again an artificial channel to the point of the proposed SR 710 bridge crossing. At this point, Lower Taylor Creek takes the form of a natural channel until it meets structure S-133/S-193 (lock and pump station) at Lake

Okeechobee. **Plate 2** shows the location of the pumps and control structures associated with this system.

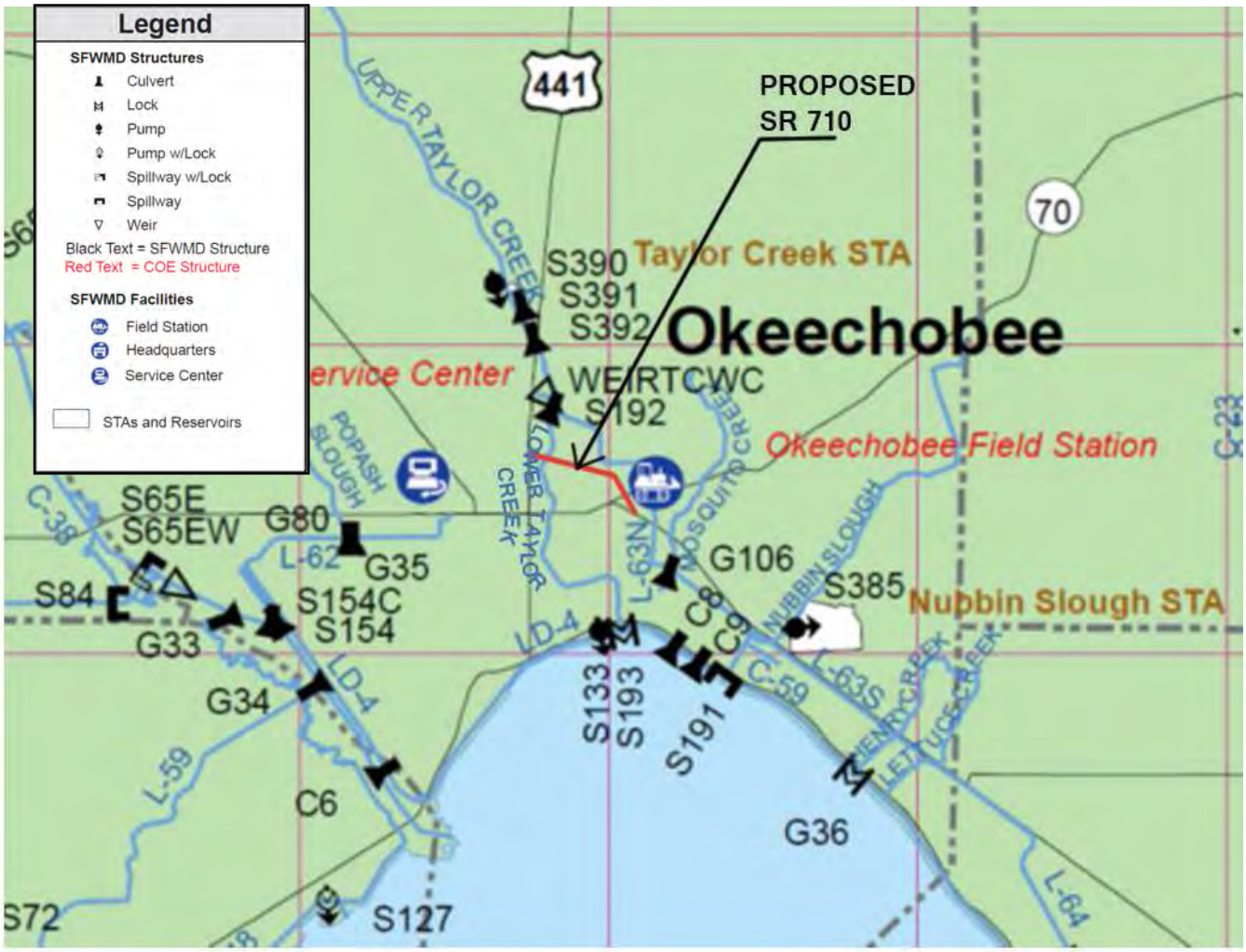


Plate 2: Location of USACE Structures

The Upper Taylor Creek basin contains a number of tributaries, namely Otter Creek, Wolff Creek and Williamson Ditch, which are primarily artificial drainage channels used for irrigation. Stages are maintained in all canals by controlling the stage in the L-63N Canal at Structure S-191 (the outlet of the L-63N Canal at Lake Okeechobee).

The normal operational drainage scenario for the Taylor Creek basin involves the diversion of flow from Upper Taylor Creek to the L-63N Canal at the location of the Upper Taylor Creek Levee and S-192 structure. S-192 prevents flow of water through the Upper Taylor Creek Levee to Lower Taylor Creek. The diverted flow then travels along the L-63N Canal to the C-59 Canal, where Structure S-191 controls discharge to Lake Okeechobee. Structure S-191 is operated to maintain a lake stage of 18.62 ft NAVD (19 ft NGVD) in the canals. S-191, C-59 Canal and L-63N Canal were designed for the 10-year storm event with a flow of 7440 cubic feet per second (cfs).

S-192 is a gated culvert and pump station at the Upper Taylor Creek Levee and start of the L-63N Canal. Its purpose is to divert flow from Upper Taylor Creek along L-63N

Canal. It is opened only for maintenance activity on L-63N Canal or to dilute low quality water in Lower Taylor Creek when Lake Okeechobee is below 12.83 ft NAVD (14 ft NGVD), allowing for gravity flow. S-192 permits back pumping from the Lower Taylor Creek into L-63N Canal in extreme flooding events. The S-192 is not designed to convey flood flows.

Lower Taylor Creek begins downstream of S-192 and flows in a southerly direction to its ultimate control structure of S-193, located 6 miles southeast of the City of Okeechobee. Structure S-192 was previously called HGS No. 6 and was left open to permit unrestricted navigation between Lake Okeechobee and Lower Taylor Creek. It was later modified to a lock structure to allow navigation when the lake regulation schedule was raised to the 15.5 to 17.5 ft NGVD range. This structure also acts as a hurricane control structure preventing hurricane tides from entering Lower Taylor Creek. There is no design flood for this structure since flood flows are discharged through adjacent pump station S-133. If the lake stage is below 12.83 ft NAVD (14 ft NGVD), S-193 is opened to allow tailwater flow from the lake to Lower Taylor Creek. The quantity introduced is pumped into the L-63N Canal at S-192 to maintain consistent stages. No standard practice of opening this structure occurs during flood conditions.

Adjacent to S-193, S-133 is a pump station with five 48-inch steel pipes that are designed to remove three-quarters of an inch of runoff per day from its tributary drainage area of 16,190 acres (25.3 square miles), resulting in a discharge of 625 cfs into Lake Okeechobee.

1.5 Drainage Basin History

A review of historical flood information was completed during the bridge hydraulics report (BHR) development for the proposed SR 710 crossing of Lower Taylor Creek. Significant flooding occurred around the lower-lying areas of Lake Okeechobee during the early 1900s. This flooding, mainly as a result of lake surges from hurricane wind forces, caused significant damage and claimed the lives of thousands of local residents. As a result, the USACE was engaged to build a system of canals, levees and locks to control water movement, as well as protect the areas surrounding the lake from storm surges.

Since USACE completed the works in the 1960s, and with strict operational standards, flooding in the area has declined in both frequency and magnitude. However, the 2013 Preliminary FEMA Flood Insurance Study (FIS) states that the existing creeks and sloughs in the area have inadequate capacities to drain local and upland areas during periods of heavy rainfall and ponding of floodwaters in those areas can be expected.

The Okeechobee 2010 Local Mitigation Strategy (LMS) noted that a number of low-lying or poorly drained areas regularly experience flooding with or without a storm. One such area is the southern portion of Okeechobee County adjacent to Lake Okeechobee. Floods have been experienced and regularly affect hundreds of homes and several roads for many days every few years (Okeechobee 2010 LMS). Available information indicates that the canals, structures and levees significantly influence the flooding problems.

1.6 PREVIOUS FLOOD STUDIES

FEMA Flood Insurance Study – Okeechobee County Florida Unincorporated Areas, August 4, 1980

The Federal Emergency Management Agency (FEMA) has published an FIS report for Okeechobee County and the incorporated areas. FEMA Federal Insurance Administration (FIA) staff with the assistance of USACE, investigated the major sources of flooding in the area of interest and the flood protection measures that were inexistent at the time of the report. Two methods were used to compute the flood stages for the S-133 basin since it presented riverine characteristics, but also acted as a large storage basin controlled by pump. The first method, a Hec-1 model, was created for the S-133 drainage basin, and peak discharges were calculated. Pumps were assumed to be operating at peak capacity with the lake level at 18.5 ft NGVD (17.33 ft NAVD). The second approach was to use a volumetric approach that compared the volume of rainfall for the design storms to the volume of water that could be pumped for a period of time. The resultant volume to be ponded was compared to a stage-storage curve and resulted in a peak stage. The results of the Hec-1 model produced slightly lower stages and were selected as the flood elevations for the S-133 basin. It was found that no 'floodways' existed due to the predominance of ponding as the primary cause of flooding.

Preliminary FEMA Flood Insurance Study – Okeechobee County Florida Unincorporated Areas, 2013 (prepared by Taylor Engineering Inc.)

Although preliminary in status, the information provided in this FIS (Taylor Engineering, Inc., 2013) is assumed to revise and supersede the information presented in the 1980 FIS for Okeechobee County. All vertical elevations presented in this study are in NAVD88. As part of this analysis, a detailed hydrologic and hydraulic study was performed for Lower Taylor Creek; this included the S-133 drainage basin previously studied under the 1980 FIS. Lower Taylor Creek was defined as from the S-193 to the L-63N. HEC-HMS was used to update the hydrologic data that was calibrated using U.S. Geological Survey (USGS) gage data and rainfall from tropical storms. Cross-section geometry was based on digital terrain data and field survey. Hydraulic analysis utilized the HEC-RAS step-backwater computer program, which employed a normal depth downstream boundary condition.

Technical Memorandum – An Atlas of Martin County Surface Water Management Basins, Richard M. Cooper and Ray Santee, (DRE-266) November 1988

This SFWMD-sponsored publication summarizes the events leading to USACE constructing these canals, levees and control structures and the uses of these canals. Of particular interest to this investigation is the detail contained for the C-59 (Taylor Creek-Nubbin Slough) Basin. A description of the flow routing and control structure operation is provided (**Plate** 3), along with a figure to show the basin, the location of the control structures and main channel alignments (**Plate 4**).

Structure	Type	Design HW Stage (ft NGVD)	Design TW Stage (ft NGVD)	Optimum Stage (ft NGVD)	Design Discharge (cfs)	Peak Stage (ft NGVD) Peak Discharge (cfs)	Date of Peak
S-191 Stage divide	Gated Spillway, 3-gates 17.6ft high x 27.8 ft wide NetCrest lgth = 81.0ft Crest elev = 7.4 ft NGVD	19.2	18.6	19.0 19.2 ≥ HW ≥ 18.8 (Gate closed if TW > HW)	7440	HW = 23.08 Q = 3236	7/18/74 6/25/87
S-192 Divide structure and pump station, Water supply from L-63N borrow canal to Taylor Creek	Gated Culvert 1-48in x 112ft CMP Invert elev = 8.0ft NGVD Pump Station, 1 unit: 13500 GPM	21.6 (water supply)	13.0 (water supply)	HW = 19.0 TW = 14.0 (water supply)	Normally Closed, open only for water supply		
G-106 Divide Structure and water supply from L-63N borrow canal to S-133 basin	Gated Culvert 1-36in x 90ft CMP Invert elev = 15.0 ft NGVD				Ocassionally open for water supply		

in = inches
ft = feet
elev = elevation
lgth = Length
TW = Tail water
Q = discharge in cfs
CMP = Corrugated metal pipe
RCP = Reinforced concrete pipe
ft NGVD = Feet relative to National Geodetic Vertical Datum
HW = Head water
CFS = Cubic feet per second
ds = downstream
ups = upstream

Plate 3: C-59 Design Information

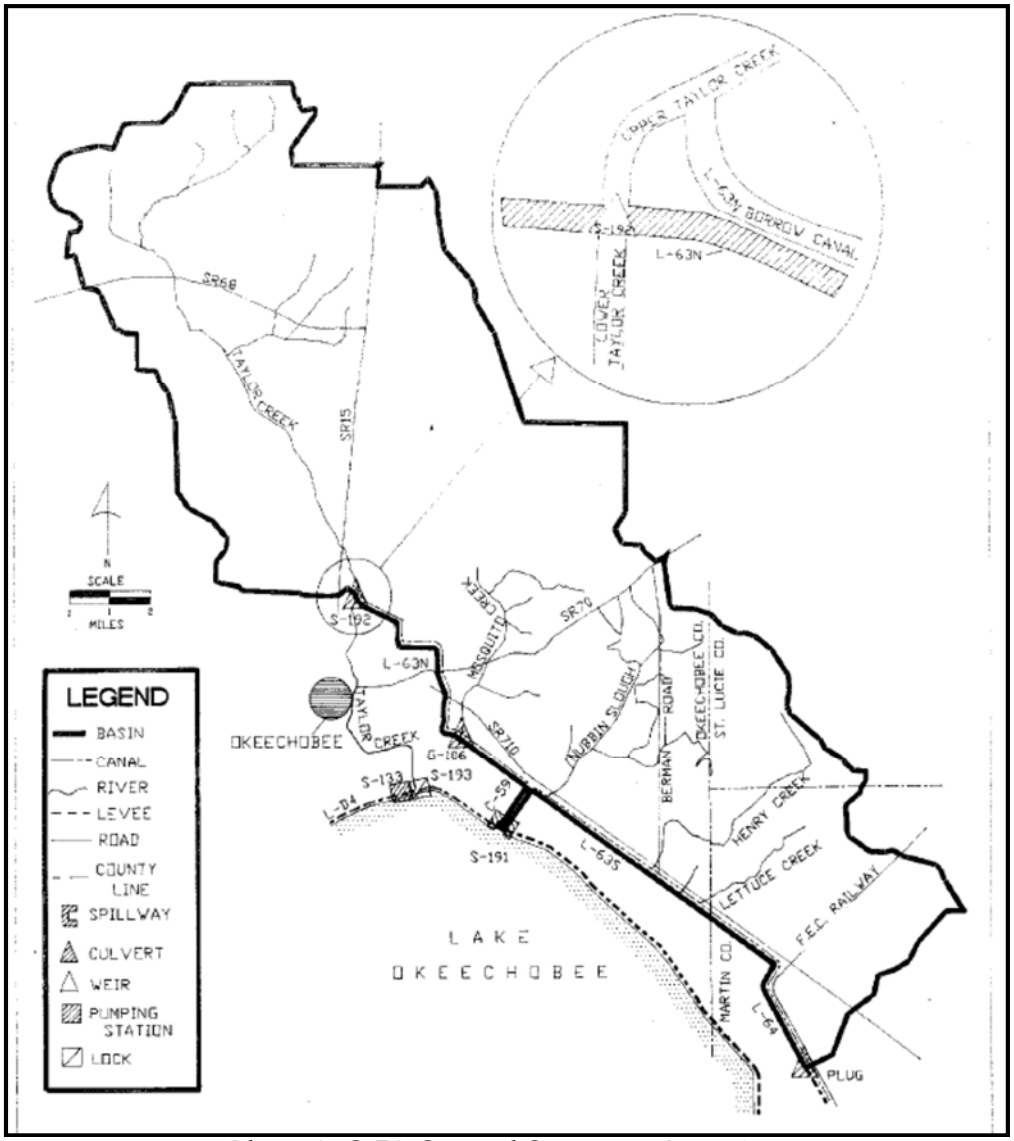


Plate 4: C-59 Control Structure Location

1.7 WETLAND FIELD REVIEW AND INFORMATION GATHERING

A preliminary ecological field review was performed to evaluate wetlands and species listed as threatened or endangered within the project vicinity. Current PD&E documents and biological evaluations currently underway under FPID 419344-3-32-01 were reviewed. A desktop review of available published information from federal and state online databases was performed to evaluate listed species that may occur in the project area. Data collection consisted of literature review of existing sources for information useful in identifying the occurrence or potential occurrence of wildlife species listed as threatened or endangered or as species of special concern (collectively recognized as listed species), as defined by U.S. Fish and Wildlife Service (USFWS) and/or the Florida Fish and Wildlife Conservation Commission (FWC). In addition, the presence of designated critical habitat and/or vegetative communities and land uses with the potential to support listed species was evaluated.

The literature review included the following sources: Natural Resources Conservation Service (NRCS) (formerly known as the Soil Conservation Service [SCS]) Soil Survey of Okeechobee County, Florida; USGS topographic quadrangle maps; FWC bald eagle and waterbird colony databases; Florida Natural Areas Inventory (FNAI) Okeechobee County tracking list; previous studies available; and false-color infrared and true-color aerial photography of the project corridor. Additional resources, such as the FNAI Field Guides and Rare and Endangered Biota of Florida Series, were used to evaluate habitat and vegetative community requirements for those species potentially occurring within the proposed project corridor.

Land use types located within the proposed project were identified through color aerial photograph interpretation and compared to land uses identified by FDOT Florida Land Use, Cover and Forms Classification System *(*FLUCFCS*)* (FDOT, 1999). Estimated wetland limits were identified on an aerial exhibit. A preliminary qualitative evaluation of the onsite wetlands system(s) was conducted. The wetlands were identified in general accordance with the USACE October 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region and the State of Florida's Delineation of the Landward Extent of Wetlands and Surface Waters (Chapter 62-340, Florida Administrative Code). Seasonal high water elevations were marked at six locations within the proposed STA and surveyed to better understand the normal water and allowable peak stage. Three Seasonal High Water Elevation (SHWE) nails were set at each location and the average elevation was used.

The wetland and wildlife evaluation is provided in **Appendix D**.

1.8 STAKEHOLDER COORDINATION

The project team contacted local stakeholders including the property owners, pump operators, City of Okeechobee, Okeechobee County, FDEP, SFWMD and USACE, etc. An introductory stakeholder meeting was held on July 31, 2014 in Okeechobee to discuss the proposed project. The meeting focused on providing project background and gauging the willingness of the stakeholders to participate via funding, design, construction, and maintenance. The data gathering included obtaining actual costs and nutrient load reductions on recently constructed water quality improvement projects.

Input was solicited for ideas and options, as well. The project team conducted follow-up meetings with various stakeholders. A summary of the meetings held in reference to the Regional Pond and STA feasibility study are as follows and the meeting minutes are included in **Appendix E:**

- Initial Brainstorming Meeting – September 13, 2013
- Second Brainstorming Meeting – April 4, 2014
- Introductory Meeting with the Hamrick property owners – July 11, 2014
- Introductory Stakeholder Meeting – July 31, 2014
- Goto Coordination Meeting with the Hamricks – August 12, 2014
    - Includes Response from Mike Hamrick
- AVCON Meeting to discuss airport interests – August 14, 2014
- Email Coordination with the SFWMD Pump Operators – September 12, 2014

In addition to meetings, a telephone log was kept to document and track project calls.

2. REGIONAL POND ANALYSIS

2 GENERAL

The Regional Pond analysis evaluated two separate sources of runoff for the same proposed pond area. Option A treats runoff already within the Lower Taylor Creek basin. Option B diverts runoff from the L-63N Canal into Lower Taylor Creek basin for treatment in the Regional Pond.

2.1 OPTION A

2.1.1 General

A preliminary HEC-RAS model was developed based on the draft Taylor Creek BHR model submitted for FPID 419344-3-32-01 (SR 710 New Alignment in Okeechobee). The pre-development model was based on the existing conditions model and flow rates developed during the BHR with the addition of adding to the HEC-RAS Model the portion of the Airport Ditch from US 441 back to the west to NW 9th Avenue. This would allow an analysis of the channel response to raising the tailwater levels where the Airport Ditch intersects Lower Taylor Creek. Limited survey data was obtained for areas along the Airport Ditch and the Lower Taylor Creek to verify critical elements.

The analysis includes nutrient loading calculations, preliminary design, and construction cost estimates. Permitted facilities within the Airport Ditch basin were reviewed to establish the treated areas versus untreated areas. Treatment calculations were performed to demonstrate compensatory treatment for a portion of SR 710. A large wet detention pond will be utilized for water quality and attenuation and will provide a source of fill material for the SR 710 project. All files developed during the current SR 710 project were utilized, including survey, ROW and the current design files. The pond was designed with 1:2 slopes to meet the Federal Aviation Administration (FAA) requirements for wildlife attractants since it is located within the 10,000-foot buffer shown in **Appendix A, Figure 4.**

2.1.2 Drainage Basin Specific Documents

FEMA Flood Insurance Rate Map (FIRM), Okeechobee County, Florida, Unincorporated Areas, Panel 200 of 275, February 4, 1981

The FIRM provides details of the design 100-year flood extent, as well as flood zones for the area adjacent to Taylor Creek and the City of Okeechobee. This will provide details of the expected flood extent and any limitations on bridge design to account for regulated floodways. Lower Taylor Creek was not included in this information. **Plate 5** shows the available floodplain data for the area.

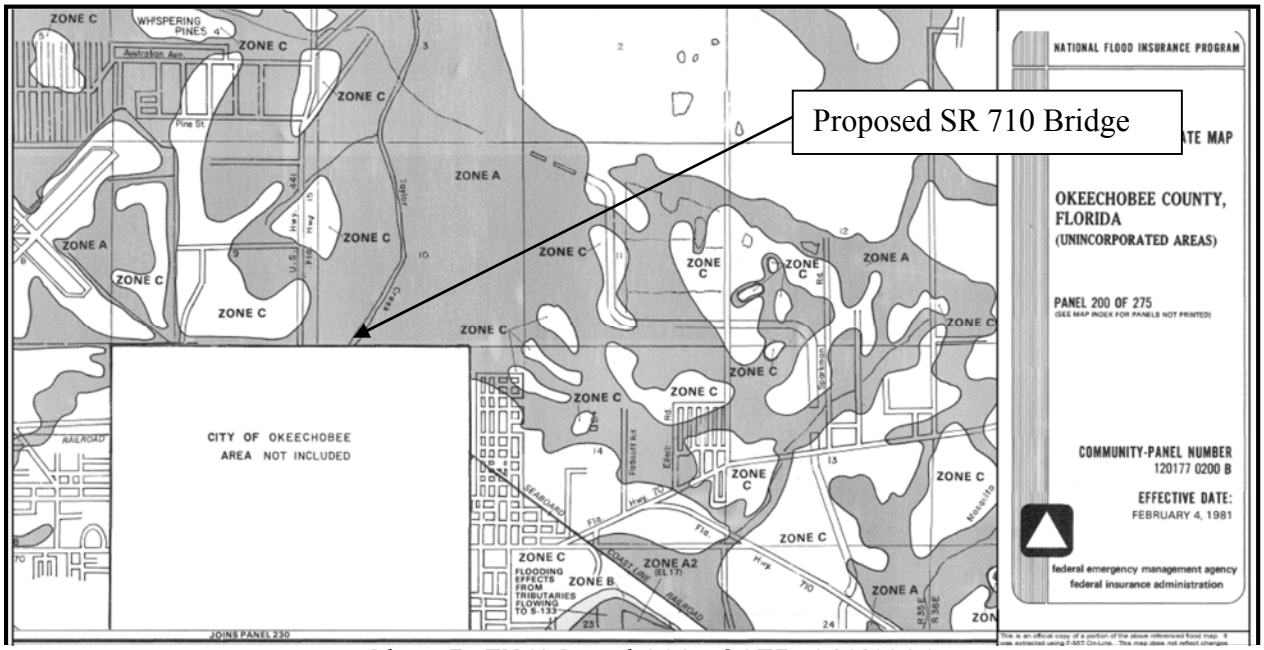


Plate 5: FIRM Panel 200 of 275, 2/4/1981

The Preliminary 2013 FEMA Maps became available in May 2013; however, these maps are not scheduled to become effective until March 20, 2015. See **Plate 6** for Preliminary 2013 FEMA FIRM.

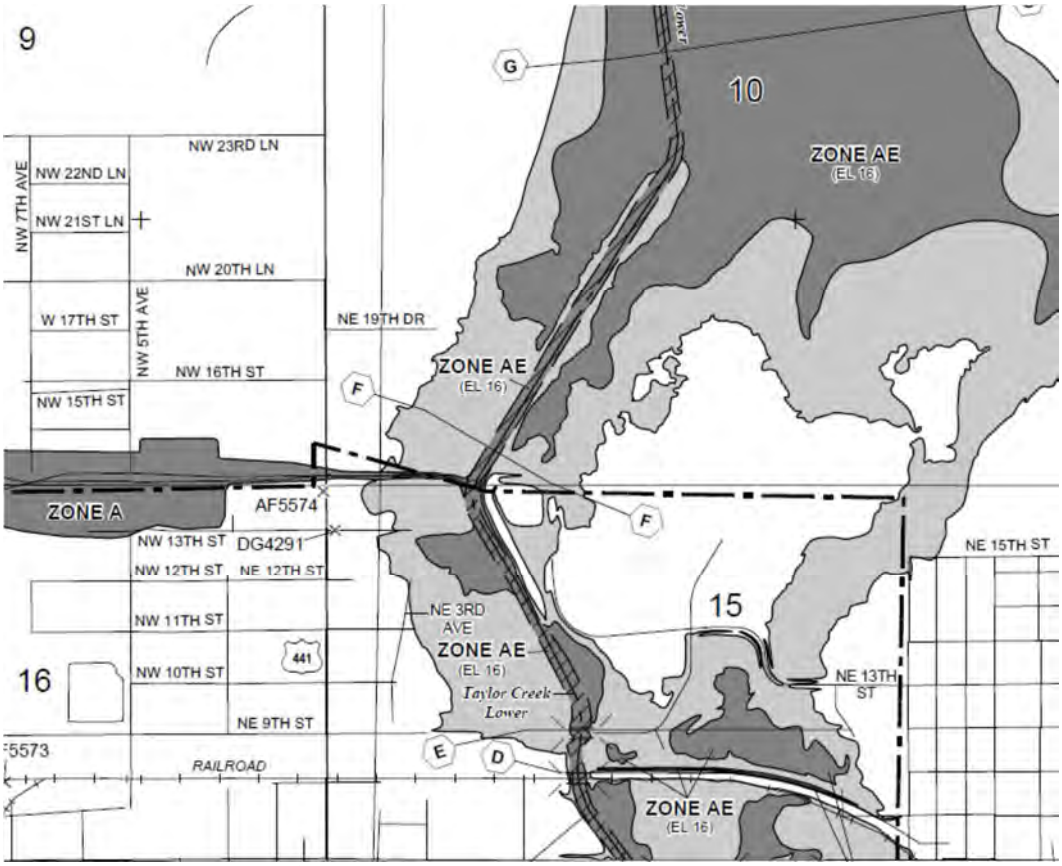


Plate 6: 2013 Preliminary FEMA FIRM

Central and Southern Florida Project for Flood Control and Other Purposes System Operating Manual – Lake Okeechobee and Everglades Agricultural Area Volume 3 DRAFT, Department of the Army Corps of Engineers, Jacksonville District, December 2005

This manual provides operational instruction to both the SFWMD and USACE in the operation of the various structures controlling water movement around and into Lake Okeechobee, as well as its tributaries and the Everglades Agricultural Area. This manual will provide guidance on how the structures around the proposed SR 710 bridge site will operate and, hence, allow impacts of the operation to be considered within this BHR, ensuring appropriate design is achieved for all operational conditions.

Okeechobee County Local Mitigation Strategy 2010, Okeechobee LMS Working Group, 2010

This report was prepared to assist in mitigation planning, enhancing public awareness, providing a decision-making tool for management, complying with state and federal program requirements, and allowing mitigation coordination between agencies. The report provides detailed and comprehensive data and discussion for all potential natural disasters, including flooding. As a result, flood history can be extracted from this report and used to verify design floods and areas susceptible to inundation. Flood history was not extracted from this report since the areas susceptible to inundation appeared to be outside of the impacts of the L-63N Canal hydraulic model. **Plate 7** shows the extents of the 100-year event expected flood hazards.

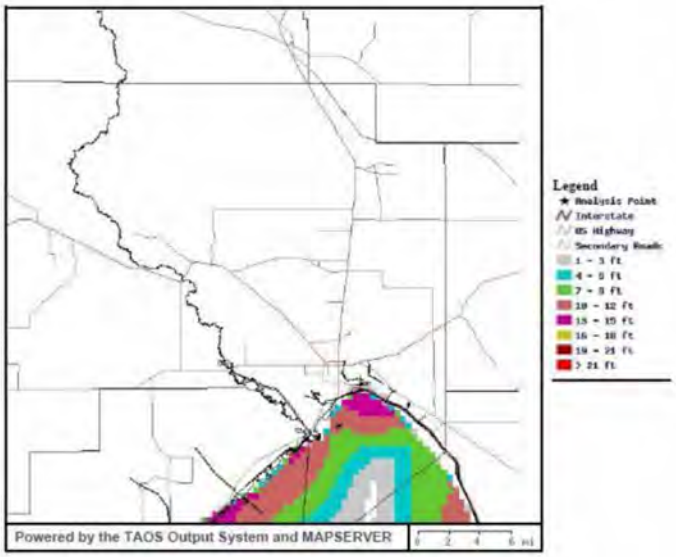


Plate 7- 100-year Event Expected Flood Hazards from 2010 Okeechobee LMS

2.1.3 Drainage Basin

Lower Taylor Creek drains a 5.46 square mile basin to the proposed SR 710 bridge. **Figure 7** in **Appendix A** shows the extent of the Lower Taylor Creek basin draining to SR 710. Lower Taylor Creek generally drains in a southerly direction towards the project site and consists primarily of manmade channels and tributaries that have a confluence immediately upstream of the proposed bridge site where the Airport Ditch meets Lower Taylor Creek. The existing Airport Ditch is a manmade channel that conveys flow west to east toward

Lower Taylor Creek. The Airport Ditch conveys runoff through SR 15 (US 441) via a 10-ft-by-6-ft box culvert just prior to draining into the main channel of Lower Taylor Creek immediately upstream of the proposed SR 710 crossing.

The Lower Taylor Creek basin area was delineated using light detection and ranging (LiDAR) data, existing permit information, and field information. This basin was divided into two sub-basins consisting of the sub-basin for the main channel of Lower Taylor Creek and the sub-basin for the Airport Ditch. **Table I** shows the breakdown of the two drainage areas flowing to the proposed crossing.

Table 1: Lower Taylor Creek at Proposed SR 710 Basin Summary

Basin	Area (sq. mi.)	10 YR Flow (CFS)	25 YR Flow (CFS)	50 YR Flow (CFS)	100 YR Flow (CFS)
Taylor Creek	2.20	201	281	346	417
Airport Ditch	3.26	437	570	699	838

The basin varies in elevation from approximately 40 ft (NAVD88) at the northern basin boundary to about 7.0 ft NAVD (bottom of the channel) at the project site. The upper and middle portion of the basin consists mostly of wetlands and rural properties (beef and dairy farmland), and the lower portion consists mostly of the low-density residential areas of Northern Okeechobee as well as the Okeechobee County Airport.

The proposed SR 710 crossing at Lower Taylor Creek is influenced by local surface water runoff and backwater flows from Lake Okeechobee (during certain operational circumstances).

The SR 710 Regional Pond is located within SFWMD jurisdiction, which will be responsible for review and issuing the environmental resource permit (ERP) for the project. The Regional Pond would be constructed as part of the new alignment construction of SR 710, and these improvements will be included in the roadway ERP permit.

2.1.4 HEC-RAS Analysis

The pre-development versus post-development HEC-RAS analysis was based on comparing the existing conditions to a proposed condition that extended the Airport Ditch over Lower Taylor Creek to the Regional Pond, a distance of approximately 1,000 ft east of Lower Taylor Creek. See **Figure 10** in **Appendix A** for the proposed modifications at the confluence of the Airport Ditch and Lower Taylor Creek. The concept diverts the Airport Ditch flow over Lower Taylor Creek in a ditch parallel to SR 710 into the proposed Regional Pond. The proposed Regional Pond has a control elevation at 18.0 ft NAVD. The existing 10–ft by-6-ft box culvert capacity at US 441 was expanded until the increase in tailwater would not cause an increase in the upstream stage. The existing headloss across the culvert for the 50-year storm event is 4.66 ft. By adding a culvert of the same size, the head loss is dramatically reduced. A tailwater in the Regional Pond of 21.0 ft NAVD was utilized for the post-construction conditions, which assumes 2.5 ft over the treatment weir at elevation 18.5 ft NAVD. The HEC-RAS model shows no rise in the stages in the Airport Ditch upstream of the proposed double 10–ft by-6-ft box culverts under US 441. Survey information was collected for cross sections further west of US 441 and includes the culvert

under NW 9th Avenue. The HEC_RAS calculations are included in **Appendix B** and the results are provided in **Table 2.**

Table 2: Airport Ditch Pre-Post HEC-RAS Analysis

HEC-RAS Model Cross Section	10-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	25-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	50-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	100-Year Water Surface Elevation (feet NAVD88)		Difference (feet)
	Exist	Proposed Double Culvert		Exist	Proposed Double Culvert		Exist	Proposed Double Culvert		Exist	Proposed Double Culvert	
4430.000	27.83	27.83	0.00	29.10	29.10	0.00	29.70	29.70	0.00	29.84	29.85	0.01
4330.000	27.77	27.77	0.00	29.05	29.05	0.00	29.64	29.64	0.00	29.76	29.77	0.01
Culvert	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4280.000	24.36	24.34	-0.02	25.16	25.02	-0.14	25.97	25.58	-0.39	26.99	26.10	-0.89
3550.000	23.74	23.71	-0.03	24.60	24.36	-0.24	25.52	24.89	-0.63	26.62	25.38	-1.24
2780.000	23.39	23.34	-0.05	24.29	23.97	-0.32	25.26	24.49	-0.77	26.43	24.96	-1.47
2100.591	23.05	22.99	-0.06	24.00	23.60	-0.40	25.05	24.10	-0.95	26.30	24.55	-1.75
1527.972	21.80	20.97	-0.83	23.15	21.55	-1.60	24.52	21.98	-2.54	26.25	22.38	-3.87
1344.355	21.85	20.78	-1.07	23.12	21.72	-1.40	24.50	22.10	-2.40	26.20	22.45	-3.75
Culvert	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1218.437	18.55	20.47	1.92	19.26	21.26	2.00	19.86	21.38	1.52	20.43	21.39	0.96
972.498	17.83	20.31	2.48	18.48	21.08	2.60	19.00	21.11	2.11	19.50	21.30	1.80
648.236	16.46	20.33	3.87	17.46	21.15	3.69	17.99	21.22	3.23	18.50	21.30	2.80
267.180	14.24	20.30	6.06	16.66	21.12	4.46	17.19	21.18	3.99	17.69	21.25	3.56
-232.820		20.24	20.24		21.06	21.06		21.09	21.09		21.13	21.13
-732.820		20.17	20.17		21.00	21.00		21.00	21.00		21.00	21.00

2.1.5 Treatment Volume Calculations

Option A is designed to treat the required presumptive runoff for the proposed SR 710 improvements only. **Figure 9** in **Appendix A** shows the location of the Regional Pond. The total area for proposed SR 710 Basin 1 through Basin 5 is 77.78 acres. The required treatment volume is 1 inch over this drainage area for wet detention ponds and results in 6.48 acre-feet (ac-ft) of treatment volume. Only SR 710 Basin 1 and Basin 2 will be routed to the pond. Compensating treatment volume will be provided for SR 710 Basin 3, Basin 4, and Basin 5 by treating a portion of the Airport Ditch drainage area. The proposed SR 710 Basin 1 and Basin 2 were delineated in the Draft Pond Siting Report and total 40.37 acres. The SR 710 Possible Regional Pond Brainstorming Meeting 2 Minutes in **Appendix E** show the proposed drainage basins for SR 710 for this option.

The proposed design provides 9.98 ac-ft of treatment with the weir elevation set at 18.5 ft NAVD. The treatment volume calculations are included in **Appendix B.**

2.1.6 Nutrient Loading Calculations

Option A is designed to provide nutrient loading reduction for total phosphorous (TP) and total nitrogen (TN) outflow to Lower Taylor Creek. The nutrient loading calculations were performed in accordance with the current basin management action plan (BMAP) land use designations and applied event mean concentration (EMC) values. **Figure 8** in **Appendix A** identifies the land uses utilized for the nutrient loading calculations.

The Airport Ditch drains a 2,086-acre area. A review of the permitted treatment areas within the drainage area determined that 231.78 acres of the basin have permitted treatment facilities. Thus, 1,855 acres remain untreated and discharge through The Airport Ditch to Lower Taylor Creek. The permitted treatment facilities are shown on **Figure 7** in **Appendix A**. Although the Regional Pond provides additional pollutant removal for those permitted treatment areas, those areas are excluded from the nutrient loading basin to provide a conservative estimate.

The total area included in the nutrient removal calculations for the Regional Pond is 1,895 acres, which includes the untreated areas of the Airport Ditch drainage basin and the proposed SR 710 Basin 1 and Basin 2.

The proposed SR 710 alignment provides a reduction in phosphorous and nitrogen compared to the pre-development loading due to the change in land use from pasture to highway. The Lower Taylor Creek basin will also have a reduction in post-development loading since the Regional Pond area will not generate a phosphorous or nitrogen loading.

With 227 ac-ft of permanent pool, the Regional Pond provides a TN removal of 34.7 percent and a TN removal of 63.0 percent across the total drainage area of 1,894.59 acres. This is a net benefit to Lake Okeechobee, with a TP removal of 39.7 percent and a TN removal of 25.0 percent for the 5.46 square miles draining to the SR 710 crossing of Lower Taylor Creek. **Table 3** summarizes the nutrient loading reductions.

Table 3: Option A Regional Pond Nutrient Loading Reductions

Nutrient	Pre-Dev (kg/yr)	Post-Dev (kg/yr)	Reduction (kg/yr)	Reduction (%)
Phosphorous	1250	754	496	39.7
Nitrogen	7489	5616	1873	25.0

The nutrient loading calculations are included in **Appendix B.**

2.1.7 Floodplain Impact Estimates

The 2013 Preliminary Flood Insurance Rate Map prepared for Taylor Creek shows that Lower Taylor Creek is a regulatory floodway. However, according to information obtained from Okeechobee County, the 2013 FEMA Flood Maps are not scheduled to be adopted until March 20, 2015. The FEMA FIRM Maps currently in effect do not show Lower Taylor Creek, and the FEMA FIS states that Lower Taylor Creek is not within a floodway.

No floodplain impacts are associated with the Regional Pond option.

2.2 OPTION B

Option B will utilize the same Regional Pond area and shape but will include only Basins 1 and 2 of the roadway basins as well as flows being diverted from the L-63N Canal. A pump system will be required to divert flow from the L-63N Canal to the Regional Pond. A pump system may also be needed to discharge treated stormwater back into the L-63N Canal.

The calculations in Appendix B for the SR 710 Regional Pond withdrawing L-63N water were performed by working the nutrient removal calculations backwards to determine an appropriate inflow rate. The nutrients from the roadway runoff were ignored. The calculations are based on the Harvey Harper methodology presented in the Evaluation of Current Stormwater Design Criteria within the State of Florida Final Report, June 2007 prepared by Harvey Harper and David Baker for the FDEP. The flow rate was controlled by the assumed residence time for the permanent pool. The residence time then determined the removal efficiency. The flow rate controlled the volume of the high concentration

runoff to be extracted from the L-63N Canal. Two residence times were evaluated to determine a range for the phosphorous removal: 21 days and 150 days. Once the removal rate was determined, the depth to anoxic conditions was calculated and the removal rate reduced for the reduction in permanent pool volume. These calculations utilized TP concentrations and TP removal rates provided by SFWMD, which were based on observed concentrations at the S-133 structure. The results are summarized in Table 4.

Table 4: Phosphorous Reduction for the Regional Pond Option B

Residence Time	Flow Rate (cfs)	Flow Rate (GPM)	Yearly Volume (Ac-Ft)	Reduction (kg/yr)	Depth to Anoxic Conditions (ft)
21 Days	5.44	2440	3940	221	8.8
150 Days	0.76	340	522	31	8.8

The results indicate that the higher flow rate would increase the reduction but it would also increase the cost of pumping. The water would need to be pumped out of the canal and into the pond and, if the discharge remains in the Lower Taylor Creek basin, it will need to be pumped to Lake Okeechobee at S-133. If the pond were relocated closer to the L-63N Canal, the pond may be able to gravity discharge back into the L-63N but would not be able to treat as much of the roadway runoff. Alternatively, the treated stormwater could be pumped back into L63-N, which would further increase the pumping costs.

3. STORMWATER TREATMENT AREA ANALYSIS

3.1 General

Three different types of alternative water quality treatment systems were evaluated. They include 1) a 60-acre STA, 2) use of BAM either within or beside Lower Taylor Creek downstream of S-192 to enhance nutrient removal, and 3) onsite retention of stormwater runoff in existing wetlands on the portion of the property lying east of Lower Taylor Creek. Estimates of both TN and TP load reduction were calculated for each of the alternatives, and estimates of design, construction and maintenance costs are provided.

3.2 Literature and Expert Panel Review

In preparation for development of the three alternative water quality treatment options, ATM interviewed experts from FDEP, SFWMD, USACE, and industry for background information on STA and alternative system experiences, costs, treatment effectiveness and design considerations. Literature supporting previous STA projects and outcomes was reviewed, and salient points are summarized in this section. Other items considered throughout these discussions include:

1. Feedback from SFWMD staff on how an STA at this site could fit in to the water management district's overall water quality improvement plan for the Lake Okeechobee basin.
2. Willingness of the property owner to participate in some fashion, either as a seller or other mode of participation, and identification of opportunities to work with Florida Department of Agriculture and Consumer Services (FDACS) and the property

owner to develop additional water storage on the property or to help fund structural agricultural best management practices (BMPs).

3. Incorporation of alternative technologies into the STA (e.g., BAM).

As part of this background review, three existing or planned STAs)were reviewed to provide information on STA experience, costs, treatment effectiveness and design considerations. STAs reviewed are all located in the Taylor Creek-Nubbin Slough sub-watershed of the Lake Okeechobee basin and include the Taylor Creek STA, the Nubbin Slough STA, and the Lakeside Ranch STA. See **Figure 11 in Appendix A** for STA locations. Results of this review are presented in the following sections.

Taylor Creek STA

The Taylor Creek STA was constructed in April 2006 and began flow-through operations on June 26, 2008. The STA has an effective treatment area of 118 acres, which is small compared to the STAs operated by SFWMD south of Lake Okeechobee. The total site area is 142 acres. Up to four pumps, each with a discharge capacity of 6 cfs, divert water into the STA. Diverted water flows through two treatment cells and discharges back into Upper Taylor Creek approximately 1.2 miles downstream. Pumps operate automatically based on the stage in Upper Taylor Creek. Normal operational water depths average 1.5 ft, but during the dry season, a minimum water depth of 0.5 ft is maintained to prevent the treatment cells from drying out. Water levels in the treatment cells are regulated via adjustable gates between the two treatment cells and at the downstream discharge point.

This STA was designed to remove 2.08 metric tons (mt) of phosphorus annually, or about 9 percent of the TP load at that point in Upper Taylor Creek. The design removal efficiency is 38 percent (Goforth, 2005b). Since commencement of operations in June 2008 through the end of water year 2013 (April 30, 2013), phosphorus removal has ranged from 0.58 to 1.11 mt annually. This represents 37 months of flow-through operations over a total of 58 months. Operation statistics and water quality and loading information are presented in Table 5. The STA performed reasonably well during the first 2 years of operation, removing 31 percent and 64 percent of input load in WY2009 and WY2011, respectively. For the most recent 2 water years, however, measured load reductions were only 20 and 22 percent. This is attributed to reversals in TP concentration, i.e., the outflow concentration of phosphorus is higher than the inflow concentration, and is discussed below in more detail.

Table 5: Summary of calculated operational parameters and performance metrics for the Taylor Creek STA by water year (Source: 2014 South Florida Environmental Report)

Parameter	WY2009	WY2011	WY2012	WY2013
Period of operation, days	244	235	366	276
Total inflow, ac-ft	9,218	6,988	13,188	5,810
Hydraulic loading rate, cm/d	10.04	7.70	9.31	5.44
Inflow TP, μg/L	408	167	341	368
Total Load In, MT	4.64	1.44	5.51	2.64
TP mass load rate, $g/m^2/d$	0.038	0.013	0.032	0.020

Parameter	WY2009	WY2011	WY2012	WY2013
Total outflow, ac-ft	8,767	6,257	12,208	5,762
Outflow TP, µg/L	295	68	292	289
Total Load Out, MT	3.12	0.52	4.40	2.05
HRT, d	6.34	7.75	6.52	9.72
TP mass removed, MT	1.44	0.91	1.15	0.58
TP Conc reduction	27.5%	59.3%	14.4%	21.5%
TP Load Reduction	31.1%	63.6%	20.2%	22.0%

The Taylor Creek STA has experienced a number of operational challenges. In February 2009, the culvert at the STA outlet failed, and the STA was inoperable for 20 months, resuming normal operations in September 2010. In addition, for the past 2 water years, TP load removal efficiency was only about 20 percent. The poor performance is attributed to a large number of reversals in weekly outflow TP concentrations. Fifteen reversals occurred during WY2012, nine of which happened between November 10, 2011 and February 15, 2012. The average difference between inflow and outflow TP concentrations during these reversals was 43 parts per billion (ppb). In WY2013, a pattern of reversals was observed between October 2012 and January 2013, and flow-through operations were discontinued on February 1, 2013. During the 4-month period in which flow reversals were occurring, 309 kilograms (kg) of TP were released into Upper Taylor Creek. The STA remained offline through the end of the water year, April 30, 2013. Minimal pumping into the STA occurred during this time so that the desired water levels were maintained. One theory about the reason these flow reversals are occurring is that when the Grassy Island Hybrid Wetland Treatment Facility is functioning well, the inflow concentrations of phosphorus to Taylor Creek STA are low enough that to establish equilibrium, phosphorus is transferred from the sediments to the water column instead of the reverse (Joe Albers, personal communication). The Grassy Island facility is located on Upper Taylor Creek, approximately 1.2 miles upstream of the intake to the Taylor Creek STA.

Nubbin Slough STA

The Nubbin Slough STA was designed and built in conjunction with the Taylor Creek STA. Although construction was completed in 2006, the facility is not yet operational due to a number of issues, including mechanical problems discovered during pump tests. There have also been problems with accumulation of sediment in the pump basin. The final repair to a damaged outfall structure is expected to be completed by the end of October 2014, with responsibility transferred from USACE to SFWMD shortly thereafter.

Nubbin Slough STA is a two-cell system, with a total treatment area of 773 acres. SFWMD recognized a significant operational constraint in that the system cannot pump sufficient water to keep the entire STA wet. If the STA goes dry, there can be a net export of phosphorus from the system. To help maintain a more consistent water supply, the Nubbin Slough design includes a 30-acre pond that can store up to 90 ac-ft of water to be released as needed into the STA. Even with this additional storage, the STA is expected to go dry, and SFWMD will be monitoring the system for the occurrence of TP export once the system is operational.

Lakeside Ranch STA

The Lakeside Ranch STA is located on a 2,700-acre property in western Martin County and adjacent to Lake Okeechobee. The project was designed in two phases. Phase I is on the north side of the property and includes 1,200 acres of treatment. Phase II will provide an additional 788 acres of effective treatment. Construction of Phase I was completed in 2012 and flow-through operations commenced in July 2013. The 2015 South Florida Environmental Report will include the first year of water quality reporting under operational conditions for the period between July 2013 and April 30, 2014.

Initial TP reduction estimates for Lakeside Ranch based on modeled results totaled 25.8 mt, including 15.4 mt in Phase I and 10.4 mt in Phase II (Hazen and Sawyer, 2011). Current reductions for both phases are 19 mt (Odi Villapando, personal communication). The total load reduction estimate included in the draft Lake Okeechobee BMAP for both phases is 21.6 mt, 14 mt for Phase I and 7.6 mt for Phase II.

Summary of Existing and Planned STA Costs

Costs for these three STAs are summarized in Table 6. Except for the costs for the Lakeside Ranch Phase II and design, permitting and construction costs for Taylor Creek STA, costs were obtained from the draft Lake Okeechobee BMAP document. Initial costs for Phase II of Lakeside Ranch are based on personal communication with SFWMD staff and initial capital costs for Taylor Creek STA were obtained from Hazen and Sawyer (2011).

Table 6: Summary of Existing STA Costs

Facility	Design, Permitting, and Construction ($)	Annual Operation and Maintenance ($)	Initial Cost per Treatment Acre ($)
Taylor Creek	5,642,293	50,000	47,816
Nubbin Slough	21,257,707	100,000	27,500
Lakeside Ranch Phase I	22,800,000	341,000	19,000
Lakeside Ranch Phase II	25,000,000	Not available	31,726

Alternative Technologies

Permeable Reactive Barriers (PRBs)

SFWMD recently completed a pilot study to assess the feasibility of using PRBs to reduce TP loads to Lake Okeechobee (IFAS 2014). The configuration of PRBs for this study consisted of trenches dug perpendicular to the direction of groundwater flow and filled with a medium that is capable of reacting to and binding the pollutant of concern. The medium used in this study was potable water treatment residuals produced from aluminum salts (Al-WTRs). Al-WTRs are capable of long-term sequestration of phosphorus, and they are readily available at little to no cost. Two study sites were selected. The first site was at an abandoned dairy and the second was at an active dairy. The first site selected did not have sufficient topography to provide adequate groundwater flow through the PRBs for phosphorus removal. In addition, the placement of the PRBs was too far from the water bodies of interest, and the benefit of the PRB was lost because the groundwater picked up phosphorus from the soil before discharge into the surface water. The up-gradient and

down-gradient TP concentrations were not statistically different. The conclusion was that placement of PRBs in the middle of highly impacted areas is not a good idea. The PRBs should be placed down-gradient of the impacted soils. The second site had much better hydraulic conditions, i.e., greater flow through the PRB, but the amount of phosphorus removed was low because the concentration of phosphorus in the groundwater was lower than expected.

Floating Aquatic Vegetation Treatment

The potential use of a new technology called Floating Aquatic Vegetation Treatment (FAVT) is being evaluated concurrent with this study. FDACS is providing funding this fiscal year for the development of an FAVT system in conjunction with a willing property owner. FAVT is a type of wetland treatment system that uses a combination of floating and submerged vegetation for phosphorus removal. Floating vegetation, typically water hyacinth, is used in the top one third of the water column. Water hyacinth is efficient at nutrient removal, but will eventually stop growing and need to be removed. The FAVT system consists of a deep zone treatment area and a shallow zone treatment area. To remove the vegetation, the shallow zone is allowed to dry out during the dry season, and the vegetation is tilled into the soil. Based on results of a pilot-scale study and work done for a dissertation at the University of Florida, FAVTs are estimated to be eight times more efficient than conventional STAs (Tony Federico, personal communication). An FAVT project in the Fisheating Creek sub-basin is included in the draft Lake Okeechobee BMAP. The annual removal of TP and TN for that project is estimated to be 8.6 mt and 29.2 mt, respectively.

3.3 Option 1 – Stormwater Treatment Area

The subject 684-acre property between Lower Taylor Creek and the L-63N Canal includes approximately 305 acres of wetland. Because of the high cost of mitigating for wetland impacts, potential STAs in the wetland areas of the property were eliminated from consideration early in the study. In addition, the proposed location of the STA on the east side of the property is outside the 10,000-ft airport buffer requirement. The Taylor Creek STA was used as the basis for development of the performance efficiencies of Option 1 because it is the most similar in size and because it is the only facility of the three evaluated for which operational data are available.

The total STA footprint shown in **Figure 13** in **Appendix A** is 60 acres and is configured to avoid impacts to wetlands. Of this total area, it is estimated that 50 acres will be available for treatment. This is consistent with the ratio of treatment area to non-treatment area for the Taylor Creek STA. This option would require establishment of a pump system on the north end of the STA with gravity outflow back into the L-63N Canal at the south end. Initially, consideration was given to pumping water from S-192 to hydrate the STA. This would require a major modification in the way the pump at S-192 is operated currently. The required pumping distance along the L-63N Canal from S-192 to the north end of the STA is approximately 1.2 miles. To facilitate adaptive management for the STA and to provide for a constant inflow of water, it will be necessary for the STA to have an independent pump system. To achieve average hydraulic loading rates of 5 to 10 centimeters per day (cm/day), the pump system will need to pump an average of 4 to 8 cfs on an annual basis. At these pumping rates, the hydraulic residence time in the STA for an average operating depth of 2.0 ft ranges from 6.1 to 12.2 days.

The annual removal of TP will vary depending upon the total load into the STA. The average annual measured inflow TP concentration to the Taylor Creek STA for water years 2009, 2011, 2012, and 2013 was 321 ppb (range 167 to 408 ppb) (SFER, 2014). This compares well with the average annual geometric mean of TP in Upper Taylor Creek at Cemetery Road for calendar years 2008 through 2011 of 354 ppb (range 298 to 439 ppb). See **Figures 11** and **12** in **Appendix A** for the basin map and land use map. For purposes of calculating an estimated average annual removal rate for TP, an inflow concentration of 354 ppb was used because the Cemetery Road site is downstream of the existing Taylor Creek STA and closer to the site under consideration. The assumed removal efficiency is 28.7 percent, which is the average TP removal efficiency for the Taylor Creek STA since the start of operations. For a hydraulic loading rate ranging from 5 to 10 cm/day over 50 treatment acres, Option 1 is expected to yield TP reductions of 465 to 727 kg/yr.

This relatively small facility is expected to cost more on a per-acre basis than the larger STAs discussed in Section 3.2 because there is no economy of scale. Taylor Creek STA is the most similar in size to Option 1 of the three STAs evaluated, and the initial cost per acre of treatment is $47,816. The Powell Creek Filter Marsh in Lee County has 40 treatment acres and is even closer in size to the Option 1 STA. Powell Creek Filter Marsh was completed in 2013 at a cost of $2,100,000 for design, permitting, and construction, or at an initial cost per treatment acre was $52,500. The Powell Creek system includes the cost of a pump station. Because it is comparable in size to the proposed STA and was completed more recently, costs from the Powell Creek project are used to calculate the estimated initial cost for Option 1 of $2,650,000. Operating and maintenance costs are assumed to be similar to Taylor Creek STA, at $50,000 annually.

3.4 Option 2 – Biosorption Activated Media (BAM)

Option 2 considers the use of BAM for nutrient removal. Marion County is using BAM in several stormwater retention basins to reduce nitrate leaching to groundwater in karst areas. Monitoring data from the springshed sites indicates that BAM is also effective at removing orthophosphate, with reductions of greater than 70 percent in the unsaturated soil zone beneath the BAM layer. The BAM removes nitrogen through biological processes in an anaerobic environment. Phosphorus is reduced by sorption onto the BAM. The BAM used for the retention pond in the springsheds consists of a 1.0:1.9:4.0 mixture of tire crumb, silt+clay, and sand. The tire crumbs increase the sorption capacity of the BAM, the silt+clay layer increases water retention and sorption capacity, and the sand promotes infiltration. To be effective at removing phosphorus, the minimum contact time with the BAM is 15 minutes.

BAM could be used downstream of S-192 in either an in-stream system or an offline swale system adjacent to Lower Taylor Creek. Both concepts require the diversion of water from the L-63N Canal into Lower Taylor Creek and would require a modification in the current manner in which the gate and/or the pump are operated. S-192 consists of a manually operated sluice gate and a pump with a design rating of 30 cfs. The gate is normally closed and opened for two reasons:

1. To divert flows from the L-63N Canal for maintenance purposes, and

2. When water quality is degraded in Lower Taylor Creek and Lake Okeechobee is sufficiently low to permit gravity flow into the lake (below elevation 14.0).

The pump is operated only when the water quality in Lower Taylor Creek is degraded and when the water level in Lake Okeechobee is too high to permit gravity flow. When the pump is discharging, S-193 is opened enough to discharge about the same amount of water as S-192 is pumping (SFWMD Operations Control Center Structure Book, Structure S-192, Revised 8/15/1994). Pump operations would not require modification if water was only supplied to the system when water levels in the L-63N Canal and lake allow for gravity flow.

For the 3,300 ft offline swale shown in **Figure 14** in **Appendix A**, diverted water flows through a swale with a bottom width of 50 ft and underlain with BAM to a depth of 1 ft. To maintain a minimum depth of 1 ft in the swale, a control berm is installed on the downstream end of the swale. The approximate volume in the swale at a depth of 1 ft is 4.1 ac-ft. Assuming an infiltration rate of 0.25 inches per hour (in/hr), this volume would have to be replaced every 48 hours, requiring an average flow from the structure of approximately 1 cfs. Assuming an average TP concentration of 354 ppb, the annual TP load to the BAM system is 316 kg/yr. Orthophosphorus is almost 80 percent of the TP in Taylor Creek water (2013, SFER), so the load of orthophosphorus is estimated at 253 kg/yr. Using a range of removal efficiency for orthophosphorus of 35 to 70 percent, this configuration can be expected to remove at least 88 to 176 kg/yr of orthophosphorus. The TN removal rate observed in the Marion County study was up to about 50 percent.

For planning purposes, in-place costs for the BAM system are estimated at $180 per cubic yard (Wanielista, personal communication). Costs could be reduced if soils onsite can be used to mix the BAM. For the swale system shown, 6,111 cubic yards are required, and the estimated cost is $1,100,000. This is likely conservative, because for a project of this size, it is expected that there would be economies of scale.

The second BAM concept that was considered, but in less detail, is an in-stream application, in which a structure is used to increase the water elevation on the structure's upstream side, forcing water downward and through a BAM layer installed under the streambed to a depth of 2 ft. The minimum downstream length of the layer is determined based on the rate of flow through the layer to maintain a minimum contact time of 15 minutes. This concept is untested, but the Stormwater Management Academy at the University of Central Florida recently received a grant from FDOT to test an in-line system for nitrate removal in a springshed. An in-stream system would not require as much land acquisition as the offline system, but the lack of demonstration projects make functional parameters less well known.

Many factors are involved with the development of a BAM system, and the needs of each site are unique and require site-specific detailed design. The numbers presented are conceptual but believed to be achievable. An important design factor to consider is the phosphorus removal design life of the BAM. Because phosphorus is removed by sorption onto the BAM, eventually the BAM will become saturated and need replacement. This is not a problem for nitrogen removal because nitrogen is removed using biological processes. Ease and cost of future maintenance is a consideration.

3.5 STA Option 3

Option 3 considers increasing water storage in the existing onsite wetlands to contain runoff from the property. A 162.5-acre wetland area is proposed for improvement (**Figure 15** in **Appendix A**) by installation of risers or other structures to restore seasonal high water lines (SHWLs) to levels more indicative of pre-disturbance. Nutrient reduction benefits are calculated for this option by assuming that whatever load from the property would have entered Lower Taylor Creek will be contained onsite. The TP and TN loads for the entire 684-acre property between Lower Taylor Creek and the L-63N Canal based on the Lake Okeechobee BMAP Load Estimation Tool are 180 and 858 kg/yr, respectively. The SHWLs and water levels in Lower Taylor Creek shown in **Appendix A Figure 6** indicate that there is an additional 1 to 2 ft of storage available in this wetland area. One foot of extra storage will completely contain runoff from an 8-inch storm event. This corresponds to the 50-year return period, 1-day maximum rainfall for the area (Pathak, 2001). During the wet season, it is unlikely that all runoff can be fully contained without some discharge into Lower Taylor Creek. Therefore, the load reduction benefit is reduced by whatever load eventually makes it to Lower Taylor Creek. Without more detailed modeling of specific rainfall events over time, it is difficult to estimate how much water will actually be discharged. For purposes of this study, a range of 50 to 80 percent retention will by assumed, resulting in TP reductions of 90 to 144 kg/yr and TN reductions of 429 to 686 kg/yr.

A secondary benefit of Option 3 is restoration of some of the wetland functions. A quantification of the potential environmental lift that could be realized by rehydration of this wetland was determined using the Uniform Mitigation Assessment Method (UMAM). The UMAM calculated the potential environmental lift per acre, known as the relative functional gain (RFG), for the 338 acres of cypress wetland contained within the property to be 0.076. The functional gain for the 162.5-acre wetland area placed in a conservation easement based on the UMAM is 12.35. Restoration of larger or smaller wetland acres would correspondingly increase or decrease the environmental lift achieved.

Potential costs for Option 3 can vary considerably depending upon the type and number of structures required to restore water levels in the wetlands and the contract with the property owners for the use of their properties. For the purposes of this discussion, initial costs would include payment to the landowner for the cost of acquiring a conservation easement over the wetland areas that are being rehydrated.

3.6 STA Discussion and Summary

Estimated nutrient reductions for each of the three options iare summarized in Table 7.

Table 7: STA Estimated Nutrient Loading Reductions

	Estimated TP Reduction (kg/yr)	Estimated TN Reduction (kg/yr)
Option 1 – Stormwater Treatment Area	465 - 727	Not calculated
Option 2 – Biosorption Activated Media	88 - 176	50 percent
Option 3 – Increased Wetland Storage	90 - 144	429 - 686

Each option presented has advantages and disadvantages. Option 1 has the potential to provide substantial nutrient reductions, but requires a large amount of privately owned land. SFWMD would be the most logical entity to operate this facility, but the agency already has a backlog of projects that lack funding, including Lakeside Ranch STA Phase II. STA operation in the northern Everglades is relatively new to the agency, and the systems function differently than the STAs in the southern Everglades. SFWMD is still working through substantive operational issues at the Taylor Creek STA related to the periodic net export of phosphorus. The Nubbin Slough STA, despite being completed in 2006, has never been operational due to a number of mechanical problems and needed repairs that should be completed by the end of October. Once Nubbin Slough is online, the SFWMD already understands that it is likely to have problems with insufficient flow to operate the STA and will have to address those issues as they arise. Since the start of flow-through operations in July 2013, Lakeside Ranch Phase I seems to be working well but is still in its stabilization phase. The first year of nutrient reduction calculations for Lakeside Ranch Phase II will be included in the 2015 South Florida Environmental Report. Given its funding constraints as well as its efforts to work through operational difficulties with existing STAs, SFWMD is likely unable to commit to managing another STA.

Option 2 can achieve reasonable nutrient reductions within a small footprint, thus minimizing land acquisition requirements. Although a number of projects have been constructed throughout the state, this is still a relatively new technology for which new applications and uses are continually being investigated. In addition, much of the effort has been focused on the use of BAM in karst areas because of its ability to reduce nitrate loads to groundwater, with less research focused on reducing phosphorus. While a relatively simplistic model was presented as part of this analysis, there are many factors involved in design of a successful system. This may be a good opportunity, however, to investigate the use of BAM in the Lake Okeechobee watershed for phosphorus removal on a larger scale.

Option 3 provides estimated reductions comparable to Option 2 but, unlike BAM, reduction estimates are not based on research data. Rehydration of the wetland will improve a disturbed wetland habitat so Option 3 has an additional ecological benefit. SFWMD funds water storage and restoration projects but is more interested in larger scale projects that have a higher benefit-to-cost ratio. In addition, SFWMD has no money available for additional water storage projects that are not already planned, in progress, or completed. Implementation of this option would require acquisition of a permanent conservation easement from the property owner. For purposes of this discussion, initial project costs are the costs to acquire the easement.

4. CONCLUSIONS

The feasibility report has presented several options worthy of investigation for both the FDOT Regional Pond and the multi-agency STA. It is recommended that the report be shared with the property owner, SFMWD, FDEP and FDACS for consideration of the alternatives to determine if partners are available to pursue the STA option.

5. REFERENCES

1. Federal Emergency Management Agency (May 2013). *Flood Insurance Rate Maps, Okeechobee County, Florida and Incorporated Areas*. Community-Panel Number 12093C0415C.

2. Federal Emergency Management Agency (May 2013). Preliminary *Flood Insurance Study: Okeechobee County, Florida and Incorporated Areas*.

3. Gary Goforth, Inc. 2005a. Operation Plan Nubbin Slough/New Palm Stormwater Treatment Area. Submitted to South Florida Water Management District.

4. Gary Goforth, Inc. 2005b. Operation Plan Taylor Creek/Grassy Island Stormwater Treatment Area. Submitted to South Florida Water Management District.

5. Hazen and Sawyer. 2011. Compilation of Benefits and Costs of STA and Reservoir Projects in the South Florida Water Management District. Submitted to the World Wildlife Fun acting on behalf of the Florida Ranchlands Environmental Services Project.

6. Institute of Food and Agricultural Sciences (IFAS). 2014. Permeable Reactive Barriers for Passive Management of Phosphorus in the Lake Okeechobee Basin: Final Report. Submitted to South Florida Water Management District, West Palm Beach, FL. Environmental Hydrology Laboratory, Soil and Water Science Department, Gainesville FL.

7. South Florida Water Management District. 2014. 2014 South Florida Environmental Report.

8. South Florida Water Management District. 2013. 2013 South Florida Environmental Report.

9. South Florida Water Management District. 2012. 2012 South Florida Environmental Report.

10. Stanley Consultants, Inc. 2003. Lake Okeechobee Water Retention/Phosphorus Removal Project Design Analysis Final Submittal. Submitted to Department of the Army Corps of Engineers, Jacksonville District.

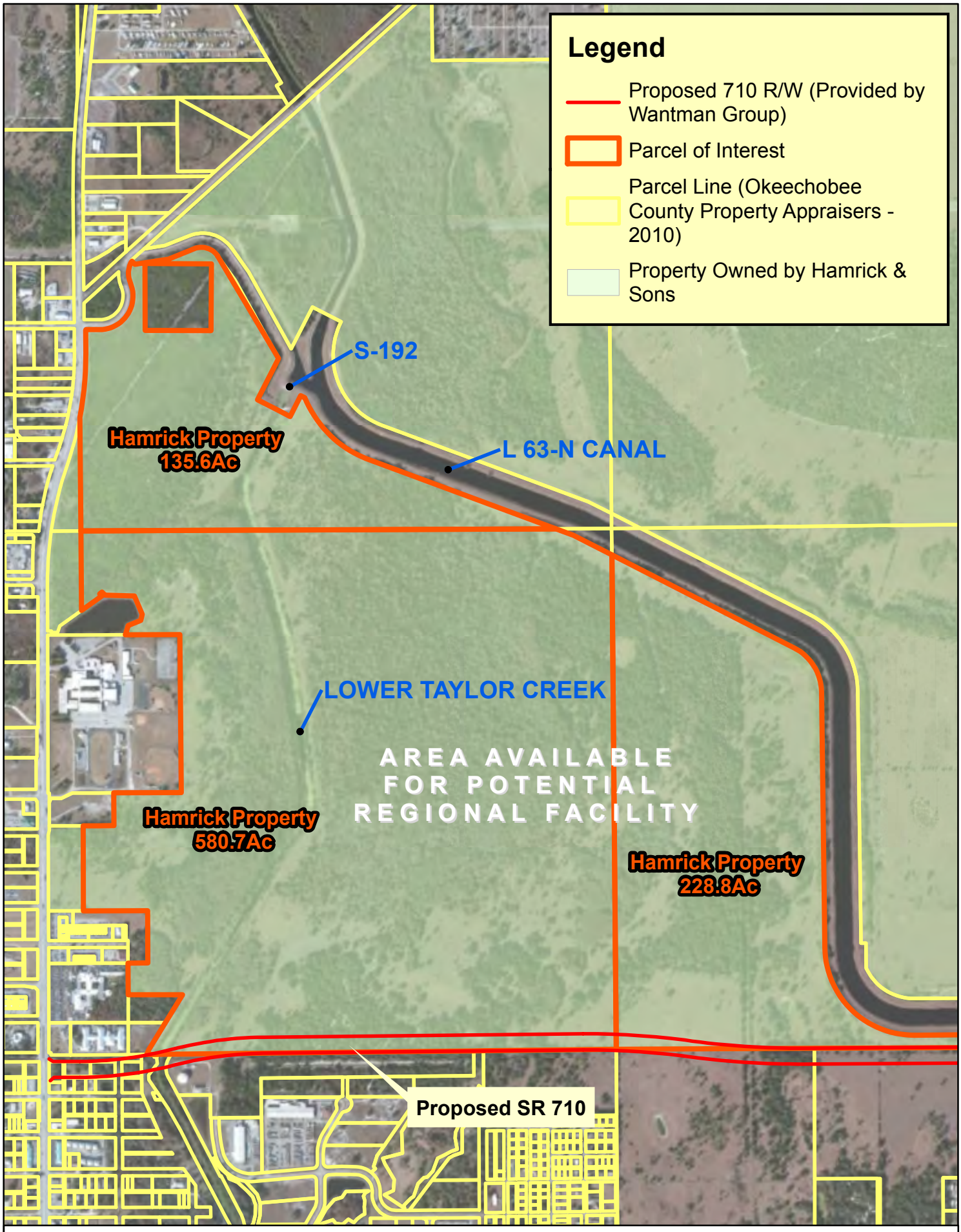
11. Stanley Consultants, Inc. 2003. Lake Okeechobee Water Retention/Phosphorus Removal Project Design Documentation Final Submittal. Submitted to Department of the Army Corps of Engineers, Jacksonville District.

Appendix A: Figures

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Final Submittal

Financial Project ID
432644-1-32-01

Okeechobee County, Florida



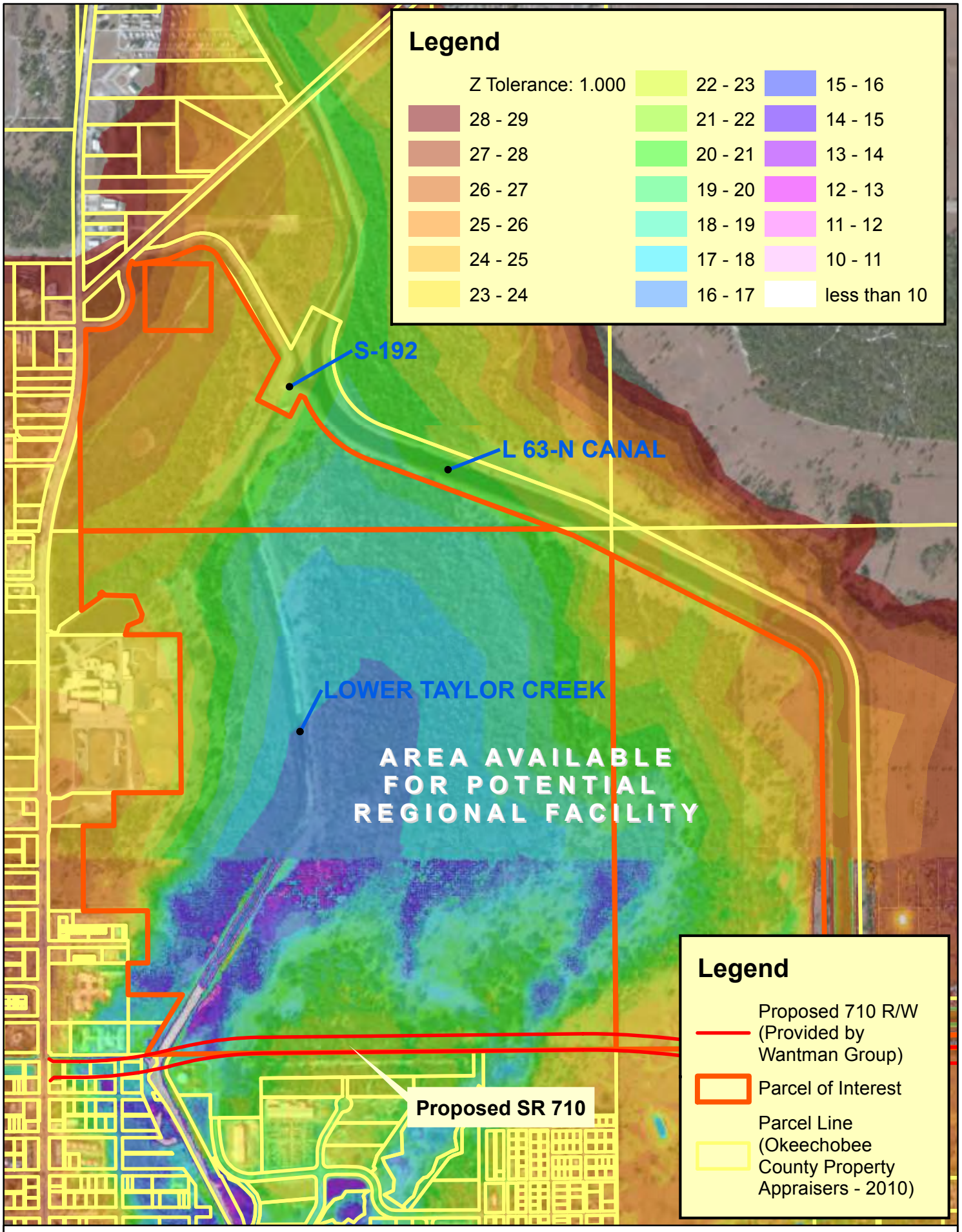
Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN,

0 0.125 0.25 Miles

N W E S

FIG 1 - LOCATION MAP

SR 710 Regional Facility Conceptual Analysis



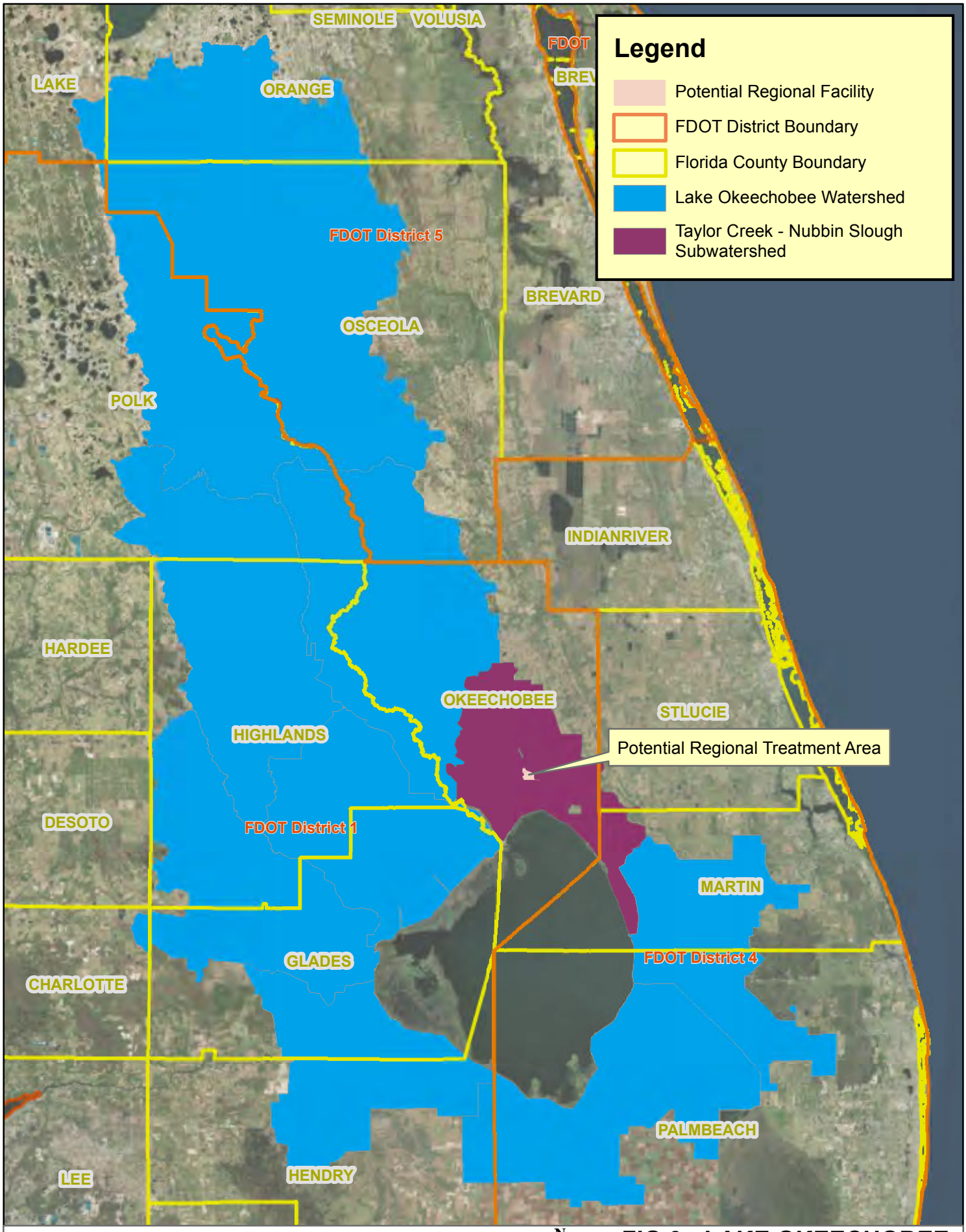
Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

0 0.125 0.25 Miles

N W E S

FIG 2 - TERRAIN MAP

SR 710 Regional Facility Conceptual Analysis

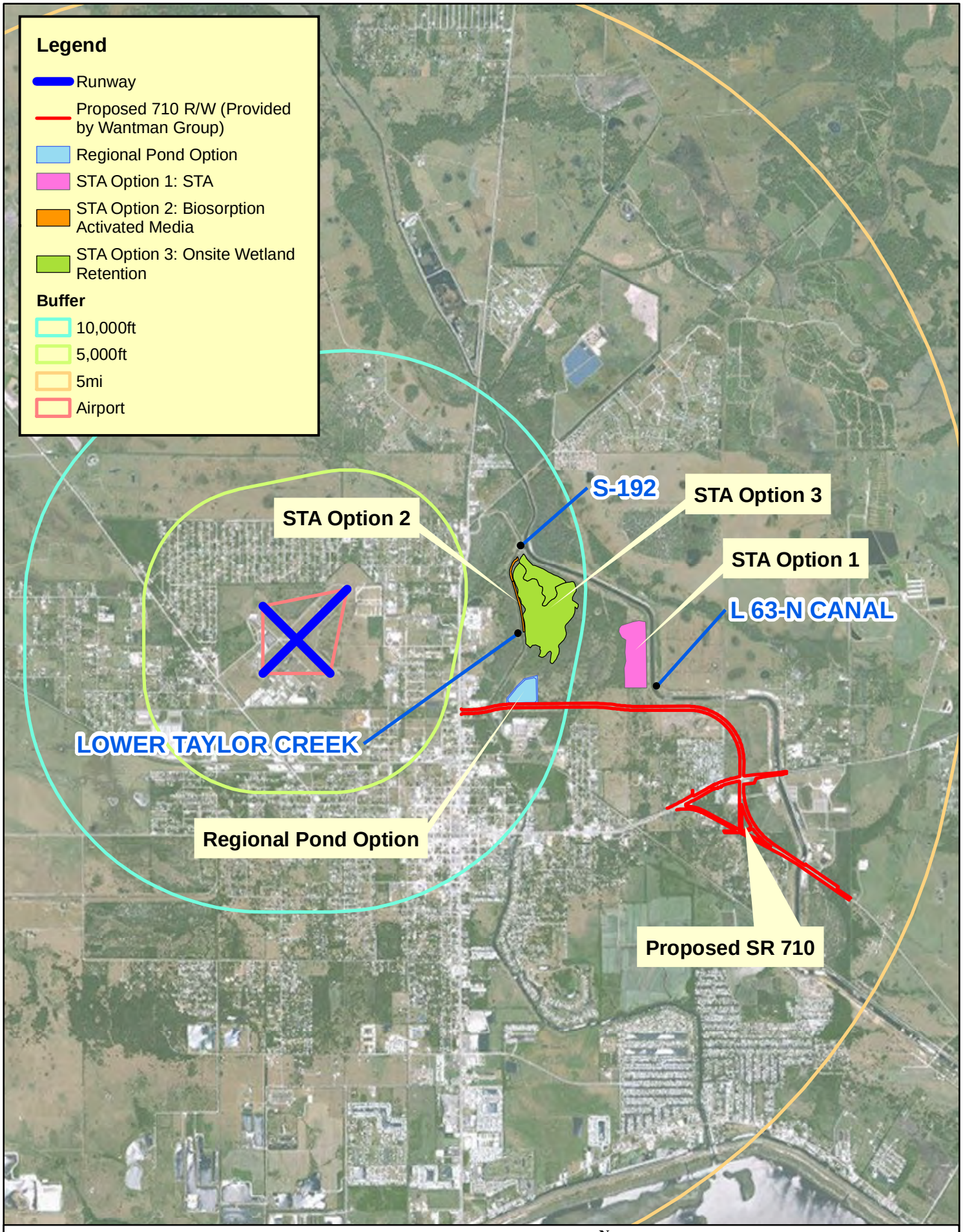


Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

0 7.5 15 Miles

N W E S

FIG 3 - LAKE OKEECHOBEE WATERSHED
SR 710 Regional Facility Conceptual Analysis



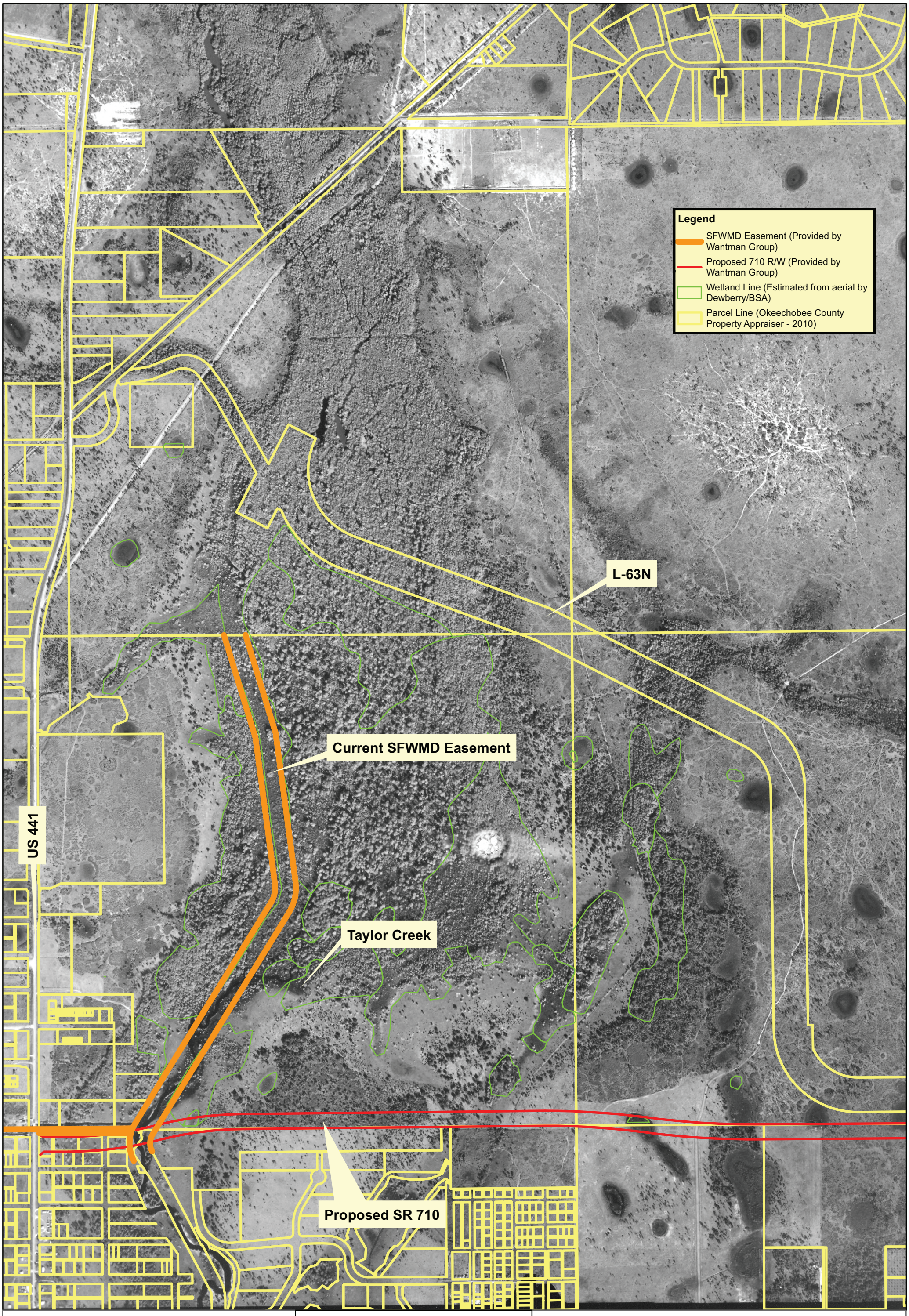
Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN,

0 0.5 1 Miles

N W E S

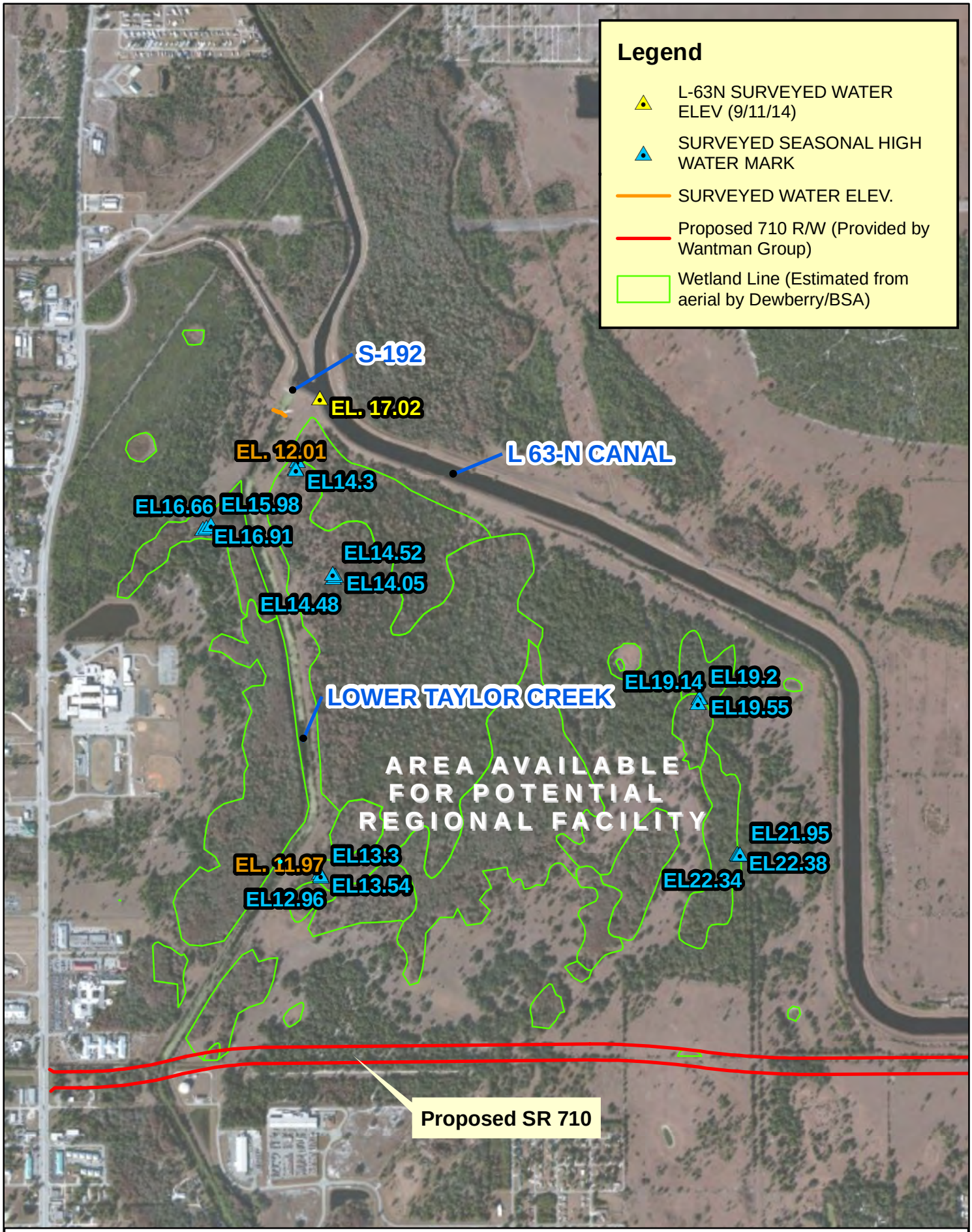
FIG 4 - FAA BUFFER

SR 710 Regional Facility Conceptual Analysis



Source: Online Aerial Photography: Florida Collection (http://ufdc.ufl.edu/aerials)
Note: Aerial spatial coordinates were unknown. The image was georeferenced using 2013 aerial imagery and 2010 parcel data.

FIGURE 5
1953 HISTORIC AERIAL
REGIONAL POND/STA LOCATION



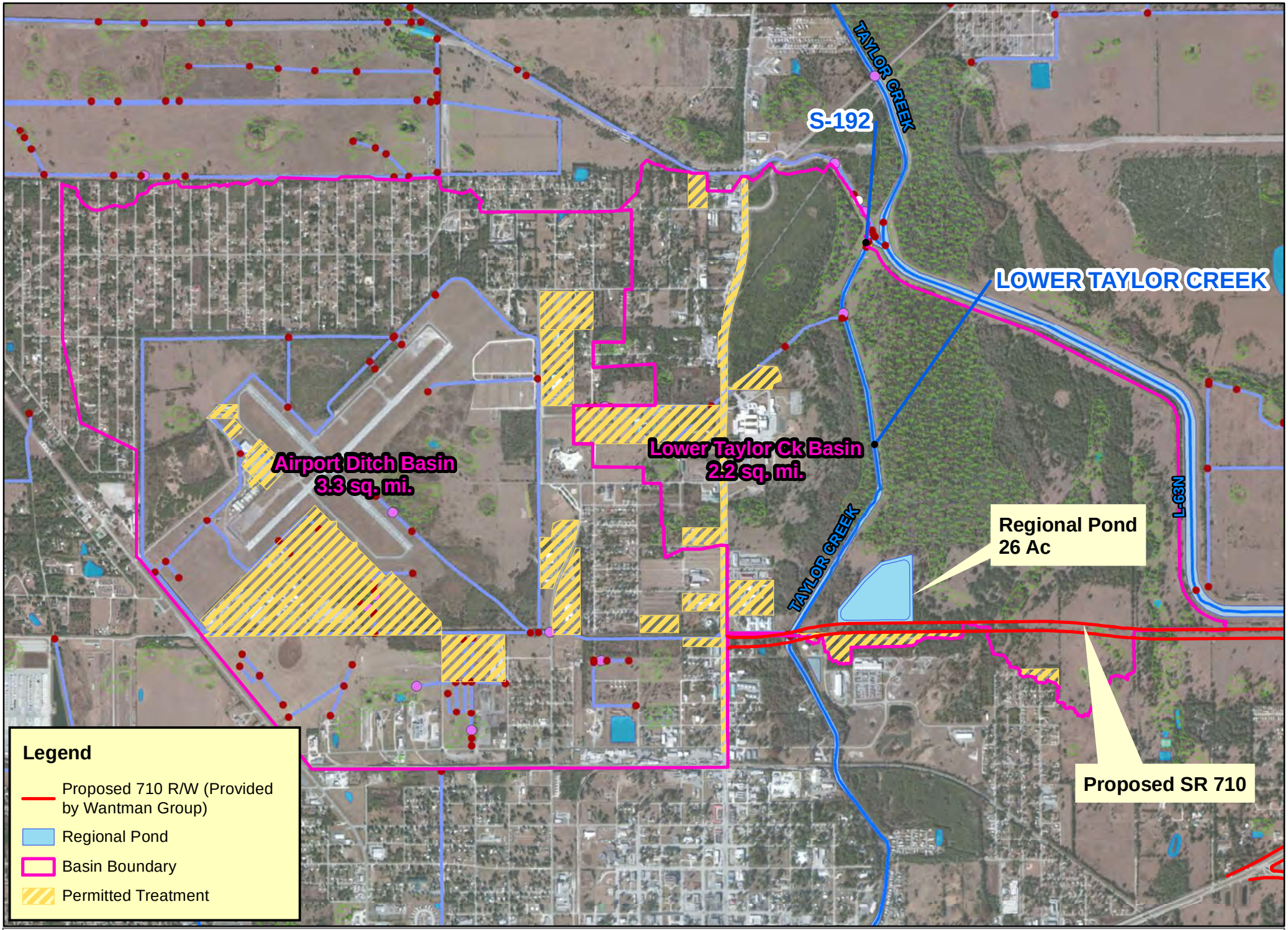
Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

0 0.125 0.25 Miles

N W E S

FIG 6 - WETLAND AND SURVEYED WATER ELEV.

SR 710 Regional Facility Conceptual Analysis



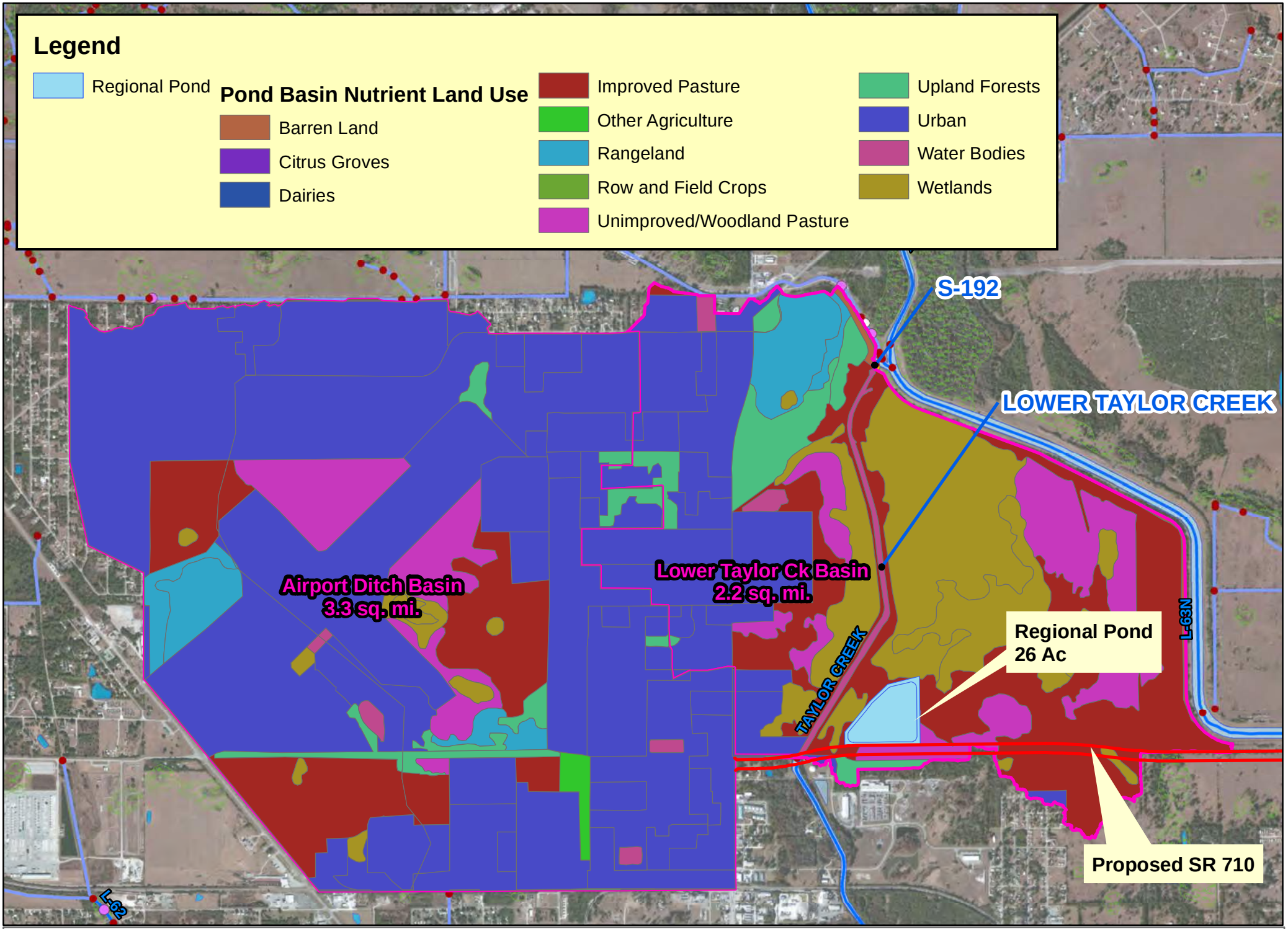
Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

0 0.25 0.5 Miles

N W E S

FIG 7 - REGIONAL POND BASIN MAP

SR 710 Regional Facility Conceptual Analysis



Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus

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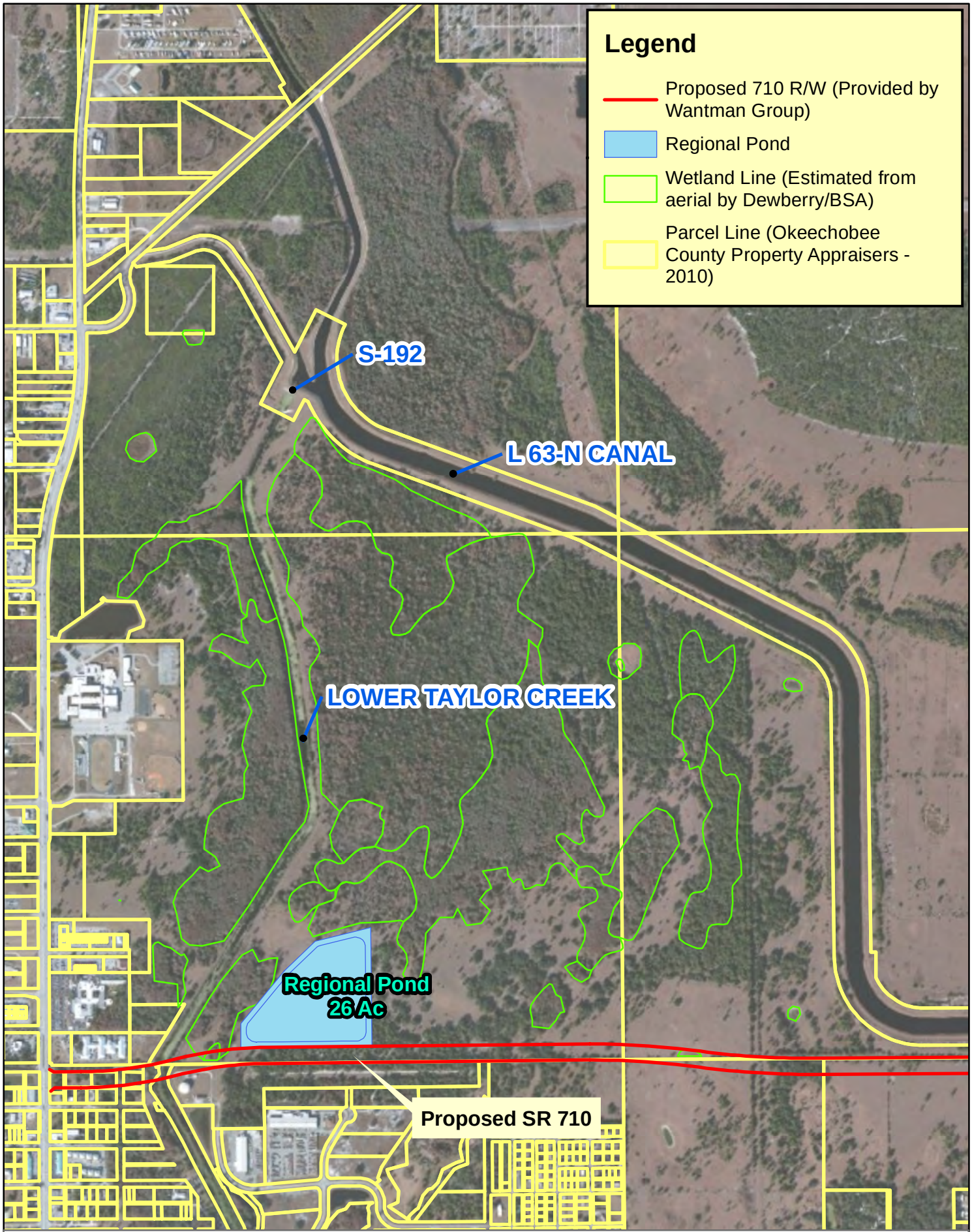
N W E S

FIG 8 - REGIONAL POND NUTRIENT LAND USE MAP

SR 710 Regional Facility Conceptual Analysis



Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN,

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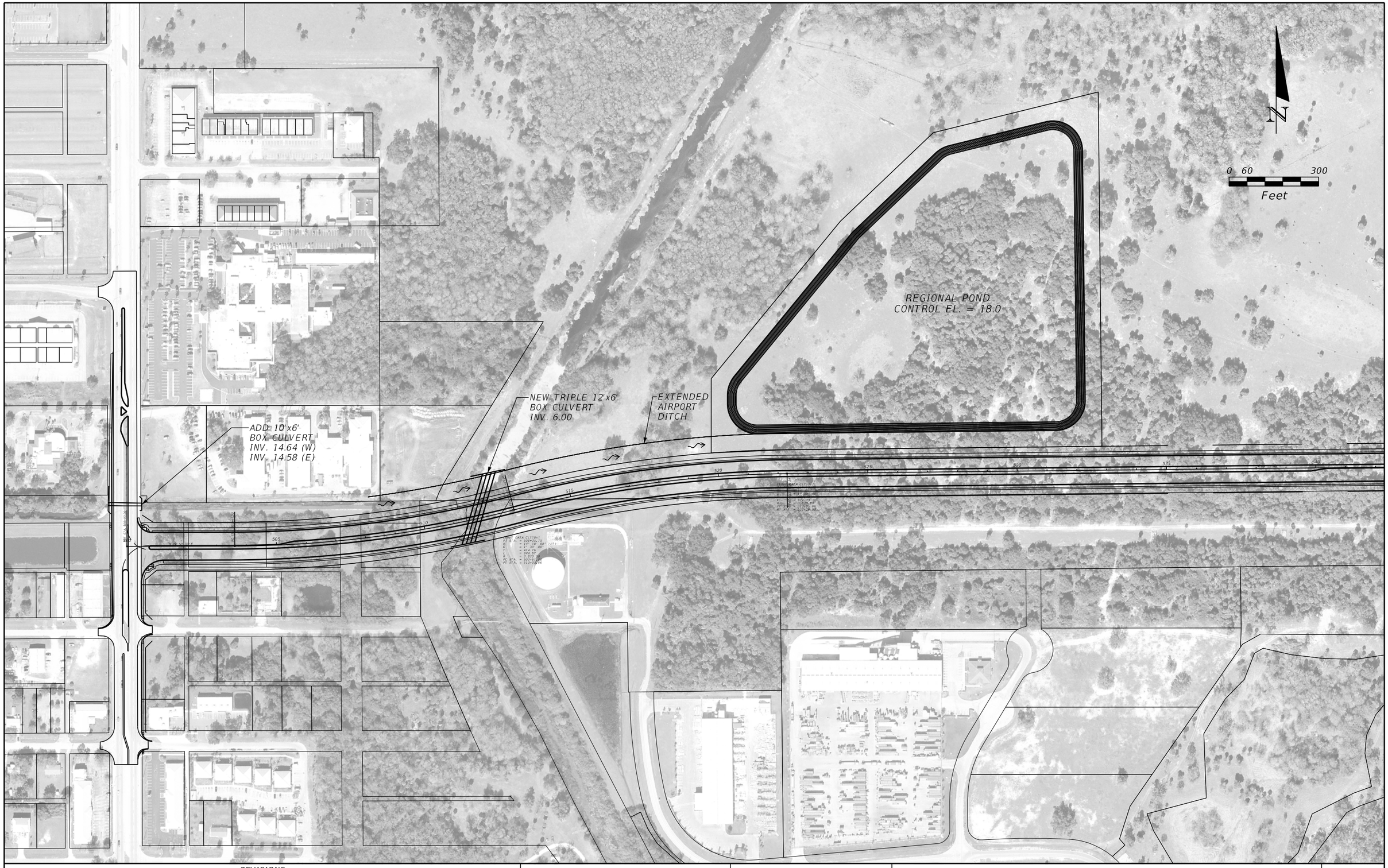
N W E S

FIG 9 - REGIONAL POND LOCATION

SR 710 Regional Facility Conceptual Analysis



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123
E.O.R.: Gregory S. Seidel, P.E. No. 47571

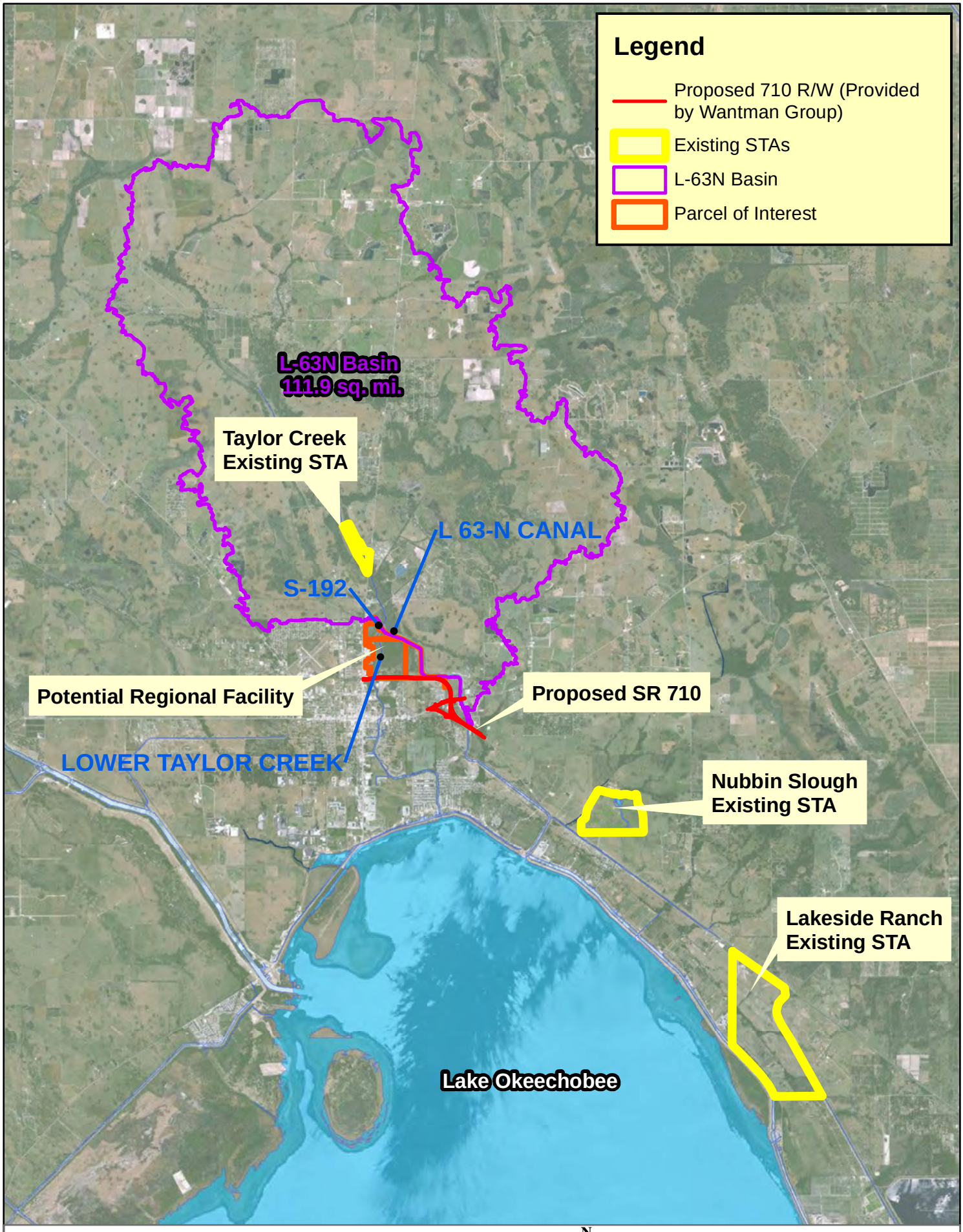
FDOT DISTRICT 1	
ROAD NO.	PROJECT NO.
SR 710	001106.00

FIG 10 - REGIONAL POND CONVEYANCE

SR 710 Regional Facility Conceptual Analysis

SHEET NO.

AExposito 9/22/2014 5:13:30 PM T:\01106.00\43264413201\drainage\FIG10_RegionalPond_Conveyance.dgn



Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

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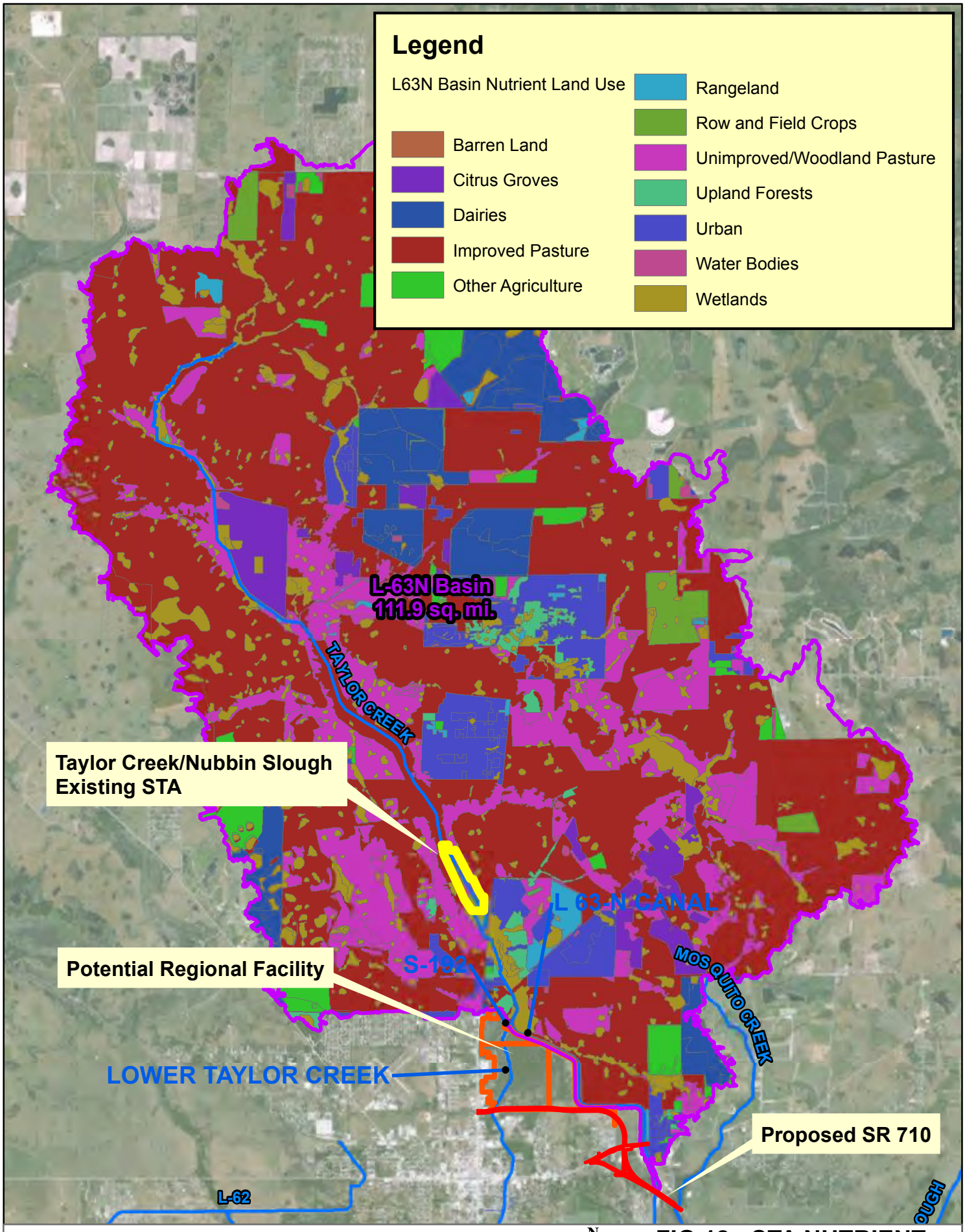
FIG 11 - STA BASIN MAP

SR 710 Regional Facility Conceptual Analysis



Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN,

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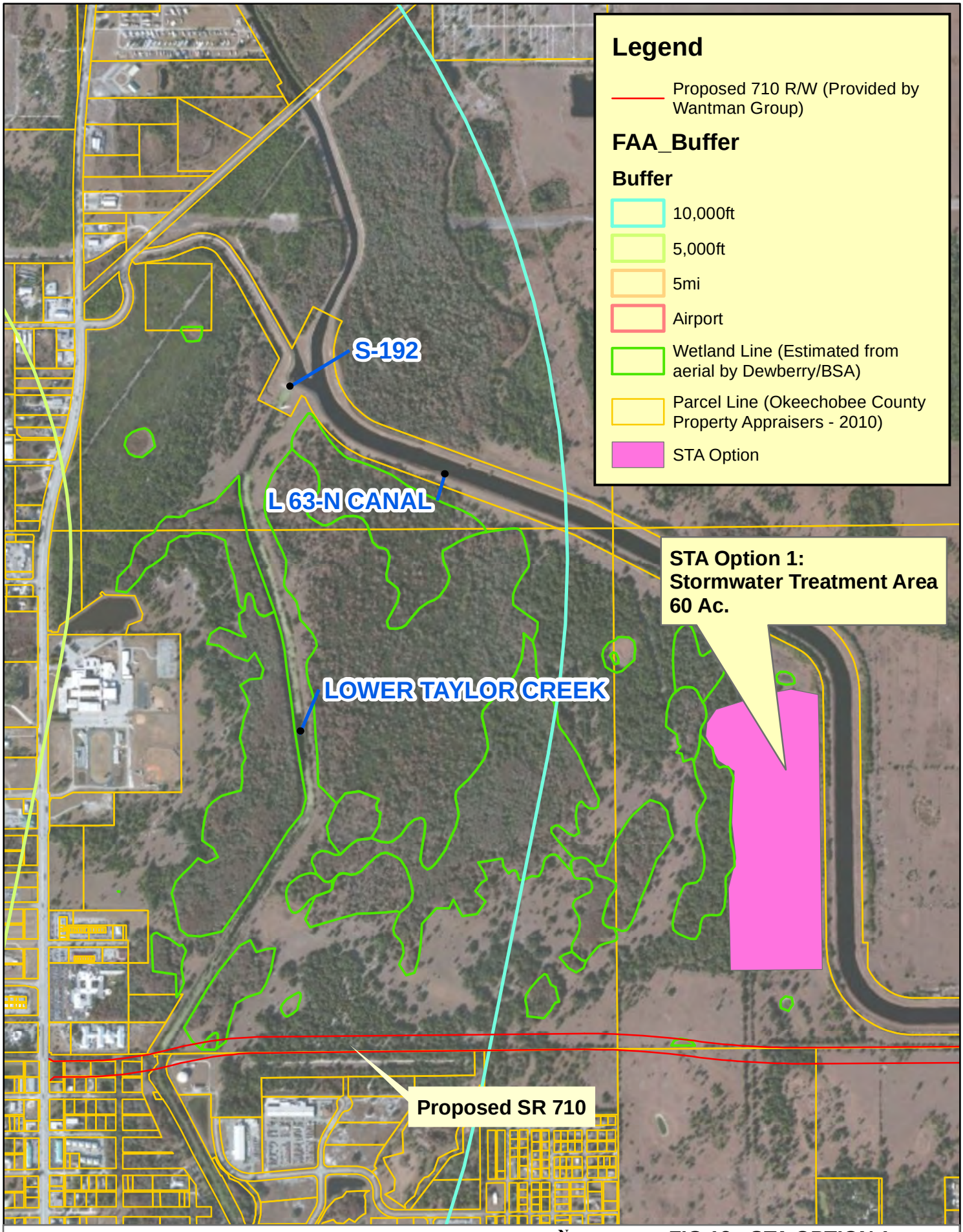
N W E S

FIG 12 - STA NUTRIENT LAND USE MAP
SR 710 Regional Facility Conceptual Analysis

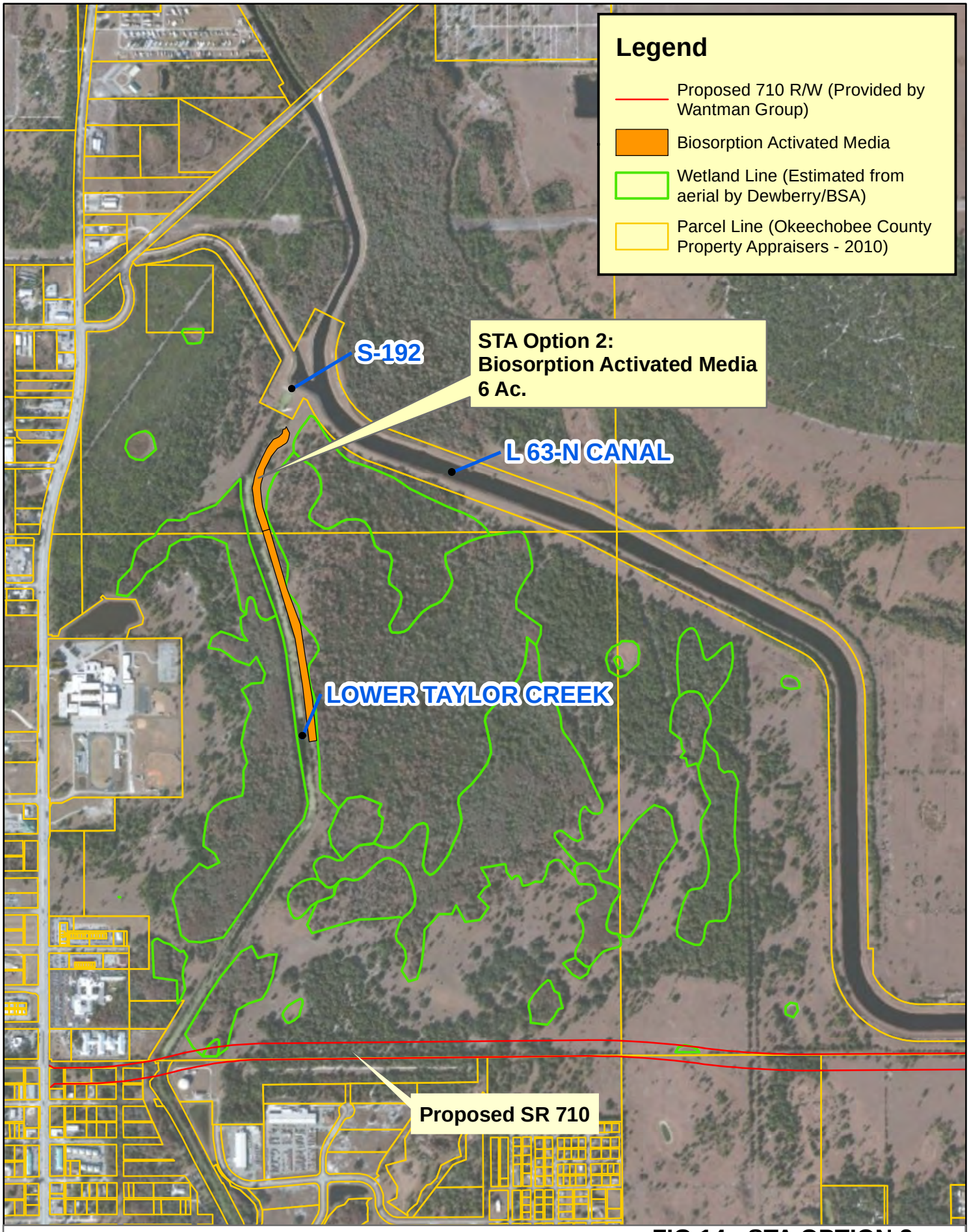


Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

0 0.125 0.25 Miles

N W E S

FIG 13 - STA OPTION 1: Stormwater Treatment Area SR 710 Regional Facility Conceptual Analysis



Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

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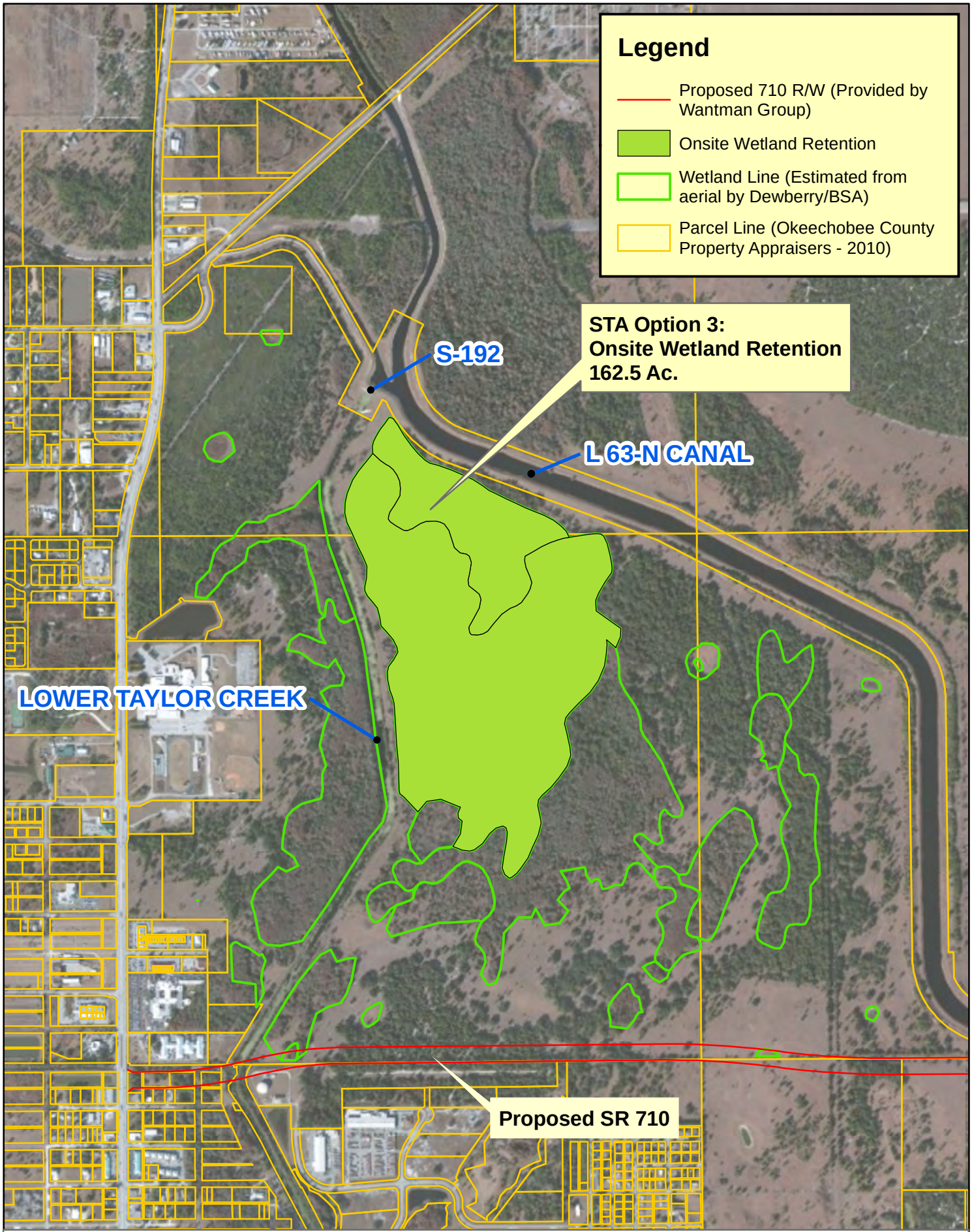
FIG 14 - STA OPTION 2: Biosorption Activated Media

SR 710 Regional Facility Conceptual Analysis



Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping,

0 0.125 0.25 Miles

N W E S

FIG 15 - STA OPTION 3: Onsite Wetland Retention

SR 710 Regional Facility Conceptual Analysis

Appendix B: Regional Pond Analysis

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Final Submittal

Financial Project ID
432644-1-32-01

Okeechobee County, Florida

TREATMENT VOLUME CALCULATIONS FOR REGIONAL POND

PROJECT: SR 710 - Regional Pond Option A PREPARED: JAN 7/24/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GSS 7/30/2014

Wet Detention Online Pond Treatment Calculations:

Total Airport Ditch Drainage area =	2086.00 Ac	
Total Treated within Airport Ditch Drainage Area =	231.78 Ac	
Remaining Area of Airport Basin Untreated =	1854.22 Ac	
SR 710 Drainage area (Basin 1 and Basin 2) =	40.37 Ac	
SR 710 Drainage area (Basin 3, Basin 4, and Basin 5) =	37.41 Ac	
Total Drainage Area Draining to Regoinal Pond =	2126.37 Ac	(Includes Airport and SR 710 Basins 1 and 2 only)
Total Area to be treated =	77.78 Ac	(Includes only SR 710 Basins)
1" runoff from drainage area =	6.48 Ac-Ft	
Required Treatment Volume (T.V.) =	**6.48**	**Ac-ft**
=	**282,341**	**ft^3**

STAGE-STORAGE FOR PROPOSED CONDITION

PROJECT: SR 710 - Regional Pond PREPARED: GSS 9/21/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: JAN 9/22/2014

Required Roadway Embankment =		413,721	CY
Shrinkage Factor =	10% =	41,372	CY
Required Pond Excavation =		455,093	CY
Required Pond Excavation =		282	Ac-Ft

Pond Storage Calculations (Wet Detention):

1:2 Slopes

Elev. (NAVD) (ft)	h ft	Area sf	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	Cum. Volume Cu-ft	Total Volume Ac-ft	Total Volume Cu-ft	
Parcel		1,126,640	25.864						
21.00	1.0	890,600	20.445	20.358	60.551	2,637,602	287.273	12,513,612	Top of Berm = App Exist Ground
20.00	1.0	883,000	20.271	20.184	40.193	1,750,807	266.915	11,626,817	
19.00	1.0	875,400	20.096	20.009	20.009	871,592	246.731	10,747,602	
18.00	1.0	867,800	19.922	19.836	0.000	0	226.722	9,876,010	NWL
17.00	1.0	860,300	19.750	19.663			206.886	9,011,954	
16.00	1.0	852,700	19.575	19.489			187.223	8,155,434	
15.00	1.0	845,200	19.403	19.317			167.734	7,306,493	
14.0	1.0	837,700	19.231	19.146	---	---	148.417	6,465,045	
13.0	1.0	830,300	19.061	18.975	---	---	129.271	5,631,045	
12.0	1.0	822,800	18.889	18.804	---	---	110.296	4,804,494	
11.0	1.0	815,400	18.719	18.635	---	---	91.492	3,985,392	
10.0	1.0	808,100	18.551	18.466	---	---	72.857	3,173,651	
9.0	1.0	800,700	18.382	18.298	---	---	54.391	2,369,272	
8.0	1.0	793,400	18.214	18.130	---	---	36.093	1,572,211	
7.0	1.0	786,100	18.046	17.963	---	---	17.963	782,468	
6.0	0.0	778,800	17.879	0.000	---	---	0.000	0	Bottom of Pond

PPV = Cum. Vol - Total = 227 Ac-Ft

NUTRIENT LOADING CALCULATIONS FOR REGIONAL POND

PROJECT: SR 710 - Regional Pond Option A PREPARED: JAN 7/24/2014

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GSS 9/21/2014

Annual Runoff Calculation

Basin	C*	Annual Runoff (in.)	Basin Area (ac)**
Regional Pond	0.6156	51	1894.59

*Assumes Non-DCIAs = 61% & DCIAs = 75%, using Zones 2 Tables from SQAH

**Basin areas = SR 710 Post Basins 1-2 and Airports Ditch Basin - Treated portions of Airports Basin

Regional Pond Nutrient Removal Calculation

Basin	Annual Runoff (ac/ft/yr)	Permanent Pool (ac-ft)	Residence Time (days)	Wet Detention TP Removal (%)	Wet Detention TN Removal (%)
Regional Pond	4956.8	227.00	16.7	63.0	34.7

Pre-Development Loading Summary

Basin	TP Outflow (kg/yr)	TN Outflow (kg/yr)
Airports Basin	762.09	4971.29
Lowers Taylors Creek Basin	460.75	2353.67
SR 710 Basins 1-2	14.16	78.85
SR 710 Basins 3-5	12.53	84.70
Total Outflow	**1249.53**	**7488.51**

Post-Development Loading TP Summary

Basin	TP (kg/yr)	% Removal	TP Outflow (kg/yr)
Airports Basin	762.09	62.99	282.05
Lowers Taylors Creek Basin***	456.47	N/A	456.47
SR 710 Basins 1-2	10.15	62.99	3.76
SR 710 Basins 3-5	11.52	N/A	11.52
Total Post TP Outflow			**753.80**

***Post Lowers Taylors Creek Basin loading is less than Pre due to the regional pond area (~20 ac)

Post-Development Loading TN Summary

Basin	TN (kg/yr)	% Removal	TN Outflow (kg/yr)
Airports Basin	4971.29	34.67	3247.93
Lowers Taylors Creek Basin***	2321.50	N/A	2321.50
SR 710 Basins 1-2	26.21	34.67	17.12
SR 710 Basins 3-5	29.72	N/A	29.72
Total Post TN Outflow			**5616.27**

***Post Lowers Taylors Creek Basin loading is less than Pre due to the regional pond area (~20 ac)

Total TP Removed	**495.7 kg/yr**
Total TN Removed	**1872.2 kg/yr**

SR 710 Regional Pond (Option B) - Withdrawal of Water from L-63N

SFWMD Provided TP Removal Rate and Concentration

PROJECT: SR 710 - Regional Pond Option B PREPARED: JAN 11/9/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GSS 11/10/2015

Scenario - SFWMD Data

1. Provided Data from SFWMD

Literature Cited:

1. ERD (Environmental Research & Design, Inc.), 2004. Lake Okeechobee Tributary Sediment Removal Demonstration Project SFWMD Contract No. C-11205. Final report submitted to South Florida Water Management District.

2. Bottcher, A.B. 2006. Phosphorus Reduction Performance and Implementation Costs under BMPs and Technologies in the Lake Okeechobee Protection Plan Area. Letter report provided to the South Florida Water Management District. West Palm Beach, FL.

Average TP concentration at S-133 = 0.203 mg/L
SFWMD recommended TP removal rate = 25.0 %

2. Wet Detention Pond Characteristics

a. Calculate annual runoff inputs to pond:

226.70 ac-ft = Permanent Pool Volume

For a 21-day residence time, the allowable volume of runoff into the pond will be:

Allowable Volume = 365 days/ 1 Year / 21 days = 3940 Ac-Ft

Flow Rate from L63-N = 5.44 cfs (Assumes 0 roadway runoff)

b. Estimate Max. Allowable Pond Depth:

1. Estimate runoff characteristics:

TP = 0.203 mg/l (from above)

2. Calculate TP loading to wet detention pond and Reduction:

TP loading to wet det. Pond = 986 kg TP/yr $Allowable\ Volume\ x\ TP\ x\ 43560\ x\ 7.48\ x\ 3.785\ x\ 10^{-6}$

TP Removal Rate = 25.00 %

TP removal by Wet Det. Pond = 247 kg TP/yr

3. Calculate TP concentration in pond:

TP removal = 25.0 % (from above)

Annual mass of TP remaining in water column = TP load to pond X (1 - TP removal)
= 739.50 kg TP/ yr

This phosphorous mass will be distributed within the pond permanent pool and the pond outflow.
Assuming that inflow and outflow are approx. equal, the

Outflow = 3940.00 ac-ft/yr

Mean Pond Concentration = 0.14391 mg TP/liter $\left(\frac{Annual\ Mass\ of\ TP}{Outflow\ Vol.+PPV}\right)\frac{10^{-5}}{43560x7.48x3.785}$

SR 710 Regional Pond (Option B) - Withdrawal of Water from L-63N

SFWMD Provided TP Removal Rate and Concentration

PROJECT: SR 710 - Regional Pond Option B PREPARED: JAN 11/9/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GSS 11/10/2015

Scenario - SFWMD Data

4. Calculate mean chlorophyll-a concentration in pond:

ln (chyl-a) = 1.058 ln (TP) - 0.934

ln (chyl-a) = 4.32

chyl-a = 75.44 mg/cu. Meter

5. Calculate mean Secchi disk depth:

SD = (24.2386 + (0.3041)(chyl-a))/(6.0632 + chyl-a)=

SD = 0.579 m= 1.90 feet

6. Calculate depth of anoxic conditions in pond:

Depth of DO<1 = 3.035*SD + 0.02164 x (chyl-a) - 0.004979 x Total P

Depth of DO<1 = 2.67 m 8.8 feet

7. Adjust Volume Reduction for Permanent Pool

Permanent Pool Volume = 226.70 Ac-Ft
Permanent Pool Above Anoxic Conditions = 203.70 Ac-Ft

Actual Estimated TP Removal =	221 kg TP/yr

SR 710 Regional Pond (Option B) - Withdrawal of Water from L-63N

SFWMD Provided TP Removal Rate and Concentration

PROJECT: SR 710 - Regional Pond Option B PREPARED: JAN 11/9/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GSS 11/10/2015

Scenario - SFWMD Data

1. Provided Data from SFWMD

Literature Cited:

1. ERD (Environmental Research & Design, Inc.), 2004. Lake Okeechobee Tributary Sediment Removal Demonstration Project SFWMD Contract No. C-11205. Final report submitted to South Florida Water Management District.

2. Bottcher, A.B. 2006. Phosphorus Reduction Performance and Implementation Costs under BMPs and Technologies in the Lake Okeechobee Protection Plan Area. Letter report provided to the South Florida Water Management District. West Palm Beach, FL.

Average TP concentration at S-133 = 0.203 mg/L
SFWMD recommended TP removal rate = 25.0 %

2. Wet Detention Pond Characteristics

a. Calculate annual runoff inputs to pond:

226.70 ac-ft = Permanent Pool Volume

For a 150-day residence time, the allowable volume of runoff into the pond will be:

Allowable Volume = 365 days/ 1 Year / 150 days = 552 Ac-Ft

Flow Rate from L63-N = 0.76 cfs (Assumes 0 roadway runoff)

b. Estimate Max. Allowable Pond Depth:

1. Estimate runoff characteristics:

TP = 0.203 mg/l (from above)

2. Calculate TP loading to wet detention pond and Reduction:

TP loading to wet det. Pond = 138 kg TP/yr $Allowable\ Volume\ x\ TP\ x\ 43560\ x\ 7.48\ x\ 3.785\ x\ 10^{-6}$

TP Removal Rate = 25.00 %

TP removal by Wet Det. Pond = 35 kg TP/yr

3. Calculate TP concentration in pond:

TP removal = 25.0 % (from above)

Annual mass of TP remaining in water column = TP load to pond X (1 - TP removal)
= 103.50 kg TP/ yr

This phosphorous mass will be distributed within the pond permanent pool and the pond outflow.
Assuming that inflow and outflow are approx. equal, the

Outflow = 552.00 ac-ft/yr

Mean Pond Concentration = 0.10777 mg TP/liter $\left(\frac{Annual\ Mass\ of\ TP}{Outflow\ Vol.+PPV}\right)\frac{10^{-5}}{43560x7.48x3.785}$

SR 710 Regional Pond (Option B) - Withdrawal of Water from L-63N

SFWMD Provided TP Removal Rate and Concentration

PROJECT: SR 710 - Regional Pond Option B PREPARED: JAN 11/9/2015

LOCATION: OKEECHOBEE COUNTY, FLORIDA CHECKED: GSS 11/10/2015

Scenario - SFWMD Data

4. Calculate mean chlorophyll-a concentration in pond:

ln (chyl-a) = 1.058 ln (TP) - 0.934

ln (chyl-a) = 4.02

chyl-a = 55.56 mg/cu. Meter

5. Calculate mean Secchi disk depth:

SD = (24.2386 + (0.3041)(chyl-a))/(6.0632 + chyl-a)=

SD = 0.668 m= 2.19 feet

6. Calculate depth of anoxic conditions in pond:

Depth of DO<1 = 3.035*SD + 0.02164 x (chyl-a) - 0.004979 x Total P

Depth of DO<1 = 2.69 m 8.8 feet

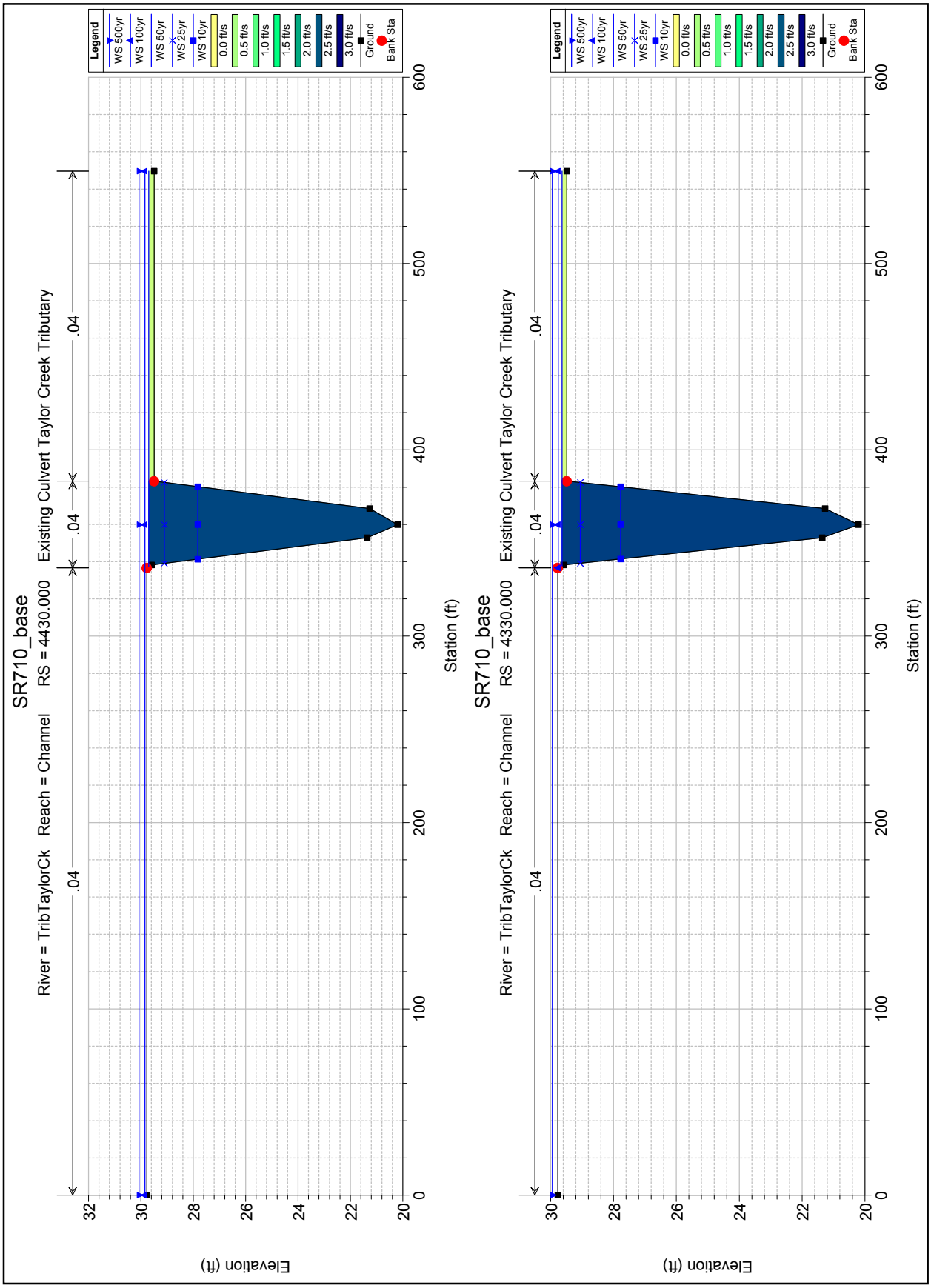
7. Adjust Volume Reduction for Permanent Pool

Permanent Pool Volume = 226.70 Ac-Ft
Permanent Pool Above Anoxic Conditions = 203.70 Ac-Ft

Actual Estimated TP Removal =	31 kg TP/yr

HEC-RAS Plan: Exist_US&DSnew River: TribTaylorCk Reach: Channel

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Channel	4430.000	50yr	699.00	20.20	29.70		29.80	0.000531	2.59	300.69	212.44	0.19
Channel	4430.000	100yr	838.00	20.20	29.84		29.97	0.000680	2.96	355.78	549.69	0.22
Channel	4430.000	500yr	1080.00	20.20	30.07		30.23	0.000844	3.38	482.53	549.69	0.24
Channel	4430.000	25yr	570.00	20.20	29.10		29.19	0.000479	2.38	239.22	43.47	0.18
Channel	4430.000	10yr	437.00	20.20	27.83		27.92	0.000551	2.34	186.73	38.93	0.19
Channel	4330.000	50yr	699.00	20.20	29.64	24.38	29.75	0.000548	2.63	288.30	211.93	0.19
Channel	4330.000	100yr	838.00	20.20	29.76	24.78	29.90	0.000735	3.05	313.74	212.97	0.22
Channel	4330.000	500yr	1080.00	20.20	29.95	25.42	30.14	0.000999	3.63	412.48	549.69	0.26
Channel	4330.000	25yr	570.00	20.20	29.05	23.98	29.14	0.000491	2.40	237.04	43.29	0.18
Channel	4330.000	10yr	437.00	20.20	27.77	23.50	27.86	0.000570	2.37	184.47	38.72	0.19
Channel	4328.000		Culvert									
Channel	4280.000	50yr	699.00	20.20	25.97		26.49	0.004668	5.80	120.53	32.30	0.53
Channel	4280.000	100yr	838.00	20.20	26.99		27.45	0.003340	5.39	155.46	35.95	0.46
Channel	4280.000	500yr	1080.00	20.20	27.58		28.16	0.003894	6.10	177.02	38.02	0.50
Channel	4280.000	25yr	570.00	20.20	25.16		25.71	0.005911	5.97	95.45	29.40	0.58
Channel	4280.000	10yr	437.00	20.20	24.36		24.91	0.007313	5.98	73.08	26.55	0.64
Channel	3550.000	50yr	699.00	17.67	25.52		25.59	0.000386	2.09	344.27	106.63	0.16
Channel	3550.000	100yr	838.00	17.67	26.62		26.67	0.000342	1.74	551.91	225.94	0.15
Channel	3550.000	500yr	1080.00	17.67	27.31		27.36	0.000296	1.77	708.40	227.98	0.14
Channel	3550.000	25yr	570.00	17.67	24.60		24.67	0.000445	2.08	273.79	61.13	0.17
Channel	3550.000	10yr	437.00	17.67	23.74		23.80	0.000464	1.96	223.20	56.57	0.17
Channel	2780.00	50yr	699.00	16.33	25.26		25.30	0.000271	1.59	443.92	126.52	0.14
Channel	2780.00	100yr	838.00	16.33	26.43		26.46	0.000174	1.41	657.90	232.87	0.11
Channel	2780.00	500yr	1080.00	16.33	27.14		27.17	0.000169	1.50	822.17	234.56	0.11
Channel	2780.00	25yr	570.00	16.33	24.29		24.33	0.000347	1.65	345.04	91.15	0.15
Channel	2780.00	10yr	437.00	16.33	23.39		23.43	0.000405	1.63	267.72	80.71	0.16
Channel	2100.591	50yr	699.00	16.00	25.05	20.02	25.10	0.000320	1.81	413.67	137.00	0.15
Channel	2100.591	100yr	838.00	16.00	26.30	20.38	26.34	0.000190	1.57	615.58	184.88	0.12
Channel	2100.591	500yr	1080.00	16.00	27.00	20.94	27.04	0.000198	1.73	754.95	236.93	0.12
Channel	2100.591	25yr	570.00	16.00	24.00	19.63	24.06	0.000458	1.94	294.96	82.10	0.17
Channel	2100.591	10yr	437.00	16.00	23.05	19.19	23.11	0.000538	1.92	227.57	65.70	0.18
Channel	1527.972	50yr	699.00	14.82	24.52	21.83	24.72	0.001986	3.58	195.41	56.29	0.34
Channel	1527.972	100yr	838.00	14.82	26.25	22.19	26.26	0.000084	0.88	1018.85	342.74	0.07
Channel	1527.972	500yr	1080.00	14.82	26.96	22.75	26.97	0.000077	0.93	1350.22	537.54	0.07
Channel	1527.972	25yr	570.00	14.82	23.15	21.43	23.45	0.003813	4.45	128.21	42.62	0.45
Channel	1527.972	10yr	437.00	14.82	21.80	20.97	22.28	0.008360	5.59	78.13	32.48	0.64
Channel	1344.355	50yr	699.00	14.44	24.50	18.35	24.56	0.000306	1.83	387.24	94.33	0.15
Channel	1344.355	100yr	838.00	14.44	26.20	18.75	26.24	0.000151	1.57	603.26	265.03	0.11
Channel	1344.355	500yr	1080.00	14.44	26.91	19.38	26.95	0.000153	1.69	837.85	349.91	0.11
Channel	1344.355	25yr	570.00	14.44	23.12	17.92	23.19	0.000478	2.04	278.98	66.69	0.18
Channel	1344.355	10yr	437.00	14.44	21.85	17.46	21.92	0.000496	2.10	207.69	48.27	0.18
Channel	1281.855		Culvert									
Channel	1218.437	50yr	699.00	13.50	19.86		20.12	0.001086	4.11	169.89	39.43	0.35
Channel	1218.437	100yr	838.00	13.50	20.43		20.72	0.001099	4.34	193.74	46.81	0.36
Channel	1218.437	500yr	1080.00	13.50	21.33		21.66	0.001079	4.61	242.74	59.87	0.36
Channel	1218.437	25yr	570.00	13.50	19.26		19.50	0.001069	3.87	147.17	37.06	0.34
Channel	1218.437	10yr	437.00	13.50	18.55		18.75	0.001057	3.59	121.75	34.20	0.34
Channel	972.498	50yr	699.00	13.10	19.00	17.37	19.60	0.002969	6.25	111.82	27.92	0.55
Channel	972.498	100yr	838.00	13.10	19.50	17.81	20.18	0.003072	6.64	126.23	29.45	0.57
Channel	972.498	500yr	1080.00	13.10	20.29	18.51	21.09	0.003166	7.17	150.63	31.87	0.58
Channel	972.498	25yr	570.00	13.10	18.48	16.91	19.00	0.002851	5.84	97.67	26.34	0.53
Channel	972.498	10yr	437.00	13.10	17.83	16.38	18.28	0.002761	5.37	81.35	24.38	0.52
Channel	648.236	50yr	699.00	12.60	17.99	16.66	18.60	0.003249	6.24	112.05	31.57	0.58
Channel	648.236	100yr	838.00	12.60	18.50	17.07	19.16	0.003218	6.52	128.54	33.59	0.59
Channel	648.236	500yr	1080.00	12.60	19.28	17.71	20.02	0.003323	6.91	156.32	38.41	0.60
Channel	648.236	25yr	570.00	12.60	17.46	16.24	18.01	0.003312	5.95	95.74	29.43	0.58
Channel	648.236	10yr	437.00	12.60	16.46	15.74	17.10	0.004858	6.38	68.51	25.46	0.69
Channel	267.180	50yr	699.00	7.17	17.19	12.29	17.29	0.002826	2.58	270.65	58.65	0.21
Channel	267.180	100yr	838.00	7.17	17.69	12.81	17.81	0.003014	2.79	300.51	60.87	0.22
Channel	267.180	500yr	1080.00	7.17	18.52	13.65	18.65	0.002935	3.01	389.35	167.49	0.22
Channel	267.180	25yr	570.00	7.17	16.66	11.81	16.74	0.002656	2.38	239.93	56.27	0.20
Channel	267.180	10yr	437.00	7.17	14.24	11.24	14.45	0.009574	3.65	119.75	38.02	0.36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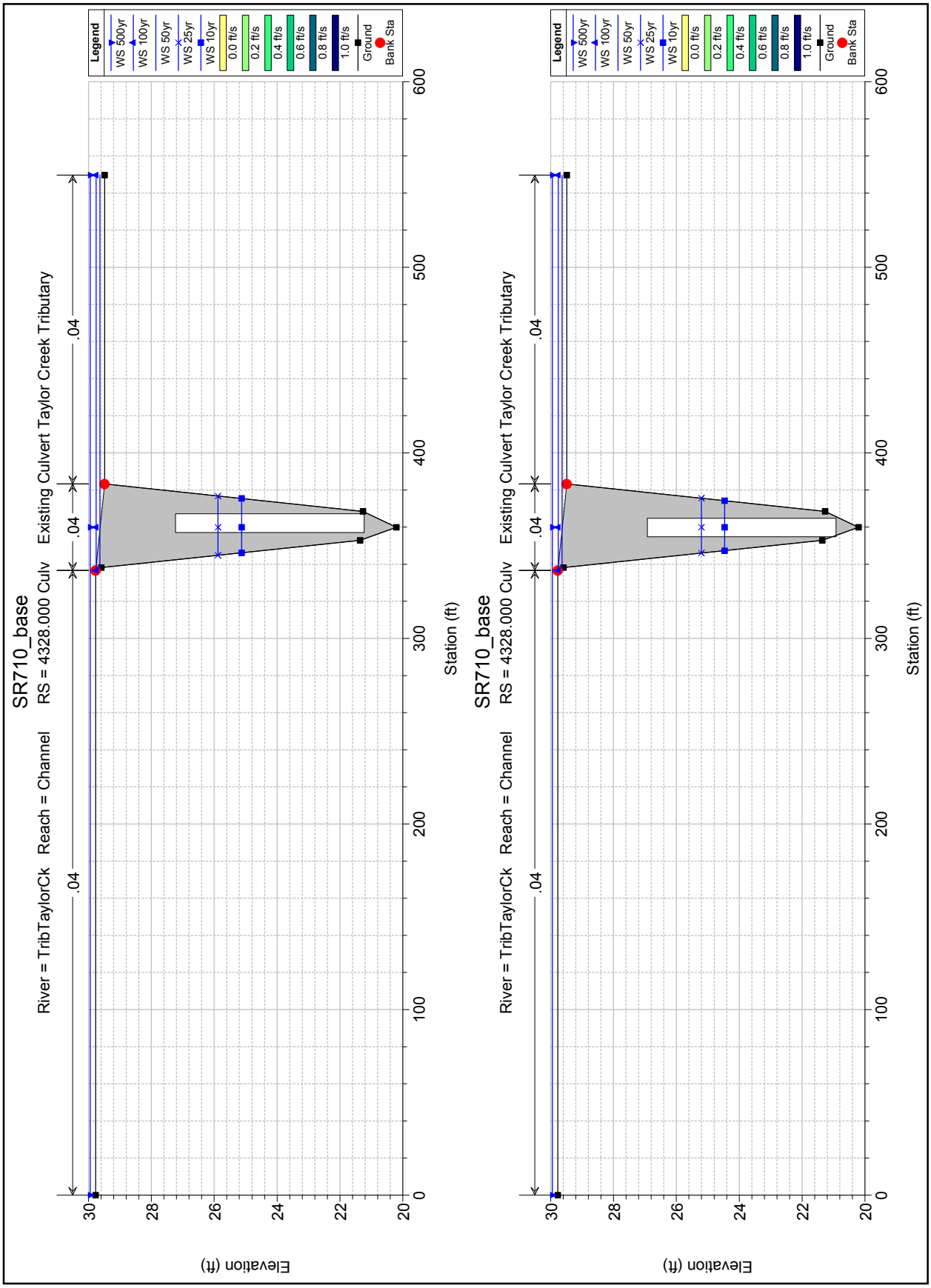
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 4330.000
Existing Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)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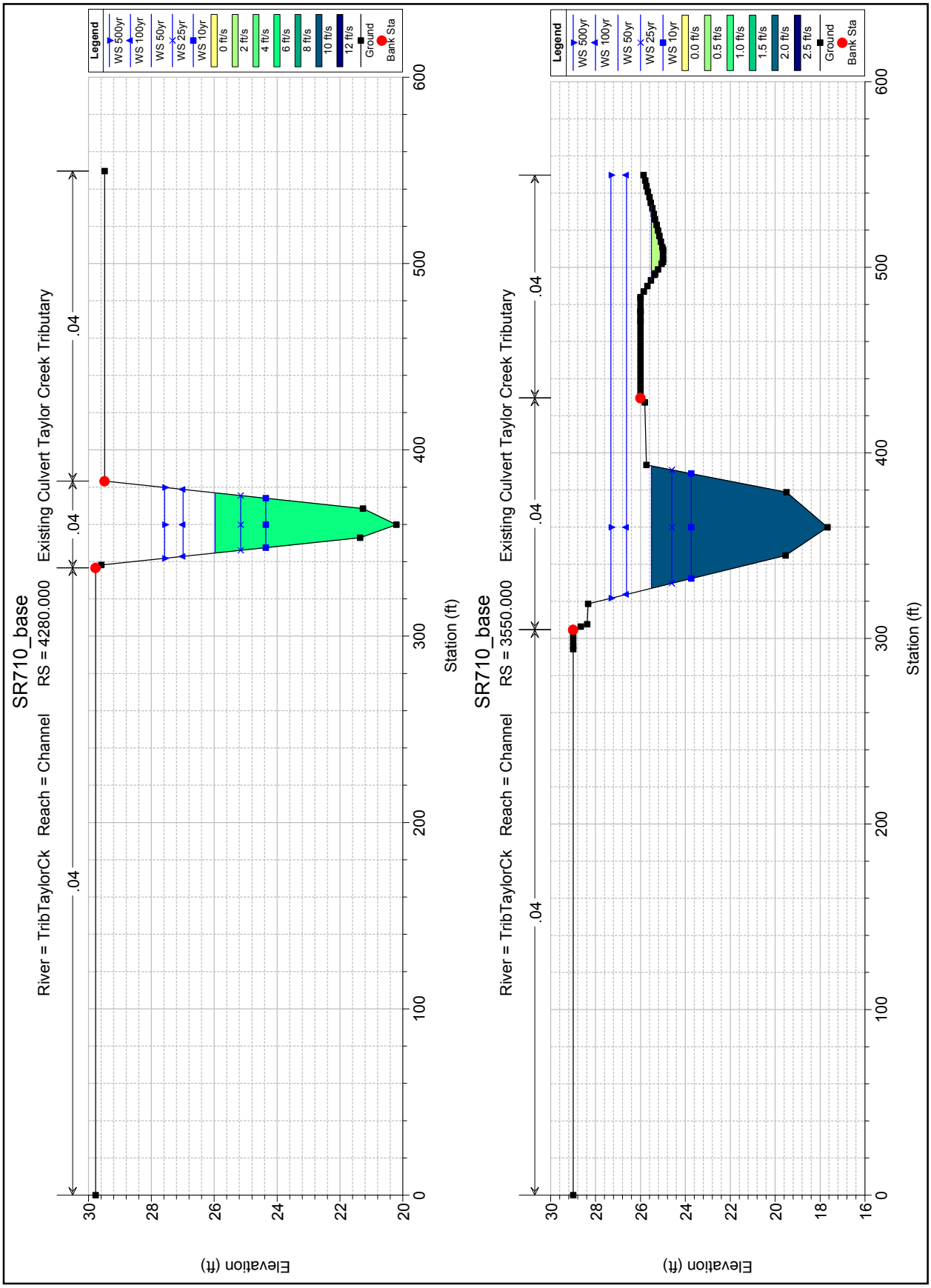
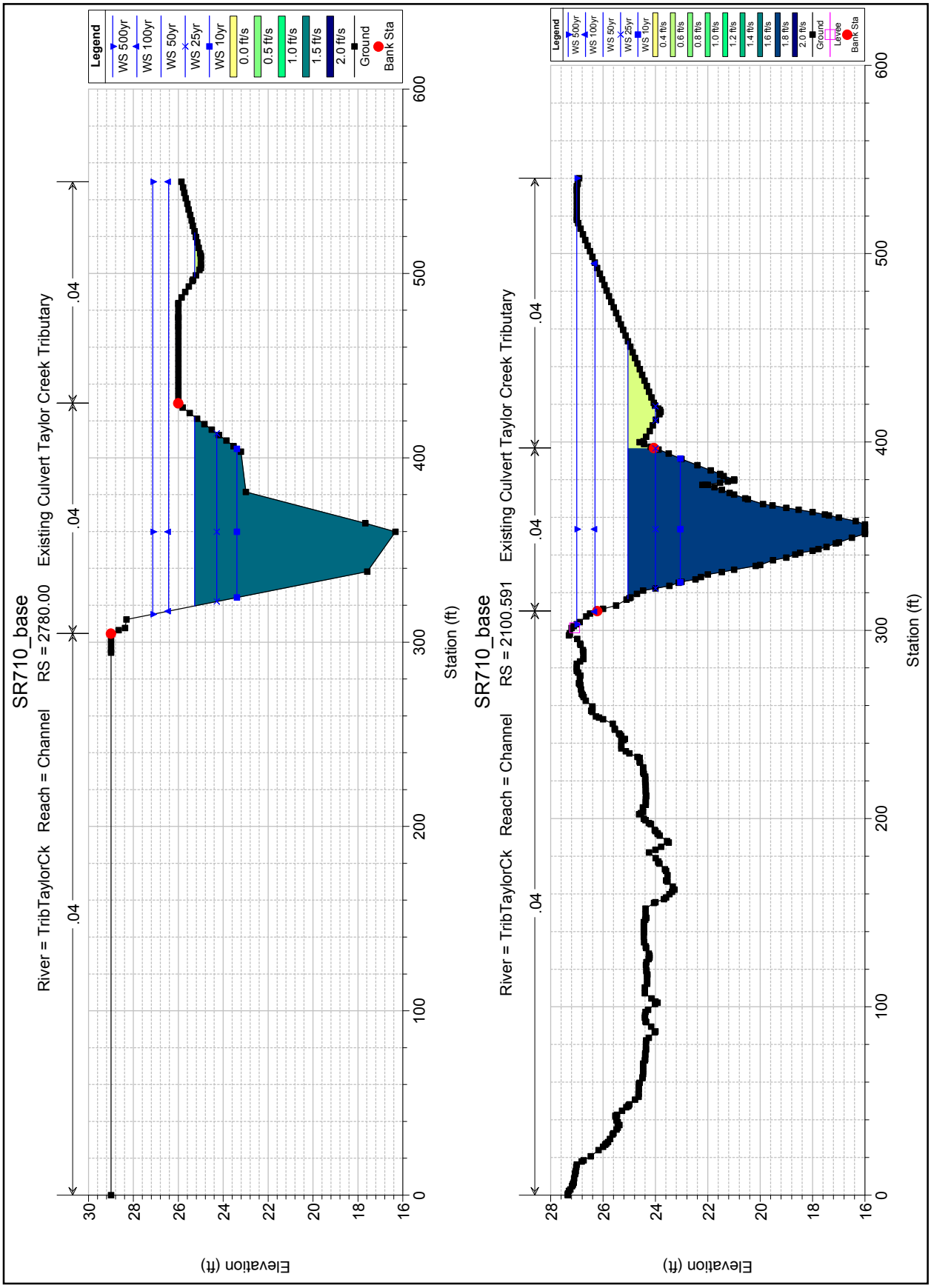
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)
30
28
26
24
22
20
0
100
200
300
400
500
600
SR710_base
River = TribTaylorCk Reach = Channel RS = 4328.000 Culv Existing Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)
30
28
26
24
22
20
0
100
200
300
400
500
600


SR710_base
River = TribTaylorCk Reach = Channel RS = 4280.000 Existing Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 3550.000 Existing Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)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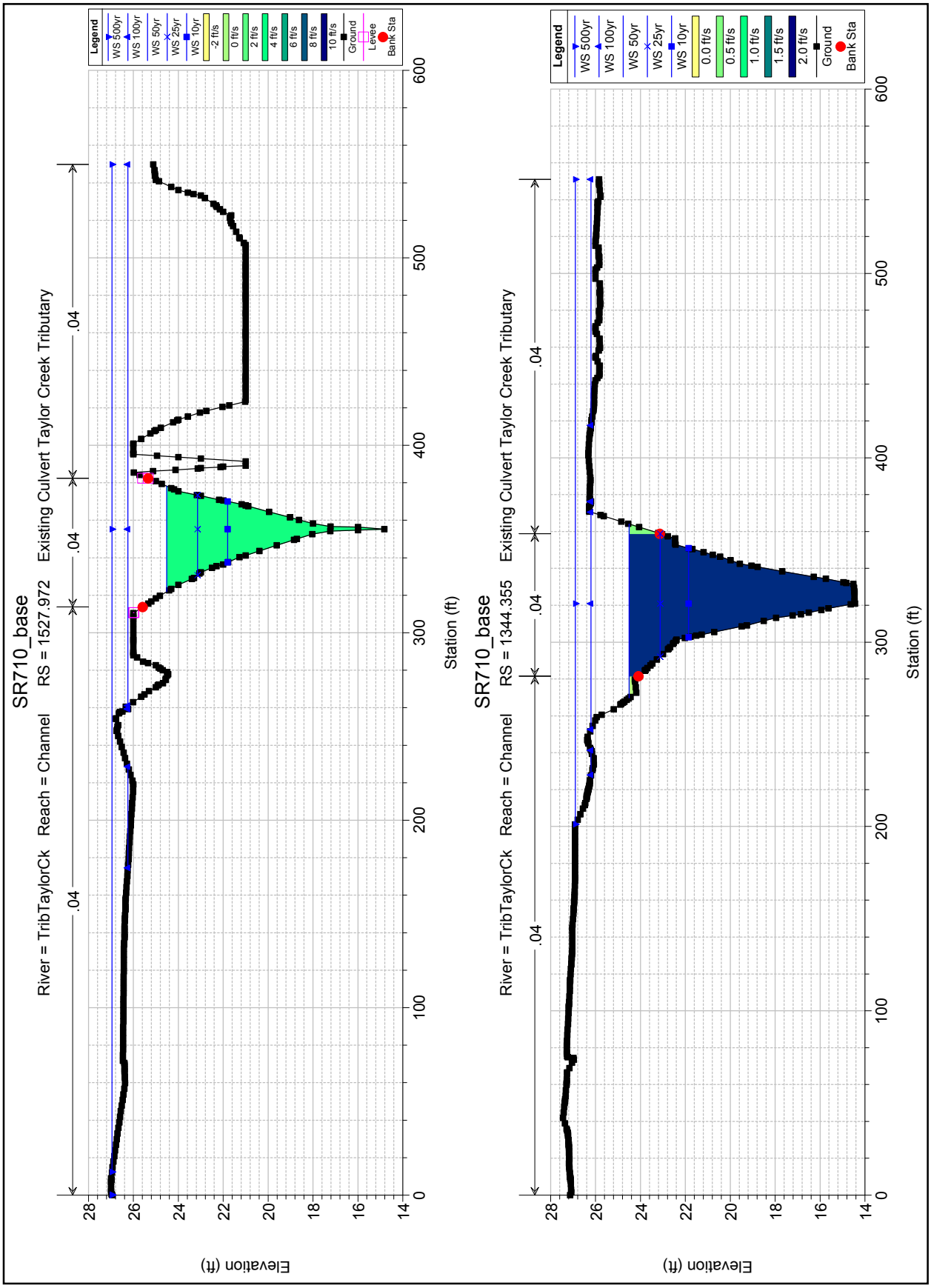
Existing Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
Ground
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 2100.591
Existing Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
2.0 ft/s
Ground
Levee
Bank Sta
.04
.04
Elevation (ft)
Station (ft)


SR710_base
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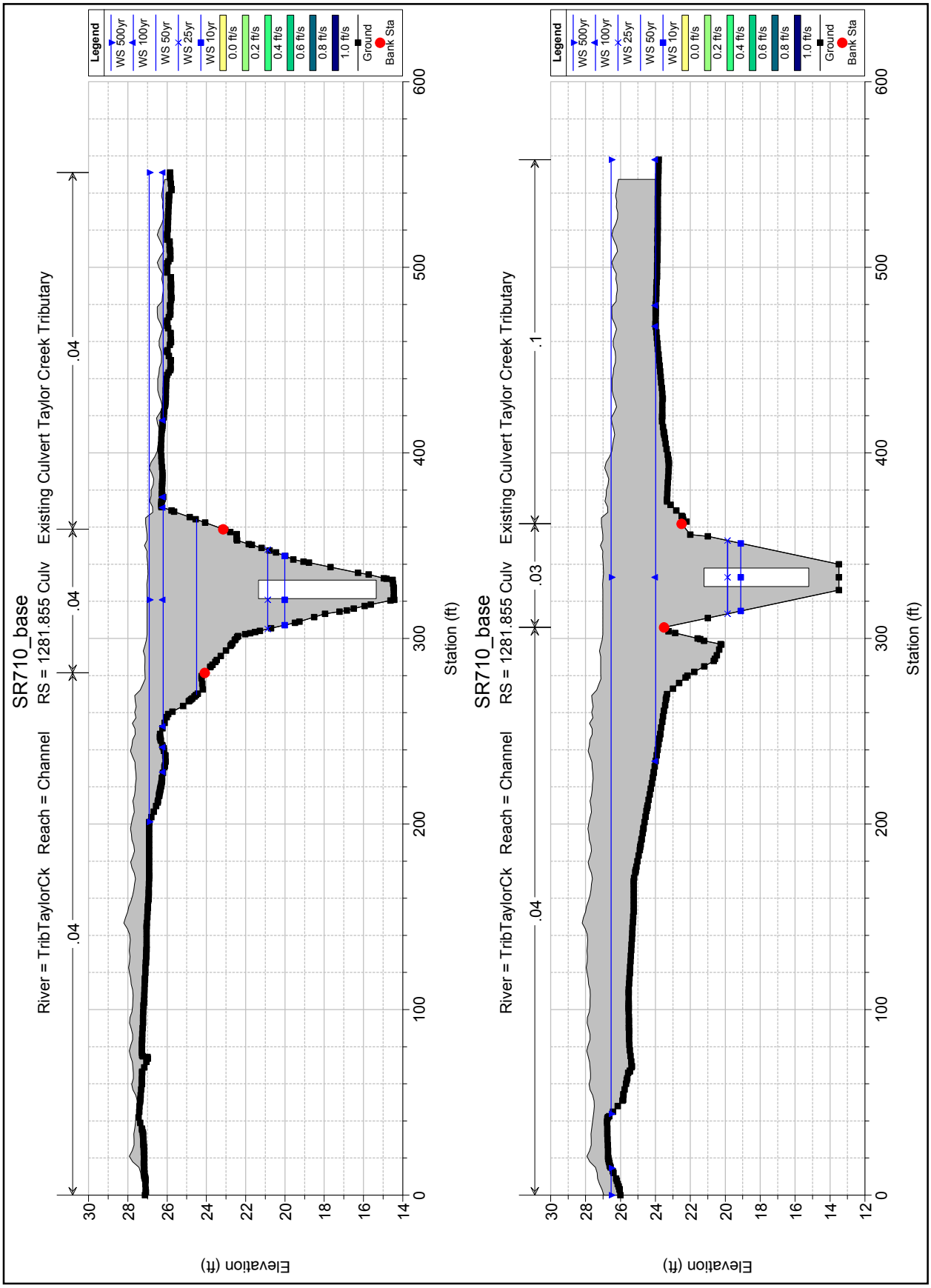
Existing Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 1344.355
Existing Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)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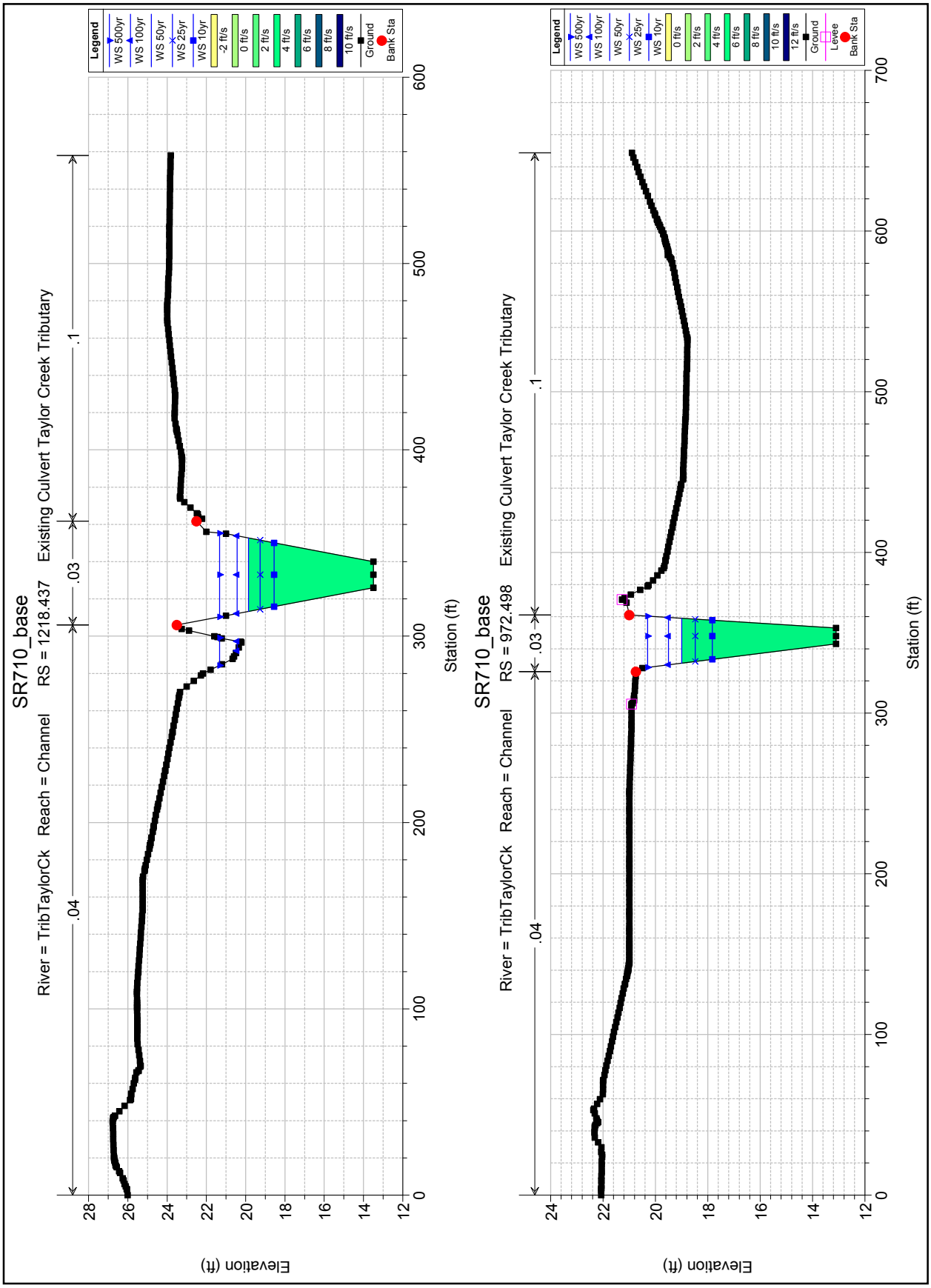
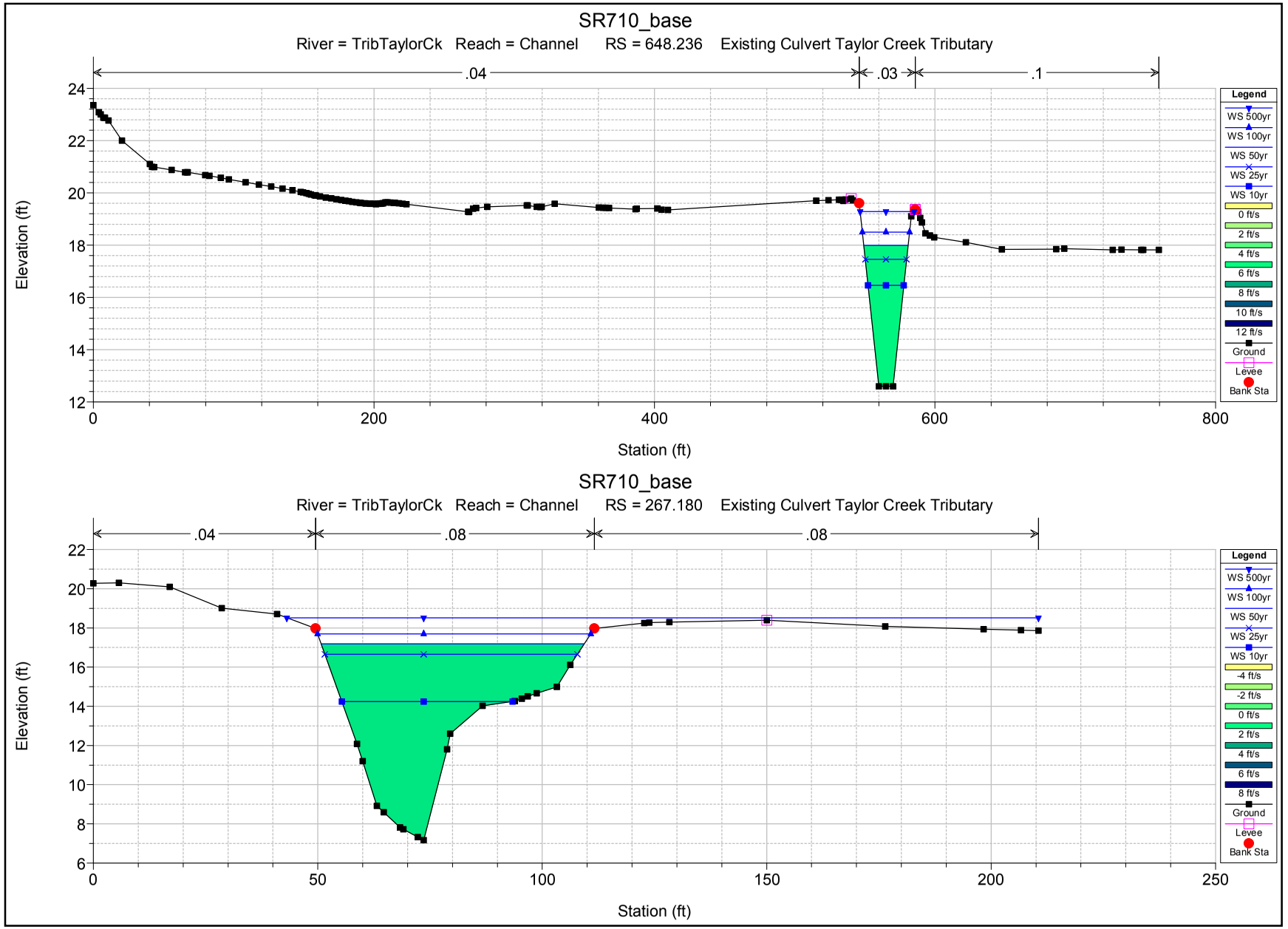
River = TribTaylorCk Reach = Channel RS = 1281.855 Culv Existing Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 1281.855 Culv Existing Culvert Taylor Creek Tributary
.04
.03
.1
Elevation (ft)
Station (ft)


SR710_base
River = TribTaylorCk Reach = Channel RS = 1218.437 Existing Culvert Taylor Creek Tributary
.04
.03
.1
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 972.498 Existing Culvert Taylor Creek Tributary
.04
.03
.1
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


SR710_base
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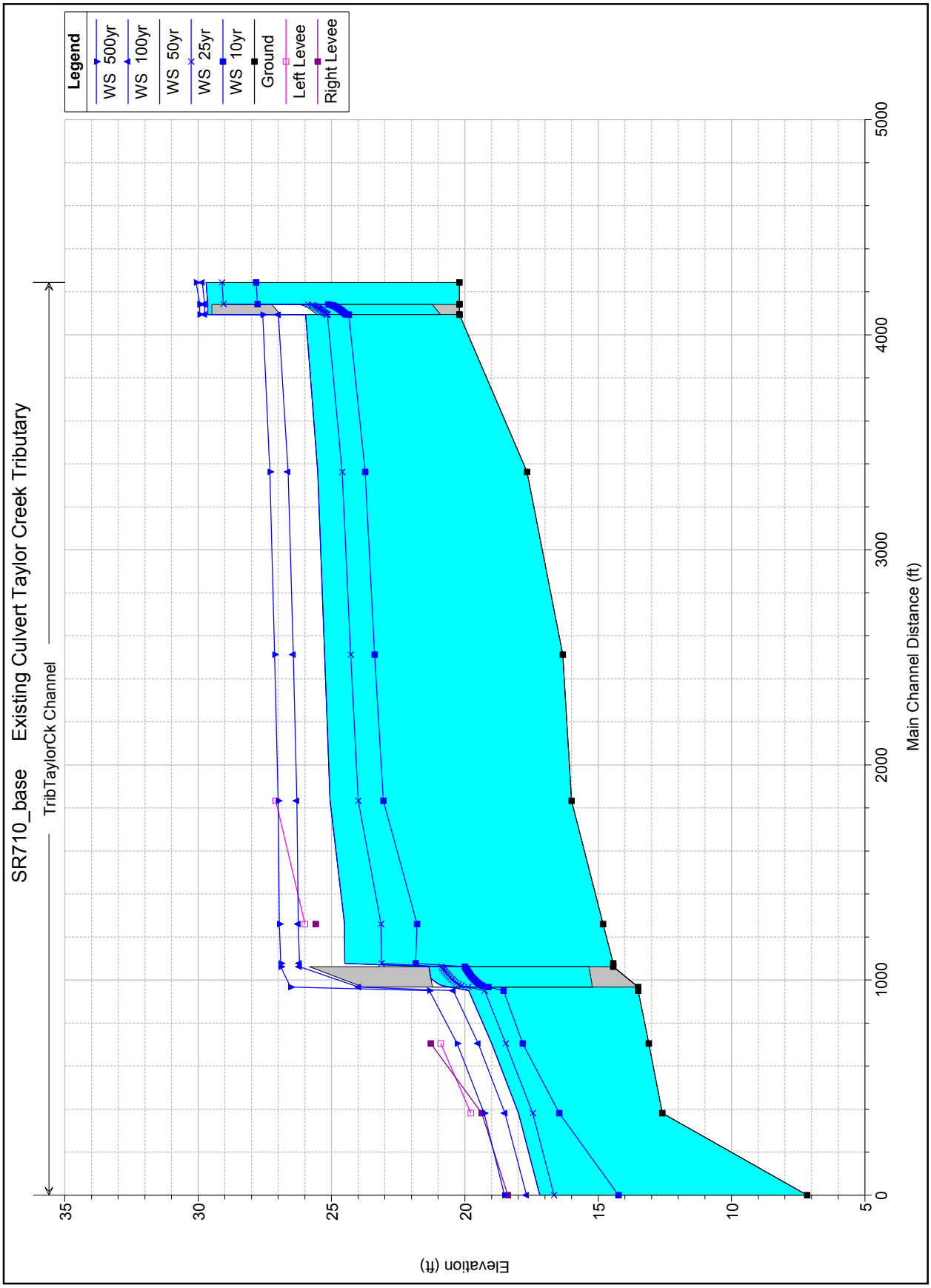
.04
.03
.1
Elevation (ft)
Station (ft)
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Levee
Bank Sta
SR710_base
River = TribTaylorCk Reach = Channel RS = 267.180 Existing Culvert Taylor Creek Tributary
.04
.08
.08
Elevation (ft)
Station (ft)
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
-4 ft/s
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Levee
Bank Sta

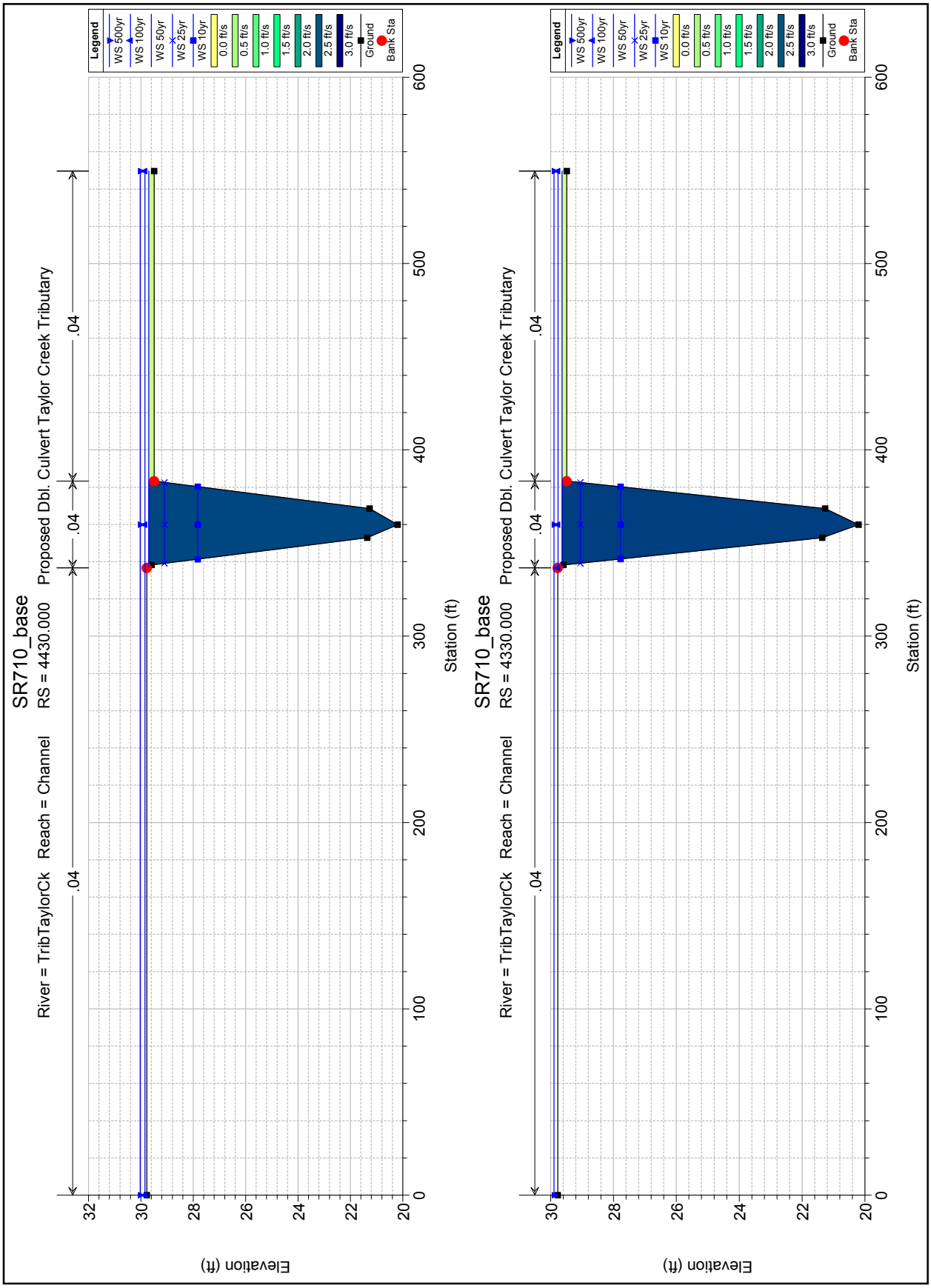

SR710_base Existing Culvert Taylor Creek Tributary
TribTaylorCk Channel
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
35
30
25
20
15
10
5
0
1000
2000
3000
4000
5000

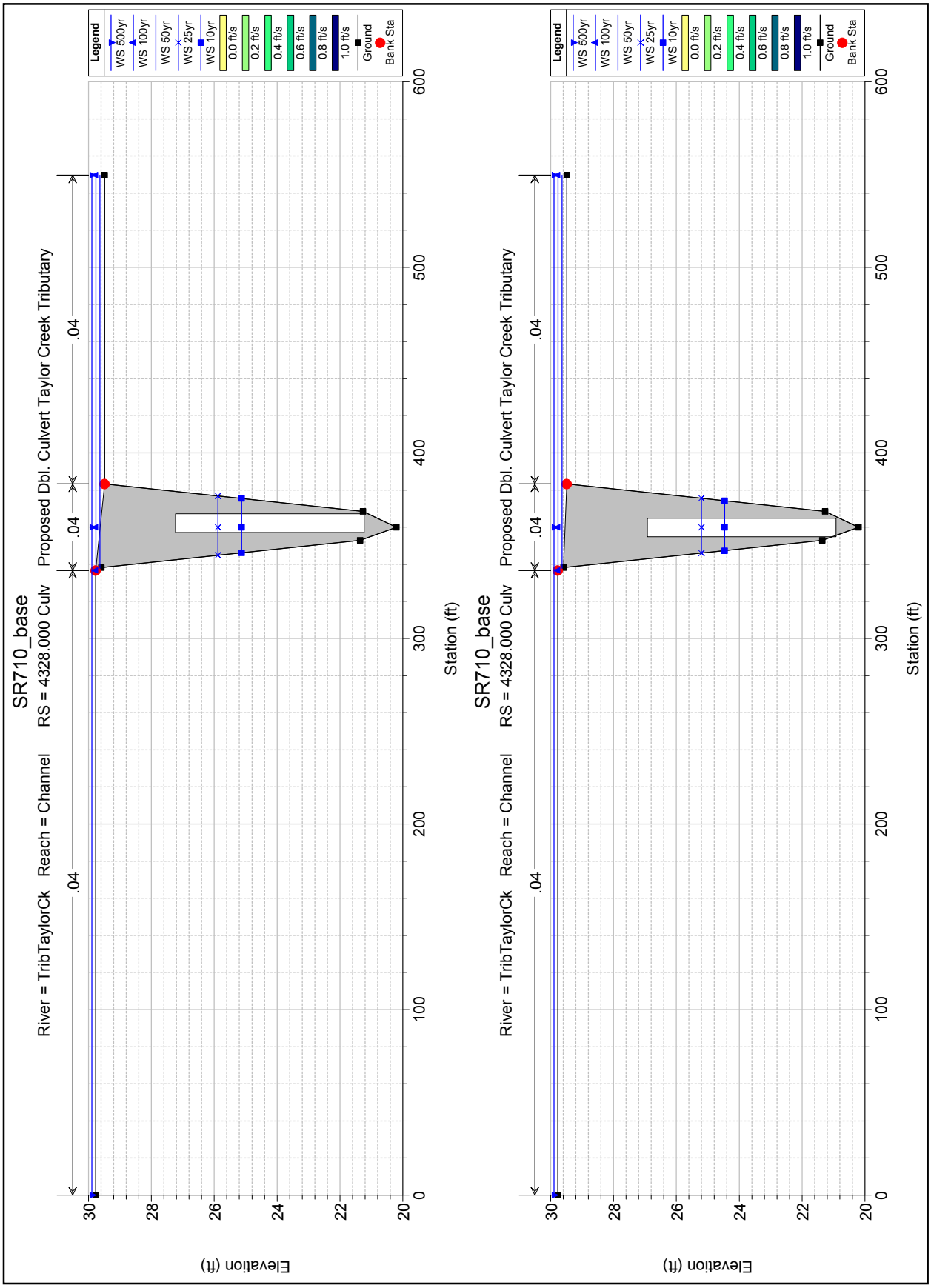
HEC-RAS Plan: US&DS River: TribTaylorCk Reach: Channel

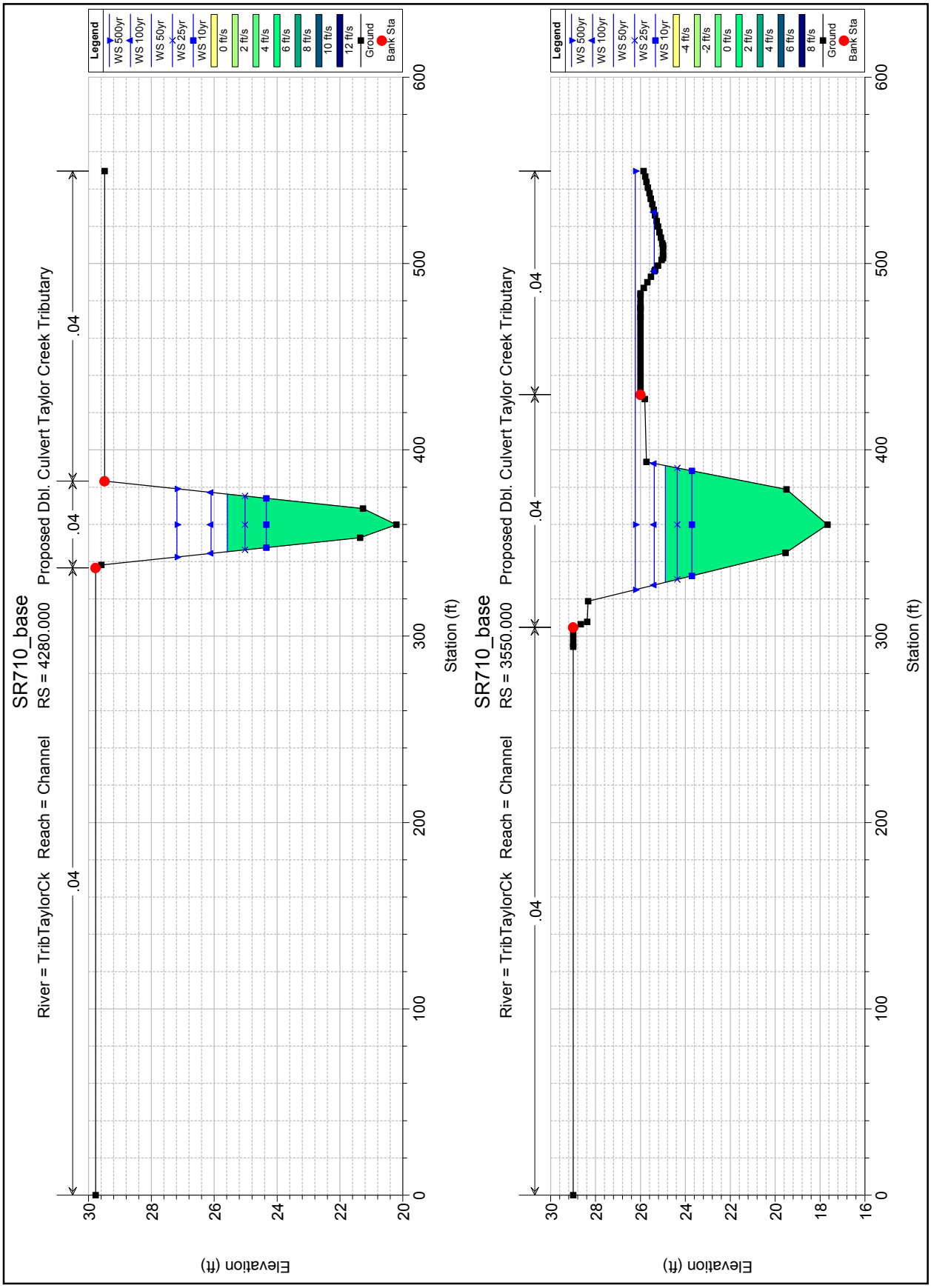
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Channel	4430.000	50yr	699.00	20.20	29.70		29.80	0.000531	2.59	300.69	212.44	0.19
Channel	4430.000	100yr	838.00	20.20	29.85		29.98	0.000676	2.95	358.38	549.69	0.21
Channel	4430.000	500yr	1080.00	20.20	30.03		30.20	0.000897	3.47	457.64	549.69	0.25
Channel	4430.000	25yr	570.00	20.20	29.10		29.19	0.000479	2.38	239.22	43.47	0.18
Channel	4430.000	10yr	437.00	20.20	27.83		27.92	0.000551	2.34	186.73	38.93	0.19
Channel	4330.000	50yr	699.00	20.20	29.64	24.39	29.75	0.000548	2.63	288.30	211.93	0.19
Channel	4330.000	100yr	838.00	20.20	29.77	24.79	29.91	0.000733	3.05	314.67	213.01	0.22
Channel	4330.000	500yr	1080.00	20.20	29.89	25.42	30.10	0.001068	3.73	382.51	549.69	0.27
Channel	4330.000	25yr	570.00	20.20	29.05	23.98	29.14	0.000491	2.40	237.04	43.29	0.18
Channel	4330.000	10yr	437.00	20.20	27.77	23.50	27.86	0.000570	2.37	184.47	38.72	0.19
Channel	4328.000		Culvert									
Channel	4280.000	50yr	699.00	20.20	25.58		26.23	0.006273	6.46	108.27	30.91	0.61
Channel	4280.000	100yr	838.00	20.20	26.10		26.80	0.006092	6.71	124.83	32.77	0.61
Channel	4280.000	500yr	1080.00	20.20	27.18		27.87	0.004928	6.65	162.36	36.62	0.56
Channel	4280.000	25yr	570.00	20.20	25.02		25.62	0.006656	6.23	91.45	28.91	0.62
Channel	4280.000	10yr	437.00	20.20	24.34		24.90	0.007441	6.02	72.63	26.49	0.64
Channel	3550.000	50yr	699.00	17.67	24.89		24.98	0.000559	2.39	291.87	62.68	0.20
Channel	3550.000	100yr	838.00	17.67	25.38		25.49	0.000601	2.58	330.72	97.00	0.20
Channel	3550.000	500yr	1080.00	17.67	26.23		26.33	0.000857	2.60	463.40	224.78	0.24
Channel	3550.000	25yr	570.00	17.67	24.36		24.43	0.000519	2.20	259.12	59.84	0.19
Channel	3550.000	10yr	437.00	17.67	23.71		23.77	0.000476	1.97	221.27	56.39	0.18
Channel	2780.000	50yr	699.00	16.33	24.49		24.55	0.000453	1.92	363.80	93.54	0.17
Channel	2780.000	100yr	838.00	16.33	24.96		25.02	0.000475	2.05	409.07	98.97	0.18
Channel	2780.000	500yr	1080.00	16.33	25.71		25.79	0.000485	2.20	508.28	161.06	0.18
Channel	2780.000	25yr	570.00	16.33	23.97		24.02	0.000436	1.80	317.04	87.53	0.17
Channel	2780.000	10yr	437.00	16.33	23.34		23.38	0.000420	1.66	264.02	80.19	0.16
Channel	2100.591	50yr	699.00	16.00	24.10	20.02	24.18	0.000640	2.32	303.31	88.18	0.20
Channel	2100.591	100yr	838.00	16.00	24.55	20.38	24.65	0.000650	2.48	350.08	116.06	0.21
Channel	2100.591	500yr	1080.00	16.00	25.30	20.94	25.41	0.000642	2.62	449.31	147.26	0.21
Channel	2100.591	25yr	570.00	16.00	23.60	19.63	23.67	0.000612	2.15	265.08	71.22	0.20
Channel	2100.591	10yr	437.00	16.00	22.99	19.19	23.05	0.000564	1.95	223.62	65.08	0.19
Channel	1527.972	50yr	699.00	14.82	21.98	21.83	23.05	0.017666	8.32	84.05	33.91	0.93
Channel	1527.972	100yr	838.00	14.82	22.38	22.19	23.51	0.016473	8.54	98.15	36.29	0.91
Channel	1527.972	500yr	1080.00	14.82	23.56	22.75	24.40	0.009702	7.35	146.97	46.63	0.73
Channel	1527.972	25yr	570.00	14.82	21.55	21.43	22.57	0.018835	8.12	70.19	30.49	0.94
Channel	1527.972	10yr	437.00	14.82	20.97	20.97	21.99	0.022534	8.11	53.85	26.43	1.00
Channel	1344.355	50yr	699.00	14.44	22.10	18.35	22.26	0.001089	3.18	220.00	49.72	0.27
Channel	1344.355	100yr	838.00	14.44	22.45	18.75	22.64	0.001306	3.53	237.64	52.70	0.29
Channel	1344.355	500yr	1080.00	14.44	23.47	19.38	23.67	0.001402	3.57	303.05	71.82	0.30
Channel	1344.355	25yr	570.00	14.44	21.72	17.92	21.85	0.000915	2.83	201.45	47.54	0.24
Channel	1344.355	10yr	437.00	14.44	20.78	17.46	20.90	0.001003	2.75	159.18	42.09	0.25
Channel	1281.855		Culvert									
Channel	1218.437	50yr	699.00	13.50	21.38		21.52	0.000439	2.95	245.91	60.51	0.23
Channel	1218.437	100yr	838.00	13.50	21.39		21.58	0.000630	3.53	245.98	60.53	0.27
Channel	1218.437	500yr	1080.00	13.50	21.58		21.87	0.000939	4.38	257.70	62.62	0.33
Channel	1218.437	25yr	570.00	13.50	21.26		21.36	0.000313	2.47	238.71	59.04	0.19
Channel	1218.437	10yr	437.00	13.50	20.47		20.55	0.000293	2.24	195.42	47.78	0.18
Channel	972.498	50yr	699.00	13.10	21.11	17.37	21.34	0.000834	3.87	207.71	234.00	0.30
Channel	972.498	100yr	838.00	13.10	21.30	17.81	21.39	0.000477	3.00	781.44	526.92	0.23
Channel	972.498	500yr	1080.00	13.10	21.47	18.51	21.60	0.000637	3.54	873.04	539.76	0.27
Channel	972.498	25yr	570.00	13.10	21.08	16.91	21.24	0.000572	3.19	199.64	229.62	0.25
Channel	972.498	10yr	437.00	13.10	20.31	16.38	20.44	0.000515	2.89	151.02	31.91	0.23
Channel	648.236	50yr	699.00	12.60	21.22	16.66	21.23	0.000061	1.20	1538.04	721.85	0.09
Channel	648.236	100yr	838.00	12.60	21.30	17.07	21.32	0.000079	1.37	1600.40	723.76	0.10
Channel	648.236	500yr	1080.00	12.60	21.48	17.71	21.49	0.000106	1.62	1725.34	727.56	0.12
Channel	648.236	25yr	570.00	12.60	21.15	16.24	21.16	0.000045	1.01	1487.81	720.31	0.07
Channel	648.236	10yr	437.00	12.60	20.33	15.74	20.35	0.000084	1.26	927.50	642.78	0.10
Channel	267.180	50yr	699.00	7.17	21.18	12.29	21.19	0.000172	0.94	904.97	210.57	0.06
Channel	267.180	100yr	838.00	7.17	21.25	12.81	21.27	0.000235	1.11	920.37	210.57	0.07
Channel	267.180	500yr	1080.00	7.17	21.40	13.65	21.43	0.000353	1.38	951.69	210.57	0.08
Channel	267.180	25yr	570.00	7.17	21.12	11.81	21.13	0.000119	0.78	892.69	210.57	0.05
Channel	267.180	10yr	437.00	7.17	20.30	11.24	20.31	0.000125	0.75	719.30	210.28	0.05

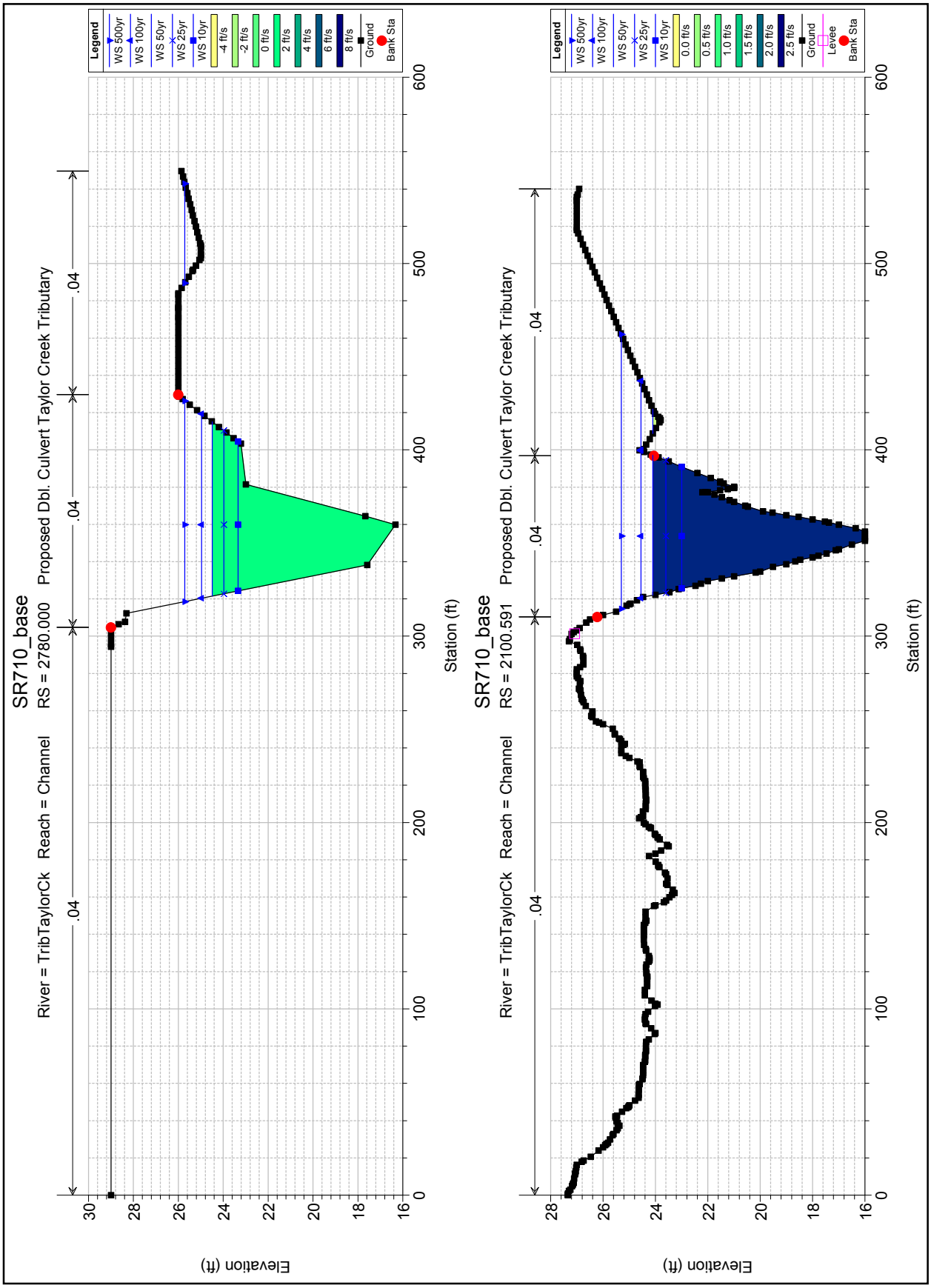
HEC-RAS Plan: US&DS River: TribTaylorCk Reach: Channel (Continued)

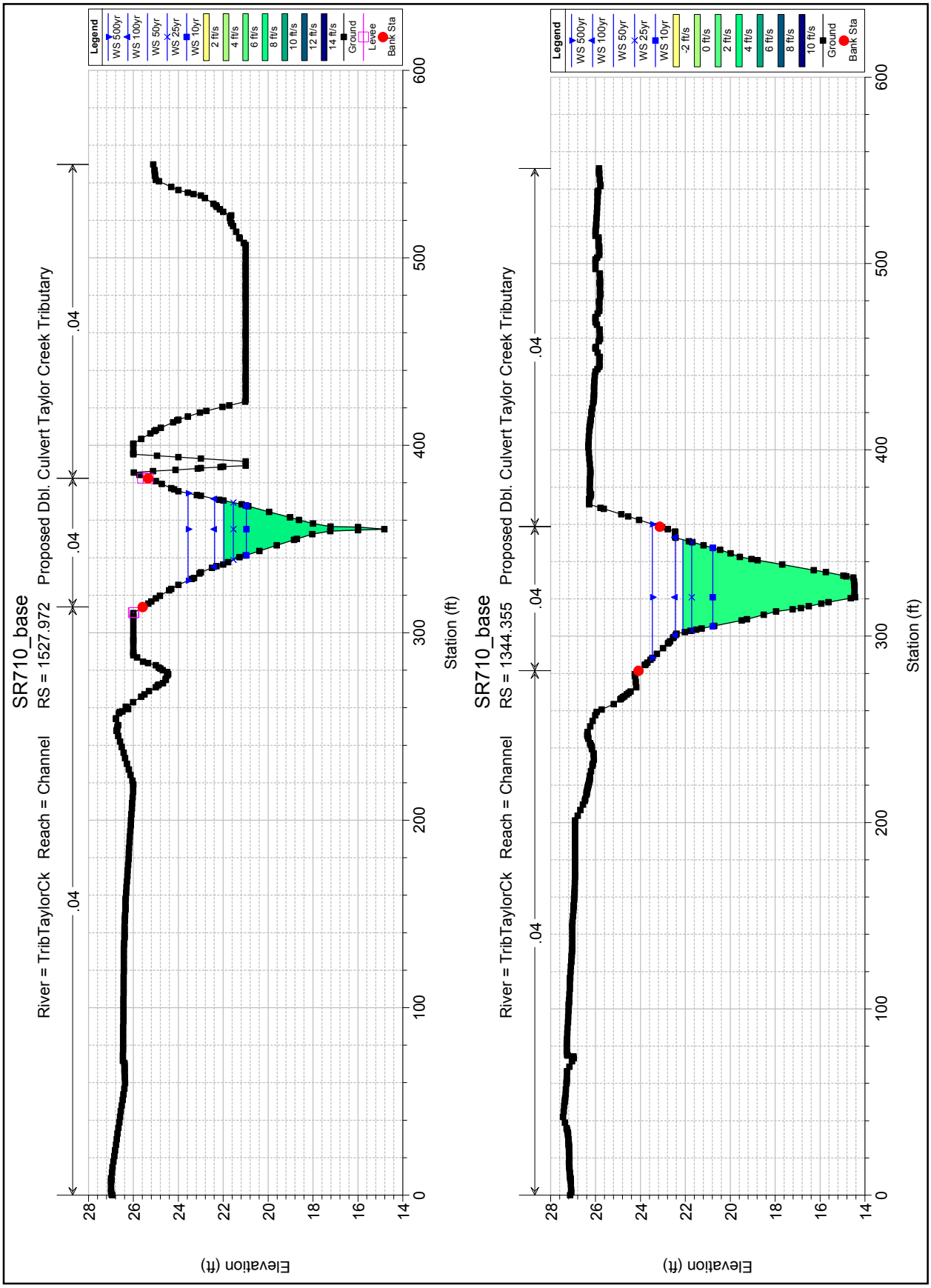
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Channel	-232.82	50yr	699.00	6.67	21.09	12.02	21.10	0.000179	0.96	891.16	210.57	0.06
Channel	-232.82	100yr	838.00	6.67	21.13	12.51	21.15	0.000251	1.14	899.37	210.57	0.07
Channel	-232.82	500yr	1080.00	6.67	21.21	13.41	21.24	0.000395	1.44	916.65	210.57	0.09
Channel	-232.82	25yr	570.00	6.67	21.06	11.52	21.07	0.000122	0.79	884.74	210.57	0.05
Channel	-232.82	10yr	437.00	6.67	20.24	10.95	20.24	0.000128	0.75	711.04	201.38	0.05
Channel	-732.82	50yr	699.00	6.17	21.00	11.73	21.01	0.000188	0.98	876.64	210.57	0.06
Channel	-732.82	100yr	838.00	6.17	21.00	12.24	21.02	0.000271	1.17	876.64	210.57	0.07
Channel	-732.82	500yr	1080.00	6.17	21.00	13.13	21.03	0.000449	1.51	876.64	210.57	0.09
Channel	-732.82	25yr	570.00	6.17	21.00	11.22	21.01	0.000125	0.80	876.64	210.57	0.05
Channel	-732.82	10yr	437.00	6.17	20.17	10.62	20.18	0.000131	0.76	702.98	197.86	0.05

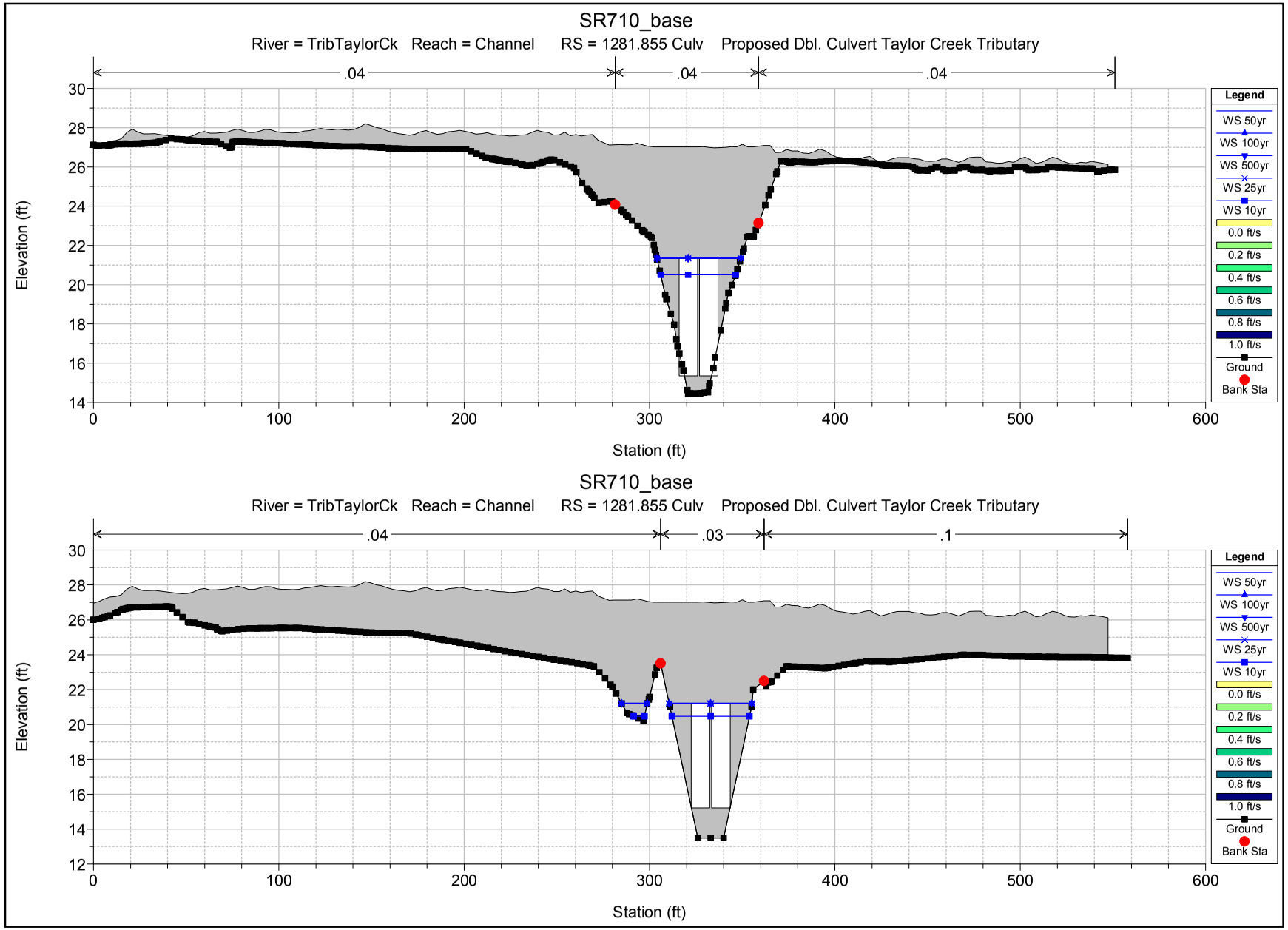

SR710_base
River = TribTaylorCk Reach = Channel RS = 4430.000 Proposed Dbl. Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 4330.000 Proposed Dbl. Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)

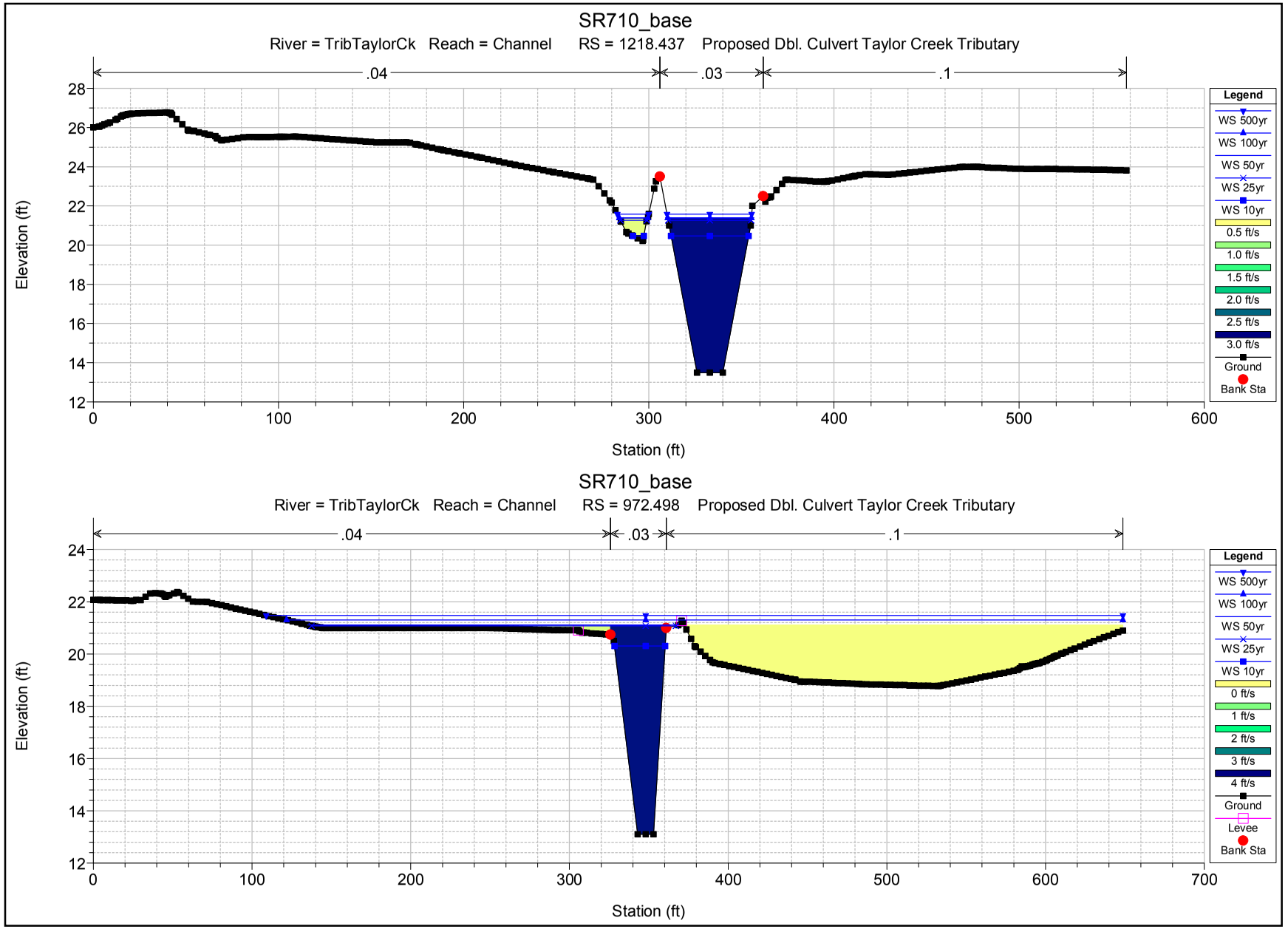

SR710_base
River = TribTaylorCk Reach = Channel RS = 4328.000 Culv Proposed Dbl. Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
30
28
26
24
22
20
0
100
200
300
400
500
600
SR710_base
River = TribTaylorCk Reach = Channel RS = 4328.000 Culv Proposed Dbl. Culvert Taylor Creek Tributary
.04
.04
.04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
30
28
26
24
22
20
0
100
200
300
400
500
600

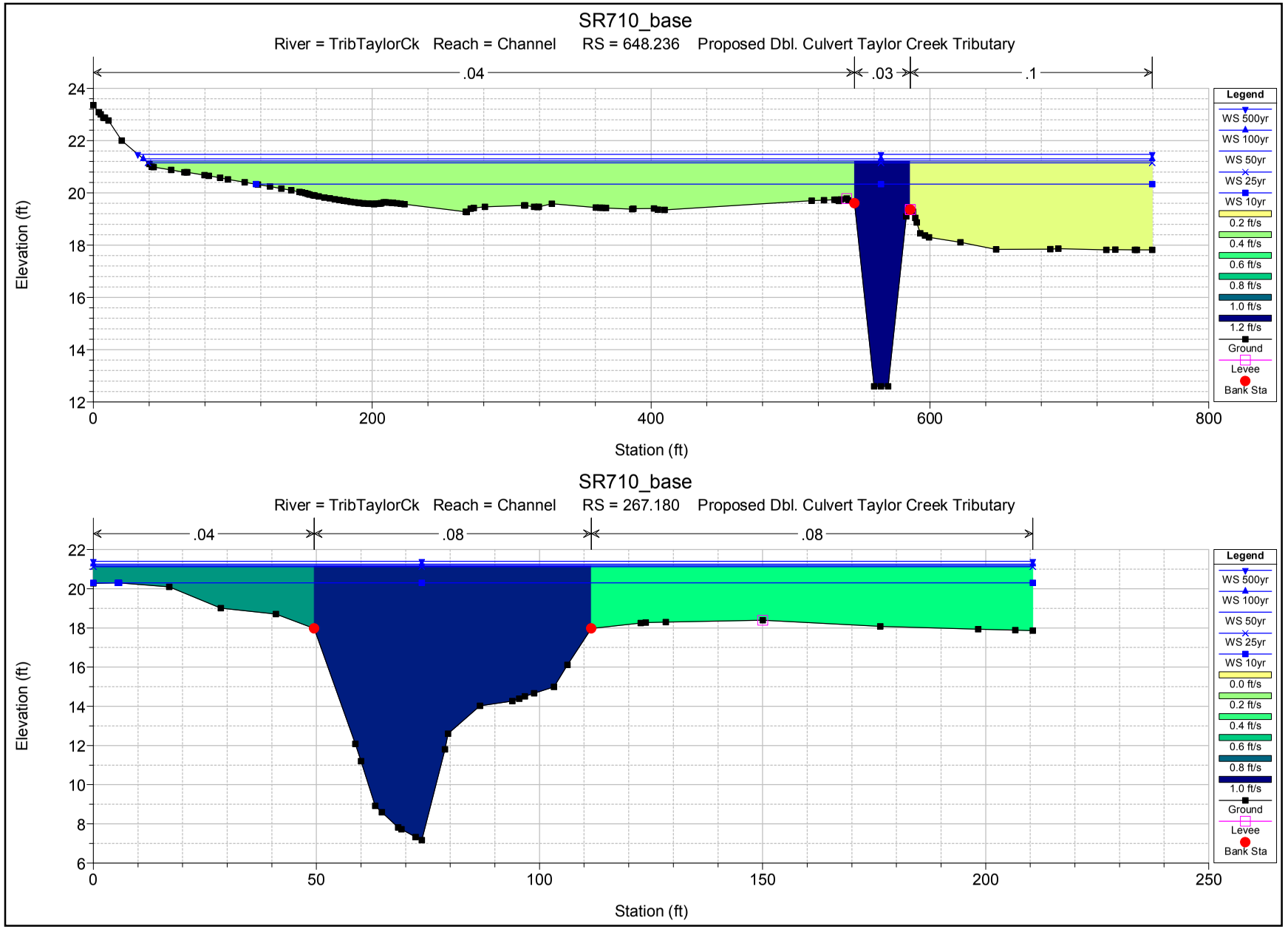

SR710_base
River = TribTaylorCk Reach = Channel RS = 4280.000 Proposed Dbl. Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 3550.000 Proposed Dbl. Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
-4 ft/s
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)

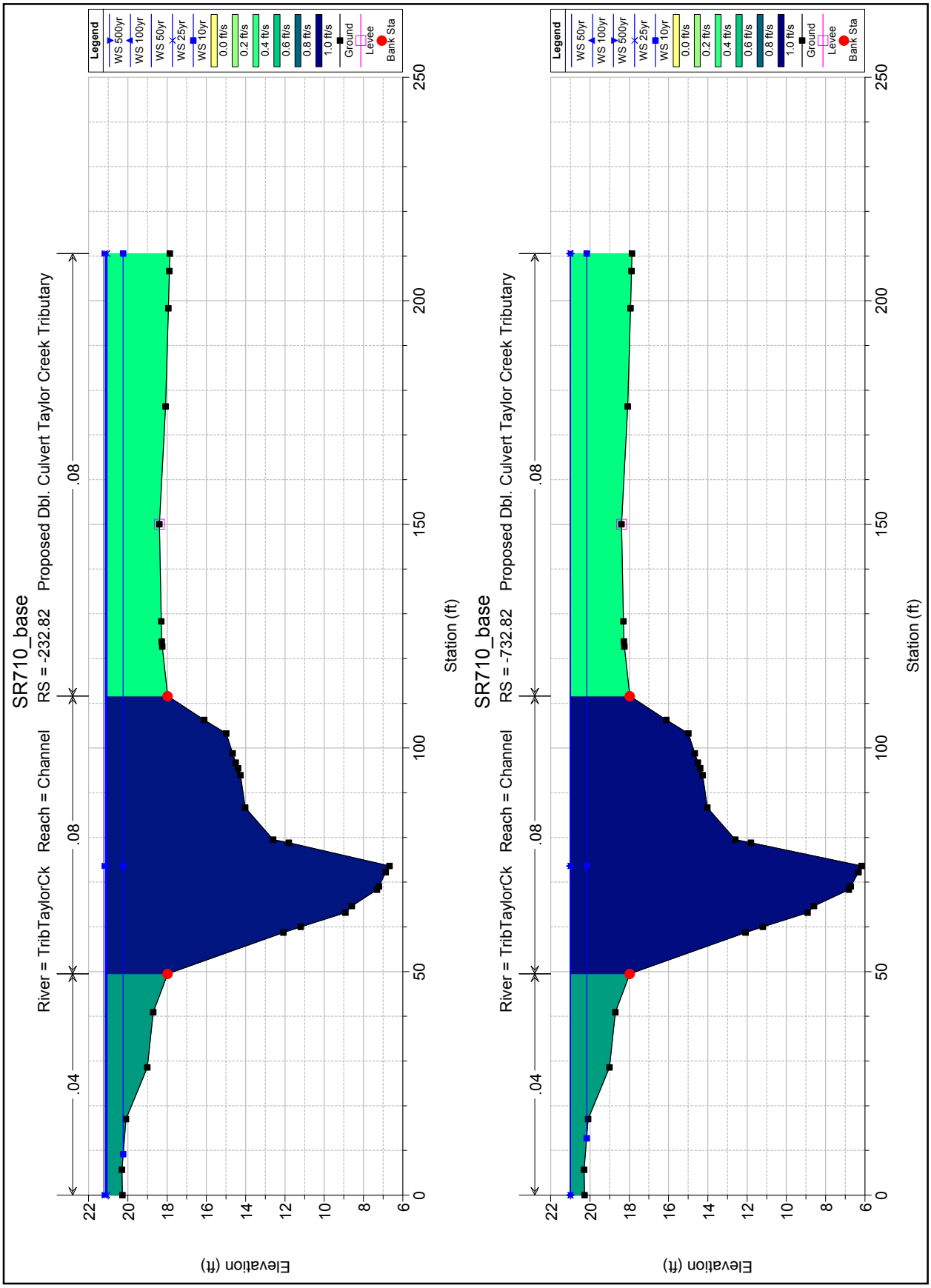

SR710_base
River = TribTaylorCk Reach = Channel RS = 2780.000 Proposed Dbl. Culvert Taylor Creek Tributary
.04 .04 .04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
-4 ft/s
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 2100.591 Proposed Dbl. Culvert Taylor Creek Tributary
.04 .04 .04
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

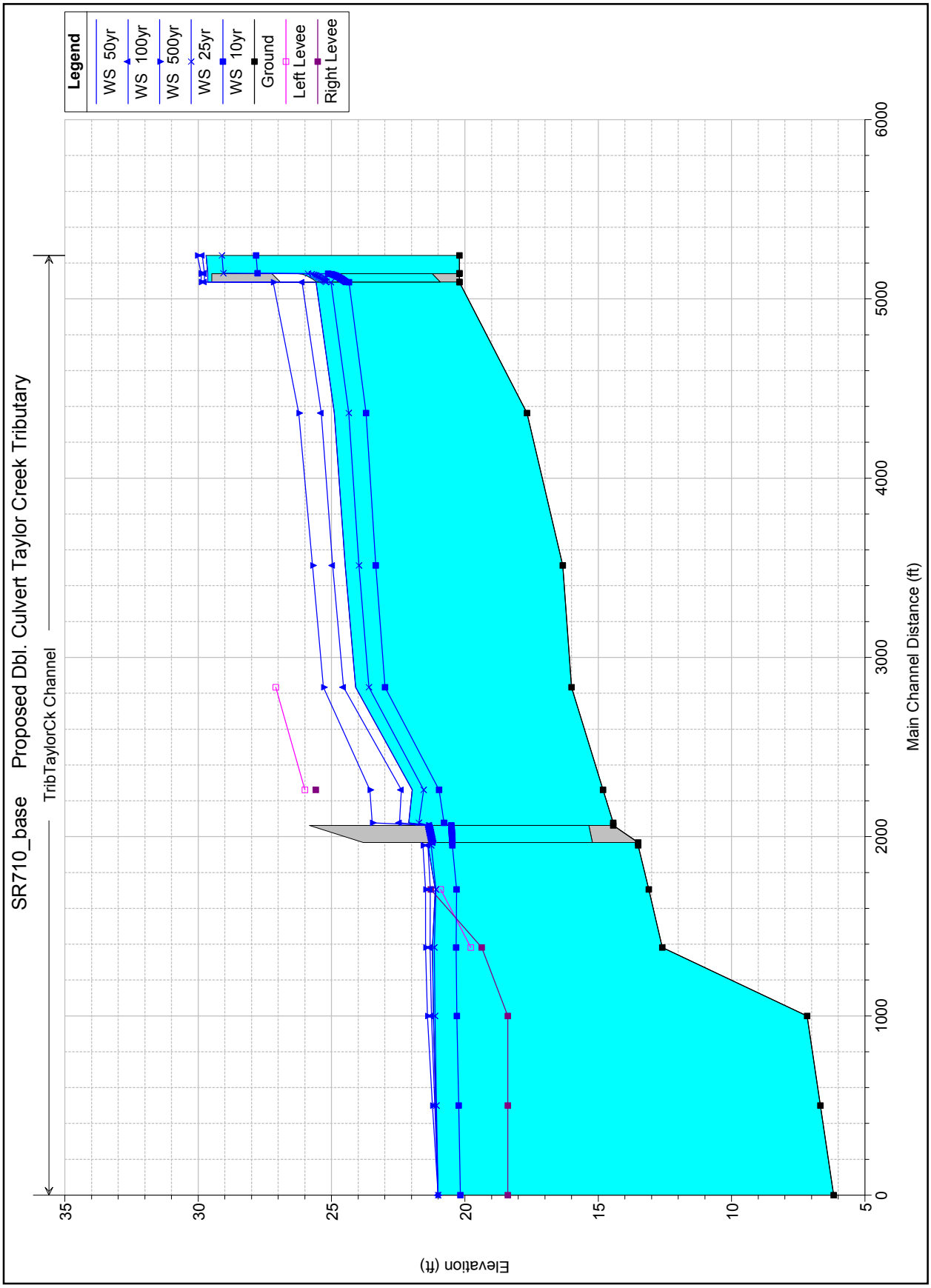

SR710_base
River = TribTaylorCk Reach = Channel RS = 1527.972 Proposed Dbl. Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Levee
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = 1344.355 Proposed Dbl. Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta
.04
.04
.04
Elevation (ft)
Station (ft)


SR710_base
River = TribTaylorCk Reach = Channel RS = 1281.855 Culv Proposed Dbl. Culvert Taylor Creek Tributary
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 50yr
WS 100yr
WS 500yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta
SR710_base
River = TribTaylorCk Reach = Channel RS = 1281.855 Culv Proposed Dbl. Culvert Taylor Creek Tributary
.04
.03
.1
Elevation (ft)
Station (ft)
Legend
WS 50yr
WS 100yr
WS 500yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Bank Sta


SR710_base
River = TribTaylorCk Reach = Channel RS = 1218.437 Proposed Dbl. Culvert Taylor Creek Tributary
.04
.03
.1
Elevation (ft)
Station (ft)
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
Ground
Bank Sta
SR710_base
River = TribTaylorCk Reach = Channel RS = 972.498 Proposed Dbl. Culvert Taylor Creek Tributary
.04
.03
.1
Elevation (ft)
Station (ft)
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
Ground
Levee
Bank Sta


SR710_base
River = TribTaylorCk Reach = Channel RS = 648.236 Proposed Dbl. Culvert Taylor Creek Tributary
.04
.03
.1
Elevation (ft)
Station (ft)
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
1.2 ft/s
Ground
Levee
Bank Sta
SR710_base
River = TribTaylorCk Reach = Channel RS = 267.180 Proposed Dbl. Culvert Taylor Creek Tributary
.04
.08
.08
Elevation (ft)
Station (ft)
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Levee
Bank Sta


SR710_base
River = TribTaylorCk Reach = Channel RS = -232.82 Proposed Dbl. Culvert Taylor Creek Tributary
Legend
WS 500yr
WS 100yr
WS 50yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Levee
Bank Sta
.04
.08
.08
Elevation (ft)
Station (ft)
SR710_base
River = TribTaylorCk Reach = Channel RS = -732.82 Proposed Dbl. Culvert Taylor Creek Tributary
Legend
WS 50yr
WS 100yr
WS 500yr
WS 25yr
WS 10yr
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Levee
Bank Sta
.04
.08
.08
Elevation (ft)
Station (ft)


SR710_base Proposed Dbl. Culvert Taylor Creek Tributary
TribTaylorCk Channel
Legend
WS 50yr
WS 100yr
WS 500yr
WS 25yr
WS 10yr
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
35
30
25
20
15
10
5
0
1000
2000
3000
4000
5000
6000

HEC-RAS Model Cross Section	River	10-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	25-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	50-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	100-Year Water Surface Elevation (feet NAVD88)		Difference (feet)	500-Year Water Surface Elevation (feet NAVD88)		Difference (feet)
		Exist	Proposed Double Culvert		Exist	Proposed Double Culvert		Exist	Proposed Double Culvert		Exist	Proposed Double Culvert		Exist	Proposed Double Culvert	
4430.000	TribTaylor Ck	27.83	27.83	0.00	29.10	29.10	0.00	29.70	29.70	0.00	29.84	29.85	0.01	30.07	30.03	-0.04
4330.000	TribTaylor Ck	27.77	27.77	0.00	29.05	29.05	0.00	29.64	29.64	0.00	29.76	29.77	0.01	29.95	29.89	-0.06
Culvert	TribTaylor Ck	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4280.000	TribTaylor Ck	24.36	24.34	-0.02	25.16	25.02	-0.14	25.97	25.58	-0.39	26.99	26.10	-0.89	27.58	27.18	-0.40
3550.000	TribTaylor Ck	23.74	23.71	-0.03	24.60	24.36	-0.24	25.52	24.89	-0.63	26.62	25.38	-1.24	27.31	26.23	-1.08
2780.000	TribTaylor Ck	23.39	23.34	-0.05	24.29	23.97	-0.32	25.26	24.49	-0.77	26.43	24.96	-1.47	27.14	25.71	-1.43
2100.591	TribTaylor Ck	23.05	22.99	-0.06	24.00	23.60	-0.40	25.05	24.10	-0.95	26.30	24.55	-1.75	27.00	25.30	-1.70
1527.972	TribTaylor Ck	21.80	20.97	-0.83	23.15	21.55	-1.60	24.52	21.98	-2.54	26.25	22.38	-3.87	26.96	23.56	-3.40
1344.355	TribTaylor Ck	21.85	20.78	-1.07	23.12	21.72	-1.40	24.50	22.10	-2.40	26.20	22.45	-3.75	26.91	23.47	-3.44
Culvert	TribTaylor Ck	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1218.437	TribTaylor Ck	18.55	20.47	1.92	19.26	21.26	2.00	19.86	21.38	1.52	20.43	21.39	0.96	21.33	21.58	0.25
972.498	TribTaylor Ck	17.83	20.31	2.48	18.48	21.08	2.60	19.00	21.11	2.11	19.50	21.30	1.80	20.29	21.47	1.18
648.236	TribTaylor Ck	16.46	20.33	3.87	17.46	21.15	3.69	17.99	21.22	3.23	18.50	21.30	2.80	19.28	21.48	2.20
267.180	TribTaylor Ck	14.24	20.30	6.06	16.66	21.12	4.46	17.19	21.18	3.99	17.69	21.25	3.56	18.52	21.40	2.88

Appendix C: STA Costs

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Final Submittal

Financial Project ID
432644-1-32-01

Okeechobee County, Florida

Cost information for STAs reviewed

Facility	Design, Permitting, and Construction ($)	Annual Operation and Maintenance ($)	Treatment Acres	Initial Cost per Treatment Acre ($)
Taylor Creek	5,642,293	50,000	118	47,816
Nubbin Slough	21,257,707	100,000	773	27,500
Lakeside Ranch Phase I	22,800,000	341,000	1,200	19,000
Lakeside Ranch Phase II	25,000,000	Not available	788	31,726
Powell Creek Filter Marsh - Lee County	2,100,000	45,000	40	52,500
Option 1	2,625,000	50,000	50	52,500

Option 2 - Cost based on in place unit price per cubic yard

Depth of Coverage (ft)	Width of Coverage (ft)	Length of coverage(ft)	In Place Cost per CY ($)	Estimated Initial Cost ($)
1	50	3,300	180	1,100,000

Option 3 - Initial costs include payment to the landowner for the cost of acquiring a conservation easement over the wetland areas that are being rehydrated.

Appendix D: Wetland and Wildlife Site Evaluation

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Final Submittal

Financial Project ID
432644-1-32-01

Okeechobee County, Florida

Dewberry

September 15, 2014

File No. SR-710 STA (50063866)

Dewberry | Bowyer-Singleton
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www.dewberry.com

Mr. Gregory S. Seidel, P.E.
The Balmoral Group
165 Lincoln Ave
Winter Park, FL 32789

Subject: **State Road 710 – Stormwater Treatment Area (STA)**
City of Okeechobee, Okeechobee, Florida
Parcel ID Nos.: 1-03-37-35-0A00-00002-0000, 1-10-37-35-0A00-00001-0000, 1-11-37-35-0A00-00001-0000

Dear Mr. Seidel:

The purpose of this letter is to summarize our site evaluation for the approximately 895-acre referenced property. A qualified biologist of Dewberry Bowyer Singleton (DBS) reviewed the referenced property to evaluate general site conditions and environmental conditions that may influence the use of the site as a stormwater treatment area. Specifically, the site was evaluated for identifying the presence of wildlife species listed as threatened (T), endangered (E) or species of special concern (SSC) as defined by the United States Fish and Wildlife Service (FWS) and/or the Florida Fish and Wildlife Conservation Commission (FWC) and their habitat. Land use types located within the proposed project were identified via vehicular and pedestrian transects and through color aerial photograph interpretation and compared to land uses identified by the Florida Department of Transportation (FDOT) *Florida Land Use, Cover and Forms Classification System (*FLUCFCS*)* (FDOT 1999) utilizing the South Florida Water Management District (SFWMD) aerial interpretation of these codes available in Geographic Information System (GIS).

PROJECT DESCRIPTION

The overall subject Property consists of approximately 895-acres located within Okeechobee County, Florida. Specifically, the subject property includes the all or portions of the following parcels:

1-03-37-35-0A00-00002-0000
1-10-37-35-0A00-00001-0000
1-11-37-35-0A00-00001-0000

The Property is located north of State Road 70E, east of U.S. Highway 441 N approximately 3 miles north of Lake Okeechobee within the City of Okeechobee. The surrounding areas consists of commercial development, Okeechobee High School, the Okeechobee County Airport, channelized Taylor Creek and other agricultural use specifically cattle ranching.

The SR 710 New Alignment Project in Okeechobee County and the City of Okeechobee is currently under design by the FDOT. During the development of the Pond Siting Report, the Pond Site location 2B and the surrounding area were identified as a possible location for a regional stormwater treatment facility that could provide greater stormwater treatment benefits to the local area. Two teleconferences were held between the FDOT, FDEP and SFWMD to brainstorm the feasibility of the site and possible cooperation between the agencies. At the last meeting, it was decided that the FDOT would perform a feasibility study for two options –

1. A Stormwater Treatment Area (STA) with interagency cooperation connected to the L63-N canal and Upper Taylor Creek.

2. A Regional Pond constructed by the FDOT for the SR 710 that would incorporate offsite areas associated with Lower Taylor Creek.

Dewberry | Bowyer-Singleton was contracted to perform the evaluation of onsite wetlands to assist in determining the ability to restore the wetlands using stormwater treatment and attenuation. Qualified environmental scientists with Dewberry | Bowyer-Singleton performed a preliminary ecological field review to evaluate onsite wetlands and listed species within the project vicinity. Dewberry reviewed the current PD&E documents and biological evaluations currently underway by the Wantman Group, Inc. We conducted a desktop review of available published information from federal and state online databases to evaluate listed species that may occupy the project area. Data collection consisted of literature review of existing sources for information useful in identifying the occurrence or potential occurrence of wildlife species listed as T, E or SSC (collectively recognized as listed species), as defined by FWS and/or the FWC. The literature review included the following sources: Natural Resources Conservation Service (f/k/a Soil Conservation Service [SCS]) Soil Survey of Okeechobee County, Florida, U.S. Geological Survey Topographic Quadrangle Maps, FWC Bald Eagle and Waterbird Colony databases, Florida Natural Areas Inventory (FNAI) Okeechobee County Tracking List, previous studies available, and false-color infrared and true color aerial photography of the project corridor, FNAI Field Guides and Rare and Endangered Biota of Florida Series.

Land use types located within the proposed project were identified through color aerial photograph interpretation and compared to land uses identified by the Florida Department of Transportation (FDOT) Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT 1999). Estimated wetland limits were identified on an aerial exhibit. A preliminary qualitative evaluation of the on-site wetlands system(s) was conducted. The wetlands were identified in general accordance with the U.S. Army Corps of Engineers (USACOE) October 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region and the State of Florida's Delineation of the Landward Extent of Wetlands and Surface Waters (Chapter 62-340, Florida Administrative Code). Seasonal High Water Elevations were marked at six (6) locations in the field adjacent to Taylor Creek (east) within the proposed STA and surveyed to better understand the normal water and allowable peak stage. Three (3) SHWE nails were set at each location and the elevation at each is provided.

ENVIRONMENTAL CONSIDERATIONS

Soils

The *Soil Surveys of Okeechobee County, Florida* (**Exhibit 1 - SCS Soils Map**) were reviewed and mapped on-site soil types as follows:

Identification Number	Soil Name	Permeability	Native Vegetation
Ph	Placid, Pamlico and Delray soils, ponded	Placid (Rapid); Pamlico (N/A); Delray (Rapid)	Sweetbay, sweetgum, cypress, bracken fern, sawgrass and other hyrophytes
Pn	Pompano fine sand	Rapid	Grassy sloughs and depressions
Ad	Adamsville fine sand	Rapid	Pine trees, saw-palmetto, cabbage palms, other native grasses and shrubs
Fr	Ft. Drum fine sand	Rapid	Open growth pines, scattered cabbage palm, saw palmetto, native grasses
Pf	Placid fine sand	Rapid	Pickerelweed and maidencane
Bm	Basinger and Pompano	Basinger (Rapid);	Maidencane, St. Johnswort, water

	fine sands, ponded	Pompano (Rapid)	lilies, pickerelweed and other hydrophytic grasses
Im	Immokalee fine sand	Rapid	Native flatwoods, saw palmetto, scattered pines and grasses
Mo	Manatee, Delray and Okeelanta soils	Manatee (Rapid); Delray (Rapid); Okeelanta (N/A)	Dense pickerelweed, iris, smartweed, maidencane, black willow and other aquatic shrubs and grasses
*N/A listed when permeability is not provided in the Soil Survey.			

General site review found soil types to be generally consistent with the mapped soil types.

Land Use

The SFWMD maintains a GIS database with a land use layer covering the entire SFWMD area. This land use layer was overlain on an aerial map using ArcGIS software. Land use types located within the proposed project were verified and/or modified through color aerial photograph interpretation and field reconnaissance. Each on-site land use form was classified using the Florida Department of Transportation (FDOT) *Florida Land Use, Cover and Forms Classification System* (FLUCFCS) as defined in the FDOT handbook, 1999 (**Exhibit 2 – FLUCFCS Map**).

The SR 710 STA project site supports six (6) land use type/vegetative communities within its boundaries. The illustration provided in **Exhibit 2** depicts the locations of all wetlands and the vegetative cover and community types for all wetlands, surface waters and uplands within the project boundaries. The uplands on the subject property consist of Improved Pasture (2110), Upland Hardwood Forest (4200) and Pine Flatwoods (4110). The wetlands and surface waters include Taylor Creek (5120), Mixed Wetland Hardwood (6170) and Cypress (6210). The following provides a brief description of the land use type/vegetative communities identified on the site:

UPLANDS

Improved Pasture – 310 acres
FLUCFCS 2110

The majority of the subject site is most consistent with the Improved Pasture classification. This area is dominated by bahia grass (*Paspalum notatum*) and dog fennel where management has not been recently intensive. This area is actively maintained under a cattle management plan so very little other vegetation is present. Those vegetative species that do exist in the less managed areas are opportunistic, weed-type species, including dog fennel (*Eupatorium capillifolium*), broomsedge (*Andropogon virginicus*), blackberry (*Rubus betulifolius*), soda apple (*Solanum capsicoides*), and Caesar weed (*Urena lobata*). Widely scattered and mostly solitary longleaf pines (*Pinus palustris*) are present.

Upland Hardwood Forest – 185 acres
FLUCFCS 4200

There are four large oak hammocks located within the property and these are located adjacent to cypress wetlands. These areas (including "Wetland 6") were likely mixed hardwood wetlands serving as floodplain storage prior to the onsite drainage feature construction. Historical aerials depict these areas as part of the historic Taylor Creek flow way and the cypress and freshwater marsh mosaic. These areas currently consist of a mature canopy of water oak (*Quercus nigra*), cabbage palm, sweetgum and elm.

Pine Flatwoods - 60 acres
FLUCFCS 4110

The on-site pine flatwoods community is located in the northwest portion of the project, on the west side of Taylor Creek. This upland community contains a canopy of slash pine (*Pinus elliotti*).

The groundcover is dominated by saw palmetto, wiregrass (*Aristida stricta*), bracken fern (*Pteridium aquilinum*), prickly pear cactus, shiny blueberry (*Vaccinium myrsinites*), gallberry (*Ilex glabra*) and runner oak (*Quercus pumila*). The soils are well drained and sandy throughout. The pines throughout the flatwoods system have died from unknown cause.

WETLANDS/OTHER SURFACE WATERS

The wetlands and surface waters illustrated in **Exhibit 3** (**Wetlands and Seasonal High Water Level Map**) were approximated using aerial photography and the National Wetlands Inventory (NWI) by qualified biologists from Dewberry | Bowyer Singleton in general accordance with the U.S. Army Corps of Engineers (USACOE) *October 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* and the State of Florida's *Delineation of the Landward Extent of Wetlands and Surface Waters* (Chapter 62-340, Florida Administrative Code). Seasonal High Wetland Levels were also set within the 6 wetland areas and are shown on **Exhibit 3**.

Wetlands 1, 2, 3, 4, 5
FLUCFCS 6210 Cypress - 338 acres
The wetland types are similar and contain a mature canopy of bald cypress (Taxodium ascendens), with a heterogenous mixture of sweet bay (*Magnolia virginiana*), red bay (*Persea palustris*) and water oak (*Quercus nigra*) with a subcanopy dominated in some areas by Brazilian pepper and a mixture of cabbage palm.

Groundcover includes wild coffee, cabbage palm, grapevine (*Vitis* spp.), smilax, blackberry (*Rubus* spp.), broomsedge (*Andropogon virginicus*), chain fern (*Woodwardia virginica*), air potato, and lizards tail (*Saururus cernuus*).

Seasonal High Water Elevations set within wetlands 1, 3 and 5 were established at flow ways (either an excavated ditch within the wetland or a historic tributary leading into Taylor Creek) which is the only location standing water was found in the wetlands. Seasonal high water indicators used to set these elevations were primarily lichen lines and the moss collar lowest extent (where present) which generally corresponded to an elevation near the top of the creek/ditch bank. These lichen lines generally maintained a relationship to the cypress knees and also a slight inflection point on the cypress trunk. Individually, these indicators are not considered the strongest; however, cumulatively they appear to be consistent and reliable for establishing a wet season peak elevation.

The cypress trees within most of the wetlands exhibit alteration to varying degrees. Cypress roots are exposed at numerous trunk bases and there is multiple inflection points present on the cypress. The USDA Soil Survey mentions that soil oxidation and subsidence can be observed in the onsite soils when water level controls are installed. Soil subsidence occurs throughout the wetlands, indicated prolonged muck exposure to oxygen, uncharacteristic for the system prior to anthropogenic manipulation.

Identifier	Elevation (ft)
Wetland 1	
SHWL 1-1	13.30
SHWL 1-2	12.96
SHWL 1-3	13.54
Wetland 2	
SHWL 2-1	14.48
SHWL 2-2	14.05
SHWL 2-3	14.52
Wetland 3	

SHWL 3-1	15.98
SHWL 3-2	16.66
SHWL 3-3	16.91
Wetland 4	
SHWL 4-1	14.30
SHWL 4-2	14.03
SHWL 4-3	14.46
Wetland 5	
SHWL 5-1	19.55
SHWL 5-2	19.20
SHWL 5-3	19.14
Wetland 6	
SHWL 6-1	22.34
SHWL 6-2	22.38
SHWL 6-3	21.95

6410 Freshwater Marsh – 2 acres

This wetland type is present in a flatwoods depression in the northern section of the property and along the southern boundary where agricultural activities have altered drainage and this area is a low pasture. Freshwater marshes are described by the Florida Natural Areas Inventory (FNAI) as "having the outer, or driest, zone often occupied by sparse herbaceous vegetation consisting of longleaf threeawn (*Aristida palustris*), beaksedges (*Rhynchospora microcarpa, R. cephalantha, R. tracyi, R. filifolia*, etc.), Elliott's yellow-eyed grass (*Xyris elliottii*), the subshrub, myrtleleaf St. John's wort (*Hypericum myrtifolium*), and patches of blue maidencane (*Amphicarpum muhlenbergianum*) or sand cordgrass (*Spartina bakeri*). This sparse zone may be followed downslope by a sparse to dense zone of peelbark St. John's wort (*Hypericum fasciculatum*), water toothleaf (*Stillingia aquatica*) and scattered herbs, such as fringed yellow-eyed grass (*Xyris fimbriata*), pipeworts (*Eriocaulon compressum* and *E. decangulare*), narrowfruit horned beaksedge (*Rhynchospora inundata*), and Baldwin's spikerush (*Eleocharis baldwinii*). The innermost, deepest zone is occupied by maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), bulltongue arrowhead (*Sagittaria lancifolia*), or sawgrass (*Cladium jamaicense*). Floating-leaved plants, such as white waterlily (*Nymphaea odorata*), may be found in open water portions of the marsh."

FISH, WILDLIFE, LISTED SPECIES AND THEIR HABITAT

Data collection consisted of a literature review of existing sources for information useful in identifying the occurrence or potential occurrence of wildlife species listed as T, E or SSC (collectively recognized as listed species), as defined by the United States Fish and Wildlife Service (USFWS) and/or the Florida Fish and Wildlife Conservation Commission (FWC). In addition, the presence of designated critical habitat and/or vegetative communities and land uses with the potential to support listed species was evaluated. The literature review included, but was not limited to, the following sources: Natural Resources Conservation Service (f/k/a Soil Conservation Service [SCS]) Soil Survey of Okeechobee County, Florida, U.S. Geological Survey Topographic Quadrangle Maps, FWC Bald Eagle and Waterbird Colony databases, previous studies available, and false-color infrared and true color aerial photography of the project corridor.

Following the initial assessment, limited pedestrian and vehicular transects were conducted throughout all habitat types to determine the presence of protected wildlife species (**Tables 1 - Listed Species Occurrence in Okeechobee County, Florida**). Special attention was given to the following species: Everglades snail kite (*Rostrhamus sociabilis plumbeus*), crested caracara, gopher tortoise (*Gopherus polyphemus*) (T), sandhill crane (*Grus Canadensis pratensis*), Sherman's fox squirrel (*Sciurus niger*

shermani), wood stork (*Mycteria americana*) and bald eagle (*Haliaeetus leucocephalus*), recently delisted by FWC and FWS due to recovery, though all appropriate species were considered.

The potential occurrence of listed species to be identified within the proposed project is based on the vegetative communities present, as well as, surrounding land uses.

Everglades Snail Kite
The Everglades snail kite (*Rostrhamus sociabilis plumbeus*) is listed as endangered by the USFWS. The project corridor falls within the USFWS CA for the species. The nearest Everglades snail kite observation occurred 3 miles south of the project area on Lake Okeechobee. Very small areas of suboptimal habitat (ditches) exist within the project limits. No evidence of the Everglades snail kite was detected during field surveys, no historic sightings of this species were documented near the project area, and suitable habitat is limited.

Audubon's Crested Caracara
The Audubon's crested caracara (*Caracara cheriway*) is listed as threatened by the USFWS. In Florida, the caracara historically occupied native dry prairies with some wet areas and scattered cabbage palms (*Sabal palmetto*), but fire suppression has caused widespread conversion of prairies to open brushland. Currently, the majority of Florida's caracara population inhabits large cattle ranches with improved pastures and scattered cabbage palms. Caracaras also occur in some improved pasturelands and even in lightly wooded areas with limited stretches of open grassland. Within these habitats, caracaras exhibit a propensity for nesting in cabbage palms, followed by live oaks (*Quercus virginiana*).

The entire project is located within the CA for the Audubon's crested caracara. The surrounding land use consists of agriculture and since cabbage palms also exist within the upland hardwoods within the project limits, caracara habitat is classified as optimal. During the two field visits, no individuals were observed flying overhead, foraging or perching in the project area. The USFWS caracara survey protocol should be undertaken to determine presence or absence of the species on site.

Indigo Snake
The eastern indigo snake is listed by the USFWS as threatened. The species inhabits a wide variety of habitats present within the project, including pine flatwoods, hardwood forests, as well as wet and dry prairies. The nearest recorded eastern indigo snake observation was approximately 5 miles to the southeast of the project in 2005. No individuals were observed during the two site visits.

Sherman's fox squirrel
The Sherman's fox squirrel (*Sciurus niger shermani*) is listed as an SSC by the FWC. The optimal habitat for this species includes pine forests which are limited within the project area and oak hammocks which are found throughout the project area. No Sherman's fox squirrels were observed during field surveys and no nests were identified. The nearest Sherman's fox squirrel observation, documented in 2011, occurred approximately 1 mile east of the project.

Gopher Tortoise
The gopher tortoise (*Gopherus polyphemus*) is listed as threatened by FWC. The gopher tortoise occurs in sandhill (pine-turkey oak associations), sand pine scrub, xeric hammock, pine flatwoods, dry prairie, coastal grasslands and dunes and mixed hardwood pine communities. These burrows are known to serve as refuge to many species, some of which are protected (eastern indigo snake, Florida mouse, gopher frog, and Florida pine snake).

Gopher tortoise burrows were identified in the project's uplands adjacent to the large canal on the project's northern end.

Florida Sandhilll Crane

The Florida sandhill crane (*Grus canadensis pratensis*) is listed as threatened by FWC and is protected under the Federal Migratory Bird Treaty Act. The Florida sandhill crane is commonly found in wet prairies, marshy lake regions, low-lying pastures (including improved pastures), and shallow water open areas. Nesting occurs in marshy depressional ponds vegetated by pickerelweed, arrowhead, fireflag, maidencane, and other herbaceous vegetation.

There were no nests or species identified on the project site during the two inspections, although suitable freshwater marsh habitat and low pasture occurs on the site.

Wood Stork
The wood stork (*Mycteria americana*) is listed as endangered by FWS and FWC. This species is typically found in freshwater marshes, swamps, lagoons, ponds, flooded fields, depressions in marshes and brackish wetlands. The critical foraging areas for this species include areas of very shallow water, generally six (6) to ten (10) inches in depth, where there is an abundance of small fishes and other aquatic life.

The project does fall within the Wood Stork Core Foraging area for two (2) wood stork colonies: 616108 Wescott Grove Reservoir and 616047A Cypress Creek. During site reviews, wood storks were observed foraging within the shallow portions of Taylor Creek.

Bald Eagle
The Bald Eagle (Haliaeetus leucocephalus) was previously listed as Threatened by the FWC and is now provided species protection by the State. Bald eagles are generally associated with large bodies of water where their dietary requirements (fish) are readily available. Bald eagles in Florida have also been observed consuming various types of waterfowl, carrion, and occasionally mammals and snakes (Scott 2004). Bald eagles prefer to roost in conifers or other sheltered sites in winter, usually selecting large, more accessible trees.

Initial research of databases containing information from the Florida Fish and Wildlife Conservation Commission (FWC), the U.S. Fish and Wildlife Service (FWS), and other agencies identifies that the project corridor is located near bald eagle habitat. The 2012 FWC database of known bald eagle nest sites identified two documented nest sites within a one (1) mile radius of the project, OK028 is located within the project and was active during the last survey period and OK022 which was last active in 2003.

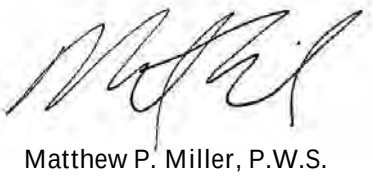
Federal and state guidelines for the bald eagle require that certain activities may be conducted outside a 660-foot radius distance outward from a nest tree (FWS 2007). Per the 2007 FWS Bald Eagle Monitoring guidelines, monitoring of the active nest is required if construction activities are to take place within the 660-foot radius during the nesting season (October 1 – May 15).

FWC's 1999 Waterbird Colony Locator database of documented colonies was queried and yielded no documented occurrences within one (1) mile of the proposed project and is the only published data available to the public.

Other wildlife observed on-site includes the limpkin, little blue heron (SCC), mourning dove, anhinga, snowy egret (SSC), tri-colored heron (SSC), white ibis (SSC), cattle egret, turkey vulture, white tailed deer, red shouldered hawk, and armadillo.

Mr. Seidel, we thank you for the opportunity of providing our services. Dewberry | Bowyer Singleton looks forward to working with you in the near future. Should you have any questions or require additional information, please contact our office at 321.354.9640.

Sincerely,



Matthew P. Miller, P.W.S.
Environmental Scientist
Dewberry | Bowyer-Singleton

MPM
SR710/Env
Enclosures

c: Alexis Preisser

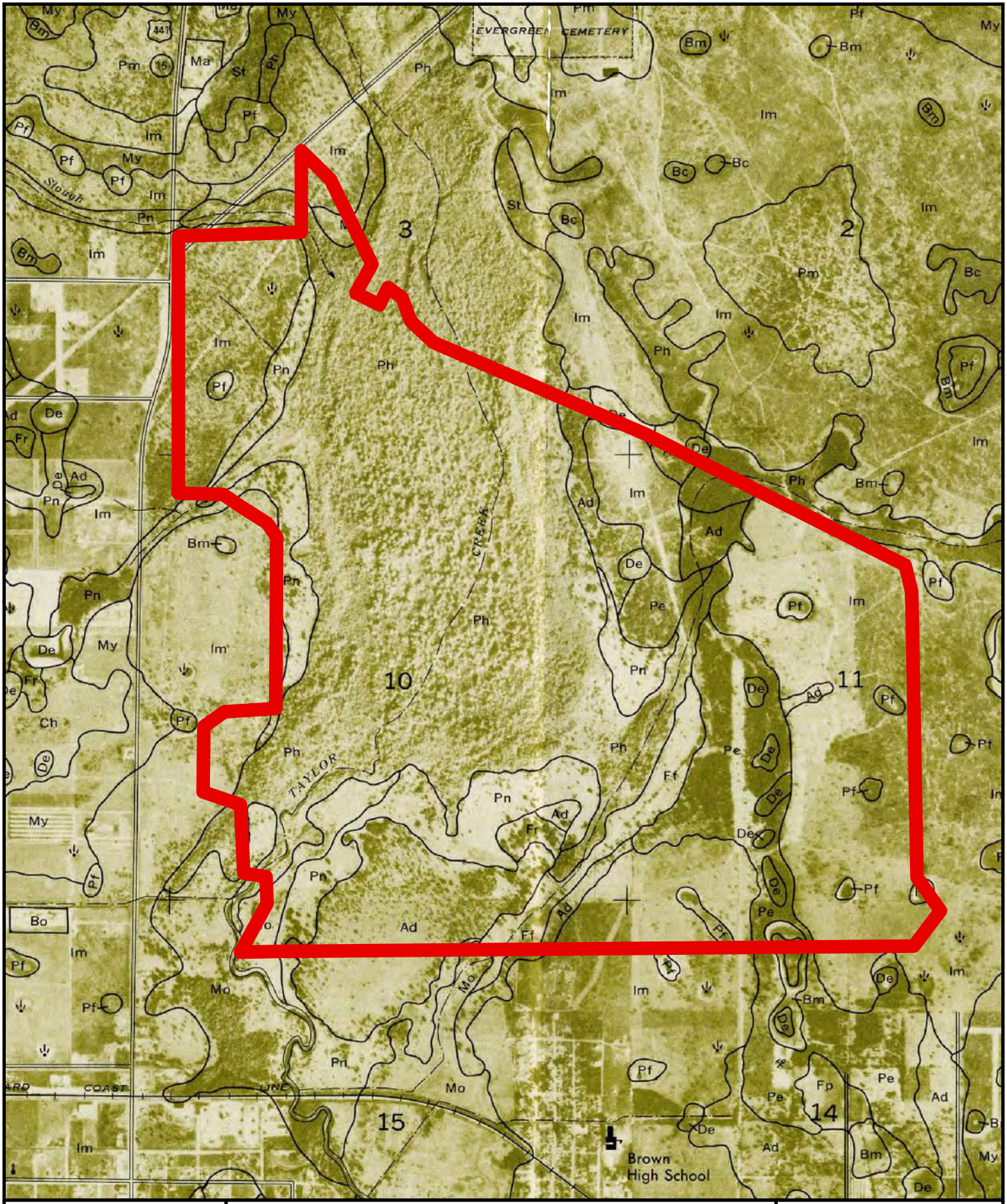
Table 1
Listed Species Occurrence-Okeechobee County, Florida

Table 1: Summary table of those federal and state listed species known to be present in Okeechobee County, Florida as documented by the FWS and FWC and their potential for occurrence within the SR 710 STA project area.

Code Key: E = Endangered, T = Threatened, P = Proposed, SSC= Species of Special Concern S/A = Similar in Appearance

Scientific Name	Common Name	FWS Status	FWC Status	Occurrence Potential
Amphibians				
Rana capito	gopher frog	N/A	SSC	Low
Reptiles				
Alligator mississippiensis	American alligator	T(S/A)	SSC	Observed
Drymarchon corais couperi	eastern indigo snake	N/A	T	Moderate
Gopherus polyphemus	gopher tortoise	N/A	SSC	Moderate
Birds				
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	E	Low
Aramus guarauna	limpkin	N/A	SSC	Moderate
Aphelocoma coerulescens	Florida scrub-jay	T	T	Low
Athene cunicularia floridana	Florida burrowing owl	N/A	SSC	Low
Egretta caerulea	little blue heron	N/A	SSC	Observed
Egretta thula	snowy egret	N/A	SSC	Observed
Egretta tricolor	tricolored heron	N/A	SSC	Moderate
Eudocimus albus	white ibis	N/A	SSC	Observed
Falco sparverius paulus	southeastern American kestrel	N/A	T	Low
Grus canadensis pratensis	Florida sandhill crane	N/A	T	Low
Haliaeetus leucocephalus	bald eagle	T	T	Observed
Mycteria americana	wood stork	E	E	Observed
Pandion haliaetus	osprey	N/A	SSC	Low
Rostrhamus sociabillis plumbeus	Snail Kite	E	E	Low
Sterna antillarum	least tern	N/A	T	Low
Mammals				
Eumops floridanus	Florida bonneted bat	E	E	Low
Sciurus niger shermani	Sherman's fox squirrel	N/A	SSC	Moderate

Data Source: URL: http://southeast.fws.gov/es/county%20lists.htm. Last modified on August 7, 2000 and URL: htpp://floridaconservation.org/pubs/endanger.html and Florida Natural Areas Inventory (FNAI). Occurrence Potential represents the likelihood of that particular species to be found within the project area. Occurrence Potential = Observed, High, Medium and Low.



Dewberry

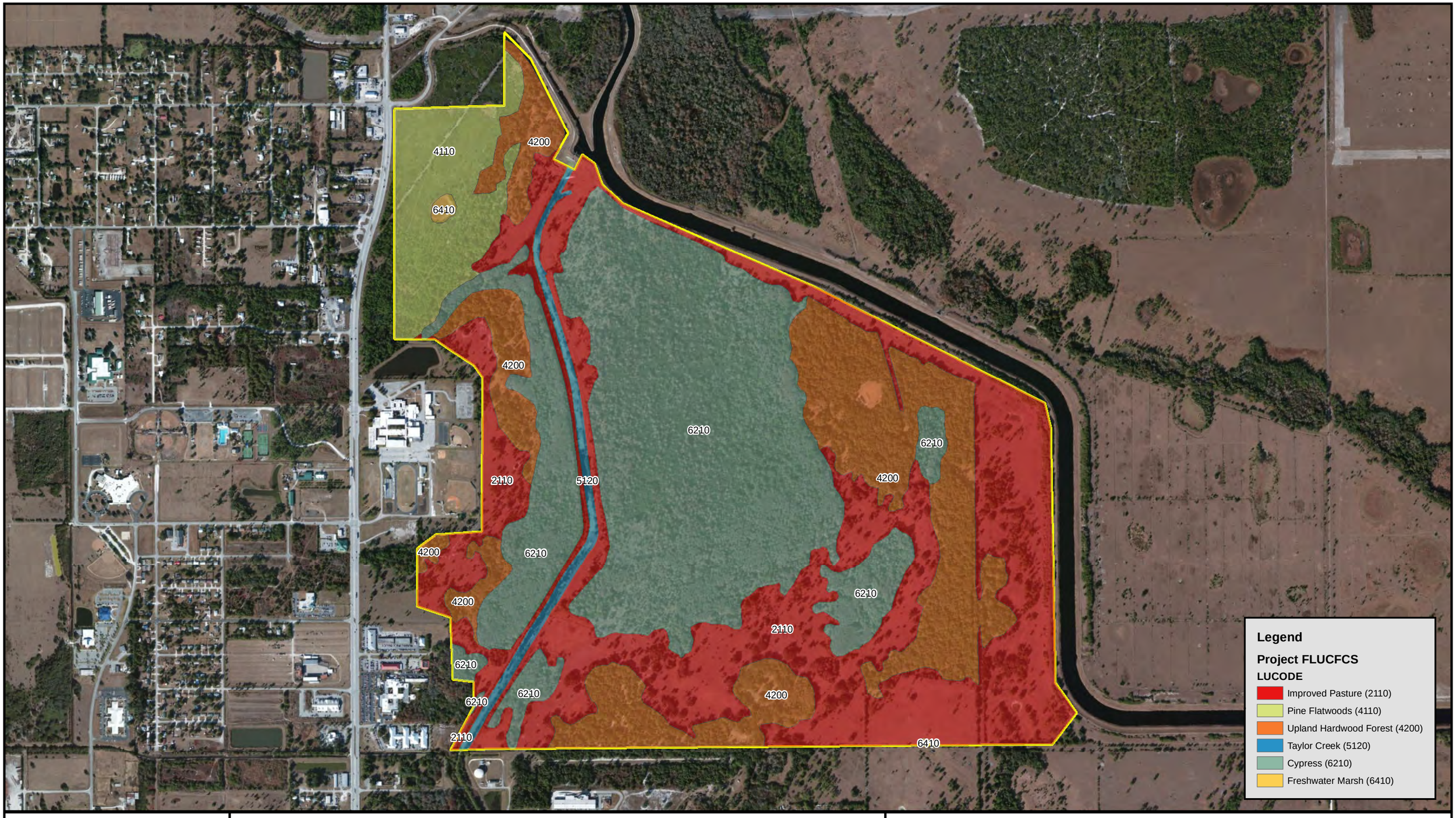
BOWYER SINGLETON

SR 710 Stormwater Treatment Area (STA)
Exhibit 1 - USDA (NRCS) Soils Map
Okeechobee, Florida

N
W E
S

Image Source: USDA Okeechobee Soil Survey

Document Path: G:\MXD\County\Okeechobee\SR710 STA\Approximate Soils Map.mxd



Dewberry

BOWYER SINGLETON

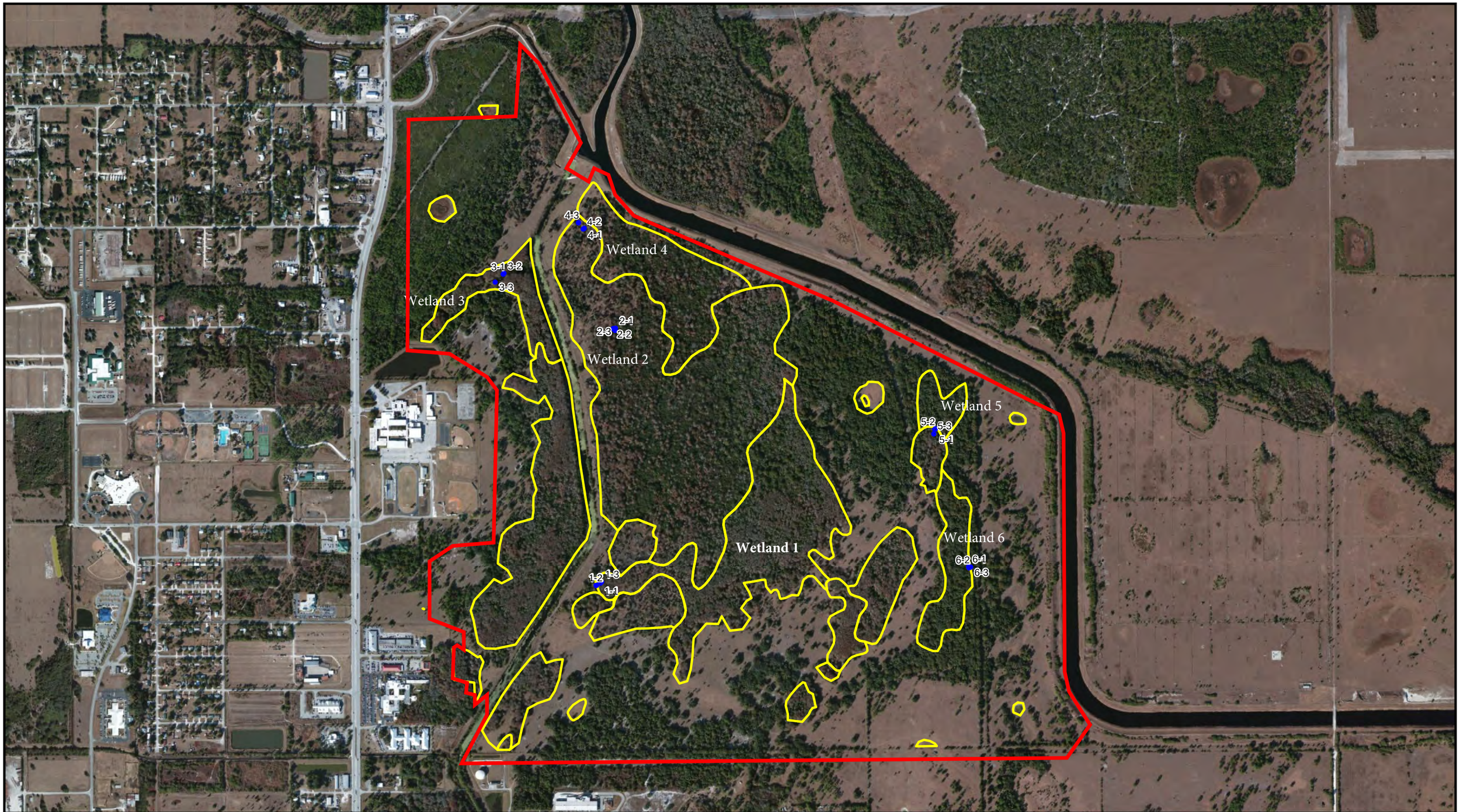
SR 710 Stormwater Treatment Area (STA)
Exhibit 2 - FLUCFCS
Okeechobee, Florida

N

0 500 1,000 Feet

Data Source: Modified SFWMD Land Use layer based on 7/25/2014 and 9/10/2014 Dewberry site visit
Image Source: ESRI World

Document Path: G:\MXD\County\Okeechobee\SR710 STA\FLUCFCS.mxd



Dewberry

BOWYER SINGLETON

SR 710 Stormwater Treatment Area (STA)
Exhibit 3 - Wetland Boundary and SHWL
Okeechobee, Florida

N

0 500 1,000 Feet

Data Source: Modified NWI Wetland Map based on 7/25/2014 and 9/10/2014 Dewberry site visit
Image Source: ESRI World, project boundary is approximate sketch based on Balmoral exhibits.

Document Path: G:\MXD\County\Okeechobee\SR710 STA\Approximate Wetlands and SHWL.mxd

Appendix 1. Site Photographs

Photograph 1. Wetland 1 facing North

Photograph 2. Wetland 1 facing East

Photograph 3. Wetland 1 facing South

Photograph 4. Wetland 1 facing West

Photograph 5. Wetland 2 facing North

Photograph 6. Wetland 2 facing East

Photograph 7. Wetland 2 facing South

Photograph 8. Wetland 2 facing West

Photograph 9. Wetland 3 facing North

Photograph 10. Wetland 3 facing East

Photograph 11. Wetland 3 facing South

Photograph 12. Wetland 3 facing West

Photograph 13. Wetland 4 facing North

Photograph 14. Wetland 4 facing East

Photograph 15. Wetland 4 facing West

Photograph 16. Wetland 4 facing West

Photograph 17. Wetland 5 facing North

Photograph 18. Wetland 5 facing East

Photograph 19. Wetland 5 facing South

Photograph 20. Wetland 5 facing West

Photograph 21. Wetland 6 facing North

Photograph 22. Wetland 6 facing East

Photograph 23. Wetland 6 facing South

Photograph 24. Wetland 6 facing West

Appendix 2. UMAM Evaluation

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
State Road 710		Cypress

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
621 - Cypress		Mitigation	338 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Lake Okeechobee		OFW

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The cypress wetlands onsite are hydrologically connected to the Taylor Creek Canal through both groundwater flow and surface water connection in the agricultural ditching.

Assessment area description

The wetland types are similar and contain a mature canopy of bald cypress (Taxodium ascendens), with a heterogenous mixture of sweet bay (Magnolia virginiana), red bay (Persea palustris) and water oak (Quercus nigra) with a subcanopy dominated in some areas by Brazilian pepper and a mixture of cabbage palm. Groundcover includes wild coffee, cabbage palm, grapevine (Vitis spp.), smilax, blackberry (Rubus spp.), broomsedge (Andropogon virginicus), chain fern (Woodwardia virginica), air potato, and lizards tail (Saururus cernuus).

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Taylor Creek Canal, Lake Okeechobee, Okeechobee County Airport	The relative wetland size in close proximity to Lake Okeechobee, makes this wetland unique.

Functions	Mitigation for previous permit/other historic use
providing cover, substrate, and refuge; breeding, nesting, denning, and nursery areas; corridors for wildlife movement; food chain support; and natural water storage, natural flow attenuation, and water quality improvement, which enhances fish, wildlife, and listed species utilization;	None

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Cypress swamps provide important habitat for many wildlife species (Casey and Ewel 1998). They provide critical breeding habitat for flatwoods salamanders (Ambystoma cingulatum and Ambystoma bishopi) and are important roosting sites for wading birds such as white ibis (Eudocimus albus) and wood stork (Mycteria americana). Other species may include the limpkin, american alligator, little blue heron, great egret, crested caracara, snowy egret, tricolored heron	Woodstork (E), limpkin (SSC), american alligator (T, S/A), little blue heron (SSC), crested caracara (T), snowy egret (SSC), tricolored heron (SSC), white ibis (SSC)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Woodstork, Limpkin, American Alligator, Little Blue Heron, Snowy Egret, Cattle Egret, Red Shouldered Hawk

Additional relevant factors:

The Cypress wetlands have been heavily impacted by agricultural drainage and the creation of the Taylor Creek canal for flood control purposes.

Assessment conducted by:	Assessment date(s):
MPM	9.15.2014

Form 62-345.900(1), F.A.C. [effective date 02-04-2004]

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
State Road 710 - STA		Cypress Wetlands
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Enhancement	MPM	9.15.2014

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	5	5	The "Location" score will not be impacted or enhanced with the project design.
.500(6)(b)Water Environment (n/a for uplands)	5	7	Seasonal High Water Elevations set within wetlands 1, 3 and 5 were established at flow ways (either an excavated ditch within the wetland or a historic tributary leading into Taylor Creek) which is the only location standing water was found in the wetlands. Seasonal high water indicators used to set these elevations were primarily lichen lines and the moss collar lowest extent (where present) which generally corresponded to an elevation near the top of the creek/ditch bank. These lichen lines generally maintained a relationship to the cypress knees and also a slight inflection point on the cypress trunk. Individually, these indicators are not considered the strongest; however, cumulatively they appear to be consistent and reliable for establishing a wet season peak elevation. The cypress trees within most of the wetlands exhibit alteration to varying degrees. Cypress roots are exposed at numerous trunk bases and there is multiple inflection points present on the cypress. Depending on the system design these wetlands may receive a lift from either increased surface water input, decreased groundwater loss due to the low control elevation from nearby drainage ditches, or a combonation of the two restoration methods.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	5	7	The wetland types are similar and contain a mature canopy of bald cypress (Taxodium ascendens), with a heterogenous mixture of sweet bay (Magnolia virginiana), red bay (Persea palustris) and water oak (Quercus nigra) with a subcanopy dominated in some areas by Brazilian pepper and a mixture of cabbage palm. Groundcover includes wild coffee, cabbage palm, grapevine (Vitis spp.), smilax, blackberry (Rubus spp.), broomsedge (Andropogon virginicus), chain fern (Woodwardia virginica), air potato, and lizards tail (Saururus cernuus). The wetland edges are particularly invaded by upland and invasive vegetation, presumably outcompeting native wetland vegetation due to the change in hydrologic conditions. Functional gains may be obtained in community structure, if the design allows water to rehydrate the system to the edges for a period of time sufficient to terminate upland vegetation. Hydrologic indicators such as historic inflection points suggest water levels may only need to acheive the historic seasonal high for a duration of 2-3% of the year (Carr 2006, COMPARISON OF SIX BIOLOGIC INDICATORS OF HYDROLOGY AND THE LANDWARD EXTENT OF HYDRIC SOILS IN WEST-CENTRAL FLORIDA, USA CYPRESS DOMES).

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.5	0.63

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

Delta = [with-current]
0.13

If mitigation
Time lag (t-factor) = 1.14
Risk factor = 1.5

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.076

Form 62-345.900(2), F.A.C. [effective date 02-04-2004]

Appendix E: Correspondence

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Final Submittal

Financial Project ID
432644-1-32-01

Okeechobee County, Florida

MEETING MINUTES

SR 710 Possible Regional Pond Brainstorming Meeting

SR 710 from US 441 to the I-63-N Canal

FPID No. 419344-3-52-01

September 13, 2013, 11:00 am; GoToMeeting

Attendees:

Lesley Bertolottis – SFWMD, Principals Scientists
Kevin Carters – SFWMD, Leads Scientists
Kelly Cranfords – SFWMD, Permittings Sections Leaders
Orlando Diazs – SFWMD, Sr. s Environmentals Scientists
Eric Gonzalezs – SFWMD, s Projects Managers Principals
Susan Martins – SFWMD, s Seniors Specialists Attorneys
John Morgans – SFWMD, s Leads Policys Analysts
Gary Ritters – SFWMD, s Intergovernmentals & s Outreachs Representatives
Steve Sentess – SFWMD, s Regulatorys Professionals Leads
Tony Waterhouses – SFWMD, s Assistants Executives Director, s Regulations
Misty Aldermans – s FDEP, s Nonpoints Sources Managements
Elizabeth Alvis – s FDEP, s Envs Consultants
Ken Kuhls – s FDEP, s Envs Consultants
Trina Vielhauers – s FDEP, s Env. s Assessments and s Restorations
Bonnie Wolffs Pelaezs – s FDACS, s Envs Specialists
Brent Setchells – s FDOT, s Permittings
Carl Spirios – s FDOT, s Drainages
Amy Setchells – s FDOTs – s Projects Managers
Brian Kirwanss – s Thes Wantman Group, s PMs - s Designs
Alfredo Rodriguezs – s Thes Wantman Group, s Roadways
Greg Griffiths – s Thes Wantman Group, s Permittings
Greg Seidels – s Thes Balmoral Group, s Drainages
Jennifer Nunns – s Thes Balmoral Group, s Drainages
Tim Desmarais – s Thes Balmoral Group, s Drainages

Purpose: s The purpose of s the s meeting was to s presents the SR s 710 s projects and s possibles regionals ponds opportunity s to s the s SFWMD s and s FDEP, s brainstorms on s ideas, s discusss feasibility and s develops as go s forward s strategy. s Below s are s highlights s of s the s meeting - s

1. Greg Seidels began s the s meeting s with s introductions. s Participants s announced s who s they s represents and s what s roles they s would s presumably s plays in s this s concept. s
   a) FDOT s – s regionals ponds approach s has costs savings s benefits s and is s in s alignment s with s BMAP s efforts s
   b) SFWMD s – s permittings and s also s involved s in s BMAP s process s
   c) FDEP s – s BMAP s coordinators
   d) FDACS s – s land s owners of s the s potentials sites enrolled s in s the s BMP s programs

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Winter Park, FL 32789 | Fax: 407.629.2183
www.balmoralgroup.us

Mr. Seidel added that he is the drainage engineer of record for the SR 710 new alignment project from US 441 to East of the L-63N Canal. As such, he is responsible for developing the stormwater management plans for the project and has been asked to evaluate regional opportunities by the FDOT.

Brent Setchell stated the FDOT position of looking for better ways to spend stormwater management dollars that would provide more treatment than just the roadway and helps reduce costs to the FDOT while providing a better "product" to the public.

2. Timeframes – Ponds Sitings Reports – November 2013
   Right-of-Ways Acquisitions – July 2015 (tentative)

3. Mr. Seidel began the brainstorming session with an overview of the proposed road alignment and overview of the local/regional hydrology. (Please see attached exhibits from the meeting agenda)

   a) Water levels governed by operations of S-133 and S-191. Taylor Creek is pumped into Lake Okeechobee. This pump station was not designed to pump both ways.
   b) Most of the runoff in Taylor Creek is from urbanized areas. Flows from the large agricultural area to the north bypass Taylor Creek and flow around the city via the L-63 Canal. Much of the ag-based runoff is treated via an existing SFWMD Stormwater Treatment area to the north.
   c) Discussed ongoing stormwater improvements and needs in the area:
      i. Oaks Parks – reconstructed swales
      ii. SW 32nd Ave ditch
      iii. TMDL-related improvements
      iv. E-W conveyance projects
      v. Miscellaneous retrofits for direct connections to Taylor Creek
   d) One option is to reverse the typical flow water in Taylor Creek, rout it through the proposed regional facility for treatment, and discharging back to Taylor Creek (or possibly L-63N). Routing water northward into L-63N may create as problem with septic tanks in the south, which have reported to have issues whenever the water reaches 13.8'.
   e) Another suggestion was to route some of the water flowing in L-63N into the proposed regional facility for treatment and release it back to L-63N.
   f) The landowners have been contacted about the roadway project.

4. It was suggested to contact USACE about this concept, as they may have interests from as permitting perspectives and possible cost-sharing. It was agreed to this at a later date following an additional coordination meeting.

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5. WatersQualitysdatasonsTaylorsCreek,sL-63N,sandsLakesOkeechobeeswouldsbes helpfulsins determinings hows tos maximizes thes potentials benefits froms thiss concept.s

s

6. Itswassnotedsthatss TaylorsCreeksusedstoshavesassandsbottomsandsissnows covereds withs organics silts ands muck.s s Thes southerns portions ofs thes basins containsshomessonsseptics tank.s

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7. Thesmeetingsendedswithsansagreementstosrevisitsandsdiscusssmoresinsdetails whensthesdraftsPondsSitingsReportsisscompletedswhichswillsbesinsNovember.ss Atsthisstime,sthesFDOTswillsknowsmoresaboutspondssizes,slocationssandscosts.ss ThesFDOTswillscontactsthesparticipantsstosscheduleshesmeetingsatsaslaters date.s

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c.ssAttendeess(ViasEmail)s

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Attachments–sAgendasExhibitss

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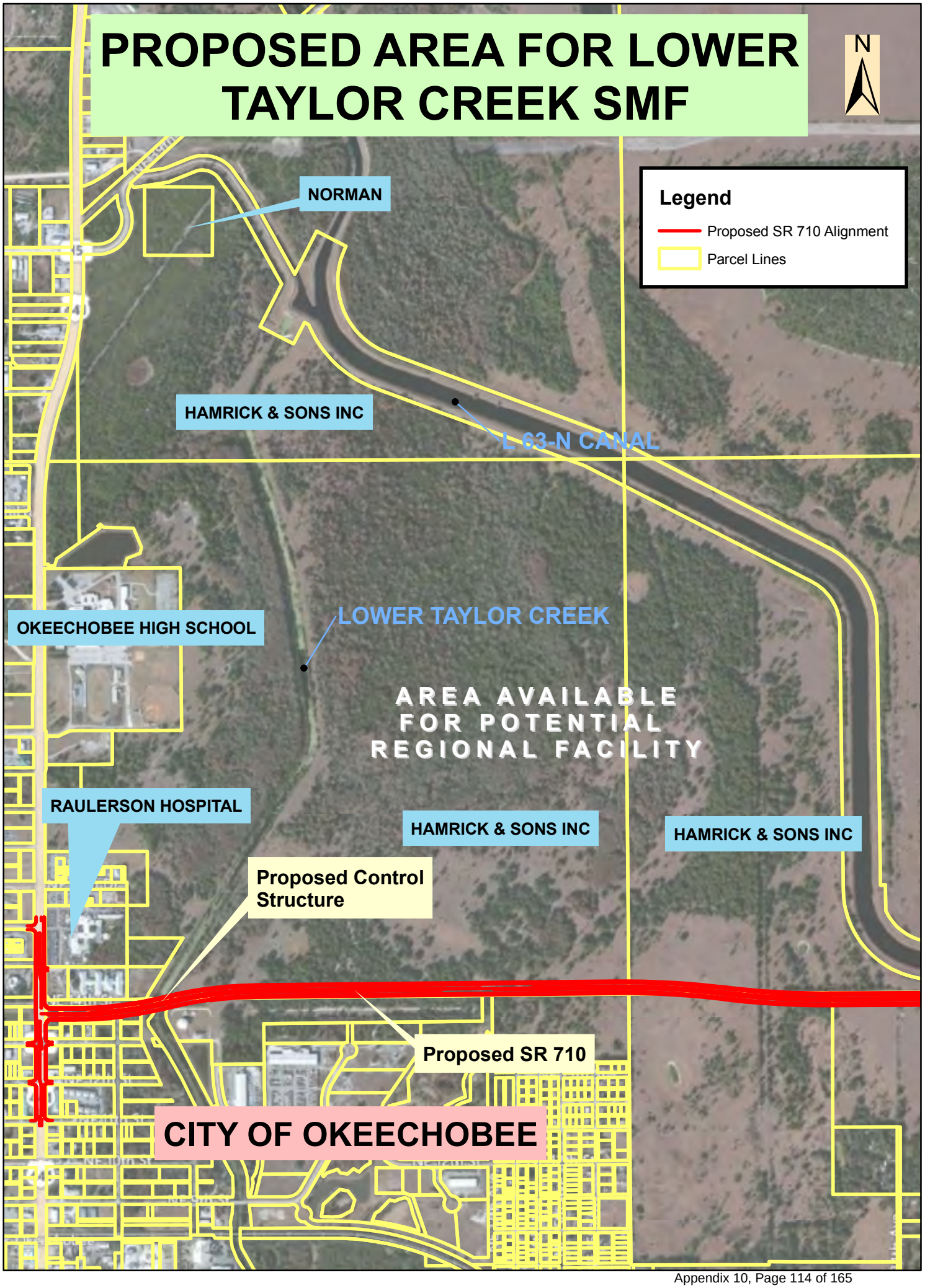
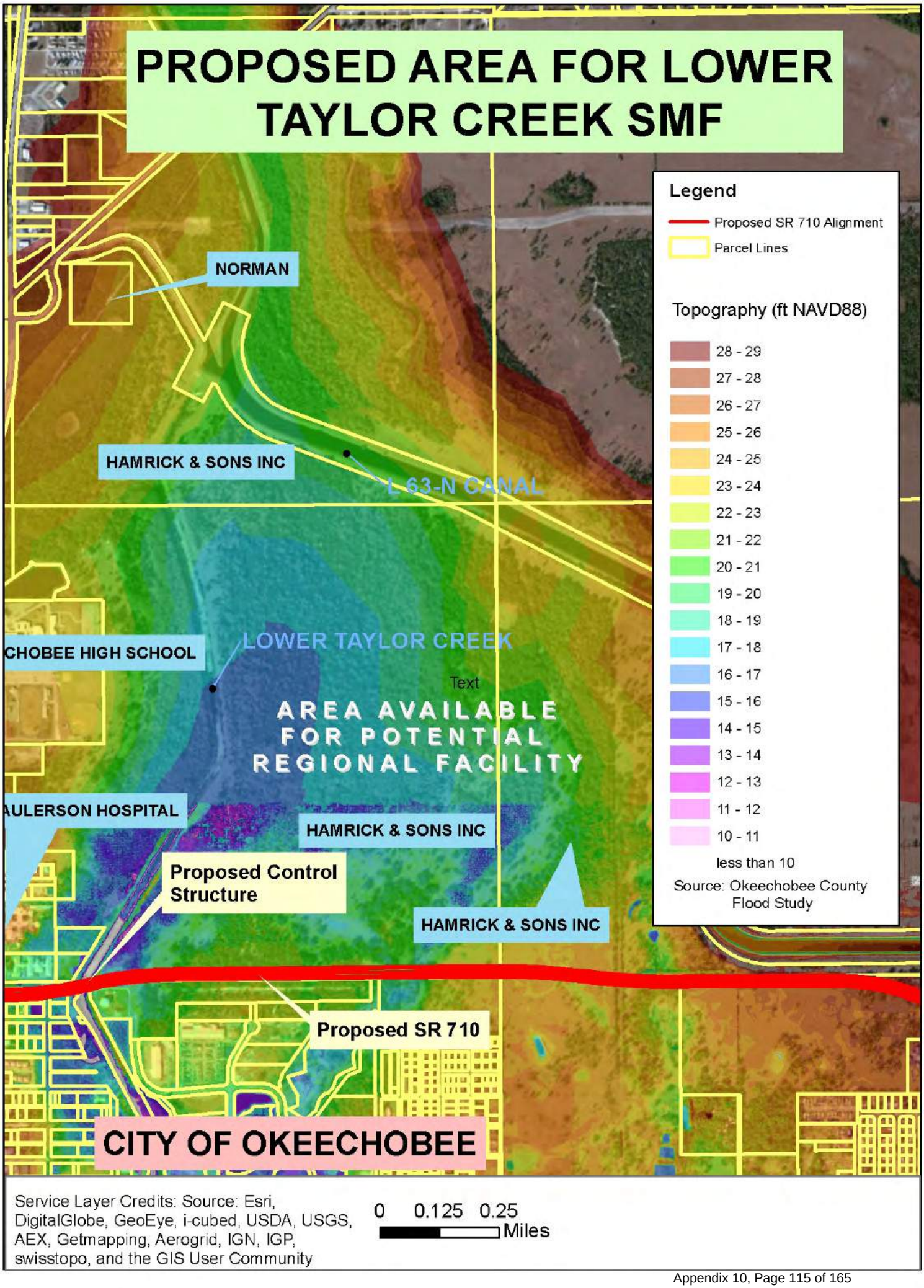

PROPOSED AREA FOR LOWER TAYLOR CREEK SMF
N
Legend
Proposed SR 710 Alignment
Parcel Lines
NORMAN
HAMRICK & SONS INC
L-63-N CANAL
OKEECHOBEE HIGH SCHOOL
LOWER TAYLOR CREEK
AREA AVAILABLE FOR POTENTIAL REGIONAL FACILITY
RAULERSON HOSPITAL
HAMRICK & SONS INC
HAMRICK & SONS INC
Proposed Control Structure
Proposed SR 710
CITY OF OKEECHOBEE


PROPOSED AREA FOR LOWER TAYLOR CREEK SMF
Legend
Proposed SR 710 Alignment
Parcel Lines
Topography (ft NAVD88)
28 - 29
27 - 28
26 - 27
25 - 26
24 - 25
23 - 24
22 - 23
21 - 22
20 - 21
19 - 20
18 - 19
17 - 18
16 - 17
15 - 16
14 - 15
13 - 14
12 - 13
11 - 12
10 - 11
less than 10
Source: Okeechobee County Flood Study
NORMAN
HAMRICK & SONS INC
L 63-N CANAL
CHOBEE HIGH SCHOOL
LOWER TAYLOR CREEK
Text
AREA AVAILABLE FOR POTENTIAL REGIONAL FACILITY
AULERSON HOSPITAL
HAMRICK & SONS INC
Proposed Control Structure
HAMRICK & SONS INC
Proposed SR 710
CITY OF OKEECHOBEE
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
0 0.125 0.25
Miles

Memo

To: Gregory Seidel, P.E.

From: Lori Stanfill, P.E.

CC:

Date: September 11, 2013

Re: SR 710 - Pump Information for Taylor Creek (Structures S-192 & S-133)

According to the System Operation Manual for Lake Okeechobee, Structure S-192 is located at the junction of L-63N Canal and Taylor Creek (North of the City of Okeechobee). This structure is a single 48" culvert with a gate and a pump. When the gate is open, it allows passage of water from L-63N to Taylor Creek (gravity flow), however, the gate is typically closed. The structure also permits back pumping from Taylor Creek to L-63N (See References).

The purpose of S-192 is to prevent stagnation in the lower reaches of Taylor Creek. The S-192 gate is normally closed, except for the following reasons: 1) Maintenance purposes, where it is needed to divert flows from L-63N Canal; 2) When the water quality in Taylor Creek is degraded (i.e. by discharge of the sewage treatment plant) and Lake Okeechobee is sufficiently low to allow gravity flow to the south into the lake (below elevation 14.0 ft, NGVD).

Similarly, the S-192 pump is only activated when the water quality in lower Taylor Creek is degraded (i.e. from discharge from the sewage treatment plant), and Lake Okeechobee is too high to allow flow into the lake (above elevation 14.0 ft, NGVD). When this occurs, structure S-193 (located at south end of Taylor Creek, at entry into Lake Okeechobee) is also open to discharge the same flow into Taylor Creek from Lake Okeechobee as is being pumped out to the north (into L-63N Canal).

S-192 is not designed to pass flood flows. Flood flows are routed to Lake Okeechobee via L-63N Canal, L-59 Canal, and structure S-191 (See Reference).

Stage and discharge Information for S-192 was obtained from the SFWMD website, and is shown below:

Location	Stage (ft NGVD)	Discharge	Date
S-192		Unavailable	11-15-2012
S-192 (US at L-63N)	19.42		3-12-2013
S-192 (DS at Taylor Creek)	13.67		3-12-2013

There is daily information for the stages and structures on Lake Okeechobee which can be accessed from the Army Corps of Engineers website (See References & Attachments). Structure S-133 is located at the southernmost end of Taylor Creek where it drains into Lake Okeechobee (at northeast bank of lake).

Structure S-133 includes 5 pumping units with a combined capacity of 625 cfs (or greater). It is designed to remove ¾ inch per day of runoff from the 16,190 acre drainage area. There are five – 48 inch steel pipes which convey pumped discharge into Lake Okeechobee. There are slidegates on the intake end (Taylor Creek side) and flapgates on the discharge end (Lake Okeechobee side).

Structure S-193 (mentioned above) is located 1200' to the east of S-133. It is a lock which can be opened to pass flows to the north or south depending on the stage in Lake Okeechobee (See Reference).

Information for the abovementioned structures can be obtained on the SFWMD website (See References). Stage and discharge Information for S-133 and S-193 was obtained from the SFWMD website, and is shown below:

Location	Stage (ft NGVD)	Discharge (cfs)	Date
S-133		282*	9-11-2013
S-133 (US at Taylor Creek)	13.67		9-11-2013
S-133 (DS at Lk. Okeechobee)	15.23		9-11-2013

Note: 2 pumps @ 1178.79 rpm discharging on 9-11-2013

According to the Army Corps of Engineers website, the pumps from Lake Okeechobee to the Caloosahatchee River were turned on in Feb. 2013, but turned off in late Aug. 2013 as the water level was sufficiently reduced and within the range the Corps likes to maintain. On September 10, 2013, the stage in Lake Okeechobee is 15.46 feet NGVD. The Corps acceptable range (Operational Management Band) for which no pumping is necessary is between 12.59 feet NGVD to 16.48 feet NGVD. The stage on the upstream side (Taylor Creek) of S-133 was 13.46 feet NGVD on Sept. 10, 2013. See attached chart for Lake Okeechobee stage information from January 2012 to September 2013 and Lake Okeechobee Vicinity Report.

References:

1. *Central and Southern Florida Project for Flood Control and Other Purposes System Operating Manual, Lake Okeechobee & EAA Vol. 3, Version 1 Draft 4*. Dept. of the Army Corps of Engineers, Jacksonville District, December 2005.
2. http://w3.saj.usace.army.mil/h2o/plots.htm. Army Corps of Engineers Website.
3. http://www.sfwmd.gov/portal/pls/portal/realtime.pkg_rr.proc_rr?p_op=OKEECHOBEE&p_wcs_name=TAYLOR_CK_1. SFWMD Website.

FIELD STATION AREAS OF RESPONSIBILITY

FACILITY & INFRASTRUCTURE LOCATIONS

OPERATIONS, MAINTENANCE & CONSTRUCTION DIVISION

Legend

SFWMD Structures

- Culvert
- Lock
- Pump
- Pump w/Lock
- Spillway w/Lock
- Spillway
- Weir

Black Text = SFWMD Structure
Red Text = COE Structure

SFWMD Facilities

- Field Station
- Headquarters
- Service Center

STAs and Reservoirs

BIG CYPRESS
(239) 597-2236
Chris Doherty, Superintendent

CLEWISTON
(863) 983-1431
Richard Champlin, Superintendent
Jorge Rivas, Asst. Superintendent

FT. LAUDERDALE
(954) 452-4814
Mike Massa, Superintendent
Maggie Urucinitz, Asst. Superintendent

HOMESTEAD
(305) 242-5933
Michael Worley, Superintendent
Robert Spears, Asst. Superintendent

MIAMI
(305) 513-3420
Jesus Carrasco, Superintendent
Andrew Wolf, Asst. Superintendent

OKEECHOBEE
(863) 462-5280
Bruce Chesser, Superintendent
Anthony Las Casas, Asst. Superintendent

ST. CLOUD
(407) 891-3550
Larry Russell, Superintendent
Ernie Feller, Asst. Superintendent

WEST PALM BEACH
(561) 791-4100
Tom Debold, Superintendent
Craig Clemons, Asst. Superintendent

PROJECT VICINITY

10 5 0 10 Miles

05/07/2013

STRUCTURE INDEX

C0CO1	E	26
C0CO2	F	26
C0CO3	F	26
CORK1	G	26
CORK2	G	26
CORK3	G	26
CR31N	E	26
CR31S	E	27
CR951_1	F	27
CR951_2	F	26
CYPRESS1	G	26
C1	L	20
C1A	M	20
C2	M	21
C3	N	21
C4A	O	22
C5	L	19
C5A	L	20
C6	N	17
C8	O	16
C9	O	17
C10	O	21
C10A	P	19
C11	P	19
C12	P	21
C12A	P	21
C13	P	20
C14	P	19
C16	P	19
C18	T	20
C37WEIR	I	9
FU1	H	29
FU2	H	28
FU3	H	27
FU4	H	27
FU5	H	26
FU6	H	26
FU7	H	25
G33	M	16
G34	N	17
G35	N	16
G36	O	17
G54	T	28
G56	U	26
G57	U	27
G58	U	30
G64	R	27
G65	U	27
G70	P	31
G72	S	30
G74	M	18
G75	M	18
G76	L	18
G78	Q	16
G79	Q	15
G80	N	16
G81	Q	14
G86N	R	28
G86S	R	28
G87	S	29
G88	N	26
G89	N	26
G90	I	15
G91	I	15
G92	T	19
G93	S	32
G94A	T	24
G94B	T	24
G94C	T	23
G94D	S	23
G96	M	22
G103	I	9
G106	O	16
G111	K	9
G113	K	9
G114	S	33
G119	R	31
G123	R	27
G134	L	22
G135	L	22
G136	M	22
G150	M	23
G151	M	23
G160	T	20
G161	U	20
G204	O	26
G205	O	26
G206	P	25
G207	L	18
G208	M	18
G211	Q	32
G212	N	22
G248A-D	R	22 STA1W
G249A-H	R	22 STA1W
G250S	R	22 STA1W
G251	R	23 STA1W
G252H-J	R	22 STA1W
G253A-J	R	22 STA1W
G254A-A1	R	22 STA1W
G254B-B1	R	22 STA1W
G254C-C1	R	22 STA1W
G254D-D1	R	22 STA1W
G254E	R	22 STA1W
G255	R	22 STA1W
G258	R	22 STA1W
G259	R	23 STA1W
G270	Q	20
G300	S	22 STA1W
G301	R	22 STA1W
G302	R	22 STA1W
G303	R	22 STA1W
G304A-J	R	22 STA1W
G305A-V	R	22 STA1W
G306A-J	R	22 STA1W
G307	R	23 STA1W
G308	R	23 STA1W
G309	R	23 STA1W
G310	R	23 STA1W
G311	S	22 STA1E
G327A-C	R	22 STA1W
G328	R	24 STA2
G329A-D	Q	25 STA2
G330A-E	Q	25 STA2
G331A-G	Q	25 STA2
G332	Q	25 STA2
G333A-E	Q	25 STA2
G334	Q	25 STA2
G335	Q	25 STA2
G336A-F	R	24 STA2
G336G	Q	25 STA2
G337	Q	25 STA2
G337A	Q	25 STA2
G338	R	24 STA2
G339	R	24 STA2
G341	R	22
G342A-D	M	24 STA5
G342E-F	M	25 STA5
G343A-H	M	24 STA5
G343I-J	N	25 STA5
G344A-D	N	24 STA5
G344E-F	N	25 STA5
G345	N	24 STA5
G348	N	24 STA5
G349A	M	24 STA5
G349B	M	24 STA5
G349C	M	24 STA5
G350B	N	24 STA5
G351	N	25 STA6
G352A-C	N	25 STA6
G353A-C	N	25 STA6
G354A-C	N	25 STA6
G357	O	25
G360B	M	24 STA5
G367A-F	Q	25 STA2
G368	Q	25 STA2
G370	Q	25 STA3/4
G370S	P	25 STA3/4
G371	Q	25 STA3/4
G372	N	24 STA3/4
G372S	N	24 STA3/4
G372HL	N	24 STA3/4
G373	N	24 STA3/4
G374A-F	P	25 STA3/4
G375A-D	Q	25 STA3/4
G375E-F	P	25 STA3/4
G376A-F	Q	25 STA3/4
G377A-E	P	25 STA3/4
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G379A-F	P	25 STA3/4
G380A-F	P	25 STA3/4
G381A-F	P	25 STA3/4
G382A-B	P	25 STA3/4
G383	P	25 STA3/4
G384A-F	P	25 STA3/4
G385	Q	25 STA3/4
G386	P	25 STA3/4
G387	P	25 STA3/4
G388	P	25 STA3/4
G389A-B	P	25 STA3/4
G390A-B	P	25 STA3/4
G393A-C	N	25 STA6
G396A-C	N	25 STA6
G402A	O	25
G402B	O	25
G402C	N	25
G402D	N	24
G404	O	26
G406	M	24 STA5
G407	N	25 STA6
G409	N	26
G410	N	24 STA5
G420	R	31
G420S	R	31
G421	R	31
G422	R	31
G423	R	31
G450	R	16
G507	N	24 STA5
G508	M	24 STA5
G509	N	25 STA5
G601	N	25 STA6
G602	N	25 STA6
G603	N	25 STA6
G700	K	10
G707	S	22
G709	L	18
G711	M	24
GG1	E	27
GG2	F	27
GG3	F	27
GG4	G	26
GG5	G	26
GG6	G	26
GG7	G	26
HC1	F	28
HEN_CR2	F	28
I75_1	F	27
I75_2	F	27
I75_3	F	26
L28WEIR	N	27
L65C	P	17
LUCKY_LA	H	27
MERRITT1	H	28
MILLER1	G	28
MILLER2	G	27
MILLER3	G	26
S2	O	22
S3	N	22
S4	M	21
S5A	S	22
S5AE	S	22
S5AS	S	22
S5AW	S	22
S6	R	24
S7	Q	25
S8	O	26
S9	R	28
S9A	R	28
S9XN	R	28
S9XS	R	28
S10A	S	25
S10C	S	25
S10D	R	25
S11A	R	27
S11B	R	27
S11C	R	27
S12A	N	31
S12B	O	31
S12C	O	31
S12D	P	31
S13	T	28
S13AW	S	28
S14	N	31
S18C	Q	36
S20	S	36
S20A	S	35
S20F	S	34
S20G	S	34
S21	S	34
S21A	S	34
S22	S	32
S25	T	31
S25A	T	31
S25B	T	31
S25BP	T	31
S26	T	31
S26P	T	31
S27	T	30
S28	T	30
S29	U	30
S30	R	29
S31	R	30
S32	R	30
S32A	R	30
S33	T	28
S34	R	27
S36	T	27
S37A	U	27
S37B	T	27
S38	S	27
S38A	S	27
S38B	S	26
S38C	S	27
S39	S	25
S39A	S	25
S40	U	25
S41	U	23
S44	U	20
S46	U	19
S47B	K	20
S47D	K	21
S48	S	16
S49	S	16
S50	S	14
S57	K	5
S58	K	5
S59	J	5
S59WEIR	J	5
S60	K	6
S61	I	7
S62	K	4
S63	J	7
S63A	J	7
S65	K	10
S65A	K	12
S65AX	K	12
S65C	L	14
S65CX	L	14
S65D	L	15
S65DX1	L	15
S65DX2	L	15
S65E	M	16
S65EW	M	16
S67	K	15
S67X	K	15
S68	J	15
S70	K	17
S71	L	18
S71W	L	18
S72	M	18
S72W	M	18
S75	K	17
S76	Q	19
S77	L	20
S78	J	21
S79	F	21
S80	S	17
S82	K	16
S83	K	16
S83X	K	16
S84	M	16
S84X	M	16
S97	S	16
S99	R	14
S118	S	33
S119	S	33
S120	S	32
S121	S	32
S122	S	33
S123	S	33
S124	S	28
S125	S	27
S127	N	17
S129	M	18
S131	L	19
S133	O	16
S135	P	18

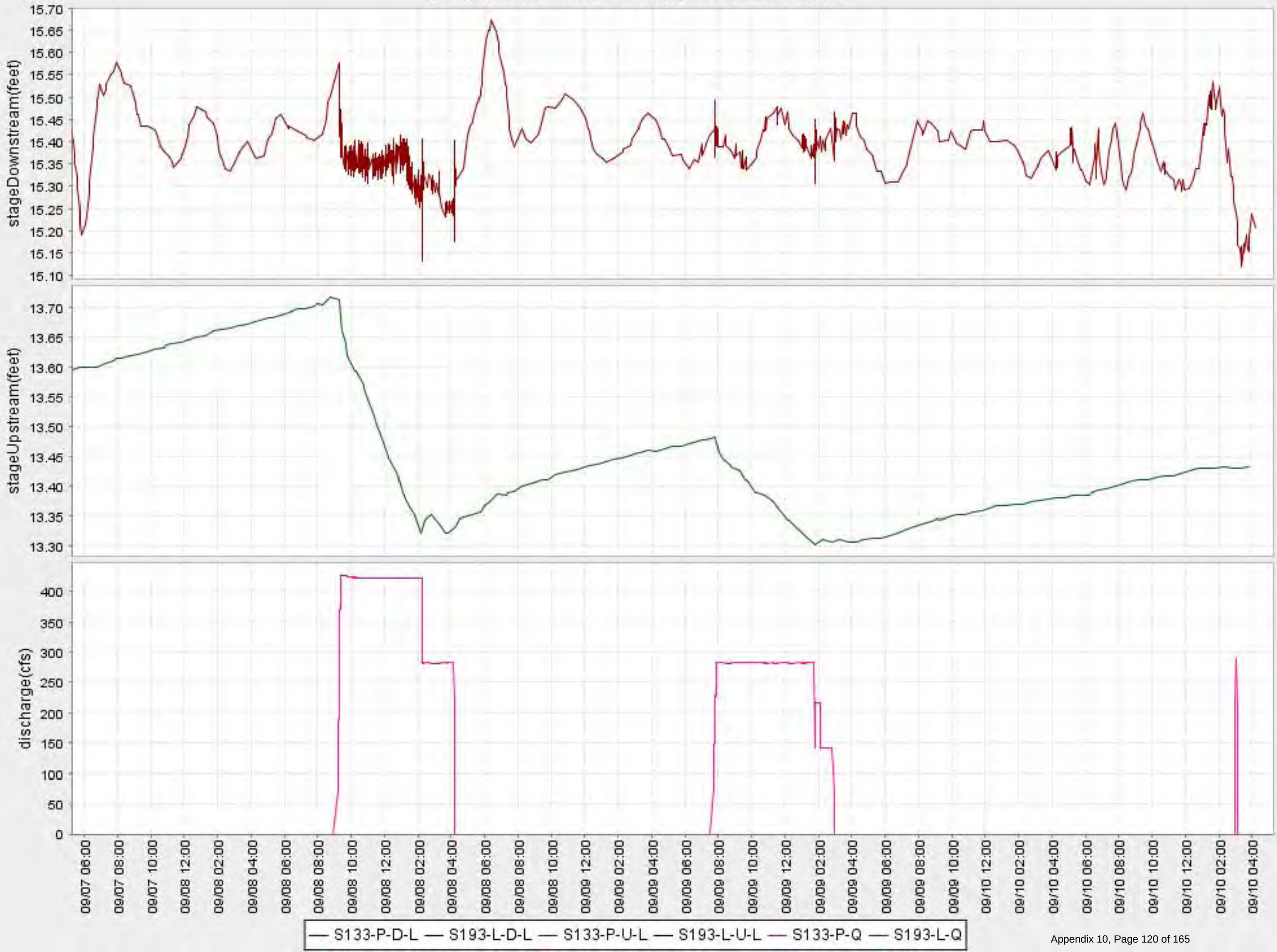
STRUCTURE INDEX (Cont'd.)

S140	N	27
S141	R	27
S142	R	27
S143	R	27
S144	R	27
S145	S	27
S146	S	27
S148	R	33
S149	S	33
S150	Q	25
S151	Q	29
S153	P	19
S154	M	16
S154C	M	16
S155	U	22
S155A	T	22
S165	R	34
S166	R	34
S167	R	34
S169	M	21
S173	Q	33
S174	Q	34
S175	Q	35
S176	Q	34
S177	Q	35
S178	Q	35
S179	R	34
S190	M	26
S191	O	17
S192	N	16
S193	O	16
S194	R	33
S195	R	34
S196	Q	34
S197	R	36
S199	Q	35
S200	Q	35
S235	L	20
S236	N	21
S308	P	19
S310	M	21
S319	S	22 STA1E
S331	Q	33
S332	Q	35
S332B	Q	34
S332C	Q	34
S332D	Q	34
S332DX1	Q	34
S333	P	31
S334	Q	31
S335	R	31
S336	Q	31
S337	R	30
S338	R	32
S339	P	27
S340	P	28
S342E	K	20
S342S	K	20
S342W	K	20
S343A	N	31
S343B	N	31
S344	N	30
S346	P	31
S347	P	32
S351	O	22
S352	P	20
S354	N	22
S355A	Q	31
S355B	Q	31
S356	Q	31
S357	Q	33
S361	S	22 STA1E
S362	S	22 STA1E
S363A-C	S	22 STA1E
S364A-C	S	22 STA1E
S365A-B	S	22 STA1E
S366A-E	S	22 STA1E
S367A-E	S	22 STA1E
S368A-E	S	22 STA1E
S369A-D	S	22 STA1E
S370A-C	S	22 STA1E
S371A-C	S	22 STA1E
S372A-E	S	22 STA1E
S373A-B	S	22 STA1E
S374A-C	S	22 STA1E
S375	S	22 STA1E
S376	S	22 STA1E
S377	S	22 STA1E
S380	R	31
S381	R	28
S382	R	14
S383	R	15
S384	R	14
S385	O	16 NUBSL
S386A-C	O	16 NUBSL
S387A-C	O	16 NUBSL
S390	N	15
S391	N	15
S392	N	15
SR29_1	I	30
SR29_2	I	30
SR29_3	I	29
SR29_4	I	29
SR29_5	I	29
SR29_6	I	28
SR29_6A	I	28
SR29_6B	I	28
SR29_7	I	28
SR29_8	I	28
TWINEAG	G	26
WIERTCWC	N	16

CANAL / LEVEE INDEX

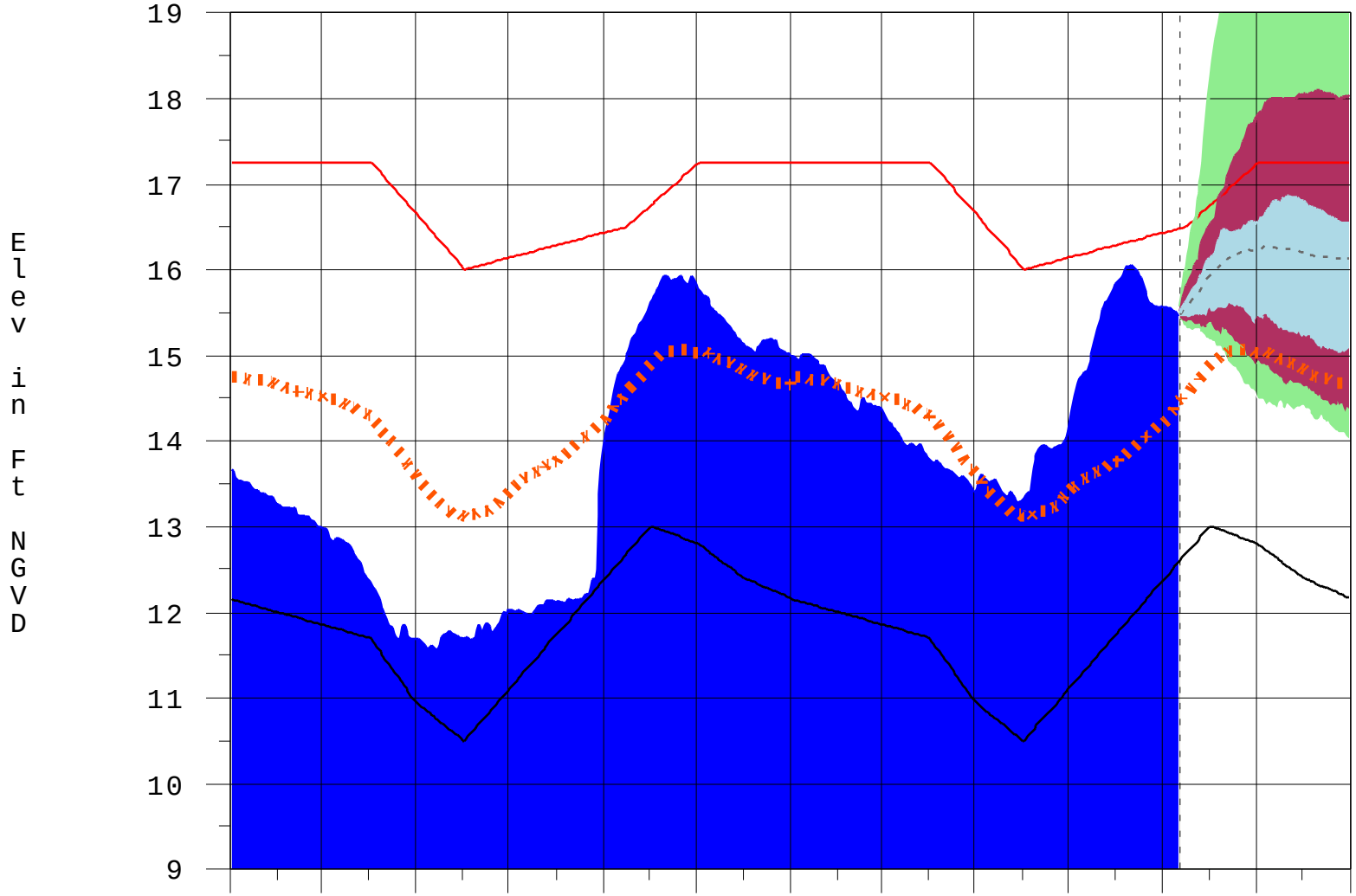
AIRPORT ROAD CANAL	E27
ARBUCKLE CREEK	I12
ARCH CREEK	U30
BARRON RIVER	I30
BOGGY CREEK	J4
C-1	S34
C-1 CONNECTOR CANAL	G27
C-10	U29
C-100	S33
C-100A	S33
C-100B	S33
C-100C	S32
C-102	R33
C-102N	R34
C-103	R34
C-103N	R34
C-103S	R34
C-11	S28
C11 EXT	Q28
C-110	Q36
C-111	Q35
C-111E	Q36
C-113	Q34
C-11S	S28
C-12	T28
C-12	T28
C-12	T28
C-123	P27
C-13	T27
C-14	T27
C-15	U25
C-16	U23
C-17	U21
C-18	T20
C-19	K20
C-1N	S33
C-1W	R33
C-2	S32
C-20	M21
C-21	M21
C-23	Q16
C-23A	S16
C-24	Q14
C-25	Q14
C-25 EXT	Q14
C-29	K4
C-29A	K4
C-29B	K5
C-3	S32
C-30	K5
C-304	R29
C-31	J6
C-32B	K5
C-32C	K5
C-32D	K5
C-32F	K5
C-32G	K6
C-33	J6
C-34	J7
C-35	I7
C-357	Q33
C-36	J8
C-37	I8
C-38	K12
C-39A	K16
C-4	S31
C-40	L17
C-41	K17
C-41A	K16
C-42	S27
C-43	I21
C-44	R18
C-5	T31
C-51	U22
C-59	O17
C-6	S31
C-60	O27
C-7	T30
C-7 EXT	S30
C-8	T30
C-8 EXT	S30
C-9	T29
C-9 EXT	R29
CATFISH CREEK	H9
COCOHATCHEE RIVER	E26
CORKSCREW CANAL	G26
CR-951 CANAL	F27
CURRY CANAL	G26
CYPRESS CANAL	G26
DANIA CUT-OFF CANAL	U28
DEAD RIVER	I8
DEERFENCE CANAL	M24
ENR COLLETION 2 CANAL	R22
ENR COLLETION 3 CANAL	R23
ENR COLLETION 4 CANAL	R23
ENR COLLETION 5 CANAL	R23
ENR COLLETION CANAL	R22
ENR DISCHARGE 2 CANAL	R23
ENR DISTRIBUTION CANAL	R22
ENR SUPPLY CANAL	R22
FAKA UNION CANAL	M28
G-16	U27
GOLDEN GATE MAIN CANAL	F27
GORDON RIVER	E27
GREEN CANAL	F27
HALDEMAN CREEK	E28
HENDERSON CREEK CANAL	F28
HENRY CREEK	O17
HILLSBORO CANAL	T25
HOLEYLAND DISTRIBUTION	O24
HOLEYLAND SEEPAGE CANAL	O24
I-75 CANAL	K27
ISTOKPOGA CANAL	K14
JACKSON CANAL	K9
KISSIMMEE RIVER	K13
L-1	M22
L-10	Q21
L-12	R21
L-13	Q22
L-14	P22
L-15	Q23
L-16	P23
L-18	P24
L-19	P23
L-1E	N22
L-2	M23
L-20	O22
L-21	O23
L-23	N25
L-24	N23
L-25	N22
L-26	N23
L-28	N27
L-28 INTERCEPTER CANAL	N27
L-29	P31
L-2W	M23
L-3	M25
L-30	Q30
L306	K20
L-31E	S35
L-31N	Q33
L-31W	Q35
L-33	R29
L-35	R28
L-35A	S27
L-35B	R27
L-36	S26
L-37	R28
L-38E	Q26
L-38W	Q26
L-39	R25
L-4	N25
L-40	T23
L-41	L20
L-42	K20
L-47	P18
L-48	M18
L-49	L18
L-5	P25
L-50	K19
L-59	M17
L-6	Q25
L-60	L18
L-61	L18
L-62	N16
L-63N	O16
L-63S	O17
L-64	P17
L-65	P18
L-67 EXT	P32
L-67A	P30
L-67C	P30
L-68A	R28
L-7	R23
L-8	R20
LAKE MARION CREEK	H7
LD-1	M21
LD-3	K19
LD-4	N17
LELY CANAL	E28
LETTUCE CREEK	O17
MERRITT CANAL	H28
MILITARY CANAL	S34
MILLER CANAL	G28
MOSQUITO CREEK	O16
NORTH FEEDER CANAL	M26
NORTH FORK NEW RIVER	U28
NORTH NAPLE DRAINAGE	E26
NORTH NEW RIVER CANAL	S28
NUBBIN SLOUGH	O16
ORANGE TREE CANAL	G26
POPASH SLOUGH	N16
PRAIRIE CANAL	H28
REEDY CREEK	H6
ROSALIE CREEK	I9
SHINGLE CREEK	I4
SOUTH FORK NEW RIVER	U28
SOUTH NEW RIVER CANAL	T28
SR 29 CANAL	I28
TAMIAMI CANAL	L30
TAYLOR CREEK	N15
TIGER CREEK	I9
TURNER RIVER	J31
WEOHYAKAPKA CREEK	I10
WEST FEEDER CANAL	L26
ZIPPRER CANAL	I9

Combined Realtime Chart of S133_S193 for last 3 Day(s)



Lake Okeechobee

11SEP13 10:00:36



High Lake Management
Okeechobee Avg Elev
Average Elev [1965-2007]
Water Shortage Management
Avg Outlook Line (No S77/S308 Releases)
Full Outlook Band (No S77/S308 Releases)
80% Outlook Band (No S77/S308 R
50% Outlook Band (No S77/S308 R
(No Releases at S77 and S308)
(Outlook POR 1965-2007)

U. S. Army Corps of Engineers, Jacksonville District
Lake Okeechobee and Vicinity Report
** Preliminary Data - Subject to Revision **

Data Ending 2400 hours 10 SEP 2013

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)	
*Okeechobee Lake Elevation	15.46	14.81	10.86	(Official Elv)

Bottom of High Lake Mngmt= 16.48 Top of Water Short Mngmt= 12.59
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 13.41
Difference from Average LORS2008 2.05

10SEP (1965-2007) Period of Record Average 14.47
Difference from POR Average 0.99

Today Lake Okeechobee elevation is determined from the 4 Int & 4 Edge stations

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 9.40'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 7.60'
Bridge Clearance = 49.24'

---

4 Interior and 4 Edge Okeechobee Lake Average (Avg-Daily values):

L001	L005	L006	LZ40	S4	S352	S308	S133
15.24	15.47	15.49	15.56	15.61	15.59	15.32	15.37

*Combination Okeechobee Avg-Daily Lake Average = 15.46 (*See Note)

Okeechobee Inflows (cfs):

S65E	3077	S191	162	Fisheating Cr	600
S154	152	S133 Pumps	0	S135 Pumps	0
S84	4	S127 Pumps	0	S2 Pumps	0
S71	156	S129 Pumps	0	S3 Pumps	0
S72	166	S131 Pumps	0	S4 Pumps	0

Total Inflows: 4317

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	0	S77	4001 (Used)
S127 Culverts	0	S351	0	S77Below	4449 (NOT USED)
S129 Culverts	0	S352	250	S308	1300 (Used)
S131 Culverts		L8 Canal Pt	352	S308Below	1212 (NOT USED)
C5	0				

Total Outflows: 5903

****S77 Structure outflow is being used to compute Total Outflow.
****S308 Structure outflow is being used to compute Total Outflow.

Okeechobee Pan Evaporation (inches):

S77	0.41	S308	0.39

Average Pan Evap x 0.75 Pan Coefficient = 0.30" = 0.02'

Lake Average Precipitation using NEXRAD: = 0.03" = 0.00'

Evaporation - Precipitation: = 0.27" = 0.02'
Evaporation - Precipitation using Lake Area of 730 square miles
is equal to 5300 cfs out of the lake.
Lake Okeechobee (Change in Storage) Flow is -6504 cfs or -12900 AC-FT

Note: Headwater, tailwater, and stage values below are instantaneous values unless otherwise specified.

	Headwater Elevation (ft-msl)	Tailwater Elevation (ft-msl)	Disch (cfs)	Gate Positions #1 (ft)	#2 (ft)	#3 (ft)	#4 (ft)	#5 (ft)	#6 (ft)	#7 (ft)	#8 (ft)	
			(I) see note at bottom									
North East Shore												
S133 Pumps:	13.46	15.52	0	0	0	0	0	0				(cfs)
S193:												
S191:	19.23	15.50	162	0.0	0.0	0.5						
S135 Pumps:	13.46	15.35	0	0	0	0	0					(cfs)
S135 Culverts:			0	0.0	0.0							
North West Shore												
S65E:	21.13	15.71	3077	2.0	1.5	1.5	1.5	1.0	1.0			
S127 Pumps:	13.46	15.40	0	0	0	0	0	0				(cfs)
S127 Culvert:			0	0.0								
S129 Pumps:	12.97	15.56	0	0	0	0						(cfs)
S129 Culvert:			0	0.1								
S131 Pumps:	12.93	15.68	0	0	0							(cfs)
S131 Culvert:												
Fisheating Creek												
nr Palmdale		32.33	600									
nr Lakeport		16.02										
C5:	16.71	15.46	0	0.0	0.0	0.0						
South Shore												
S4 Pumps:	10.88	15.58	0	0	0	0						(cfs)
S169:	14.41	10.90	0	0.0	0.0	0.0						
S310:	15.55		2									
S3 Pumps:	10.59	15.60	0	0	0	0						(cfs)
S354:	15.60	10.59	0	0.0	0.0							
S2 Pumps:	9.87	15.52	0	0	0	0	0					(cfs)
S351:	15.52	9.87	0	0.0	0.0	0.0						
S352:	15.49	11.48	250	0.8	0.8							
C10A:	-NR-	-NR-		10.0	10.0	8.0	10.0	10.0				
L8 Canal PT		15.35	352									

S351 and S352 Temporary Pumps/S354 Spillway

S351:	9.87	15.52	0	-NR--NR--NR--NR--NR--NR-
S352:	11.48	15.49	250	-NR--NR--NR--NR-
S354:	10.59	15.60	0	-NR--NR--NR--NR-

```
Caloosahatchee River (S77, S78, S79)
  S47B:        13.04     12.03            0.0  0.5
  S47D:        12.03     10.71    -NR-    0.0
  S77:
    Spillway and Sector Flow:
               15.26     10.86    4000   -NR-  3.7  3.7  3.7
    Flow Due to Lockages+:            1

  S77 Below USGS Flow Gage        4449

  S78:
    Spillway and Sector Flow:
               10.32      3.16    5255    4.0  4.0  4.5  4.0
    Flow Due to Lockages+:            4

  S79:
    Spillway and Sector Flow:
                2.92      1.40    7862    3.0  3.0  3.0  4.0  4.0  3.0  3.0  3.0
    Flow Due to Lockages+:            2
    Percent of flow from S77         51%
    Chloride            (ppm)     48


St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
               15.30     14.26    1298    0.0  3.0  3.5  0.0
    Flow Due to Lockages+:            2

  S308 Below USGS Flow Gage       1212
  S153:        18.95     14.14      84    0.5  0.0
  S80:
    Spillway and Sector Flow:
               14.08      0.85    1808    0.0  1.0  1.0  0.0  1.0  1.0  0.0
    Flow Due to Lockages+:           13
    Percent of flow from S308        72%

  Steele Point Top Salinity    (mg/ml) ****
  Steele Point Bottom Salinity (mg/ml) ****

  Speedy Point Top Salinity    (mg/ml) 7089
  Speedy Point Bottom Salinity (mg/ml) 7723

 + Flow Due to lockages is computed utilizing average daily headwater and
   tailwater along with total number of lockages for the day to calculate
   a volume which is then converted to an average discharge in cfs.
```

Daily Precipitation Totals	1-Day (inches)	3-Day (inches)	7-Day (inches)	Wind Direction (Degø)	Wind Speed (mph)
S133 Pump Station:	-NR-	0.13	1.38		
S193:	-NR-	0.00	0.00	-NR-	-NR-
Okeechobee Field Station:	-NR-	0.00	0.00		
S135 Pump Station:	-NR-	0.98	2.15		
S127 Pump Station:	-NR-	0.00	0.08		
S129 Pump Station:	-NR-	0.70	1.62		
S131 Pump Station:	-NR-	0.00	0.07		
S77:	0.00	0.00	0.33	114	2
S78:	0.00	0.00	1.57	25	1
S79:	0.15	0.16	1.40	36	2

S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.17	1.30		
S3 Pump Station:	-NR-	0.01	0.87		
S2 Pump Station:	-NR-	0.02	0.35		
S308:	0.18	0.18	0.24	270	0
S80:	0.57	0.77	0.78	90	0
Okeechobee Average (Sites S78, S79 and S80 not included)	0.09	0.17	0.65		
Oke Nexrad Basin Avg	0.03	0.06	0.67		

Okeechobee Lake Elevations				Difference from 10SEP13
10SEP13	-1 Day =	09 SEP 2013	15.49	0.03
10SEP13	-2 Days =	08 SEP 2013	15.51	0.05
10SEP13	-3 Days =	07 SEP 2013	15.52	0.06
10SEP13	-4 Days =	06 SEP 2013	15.51	0.05
10SEP13	-5 Days =	05 SEP 2013	15.53	0.07
10SEP13	-6 Days =	04 SEP 2013	15.54	0.08
10SEP13	-7 Days =	03 SEP 2013	15.55	0.09
10SEP13	-30 Days =	11 AUG 2013	16.03	0.57
10SEP13	-1 Year =	10 SEP 2012	14.81	-0.65
10SEP13	-2 Year =	10 SEP 2011	10.86	-4.60

Long Term Mean 30day Avearge ET for Lake Alfred (Inches) = 4.21

Lake Okeechobee Net Inflow (LONIN)						
		Average Flow over the previous 14 days				Avg-Daily Flow
10SEP13	Today =	10 SEP 2013	4652	WED		-604
10SEP13	-1 Day =	09 SEP 2013	5146	TUE		1328
10SEP13	-2 Days =	08 SEP 2013	5509	MON		3524
10SEP13	-3 Days =	07 SEP 2013	5282	SUN		8285
10SEP13	-4 Days =	06 SEP 2013	5105	SAT		2180
10SEP13	-5 Days =	05 SEP 2013	5485	FRI		4287
10SEP13	-6 Days =	04 SEP 2013	5528	THU		4081
10SEP13	-7 Days =	03 SEP 2013	5221	WED		6085
10SEP13	-8 Days =	02 SEP 2013	5055	TUE		3705
10SEP13	-9 Days =	01 SEP 2013	4672	MON		8314
10SEP13	-10 Days =	31 AUG 2013	4174	SUN		4563
10SEP13	-11 Days =	30 AUG 2013	3916	SAT		4619
10SEP13	-12 Days =	29 AUG 2013	3934	FRI		10499
10SEP13	-13 Days =	28 AUG 2013	3342	THU		4261

S65E						
		Average Flow over previous 14 days				Avg-Daily Flow
10SEP13	Today=	10 SEP 2013	3223	WED		3077
10SEP13	-1 Day =	09 SEP 2013	3200	TUE		3217
10SEP13	-2 Days =	08 SEP 2013	3149	MON		3216
10SEP13	-3 Days =	07 SEP 2013	3114	SUN		3378
10SEP13	-4 Days =	06 SEP 2013	3057	SAT		3009
10SEP13	-5 Days =	05 SEP 2013	3072	FRI		2776
10SEP13	-6 Days =	04 SEP 2013	3097	THU		3200
10SEP13	-7 Days =	03 SEP 2013	3081	WED		3234
10SEP13	-8 Days =	02 SEP 2013	3064	TUE		3130
10SEP13	-9 Days =	01 SEP 2013	3062	MON		3393
10SEP13	-10 Days =	31 AUG 2013	3041	SUN		3218
10SEP13	-11 Days =	30 AUG 2013	3105	SAT		3283

10SEP13 -12 Days =	29 AUG 2013	3197	FRI	3501
10SEP13 -13 Days =	28 AUG 2013	3278	THU	3496

Lake Okeechobee Outlets Last 14 Days

DATE	S-77 Discharge (0700-2100) (AC-FT)	S-77 Discharge (ALL DAY) (AC-FT)	Below S-77 Discharge (ALL-DAY) (AC-FT)	S-78 Discharge (0700-2100) (AC-FT)	S-78 Discharge (ALL DAY) (AC-FT)	S-79 Discharge (ALL DAY) (AC-FT)
10 SEP 2013	4738	7934	8822	6192	10429	15595
09 SEP 2013	4626	7771	8697	6240	10466	17759
08 SEP 2013	4554	7673	8528	5960	9945	17447
07 SEP 2013	4692	7895	8778	5889	9977	14918
06 SEP 2013	4782	8158	9020	6229	10457	16324
05 SEP 2013	5029	8434	9256	6521	10981	16496
04 SEP 2013	4866	8168	9168	6620	11170	17692
03 SEP 2013	4713	7952	8694	6532	10854	18873
02 SEP 2013	4878	8225	8778	6024	10130	19373
01 SEP 2013	4020	8386	8845	4812	10098	15902
31 AUG 2013	3853	8386	8850	4618	10162	16993
30 AUG 2013	3820	8326	8759	4686	10251	18255
29 AUG 2013	3827	8366	8851	4610	10025	18838
28 AUG 2013	3880	8438	8769	4459	9759	19453

DATE	S-310 Discharge (ALL DAY) (AC-FT)	S-351 Discharge (ALL DAY) (AC-FT)	S-352 Discharge (ALL DAY) (AC-FT)	S-354 Discharge (ALL DAY) (AC-FT)	L8 Canal Pt Discharge (ALL DAY) (AC-FT)
10 SEP 2013	3	0	496	0	698
09 SEP 2013	8	0	333	0	718
08 SEP 2013	-0	0	621	0	724
07 SEP 2013	10	0	682	0	779
06 SEP 2013	2	0	1130	0	808
05 SEP 2013	12	0	851	0	796
04 SEP 2013	18	0	944	0	784
03 SEP 2013	2	0	758	0	804
02 SEP 2013	-5	0	258	0	743
01 SEP 2013	2	0	389	0	782
31 AUG 2013	60	0	1251	0	797
30 AUG 2013	29	0	1384	0	808
29 AUG 2013	-2	0	325	0	718
28 AUG 2013	93	0	1222	0	753

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
10 SEP 2013	2578	2404	3611
09 SEP 2013	2419	2236	3596
08 SEP 2013	2276	2163	3640
07 SEP 2013	2781	2741	3600
06 SEP 2013	2831	2814	3573
05 SEP 2013	2722	2751	3596
04 SEP 2013	2507	2431	3624
03 SEP 2013	2560	2320	3620
02 SEP 2013	2432	2114	3640
01 SEP 2013	2636	2491	3628
31 AUG 2013	2920	2712	3604
30 AUG 2013	2951	2672	3600
29 AUG 2013	2820	2650	3580

28 AUG 2013   2344   2517   3620

*** NOTE: 1) Discharge from (0700-2100) is computed using Spillway and Sector Gate Discharges from 0700 hrs to 2100 hrs.
2) Discharge (ALL DAY) is computed using Spillway, Sector Gate and Lockages Discharges from 0015 hrs to 2400 hrs.

(I) - Flows preceeded by "I" signify an instantaneous flow computed from the single value reported for the day

---

* On 11 May 1999, Lake Okeechobee Elevation was switched from Instantaneous 2400 value to an average-daily lake average.
On 14 Mar 2001, due to the isolation of various gages within the standard 10 stations, the average of the interior 4 station gages was used as the Lake Okeechobee Elevation.
On 05 November 2010, Lake Okeechobee Elevation was switched to a 9 gage mix of interior and edge gages to obtain a more reliable representation of the lake level.
On 09 May 2011, Lake Okeechobee Elevation was switched to a 8 gage mix of interior and edge gages to obtain a more reliable representation of the lake level due to isolation of S135 from low lake levels.
Today Lake Okechobee elevation is determined from the 4 Int & 4 Edge stations
++ For more information see the Jacksonville District Navigation website at http://www.saj.usace.army.mil/
$ For information regarding Lake Okeechobee Service Area water restrictions please refer to www.sfwmd.gov

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Report Generated 11SEP2013 @ 09:46 ** Preliminary Data - Subject to Revision **

MEETING MINUTES

SR 710 Possible Regional Pond Brainstorming Meeting 2
SR 710 from US 441 to the L-63N Canal
FPID No. 419344-3-52-01

April 4, 2014, 2:00 pm; GoToMeeting

Attendees:

Names		E-mails	Offices Phones Numbers
FDOT			
Ricks Rennas	States Drainages Engineers	rick.renna@dot.state.fl.us	850-414-5351
Brents Setchells	Districts Environmentals Permittings Engineers	brent.setchell@dot.state.fl.us	863-519-2557
Nicoles Moniess	Districts Environmentals Permittings Specialists	nicole.monies@dot.state.fl.us	863-519-2359
Amys Setchells	Seniors Projects Managers	amy.setchell@dot.state.fl.us	863-519-2609
SFWMD			
Lesleys Bertolottis	Principals Scientists (Northerns Everglades Programs Managers)	lbertolo@sfwmd.gov	(561) 682-6415
Kevins Carters	Leads Scientists (TMDLs Coordinator)	kecarter@sfwmd.gov	(561) 682-6949
Orlandos Diazs	Seniors Environmentals Scientists (Waters Qualitys Treatments Technologies)	odiaz@sfwmd.gov	(561) 682-6534
Erics Gonzalezs	Projects Managers Principals (Northerns Everglades)	ergonzal@sfwmd.gov	(561) 682-6391
Jesses Markles	Okeechobees Regulatorys Services Centers Administrators	jmarkle@sfwmd.gov	(863) 462-5260 x3005
Damons Meierss	Principals Engineers (Disperseds Waters Management)	dmeiers@sfwmd.gov	(561) 682-6876
Garys Ritters	Intergovernmentals Representative: Okeechobee, Glades, and Highlands Counties	gritter@sfwmd.gov	(863) 462-5260 x3017
Steves Sentess	Regulatorys Professionals Leads (Wests Coasts and Locals Projects)	ssentes@sfwmd.gov	(239) 338-2929 x7754
Tonys Waterhouses	Assistants Directors Regulations Divisions	twaterho@sfwmd.gov	(561) 682-6867

Name		Email	Phone
FDEP			
Kim Dinkins	Environmental Consultant	Kimberleigh.Dinkins@dep.state.fl.us	850-245-8825
Katie Hallas	Environmental Consultant	Katie.Hallas@dep.state.fl.us	850-245-8432
Beth Alvi	Program Administrator	Elizabeth.Alvi@dep.state.fl.us	850-245-8559
Trina Veilhauer	Deputy Director	Trina.Vielhauer@dep.state.fl.us	850-245-8338
Wantman Group			
Henri Belrose	Project Manager	henri.belrose@wantmangroup.com	813-574-3190
Eric Lanning	Project Engineer	Eric.Lanning@WantmanGroup.com	407-581-1221
Kasey Carrere	Environmental Scientist	Kasey.Carrere@WantmanGroup.com	407-581-1221
Balmoral Group			
Greg Seidel	Project Drainage Engineer	gseidel@balmoralgroup.us	407-629-2185
Jennifer Nunn	Asst. Project Drainage Engineer	JNunn@Balmoralgroup.us	407-629-2185
Lori Stanfill	Asst. Project Drainage Engineer	LStanfill@balmoralgroup.us	407-629-2185
ATM			
Janet Hearn	Senior Engineer	JHearn@AppliedTM.com	386-256-1018

Purpose: The purpose of the meeting is for the FDOT to present the results of draft Pond Siting Report and continue discussion. Below are highlights of the meeting -

1. Greg Seidel began the meeting with introduction of the lead contacts for each agency and a brief description of the roles.

2. Brent Setchell reiterated from the previous meeting the FDOT's interest in providing as much nutrient loading reduction as possible based on the FDOT budget for "typical postage stamp ponds" on a project. He added that the FDOT is very interested in partnering in regional treatment. Rick Renna affirmed the FDOT position.

3. Mr. Setchell summarized the current SR 710 status - the pond costs for the project are estimated at [redacted]. The FDOT has not completed its review and this number is subject to change. The SR 710 project has ROW funding beginning in FY 2016 (July 2015). The goal for completing a partnering agreement for regional treatment would be April 2015 prior to finalizing our ROW maps. The project is not currently funded for construction, but the earliest construction could be funded would be FY 2019 (July 2018). Mr. Seidel provided a brief review of the SR 710 project utilizing the meeting exhibits (See

Attachments) and google maps. The project will be a four-lane curb and gutter typical section. The roadway begins at US 441 at the Airport Ditch and runs east along a new alignment across Taylor Creek then turns south tying into the existing SR 710 before crossing the L-63N Canal and ending at Mosquito Creek. The project length is approximately 3.85 miles.

4. Mr. Seidel gave a review of the Taylor Creek and L-63N Canal Bridge Hydraulics Reports (BHR) at SR 710 noting that the reports were completed in NAVD datum. The Taylor Creek BHR indicated that the Lower Taylor Creek basin is comprised of a 3.26 square mile Airport Ditch Basin and a 2.20 square mile Lower Taylor Creek Basin for a total drainage basin of 5.46 square miles. From the BHR for the L-63N Canal, the drainage basin upstream of the SR 710 crossing is 111.89 square miles.

5. Mr. Seidel provided the control elevations within Taylor Creek as 12.83 NAVD and within the L-63 as 17.83 NAVD.

6. Mr. Seidel gave a review of the pond siting report for the project and focused on the different elements reviewed such as drainage patterns, wetlands, cultural resources, utilities, geotechnical data and contamination screenings and estimated costs. For each of the areas, Mr. Seidel highlighted the evaluations for Pond Site 2C which would be within the location of the regional facility. He noted the study area did not include the entire regional pond area shown in the first meeting.

7. Mr. Renna made a comment that the 2C site would likely contain wetlands which could be used for wetland enhancement and nutrient uptake.

8. Mr. Seidel commented that the regional pond would reduce pollutants at a much higher concentration than the smaller SR 710 ponds. Specifically, the PSR estimated a reduction of 12 kg/yr for the post stamp ponds vs an estimated 2-3 MT/yr for a regional facility depending on the size.

9. Mr. Seidel went over the preliminary stormwater management concept for SR 710 utilizing the regional pond. This concept includes 3 drainage basins: the first basin will discharge to the regional pond; the second basin will discharge for pre-treatment to an existing (SR 70) pond without meeting pre/post requirements prior to discharging to L-63N Canal; and the third basin will discharge directly to the L-63N Canal. Mr. Renna commented that the existing permitting rules allow for compensatory treatment, and that approval of discharge

into the L-63N Canal would not be difficult. There was no objection from either SFWMD or FDEP participants.

10. Several local projects were noted including the Nubbin Slough STA, the Upper Taylor Creek STA, Treasure Island and Oak Park.

11. Gary Ritter commented that there is water demand from the L-63N Canal. If S-192 is utilized, project needs to be cognizant of water supply needs.

12. Concerns were expressed with the proximity of the Okeechobee airport to the proposed regional treatment facility and need to be at least 10,000 feet away to reduce the risk of bird strikes.

13. Mr. Renna indicated that he was meeting with Tom Frick from FDEP on Thursday to discuss this project among others.

14. Trina Veilhauer indicated the FDEP is quite interested and asked how we best move forward from this point. Brent Setchell offered that FDOT could fund The Balmoral Group through their District 1 Districtwide Drainage contract to perform a feasibility study for the regional treatment. It was agreed that the feasibility study would analyze two options – a project option funded and constructed entirely by the FDOT to meet permit requirements and a Stormwater Treatment Area (STA) option that investigated partnering and a much larger facility. Mr. Seidel indicated that a scope of services would be prepared to investigate the two options, which would include meetings and coordination with stakeholders. A draft report will be submitted to FDOT, SFWMD and FDEP for review prior to finalizing the report.

15. Brent Setchell noted that FDOT staff is not "experts" in the design of STAs and would look for either SFWMD or FDEP to take the lead in the design and construction of a larger STA.

16. Brent Setchell noted that FDOT would like to utilize suitable excavated material from the regional pond for use as fill on its SR 710 project.

17. It was noted that the project is not within the Central Florida Water Initiative (CFWI) boundaries.

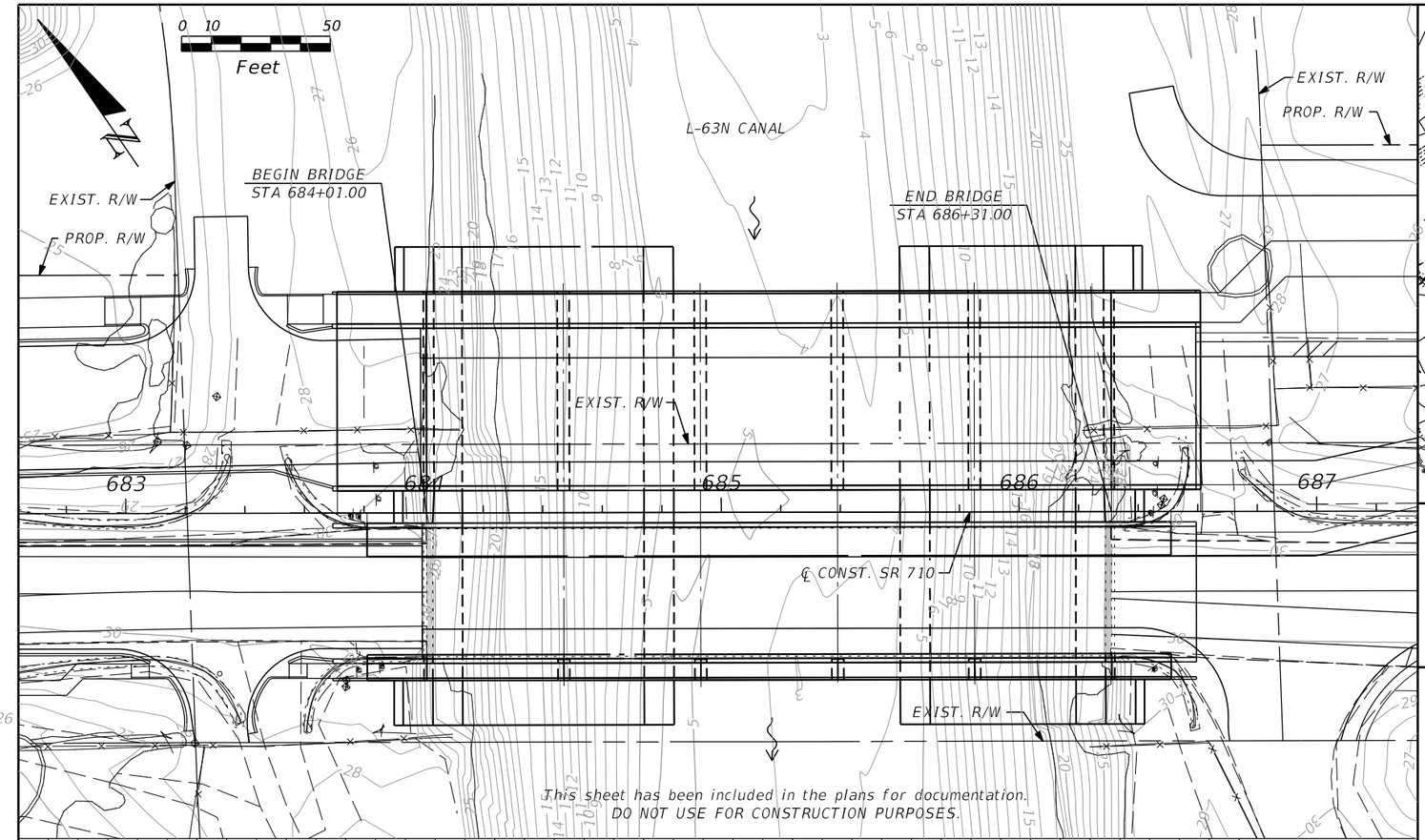
Action Items

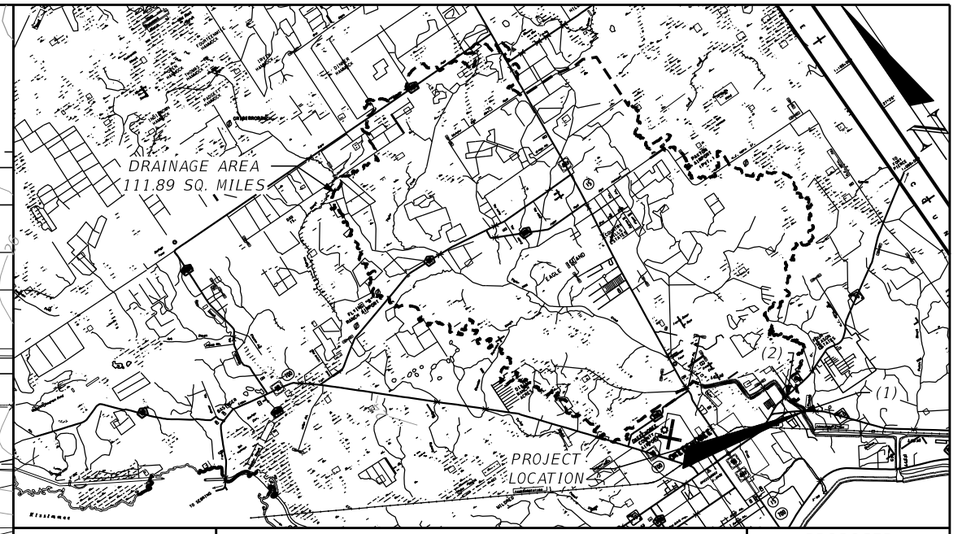
1. FDOT shall negotiate a Task Work Order with the Balmoral Group to prepare the feasibility study for the regional treatment options. The draft report is expected to be sent to FDEP & SFWMD for review by August 15, 2014.

2. FDEP and SFWMD to explore funding participation options and be prepared to make a funding commitment no later December 31, 2014 so that we may move forward with preparing an agreement.

c. Attendees (Via Email)

Attachment – Agenda Exhibitss





(REFERENCE)	EXISTING STRUCTURES (1)	(2)	(3)	(4)	PROPOSED STRUCTURE
FOUNDATION	CONCRETE PILES	24" SQ. CONCRETE PILES			CONCRETE PILES
OVERALL LENGTH	230'	231'			230'
SPAN LENGTH	5 @ 46'	3 @ 77.0'			5 @ 46'
TYPE CONSTRUCTION	CONCRETE	CONCRETE COMPOSITE			CONCRETE
AREA OF OPENING @ D.F.		3120 SF			
BRIDGE WIDTH	46.25'	44.292' & 56.292'			130.6'
ELEV. LOW MEMBER	26.33 FT NAVD	27.62 FT NAVD			26.33 FT NAVD

HYDRAULIC DESIGN DATA

NOTE:
The hydraulic data is shown for informational purposes only to indicate the flood discharges and water surface elevations which may be anticipated in any given year. This data was generated using highly variable factors determined by a study of the watershed. Many judgements and assumptions are required to establish these factors. The resultant hydraulic data is sensitive to changes, particularly antecedent conditions, urbanization, channelization and land use. Users of this data are cautioned against the assumption of precision which cannot be obtained.

TERMS:
Design Flood: Utilized to assure a desired level of hydraulic performance.
Base Flood: Has a 1% chance of being exceeded in any given year (100 year frequency)
Overtopping Flood: Causes flow over the highway, over a watershed divide, or thru emergency relief structures.
Greatest Flood: The most severe that can be predicted where overtopping is not practicable.

WATER SURFACE ELEVATIONS: N.H.W. (Non-Tidal) 17.83 FT NAVD M.H.W. (Tidal) _____
CONTROL (Non-Tidal) 17.83 FT NAVD M.L.W. (Tidal) _____

FLOOD DATA:	MAX. EVENT OF RECORD	DESIGN FLOOD	BASE FLOOD	☐ OVERTOPPING or ☒ GREATEST FLOOD
STAGE ELEV. NAVD (ft)		20.24	21.04	23.26
DISCHARGE (cfs)		6797	8202	12063
AVERAGE VELOCITY (f/s)		2.94	3.34	4.18
EXCEEDANCE PROB. (%)		2	1	0.2
FREQUENCY (yr.)		50	100	500

SCOUR PREDICTIONS FOR PROPOSED STRUCTURE DESCRIBED ABOVE:

PIER INFORMATION NUMBERS	SIZE AND TYPE	LONG TERM SCOUR ELEV. PROPOSED	TOTAL SCOUR ELEVATION WORST CASE < 100 yr. FREQ. (yr.) 100 YR	WORST CASE < 500 yr. FREQ. (yr.) 500 YR
			5.01	5.54

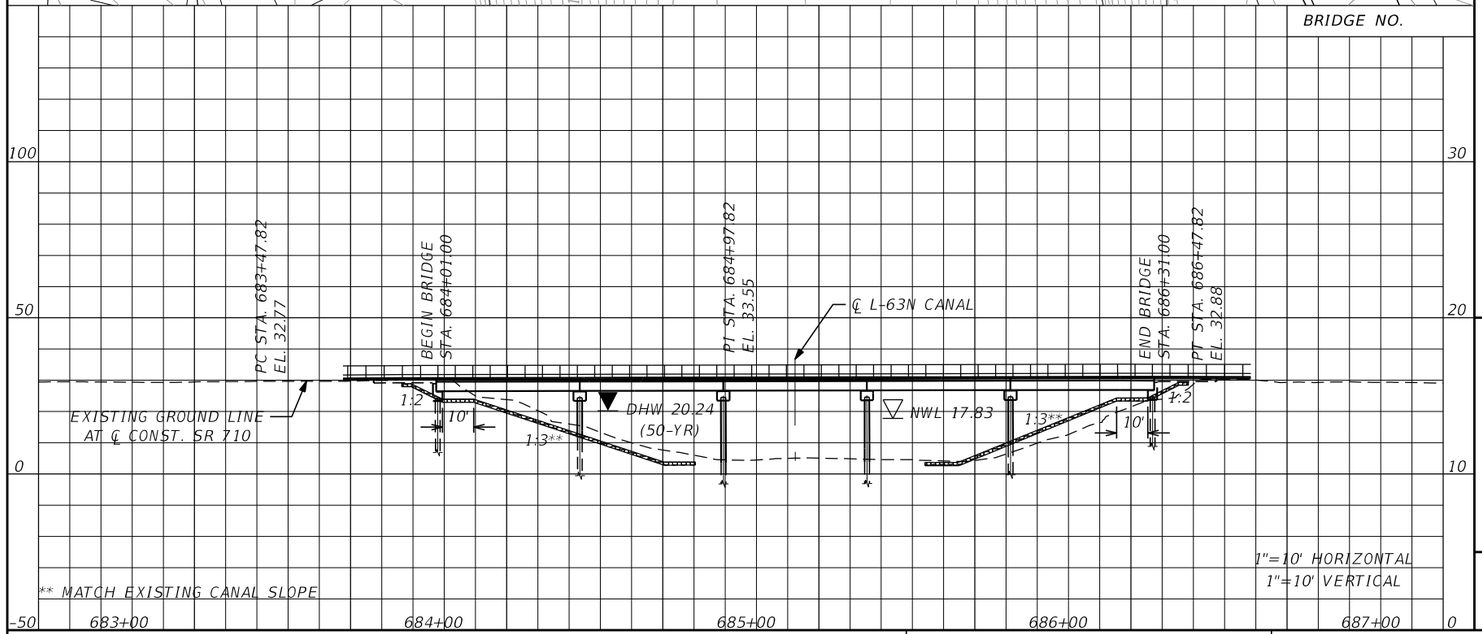
HYDRAULIC RECOMMENDATIONS

1. BEGIN BRIDGE STATION 684+01.00 END BRIDGE STATION 686+31.00 SKEW ANGLE 0
2. CLEARANCE PROVIDED: NAV: HORIZ. N/A VERT. N/A ABOVE EL. N/A DRIFT: HORIZ. 43 VERT. 8.5 ABOVE EL. 17.83 (NHW)
3. MINIMUM CLEARANCE: NAV: HORIZ. N/A VERT. N/A ABOVE EL. N/A DRIFT: HORIZ. 43 VERT. 6.09 ABOVE EL. 20.24 (DHW)
4. ABUTMENTS:

	BEGIN BRIDGE	END BRIDGE
RUBBLE GRADE:	STANDARD RUBBLE	STANDARD RUBBLE
SLOPE:	3:1	3:1
BURIED OR NON-BURIED HORIZ. TOE:	BURIED	BURIED
TOE HORIZ. DISTANCE:	10.00' TO EL. 4.00	10.00' TO EL. 4.00
LIMIT OF PROTECTION:	R/W TO R/W	R/W TO R/W

5. DECK DRAINAGE: _____

REMARKS: PRELIMINARY DESIGN ONLY – FURTHER ANALYSIS REQUIRED



REVISIONS DATE	DESCRIPTION	DATE	DESCRIPTION

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123
E.O.R.: Gregory S. Seidel, P.E. No. 47571

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 710	OKEECHOBEE	419344-3-32-01

BRIDGE HYDRAULIC RECOMMENDATIONS

SHEET NO. BHRS

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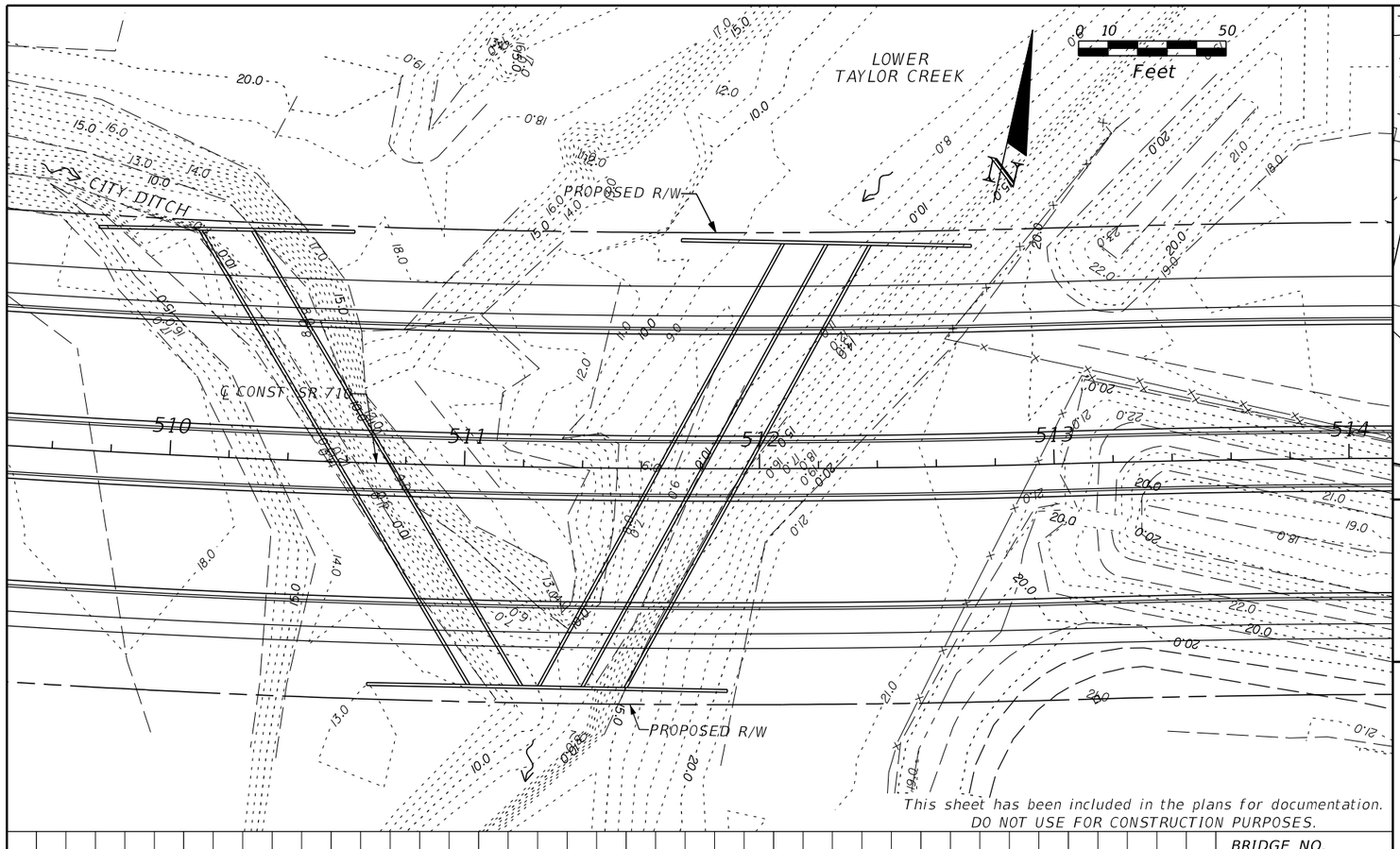

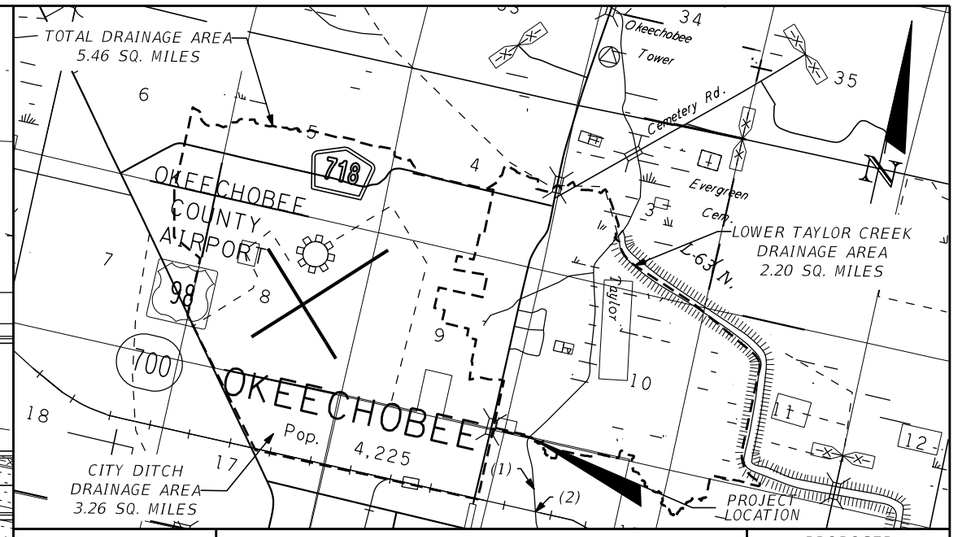

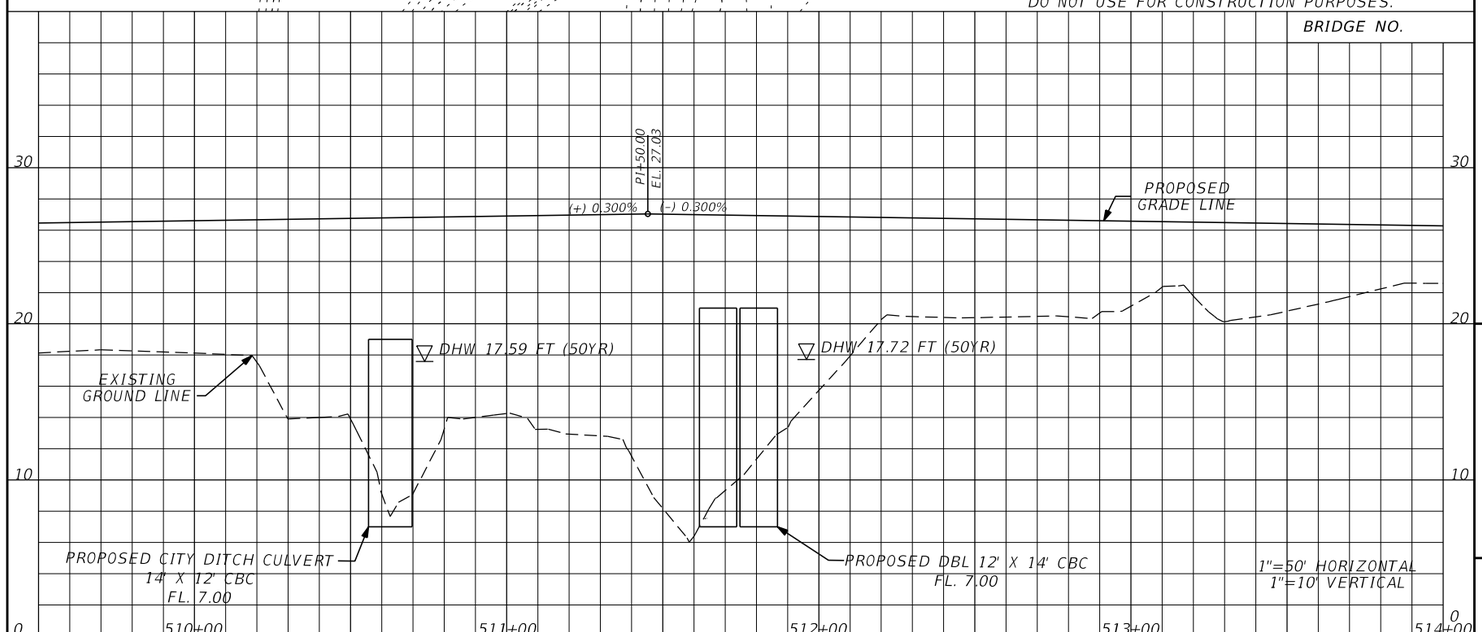

(REFERENCE)	EXISTING STRUCTURES (1)	(2)	(3)	(4)	PROPOSED STRUCTURE
FOUNDATION	CONCRETE PILES	CONCRETE PILES			N/A
OVERALL LENGTH	150'	180'			DBL 12'W X 14'H CBC
SPAN LENGTH	5 @ 30'	18 @ 10'			N/A
TYPE CONSTRUCTION					CONCRETE
AREA OF OPENING @ D.F.					N/A
BRIDGE WIDTH	40'	60'			N/A
ELEV. LOW MEMBER	18.83 FT NAVD	23.00 FT NAVD			N/A

HYDRAULIC DESIGN DATA

NOTE:
The hydraulic data is shown for informational purposes only to indicate the flood discharges and water surface elevations which may be anticipated in any given year. This data was generated using highly variable factors determined by a study of the watershed. Many judgements and assumptions are required to establish these factors. The resultant hydraulic data is sensitive to changes, particularly antecedent conditions, urbanization, channelization and land use. Users of this data are cautioned against the assumption of precision which cannot be obtained.

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Overtopping Flood: Causes flow over the highway, over a watershed divide, or thru emergency relief structures.
Greatest Flood: The most severe that can be predicted where overtopping is not practicable.

WATER SURFACE ELEVATIONS: N.H.W. (Non-Tidal) 12.83 FT NAVD M.H.W. (Tidal) _____
CONTROL (Non-Tidal) 12.83 FT NAVD M.L.W. (Tidal) _____

FLOOD DATA:	MAX. EVENT OF RECORD	DESIGN FLOOD	BASE FLOOD	☐ OVERTOPPING or ☒ GREATEST FLOOD
STAGE ELEV. NAVD (ft)		17.72	18.22	19.05
DISCHARGE (cfs)		346	417	599
AVERAGE VELOCITY (f/s)		0.32	0.35	0.45
EXCEEDANCE PROB. (%)		2	1	0.2
FREQUENCY (yr.)		50	100	500

SCOUR PREDICTIONS FOR PROPOSED STRUCTURE DESCRIBED ABOVE:

TOTAL SCOUR ELEVATION _____

PIER INFORMATION NUMBERS	SIZE AND TYPE	LONG TERM SCOUR ELEV.	WORST CASE < 100 yr. FREQ. (yr.)	WORST CASE < 500 yr. FREQ. (yr.)

HYDRAULIC RECOMMENDATIONS

1. BEGIN BRIDGE STATION _____ END BRIDGE STATION _____ SKEW ANGLE _____
2. CLEARANCE PROVIDED: NAV: HORIZ. ____ VERT. ____ ABOVE EL. ____ DRIFT: HORIZ. ____ VERT. ____ ABOVE EL. ____
3. MINIMUM CLEARANCE: NAV: HORIZ. ____ VERT. ____ ABOVE EL. ____ DRIFT: HORIZ. ____ VERT. ____ ABOVE EL. ____
4. ABUTMENTS:

	BEGIN BRIDGE	END BRIDGE
RUBBLE GRADE:		
SLOPE:		
BURIED OR NON-BURIED HORIZ. TOE:		
TOE HORIZ. DISTANCE:		
LIMIT OF PROTECTION:		

5. DECK DRAINAGE: _____

REMARKS: CITY DITCH CULVERT INFORMATION IS SHOWN FOR REFERENCE ONLY.

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123
E.O.R.: Gregory S. Seidel, P.E. No. 47571

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 710	OKEECHOBEE	419344-3-32-01

BRIDGE HYDRAULIC RECOMMENDATIONS

SHEET NO. BHRS

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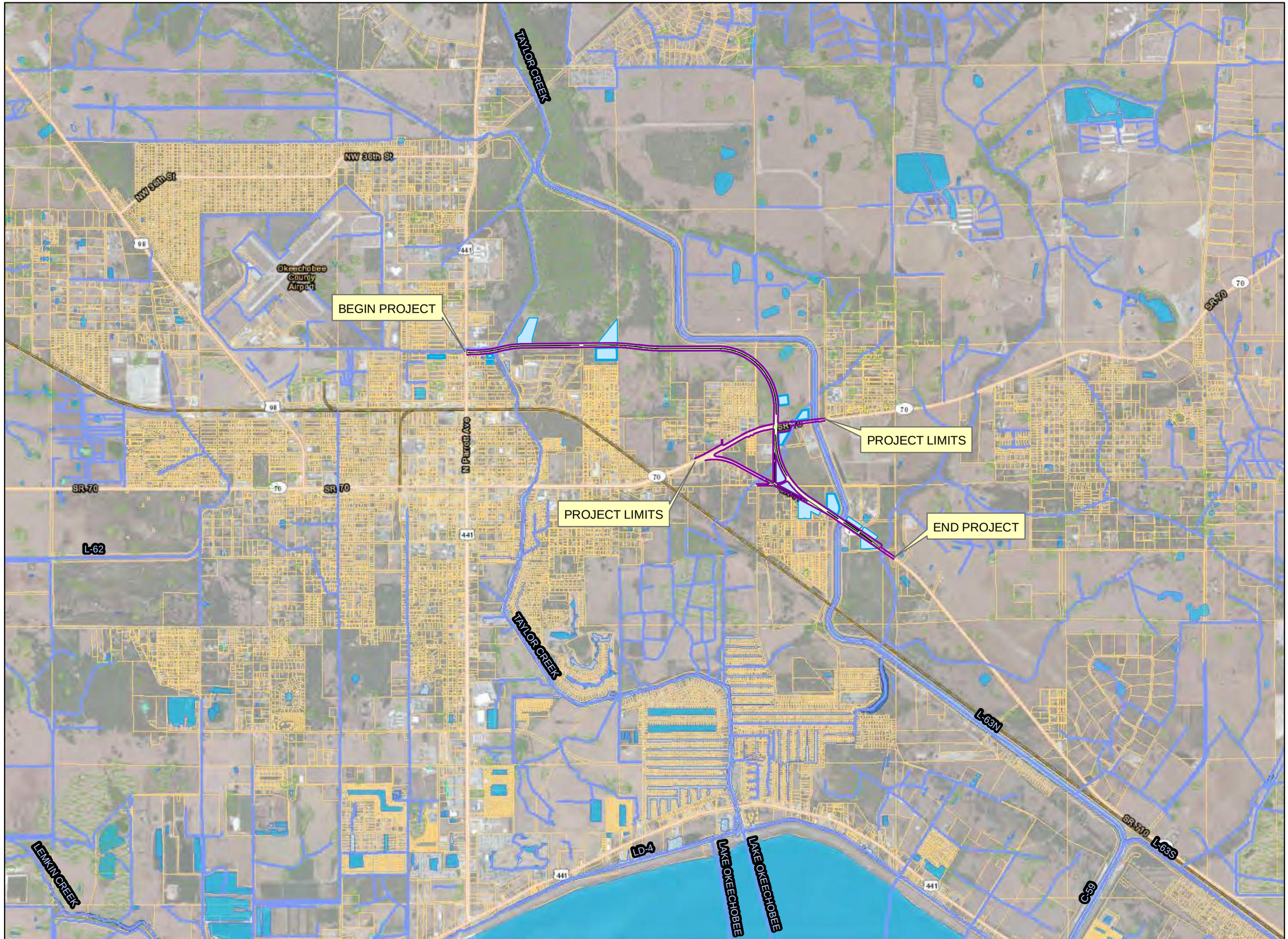


Project Location

Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Proposed ROW

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoover Dike Area, existing permits, and recent survey files.

N W E S

0 200,000 Feet

0 50 Miles

Location Map
Figure 1

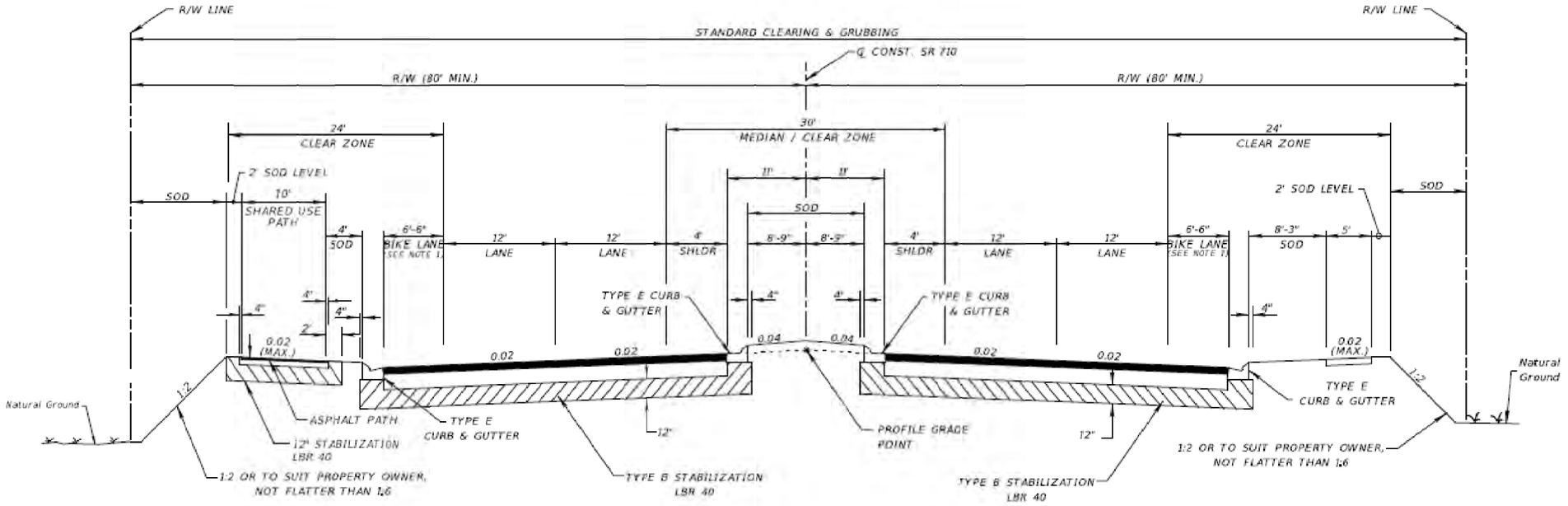
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG1_Location_SR710.mxd	October, 2013	The Balmoral Group



TYPICAL SECTION NO. 1
SR 710
STA. 500+00.00 TO STA. 703+50.00

TYPICAL SECTION NOTES:

1. PROVIDES FOR 8' USABLE SHOULDER.

NEW CONSTRUCTION

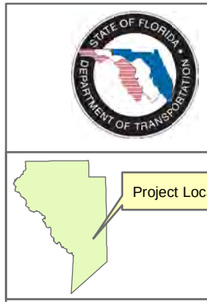
OPTIONAL BASE GROUP 11 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (4")
AND FRICTION COURSE FC-5 (¾") (RUBBER)

PATH

OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC A) (1")

TRAFFIC DATA

CURRENT YEAR = 2013 AADT = 7,100
ESTIMATED OPENING YEAR = 2015 AADT = 11,400
ESTIMATED DESIGN YEAR = 2035 AADT = 14,190
K = 9.0% D = 56.2% T = 20.9% (24 HOUR)
DESIGN HOUR T = 10.5%
DESIGN SPEED = 50 MPH



Typical Section
Figure 2

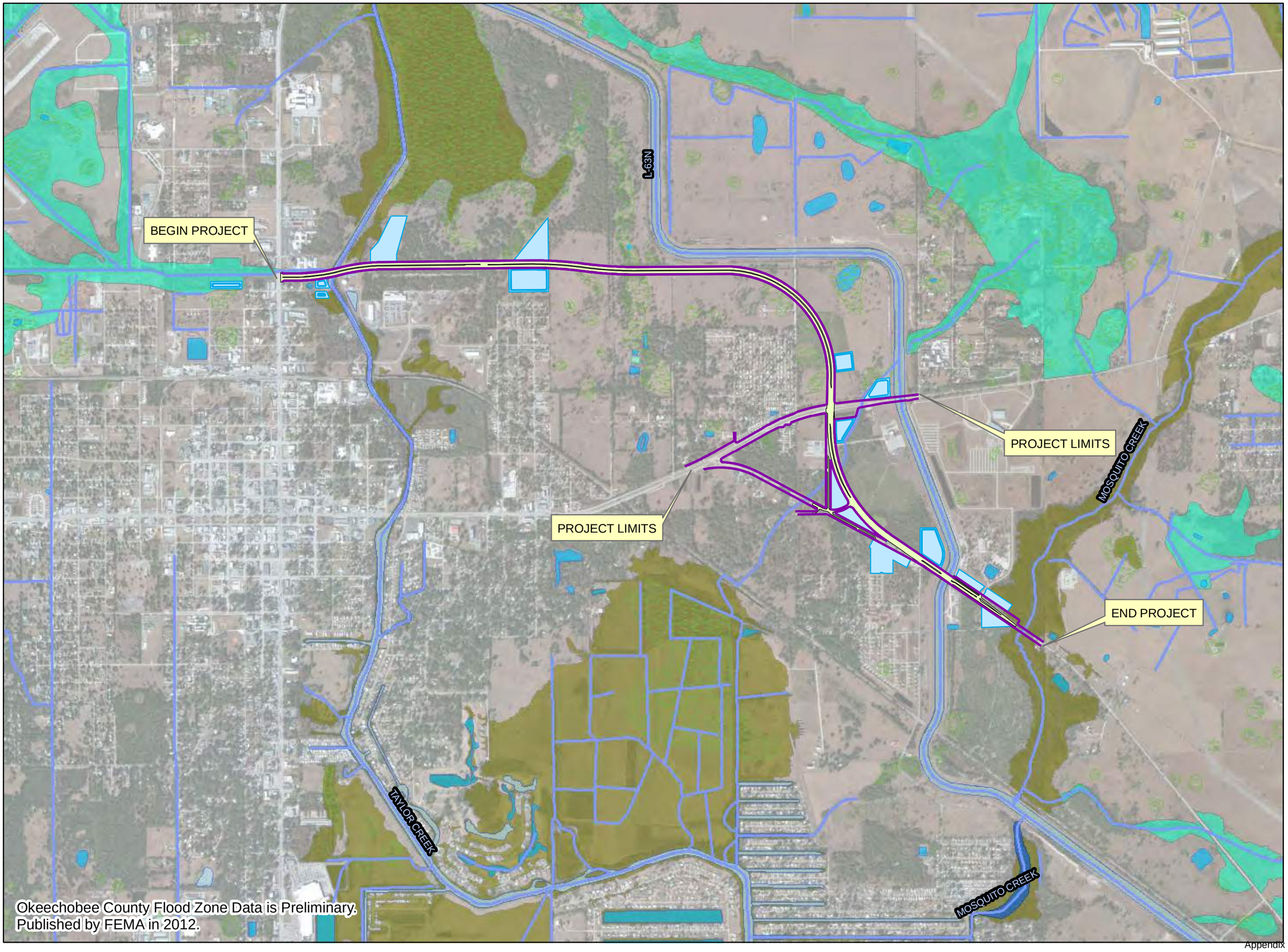
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

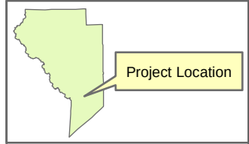
SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIG2_TypicalSection_SR710.mxd	October, 2013	The Balmoral Group



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION



Legend

- Proposed Roadway
- Proposed Ponds
- Proposed ROW

Flood Zones

- A
- AE

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoober Dike Area, existing permits, and recent survey files.

N
W E
S

0 1,000 2,000 Feet

0 0.25 Miles

FEMA FIRM Map
Figure 5

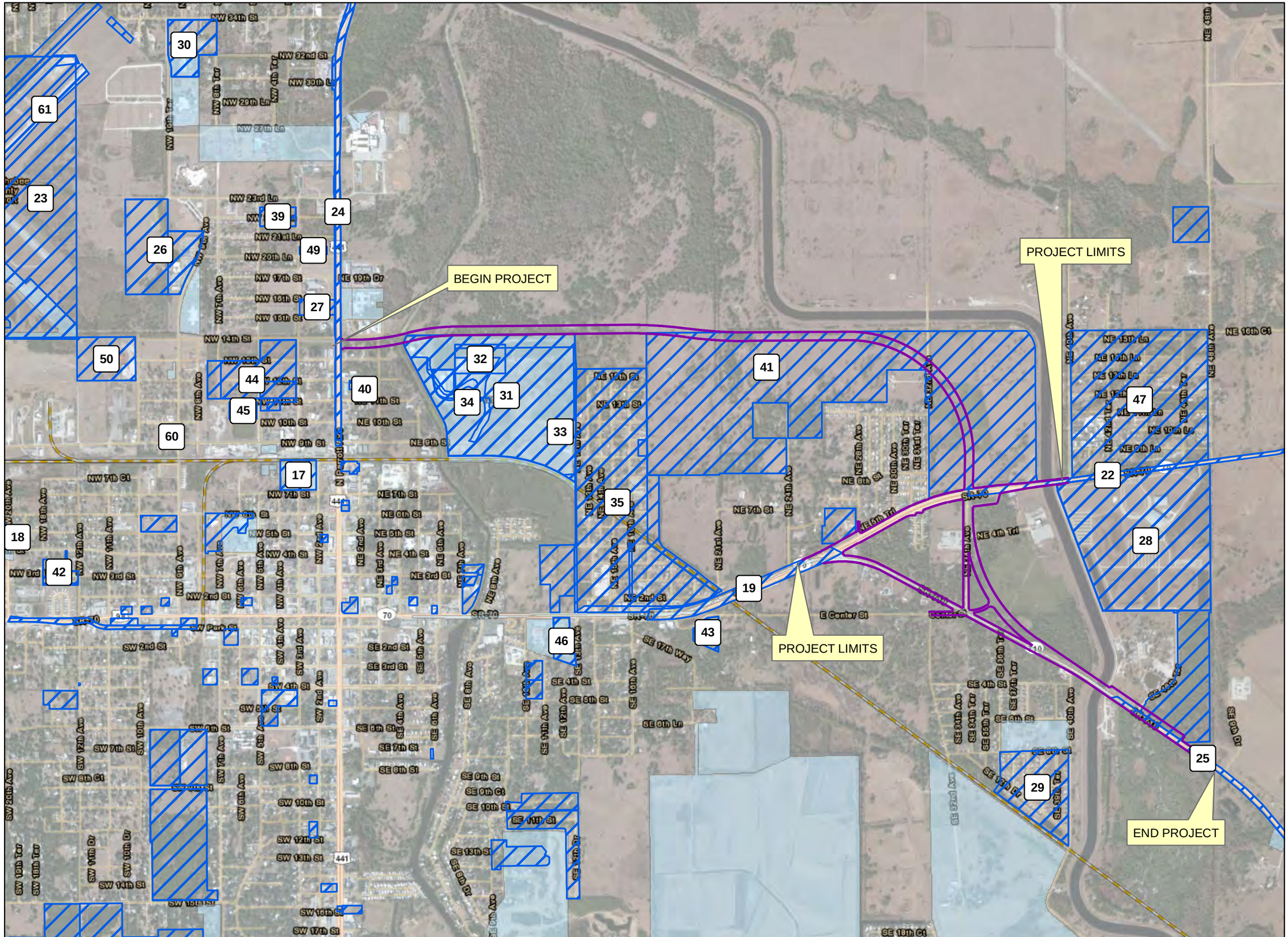
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
FIGS_FEMAMap_SR710.mxd	October, 2013	The Balmoral Group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Project Location

Legend

Proposed ROW

Parcels

N W E S

0 25 50 Feet

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The aerial source is I.F. Rooks and Associates, March, 2013.

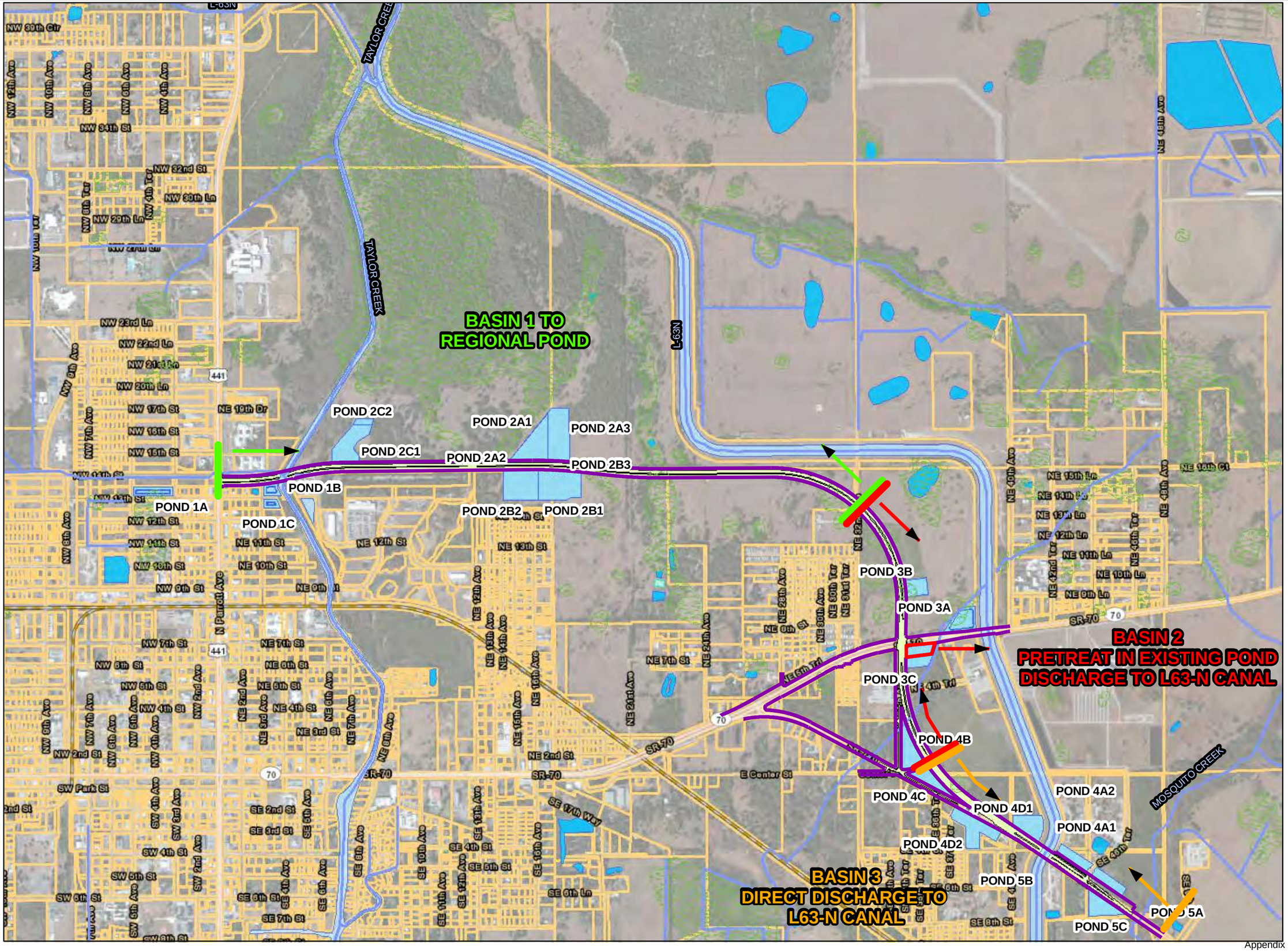
Pond 2C Aerial
Figure 12F

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

Okeechobee County, Florida

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

SR 710 from US 441 to
the L-63N Canal



Project Location

Legend

- Proposed Roadway
- Proposed Ponds
- Parcels
- Proposed ROW

Notes:

1. The information on this sheet is for information purposes only and is not to be used for construction. The sheet is to be used for documentation and to assist agencies and construction personnel with drainage concerns.

2. The existing contour information has been compiled from multiple sources including the National Elevation Dataset, Okeechobee County contours, LiDAR from Herbert Hoover Dike Area, existing permits, and recent survey files.

N W E S

0 800 1,600 Feet

0 0.2 Miles

Regional Pond Post Basin Map

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
www.balmoralgroup.us
Certificate of Authorization No. 26123

TBG Proj. No.: 00809.00
FPID No.: 419344-3-32-01

SR 710 from US 441 to the L-63N Canal

Okeechobee County, Florida

Filename:	Map Date:	Map Prepared By:
	October, 2013	The Balmoral Group

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Initial Meeting with Hamrick Property Owner
Meeting Minutes
FPID No. 432644-1-32-01 – D1 DW Drainage

Location: District One, Bartow
Date: July 11, 2014
Time 11:00 am

The purpose of the meeting is to introduce the SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study as an investigation being undertaken by the FDOT District One as a part of the SR 710 new alignment project in Okeechobee.

Attendees: See attached Sign-In Sheet

1. Mr. Brent Setchell gave an introduction and project background on the SR 710 Feasibility Study to the property owners, Mr. Michael and Ms. Maryann Hamrick and their consultant, Morris Crady.

2. Mr. Greg Seidel introduced the regional pond alternative that is to be constructed by the FDOT for the SR 710. This option would incorporate offsite areas associated with Lower Taylor Creek.

   Ms. Janet Hearn introduced the Stormwater Treatment Area (STA) alternative which would require interagency cooperation and be hydraulically connected to the L63-N canal and Upper Taylor Creek. Ms. Hearn said that the amount of nutrient reduction achieved by the STA would depend in part on the area of the STA but that a minimum size of 100 acres is desirable. This is comparable to the Taylor Creek STA which has a treatment area of 118 acres.

3. Ms. Amy Setchell gave a brief update on the SR 710 new alignment project from L-63N to US-41.

4. Mr. Hamrick reiterated that maintaining the integrity of the property is important to them.

5. As part of the study, a portion of the property will be surveyed to verify design assumptions. Access to the site will be coordinated with the ranch manager. Contact information to be provided by The Wantman Group. Survey will need to get started as soon as possible.

6. The next step is to set-up a Stakeholder Meeting in Okeechobee. This will be scheduled in the next two weeks. The Balmoral Group will be contacting the Hamricks regarding availability.

End of Minutes

SIGN IN SHEET

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Initial Meeting with Hamrick Property Owner
Meeting Agenda
FPID No. 432644-1-32-01 - D1 DW Drainage

Location: District One, Bartow
Date: July 11, 2014
Time 11:00 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS	Initials
Carlton Spirio	FDOT	Drainage	Carlton.Spirio@dot.state.fl.us	
Brent Setchell	FDOT	Drainage	Brent.Setchell@dot.state.fl.us	BS
Amy Setchell	FDOT	PM	Amy.Setchell@dot.state.fl.us	AES
Michael Hamrick	Property Owner		MHamrick@manateelegal.com	MHS
Morris Crady				MC
Gregory Seidel	The Balmoral Group	Consultant	gseidel@balmoralgroup.us	GS
Jennifer Nunn	The Balmoral Group	Consultant	jnunn@balmoralgroup.us	JN
Janet Hearn	ATM	Consultant	jhearn@appliedtm.com	JH
Henri Belrose	Wantman Group	Consultant	Henri.belrose@wantmangroup.com	HB
Alfredo Rodriguez	Wantman Group	Consultant	Alfredo.rodriguez@wantmangroup.com	AR
Gregory Bowne	FDOT	Right-of-way	Gregory.Bowne@dot.state.fl.us	Greg
Jennie Richard	FDOT	Right-of-way	Jennie.Richard@dot.state.fl.us	JR
Morris Crady	Lucido & Assoc.	Hamrick & Sons	mcrady@lucidodesign.com	MC
MARYANN HAMRICK	HAMRICK & SONS		ANNIE4UF@ACI.COM	mah
Nicole Monies	FDOT	Permits	nicole.monies@dot.state.fl.us	NM

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Stakeholder Meeting Minutes
FPID No. 432644-1-32-01 – D1 DW Drainage

Location: SFWMD Okeechobee Service Center, Okeechobee
Date: July 31, 2014
Time 10:30 am

The purpose of the meeting is to introduce the SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study as an investigation being undertaken by the FDOT District One as a part of the SR 710 new alignment project in Okeechobee.

Attendees: See attached Sign-In Sheet

1. Mr. Brent Setchell gave an introduction on the SR 710 Feasibility Study.

2. Mr. Greg Seidel gave a brief project history explaining how the SR 710 Feasibility Study has progressed to this point.

3. Mr. Greg Seidel introduced the regional pond alternative that is to be constructed by the FDOT for the SR 710. This option would incorporate offsite areas associated with Lower Taylor Creek.
    a. Representatives from Okeechobee County confirmed the airport ditch is owned by the County from Taylor Creek up to airport property.
    b. Mr. Setchell voiced his concern about conveying water from the airport ditch to the regional pond. He mentioned the preferred option on behalf of the FDOT would be to provide the required 1-inch of treatment for the SR 710 roadway and demonstrate that the nutrient removal shows a net benefit to the community.
    c. Mr. Seidel mentioned that a lower treatment depth could be provided. He also indicated that a control structure could be located at Taylor Creek and securing flood rights from the property owners could be an option.
    d. Mr. Setchell explained the SR 710 Regional Pond approach in that Basins 1 and 2 would be treated by the Regional Pond, Basin 3 and a portion of Basin 4 would pre-treat via the existing pond and that the remaining runoff would discharge directly to the L-63N Canal.

4. Ms. Janet Hearn introduced the Stormwater Treatment Area (STA) alternatives which would require interagency cooperation and be hydraulically connected to the L63-N canal and Upper Taylor Creek.
    a. Ms. Hearn said that for planning purposes a 100-acre STA is being evaluated. This is comparable to the Taylor Creek STA which has a treatment area of 118 acres. A 100 acre STA could remove about 1,500 to 1,600 kg of TP per year. An overview of three potential locations for a 100 acre STA within the Hamrick property was presented. These three sites were selected to avoid wetlands.

b. The Lake Okeechobee TMDL requires an in-lake concentration of 40 parts per billion (ppb) TP.
c. FDEP added that the existing Taylor Creek STA provides approximately 1520 kg of removal.
d. The STA 2 option would require some rehabilitation of the existing wetland in order to retain runoff from the surrounding property. This would provide additional storage and remove approximately 180 kg TP per year without additional flow from the L-63N Canal or Upper Taylor Creek.
e. The STA 2 option could provide up to 1000 kg of removal if inflow was augmented with flow from L-63N Canal.
f. Mr. Morris Crady asked if a combination of STA 1 and STA 2 would be possible in order to still use the property (i.e. for walking trails) in the winter. Mr. Seidel responded by saying the final STA choice is not part of the feasibility study and would be coordinated under final design.
g. Mr. Setchell liked the fact that the STA 2 option would provide some treatment and attenuation. However, he expressed some concern for the STA 2 option since the restored wetlands would be limited on the treatment volume depth (storage) provided. Would this option still require a control structure and how would the western bank of Lower Taylor Creek be affected?
h. If an STA option is chosen, FDOT would still need to obtain fill for the SR 710 project and this could be coordinated through agreements.
i. Mr. Hamrick asked if an STA option would impact ranch operations. Ms. Bonnie Wolff Pelaez confirmed that the BMAP manual does not restrict cattle from the wetlands.
j. Mr. Hamrick mentioned that the wetland portion of his property is the emotional piece, and the upland portion of his property is the economic piece.

5. Mr. Seidel mentioned that if an STA option was selected, FDOT would not be taking the lead on this design and this would most likely fall to the FDEP or SFWMD.

6. Mr. Jim Threewits reiterated his concerns with ponds adjacent to the right-of-way. The County has requested from FDOT that the new SR 710 alignment be a main corridor to attract development. The County wants this gateway to be pretty and attractive for development and does not want unattractive ponds or ponds along the roadway frontage. Mr. Threewits feels this is a chance to do something good and doesn't want to miss out and added that this is a very valuable piece of the land to the county.
    a. Mr. Setchell responded by saying that FDOT is evaluating the need for pond fencing. FDOT is open to providing drainage easements for property owners to provide pond maintenance.
    b. Mr. Setchell stated that FDOT does not want to move ponds away from the right-of-way due to the hydraulics and increase in cost.

7. Mr. Seidel commented that the current schedule calls for a decision to be reached by the end of the year.
    a. Ms. Amy Setchell responded that the draft Feasibility report is due Sept. 22nd with the final report due Oct. 22nd.

b. The next step is to review the information presented today individually with the stakeholders and obtain feedback as necessary.
c. Final calculations need to be performed.

End of Minutes

c. Attendees
Carl Spirio, P.E., FDOT Drainage
Alfredo Rodriguez, P.E., Wantman

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Stakeholder Meeting
Sign-In Sheet
FPID No. 432644-1-32-01 - D1 DW Drainage

Location: SFWMD Okeechobee Service Center Auditorium
3800 NW 16th Boulevard, Suite A, Okeechobee, FL 34972
Date: July 31, 2014
Time 10:30 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS	Initials
Carlton Spirio	FDOT	Drainage	Carlton.Spirio@dot.state.fl.us	
Brent Setchell	FDOT	Permitting	Brent.Setchell@dot.state.fl.us	
Amy Setchell	FDOT	PM	Amy.Setchell@dot.state.fl.us	
Kevin Inlge	FDOT		Kevin.Ingle@dot.state.fl.us	
Jeffrey Mednick	FDOT		Jeffrey.Mednick@dot.state.fl.us	
Michael Hamrick	Property Owner	Hamrick & Sons	MHamrick@manateelegal.com	
Morris Crady	Lucido & Assoc.	Hamrick & Sons	mcrady@lucidodesign.com	
Maryann Hamrick	Property Owner	Hamrick & Sons	Annie4UF@aol.com	
Regina Hamrick	Property Owner	Hamrick & Sons		
Gregory Seidel	The Balmoral Group	Project Drainage Engineer	gseidel@balmoralgroup.us	
Jennifer Nunn	The Balmoral Group	Project Drainage Engineer	jnunn@balmoralgroup.us	
Janet Hearn	ATM	STA Designer	jhearn@appliedtm.com	
Henri Belrose	Wantman Group	Consultant PM	Henri.belrose@wantmangroup.com	
Alfredo Rodriguez	Wantman Group	Consultant Asst. PM	Alfredo.rodriguez@wantmangroup.com	
Kathy Scott	Okeechobee Co.	Kathy Airport/TDC	kscott@co.okeechobee.fl.us	
Lee Evett	Okeechobee Co.		levett@co.okeechobee.fl.us	
Jim Threewits	Okeechobee Co.	Admin	jthreewits@co.okeechobee.fl.us	
Kelly Baney	Okeechobee Co.		kbaney@co.okeechobee.fl.us	
Katie Hallas	FDEP	PHONE	Katie.Hallas@dep.state.fl.us	
Elizabeth Alvi	FDEP	PHONE	Elizabeth.Alvi@dep.state.fl.us	
Jim Jeffords	USACE		jim.w.jeffords@usace.army.mil	
David Allen	City of Okeechobee		dallen@cityofokeechobee.com	
Lesley Bertolotti	SFWMD		lbertolo@sfwmd.gov	
Bonnie Wolff Pelaez	FDACS		Bonnie.WolffPelaez@freshfromflorida.com	
Regina Hamrick				

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
Stakeholder Meeting
Sign-In Sheet
FPID No. 432644-1-32-01 - D1 DW Drainage

Location: SFWMD Okeechobee Service Center Auditorium
3800 NW 16th Boulevard, Suite A, Okeechobee, FL 34972
Date: July 31, 2014
Time 10:30 am

NAME	FIRM/AGENCY	OFFICE / RESPONSIBILITY	EMAIL ADDRESS	Initials
GARY RITTER	SFWMD	INTER GOV	gritter@sfwmd.gov	GR

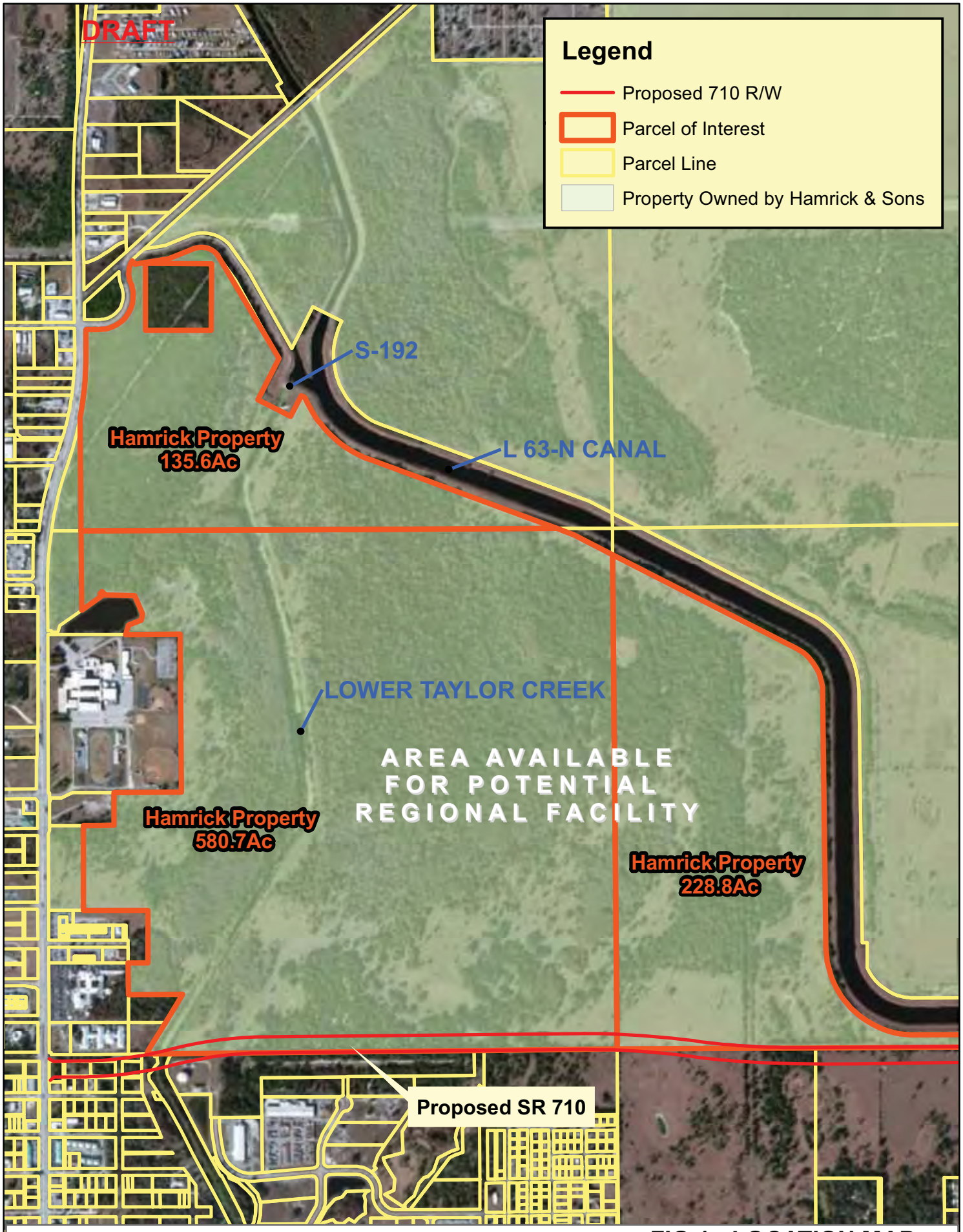


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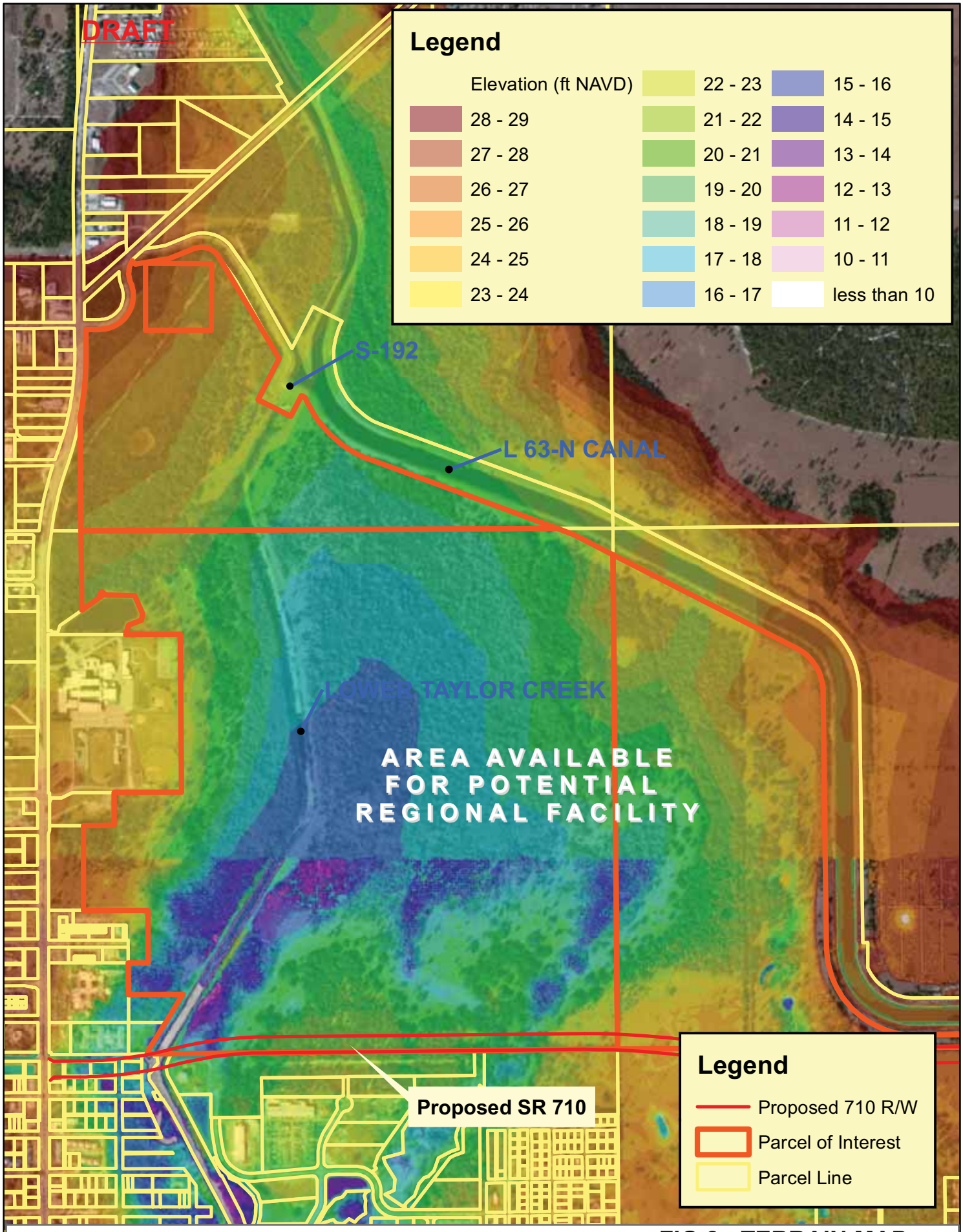
FIG 1 - LOCATION MAP

SR 710 Regional Facility Conceptual Analysis



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

0 0.125 0.25 Miles

FIG 2 - TERRAIN MAP

SR 710 Regional Facility Conceptual Analysis

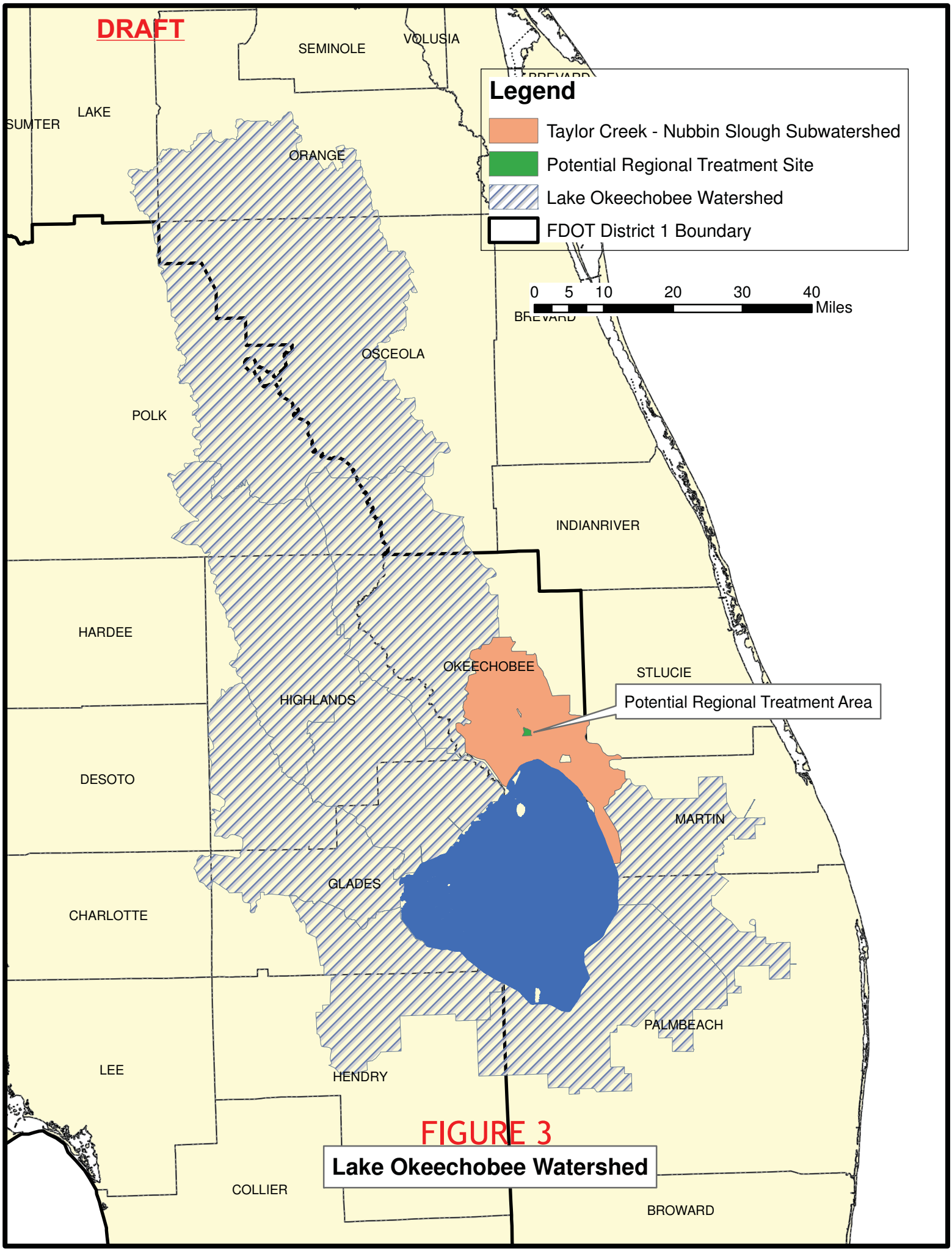
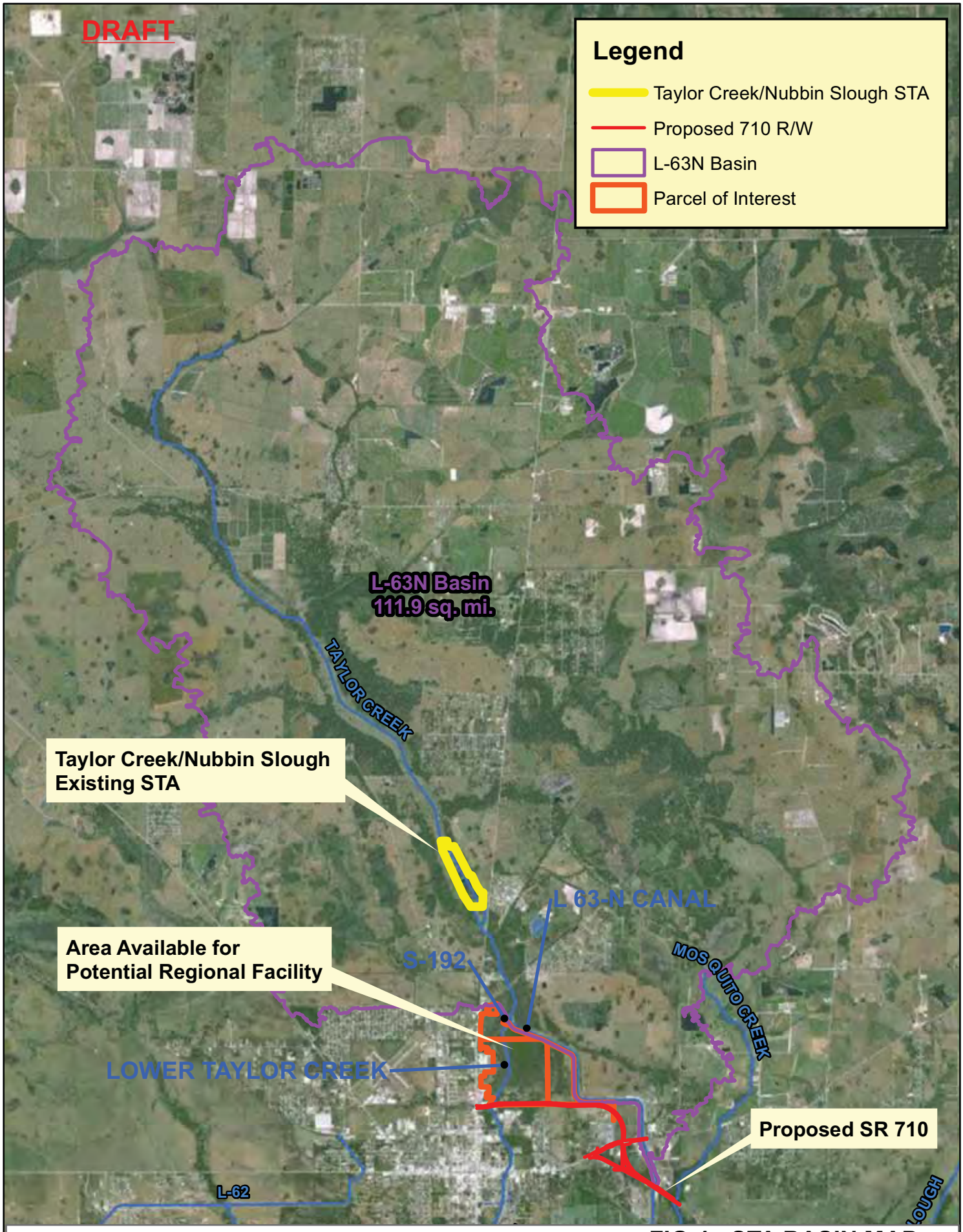


FIGURE 3

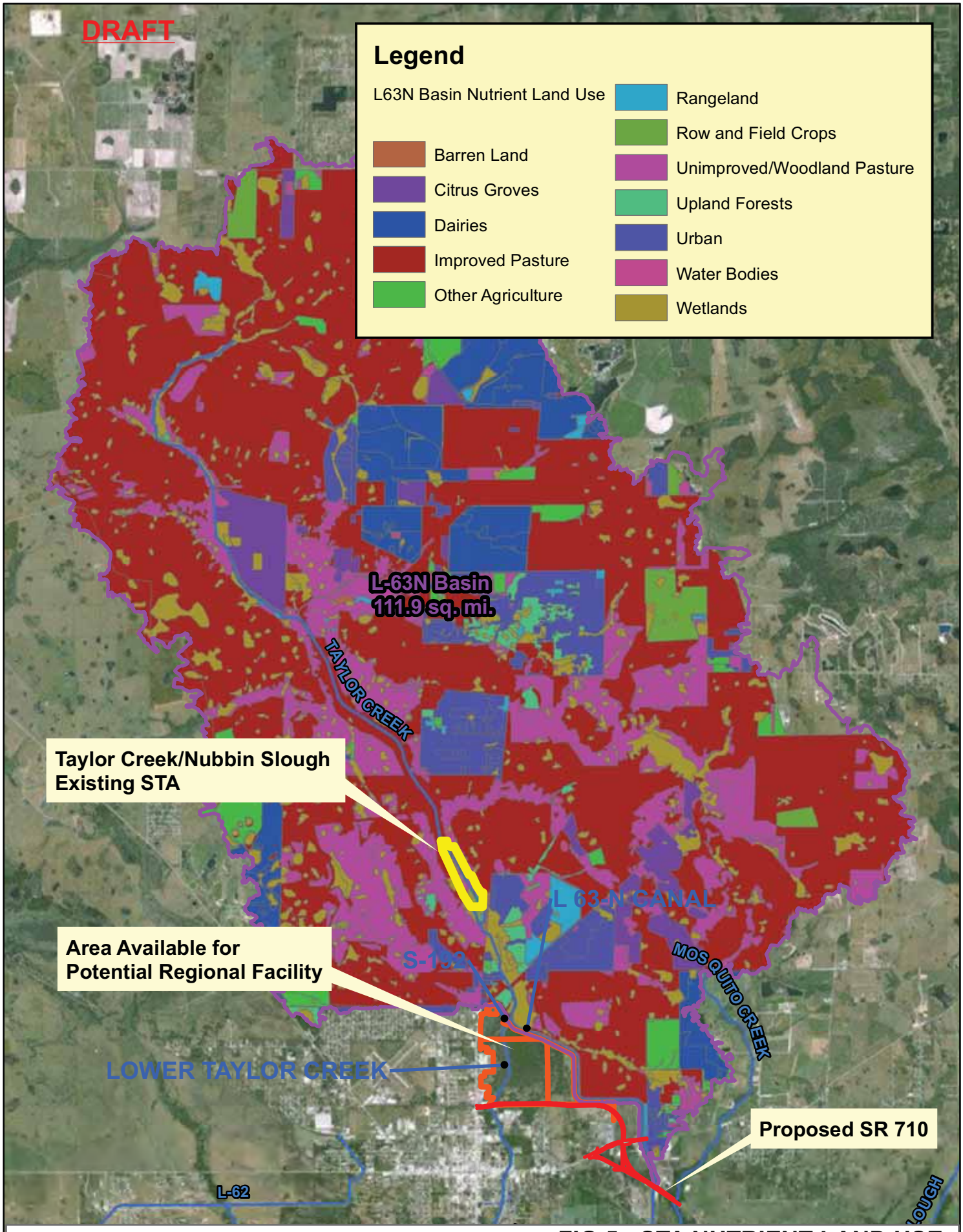
Lake Okeechobee Watershed



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

FIG 4 - STA BASIN MAP

SR 710 Regional Facility Conceptual Analysis



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

0 1 2 Miles

FIG 5 - STA NUTRIENT LAND USE

SR 710 Regional Facility Conceptual Analysis

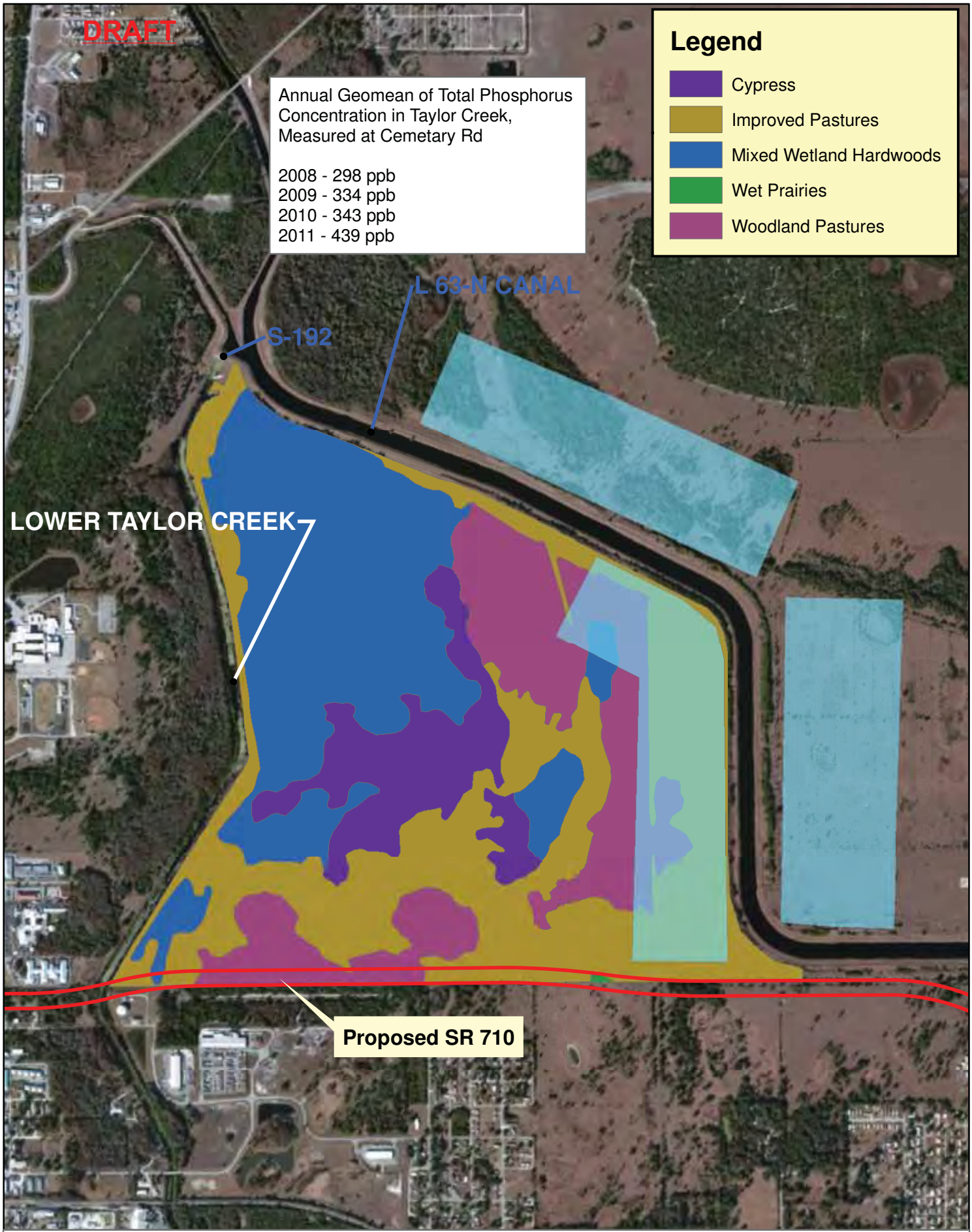


FIG 6 **POTENTIAL 100 ACRE STA LOCATIONS**

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

0 0.125 0.25 Miles

SR 710 Regional Facility Conceptual Analysis

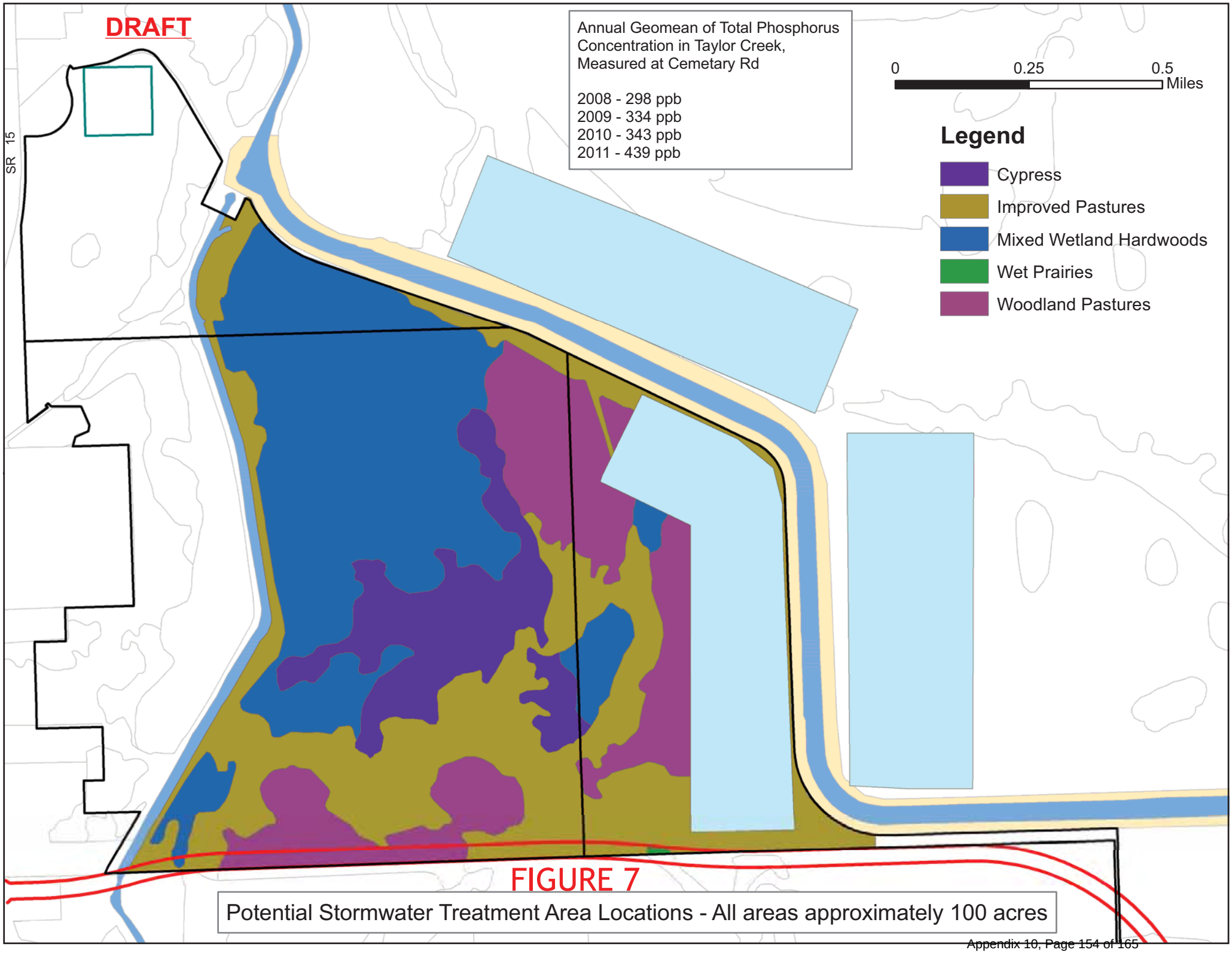
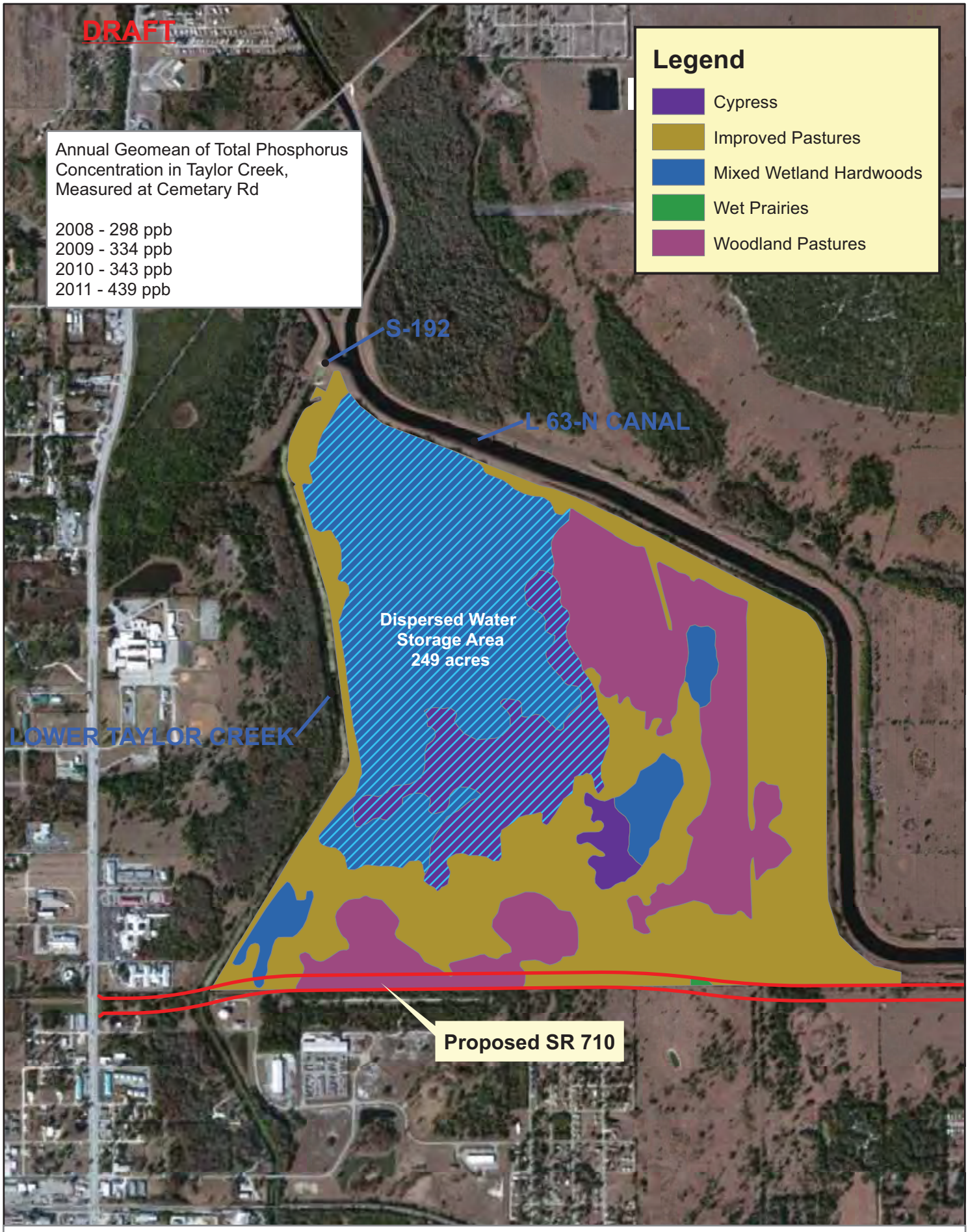


FIGURE 7

Potential Stormwater Treatment Area Locations - All areas approximately 100 acres



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

0 0.125 0.25 Miles

FIG 8 AREA FOR POTENTIAL DISPERSED WATER STORAGE

SR 710 Regional Facility Conceptual Analysis

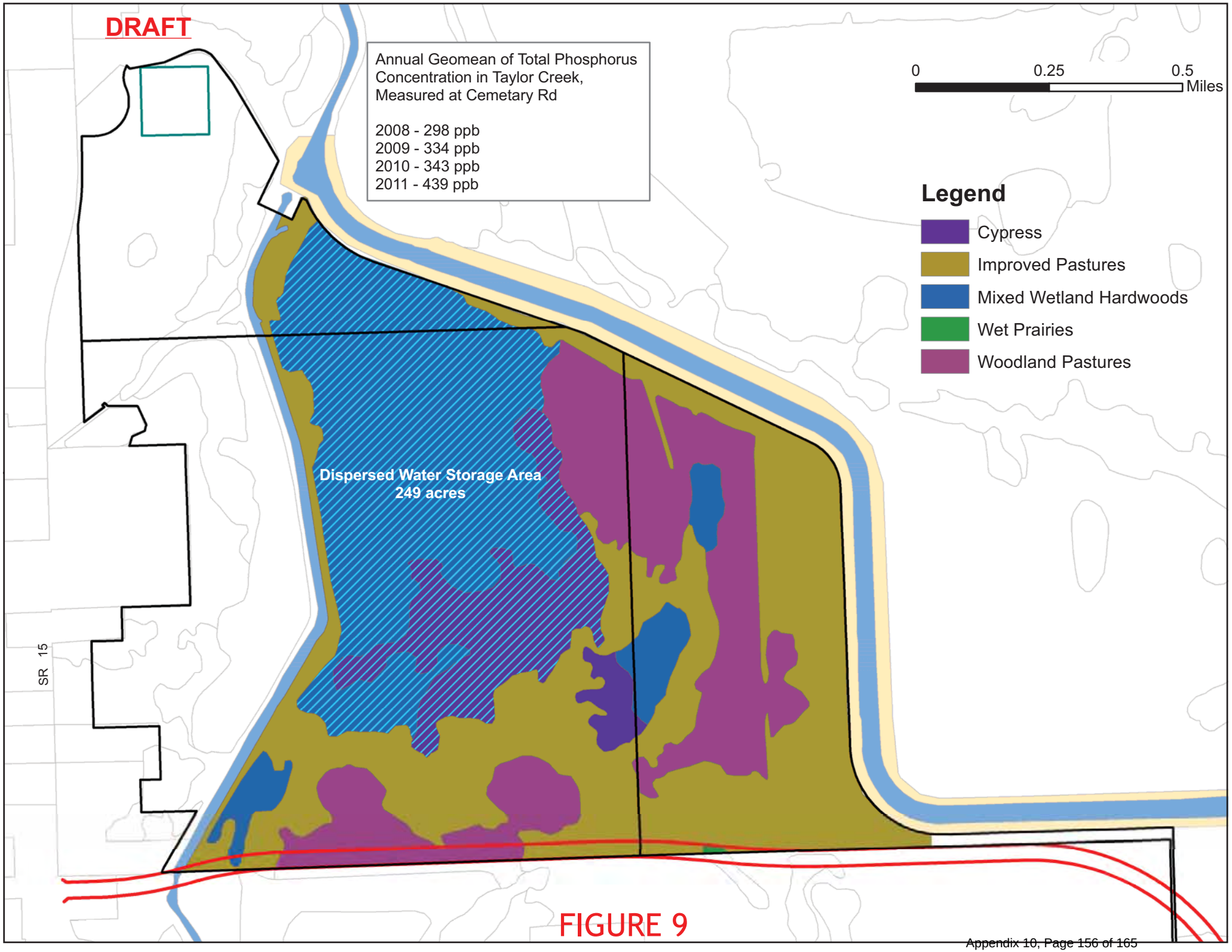
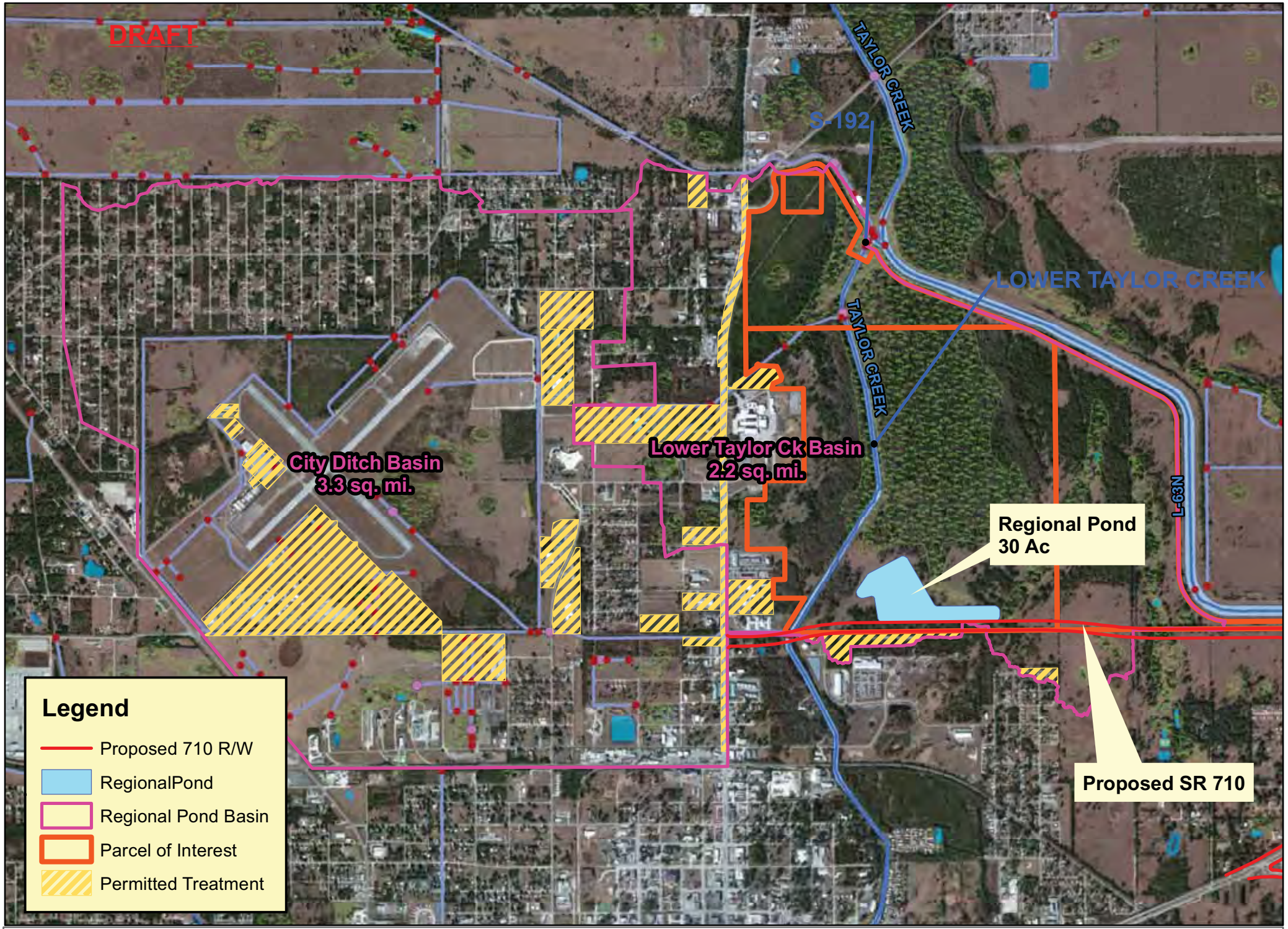

DRAFT
Annual Geomean of Total Phosphorus Concentration in Taylor Creek, Measured at Cemetary Rd
2008 - 298 ppb
2009 - 334 ppb
2010 - 343 ppb
2011 - 439 ppb
0
0.25
0.5
Miles
Legend
Cypress
Improved Pastures
Mixed Wetland Hardwoods
Wet Prairies
Woodland Pastures
Dispersed Water Storage Area
249 acres
SR 15

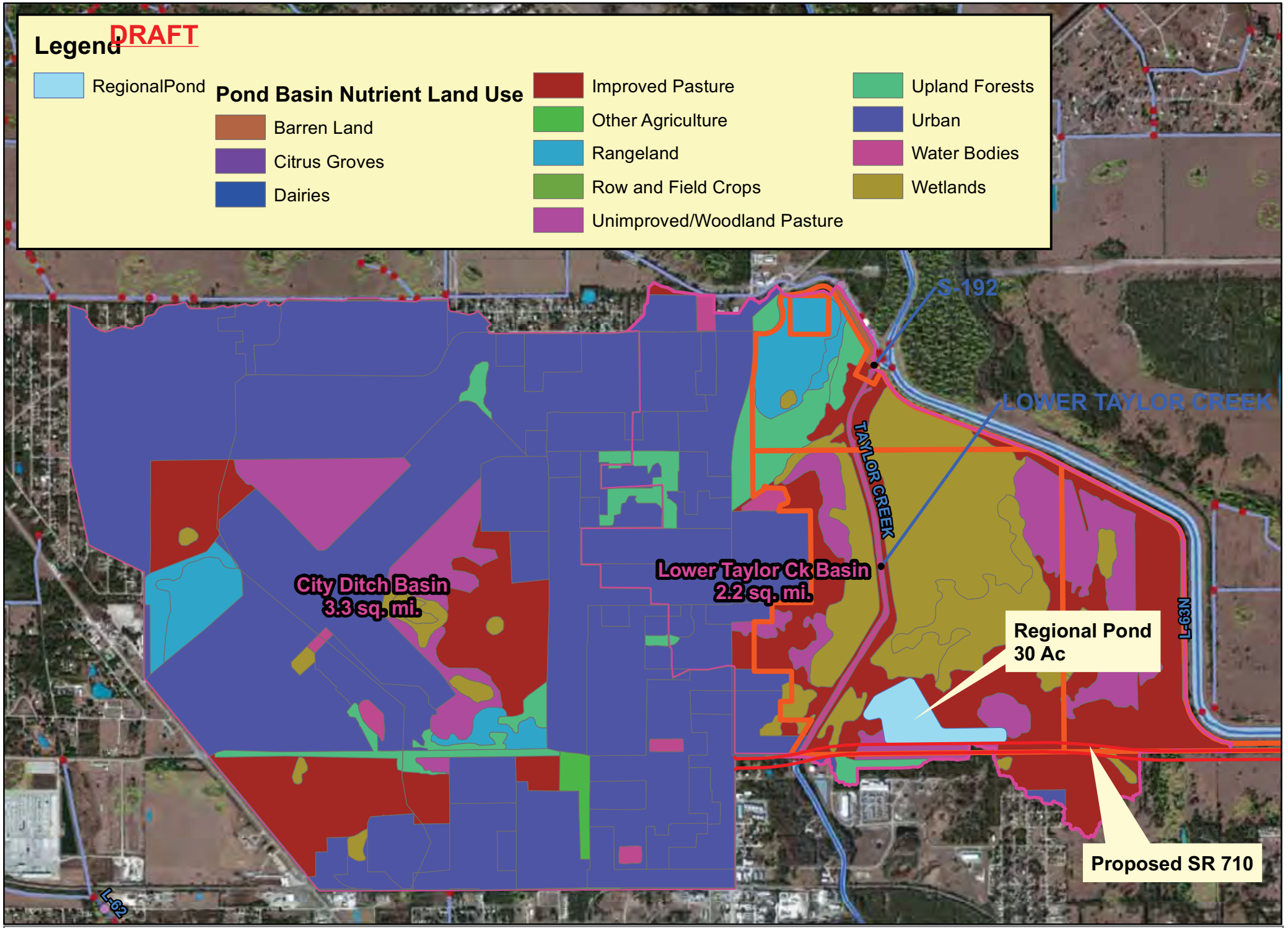
FIGURE 9



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX,

0 0.25 0.5 Miles

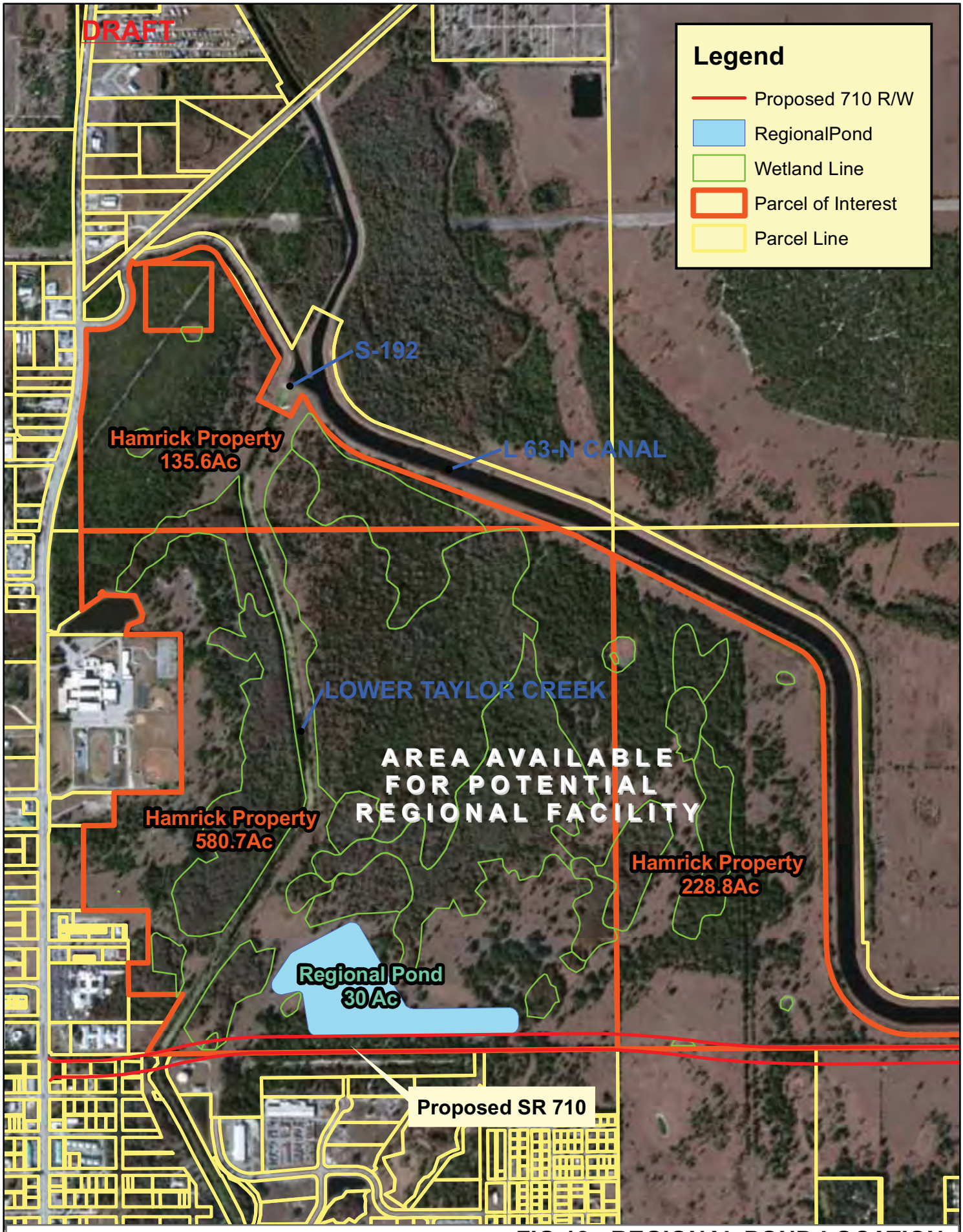
FIG 10 - REGIONAL POND BASIN MAP
SR 710 Regional Facility Conceptual



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX,

0 0.25 0.5 Miles

FIG 11 - REGIONAL POND NUTRIENT LAND USE MAP
SR 710 Regional Facility Conceptual



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

0 0.125 0.25 Miles

FIG 12 - REGIONAL POND LOCATION

SR 710 Regional Facility Conceptual Analysis

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

0 0.5 1 Miles

FIG 13 - FAA Buffer

SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
GOTO Meeting with Mike Hamrick, Property Owner
Meeting Minutes
FPID No. 432644-1-32-01 – D1 DW Drainage

Location: GotoMeeting
Date: August 12, 2014
Time 9:00 am

By: Greg Seidel Checked By: Janet Hearn

Attendees: Mike Hamrick, Tony Federico, Greg Seidel, Janet Hearn,

1. A Gotomeeting was held between Greg Seidel, Janet Hearn, Mr. Hamrick and Mr. Hamrick's consultant, Tony Federico, to advise him regarding pollutant loadings and discharges. Mr. Federico is a principal at Federico, Lamb and Associates and has worked extensively on water quality issues in the Lake Okeechobee basin.

2. Greg Seidel went through the Regional Pond/ STA options that are being reviewed by the FDOT and gave a brief project history of SR 710 and how we have gotten to this point. Mr. Federico asked multiple questions for clarification and inquired as to the preliminary loading rate calculations. Janet Hearn will provide preliminary rate calculations for his review.

3. Mr. Hamrick indicated that their preferred location for an STA would be in the triangle of land to the north of where Taylor Creek and the L-63 canal diverge but that they have not ruled out any of the other locations presented to date. Greg noted that putting something in the north triangle would be difficult because of the gas line that runs through that portion of the property. Mr. Hamrick said that the easement he negotiated for the gas line is more flexible than the standard easement language and may give FDOT more flexibility. The exhibit developed for the Hamricks that was shown at the stakeholder meeting was just an exhibit to demonstrate a size comparison; it was not a location exhibit.

4. Mr. Hamrick said that it is important to maintain the integrity of the property and the current level of use of the property.

c. Attendees
Brent Setchell, FDOT
Carl Spirio, FDOT
Amy Setchell, FDOT
Jennifer Nunn, Balmoral Group

Greg Seidel

From: Setchell, Amy <Amy.Setchell@dot.state.fl.us>
Sent: Thursday, September 04, 2014 1:25 PM
To: Mike Hamrick; Greg Seidel; federico@fla-inc.com; JHearn@AppliedTM.com
Cc: Setchell, Brent; Spirio, Carlton D; Jennifer Nunn
Subject: RE: SR 710 Regional Pond Hamrick Meeting Minutes.2014.08.12

Mr. Hamrick,

The Department has received your emails and its will be documented as part of the SR 710 Feasibility Study. We appreciates your participation and interest in the project and looks forward to sharing the results of study with you.

Thank you,

Amy Setchell, P.E.
Projects Managers
FDOT District 1
801 N. Broadway Ave.
Bartow, FL 33830
P:(863)519-2609
Email: Amy.Setchell@dot.state.fl.us

From: Mike Hamrick [mailto:MHamrick@manateelegal.com]
Sent: Thursday, September 04, 2014 11:45 AM
To: Greg Seidel; federico@fla-inc.com; JHearn@AppliedTM.com
Cc: Setchell, Brent; Spirio, Carlton D; Setchell, Amy; Jennifer Nunn
Subject: RE: SR 710 Regional Pond Hamrick Meeting Minutes.2014.08.12

Greg,

Thanks you for the minutes. As to your 4th points in the minutes (which are similarly stated in prior minutes as well), I thought it might be helpful for me to express in writing what I have attempted to say by spoken word. Thus, in hopes of avoiding as misunderstanding, let me express the position of Hamrick & Sons, Inc. this way:

Hamrick & Sons, Inc. has been approached by DOT and other entities with various concepts and ideas relating to drainage options in the construction of the SR 710 Extension. Thus far, these ideas have consisted of as "Regional Pond", as Stormwater Treatment Area and as Water Dispersal Area. Thus far, for understandable reasons, there has been limited information on acreage to be used and no information what so ever on compensation to the landowner. Hamrick & Sons, Inc. has made no demands on the continued use of the property or the size of the project. What we have said is that the property is currently an operating cattle ranch (both to the north and the south of the I-63 canal). If the purposes of the relevant entities could be accomplished with minimal disruption to the present use of the property, that is a factor is making such an endeavor attractive to Hamrick & Sons, Inc. If the relevant entities desire to use the property in a way that would substantially impair or eliminate part or all of the use of the property to the south of the I-63 canal for cattle purposes, then Hamrick & Sons, Inc. would simply have to evaluate the compensation being proposed against the lost revenues from a scut back in the existing cattle operations. While continued "integrity" of the property in its current use is attractive to Hamrick & Sons, Inc., at no time have we indicated that we would not look at any proposed project where more substantial changes would occur. Having said that, Hamrick & Sons is left without much of a way to evaluate anything without more definitive direction from the relevant entities, including, at some point, an indication of dollars associated with each decision. Nothing has been ruled off the table. For that matter, I don't have

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MikesHamrickss
President,sHamricks&sSons,sInc.ss
s
s
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601 12th Street West
Bradenton, Florida 34205
mhamrick@manateelegal.com
Phone: (941) 747-1871
Facsimile: (941) 745-2866
www.manateelegal.com
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From: Greg Seidel [mailto:GSeidel@balmoralgroup.us]
Sent: Thursday, September 04, 2014 11:05 AM
To: Mike Hamrick; federico@fla-inc.com; JHearn@AppliedTM.com
Cc: Setchell, Brent (Brent.Setchell@dot.state.fl.us); CARLTON.SPIRIO@DOT.STATE.FL.US; Amy.Setchell@dot.state.fl.us; Jennifer Nunn
Subject: SR 710 Regional Pond Hamrick Meeting Minutes.2014.08.12
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PleasesfindsattachedsthesnotessfromsthesGotoMeetingswithsMikesHamricksandsTonysFedericosregardingsthesproposeds RegionalsPond/StormwatersTreatmentsAreasatsthesproposedsSRs710,sAirportsDitchsandsLowersTaylorsCreekssconfluence.s
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GregorysS.sSeidel,sP.E.s
ThesBalmoralsGroups
165sLincolnsAve.s
WintersPark,sFLs32789s
Phone:s407.629.2185,sexts103s
Mobile: 407.739.4899
Fax:s407.629.2183s
e-Mail:sgseidel@balmoralgroup.uss
Web:shttp://www.balmoralgroup.usss

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SR 710 Stormwater Treatment Area/Regional Pond Feasibility Study
SR 710 Conceptual Regional Pond/STA Meeting with Avcon Representing Okeechobee
Meeting Minutes
FPID No. 432644-1-32-01 – D1 DW Drainage

Location: AVCON, 5555 E. Michigan Street, Suite 200 Orlando, FL 32822-2779
Date: Thursday, August 14, 2014
Time 3:00pm

Attendees:

1. Greg Seidel – The Balmoral Group, Drainage
2. Jim Kriss-AVCON, Principal
3. Hilary Maull – AVCON, Project Manager-Airports
4. Brent Setchell (by phone) - FDOT, Project Manager

Purpose: The purpose of the meeting is for The Balmoral Group to present a brief recap of the stakeholder kickoff meeting to the Okeechobee Airport General Consultant and to share information to help determine if the airport may benefit from the project and be a contributing stakeholder should the project move forward.

1. Greg Seidel began the meeting by giving a project background to AVCON. Avcon is the general consultant for the Okeechobee County Airport and has developed their master stormwater plan.

2. Greg Seidel gave the background review.

3. Discussion was held regarding FAA requirements for a new pond within the FAA Wildlife Management Area. Mr. Seidel presented the map showing that the new proposed ponds would lie within this area. It was noted that if the airport got involved the requirements may be more stringent because the FAA dollars would be included in the project.

4. Mr. Kriss indicated that there was certainly some possibility for the group to work together and it all seemed very reasonable. The other issue the airport had was they were looking for mitigation credits for wetland impacts to their site. There was a previous worked out deal on the table with a mitigation bank, however that deal fell through and so this is an ongoing issue and the airport is pursuing possible mitigation options.

5. The meeting ended with the decision that AVCON would approach the FAA regarding non project specific questions and once those questions were answered they would return to discuss the responses with the FDOT. We would go forward from that point.

c. Attendees
Amy Setchell, FDOT
Carl Spirio, FDOT
Jim Threewits, Okeechobee County
Kathy Scott, Okeechobee County
Kelly Baney, Okeechobee County
Jennifer Nunn, Balmoral Group

Greg Seidel

From: Jennifer Nunn
Sent: Friday, September 12, 2014 8:24 AM
To: Jose Otero (jotero@sfwmd.gov)
Cc: Hearn, Janet; Greg Seidel; Ostrovsky, Moysey
Subject: SR 710 Regional Pond/STA Feasibility Study - SFWMD Operations
Attachments: Location.pdf

Jose,s

Persourphonesconversationsons9/9/14,sIsamsfollowingsupswithsansemailstosrequestsadditionalsinformationsregardingsthes structuressS-192sandsS-133/S-193.sThesBalmoralsGroupshassbeenscontractedstosperformsasfeasibilitysstudysforsregionals pondsandsSTAsoptionssinsthesLowersTaylorsCreeksarea.sThississbeingsundertakensbysthesFDOTsDistrictsOnesassaspartsofsthes SRs710snewsalignmentsprojectsinsOkeechobee.ssThesSRs710sNewsAlignmentsProjectsinsOkeechobeesCountysandsthesCitysofs OkeechobeesissscurrentlysundersdesignsbysthesFDOT.ssDuringsthesdevelopmentsofsthesPondsSitingsReport,sonesofsthesponds sitesswassidentifiedsassaspossiblesLocationsforsasregionalsstormwaterstreatmentsfacilitysthatscouldsprovidesgreaters stormwaterstreatmentsbenefitsstosthesLocalsarea.ssThissundevelopedsareasissLocatedseastsofsthesCitysofsOkeechobee,sjusts southsofsthesconfluencesofsLowersTaylorsCreeksandsthesL-63NsCanal.ssThissPropertysappearsstosownedsandscontrolledsbys HamricksandSonssbasedsonsthesLocalspropertysappraiserswebsitesandsthesFDOTsdeedsresearch.ssPleasesseesattachedsmap. s

PersoursdiscussionsTuesday,sitswasconfirmedsthatsthesUSsArmysCorpssbuiltsandsconveyedsS-192sandsS-133/S-193stosthes SFWMD.s

Pleasesanswersandsprovidesclarificationsonsthesfollowing:ss

- Whossshassthesauthoritystosmodifysthesstructuresorsoperationsofsthesstructure?s
- Whatsisssthesprocesssofsmodifyingsthesstructuresorsoperationsmanual?sWhosperformssthesreviewsofstheses changes?s
- WhoscontrolssthesleveessalongsthesL-63NsandswhoswouldsreviewsadditionalsconnectionsstosthesL-63N?s
- Specifically,showsissthesS-192sandsS-193/S-133sstructuressoperatedstosdate?sThesinformationswesobtainedsiss fromsasDrafts2005sCentralsandsSouthernsFloridasProjectsForsFloodsControlsandsOthersPurposessSystemsOperatings ManualsforsLakesOkeechobeesandsEvergladessAgriculturalsAreasVolumes3,sDecembers2005.sIssstheresasmores recentsOperatingsManualswithsupdatesinformation?s

Letsmesknowsifsyoushavesanysquestions.s

Thanks,s

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s

Jennifer A. Nunn, P.E.

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
T: 407.629.2185 ext 108
F: 407.629.2183