

Pond Siting Report
SR 659 (Combee Rd)
From US 98 to North Crystal Lake Drive
POLK COUNTY

FPID 440274-1-22-01

ETDM Number: 14326

Prepared For:
FLORIDA DEPARTMENT OF TRANSPORTATION
District I



Prepared By:
Patel, Greene & Associates, LLC
12570 Telecom Drive
Temple Terrace, Florida 33637

Submitted in Association with:
Kimley-Horn
189 South Orange Avenue, Suite 1000
Orlando, Florida 32801

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The environmental review, consultation, and other actions required by applicable federal environment laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT

Signature Page Professional Engineer's Seal

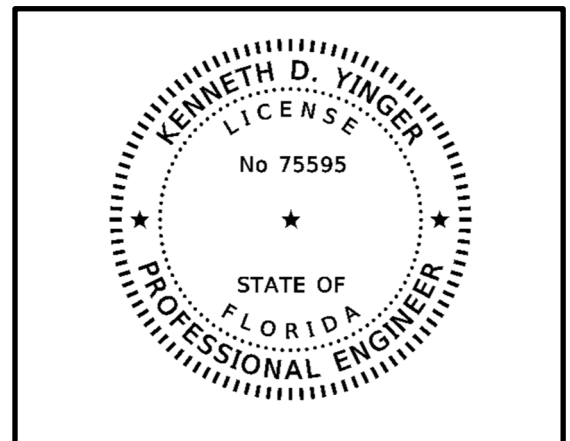
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EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) is conducting a Project Development & Environment (PD&E) Study to evaluate a 1.4-mile segment of SR 659 (Combee Road) from US 98 to North Crystal Lake Drive in Polk County, Florida. Combee Road is a two-lane undivided minor arterial roadway with 4-foot wide paved shoulders and little to no sidewalk. The area adjacent to the roadway is a mix of industrial, retail/office, and residential land uses. The proposed improvements will enhance the multimodal mobility along the roadway with the addition of a two-way left turn lane for left-turning traffic and accommodations for pedestrians and bicyclists. Intersection improvements will be made to enhance safety and traffic flow. Additionally, the roadway will be converted from a rural typical section to an urban typical section with curb and gutter and a storm water collection system to improve drainage conditions.

The project can be divided into two drainage basins with one sub-basin. Basin 1 is the southern portion of the corridor that discharges to US 98. The limits of Basin 1 are from US 98 to Kiwanis Avenue. The sub-basin within Basin 1 is a portion that discharges into existing neighborhoods to the west from Commerce Point Drive to Kiwanis Avenue. Basin 2 is the northern portion, which discharges to Crystal Lake. The limits of Basin 2 are from Kiwanis Avenue to North Crystal Lake Drive.

To reduce the right-of-way needs for off-site ponds and to address the treatment and attenuation for this project, Environmental Look-Around (ELA) meetings were conducted. Those attending the ELA meetings included the project study team, members of the US 98 widening design project team, FDOT staff, representatives for the City of Lakeland (COL) and Polk County, and maintenance personnel from FDOT, COL, and Polk County. The purpose of these ELA meetings was to coordinate with all stakeholders and determine a regional approach that addresses water quality for not only the Combee Road study, but also the surrounding area.

For Basin 1, the recommended alternative is to utilize, as much as possible, the compensatory treatment and attenuation volume in the US 98 modified Pond 2-A. The design team needs to coordinate with FDOT and the US 98 design team for the use of the pond. Likewise, a permit modification may be needed for the existing permit that includes Pond 2-A. For any additional treatment and attenuation volume needed for the project, the Ridley USA Inc. site will be used for a pond. The configuration of the pond (SMF 1-A-1 or SMF 1-A-2) can be finalized in the design phase. It is important that the design team coordinate with Polk County, as both McJunkin Road and Lyon Drive are maintained by the County.

For Basin 2, water quality needs can be provided through a regional approach that combines the existing pond on the north side of Crystal Lake (SMF 2A-2) and by converting the existing ditch between South Crystal Lake Drive and Skyview Drive into a pond by adding a control structure (SMF 2A-1).

Table of Contents

EXECUTIVE SUMMARY	iii
1.0 PROJECT DESCRIPTION	1
2.0 ALTERNATIVES	2
Alternative 1.....	2
Alternative 2.....	2
No-Build Alternative	2
3.0 POND SITING ANALYSIS.....	3
3.1 DESIGN CRITERIA	3
3.2 SWFWMD PRESUMPTIVE WATER QUALITY CRITERIA	3
3.3 EXISTING DRAINAGE	3
3.3.1 DRAINAGE PATTERNS	4
3.3.2 DRAINAGE BASINS	4
3.4 PROPOSED DRAINAGE	5
3.5 WATER QUALITY AND QUANTITY	5
3.5.1 Basin 1 Impaired Waterbody Nutrient Loading Water Quality.....	6
3.6 ENVIRONMENTAL LOOK-AROUND (ELA) MEETINGS	6
3.6.1 ELA MEETING 1.....	6
3.6.2 ELA MEETING 2.....	6
3.6.3 ELA MEETING 3.....	7
3.7 POND EVALUATION.....	7
3.7.1 OPTION 1 – CITY OF LAKE LAND PARCEL.....	7
3.7.2 OPTION 2 – INNOVATIVE TECHNOLOGY	7
3.7.3 OPTION 3 – JOINT-USE	8
3.7.4 POND SITE ALTERNATIVES	8
3.7.5 COST ESTIMATES.....	10
POND SITING MATRIX	11
4.0 FLOODPLAIN IMPACTS.....	11
5.0 WETLAND IMPACTS	11
6.0 PERMIT REQUIREMENTS	12
7.0 RESULTS AND RECOMMENDATIONS.....	12
8.0 RESOURCES FOR ANALYSIS	13

List of Tables

Table 3-1: Summary of Predominant Soil Types	3
Table 3-2: Required Treatment and Attenuation Volumes	5
Table 3-3: Basin 1 Nutrient Loading Efficiency	6
Table 3-4: Basin 2 Volume Availability and Needs	10
Table 3-5: Basin 1 Pond Site Cost Estimates	10
Table 3-6: Basin 2 Pond Site Cost Estimates	10
Table 3-7: Pond Matrix Considerations	11

List of Figures

Figure 1-1 - Location Map	1
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Appendices

APPENDIX A: Exhibits	
APPENDIX B: Calculations	
APPENDIX C: ELA Meetings	
APPENDIX D: Pond Siting	
APPENDIX E: Correspondence	

1.0 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) is conducting a Project Development & Environment (PD&E) Study to evaluate a 1.4-mile segment of SR 659 (Combee Road) from US 98 to North Crystal Lake Drive in Polk County, Florida. Combee Road is a two-lane undivided minor arterial roadway with 4-foot wide paved shoulders and little to no sidewalk. The area adjacent to the roadway is a mix of industrial, retail/office, and residential land uses. The proposed improvements will enhance the multimodal mobility along the roadway with the addition of a two-way left turn lane for left-turning traffic and accommodations for pedestrians and bicyclists. Intersection improvements will be made to enhance safety and traffic flow. Additionally, the roadway will be converted from a rural typical section to an urban typical section with curb and gutter and a storm water collection system to improve drainage conditions.

This project is located in western Polk County within Township 28, Range 24, Sections 27 and 28. See **Figure 1** for the Project Location Map.



Figure 1-1 - Location Map

The primary vertical datum in this report and in the calculations is the North American Vertical Datum of 1988 (NAVD 88). Where practical, elevations are shown in both NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) to enable direct comparison between values in this report and values obtained from other entities. To convert from NGVD 29 elevations to NAVD 88 elevations the following

equation applies: NGVD 29 -0.89 ft = NAVD 88. See **Appendix A** for the National Geodetic Survey VERTCON datum conversion.

2.0 ALTERNATIVES

Alternatives evaluated for this PD&E Study include Alternative 1, Alternative 2, and the No-Build Alternative. The Preferred Alternative is Alternative 2. See **Appendix A** for an exhibit of the existing and proposed typical sections.

Alternative 1

Alternative 1 proposes one lane in each direction separated by a 13-foot wide two-way left turn lane. This alternative includes 6-foot wide sidewalks for pedestrians and 7-foot wide buffered bicycle lanes for cyclists. The existing roadside stormwater ditches would be replaced by a closed drainage system with curb and gutter. As part of this alternative, roundabouts were considered at the intersections of Maine Avenue and Skyview Drive.

Alternative 2

Alternative 2 provides a more comfortable environment for pedestrians and cyclists. This includes 8-foot wide sidewalks and a 4-foot wide minimum buffer between the sidewalk and back of curb. Similar to Alternative 1, Alternative 2 provides one lane in each direction separated by a 13-foot wide two-way left turn lane; however, no separate bicycle lanes are proposed. The proposed 12-foot wide travel lanes provide greater maneuverability for trucks and transit vehicles that regularly use the corridor. The existing roadside stormwater ditches would be replaced by a closed drainage system with curb and gutter. As part of this alternative, roundabouts were considered at the intersections of Maine Avenue and Skyview Drive.

No-Build Alternative

The No-Build Alternative assumes no improvement to Combee Road other than routine maintenance. It provides a benchmark for comparative purposes with the Build Alternatives.

The advantages of the No-Build Alternative include the following:

- No impact to the adjacent natural, physical, and human environments
- No expenditure of funds for right-of-way acquisition or construction
- No utility impacts

The disadvantages of the No-Build Alternative include the following:

- Not consistent with the Polk TPO's Complete Streets Action Plan
- Does not enhance pedestrian and bicycle accommodations along the roadway
- Does not improve safety conditions
- Does not improve vehicular traffic operations

The No-Build Alternative remains a viable alternative throughout the study and the public involvement process.

3.0 POND SITING ANALYSIS

3.1 DESIGN CRITERIA

The design criteria for ponds consists of a combination of Southwest Florida Water Management District (SWFWMD) presumptive criteria, nutrient loading criteria for Impaired Water Bodies, FDOT stormwater management standards, and practical design criteria.

3.2 SWFWMD PRESUMPTIVE WATER QUALITY CRITERIA

Proposed stormwater management ponds are required to meet SWFWMD presumptive water quality criteria. The primary available treatment methods are dry retention (when adequate clearance to the Seasonal High Groundwater Table (SHGWT) is feasible) and wet detention. The project traverses several different soils types according to the Natural Resource Conservation Service (NRCS) Soil Survey for Polk County. Most of the soils have a hydrologic soil group (HSG) of A or A/D and relatively low SHGWT elevations. Refer to **Table 3-1** for a summary of the predominant soil types found along the project and **Appendix A** for soils information.

Table 3-1: Summary of Predominant Soil Types

NRCS Map Unit	Soil Type	HSG	Depth to SHGWT (ft)	Approximate Percentage of Area
8	Hydraquents, Clayey	D	0.00	0.5%
11	Arents-Water Complex	A	>6.50	7.3%
15	Tavares fine sand	A	4.75	2.5%
16	Urban land		>6.50	38.6%
17	Smyrna fine sand	A/D	1.00	2.5%
21	Immokalee sand	B/D	1.00	6.8%
22	Pomello-fine sand	A	2.75	0.1%
31	Adamsville fine sand	A/D	1.67	0.6%
49	Adamsville-Urban land	A	2.75	1.6%
53	Myakka-Immokolee-Urban	A/D	1.00	6.1%
54	Pomello-Urban land	A	2.75	0.5%
63	Tavares-Urban land	A	4.75	27.2%
68	Arents	A	3.00	2.4%
99	Water		0.00	3.2%

3.3 EXISTING DRAINAGE

The existing project area consists of two-lane undivided rural roadway. Roadway stormwater runoff discharges to existing cross drains or ditches. Off-site areas throughout the study area are primarily commercial, with some industrial and high-density residential areas.

The southern portion of the project is located within the Banana Lake WBID 1549A, which is impaired for nutrients. This impairment will be addressed in proposed stormwater management facilities. The northern portion is located within the Saddle Creek WBID 1497, which is impaired for fecal coliform but does not require nutrient removal for this impairment. Crystal Lake is classified as the only wetland/surface water. There are no direct discharges to Outstanding Florida Waters. See **Appendix A** for WBID information.

3.3.1 DRAINAGE PATTERNS

At the beginning of the project, roadway stormwater is collected via closed storm sewer systems, which discharge to US 98 to the south. At the end of the project, roadway stormwater discharges to Crystal Lake to the north. Throughout the rest of the project, roadway stormwater runoff sheet flows to roadside swales and continues to existing cross drains or ditches. Areas adjacent to the project throughout the study area are primarily commercial, with some industrial and high-density residential areas. There are considerable off-site flows entering the Combee Road system from these commercial and industrial areas, as well as side streets, primarily from the east side. The project area is located within two main watersheds: Saddle Creek to the north and the Banana Lake Canal to the south.

The existing drainage patterns were developed from as-built documents, existing contours, and a field review conducted on October 17, 2018. From the southern end of the project to just south of Maine Avenue, the northbound lane and shoulder flows to an existing storm sewer system comprised of ditch bottom inlets (DBIs) located along grassed areas adjacent to the shoulder. This storm sewer system discharges south to the existing roadside ditch along US 98.

From Maine Avenue to South Crystal Lake Drive, the northbound lane and shoulder flows to a system comprised of DBIs, side drains, and roadside ditches. This system flows south from South Crystal Lake Drive on the east side of the roadway and crosses under Combee Road via an existing 36-inch cross drain at Maine Avenue, discharging into the west roadside ditch. The west roadside ditch conveys runoff from the southbound lane and shoulder from just south of McJunkin Road until it discharges into an existing DBI located approximately 365-feet south of Lyon Drive, in front of Joseph Motors. This system then discharges into the US 98 roadside ditch.

From north of McJunkin Road to the railroad crossing, the southbound lane and shoulder flows into the west roadside ditch, which flows south from the railroad crossing to McJunkin Road and then flows west along McJunkin Road, eventually discharging into the US 98 roadside ditch.

From north of the railroad crossing to just south of Commerce Point Drive, the southbound lane and shoulder flows into the west roadside ditch, which flows south from Commerce Point Drive to the railroad crossing, and then discharges to the west along the railroad corridor, eventually discharging into the US 98 roadside ditch.

From Commerce Point Drive to south of Kiwanis Avenue, the west side of Combee Road has no defined ditches or storm sewer. Roadway runoff sheet flows into the neighborhood side streets. The runoff from the neighborhood side streets causes periodic flooding due to a poorly maintained outfall.

From Kiwanis Avenue a defined ditch collects roadway runoff and off-site runoff and discharges directly into Crystal Lake. The outfall for Crystal Lake is wetlands located to the east of Combee Road (SWFWMD Permit No. 4414188.00). See **Appendix A** for the Regional Basin Delineation Exhibit.

3.3.2 DRAINAGE BASINS

The project can be divided into two basins with one sub-basin. Basin 1 is the southern portion of the corridor that discharges to US 98. The southern basin ultimately discharges to the US 98 ditches. The limits of Basin 1 are from US 98 to Kiwanis Avenue. The sub-basin within Basin 1 is a portion that discharges into existing neighborhoods to the west from Commerce Point Drive to south of Kiwanis

Avenue. Basin 2 is the northern portion, which discharges to Crystal Lake. The limits of Basin 2 are from Kiwanis Avenue to North Crystal Lake Drive. See **Appendix A** for the basins limits.

3.4 PROPOSED DRAINAGE

It is recommended that the entire drainage system be replaced. The system is in poor condition, exhibiting multiple locations of failure. It is anticipated that the runoff will be conveyed via gutters to new curb inlets and a new closed storm sewer system. Off-site flows that are coming to the roadway will need to be accommodated in the proposed design. In accordance with subsection 373.413(6), F.S., it is likely that the incorporation of off-site runoff into the system will be acceptable by SWFWMD. However, it is noted that the design capacity of the on-site system may need to be evaluated to ensure there is no harm to the existing conditions. If permitting requirements at the time of design prohibit co-mingling the on-site and off-site runoff without treatment of the off-site basin, separate storm sewer systems for on-site and off-site runoff may be necessary to avoid the need for additional right-of-way to accommodate larger ponds. Closed storm sewer systems utilizing curb and gutter inlets and back of sidewalk inlets are recommended to accommodate the proposed typical section. The secondary system will be provided in the design phase.

It is worth noting that there is a potential for the project to encounter contaminated surficial groundwater along the corridor. Further investigation is needed to determine if there are areas of contamination and their extent and severity.

3.5 WATER QUALITY AND QUANTITY

The typical section for the first alternative will reduce the existing travel lanes to 11-feet and remove the existing shoulders. It will add a 13-foot two-lane left turn lane, 7-foot buffered bike lanes, and curb and 6-foot sidewalks on each side. The typical section for the second alternative will maintain the existing 12-foot travel lanes and remove the existing shoulders. It will add a 13-foot two-way left turn lane, curb, and 8-foot sidewalks on each side.

Table 3-2 shows the required treatment and attenuation volumes for each alternative. These calculations were based on treatment for the additional impervious area only. Even though the recommended treatment method for Basin 1 is dry retention, wet detention requirements are provided based coordination during the Environmental Look-Around meetings and possible joint-use pond with the US 98 project. See **Section 6** for the presumptive water quality criteria.

Table 3-2: Required Treatment and Attenuation Volumes

Basin	Alternative 1		Alternative 2	
	Required Treatment Volume (ac-ft)*	Required Attenuation Volume (ac-ft)	Required Treatment Volume (ac-ft)*	Required Attenuation Volume (ac-ft)
1 (wet)	0.27	0.80	0.20	0.60
1 (dry)	0.14	0.80	0.10	0.60
2 (wet only)	0.16	0.41	0.12	0.30

Refer to **Appendix B** for water quality and quantity calculations for both wet detention and dry retention.

3.5.1 Basin 1 Impaired Waterbody Nutrient Loading Water Quality

Since Basin 1 is located within a waterbody that is impaired for nutrients, nutrient loading calculations are required to make sure each pond alternative is meeting the required total nitrogen (TN) and total phosphorus (TP) treatment efficiency. Dry retention is the only treatment option recommended for Basin 1 and thus only dry retention nutrient loading calculations are provided in **Table 3-3**.

Table 3-3: Basin 1 Nutrient Loading Efficiency

SMF	Required TN Treatment Efficiency (%)	Provided TN Treatment Efficiency (%)	Required TP Treatment Efficiency (%)	Provided TP Treatment Efficiency (%)
1-A-1/1-A-2	38	60	38	60
1-B	37	59	37	59
1-C	32	60	32	60

Alternative 1 typical section used for nutrient Loading efficiency calculations.

3.6 ENVIRONMENTAL LOOK-AROUND (ELA) MEETINGS

To reduce the right-of-way needs for off-site ponds and to address the treatment and attenuation for this project, Environmental Look-Around (ELA) meetings were conducted. Those attending the ELA meetings included the project study team, members of the US 98 widening design project team, FDOT staff, representatives for the City of Lakeland (COL) and Polk County, and maintenance personnel from FDOT, COL, and Polk County. The purpose of these ELA meetings was to coordinate with all stakeholders and determine a regional approach that addresses water quality for not only the Combee Road study, but also the surrounding area.

3.6.1 ELA MEETING 1

The first ELA meeting was conducted October 18, 2018, at FDOT District 1 headquarters. During this meeting, several regional approach options were discussed. There are existing permits with SWFWMD that have stormwater management facilities (SMFs) located near the study corridor. Some SMF sites are south of US 98 near Edgewood Drive and north US 98 and Polk Parkway interchange. There is also one permitted SMF site along the north side of Crystal Lake that is owned by Polk County. These sites were discussed with those present in the meeting. The design team for the US 98 widening project was also present, and there was discussion of a joint-use SMF opportunity. It was suggested that the design team could allow for additional volume in their ponds for the proposed Combee Road project. There is a parcel on the east side of Combee Road that is owned by the COL. There was discussion on using this as a pond site. Some innovative low-impact design (LID) options were considered for this project, but maintenance personnel from Polk County, COL, and FDOT would need to provide input on some of those options. The action items for this meeting included continued coordination with all involved parties to present viable alternatives at the next ELA meeting. These alternatives would then be discussed for final recommendations. The minutes for the meeting can be found in **Appendix C**.

3.6.2 ELA MEETING 2

The second ELA meeting was conducted on December 17, 2018, at the FDOT District 1 headquarters. During this meeting, there was discussion on how to address the drainage requirements in a cooperative agreement with the following involved parties: FDOT, Polk County, and the COL. Ideally, a regional approach can be implemented that benefits the watersheds and all the stakeholders. The main outcome from the meeting are as follows: The opportunity for a joint-use pond with the US 98 widening project

was not considered in the best interest of both projects, but it was still kept as a potential alternative. Polk County and the COL do not have funds to help with maintenance of innovative stormwater treatment. The FDOT would prefer SMFs and infrastructure that are low maintenance. For the basin north of Kiwanis Avenue, it was concluded that modifying the Polk County pond permit would be the most advantageous for water quality in this area. The pond has available volume, and retrofitting the existing closed flume inlets along Crystal Lake into curb inlets can be done to pipe the runoff to the pond. This is a recommendation found in the COL Crystal Lake TMDL Implementation Final Report. An excerpt of this report can be found in **Appendix C**. A regional alternative does not seem to be suitable for the basin south of Kiwanis Avenue. Pond site alternatives will be analyzed for this basin and are to be presented at the final ELA meeting. The minutes for the meeting can be found in **Appendix C**.

3.6.3 ELA MEETING 3

The third ELA meeting was conducted on February 19, 2019, at the FDOT District 1 headquarters. The COL parcel originally pursued as an option was not viable because of its use as a maintenance facility for Lakeland Electric. This parcel was no longer an option to pursue in the southern basin. The PD&E staff coordinated with the US 98 design team further. The US 98 design team plans to modify Pond 2A, currently permitted by FDOT. The available volume in the modified pond may help meet some of the water quality and quantity needs for the Combee Road project. FDOT staff recommended that the PD&E staff still pursue a traditional pond siting analysis for the southern basin since the construction and permitting of the US 98 project may or may not correspond to the design and construction of the Combee Road Project.

For the northern basin, which is part of the Saddle Creek basin and discharges into Crystal Lake, the preferred alternative is to use the Polk County pond that is located north of Crystal Lake. This improvement was an alternative recommended in the COL TMDL report. It was discussed that the preparation of a maintenance agreement between the County and FDOT should be started now, with the PD&E study.

Action items for this last meeting included further coordination with Polk County to address maintenance items and to pursue a traditional pond siting analysis for the southern basin.

3.7 POND EVALUATION

3.7.1 OPTION 1 – CITY OF LAKELAND PARCEL

The first option considered was a COL-owned parcel located on the east side of Combee Road, just north of the Eaton Park substation. The parcel is currently being used as maintenance access by Lakeland Electric for the Eaton Park substation. After coordination with the COL and Lakeland Electric, the parcel was deemed not a suitable alternative for the proposed pond for Basin 1. Refer to **Appendix E** for the correspondence and coordination with the COL.

3.7.2 OPTION 2 – INNOVATIVE TECHNOLOGY

Another option for Basin 1 was to consider innovative alternatives, such as hydrodynamic separators or tree box filters to address water quality concerns. FDOT, Polk County, and COL all stated that their maintenance departments were unable to provide the funds or staff necessary to maintain such

alternatives. Therefore, this option was not considered feasible. Refer to **Appendix E** for coordination with Polk County concerning these alternatives.

3.7.3 OPTION 3 – JOINT-USE

Another option considered during the ELA meetings, was to provide a joint-use pond to be used by both the Combee Road project and a project currently in design along US 98 from Edgewood Drive to Main Street. The US 98 project, at the time of writing this report, is undergoing its own Pond Siting Report. The preferred pond site for this project is to modify the existing permitted FDOT Pond 2A, which was permitted under the US 98 South of Brooks Street to South of Edgewood Drive North road project under SWFWMD Permit No. 44019176.001. The permitted pond provides 0.73 ac-ft of treatment volume. The US 98 project plans to accommodate an additional 0.38 ac-ft of volume. The project only needs 0.10 ac-ft of volume, leaving an additional 0.28 ac-ft of available volume for the Combee Road project. This option provides the treatment volume needed for Basin 1. The US 98 project is planning to overattenuate the existing run-off going into the pond. This may address some of the attenuation volume for Combee Road. If this option is used, it is still likely that another pond site or alternative will be needed to address the remaining treatment and/or attenuation needs for Basin 1. This is because if the US 98 pond is used for compensatory treatment, that volume of water cannot be used as treatment for any other parts of the US 98 project. Therefore, this option would require coordination with the adjacent US 98 project and was found not to be feasible. Refer to **Appendix E** for the correspondence and coordination with the US 98 design team.

3.7.4 POND SITE ALTERNATIVES

3.7.4.1 Basin 1

For the southern portion of the project, Basin 1, no regional alternatives were viable. Therefore, a traditional pond siting analysis was conducted for this basin and three potential pond sites were identified.

The size and calculations for these ponds was based on a dry retention pond, as the soils are relatively sandy with a lower groundwater table. Likewise, some of these ponds are adjacent to the CSX rail lines, which does not allow standing water adjacent to the railway road bed. Refer to **Appendix B** for preliminary pond sizing calculations. The southern basin is also impaired for nutrients. **Appendix B** contains calculations for nutrient loading requirements.

The final option is to consider traditional pond sites to accommodate the treatment and attenuation volume for the project. If the joint-use option with the US 98 project is available, the remaining treatment and/or attenuation volume for this project still needs to be addressed. To be conservative, pond alternatives were sized to provide all water quality and water quantity requirements. See **Appendix D** for an exhibit of these pond sites. **Appendix D** contains the cost estimates relating to each pond site.

3.7.4.1.1 SMF 1-A

The first site alternative, SMF 1-A, is located on the Ridley USA Incorporated site, along the west side of the Combee Road corridor south of McJunkin Road and north of Lyon Drive. If the pond inflow piping is along McJunkin Road, the pond can be placed north in the property adjacent to McJunkin Road (SMF1-A-1).

If the pond inflow piping is brought along Lyonal Drive, the pond would be placed towards the back of the property, adjacent to the CSX track that runs parallel to US 98 (SMF1-A-2). This inflow would require less piping, but it will require a jack and bore pipe under the CSX spur line.

In both scenarios, the final outfall to this pond would be to the US 98 ditches. There is an existing 48-inch outfall pipe under the CSX rail line that discharges to the US 98 ditch. The control structure for this pond could tie to that pipe. The US 98 ditches are the existing outfall for Basin 1.

Hydraulically, this alternative is viable, as the site is towards the end of the existing trunk line and discharges to an existing pipe going to the US 98 ditches.

According to the CSX Public Project Information Manual, ponding against the CSX roadbed is not allowed. Therefore, this pond would need to be a dry pond, avoiding water adjacent to the roadbed. See **Appendix D** for an excerpt from the manual and **Appendix D** for an exhibit of the pond site. The SHGWT in this area was based on the NRCS which is approximately 1-ft below existing ground. The pond control elevation is set 1-ft above the estimated SHGWT.

3.7.4.1.2 SMF 1-B

The second site alternative, SMF 1-B, is located along the east side of Combee Road, south of Maine Avenue. It encompasses four residential sites and one FDOT-owned site. Two of the sites are empty parcels and two have residences. This alternative would require the relocation of two households.

This site is hydraulically viable. It is near the southern end of the project, with inflow and outflow along the main trunk line of Combee Road. See **Appendix D** for an exhibit of this pond site. The SHGWT in this area was based on the NRCS which is approximately 3.5-ft below existing ground. The pond control elevation is set 1-ft above the estimated SHGWT.

3.7.4.1.3 SMF 1-C

The third site alternative, SMF 1-C, is located on the east side of Combee Road, just south of the CSX rail line. The site is currently a business location. The pond should be able to fit within the back portion of the property to avoid disrupting the location of the business in the front.

Of the proposed pond sites, this pond site is the least hydraulically feasible. It is the northern most pond site within Basin 1. It would require compensatory treatment, capturing all the impervious area in the northern portion of this basin and treating all the directly connected impervious area to provide for the treatment volume needed. The pond alternatives can likely meet the treatment volume requirement by only capturing half of the roadway. If this pond site is used, the remaining portion of the basin to the south would have to discharge untreated.

This pond is also adjacent to the CSX roadbed and, therefore, should follow the requirements set out by the CSX Public Project Information, as described in Section 3.7.4.1. See **Appendix D** for an exhibit of this pond site. The SHGWT in this area was based on the NRCS which is approximately 6-ft below existing ground. The pond control elevation is set 1-ft above the estimated SHGWT.

3.7.4.2 Basin 2

Water quality needs can be provided through a regional approach that combines an existing pond (SMF 2A-2) and converting an existing ditch to a pond (SMF 2A-1). This is the only pond siting analysis option for this basin.

3.7.4.2.1 SMF 2A-1

SMF 2A-1 is located along the west side of Combee Road, between South Lake Drive and Skyview Drive. The pond site is an existing ditch that will be converted to a pond. This wet detention pond site can treat a portion of the additional Basin 2 pavement area. See **Appendix D** for an exhibit of this pond site.

3.7.4.2.2 SMF 2A-2

From the ELA meetings, it was concluded that the Basin 2 water quality requirements can be provided in the Polk County pond north of the lake (SMF 2A-2). This wet detention pond site can treat a portion of the additional Basin 2 pavement area and attenuate the entire Basin 2 additional pavement area. See **Appendix D** for an exhibit of the recommended pond for Basin 2.

Table 3-4 provides the available volume in the Polk County pond and the volume required for the northern basin.

Table 3-4: Basin 2 Volume Availability and Needs

Polk County Pond Available Volume (ac-ft)	Basin 2 Volume Water Quality and Quantity Needs (ac-ft)*
0.92	0.42

*These values assume wet detention stormwater management facilities and one-inch of runoff treatment over the additional impervious area.

Reviewing the North Crystal Lake Drive Drainage Improvements permit, the existing pond is only providing about 0.5' of freeboard for the 25yr stage even though the pond is providing excess treatment and attenuation volume. To make this pond work an additional control structure and/or smart structure within the FDOT R/W to control the max stage on the pond will be required.

3.7.5 COST ESTIMATES

Construction and right-of-way costs were developed for the pond sites for Basin 1 and 2. **Tables 3-5 & 3-6** below gives a summary of those costs for each pond site.

Table 3-5: Basin 1 Pond Site Cost Estimates

	SMF-1-A-1/-2*	SMF-1-B	SMF-1-C
Construction Costs	\$206,425/\$298,100	\$139,500	\$171,419
Right-of-way	\$270,000	\$740,000	\$300,000
Total	\$476,425/\$568,100	\$879,500	\$471,419

*The difference in cost reflects the inflow pipe costs for piping along McJunkin Road versus Lyonel Drive.

Table 3-6: Basin 2 Pond Site Cost Estimates

	SMF-2A-1	SMF-2A-2
Construction Costs	\$19,900	\$93,013
Right-of-way	\$43,000	N/A
Total	\$155,913	

POND SITING MATRIX

These sites were compared and evaluated using a pond siting matrix, where various considerations were ranked from 1 to 10, with 10 being the most desirable alternative. **Table 3-7** shows the considerations and the qualifications for making a pond site more advantageous. **Appendix D** has the final Pond Siting matrix with scores and ranks. Note, the preferred pond site was SMF 1-A, with a score of 100 points.

Table 3-7: Pond Matrix Considerations

Consideration	Comments for most advantageous
R/W cost	The lowest cost
Construction Cost	The lowest cost
Pond Size	Smallest, most efficient use of space
Land Use	The one that does not impede growth or disrupt growth/development
Hydraulic Feasibility	Closest to the corridor and outfall Closest to the low point in the basin
Utilities	Least amount of utility conflicts
Contamination	Least likely to have contamination
Threatened and Endangered Species	Little to no impacts to species
Wetlands	Little to no impacts to wetlands
Section 4(f)	Little to no impacts to 4(f) properties
Construction	Easiest to construct, proximity to corridor
Maintenance	Easiest to maintain
Aesthetics	Out of view to the public or aesthetic appeal
Public Opinion and Adjacent Residency Concerns	Most likely to be agreeable to the public

4.0 FLOODPLAIN IMPACTS

The FEMA FIRM for Polk County was used to identify potential floodplain and floodway encroachments. According to the existing FEMA FIRM Panel No. 12105C0320G (included in **Appendix A**), only one location within the project limits is located within the 100-year floodplain. At the intersection of Combee Road and North Crystal Lake Drive there is a floodplain designated Zone A. In addition, Crystal Lake has a 100-year floodplain designated Zone AE (elevation 139.1). Because the existing roadway is proposed to be widened within this area, floodplain impacts are anticipated and will need to be addressed during design. During the design phase for this project, the SWFWMD hydraulic models will need to be updated to include the proposed improvements to Combee Road. Correspondence with Polk County regarding floodplain risks for this project can be found in **Appendix E**.

5.0 WETLAND IMPACTS

The existing wetlands within the project corridor include Crystal Lake and east of Combee Road across from Crystal Lake. Minor impacts to these wetlands are anticipated given the widening of the roadway, proposed sidewalk, and proposed roundabout. Gravity walls behind the sidewalk and other mitigation measures may be feasible to minimize wetland impacts. Additional information regarding wetland impacts is provided in the Natural Resources Evaluation (NRE) provided under separate cover.

6.0 PERMIT REQUIREMENTS

The project will require an Individual Environmental Resource Permit from SWFWMD. The following is the required design criteria for SWFWMD.

- Water quality treatment is required for the first one-half inch of runoff from the additional impervious area for dry retention;
- Water quality treatment is required for the first one inch of runoff from the additional impervious area for wet detention;
- Total treatment volume for dry retention shall be available within 72 hours;
- Treatment volume for wet detention shall be discharged in no less than 120 hours with no more than one-half the total volume discharged within the first 60 hours;
- In open drainage basins, the post-development peak discharge rate shall not exceed that of the pre-development for the SWFWMD 25-year, 24-hour storm event;

A Pre-Application meeting was conducted with SWFWMD on February 6, 2019. During that meeting, the water quality approach to both the southern and the northern basin was discussed. The main concern in the southern basin was that if the US 98 project pond is used for compensatory treatment, then that volume of water cannot be providing treatment for any other parts of the US 98 project.

For permitting, the Combee Road project would submit an Individual Permit application. A letter of minor modification or administrative authorization will be added to the US 98 permit, the Combee Road Permit No. 4722081, and the Crystal Lake pond Permit No. 4010422 for the treatment and attenuation volumes to be utilized from their permitted stormwater management facilities. Please see **Appendix E** for Pre-Application meeting minutes.

7.0 RESULTS AND RECOMMENDATIONS

For Basin 1, the recommended alternative is to utilize, as much as possible, the compensatory treatment and attenuation volume in the US 98 modified FDOT Pond 2A. During design, coordination with FDOT and the US 98 design team is recommended to coordinate the available volume in their pond. SMF 1-A can be used to provide any additional treatment or attenuation volume required. The configuration of the pond (SMF 1-A-1 or SMF 1-A-2) can be finalized in the design phase, when survey and geotechnical information is available. It is important that the design team coordinate with Polk County as both McJunkin Road and Lyon Drive are maintained by the County.

For Basin 2, water quality needs can be provided through a regional approach that combines the existing pond on the north side of Crystal Lake (SMF 2A-2) and by converting the existing ditch between South Crystal Lake Drive and Skyview Drive into a pond by adding a control structure (SMF 2A-1).

8.0 RESOURCES FOR ANALYSIS

The following resources were used in the analyses performed for this report.

- Florida Department of Environmental Protection MapDirect
- FEMA FIRMs
- FDOT Drainage Manual, 2020
- SWFWMD Aerials
- Field Reviews
- LiDAR contour elevation information
- Topographic Survey
- NRCS Web Soil Survey

APPENDIX A: Exhibits

VERTCON Datum Information

Typical Sections

Soil Information

WBID Information

Drainage Basin Delineation

FEMA Information

Polk Water Atlas

Questions concerning the VERTCON process may be mailed to [NGS](#)

Latitude: 28 01 00.750

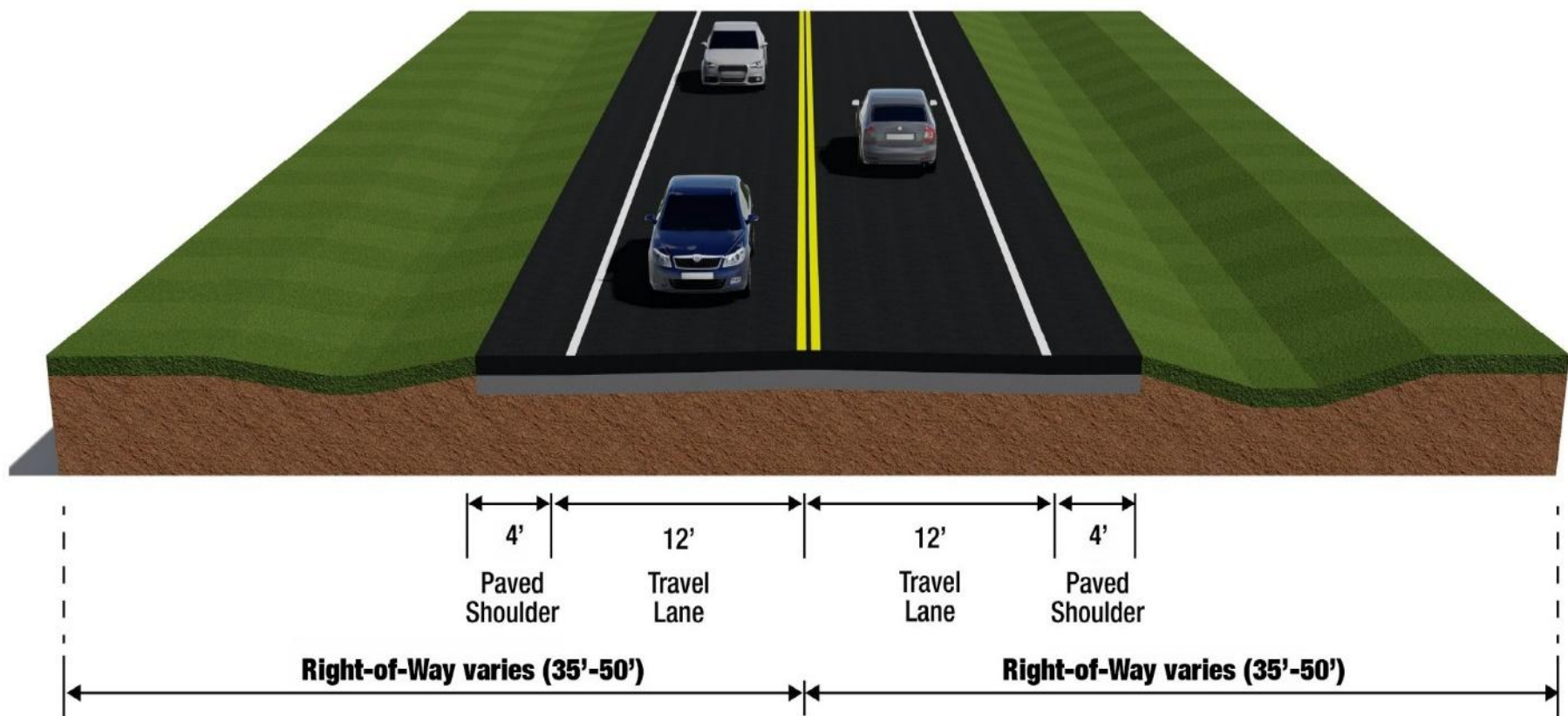
Longitude: 081 54 27.850

NGVD 29 height: 1.00 FT

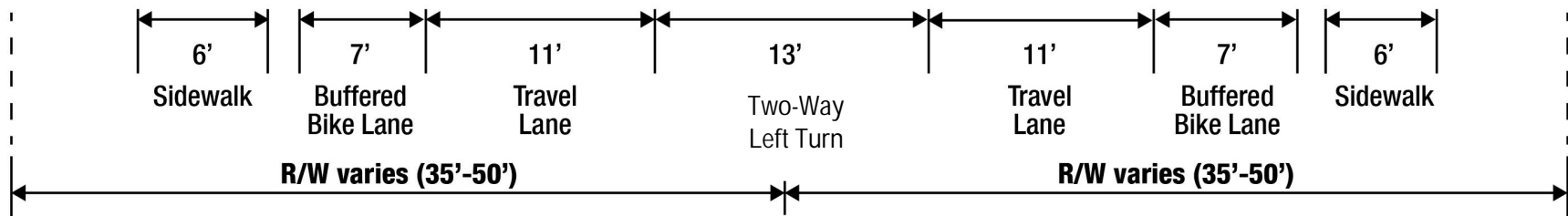
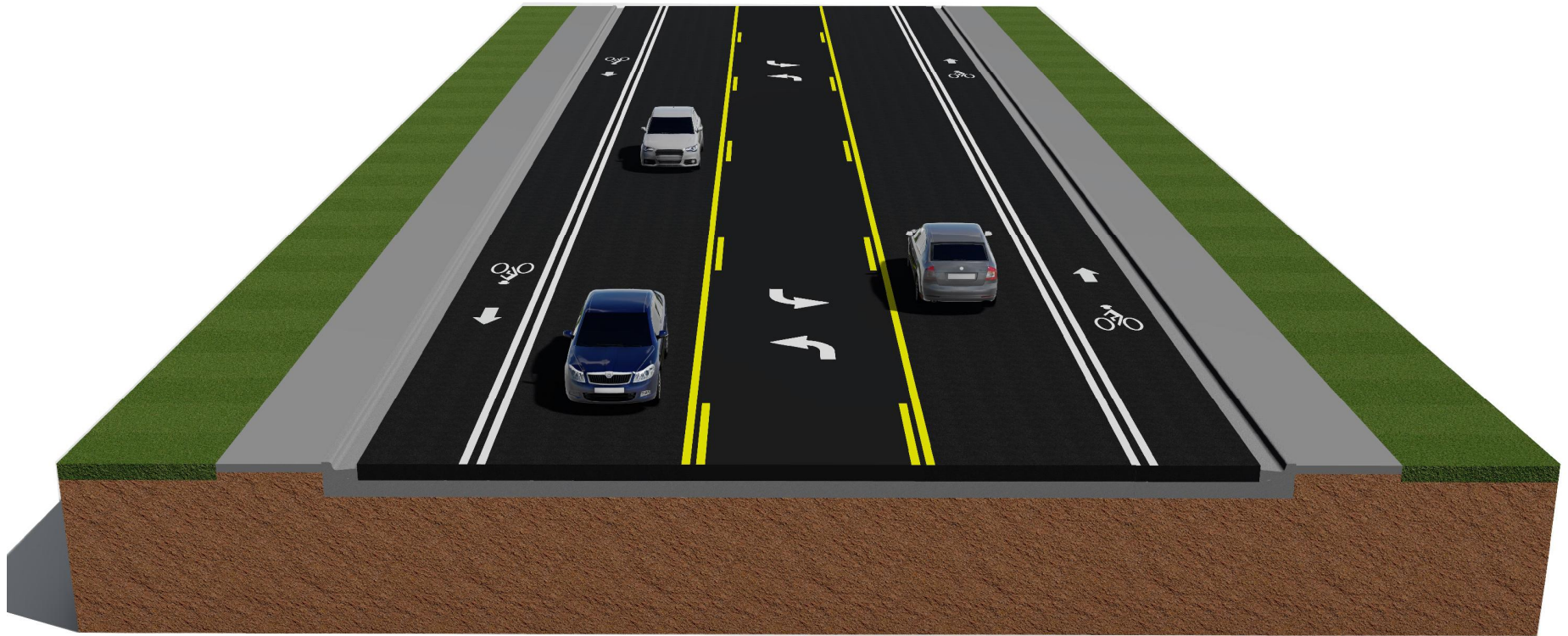
Datum shift(NAVD 88 minus NGVD 29): -0.886 feet

Converted to NAVD 88 height: 0.114 feet

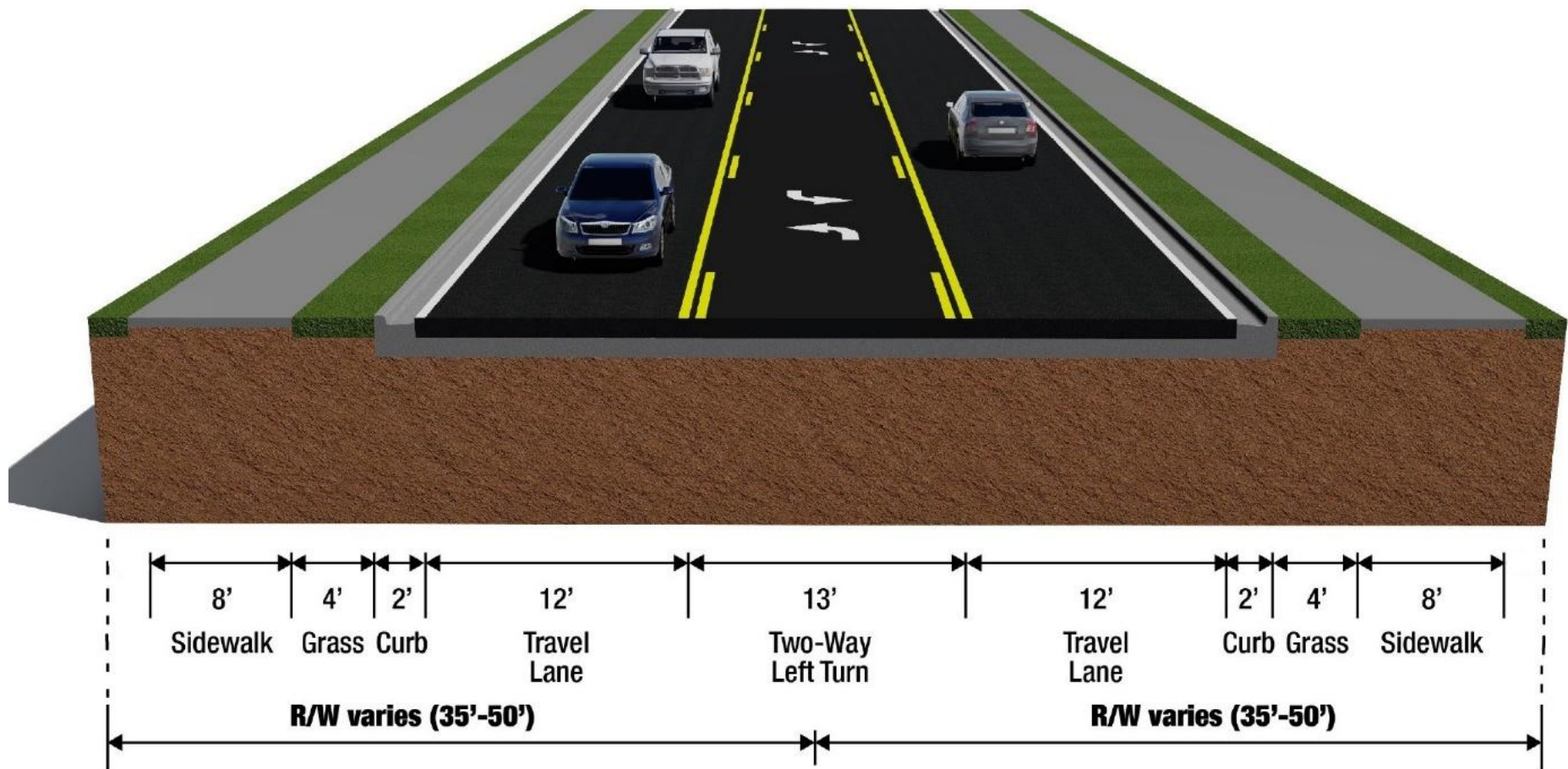
Existing Typical Section



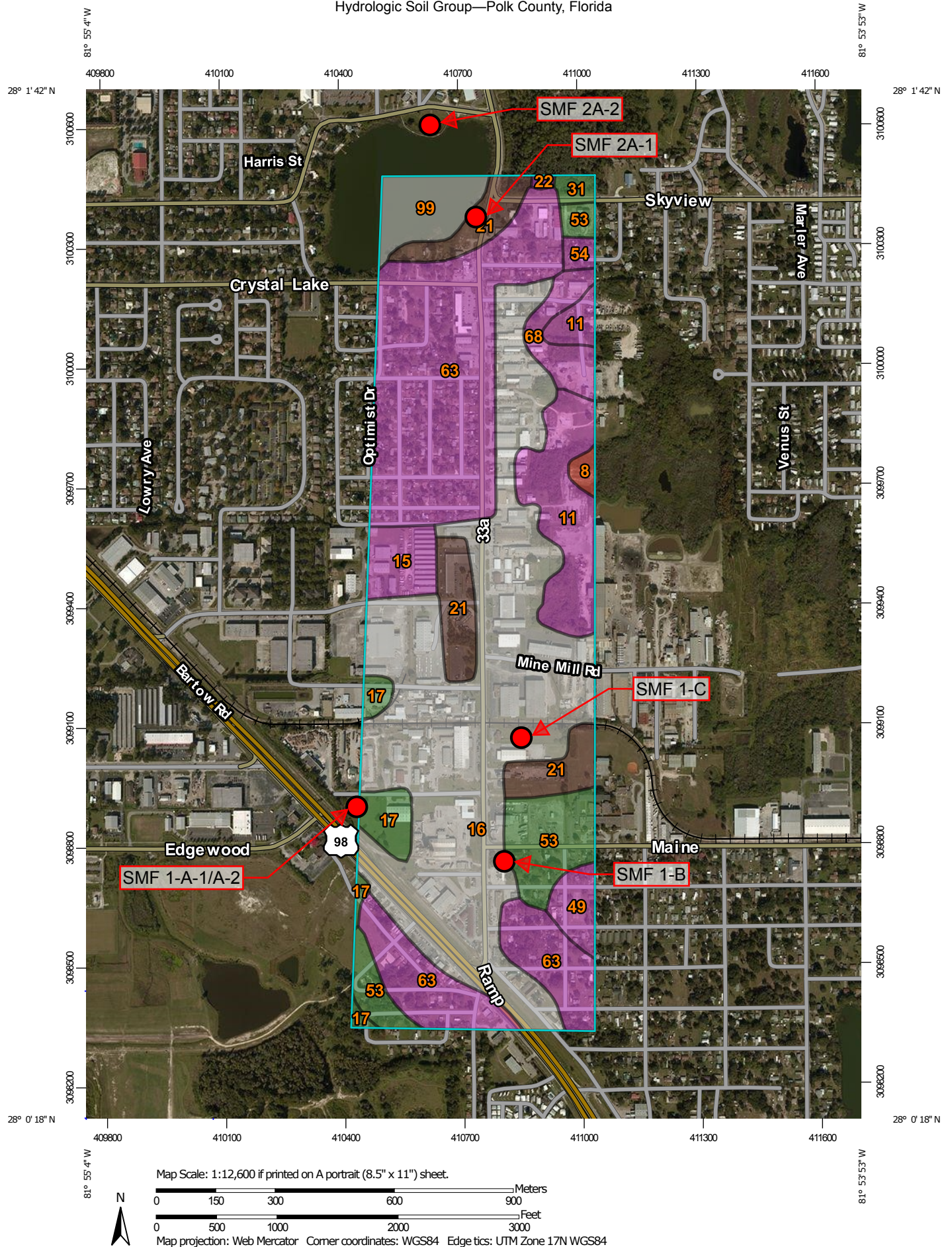
Alternative 1



Alternative 2



Hydrologic Soil Group—Polk County, Florida



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines


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

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Polk County, Florida

Survey Area Data: Version 14, Sep 28, 2016

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

Date(s) aerial images were photographed: Nov 28, 2014—Dec 9, 2014

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Polk County, Florida (FL105)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Hydraquents, clayey	D	1.4	0.5%
11	Arents-Water complex	A	22.4	7.3%
15	Tavares fine sand, 0 to 5 percent slopes	A	7.5	2.5%
16	Urban land		117.7	38.6%
17	Smyrna and Myakka fine sands	A/D	7.5	2.5%
21	Immokalee sand	B/D	20.8	6.8%
22	Pomello fine sand	A	0.5	0.1%
31	Adamsville fine sand, 0 to 2 percent slopes	A/D	1.7	0.6%
49	Adamsville-Urban land complex	A	4.9	1.6%
53	Myakka-Immokalee-Urban land complex	A/D	18.6	6.1%
54	Pomello-Urban land complex	A	1.6	0.5%
63	Tavares-Urban land complex	A	83.0	27.2%
68	Arents, 0 to 5 percent slopes	A	7.4	2.4%
99	Water		9.9	3.2%
Totals for Area of Interest			304.8	100.0%

Description

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

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

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

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

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

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

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

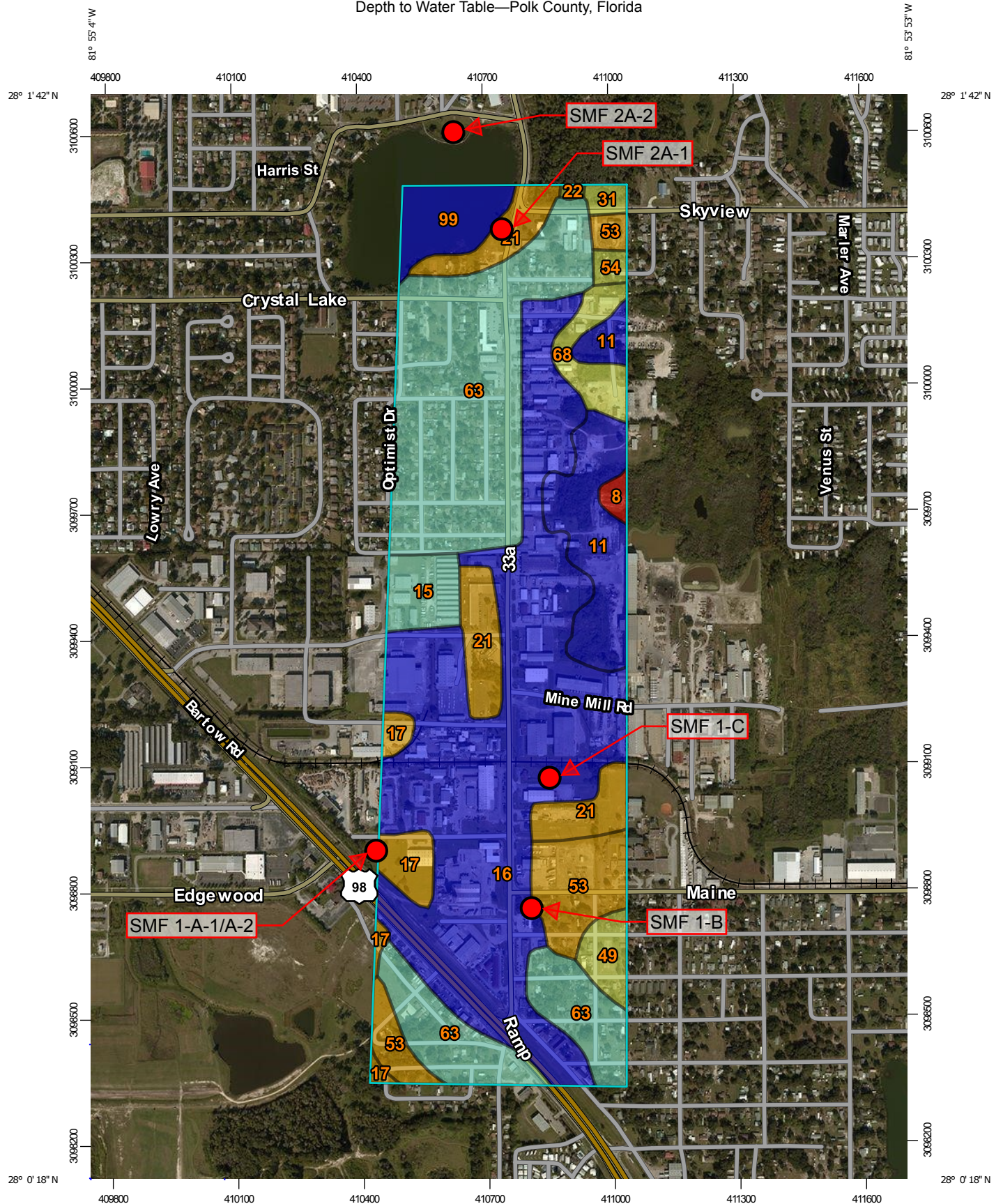
Rating Options

Aggregation Method: Dominant Condition

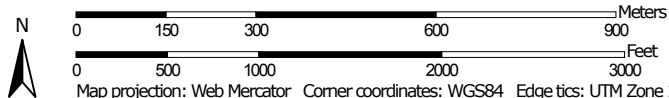
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Water Table—Polk County, Florida



Map Scale: 1:12,600 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

8/2/2017
Page 1 of 4



MAP LEGEND

Area of Interest (AOI)


 Area of Interest (AOI)

Soils







Soil Rating Polygons


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

Soil Rating Lines

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

Soil Rating Points






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

 Not rated or not available


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 14, Sep 28, 2016

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

Date(s) aerial images were photographed: Nov 28, 2014—Dec 9, 2014

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

Depth to Water Table

Depth to Water Table— Summary by Map Unit — Polk County, Florida (FL105)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
8	Hydraquents, clayey	0	1.4	0.5%
11	Arents-Water complex	>200	22.4	7.3%
15	Tavares fine sand, 0 to 5 percent slopes	145	7.5	2.5%
16	Urban land	>200	117.7	38.6%
17	Smyrna and Myakka fine sands	31	7.5	2.5%
21	Immokalee sand	31	20.8	6.8%
22	Pomello fine sand	84	0.5	0.1%
31	Adamsville fine sand, 0 to 2 percent slopes	51	1.7	0.6%
49	Adamsville-Urban land complex	84	4.9	1.6%
53	Myakka-Immokalee-Urban land complex	31	18.6	6.1%
54	Pomello-Urban land complex	84	1.6	0.5%
63	Tavares-Urban land complex	145	83.0	27.2%
68	Arents, 0 to 5 percent slopes	92	7.4	2.4%
99	Water	>200	9.9	3.2%
Totals for Area of Interest			304.8	100.0%

Description

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

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

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

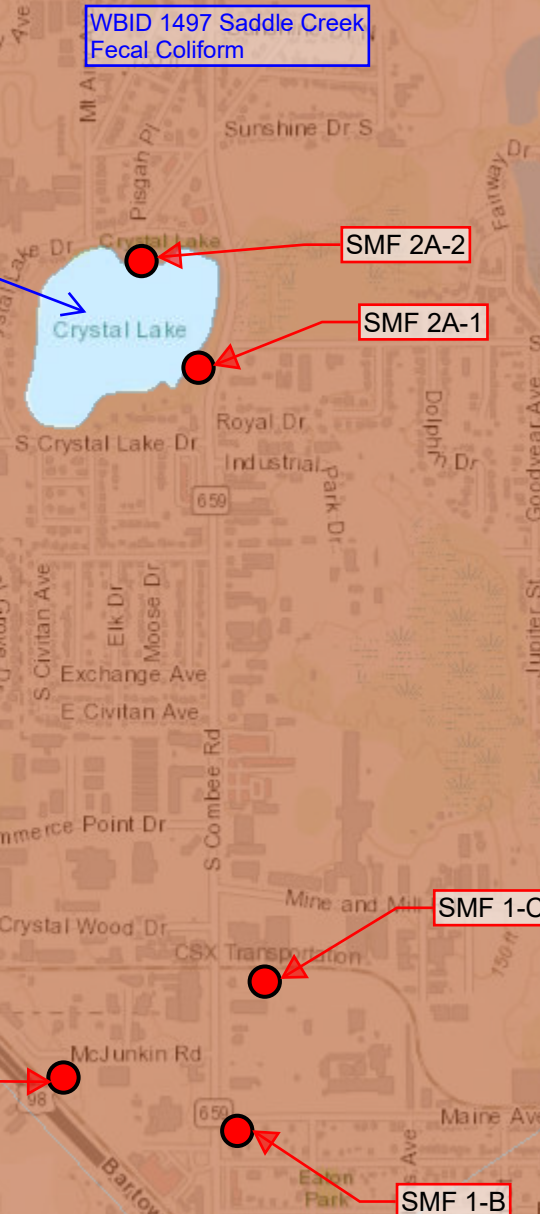
Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

DS

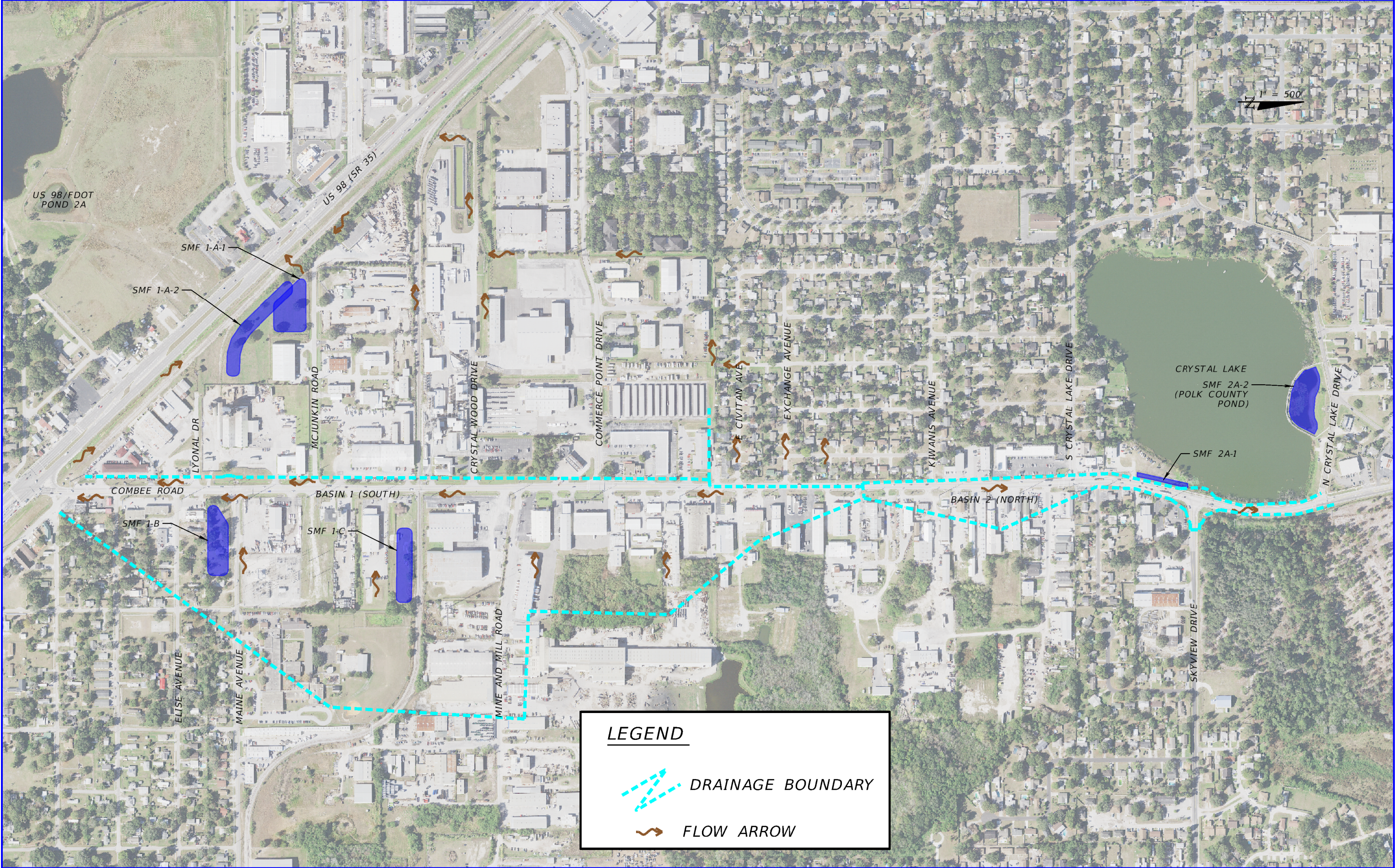


 **9ULILHGLWPH**

5

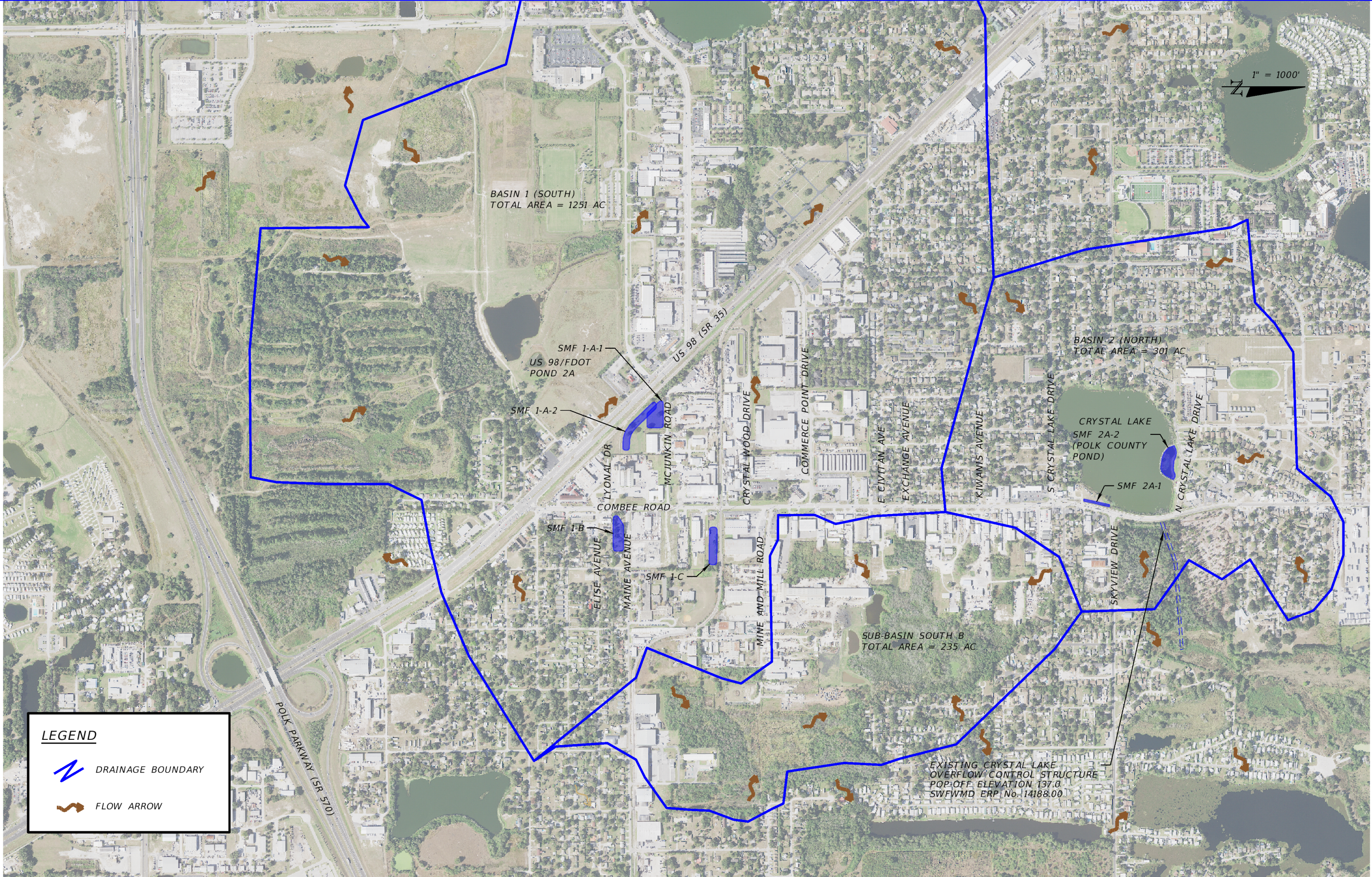
DSFUH DWHGDS' UHFW SFUHG 6 XGHLQG

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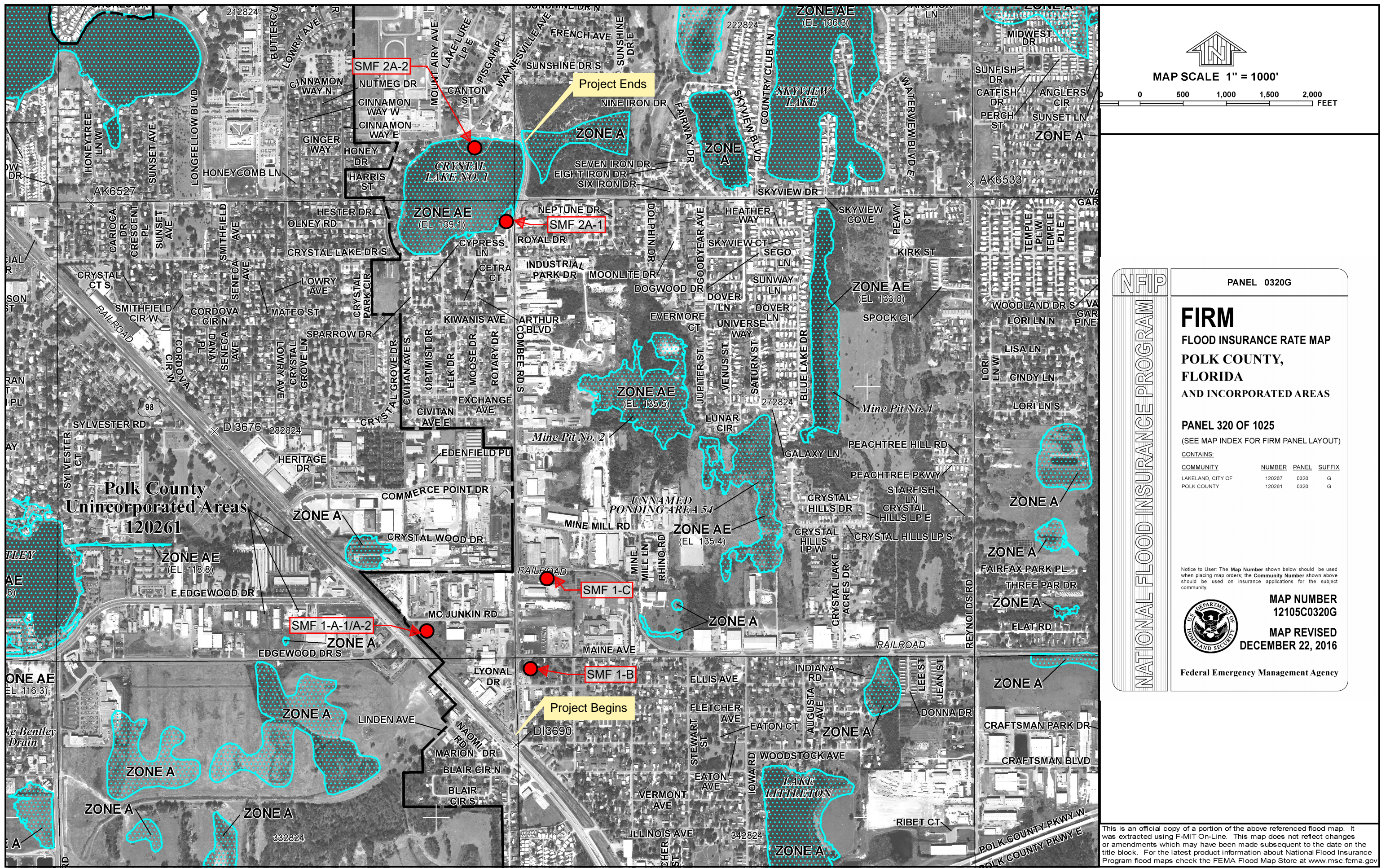


REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			DRAINAGE BASIN DELINEATION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 659	POLK	440274-1-22-01		A-5(A)

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.




REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			REGIONAL DRAINAGE DELINEATION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 659	POLK	440274-1-22-01		A-5(B)





Bathymetric Maps and Depth Information

These are the latest available contour maps of the lake's bottom. These maps can be used to determine where "holes" (deep spots) exist on the lake bottom. Such areas are often productive for fishing. [Learn more about bathymetric maps »](#)

	View Map	Details	Method	Lake Elevation
		Date: 3/16/2010 Source: POLKCO_NRD_WQ	DGPS_SONAR	131.58 ft. ()

Additional Hydrology and Geology Information

The Lake Region Classification System is a tool used for grouping lakes based on similarities in physiography, geology, soils, hydrology, water chemistry, vegetation, and climate. It was created from a cooperative effort involving the United States Environmental Protection Agency, the Florida Department of Environmental Protection, and researchers at the University of Florida's Department of Fisheries and Aquatic Sciences. There are a total of 47 Lake Region groups. These are used to provide a framework of the different types of lakes in the state so that management plans can be developed for groups of lakes with similar characteristics. [Learn more about Florida Lake Regions »](#)

The lake region this lake is located in is:

Lakeland/Bone Valley Upland (Region 7530)

The Lakeland Ridge consists of sand hills near 200 feet in elevation with many solution depression lakes. The Bone Valley Uplands tend to be more poorly drained flatwoods area. All of these areas are covered by phosphatic sand or clay. The region generally encompasses the area of most intensive phosphate mining, but phosphate deposits and mining activities are also found south of this region. As one might expect, the dominant characteristic of all lakes in this region is high phosphorus, along with high nitrogen and chlorophyll values. The lakes are alkaline with some receiving limestone-influenced groundwater.

[View a Map of the Lake Region Classification System boundaries within the Advanced Mapping Tool](#)

Advanced Data Features



Data Download and Advanced Graphing Tool

Download and/or graph water quality, hydrology, and rainfall trends using the data presented on the Atlas for use in your own analyses and reports.

APPENDIX B: Calculations

Water Quality - Wet Detention

Water Quality/Pond Sizing- Dry Retention

Nutrient Loading

**Summary of Existing Permitted Volumes (with
attached permit excerpts)**

Patel, Greene & Associates, PLLC

Designed By: DKA

Date: 8/19/2021

Checked By: KDY

Date: 8/19/2021

Subject: FPID 440274-1-22-01, Combee Road

Stormwater Management Facility Summary - Alternative 1 Typical Section

BASIN	STATIONS		PRE-DEVELOPMENT AREAS (AC)			POST-DEVELOPMENT AREAS (AC)			ADD'L DCIA (AC)	COLLECT DCIA (AC)	TOTAL TREAT. REQ. (AC-FT)	TOTAL TREAT. PROV. (AC-FT)	TOTAL ATTEN. REQ. (AC-FT)	TOTAL ATTEN. PROV. (AC-FT)	TREATMENT TYPE	POND AREA (AC)
	FROM	TO	IMP.	PER.	TOTAL	IMP.	PER.	TOTAL								
Basin 1	10+00	56+00	3.59	6.97	10.56	6.86	3.70	10.56	3.27	0.00	0.27	0.27	0.80	0.86	Wet Detention	1.0
Basin 2 SMF 2A-1 & SMF 2A-2	56+00	83+00	2.11	4.09	6.20	4.03	2.17	6.20	1.92	0.00	0.16	0.16	0.41	0.41	Wet Detention	n/a

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			3.59 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	
			65.00 ft	
Impervious Area			6.86 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Wet Detention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>1.00 in.</u>	6.86 ac	3.27 ac	0.00 ac	10.56 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required	0.27 ac-ft
Treatment Volume from existing sources (treatment types must match)*	0.00 ac-ft
Total Treatment volume required	0.27 ac-ft

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
ATTENUATION CALCULATIONS
 Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.
Pre-development Conditions

	R/W Area	Pond Area	Total Area
	<u>10.56 ac</u>	<u>1.00 ac</u>	<u>11.56 ac</u>
Total Area to be attenuated for (choose)			
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>7.97 ac</u>

CN Calculations

<u>Soil Types (provide)</u>	<u>Smryna</u>	<u>Urban Land</u>	
<u>Open Space type (choose)</u>	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
<u>HSG (choose)</u>	<u>A</u>	<u>D</u>	
<u>Percentage Basin (provide)</u>	<u>70%</u>	<u>30%</u>	
<u>CN</u>	<u>68</u>	<u>89</u>	<u>0</u>
			<u>74</u>

 Composite
 Open Space CN

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>30.43</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>7.97 ac</u>	<u>74</u>	<u>51.23</u>
		CN _{pre} =	<u>81.7</u>

SCS Method for Attenuation Volume:

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

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

$$S_{pre} = 2.25 \text{ in.}$$

$$Q_{pre} = 7.25 \text{ in.}$$
 Pre-development runoff volume = 6.99 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
Total Area to be attenuated for	10.56 ac	1.00 ac	11.56 ac
Roadway			6.86 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			4.70 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.86 ac	98	58.16
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	4.70 ac	74	30.21
CN _{post} =			88.4

SCS Method for Attenuation Volume:

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

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

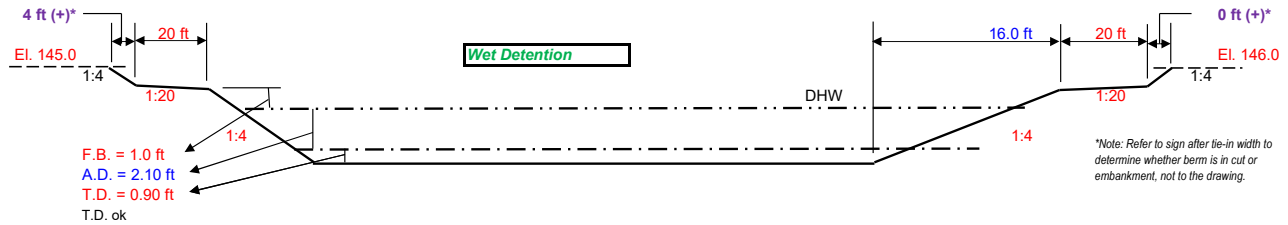
$$S_{\text{post}} = 1.32 \text{ in.}$$

$$Q_{\text{post}} = 8.08 \text{ in.}$$

$$\text{Post-development runoff volume} = 7.79 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.80 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
POND SIZE ESTIMATE

Approx. low edge of pavement elevation (LEOP) = 146.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 141.00
 Seasonal High Ground Water Elevation (SHGWT) = 141.00
 SHGWT Check for Dry Retention Only N/A
 Tailwater Elevation (TW) = 141.00
 Allowable High Water (AHW) = 144.61
 Design Highwater (DHW) = 144.00
 Head loss (0.08%) from LEOP to SMF (435 ft) = 0.35 ft
 Head loss (0.08%) from SMF to Outfall (55 ft) = 0.04 ft
 Available depth for T.D. + A.D. = 3.00 ft

SHGWT Existing ground at pond site is EL. 145. Estimated SHGWT is 3.5 ft below ground based on soil map

*TW elevation source:

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
 Treatment volume provided
 Long Rectangular dimension at pond bottom (R1)
 Short Rectangular dimension at pond bottom (R2)
 Attenuation volume provided
 Long Rectangular dimension at tie-in (R1)
 Short Rectangular dimension at tie-in (R2)

0.30 ac
0.27 ac-ft
229 ft
57 ft
0.86 ac-ft
305 ft
133 ft

Treatment Volume Required
 0.27 ac-ft
 Attenuation Volume Required
 0.80 ac-ft

Minimum Total Area Required:

1.00 ac

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 2 - Required Treatment and Attenuation

	<u>Pre</u>	<u>Post</u>
From Station	56+00	56+00
To Station	83+00	83+00
Basin Length	2700.00 ft	2700.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	6.20 ac	6.20 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			2.11 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	
			65.00 ft	
Impervious Area			4.03 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)
 Runoff Treatment
 Area to be Treated (choose)

Wet Detention
1.00 in.
Add'l DCIA

Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
4.03 ac	1.92 ac	0.00 ac	6.20 ac

Treatment Volume required
 Treatment Volume from existing sources (treatment types must match)*
 Total Treatment volume required
 *referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

0.16 ac-ft
0.00 ac-ft
0.16 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose)

Yes
Zone 8
25-yr
24-hr
9.5 in.

Zone (choose)

Frequency (choose)

Time (choose)

Precipitation Depth

Pre-development Conditions

R/W Area	Pond Area	Total Area
6.20 ac	0.00 ac	6.20 ac

Total Area to be attenuated for (choose)

Roadway	2.11 ac
Gravel Roads	0.00 ac
Gravel Roads	0.00 ac
Gravel Roads	0.00 ac
Gravel Roads	0.00 ac
Gravel Roads	0.00 ac
Gravel Roads	0.00 ac
Open Space	4.09 ac

CN CalculationsSoil Types (provide)Open Space type (choose)HSG (choose)Percentage Basin (provide)CN

Urban Land	Tavares	Arents	
Open Space (Good >75%)	Open Space (Fair 50%-75%)	Open Space (Poor <50%)	
A	A	A	Composite
50%	30%	20%	Open Space CN
98	49	68	77

Area	CN	Weighted CN
Roadway	98	33.35
Gravel Roads	81	0.00
Gravel Roads	81	0.00
Gravel Roads	81	0.00
Gravel Roads	81	0.00
Gravel Roads	81	0.00
Gravel Roads	81	0.00
Open Space	77	50.99
CN _{pre} =		84.3

SCS Method for Attenuation Volume:

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

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

$$S_{pre} = 1.86 \text{ in.}$$

$$Q_{pre} = 7.59 \text{ in.}$$

$$\text{Pre-development runoff volume} = 3.92 \text{ ac-ft}$$

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section

ATTENUATION CALCULATIONS (CONT.)

Post-development Conditions

	R/W Area	Pond Area	
Total Area to be attenuated for	6.20 ac	0.00 ac	6.20 ac
Roadway			4.03 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			2.17 ac

CN Calculations	Area	CN	Weighted CN
Roadway	4.03 ac	98	63.70
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	2.17 ac	77	27.06
CN _{post} =			90.8

SCS Method for Attenuation Volume:

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

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

$$S_{\text{post}} = 1.02 \text{ in.}$$

$$Q_{\text{post}} = 8.38 \text{ in.}$$

$$\text{Post-development runoff volume} = 4.33 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.41 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
Basin 2 - Provided Treatment and Attenuation

SMF 2A-1 (Treatment Only)

	<u>Pre</u>	<u>Post</u>
From Station	56+00	56+00
To Station	75+00	75+00
Basin Length	1900.00 ft	1900.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	4.36 ac	4.36 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	

Impervious Area **34.00 ft**
 Impervious Area **1.48 ac**

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	

Impervious Area **65.00 ft**
 Impervious Area **2.84 ac**

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Wet Detention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>1.00 in.</u>	2.84 ac	1.35 ac	0.00 ac	4.36 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required
 Treatment Volume from existing sources (treatment types must match)*
 Total Treatment volume required

0.11 ac-ft
0.00 ac-ft
0.11 ac-ft

0.06 ac-ft Provided

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

PROVIDED TREATMENT CALCULATIONS

Convert Ditch to Linear Pond:

Ditch Geometry				Treatment Depth	Treatment Volume
Side Slope	Bottom Width	Side Slope	Length		
1:4	6.0 ft	1:4	280 ft	1.0 ft	0.06 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section

SMF 2A-2 (Treatment and Attenuation)

	<u>Pre</u>	<u>Post</u>
From Station	75+00	75+00
To Station	83+00	83+00
Basin Length	800.00 ft	800.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	1.84 ac	1.84 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			0.62 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	
			65.00 ft	
Impervious Area			1.19 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Wet Detention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>1.00 in.</u>	1.19 ac	0.57 ac	0.00 ac	1.84 ac
Area to be Treated (choose)	<u>Total Imp. Area</u>				

Treatment Volume required	<u>0.10 ac-ft</u>	Treat Total Imp. Area
Treatment Volume from existing sources (treatment types must match)*	<u>0.00 ac-ft</u>	
Total Treatment volume required	<u>0.10 ac-ft</u>	

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

TOTAL TREATMENT CALCULATIONS

Total Required Treatment Volume:	0.16 ac-ft	
Total Provided Treatment Volume:	0.06 ac-ft	SMF 2A-1
	0.10 ac-ft	SMF 2A-2
	0.16 ac-ft	Total

TOTAL ATTENUATION CALCULATIONS

SMF 2A-2 To Provide Attenuation for Basin 2 Existing pond currently provides additional volume that will be used for this project.

Patel, Greene & Associates, PLLC

Designed By: DKA
Date: 8/19/2021
Checked By: KDY
Date: 8/19/2021

Subject: FPID 440274-1-22-01, Combee Road
Stormwater Management Facility Summary - Alternative 2 Typical Section

BASIN	STATIONS		PRE-DEVELOPMENT AREAS (AC)			POST-DEVELOPMENT AREAS (AC)			ADD'L DCIA (AC)	COLLECT DCIA (AC)	TOTAL TREAT. REQ. (AC-FT)	TOTAL TREAT. PROV. (AC-FT)	TOTAL ATTEN. REQ. (AC-FT)	TOTAL ATTEN. PROV. (AC-FT)	TREATMENT TYPE	POND AREA (AC)
	FROM	TO	IMP.	PER.	TOTAL	IMP.	PER.	TOTAL								
Basin 1	10+00	56+00	3.59	6.97	10.56	6.02	4.54	10.56	2.43	0.00	0.20	0.20	0.60	0.66	Wet Detention	0.8
Basin 2 SMF 2A-1 & SMF 2A-2	56+00	83+00	2.11	4.09	6.20	3.53	2.67	6.20	1.43	0.00	0.12	0.13	0.30	0.30	Wet Detention	n/a

Patel, Greene & Associates, PLLC

Designed By: DKA
 Date: 6/17/2021
 Checked By: KDJ
 Date: 6/17/2021

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2
 SMF Name: Basin 1

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
			Impervious Area	3.59 ac

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Sidewalk	8.00 ft	2	16.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
			Impervious Area	6.02 ac

TREATMENT CALCULATIONS

Treatment Type (choose)	Wet Detention	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	1.00 in.	6.02 ac	2.43 ac	0.00 ac	10.56 ac
Area to be Treated (choose)	Add'l DCIA				

Treatment Volume required	0.20 ac-ft
Treatment Volume from existing sources (treatment types must match)*	0.00 ac-ft
Total Treatment volume required	0.20 ac-ft

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2
ATTENUATION CALCULATIONS
 Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.
Pre-development Conditions

	R/W Area	Pond Area	Total Area
	<u>10.56 ac</u>	<u>0.80 ac</u>	<u>11.36 ac</u>
Total Area to be attenuated for (choose)			
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>7.77 ac</u>

CN Calculations

<u>Soil Types (provide)</u>	<u>Smryna</u>	<u>Urban Land</u>	
<u>Open Space type (choose)</u>	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
<u>HSG (choose)</u>	<u>A</u>	<u>D</u>	
<u>Percentage Basin (provide)</u>	<u>70%</u>	<u>30%</u>	
<u>CN</u>	<u>68</u>	<u>89</u>	<u>0</u>
			<u>74</u>

 Composite
 Open Space CN

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>30.97</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>7.77 ac</u>	<u>74</u>	<u>50.82</u>
		CN _{pre} =	<u>81.8</u>

SCS Method for Attenuation Volume:

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

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

$$S_{pre} = 2.23 \text{ in.}$$

$$Q_{pre} = 7.27 \text{ in.}$$

$$\text{Pre-development runoff volume} = 6.88 \text{ ac-ft}$$

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	0.80 ac	11.36 ac
Total Area to be attenuated for			
Roadway			6.02 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			5.34 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.02 ac	98	51.93
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	5.34 ac	74	34.93
CN _{post} =			86.9

SCS Method for Attenuation Volume:

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

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

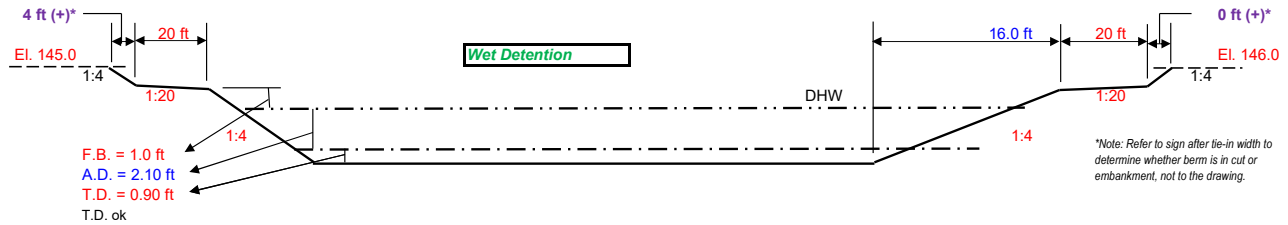
$$S_{\text{post}} = 1.51 \text{ in.}$$

$$Q_{\text{post}} = 7.90 \text{ in.}$$

$$\text{Post-development runoff volume} = 7.48 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.60 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2
POND SIZE ESTIMATE

Approx. low edge of pavement elevation (LEOP) = 146.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 141.00
 Seasonal High Ground Water Elevation (SHGWT) = 141.00
 SHGWT Check for Dry Retention Only N/A
 Tailwater Elevation (TW) = 141.00
 Allowable High Water (AHW) = 144.61
 Design Highwater (DHW) = 144.00
 Head loss (0.08%) from LEOP to SMF (435 ft) = 0.35 ft
 Head loss (0.08%) from SMF to Outfall (55 ft) = 0.04 ft
 Available depth for T.D. + A.D. = 3.00 ft

SHGWT Existing ground at pond site is EL 145. Estimated SHGWT is 3.5 ft below ground based on soil map

*TW elevation source:

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
 Treatment volume provided
 Long Rectangular dimension at pond bottom (R1)
 Short Rectangular dimension at pond bottom (R2)
 Attenuation volume provided
 Long Rectangular dimension at tie-in (R1)
 Short Rectangular dimension at tie-in (R2)

0.22 ac
0.20 ac-ft
196 ft
49 ft
0.66 ac-ft
272 ft
125 ft

Treatment Volume Required
 0.20 ac-ft
 Attenuation Volume Required
 0.60 ac-ft

Minimum Total Area Required:

0.80 ac

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 2 - Required Treatment and Attenuation

	<u>Pre</u>	<u>Post</u>
From Station	56+00	56+00
To Station	83+00	83+00
Basin Length	2700.00 ft	2700.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	6.20 ac	6.20 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			2.11 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	8.00 ft	2	16.00 ft	
Sidewalk	2.00 ft	2	4.00 ft	
Type E C&G	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
Impervious Area			3.53 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Wet Detention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>1.00 in.</u>	3.53 ac	1.43 ac	0.00 ac	6.20 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required	0.12 ac-ft
Treatment Volume from existing sources (treatment types must match)*	0.00 ac-ft
Total Treatment volume required	0.12 ac-ft

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 2 - Required Treatment and Attenuation

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	RW Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>6.20 ac</u>	<u>0.00 ac</u>	<u>6.20 ac</u>
Roadway			<u>2.11 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>4.09 ac</u>

CN Calculations

Soil Types (provide)	Urban Land	Tavares	Arents	
Open Space type (choose)	Open Space (Good >75%)	Open Space (Fair 50%-75%)	Open Space (Poor <50%)	
HSG (choose)	<u>A</u>	<u>A</u>	<u>A</u>	<u>Composite</u>
Percentage Basin (provide)	<u>50%</u>	<u>30%</u>	<u>20%</u>	<u>Open Space CN</u>
CN	<u>98</u>	<u>49</u>	<u>68</u>	<u>77</u>

	Area	CN	Weighted CN
Roadway	<u>2.11 ac</u>	<u>98</u>	<u>33.35</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>4.09 ac</u>	<u>77</u>	<u>50.99</u>
		CN _{pre} =	<u>84.3</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 1.86 in.
 Q_{pre} = 7.59 in.
 Pre-development runoff volume = 3.92 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 2 - Required Treatment and Attenuation

ATTENUATION CALCULATIONS (CONT.)

Post-development Conditions

	R/W Area	Pond Area	
Total Area to be attenuated for	6.20 ac	0.00 ac	6.20 ac
Roadway			3.53 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			2.67 ac

CN Calculations	Area	CN	Weighted CN
Roadway	3.53 ac	98	55.80
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	2.67 ac	77	33.29
CN _{post} =			89.1

SCS Method for Attenuation Volume:

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

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

S_{post} = 1.23 in.
 Q_{post} = 8.17 in.
 Post-development runoff volume = 4.22 ac-ft

Attenuation volume required (Post-Pre)

0.30 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
Basin 2 - Provided Treatment and Attenuation

SMF 2A-1 (Treatment Only)

	<u>Pre</u>	<u>Post</u>
From Station	56+00	56+00
To Station	75+00	75+00
Basin Length	1900.00 ft	1900.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	4.36 ac	4.36 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			1.48 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	8.00 ft	2	16.00 ft	
Sidewalk	2.00 ft	2	4.00 ft	
Type E C&G	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
Impervious Area			2.49 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	Wet Detention	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	1.00 in.	2.49 ac	1.00 ac	0.00 ac	4.36 ac
Area to be Treated (choose)	Add'l DCIA				

Treatment Volume required	0.08 ac-ft	
Treatment Volume from existing sources (treatment types must match)*	0.00 ac-ft	
Total Treatment volume required	0.08 ac-ft	0.04 ac-ft Provided

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

PROVIDED TREATMENT CALCULATIONS

Convert Ditch to Linear Pond:	Ditch Geometry				Treatment	Treatment
	Side Slope	Bottom Width	Side Slope	Length	Depth	Volume
	1:4	5.0 ft	1:4	280 ft	0.8 ft	0.04 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
Description Pond Sizing Calculations
Basin: Alternative 2 Typical Section
Basin 2 - Provided Treatment and Attenuation

SMF 2A-2 (Treatment and Attenuation)

	<u>Pre</u>	<u>Post</u>
From Station	75+00	75+00
To Station	83+00	83+00
Basin Length	800.00 ft	800.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	1.84 ac	1.84 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			0.62 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	8.00 ft	2	16.00 ft	
Sidewalk	2.00 ft	2	4.00 ft	
Type E C&G	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
Impervious Area			1.05 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Wet Detention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>1.00 in.</u>	1.05 ac	0.42 ac	0.00 ac	1.84 ac
Area to be Treated (choose)	<u>Total Imp. Area</u>				

Treatment Volume required	<u>0.09 ac-ft</u>	Treat Total Imp. Area
Treatment Volume from existing sources (treatment types must match)*	<u>0.00 ac-ft</u>	
Total Treatment volume required	<u>0.09 ac-ft</u>	

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

TOTAL TREATMENT CALCULATIONS

Total Required Treatment Volume:	0.12 ac-ft	
Total Provided Treatment Volume:	0.04 ac-ft	SMF 2A-1
	0.09 ac-ft	SMF 2A-2
	0.13 ac-ft	Total

TOTAL ATTENUATION CALCULATIONS

SMF 2A-2 To Provide Attenuation for Basin 2 Existing pond currently provides additional volume that will be used for this project.

Patel, Greene & Associates, PLLC

Designed By: DKA

Date: 6/17/2021

Checked By: KDY

Date: 6/17/2021

Subject: FPID 440274-1-22-01, Combee Road

Stormwater Management Facility Summary - Alternative 1 Typical Section

BASIN	STATIONS		PRE-DEVELOPMENT AREAS (AC)			POST-DEVELOPMENT AREAS (AC)			ADD'L DCIA (AC)	TOTAL TREAT. REQ. (AC-FT)	TOTAL TREAT. PROV. (AC-FT)	TOTAL ATTEN. REQ. (AC-FT)	TOTAL ATTEN. PROV. (AC-FT)	TREATMENT TYPE	POND AREA (AC)
	FROM	TO	IMP.	PER.	TOTAL	IMP.	PER.	TOTAL							
Basin 1 - SMF 1-A	10+00	56+00	3.59	6.97	10.56	6.86	3.70	10.56	3.27	0.14	0.14	0.80	0.81	Dry Retention	1.4
Basin 1 - SMF 1-B	10+00	56+00	3.59	6.97	10.56	6.86	3.70	10.56	3.27	0.14	0.14	0.73	1.02	Dry Retention	1.1
Basin 1 - SMF 1-C	10+00	56+00	3.59	6.97	10.56	6.86	3.70	10.56	3.27	0.14	0.14	0.30	0.88	Dry Retention	0.8

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-A

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			3.59 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	
			65.00 ft	
Impervious Area			6.86 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)
 Runoff Treatment
 Area to be Treated (choose)

<u>Dry Retention</u>
<u>0.50 in.</u>
<u>Add'l DCIA</u>

Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
6.86 ac	3.27 ac	0.00 ac	10.56 ac

Treatment Volume required
 Treatment Volume from existing sources (treatment types must match)*
 Total Treatment volume required
 *referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

0.14 ac-ft
0.00 ac-ft
0.14 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-A

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	R/W Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>10.56 ac</u>	<u>1.40 ac</u>	<u>11.96 ac</u>
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>8.37 ac</u>

CN Calculations

Soil Types (provide)	<u>Smryna</u>	<u>Urban Land</u>	
Open Space type (choose)	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
HSG (choose)	<u>A</u>	<u>D</u>	
Percentage Basin (provide)	<u>70%</u>	<u>30%</u>	
CN	<u>68</u>	<u>89</u>	<u>0</u>
			<u>74</u>

Composite
 Open Space CN

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>29.42</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>8.37 ac</u>	<u>74</u>	<u>52.00</u>
		CN _{pre} =	<u>81.4</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 2.28 in.
 Q_{pre} = 7.22 in.
 Pre-development runoff volume = 7.20 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-A

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	1.40 ac	11.96 ac
Total Area to be attenuated for			
Roadway			6.86 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			5.10 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.86 ac	98	56.21
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	5.10 ac	74	31.68
		CN _{post} =	87.9

SCS Method for Attenuation Volume:

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

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

$$S_{post} = 1.38 \text{ in.}$$

$$Q_{post} = 8.03 \text{ in.}$$

$$\text{Post-development runoff volume} = 8.00 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.80 ac-ft

Subject:	FPID 440274-1-22-01, Combee Road
Description	Pond Sizing Calculations
Basin:	Alternative 1 Typical Section
SMF Name:	Basin 1 - SMF 1-A

[illegible]

T.D. ok

Approx. low edge of pavement elevation (LEOP)= 143.00

Approx. hydraulic clearance from LEOP = 1.00 ft

Approx. Control Elevation (wet)/Pond Bottom (dry) = 131.00

Seasonal High Ground Water Elevation (SHGWT) = 130.00

SHGWT Check for Dry Retention Only ok

Tailwater Elevation (TW) = 130.00

Allowable High Water (AHW) = 141.34

Design Highwater (DHW) = 133.22

Head loss (0.08%) from LEOP to SMF (765 ft) = 0.61 ft

Head loss (0.08%) from SMF to Outfall (55 ft) = 0.04 ft

Available depth for T.D. + A.D. = 2.22 ft

SHGWT Existing ground at pond site is EL 131. Estimated SHGWT is 1ft below ground based on soil map

* TW elevation source: groundwater

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
Treatment volume provided
Long Rectangular dimension at pond bottom (R1)
Short Rectangular dimension at pond bottom (R2)
Attenuation volume provided
Long Rectangular dimension at tie-in (R1)
Short Rectangular dimension at tie-in (R2)

0.36 ac

0.14 ac-ft

250 ft

63 ft

0.81 ac-ft

350 ft

162 ft

Treatment Volume Required

0.14 ac-ft

Attenuation Volume Required

0.80 ac-ft

Minimum Total Area Required:

1.40 ac

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-B

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			3.59 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	
			65.00 ft	
Impervious Area			6.86 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Dry Retention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>0.50 in.</u>	6.86 ac	3.27 ac	0.00 ac	10.56 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required	<u>0.14 ac-ft</u>
Treatment Volume from existing sources (treatment types must match)*	<u>0.00 ac-ft</u>
Total Treatment volume required	<u>0.14 ac-ft</u>

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-B

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	R/W Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>10.56 ac</u>	<u>1.10 ac</u>	<u>11.66 ac</u>
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>8.07 ac</u>

CN Calculations

Soil Types (provide)	<u>Myakka</u>	<u>Urban Land</u>	
Open Space type (choose)	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
HSG (choose)	<u>A</u>	<u>D</u>	
Percentage Basin (provide)	<u>60%</u>	<u>40%</u>	
CN	<u>68</u>	<u>89</u>	<u>0</u>
			<u>76</u>

Composite
Open Space CN

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>30.17</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>8.07 ac</u>	<u>76</u>	<u>52.88</u>
		CN _{pre} =	<u>83.1</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 2.04 in.
 Q_{pre} = 7.43 in.
 Pre-development runoff volume = 7.21 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-B

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	1.10 ac	11.66 ac
Total Area to be attenuated for			
Roadway			6.86 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			4.80 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.86 ac	98	57.66
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	4.80 ac	76	31.45
		CN _{post} =	89.1

SCS Method for Attenuation Volume:

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

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

$$S_{post} = 1.22 \text{ in.}$$

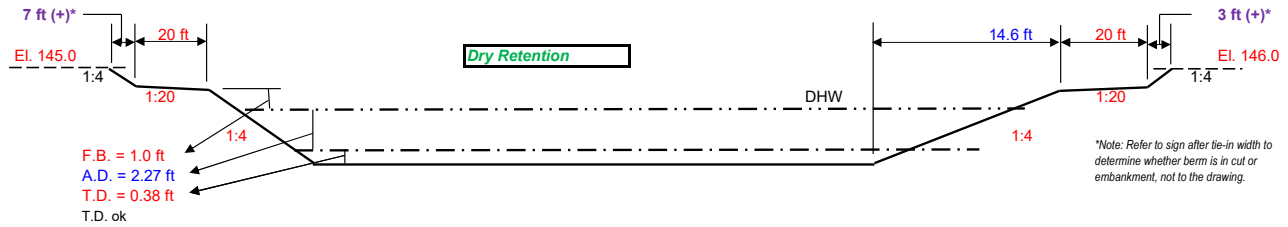
$$Q_{post} = 8.18 \text{ in.}$$

$$\text{Post-development runoff volume} = 7.94 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.73 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-B

POND SIZE ESTIMATE

Approx. low edge of pavement elevation (LEOP) = 146.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 142.00
 Seasonal High Ground Water Elevation (SHGWT) = 141.00
 SHGWT Check for Dry Retention Only ok
 Tailwater Elevation (TW) = 141.00
 Allowable High Water (AHW) = 144.65
 Design Highwater (DHW) = 144.65
 Head loss (0.08%) from LEOP to SMF (435 ft) = 0.35 ft
 Head loss (0.08%) from SMF to Outfall (55 ft) = 0.04 ft
 Available depth for T.D. + A.D. = 2.65 ft

SHGWT Existing ground at pond site is EL 145. Estimated SHGWT is 3.5 ft below ground based on soil map

* TW elevation source: groundwater

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
 Treatment volume provided
 Long Rectangular dimension at pond bottom (R1)
 Short Rectangular dimension at pond bottom (R2)
 Attenuation volume provided
 Long Rectangular dimension at tie-in (R1)
 Short Rectangular dimension at tie-in (R2)

0.36 ac
0.14 ac-ft
250 ft
63 ft
1.02 ac-ft
329 ft
141 ft

Treatment Volume Required
 0.14 ac-ft
 Attenuation Volume Required
 0.73 ac-ft

Minimum Total Area Required:

1.10 ac

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-C

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			3.59 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	11.00 ft	2	22.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Bike Lanes	7.00 ft	2	14.00 ft	
Sidewalk	6.00 ft	2	12.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
Contingency		0%	0.00 ft	
			65.00 ft	
Impervious Area			6.86 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Dry Retention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>0.50 in.</u>	6.86 ac	3.27 ac	0.00 ac	10.56 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required	<u>0.14 ac-ft</u>
Treatment Volume from existing sources (treatment types must match)*	<u>0.00 ac-ft</u>
Total Treatment volume required	<u>0.14 ac-ft</u>

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-C

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	R/W Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>10.56 ac</u>	<u>0.80 ac</u>	<u>11.36 ac</u>
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>7.77 ac</u>

CN Calculations

<u>Soil Types (provide)</u>	<u>Urban Land</u>		
<u>Open Space type (choose)</u>	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
<u>HSG (choose)</u>	<u>D</u>		
<u>Percentage Basin (provide)</u>	<u>100%</u>		
<u>CN</u>	<u>89</u>	<u>0</u>	<u>0</u>
			<u>Composite Open Space CN</u>
			<u>89</u>

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>30.97</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>7.77 ac</u>	<u>89</u>	<u>60.87</u>
		CN _{pre} =	<u>91.8</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 0.89 in.
 Q_{pre} = 8.51 in.
 Pre-development runoff volume = 8.06 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-C

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	0.80 ac	11.36 ac
Total Area to be attenuated for			
Roadway			6.86 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			4.50 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.86 ac	98	59.18
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	4.50 ac	89	35.26
		CN _{post} =	94.4

SCS Method for Attenuation Volume:

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

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

$$S_{post} = 0.59 \text{ in.}$$

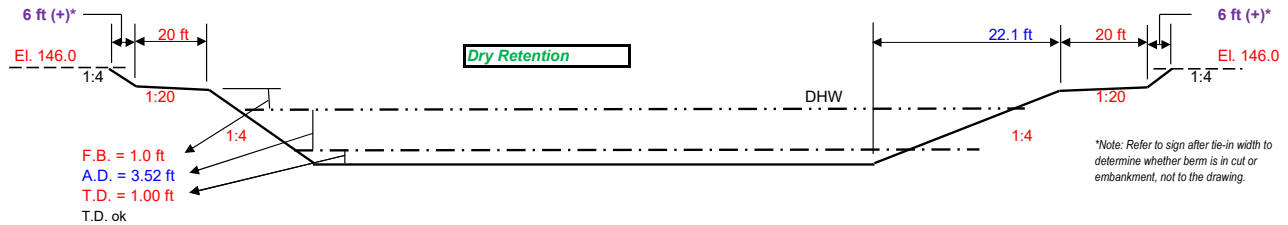
$$Q_{post} = 8.83 \text{ in.}$$

$$\text{Post-development runoff volume} = 8.36 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.30 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 1 Typical Section
 SMF Name: Basin 1 - SMF 1-C

POND SIZE ESTIMATE

Approx. low edge of pavement elevation (LEOP) = 147.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 141.00
 Seasonal High Ground Water Elevation (SHGWT) = 140.00
 SHGWT Check for Dry Retention Only ok
 Tailwater Elevation (TW) = 140.00
 Allowable High Water (AHW) = 145.52
 Design Highwater (DHW) = 145.52
 Head loss (0.08%) from LEOP to SMF (605 ft) = 0.48 ft
 Head loss (0.08%) from SMF to Outfall (180 ft) = 0.14 ft
 Available depth for T.D. + A.D. = 4.52 ft

SHGWT Existing ground at pond site is EL 146. Estimated SHGWT is 6.0 ft below ground based on soil map

* TW elevation source: groundwater

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
 Treatment volume provided
 Long Rectangular dimension at pond bottom (R1)
 Short Rectangular dimension at pond bottom (R2)
 Attenuation volume provided
 Long Rectangular dimension at tie-in (R1)
 Short Rectangular dimension at tie-in (R2)

0.14 ac
0.14 ac-ft
156 ft
39 ft
0.88 ac-ft
252 ft
135 ft

Treatment Volume Required
 0.14 ac-ft
 Attenuation Volume Required
 0.30 ac-ft

Minimum Total Area Required:

0.80 ac

Patel, Greene & Associates, PLLC

Designed By: DKA

Date: 6/17/2021

Checked By: KDY

Date: 6/17/2021

Subject: FPID 440274-1-22-01, Combee Road

Stormwater Management Facility Summary - Alternative 2 Typical Section

BASIN	STATIONS		PRE-DEVELOPMENT AREAS (AC)			POST-DEVELOPMENT AREAS (AC)			ADD'L DCIA (AC)	TOTAL TREAT. REQ. (AC-FT)	TOTAL TREAT. PROV. (AC-FT)	TOTAL ATTEN. REQ. (AC-FT)	TOTAL ATTEN. PROV. (AC-FT)	TREATMENT TYPE	POND AREA (AC)
	FROM	TO	IMP.	PER.	TOTAL	IMP.	PER.	TOTAL							
Basin 1 - SMF 1-A	10+00	56+00	3.59	6.97	10.56	6.02	4.54	10.56	2.43	0.10	0.10	0.60	0.60	Dry Retention	1.2
Basin 1 - SMF 1-B	10+00	56+00	3.59	6.97	10.56	6.02	4.54	10.56	2.43	0.10	0.10	0.54	0.74	Dry Retention	0.9
Basin 1 - SMF 1-C	10+00	56+00	3.59	6.97	10.56	6.02	4.54	10.56	2.43	0.10	0.10	0.22	0.68	Dry Retention	0.7

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-A

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			3.59 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Sidewalk	8.00 ft	2	16.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
Impervious Area			6.02 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)
 Runoff Treatment
 Area to be Treated (choose)

<u>Dry Retention</u>
<u>0.50 in.</u>
<u>Add'l DCIA</u>

Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
6.02 ac	2.43 ac	0.00 ac	10.56 ac

Treatment Volume required
 Treatment Volume from existing sources (treatment types must match)*
 Total Treatment volume required
 *referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

0.10 ac-ft
0.00 ac-ft
0.10 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-A

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	R/W Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>10.56 ac</u>	<u>1.20 ac</u>	<u>11.76 ac</u>
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>8.17 ac</u>

CN Calculations

<u>Soil Types (provide)</u>	<u>Smryna</u>	<u>Urban Land</u>	
<u>Open Space type (choose)</u>	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
<u>HSG (choose)</u>	<u>A</u>	<u>D</u>	
<u>Percentage Basin (provide)</u>	<u>70%</u>	<u>30%</u>	
<u>CN</u>	<u>68</u>	<u>89</u>	<u>0</u>
			<u>74</u>

Composite
 Open Space CN

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>29.92</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>8.17 ac</u>	<u>74</u>	<u>51.62</u>
		CN _{pre} =	<u>81.5</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 2.26 in.
 Q_{pre} = 7.24 in.
 Pre-development runoff volume = 7.09 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-A

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	1.20 ac	11.76 ac
Total Area to be attenuated for			
Roadway			6.02 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			5.74 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.02 ac	98	50.17
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	5.74 ac	74	36.27
		CN _{post} =	86.4

SCS Method for Attenuation Volume:

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

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

$$S_{post} = 1.57 \text{ in.}$$

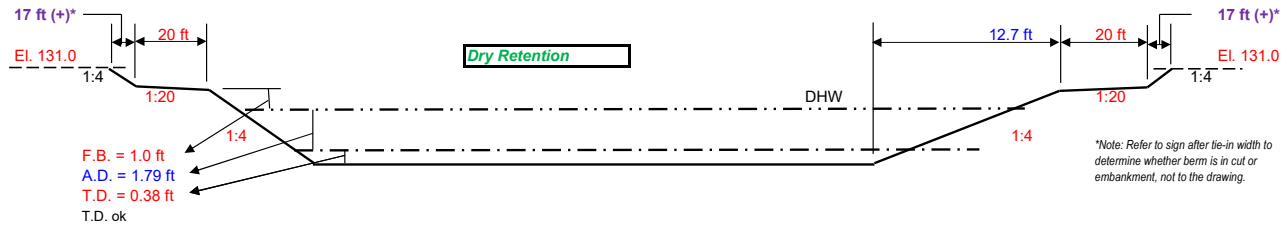
$$Q_{post} = 7.85 \text{ in.}$$

$$\text{Post-development runoff volume} = 7.69 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.60 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-A

POND SIZE ESTIMATE

Approx. low edge of pavement elevation (LEOP) = 143.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 131.00
 Seasonal High Ground Water Elevation (SHGWT) = 130.00
 SHGWT Check for Dry Retention Only ok
 Tailwater Elevation (TW) = 130.00
 Allowable High Water (AHW) = 141.34
 Design Highwater (DHW) = 133.16
 Head loss (0.08%) from LEOP to SMF (765 ft) = 0.61 ft
 Head loss (0.08%) from SMF to Outfall (55 ft) = 0.04 ft
 Available depth for T.D. + A.D. = 2.16 ft

SHGWT Existing ground at pond site is EL 131. Estimated SHGWT is 1ft below ground based on soil map

* TW elevation source: groundwater

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
 Treatment volume provided
 Long Rectangular dimension at pond bottom (R1)
 Short Rectangular dimension at pond bottom (R2)
 Attenuation volume provided
 Long Rectangular dimension at tie-in (R1)
 Short Rectangular dimension at tie-in (R2)

0.27 ac
0.10 ac-ft
217 ft
54 ft
0.60 ac-ft
315 ft
153 ft

Treatment Volume Required
 0.10 ac-ft
 Attenuation Volume Required
 0.60 ac-ft

Minimum Total Area Required:

1.20 ac

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-B

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
			Impervious Area	3.59 ac

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Sidewalk	8.00 ft	2	16.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
			Impervious Area	6.02 ac

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Dry Retention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>0.50 in.</u>	6.02 ac	2.43 ac	0.00 ac	10.56 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required	0.10 ac-ft
Treatment Volume from existing sources (treatment types must match)*	0.00 ac-ft
Total Treatment volume required	0.10 ac-ft

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-B

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	R/W Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>10.56 ac</u>	<u>0.90 ac</u>	<u>11.46 ac</u>
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>7.87 ac</u>

CN Calculations

Soil Types (provide)	<u>Myakka</u>	<u>Urban Land</u>	
Open Space type (choose)	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
HSG (choose)	<u>A</u>	<u>D</u>	
Percentage Basin (provide)	<u>60%</u>	<u>40%</u>	
CN	<u>68</u>	<u>89</u>	<u>0</u>
			<u>76</u>

Composite
Open Space CN

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>30.70</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>7.87 ac</u>	<u>76</u>	<u>52.47</u>
		CN _{pre} =	<u>83.2</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 2.02 in.
 Q_{pre} = 7.44 in.
 Pre-development runoff volume = 7.10 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-B

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	0.90 ac	11.46 ac
Total Area to be attenuated for			
Roadway			6.02 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			5.44 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.02 ac	98	51.48
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	5.44 ac	76	36.27
		CN _{post} =	87.7

SCS Method for Attenuation Volume:

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

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

$$S_{post} = 1.40 \text{ in.}$$

$$Q_{post} = 8.01 \text{ in.}$$

$$\text{Post-development runoff volume} = 7.65 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.54 ac-ft

Subject:	FPID 440274-1-22-01, Combee Road
Description	Pond Sizing Calculations
Basin:	Alternative 2 Typical Section
SMF Name:	Basin 1 - SMF 1-B

7 ft (+)*

20 ft

1:4

1:20

1:4

1:20

14.6 ft

20 ft

1:4

3 ft (+)*

El. 145.0

El. 146.0

DHW

Dry Retention

F.B. = 1.0 ft

A.D. = 2.25 ft

T.D. = 0.40 ft

T.D. ok

*Note: Refer to sign after tie-in width to determine whether berm is in cut or embankment, not to the drawing.

Approx. low edge of pavement elevation (LEOP) = 146.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 142.00
 Seasonal High Ground Water Elevation (SHGWT) = 141.00
 SHGWT Check for Dry Retention Only ok
 Tailwater Elevation (TW) = 141.00
 Allowable High Water (AHW) = 144.65
 Design Highwater (DHW) = 144.65
 Head loss (0.08%) from LEOP to SMF (435 ft) = 0.35 ft
 Head loss (0.08%) from SMF to Outfall (55 ft) = 0.04 ft
 Available depth for T.D. + A.D. = 2.65 ft

SHGWT Existing ground at pond site is EL 145. Estimated SHGWT is 3.5ft below ground based on soil map

* TW elevation source: groundwater

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
Treatment volume provided
Long Rectangular dimension at pond bottom (R1)
Short Rectangular dimension at pond bottom (R2)
Attenuation volume provided
Long Rectangular dimension at tie-in (R1)
Short Rectangular dimension at tie-in (R2)

0.25 ac
0.10 ac-ft
209 ft
52 ft
0.74 ac-ft
287 ft
131 ft

Treatment Volume Required	0.10 ac-ft
Attenuation Volume Required	0.54 ac-ft

Minimum Total Area Required:

0.90 ac

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-C

	<u>Pre</u>	<u>Post</u>
From Station	10+00	10+00
To Station	56+00	56+00
Basin Length	4600.00 ft	4600.00 ft
R/W to R/W Width	100.00 ft	100.00 ft
Total Area	10.56 ac	10.56 ac

Pre-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Shoulder	5.00 ft	2	10.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			34.00 ft	
Impervious Area			3.59 ac	

Post-development Impervious Areas (choose)	Width	Number	Total Width	Notes
Travel Lanes	12.00 ft	2	24.00 ft	
Turn Lanes	13.00 ft	1	13.00 ft	
Sidewalk	8.00 ft	2	16.00 ft	
Type E C&G	2.00 ft	2	4.00 ft	
	0.00 ft	0	0.00 ft	
Contingency		0%	0.00 ft	
			57.00 ft	
Impervious Area			6.02 ac	

TREATMENT CALCULATIONS

Treatment Type (choose)	<u>Dry Retention</u>	Total Imp. Area	Add'l DCIA	Collected DCIA	Total R/W
Runoff Treatment	<u>0.50 in.</u>	6.02 ac	2.43 ac	0.00 ac	10.56 ac
Area to be Treated (choose)	<u>Add'l DCIA</u>				

Treatment Volume required	<u>0.10 ac-ft</u>
Treatment Volume from existing sources (treatment types must match)*	<u>0.00 ac-ft</u>
Total Treatment volume required	<u>0.10 ac-ft</u>

*referenced from Existing Treatment and Storage Summary. 0.00 ac-ft if not applicable

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-C

ATTENUATION CALCULATIONS

Will attenuation be necessary? (choose) Yes
 Zone (choose) Zone 8
 Frequency (choose) 25-yr
 Time (choose) 24-hr
 Precipitation Depth 9.5 in.

Pre-development Conditions

	R/W Area	Pond Area	Total Area
Total Area to be attenuated for (choose)	<u>10.56 ac</u>	<u>0.70 ac</u>	<u>11.26 ac</u>
Roadway			<u>3.59 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Gravel Roads			<u>0.00 ac</u>
Open Space			<u>7.67 ac</u>

CN Calculations

<u>Soil Types (provide)</u>	<u>Urban Land</u>		
<u>Open Space type (choose)</u>	Open Space (Poor <50%)	Open Space (Poor <50%)	Open Space (Poor <50%)
<u>HSG (choose)</u>	<u>D</u>		
<u>Percentage Basin (provide)</u>	<u>100%</u>		
<u>CN</u>	<u>89</u>	<u>0</u>	<u>0</u>
			<u>Composite</u>
			<u>Open Space CN</u>
			<u>89</u>

	Area	CN	Weighted CN
Roadway	<u>3.59 ac</u>	<u>98</u>	<u>31.25</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Gravel Roads	<u>0.00 ac</u>	<u>81</u>	<u>0.00</u>
Open Space	<u>7.67 ac</u>	<u>89</u>	<u>60.62</u>
		CN _{pre} =	<u>91.9</u>

SCS Method for Attenuation Volume:

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

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

S_{pre} = 0.89 in.
 Q_{pre} = 8.51 in.
 Pre-development runoff volume = 7.99 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-C

ATTENUATION CALCULATIONS (CONT.)**Post-development Conditions**

	R/W Area	Pond Area	
	10.56 ac	0.70 ac	11.26 ac
Total Area to be attenuated for			
Roadway			6.02 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Gravel Roads			0.00 ac
Open Space Composite			5.24 ac

CN Calculations	Area	CN	Weighted CN
Roadway	6.02 ac	98	52.39
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Gravel Roads	0.00 ac	81	0.00
Open Space	5.24 ac	89	41.42
		CN _{post} =	93.8

SCS Method for Attenuation Volume:

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

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

$$S_{post} = 0.66 \text{ in.}$$

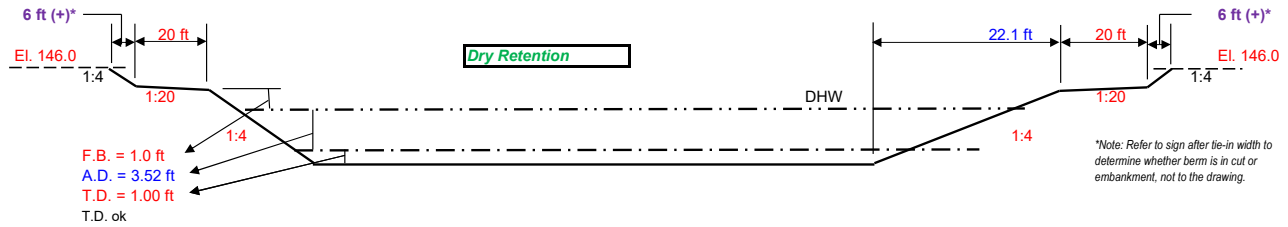
$$Q_{post} = 8.75 \text{ in.}$$

$$\text{Post-development runoff volume} = 8.21 \text{ ac-ft}$$

Attenuation volume required (Post-Pre)

0.22 ac-ft

Subject: FPID 440274-1-22-01, Combee Road
 Description: Pond Sizing Calculations
 Basin: Alternative 2 Typical Section
 SMF Name: Basin 1 - SMF 1-C

POND SIZE ESTIMATE

Approx. low edge of pavement elevation (LEOP)= 147.00
 Approx. hydraulic clearance from LEOP = 1.00 ft
 Approx. Control Elevation (wet)/Pond Bottom (dry) = 141.00
 Seasonal High Ground Water Elevation (SHGWT)= 140.00
 SHGWT Check for Dry Retention Only ok
 Tailwater Elevation (TW) = 140.00
 Allowable High Water (AHW)= 145.52
 Design Highwater (DHW)= 145.52
 Head loss (0.08%) from LEOP to SMF (605 ft) = 0.48 ft
 Head loss (0.08%) from SMF to Outfall (180 ft) = 0.14 ft
 Available depth for T.D. + A.D. = 4.52 ft

SHGWT Existing ground at pond site is EL 146. Estimated SHGWT is 6.0 ft below ground based on soil map

* TW elevation source: groundwater

Equivalent Rectangular Ratio (choose)

Rectangle

Treatment area provided at treatment depth (T.D.)
 Treatment volume provided
 Long Rectangular dimension at pond bottom (R1)
 Short Rectangular dimension at pond bottom (R2)
 Attenuation volume provided
 Long Rectangular dimension at tie-in (R1)
 Short Rectangular dimension at tie-in (R2)

0.10 ac
0.10 ac-ft
132 ft
33 ft
0.68 ac-ft
228 ft
129 ft

Treatment Volume Required
 0.10 ac-ft
 Attenuation Volume Required
 0.22 ac-ft

Minimum Total Area Required:

0.70 ac

Complete Report (not including cost) Ver 4.3.2

Project: SMF 1-A

Date: 6/16/2021 2:55:17 PM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Alternative 1 Typical Section
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	12.65
Rational Coefficient (0-1)	0.30
Non DCIA Curve Number	74.00
DCIA Percent (0-100)	30.00
Nitrogen EMC (mg/l)	1.130
Phosphorus EMC (mg/l)	0.188
Runoff Volume (ac-ft/yr)	15.549
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	21.664
Phosphorus Loading (kg/yr)	3.604

Post-Condition Landuse Information

Landuse	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	12.65
Rational Coefficient (0-1)	0.50
Non DCIA Curve Number	74.00
DCIA Percent (0-100)	58.00
Wet Pond Area (ac)	0.59
Nitrogen EMC (mg/l)	1.130
Phosphorus EMC (mg/l)	0.188
Runoff Volume (ac-ft/yr)	25.167
Groundwater N (kg/yr)	0.000

Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	35.065
Phosphorus Loading (kg/yr)	5.834

Catchment Number: 1 Name: Alternative 1 Typical Section

Project: SMF 1-A

Date: 6/16/2021

Retention Design

Retention Depth (in)	0.500
Retention Volume (ac-ft)	0.503

Watershed Characteristics

Catchment Area (acres)	12.65
Contributing Area (acres)	12.060
Non-DCIA Curve Number	74.00
DCIA Percent	58.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	38
Provided TN Treatment Efficiency (%)	60
Required TP Treatment Efficiency (%)	38
Provided TP Treatment Efficiency (%)	60

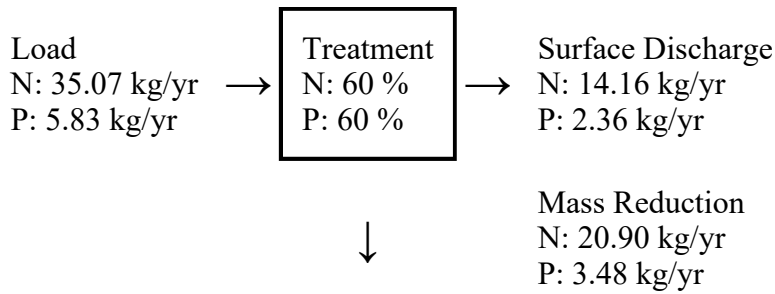
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

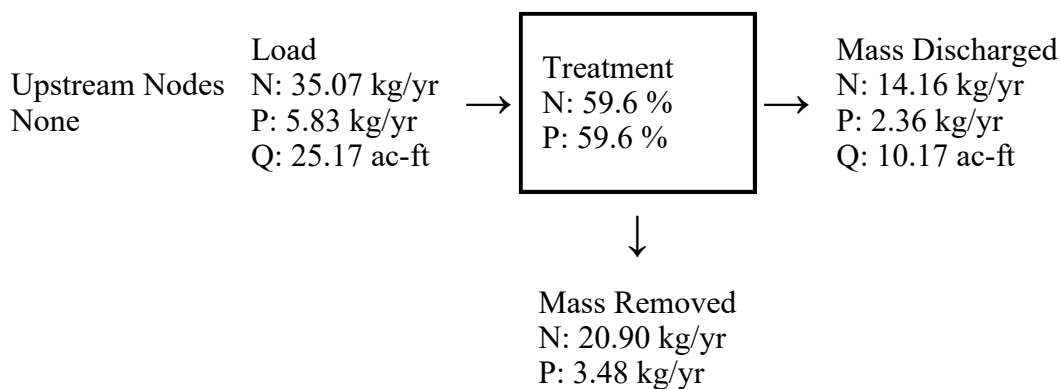
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	20.900
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	3.477
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)



Load Diagram for Retention (As Used In Routing)



Summary Treatment Report Version: 4.3.2

Project: SMF 1-A

Analysis Type: Net Improvement

Date:6/16/2021

BMP Types:

Catchment 1 - (Alternative 1 Typical Section) Retention

Routing Summary

Catchment 1 Routed to Outlet

Based on % removal values to the nearest percent

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load 21.66 kg/yr

Total N post load 35.07 kg/yr

Target N load reduction	38 %	
Target N discharge load	21.66 kg/yr	
Percent N load reduction	60 %	
Provided N discharge load	14.16 kg/yr	31.23 lb/yr
Provided N load removed	20.9 kg/yr	46.09 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	3.604 kg/yr	
Total P post load	5.834 kg/yr	
Target P load reduction	38 %	
Target P discharge load	3.604 kg/yr	
Percent P load reduction	60 %	
Provided P discharge load	2.357 kg/yr	5.2 lb/yr
Provided P load removed	3.477 kg/yr	7.667 lb/yr

Complete Report (not including cost) Ver 4.3.2

Project: SMF 1-B

Date: 6/16/2021 2:53:03 PM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Alternative 1 Typical Section
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	12.35
Rational Coefficient (0-1)	0.31
Non DCIA Curve Number	76.00
DCIA Percent (0-100)	31.00
Nitrogen EMC (mg/l)	1.130
Phosphorus EMC (mg/l)	0.188
Runoff Volume (ac-ft/yr)	15.938
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	22.206
Phosphorus Loading (kg/yr)	3.694

Post-Condition Landuse Information

Landuse	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	12.35
Rational Coefficient (0-1)	0.51
Non DCIA Curve Number	76.00
DCIA Percent (0-100)	59.00
Wet Pond Area (ac)	0.58
Nitrogen EMC (mg/l)	1.130
Phosphorus EMC (mg/l)	0.188
Runoff Volume (ac-ft/yr)	25.131
Groundwater N (kg/yr)	0.000

Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	35.015
Phosphorus Loading (kg/yr)	5.825

Catchment Number: 1 Name: Alternative 1 Typical Section

Project: SMF 1-B

Date: 6/16/2021

Retention Design

Retention Depth (in)	0.500
Retention Volume (ac-ft)	0.490

Watershed Characteristics

Catchment Area (acres)	12.35
Contributing Area (acres)	11.770
Non-DCIA Curve Number	76.00
DCIA Percent	59.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	37
Provided TN Treatment Efficiency (%)	59
Required TP Treatment Efficiency (%)	37
Provided TP Treatment Efficiency (%)	59

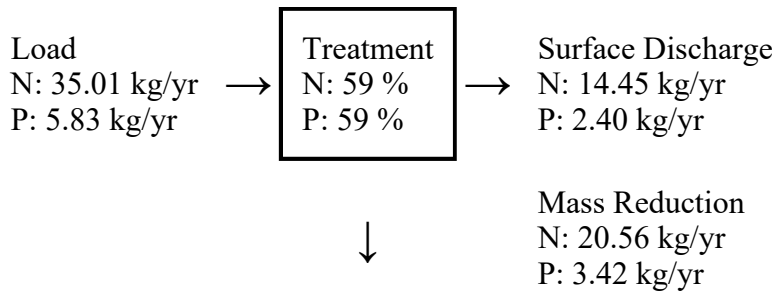
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

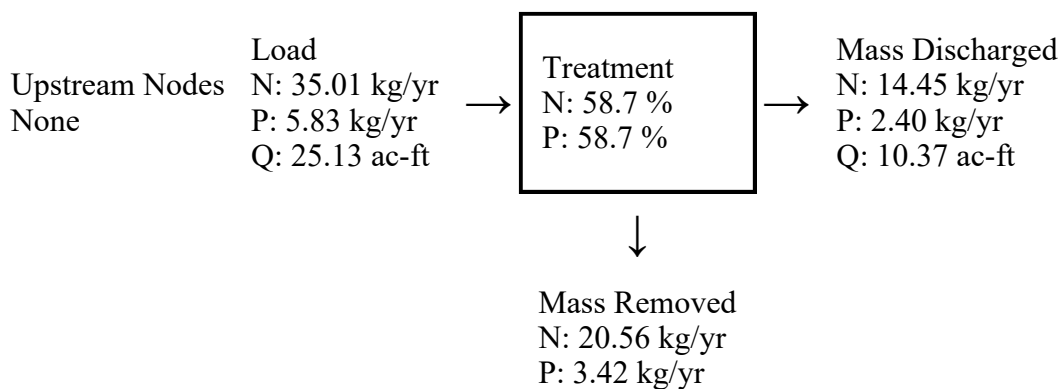
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	20.563
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	3.421
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)



Load Diagram for Retention (As Used In Routing)



Summary Treatment Report Version: 4.3.2

Project: SMF 1-B

Analysis Type: Net Improvement

Date:6/16/2021

BMP Types:

Catchment 1 - (Alternative 1 Typical Section) Retention

Routing Summary

Catchment 1 Routed to Outlet

Based on % removal values to the nearest percent

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load 22.21 kg/yr

Total N post load 35.01 kg/yr

Target N load reduction	37 %	
Target N discharge load	22.21 kg/yr	
Percent N load reduction	59 %	
Provided N discharge load	14.45 kg/yr	31.86 lb/yr
Provided N load removed	20.56 kg/yr	45.34 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	3.694 kg/yr	
Total P post load	5.825 kg/yr	
Target P load reduction	37 %	
Target P discharge load	3.694 kg/yr	
Percent P load reduction	59 %	
Provided P discharge load	2.404 kg/yr	5.3 lb/yr
Provided P load removed	3.421 kg/yr	7.544 lb/yr

Complete Report (not including cost) Ver 4.3.2

Project: SMF 1-C

Date: 6/18/2021 10:59:06 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Alternative 1 Typical Section
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	10.56
Rational Coefficient (0-1)	0.33
Non DCIA Curve Number	76.00
DCIA Percent (0-100)	34.00
Nitrogen EMC (mg/l)	1.130
Phosphorus EMC (mg/l)	0.188
Runoff Volume (ac-ft/yr)	14.594
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	20.334
Phosphorus Loading (kg/yr)	3.383

Post-Condition Landuse Information

Landuse	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	10.56
Rational Coefficient (0-1)	0.50
Non DCIA Curve Number	76.00
DCIA Percent (0-100)	57.00
Wet Pond Area (ac)	0.27
Nitrogen EMC (mg/l)	1.130
Phosphorus EMC (mg/l)	0.188
Runoff Volume (ac-ft/yr)	21.357
Groundwater N (kg/yr)	0.000

Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	29.756
Phosphorus Loading (kg/yr)	4.951

Catchment Number: 1 Name: Alternative 1 Typical Section

Project: SMF 1-C

Date: 6/18/2021

Retention Design

Retention Depth (in)	0.500
Retention Volume (ac-ft)	0.429

Watershed Characteristics

Catchment Area (acres)	10.56
Contributing Area (acres)	10.290
Non-DCIA Curve Number	76.00
DCIA Percent	57.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	32
Provided TN Treatment Efficiency (%)	60
Required TP Treatment Efficiency (%)	32
Provided TP Treatment Efficiency (%)	60

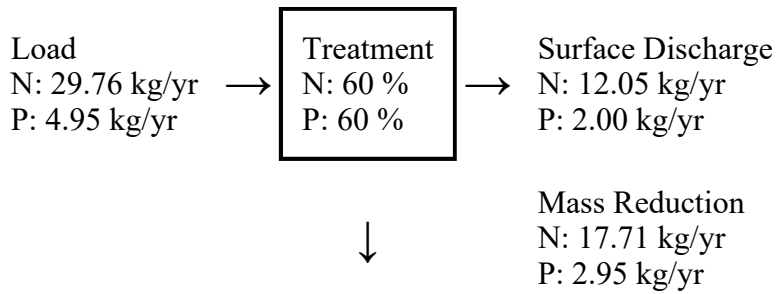
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

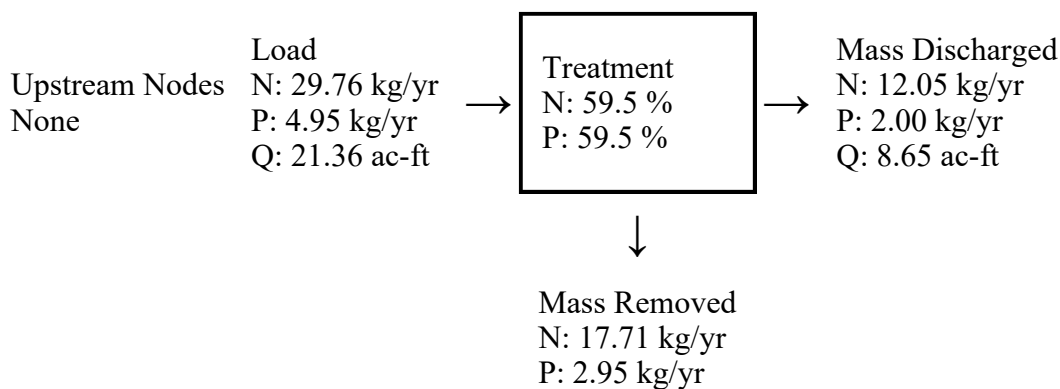
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	17.706
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	2.946
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)



Load Diagram for Retention (As Used In Routing)



Summary Treatment Report Version: 4.3.2

Project: SMF 1-C

Analysis Type: Net Improvement

Date:6/18/2021

BMP Types:

Catchment 1 - (Alternative 1 Typical Section) Retention

Routing Summary

Catchment 1 Routed to Outlet

Based on % removal values to the nearest percent

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load 20.33 kg/yr

Total N post load 29.76 kg/yr

Target N load reduction	32 %	
Target N discharge load	20.33 kg/yr	
Percent N load reduction	60 %	
Provided N discharge load	12.05 kg/yr	26.57 lb/yr
Provided N load removed	17.71 kg/yr	39.04 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	3.383 kg/yr	
Total P post load	4.951 kg/yr	
Target P load reduction	32 %	
Target P discharge load	3.383 kg/yr	
Percent P load reduction	60 %	
Provided P discharge load	2.005 kg/yr	4.42 lb/yr
Provided P load removed	2.946 kg/yr	6.496 lb/yr

Patel, Greene & Associates, PLLC

Designed By: GLSP

Date: 9/24/2018

Checked By: _____

Date: _____

Subject: FPID 440274-1-22-01, Combee Road

Existing Treatment and Storage Summary

PROJECT NAME	PERMIT NUMBER	VOLUME AT TOB (AC-FT)	REQ. TREATMENT (AC-FT)	PROV. TREATMENT (AC-FT)	STORAGE AVAILABLE (AC-FT)	TREATMENT TYPE	SOURCE* (NOTES)
US 98 (Brooks to Edgewood) (FDOT)	44019176	5.47	0.73	2.01	1.28	wet detention	Pond 9
US 98 (Brooks to Edgewood) (FDOT)	44019176	3.24	0.73	0.85	0.12	wet detention	Pond 2A
Edgewood Regional Drainage (Polk County)	44002430			17.93		wet detention	Lake wet creation Node 17-S
Holloway Regional Stormwater				14.44		wet detention	6-filtration reserve
			11.64	32.37	20.73		Total (projected to replace Pond 2A)
Crystal Lake Drainage Improvements (Polk County)	44010422	2.27	0.15	1.07	0.92	wet detention	BMP Pond

* Source can be WMD Permit number, permitted plans, permit report. Note if in a specific WMD basin like SFWMD special basin

APPENDIX C: ELA Meetings

Kick-off Meeting

**Meeting 1- Agenda, Minutes,
Exhibits, Sign-in Sheet**

**Meeting 2- Agenda, Minutes,
Exhibits, Sign-in Sheet**

**Meeting 3- Agenda, Minutes,
Exhibits, Sign-in Sheet**

**Excerpt from City of Lakeland
TMDL report**



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to Skyview Drive

Meeting Name: FDOT ELA Kick-off meeting

Date: July 26, 2018

Location: D1- HQ Elizabeth Moore Room 214

1. Introductions
2. Project Scope and Description
 - a. PD&E Study
 - b. Widening SR 659
3. Drainage Concerns
 - a. Treatment and Attenuation needed
 - b. Pond Needs
 - c. Regional Approach
 - i. FDOT
 - ii. Polk County
 1. Polk County Regional Water Management Facility
 2. US 98 Pond
 - iii. City of Lakeland
 1. Crystal Lake Enhancements
 2. City Owned parcel across from McJunkin Rd
4. Logistics of Meetings
 - a. Approximately 3 meetings
 - b. Location/Time
 - c. Key Voices at the Table
 - d. Point of contact at FDOT
5. Discussion and Action Items



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive

Meeting Name: FDOT ELA kick-off meeting

Date/Time: July 26, 2018 1:30pm

Location: D1-HQ Elizabeth Moore Room 214

Minutes Prepared By: Gretchen Suarez-Pena

Attendees:

Patrick Bateman (FDOT), Brent Setchell (FDOT), Sergio Figueroa (FDOT), Nicole Monies (FDOT), Teresa Austin (FDOT), Nicole Harris (Stantec), Ben Clayton (FDOT), Michael Garau (Kimley-Horn), Gretchen Suárez-Peña (PGA), Tim Polk (PGA)

The following notes reflect our understanding of the discussions and decisions made at this meeting. If you have any questions, additions, or comments, please contact us. We will consider the minutes to be accurate unless written notice is received within 5 working days of the date issued.

Meeting Minutes:

Michael Garau gave an overview of the project. This PD&E study involves improving and widening SR 659/Combee Road from US 98 to North Crystal Lake Drive. The project includes improving roadway and pedestrian safety. Alternatives and typical sections are currently being developed.

Gretchen Suarez-Pena went on to describe that the current typical section of the roadway is a rural typical section in an urban environment. The existing drainage system involves a mix of roadside swales, side drains and some closed storm sewer. Based on some preliminary analysis there appear to be three sub-basins. The majority goes south to the Banana Lake Basin. Part of that basin goes through residential areas. The portion from Kiwanis to Skyview drive drains to Crystal Lake. The purpose of this meeting is to identify potential regional alternatives to addresses the water quality and quantity needs for the project without the use of off-site ponds. There are some potential pond sites that could be considered if necessary. Particularly, a parcel north of Maine Avenue on the east side of Combee Road is owned by the City of Lakeland.

One of the potential regional alternatives is that the area that drains south to the Banana Lake basin can be treated and attenuated in the Polk County Regional Water Management Facility (PCRWMF) located northwest of the Polk Parkway and US 98 interchange. Likewise, the FDOT also has an existing pond (Pond 9) that provides treatment and attenuation for US 98. Expanding the US 98 pond or the PCRWMF facility can provide water management for the Combee Road project.

Brent stated that they have drainage issues around US 98 and Pond 9 on the west side and with the Pond 9 outfall where the water elevation in the outfall ditch is greater than the bleed down elevation. However, the water elevation just to the west of Pond 9 appears to be well below the bleed down elevation in the pond. There are also legacy drainage issues for the businesses just north of the outfall ditch on the west side of US 98. He stated that Ben Clayton had been looking at this and they plan on having a drainage project to correct the issues. He



also stated that there is a tremendous amount of trash clogging up the inlets in the area and that we should consider trash control measures for the proposed improvements.

Tim mentioned that the PCRWMF ERP was modified with the construction of the north US 98 pond, Pond 2A. This pond takes water from US 98 and then discharges to the PCRWMF. The outfall near the Pizza Hut still exists and drains the offsite water (which includes some of Combee Road) around Pond 2A. Brent mentioned that Jim Myers, TLP Engineering Consultants, is also looking to expand Pond 2A as an alternative to their project, which goes from Edgewood Drive N to Main Street. The additional impervious area from that project is primarily from intersection improvements, as the corridor has constrained R/W with the RR. He recommended that we contact Jim Myers and coordinate with that project and see if there is something that they can do to help compensate and/or accommodate Combee Road.

Gretchen then mentioned that Combee Road is a rural typical section and that some of the water presently sheet flows directly to a subdivision west of Combee Road between Civitan Avenue and Kiwanis Avenue. The stormwater drains west to Elk Drive and ponds for extended periods. It is supposed to drain to a ditch that runs west. We would like to address this drainage issue and others with our improvements. It is assumed that we will have a storm sewer system or systems. We may need to provide some “pre-treatment” or systems that remove silt and floatables prior to discharge to existing outfalls, which will eventually go to PCRWMF.

Gretchen then addressed the Crystal Lake outfall. Crystal Lake used to be a closed basin, but the FDOT obtained R/W at the northeast corner to provide an outfall for the lake. There is also the potential for a Region Facility downstream of this outfall that Polk County may have interest in. The County does seem to be favorable to addressing water quality concerns at Crystal Lake.

There was some discussion on potential base clearance issues. Michael Garau stated that geotechnical evaluation was limited for the study but that this would be considered.

Gretchen asked if there were any points of contacts at the city and county that FDOT had worked with and would prefer to involve in the conversation. The goal of future meetings is to bring key voices to the table and document the preferences and commitments from the city and county so that the best approach can be found for this project. The goal as previously stated is to eliminate the need for off-site ponds. Brent mentioned that Laurie Smith at the City of Lakeland would be a good contact. Likewise, Brent stated that Jay Jarvis and Phil Irven from Polk County would be good sources of contacts as well. Brent stated that the drainage points of contact for FDOT would be Ben Clayton, Sergio Figueroa and himself. Meetings would be set-up through Michael Garau and Patrick Bateman. Meetings would begin in September after the public kick-off meeting in late August. There are three anticipated meetings. The first meeting is to address the project and provide a potential approach for regional stormwater management opportunities. The second meeting is to solidify alternatives to be documented in the PD&E. The third meeting will be to provide a conclusion and recommendation on the approach.



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SIGN-IN SHEET




Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to Skyview Drive

Meeting Name: FDOT ELA Kick-off meeting

Date/Time: July 26, 2018 1:30pm

Location: D1- HQ Elizabeth Moore Room 214

INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
PBB	Patrick Bateman	FDOT	(863) 519-2792	Patrick.Bateman@dot.state.fl.us
	Sergio Figueroa	FDOT		Sergio.Figueroa2@dot.state.fl.us
BS	Brent Setchell	FDOT	863-519-2557	Brent.Setchell@dot.state.fl.us
NMM	Nicole Monies	FDOT	(863) 519-2359	Nicole.Monies@dot.state.fl.us
DA	Teresa Austin	FDOT		Teresa.Austin@dot.state.fl.us
	Nicole Harris	FDOT Stantec		Nicole.Harris@dot.state.fl.us
MG	Michael Garau	Kimley-Horn		Michael.Garau@kimley-horn.com
	Gretchen Suarez-Pena	PGA	863-533-7317 ext. 202	Gretchen.Suarez-Pena@patelgreene.com



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SIGN-IN SHEET

INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
TAP	Tim Polk	PGA	863-533-7317 ext. 205	Tim.Polk@patelgreene.com
BC	Ben Clayton	FDOT	863-519-2480	benjamin.clayton@dot.state.fl.us



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to Skyview Drive

Meeting Name: ELA meeting

Date: October 18, 2018

Location: D1- HQ DEMO Room 231

1. Introductions
2. Project Scope and Description
 - a. PD&E Study
 - b. Widening SR 659
3. Drainage Concerns
 - a. No existing treatment
 - b. Treatment and Attenuation (1 inch over Total Impervious Area)

ALTERNATIVE		TOTAL IMPERVIOUS AREA TREATMENT (AC-FT)	ADD'L IMPERVIOUS AREA TREATMENT (AC-FT)	ATTENUATION (AC-FT)
Alt 1	Polk TPO* Recommendations Basin 1	0.55	0.23	1.33
	Polk TPO* Recommendations Basin 2	0.24	0.10	0.56
Alt 2	Shared Use Path Basin 1	0.52	0.20	1.12
	Shared Use Path Basin 2	0.22	0.08	0.48
Alt 3	Buffered Bike Lanes Basin 1	0.61	0.29	1.64
	Buffered Bike Lanes Basin 2	0.26	0.12	0.70

* TPO- Transportation Planning Organization

- c. Regional Approach
 - i. FDOT
 1. Pond 9
 2. Pond 2A- SWFWMD Permit 4402430.007 (2009) states it's to be removed.
 - ii. Polk County
 1. Holloway Regional Stormwater Facility
 2. Crystal Lake Drainage Improvements (Basin 2



PROJECT NAME	PERMIT NUMBER	VOLUME AT TOB (AC-FT)	REQ. TREATMENT (AC-FT)	PROV. TREATMENT (AC-FT)	STORAGE AVAILABLE (AC-FT)	(NOTES)
US 98 (Brooks to Edgewood) (FDOT)	44019176	5.47	0.73	2.01	1.28	Pond 9
US 98 (Brooks to Edgewood) (FDOT)	44019176	3.24	0.73	0.85	0.12	Pond 2A
Edgewood Regional Drainage (Polk County)	44002430			17.93		Lake Wetland Creation
Holloway Regional Stormwater				14.44		Filtration Reserve
				32.37	22.56	Total
Crystal Lake Drainage Improvements (Polk County)	44010422	2.27	0.15	1.07	0.92	BMP Pond

- d. US 98 Project
 - i. Pond 1A adjacent to Pond 2A (Holloway)
 - ii. Pond 1B (Ridley USA)
- e. Available parcels
 - i. City of Lakeland Parcel (1.5 acre)
 - ii. Greenfield Five LLC
 - iii. Holloway
 - iv. Ridley USA
- 4. Discussion and Action Items
 - a. City of Lakeland and Polk County Municipal Separate Storm Sewer Systems (MS4) projects
 - b. Further Action items
 - c. Hydraulic Feasibility
 - d. Next ELA Meeting
 - e. Minutes by PGA
 - f. Other



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive

Meeting Name: ELA meeting

Date/Time: October 18, 2018 9:00am

Location: D1-HQ Elizabeth Moore Room 214

Minutes Prepared By: Gretchen Suarez-Pena

Attendees:

Patrick Bateman (FDOT), Sergio Figueroa (FDOT), Bill Hartmann (FDOT), Lauren Peters (FDOT), Teresa Austin (FDOT), Nicole Monies (FDOT) Jessica Schilling (City of Lakeland), Cole Edwards (City of Lakeland), Phil Irven (Polk County), Barry Switzer (TLP), Matt Dockins (RKK), Jay Patel (Inwood), Michael Garau (Kimley-Horn), Gretchen Suárez-Peña (PGA)

The following notes reflect our understanding of the discussions and decisions made at this meeting. If you have any questions, additions, or comments, please contact us. We will consider the minutes to be accurate unless written notice is received within 5 working days of the date issued.

Meeting Minutes:

Gretchen Suárez-Peña started out the meeting with introductions. Those in attendance (see attendees list) introduced themselves. Michael Garau, project manager, gave an overview of the project. This is a Project Development and Environment Study of Combee Road, or SR 659, from US 98 to North Crystal Lake Drive.

Typical Sections

Michael showed an exhibit of the existing typical section which is comprised mainly of a two-lane undivided roadway with roadside ditches. There is some closed storm sewer throughout the corridor. Michael shared the proposed typical section alternatives:

- The Polk TPO Recommended Alternative – This typical section is comprised of a two-lane divided urban section with two 11-foot travel lanes, one 13-foot two-way left turn median, 4-foot paved shoulders and 6-foot sidewalks on each side.
- The Shared-Use Path Alternative – This typical section is comprised of a two-lane divided urban section with two 11-foot travel lanes, one 13-foot two-way left turn median, a 6-foot sidewalk on one side and a 10-foot shared-use path on the other side.
- The Buffered Bike Lane Alternative – This typical section is comprised of two 11-foot travel lanes, one 13-foot two-way left turn median, a 7-foot buffered bike lane on each side and a 6-foot sidewalk on each side.

Drainage Considerations

Michael stated that although this is not a capacity project, there is some widening, and an addition of a turn lane that should help with traffic. Gretchen then noted that the concept plans provided showed the buffered bike lane alternative. She also addressed that a main concern for this corridor was the considerable offsite runoff coming to the roadway storm sewer system and ditches on the east side. On the west side, offsite runoff is not a concern, but there are no existing drainage features on this side, and the runoff sheet flows into neighborhoods and off



the roadway. There are no defined swales. The proposed curb and gutter system will be a large improvement to the area.

Gretchen went on to address that the main drainage concern for this project is that the added impervious area will need to be treated and attenuated. An individual permit from Southwest Florida Water Management District (SWFWMD) will be needed. Currently, there is no permitted water quality treatment for this facility. Treatment needs were calculated based on two criteria: needing to treat 1 inch over the total impervious area and needing to treat only the additional impervious area. The latter is more advantageous, as it will be less volume to treat. The table provided in the Agenda can be seen below.

	ALTERNATIVE	TOTAL IMPERVIOUS AREA TREATMENT (AC-FT)	ADD'L IMPERVIOUS AREA TREATMENT (AC-FT)	ATTENUATION (AC-FT)
Alt 1	Polk TPO* Recommendations Basin 1	0.55	0.23	1.33
	Polk TPO* Recommendations Basin 2	0.24	0.10	0.56
Alt 2	Shared Use Path Basin 1	0.52	0.20	1.12
	Shared Use Path Basin 2	0.22	0.08	0.48
Alt 3	Buffered Bike Lanes Basin 1	0.61	0.29	1.64
	Buffered Bike Lanes Basin 2	0.26	0.12	0.70

*Transportation Planning Organization

Nicole Monies and Sergio Figueroa confirmed that SWFWMD should be agreeable to only treating the new impervious area as is required by the rule. Bill Hartmann questioned whether SWFWMD would require replacement of the existing incidental treatment in the roadside swales. Sergio said that this is usually not needed.

The stormwater management approach for this project is to provide a regional or joint-use solution. This approach would avoid purchasing right-of-way for ponds, which is especially beneficial on this project, given the development of the corridor and lack of available pond sites. There are two main watershed/basins in this project. The Banana Lake WBID to the south (via Us 98) and the Saddle Creek WBID to the north (via Crystal Lake).

Banana Lake WBID

FDOT already has two permitted ponds along the nearby US 98 corridor: Pond 9 and Pond 2A. Pond 9, the farthest away, is located on the northwest corner of the interchange of Polk Parkway and US 98. Pond 2A is located on the Holloway property southeast of the intersection of Edgewood Drive and US 98. The permitted regional stormwater facility and wetland area within the Holloway property is privately owned and appears to have substantial volume available for treatment and attenuation.

Gretchen did mention that there is a City of Lakeland owned parcel located across from McJunkin Road on the east side of Combee Road. Jessica Schilling and Cole Edwards from the City of Lakeland stated that they were unsure of the use of the parcel but that they would investigate. They believe it is being used as a maintenance staging area for Lakeland Electric.



TLP and Inwood are currently working on the road widening project on US 98 from south of Edgewood Drive to Main Street in Lakeland. Currently, there are three potential pond sites for this project. Pond 1A would be adjacent to FDOT Pond 2A located on the Holloway property. There is also the potential of modifying the already existing Pond 2A. Jay Patel and Barry Switzer mentioned that the owner is not very agreeable, and this may not be a feasible option. Pond 1B would be located on the Ridley USA property. The concern here is that it may be difficult to place an outfall pipe under the CSX line to the final outfall west of US 98. Sergio mentioned that a jack and bore could be possible. Pond 1C would be located on the Greenfield Five LLC property. This is a large site with the potential to accommodate both US 98 and Combee Road runoff. This property may be a more advantageous pond site as it already has a drainage easement that goes to the outfall and it is for sale. The US 98 project needs a 3.5-acre pond. There was some discussion about these pond sites. The Ridley USA property is closer to Combee Road and could be more hydraulically feasible. There was some question as to whether US 98 was currently being treated. It was generally understood that US 98 at this time is not receiving runoff treatment. Treating all of US 98 could be considered compensatory treatment for Combee Road.

Saddle Creek WBID

Polk County permitted and operates the Crystal Lake Drainage Improvement area, along with Crystal Lake as a whole. The City of Lakeland is currently conducting a feasibility study on TMDL and nutrient impairment concerns of Crystal Lake. The City of Lakeland only maintains a small portion of drainage on the southwest side of Crystal Lake. Some potential alternatives in this area include treating the roadway runoff in some sort of geoengineered media like within a tree box filter or using Bold and Gold. Currently, from Skyview Drive to North Crystal Lake Drive, Combee Road runoff goes to Crystal Lake untreated. CDS units or some other type of sediment removal system were also discussed, but these require maintenance. Phil Irven and FDOT staff stated that maintenance would have to be agreeable to these alternatives. For the next ELA meeting, maintenance staff from Polk County and FDOT will be invited, so they can be part of the conversation and provide a “win-win” situation for all parties. Another option is to permit a linear pond on the west side of Combee Road just southeast of Crystal Lake. There is currently an existing ditch there, but it fills with trash and debris. Cleaning up this area would benefit the lake. There was also discussion on the wetland area to the east of Combee Road north of Skyview Drive. This is the main outfall for Crystal Lake and this area can be used as a treatment area. The FDOT has already permitted this area. Usually SWFWMD does not like work within wetlands, but it is a potential option.

Municipal Drainage Concerns

Sergio asked Polk County and the City of Lakeland if there are specific drainage concerns in this area. There was discussion about the Eaton Park area and how it often floods. The discussion also included, the neighborhoods on the west side of Combee Road, in-between Civitan Avenue and Kiwanis Avenue, as they receive extensive roadway runoff from Combee Road and experience substantial flooding. The proposed curb and gutter system for Combee Road will alleviate this flooding. Finding a permittable water quality and quantity alternative for this corridor will ensure that the storm sewer concept can alleviate these drainage issues within the study limits and in adjacent communities.

Action Items:

The following are action items to be complete before the next ELA meeting:

- The Combee Road PD&E Study Team (PGA and Kimley Horn) will layout the following alternatives for water quality and quantity



MEETING MINUTES

- Crystal Lake improvements using CDS units, Gold and Bold, tree box filters, a linear pond, or improving the wetland to the east.
- For the Banana Lake basin to the south consider Pond 1B and Pond 1C locations and coordinate with TLP and Inwood on their water quality and quantity needs. Determine hydraulic feasibility or compensatory treatment in this basin. Follow up with City of Lakeland on the use and availability of the City owned parcel.
- The next ELA meeting will take place in early December
- A preapplication meeting with SWFWMD will take place in early February 2019
- The public meeting for this PD&E will take place spring 2019 and the final ELA meeting will take place after that meeting for final recommendations to be included in the PD&E documentation.
- Meeting invitations for the next ELA meeting will be forwarded on to Natural Resource personnel at the County and/or City and to any maintenance personnel from FDOT and Polk County.

Exhibits from the Meeting are attached to these minutes.



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MEETING MINUTES

ATTACHMENTS:

Sign-in Sheet
Typical Section Alternatives
Concept Plans
Potential Pond Site Exhibit
US 98 Project Potential Ponds



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SIGN-IN SHEET

Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to Skyview Drive

Meeting Name: FDOT ELA Kick-off meeting

Date/Time: July 26, 2018 1:30pm

Location: D1- HQ DEMO Room 231

INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
PBB	Patrick Bateman	FDOT	863-519-2792	Patrick.Bateman@dot.state.fl.us
	Brent Setchell	FDOT	863-519-2557	Brent.Setchell@dot.state.fl.us
	Sergio Figueroa	FDOT	863-519-2839	Sergio.Figueroa2@dot.state.fl.us
	Bill Hartmann	FDOT	863-519-2293	William.Hartmann@dot.state.fl.us
	Lauren Peters	FDOT		Lauren.Peters@dot.state.fl.us
	Jessica Schilling	City of Lakeland	863-834-8439	jessica.schilling@lakelandgov.net
	Phil Irlen	Polk County	863-535-2200	PhillIrlen@polk-county.net
	Barry Switzer	TLP	407-574-5852	barry.switzer@tlpeng.com

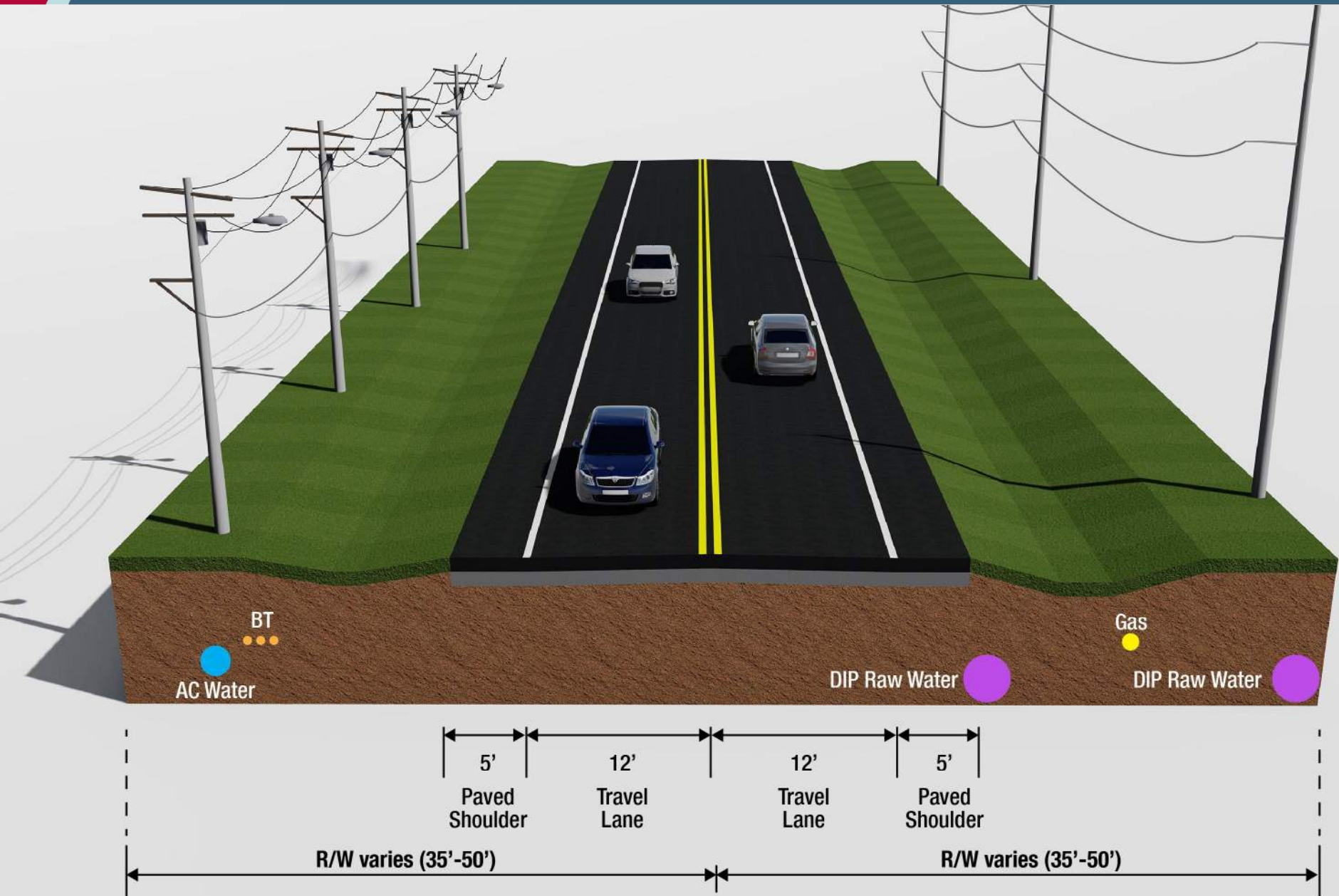


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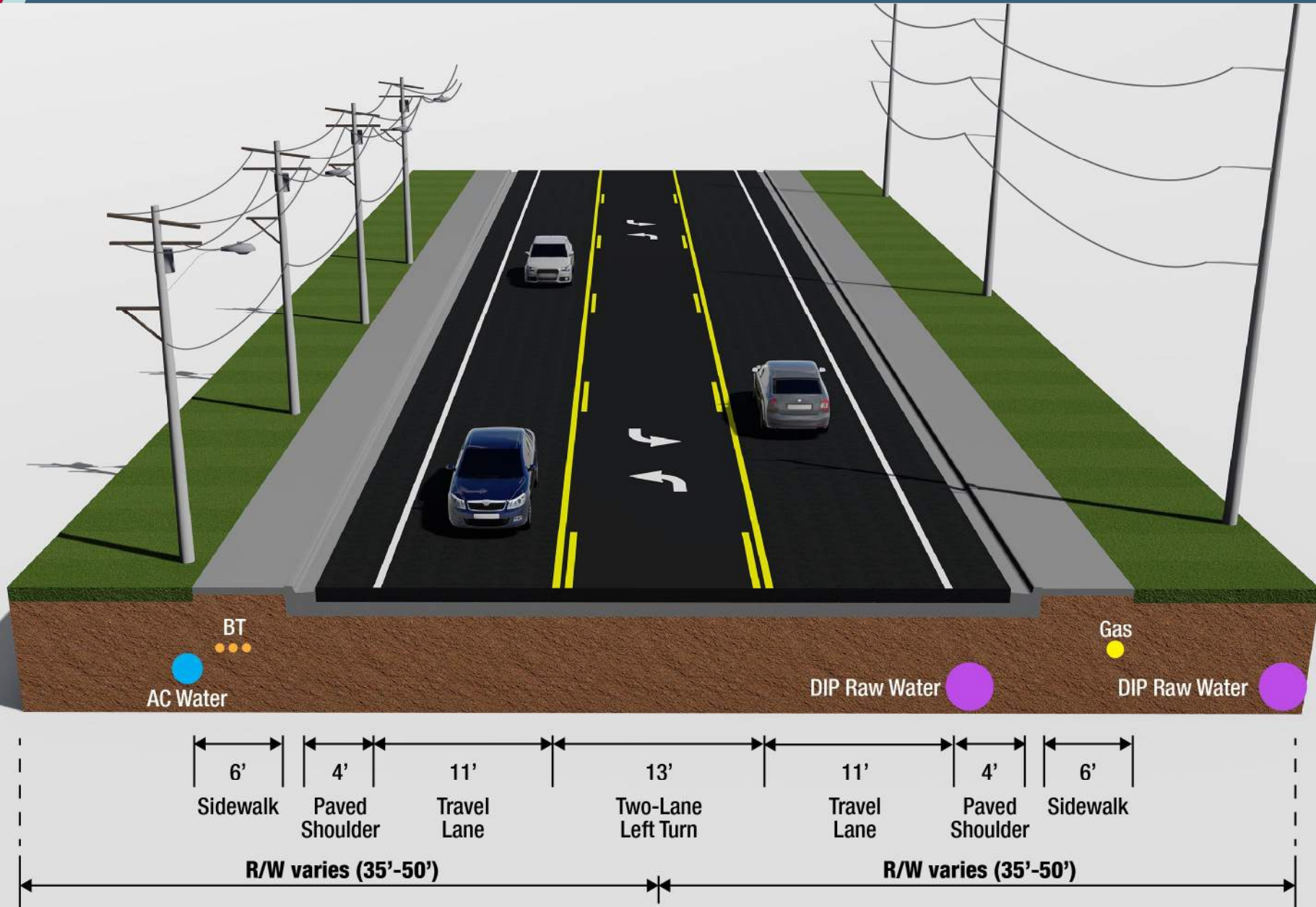
SIGN-IN SHEET

INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
MDP	Matt Dockins	RKK	813-386-1460	mdockins@rkk.com
MG	Michael Garau	Kimley-Horn	407-427-1618	Michael.Garau@kimley-horn.com
GS	Gretchen Suarez-Pena	PGA	863-533-7317 ext. 202	Gretchen.Suarez-Pena@patelgreene.com
	Tim Polk	PGA	863-533-7317 ext. 205	Tim.Polk@patelgreene.com
JP	Jay Patel	Inwood	407 971 8850	jpatel@inwoodinc.com
CE	Cole Edwards	CITY OF LAKELAND	863 834 3307	cole.edwards@lakeandgov.net
TA	Teresa Austin	FDOT	863-519-2621	teresa.austine@dot.state.fl.us
MM	Nicole Montes	FDOT-Permits	863-519-2351	nicole.montes@dot.state.fl.us

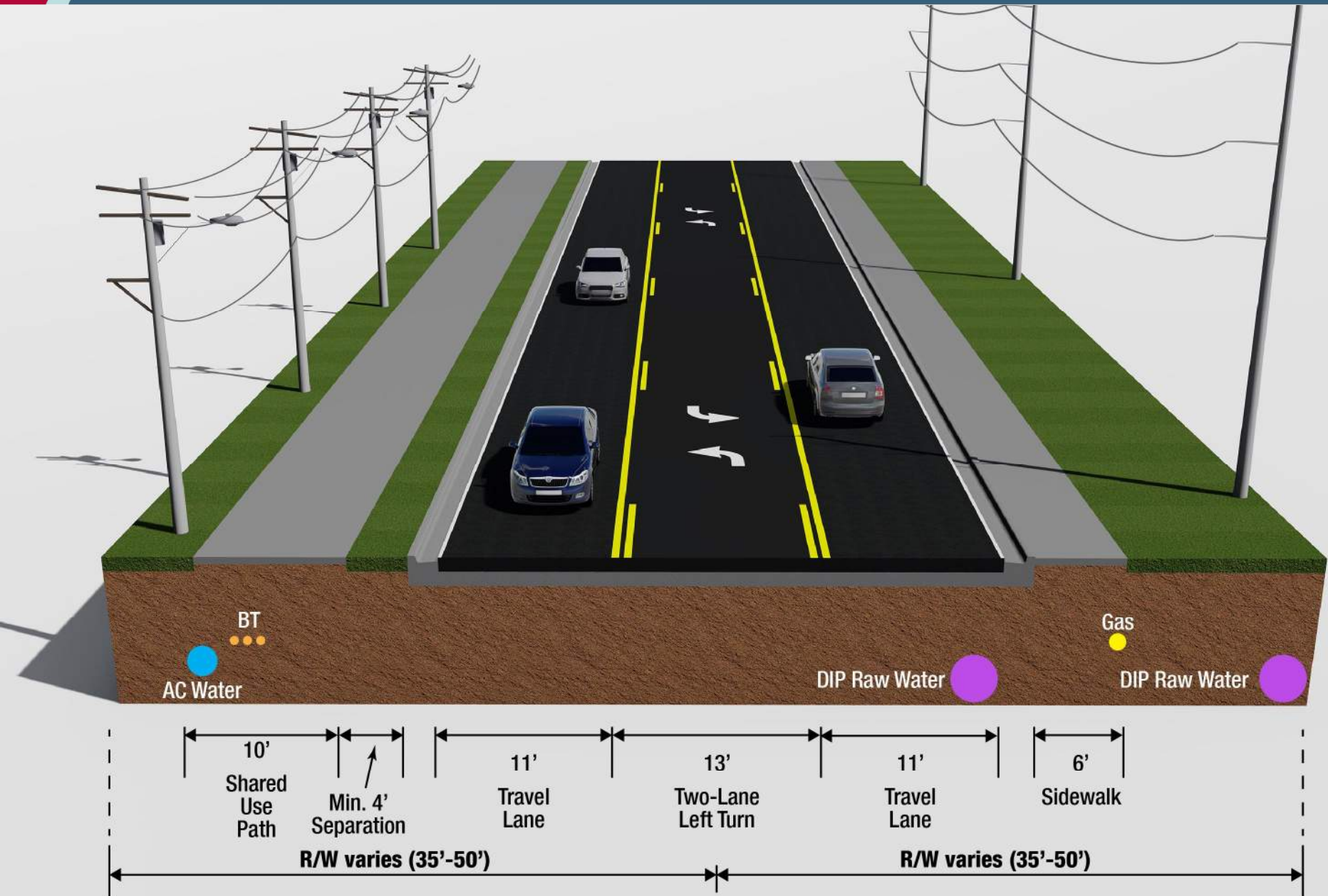
Existing Typical Section



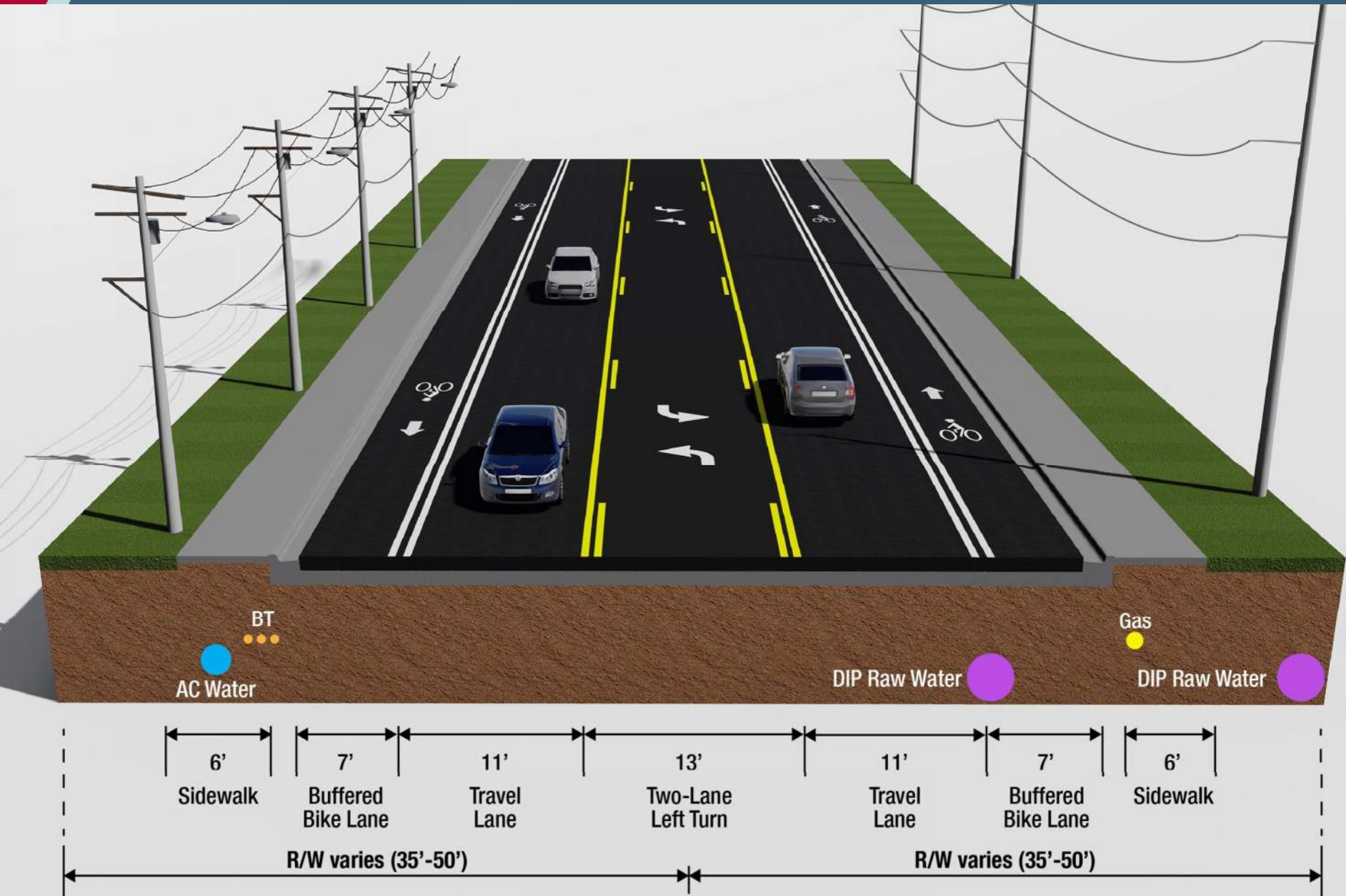
Polk TPO Recommendation

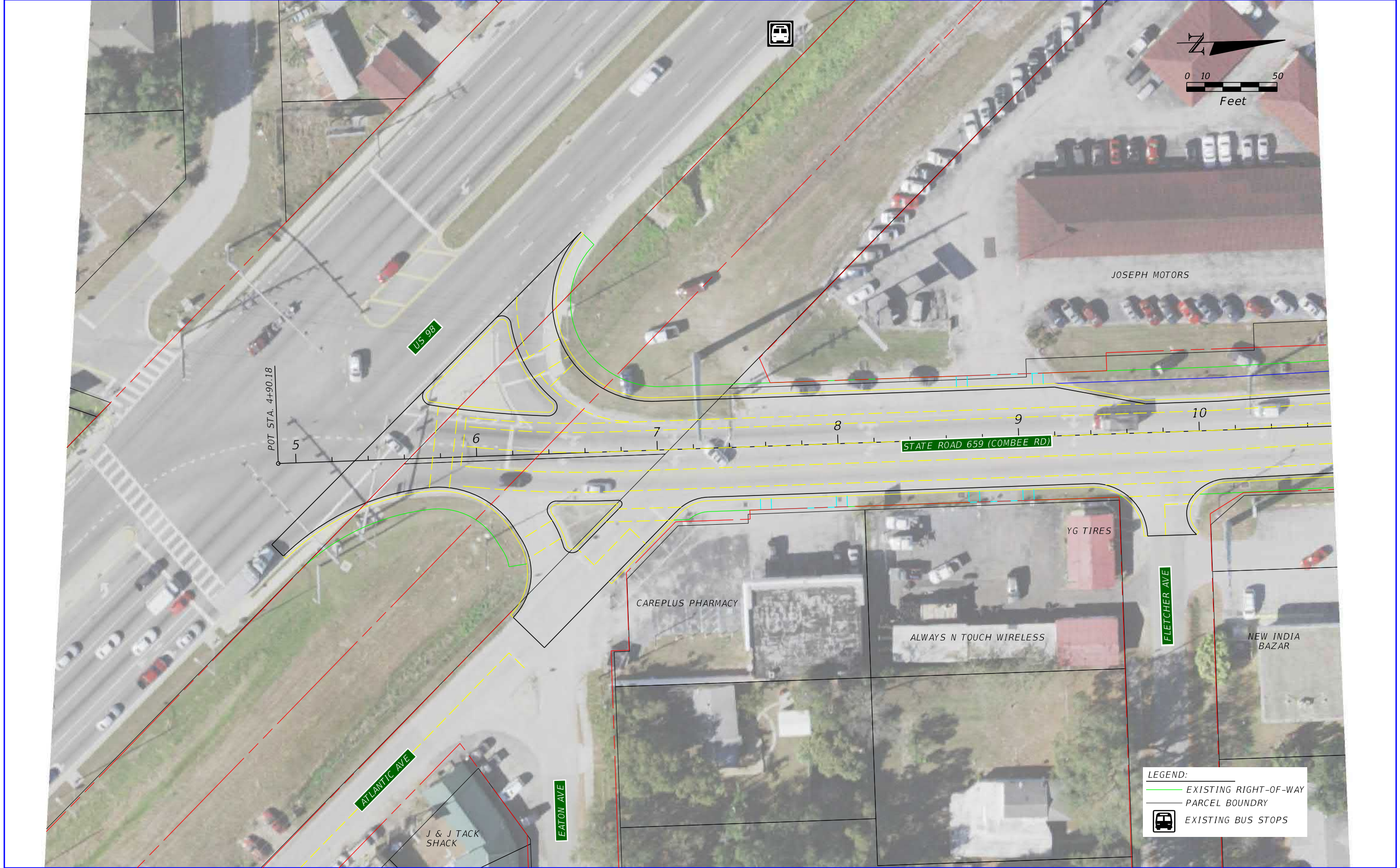


Shared-Use Path Option

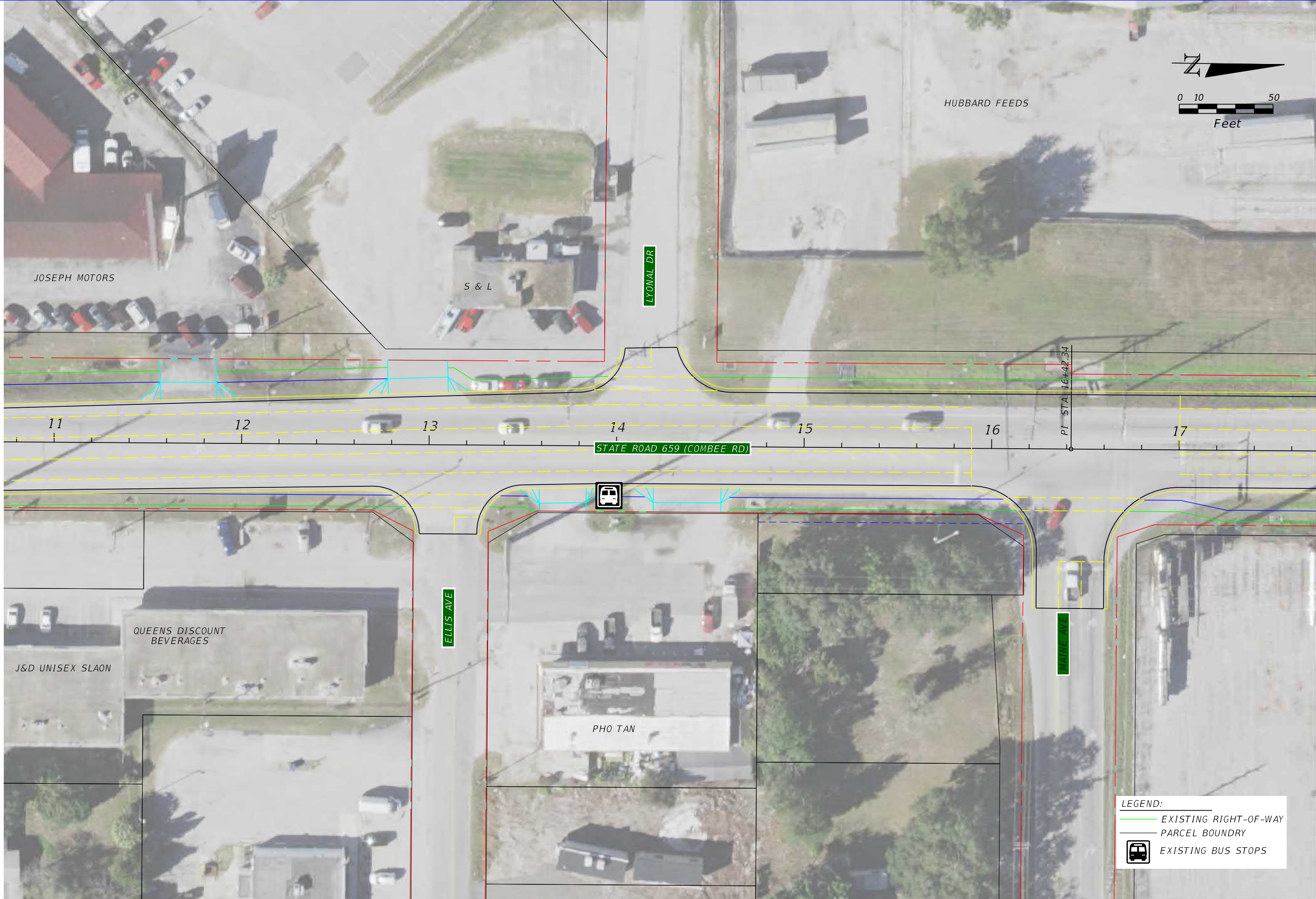


Buffered Bike Lane Option

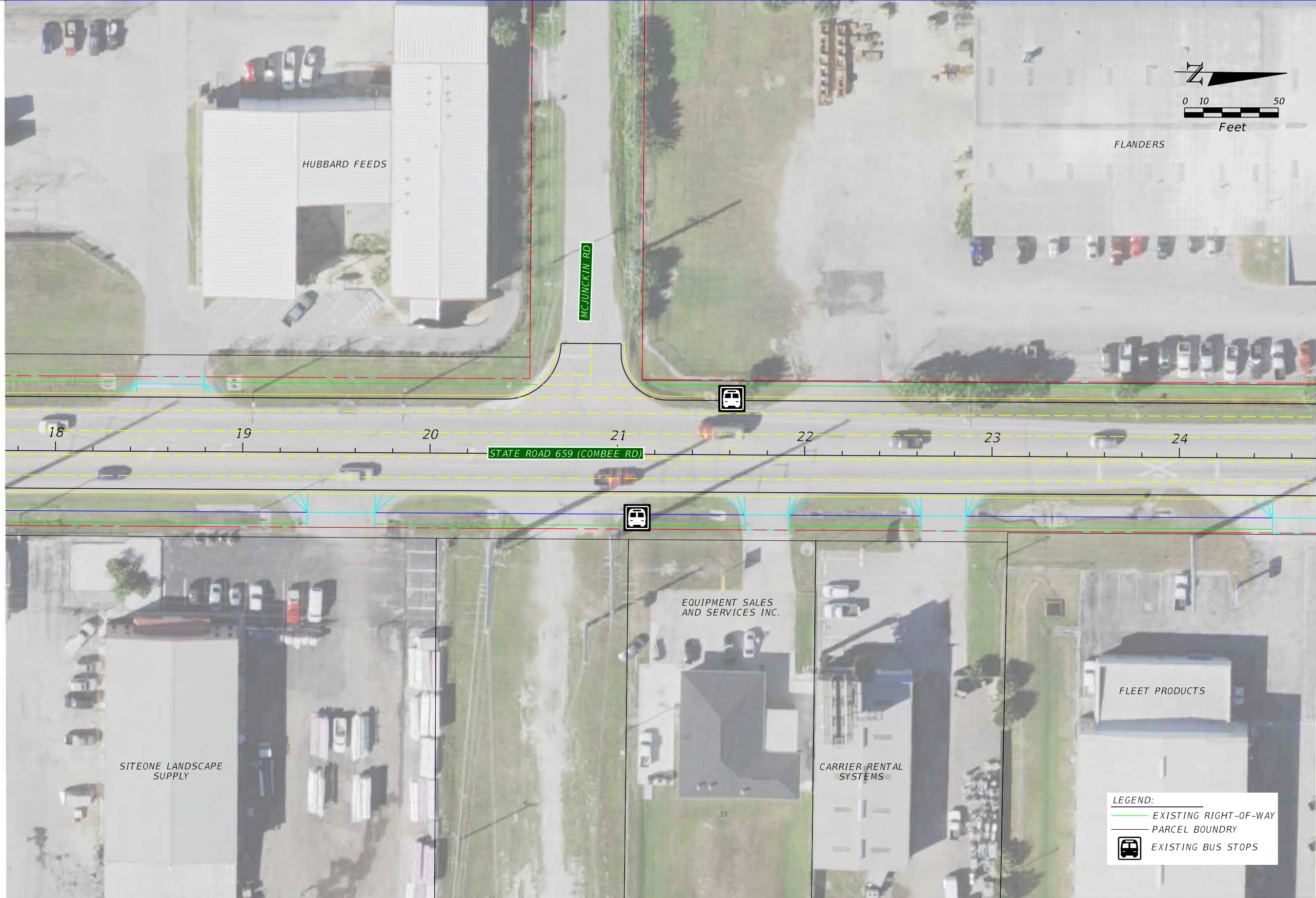




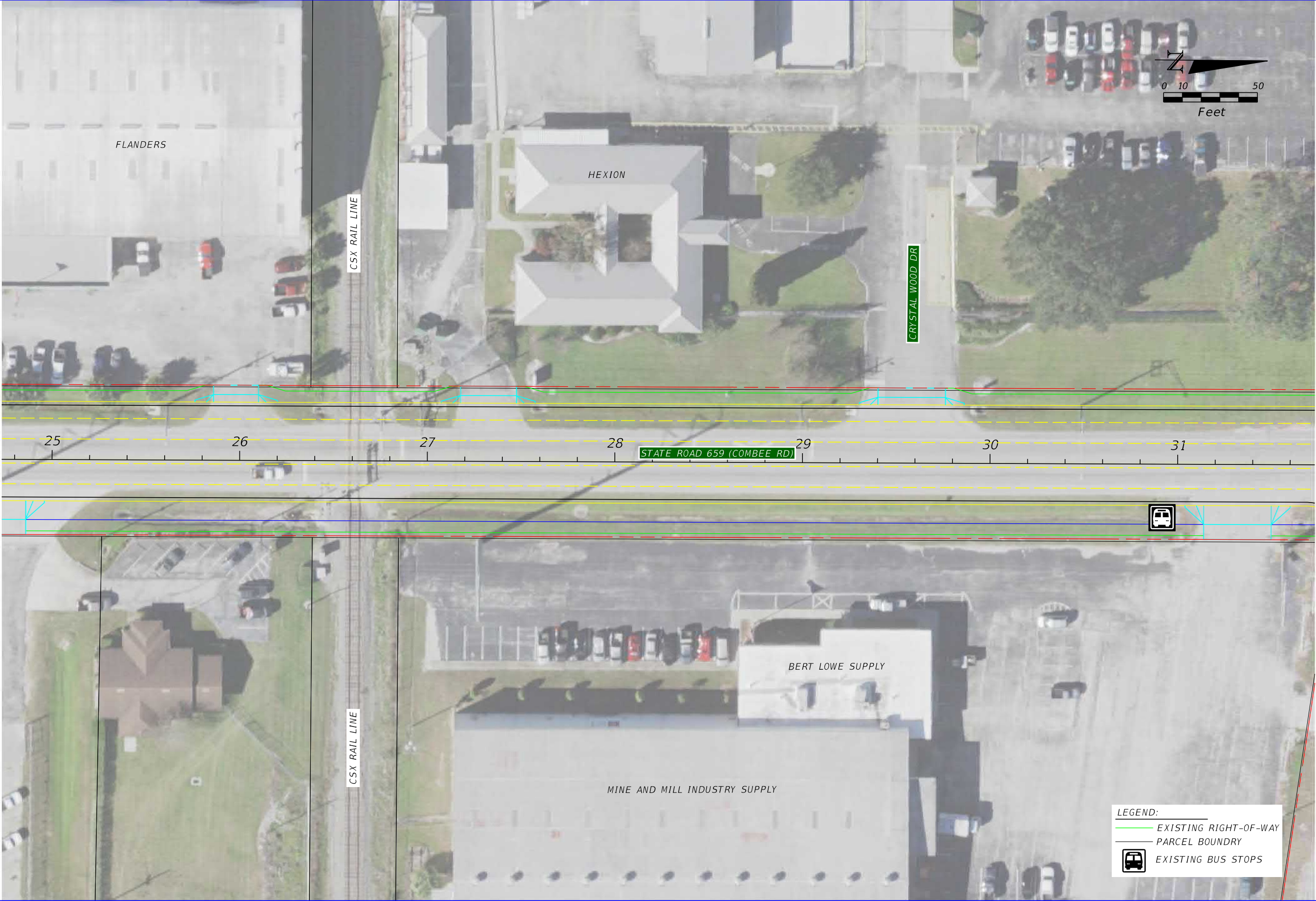
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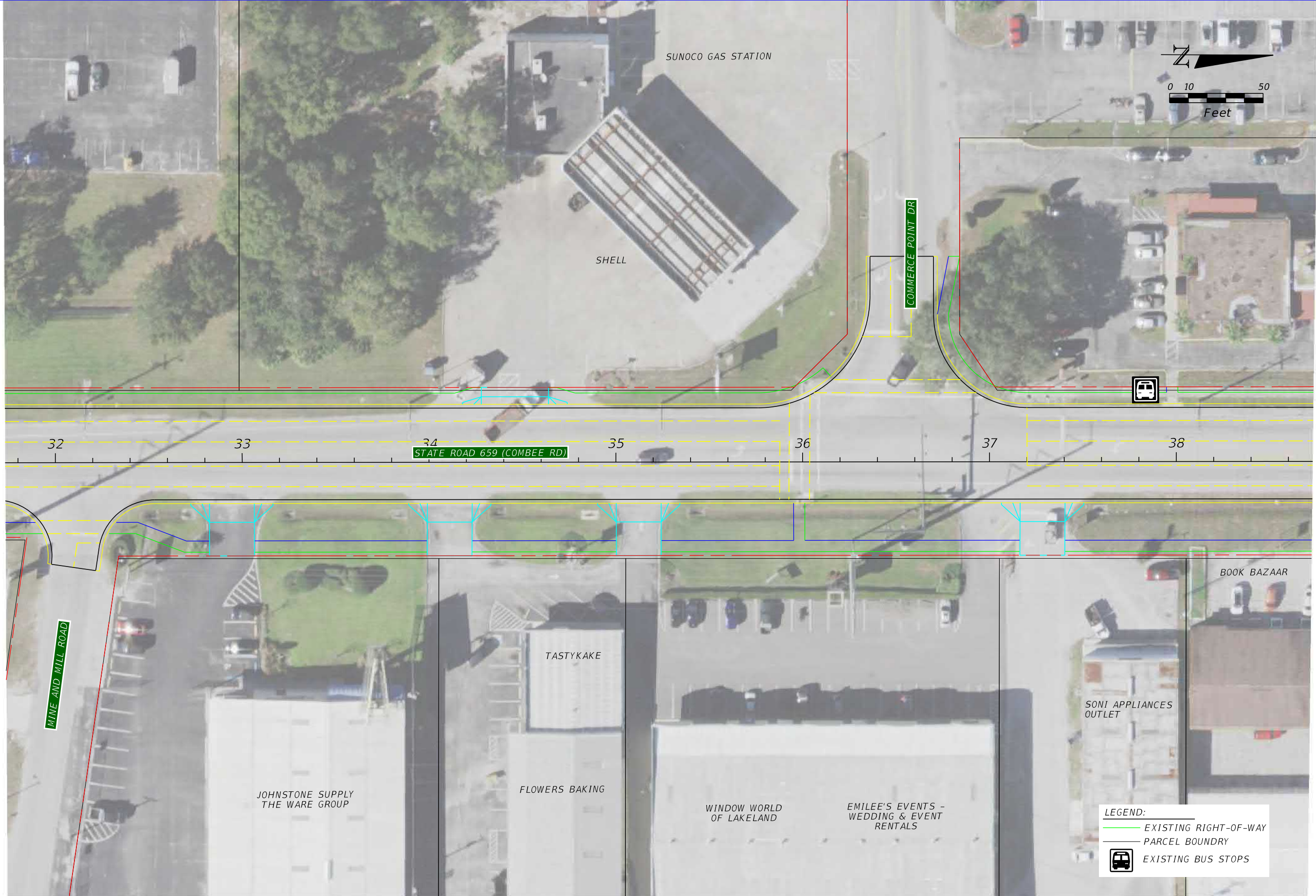
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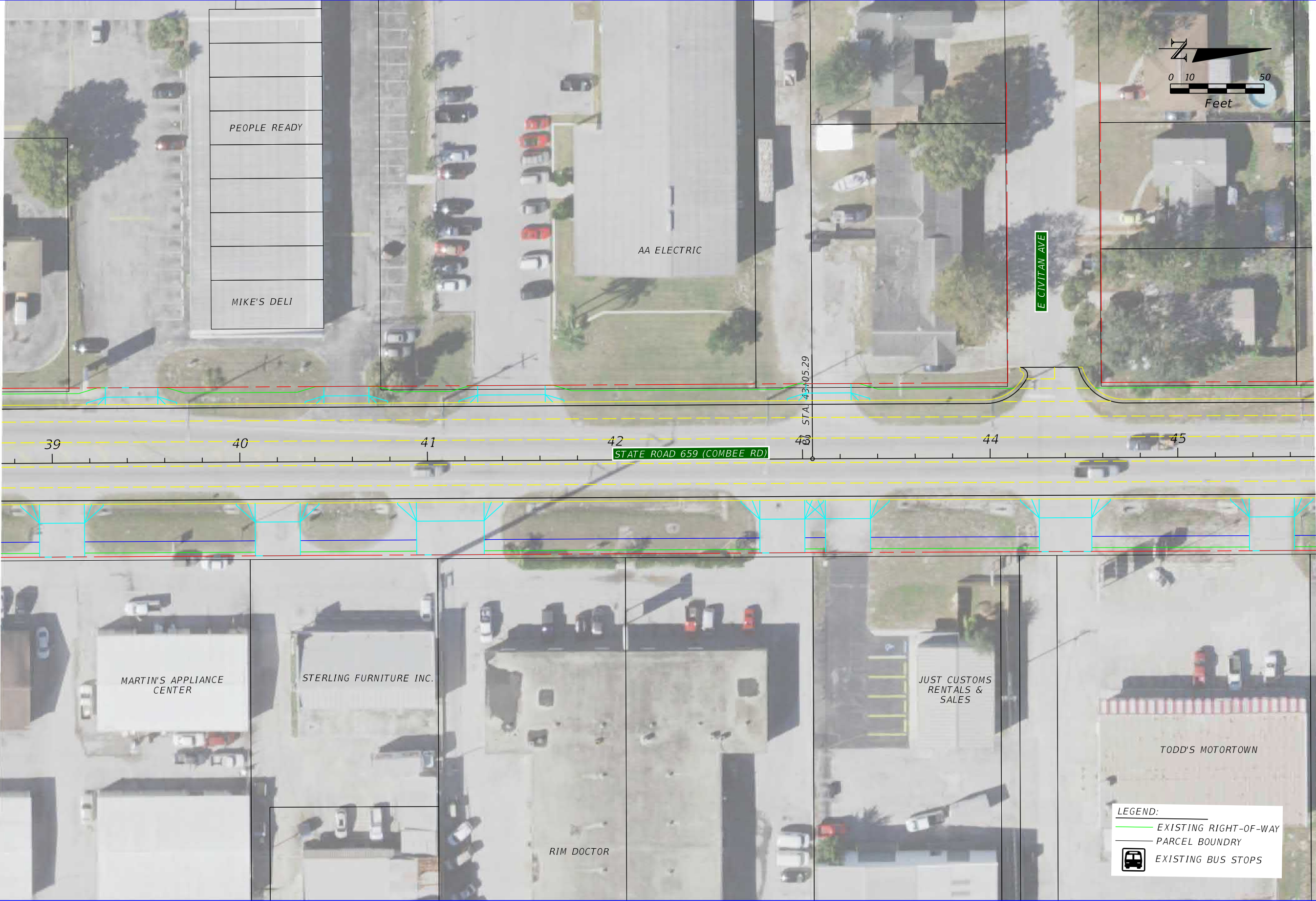
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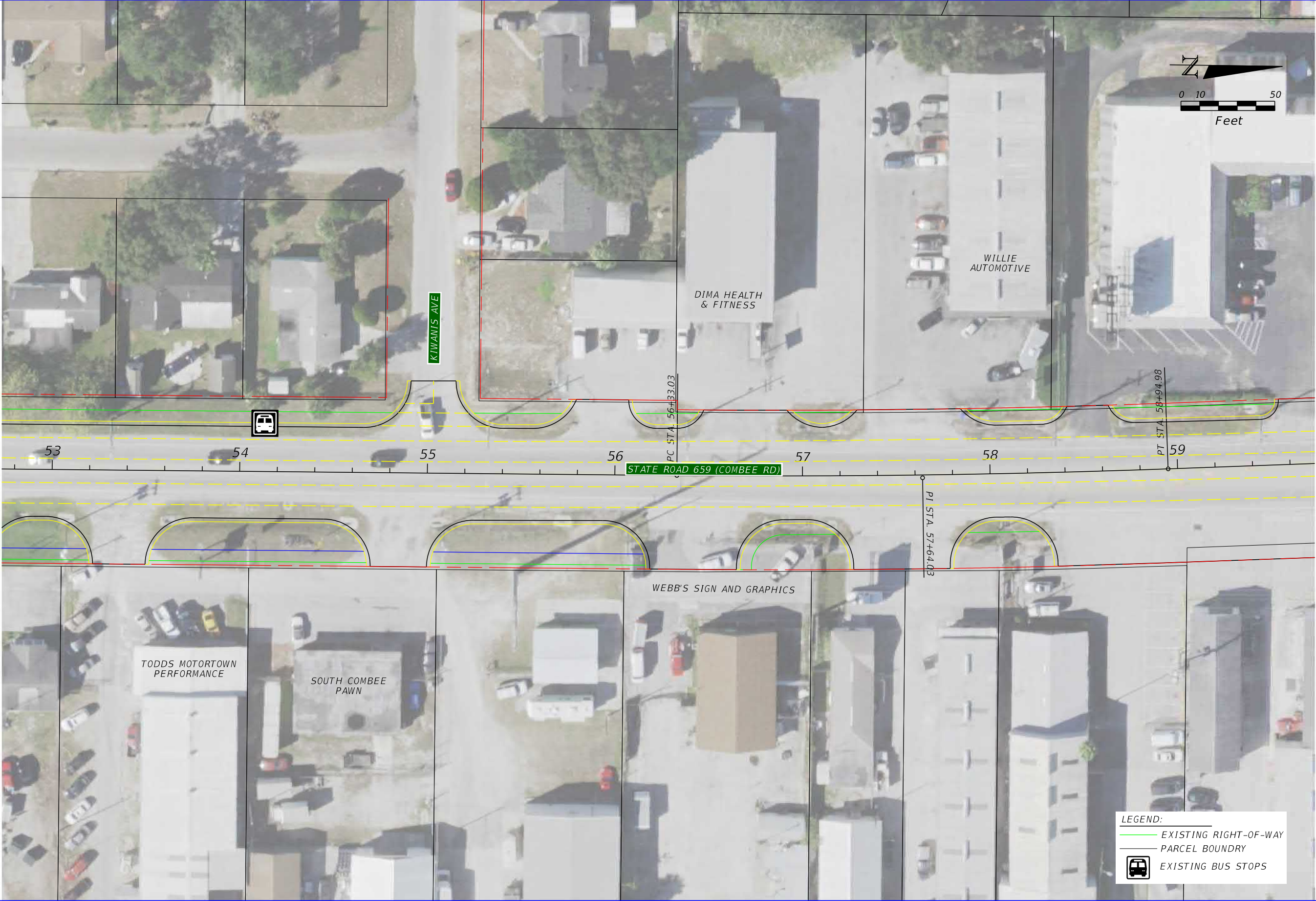
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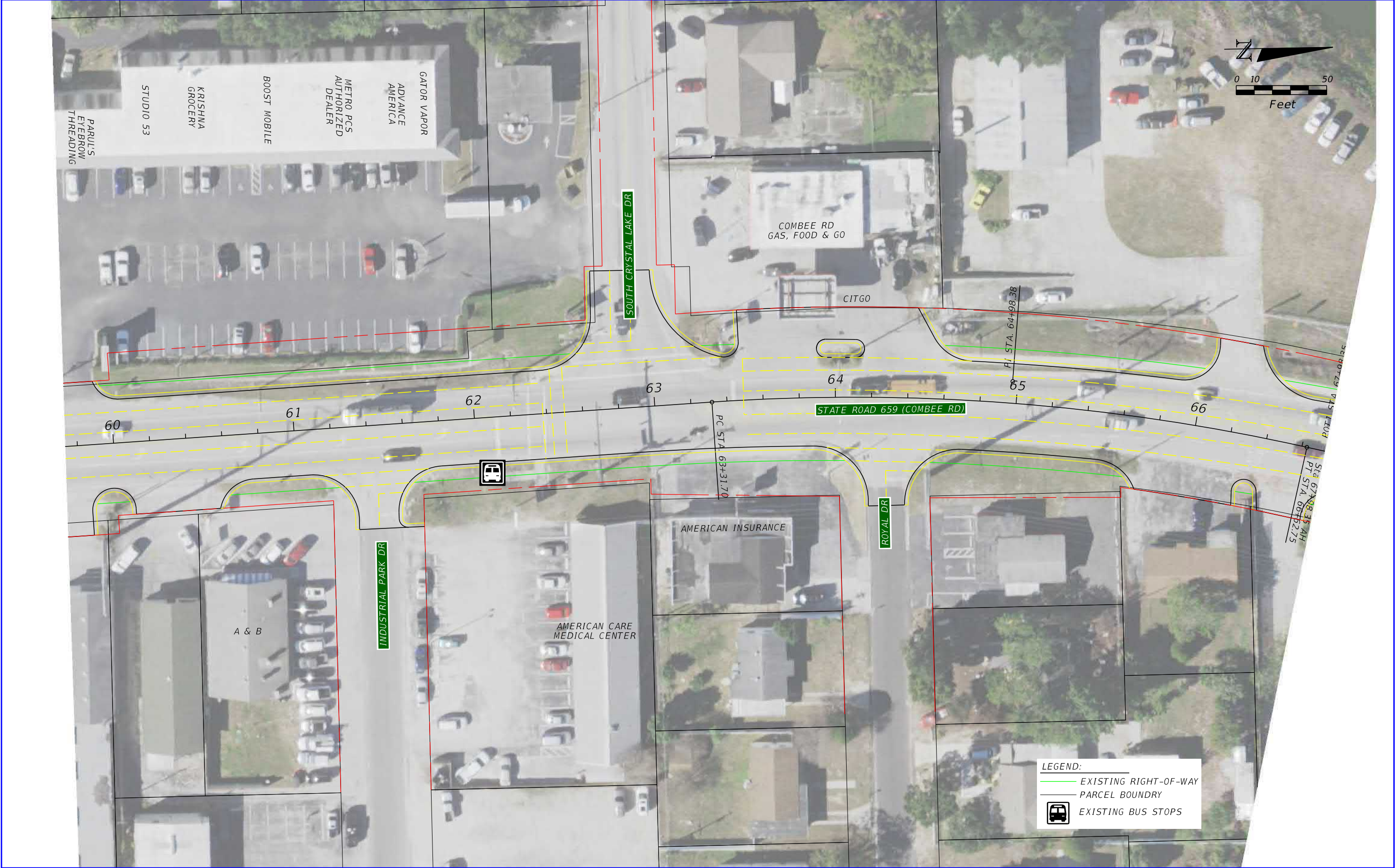
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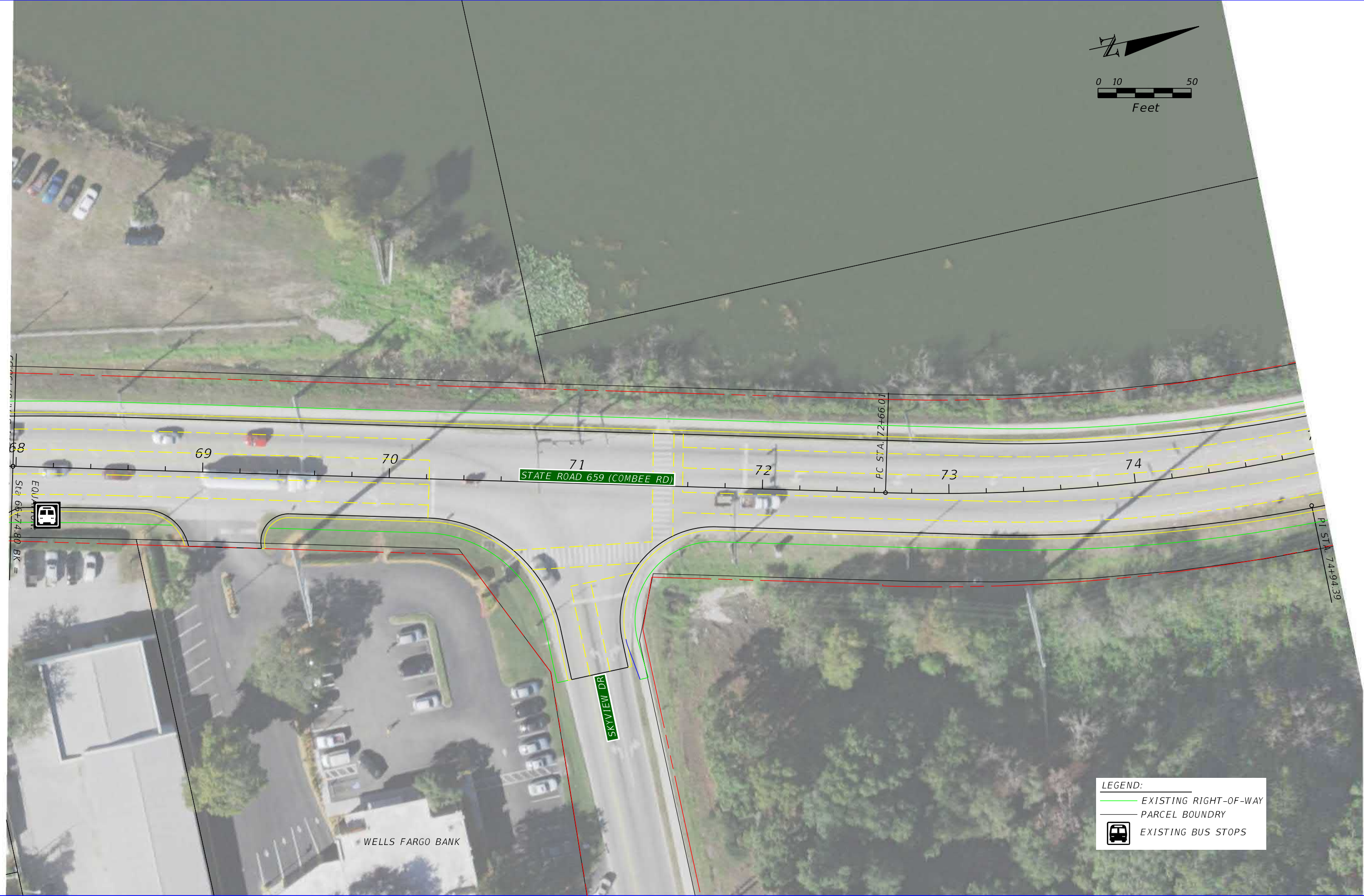
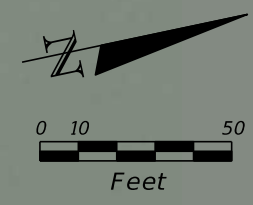
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REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN SHEET	SHEET NO.
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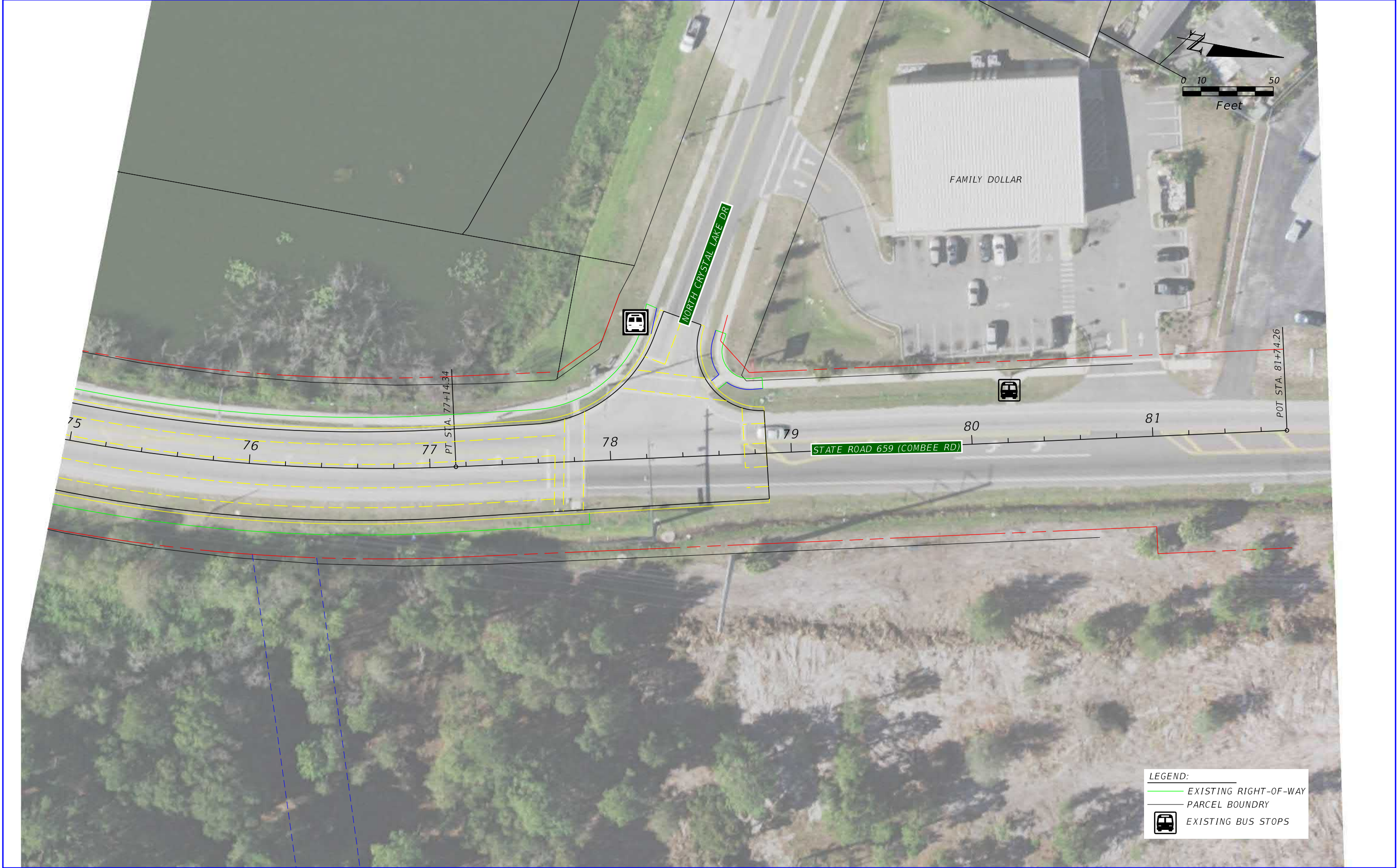
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DATE	DESCRIPTION	DATE	DESCRIPTION					
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						149881000		



LEGEND:

- EXISTING RIGHT-OF-WAY
- PARCEL BOUNDRY
- EXISTING BUS STOPS

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	PLAN SHEET		SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION				
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	10
						149881000	



REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN SHEET	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		11
						149881000		





REVISIONS				TLP ENGINEERING CONSULTANTS, INC. 11486 CORPORATE BLVD., SUITE 151 ORLANDO, FL. 32817 PH: 407-901-5060 JAMES E. MYERS, P.E. 44751 CERT. OF AUTH. #27205	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POND LOCATION 1A	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 35	POLK	197562-4-32-01		



REVISIONS				TLP ENGINEERING CONSULTANTS, INC. 11486 CORPORATE BLVD., SUITE 151 ORLANDO, FL. 32817 PH: 407-901-5060 JAMES E. MYERS, P.E. 44751 CERT. OF AUTH. #27205	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POND LOCATION 1B	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION						
					ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 35	POLK	197562-4-32-01		



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to Skyview Drive

Meeting Name: ELA Meeting 2

Date: December 17, 2018

Location: D1- HQ

1. Introductions
2. Project Scope and Description
3. ELA Meeting 1 Overview
 - a. No existing treatment
 - b. Treatment and Attenuation

ALTERNATIVE		ADD'L IMPERVIOUS AREA TREATMENT (AC-FT)	ATTENUATION (AC-FT)
Alt 1	Polk TPO* Recommendations Basin 1	0.23	1.33
	Polk TPO* Recommendations Basin 2	0.10	0.56
Alt 2	Shared Use Path Basin 1	0.20	1.12
	Shared Use Path Basin 2	0.08	0.48
Alt 3	Buffered Bike Lanes Basin 1	0.29	1.64
	Buffered Bike Lanes Basin 2	0.12	0.70

* TPO- Transportation Planning Organization

4. Regional Approach per Basin
 - a. Basin 1 Options
 - i. Ridley USA Property
 - ii. City of Lakeland Property
 - iii. It appears that join-use option with US 98 project is off the table
 - b. Basin 2 Options
 - i. Polk County/City of Lakeland - Crystal Lake Drainage Improvements
 - ii. City of Lakeland Crystal Lake TMDL Implementation Final Report recommends "redirection of untreated stormwater to the existing Polk County wet detention system" based on findings.
 - iii. Retrofit closed flumes (redirect to pond above)



iv. Ditch area adjacent to Lake

PROJECT NAME	PERMIT NUMBER	VOLUME AT TOB (AC-FT)	REQ. TREATMENT (AC-FT)	PROV. TREATMENT (AC-FT)	STORAGE AVAILABLE (AC-FT)	(NOTES)
Crystal Lake Drainage Improvements (Polk County)	44010422	2.27	0.15	1.07	0.92	BMP Pond

5. Innovative ideas-Maintenance

- a. Bold and Gold
 - i. US 98 CBC
- b. CDS units- Instead of Closed flume inlets along Crystal Lake
 - i. Captures and retains trash
 - ii. Used to meet TMDL requirements
- c. Tree Filters
 - i. Pollutant Removal (>85% TSS, >45% N, >60% Ph etc)
 - ii. Provide Landscaping

6. Discussion and Action Items

- a. Further Action items
- b. Next ELA Meeting
- c. Minutes by PGA
- d. Other



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive

Meeting Name: ELA Meeting 2

Date: December 17, 2018

Location: D1- HQ

Attendees:

Patrick Bateman (FDOT), Sergio Figueroa (FDOT), Brent Setchell (FDOT), Bill Hartmann (FDOT), Lauren Peters (FDOT), Teresa Austin (FDOT), Sharon Hedrick Harris (FDOT), Jessica Schilling (City of Lakeland), Phil Irvén (Polk County), Jay Jarvis (Polk County), Matt Dockins (RKK), Michael Garau (Kimley-Horn), Gretchen Suárez-Peña (PGA), Tim Polk (PGA), Jen Rehl (PGA), William Roll (KH)

The following notes reflect our understanding of the discussions and decisions made at this meeting. If you have any questions, additions, or comments, please contact us. We will consider the minutes to be accurate unless written notice is received within 5 working days of the date issued.

Meeting Minutes

Gretchen Suárez-Peña started the meeting by addressing some of the items discussed in the previous ELA meeting. Michael Garau then addressed the purpose of this PD&E, which is to study concepts to improve Combee Road. The proposed typical section has two lanes with a two-way, center turn lane.

The purpose of this second ELA meeting is to discuss ways to address the drainage requirements in a cooperative agreement with the following involved parties: FDOT, Polk County and the City of Lakeland. Ideally, a regional approach can be implemented that benefits the watersheds and all the stakeholders.

The only ROW acquisition for this project is for stormwater management (ponds). There is no existing treatment provided for Combee Road. The proposed improvements add relatively little additional pavement to the existing condition.

The project can be divided into two separate basins. Basin 1, which is part of the greater Banana Lake watershed is located to the south from US 98 to Kiwanis Avenue. Basin 2, which discharges to Crystal Lake is part of the Saddle Creek Basin, is the northern basin from Kiwanis Avenue to N. Crystal Lake Road.

Currently, there are two pond sites being considered as alternatives to serve the stormwater needs for Basin 1. Pond 1A, is within the Ridley USA Inc. property. The pond is being proposed to the west of the existing buildings and parking lot. This pond site is 3.8 acres, which would be enough to provide the necessary treatment and attenuation for Basin 1. Currently, this parcel is also being considered for the US 98 widening project. However, it is not a preferred alternative.



MEETING MINUTES

The US 98 design team still needs to provide treatment calculations if this will be a joint-use pond. The pond will discharge south into the existing US 98 roadside ditch, as the parcel does in the existing condition. The option of using the existing cross drain under US 98 for discharge of this pond alternative was brought up during the meeting.

There was a question regarding the use of the existing Polk County regional stormwater management area north of the Polk Parkway. There appeared to be available capacity for treatment and attenuation in this facility. However, Polk County staff said this area is now a private park and is not available for any stormwater management use. The project can still discharge there, as that is the existing drainage pattern, as long as pre-post is met. In the first ELA meeting, the use of this area for treatment and attenuation was unfeasible.

Pond 1B, the second pond site alternative for Basin 1, is located east of Combee Road in a parcel owned by the City of Lakeland. The parcel is 1.9 acres and it can meet the stormwater management needs for Basin 1 as a wet pond. City of Lakeland staff stated that the parcel is used for Lakeland Electric equipment staging and access. There are major transmission poles which would need to be accounted for and voided if this site is selected. Further coordination with Lakeland Electric and the City of Lakeland is needed to discuss the possibility of using this site for stormwater purposes.

Basin 2 has three alternative pond sites. Pond 2A is located at the northern end of Crystal Lake. It is an existing pond owned by Polk County with an existing 0.29 inches of runoff being treated in the pond. The City of Lakeland Crystal Lake TMDL Implementation Final Report recommends that untreated Combee Road runoff be redirected to Pond A. This can be achieved by retrofitting the existing closed flume inlets along Combee Road into a closed storm sewer system so that they discharge to into Pond 2A.

Two other alternatives are Pond 2B and Pond 2C. Pond 2B is currently a ditch area collecting runoff from Combee Road and discharging into Crystal Lake. This area is 0.2 acres. This ditch would be converted into a linear pond, with a control structure placed at the downstream end before discharging into Crystal Lake. Pond 2C is within a parcel owned by an auto repair shop. It is approximately 0.8 acres when combines with the ditch area. This would be a total take right-of-way purchase.

During the meeting, it was confirmed that there is no shifting of the alignment outside the right of way.

There was discussion on the use of alternative stormwater treatment methods such as Bold and Gold, tree filters and CDS units. The main question was if these methods are implemented, how will they be maintained. FDOT Maintenance stated that they prefer low maintenance alternatives due to their lack of man power and equipment, such as vac trucks. FDOT staff did state that they would be willing to pay for the construction of the improvements if either the City or the County would be willing to maintain it. Both Polk County and City of Lakeland stated that further coordination would be needed before there was a commitment on their part to maintain alternative treatment methods. The lack of funds for maintenance for both entities was brought up as a hinderance to committing to this task.



MEETING MINUTES

FDOT stated that they would not be able to maintain any alternative treatment options. FDOT believes there are good pond alternatives available for this project, therefore there is no need to look at options that require a lot of maintenance.

The question of using the wetland area located east of Combee Road at N. Crystal Lake Drive was brought up. Due to the permitting complexity and environmental sensitivity of the site, it is a low priority option.

Action Items

- Coordination with Lakeland Electric regarding the City of Lakeland parcel where Pond 1B is proposed.
- Set up "pre-app" meeting with SWFWMD
- Coordination with City of Lakeland and Polk County regarding the possibility of maintenance agreement if proprietary products are used.
- PD&E team to provide a maintenance cost estimate to help the entities involved make a better decision.
- Continued coordination on the treatment and attenuation needs for the US 98 widening project.
- Final ELA meeting in February for the final recommended alternatives.
- Optional Services will probably be encumbered to evaluate more conventional pond alternatives in the southern basin in the PSR.
- Due to the limited increase in the additional impervious area in the northern basin, joint-use with the existing County facility is still feasible.

Exhibits from the Meeting and the Sign-In sheet are attached to these minutes.

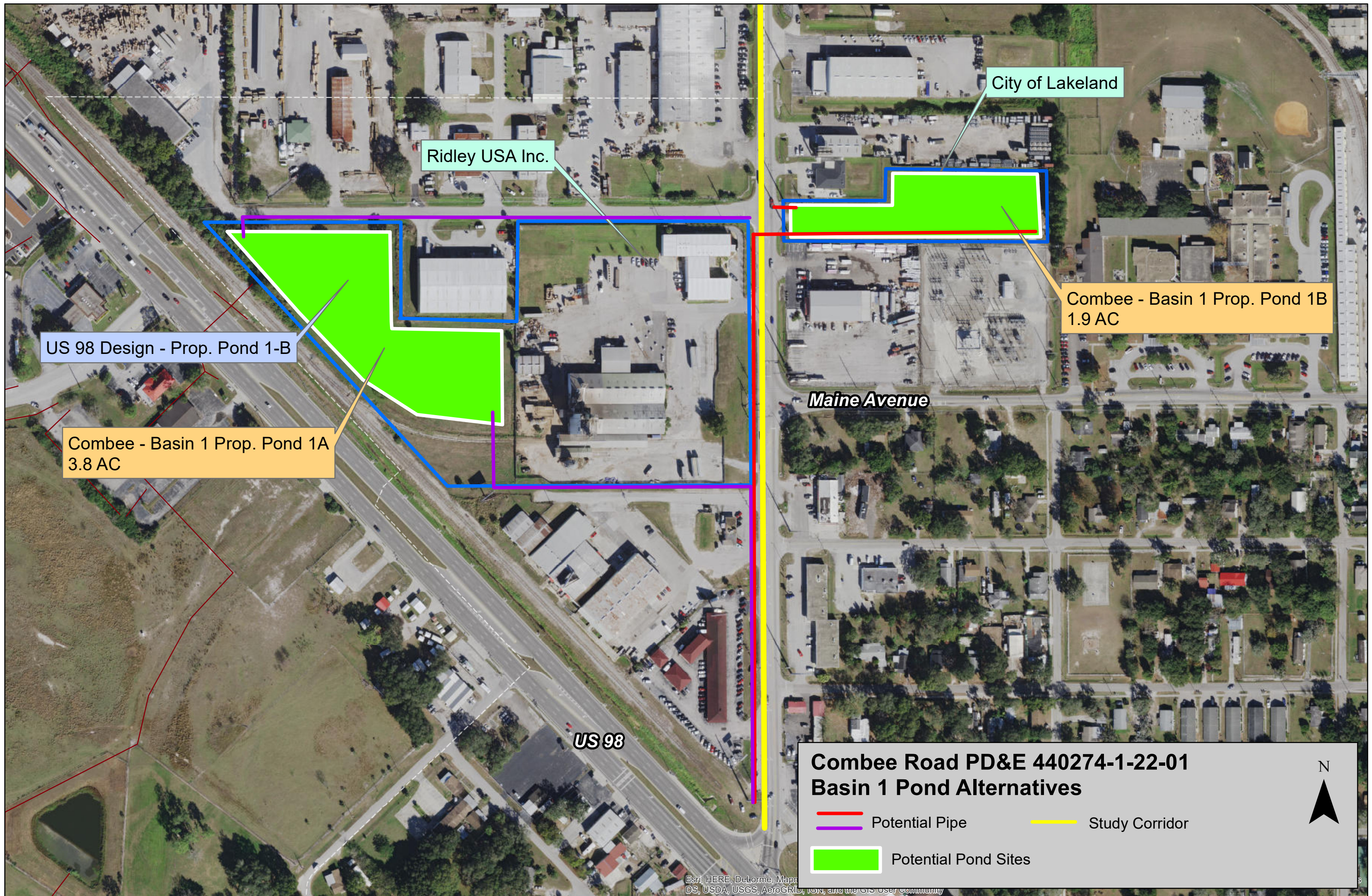


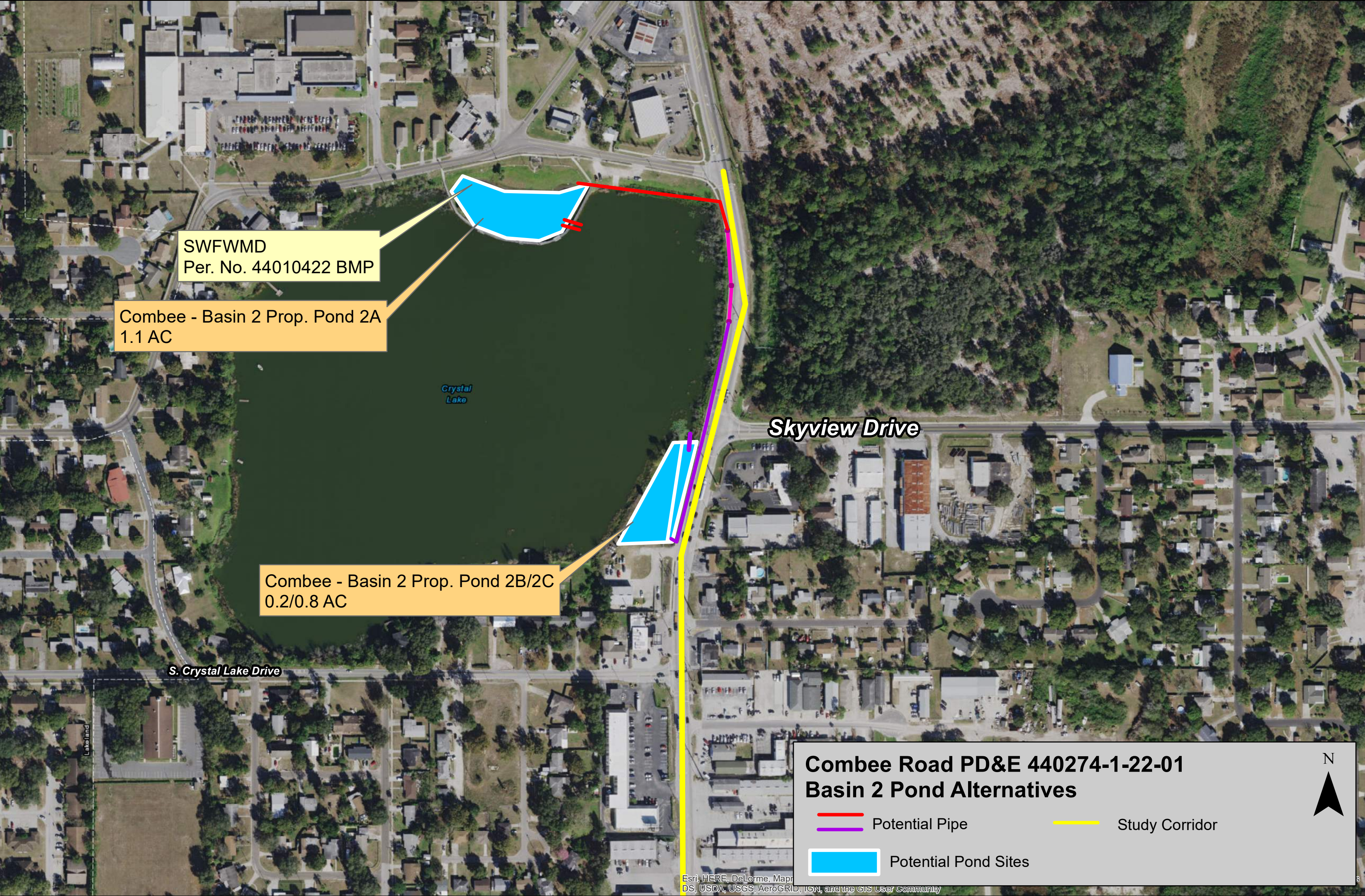
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MEETING MINUTES

ATTACHMENTS:

Potential Pond Site Exhibits
Sign-in Sheet







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SIGN-IN SHEET



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to Skyview Drive

Meeting Name: FDOT ELA Meeting 2

Date/Time: November 18, 2018 8:30am




Location: D1- HQ

INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
PBB	Patrick Bateman	FDOT	863-519-2792	Patrick.Bateman@dot.state.fl.us
Bd	Brent Setchell	FDOT	863-519-2557	Brent.Setchell@dot.state.fl.us
	Sergio Figueroa	FDOT	863-519-2839	Sergio.Figueroa2@dot.state.fl.us
	Teresa Austin	FDOT	863-519-2621	Teresa.austin@dot.state.fl.us
wf	Bill Hartmann	FDOT	863-519-2293	William.Hartmann@dot.state.fl.us
	Lauren Peters	FDOT		Lauren.Peters@dot.state.fl.us
	Nicole Monies	FDOT	863-519-2351	Nicole.monies@dot.state.fl.us
	Lavenia Toole	FDOT Maintenance	863-519-4310	lavenia.toole@dot.state.fl.us



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Tel: 863.533.7317 | www.patelgreene.com

SIGN-IN SHEET

INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
	Sharon Hedrick Harris	FDOT Maintenance	863-519-2315	Sharon.HedrickHarris@dot.state.fl.us
	Jessica Schilling	City of Lakeland	863-834-8439	jessica.schilling@lakelandgov.net
	Cole Edwards	City of Lakeland	863-834-3307	Cole.edwards@lakelandgov.net
	Phil Iven	Polk County	863-535-2200	PhillIven@polk-county.net
	Jay Jarvis	Polk County	863-535-2200	JayJarvis@polk-county.net
	Barry Switzer	TLP	407-574-5852	barry.switzer@tlpeng.com
	Jay Patel	Inwood	407-971-8850	jpatel@inwoodinc.com
	Matt Dockins	RKK	813-386-1460	mdockins@rkk.com
	Michael Garau	Kimley-Horn	407-427-1618	Michael.Garau@kimley-horn.com
	Gretchen Suarez-Pena	PGA	863-533-7317 ext. 202	Gretchen.Suarez-Pena@patelgreene.com



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INITIAL	NAME	REPRESENTING	PHONE NUMBER	EMAIL ADDRESS
JBR	Jen Rehrl	PGA-Drainage	863-242-6029	jen.rehrl@patelgreene.com
TAP	Tim Polk	PGA Drainage	863-533-7317	tim.polk@patelgreene.com
Wm	William Roll	KH	863-608-5304	william.roll@kimley-horn.com



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive

Meeting Name: ELA Meeting 3

Date: February 19, 2019

Location: D1- HQ

1. Introductions
2. Project Scope and Description
3. ELA Meeting 2 Overview
 - a. Pond Alternatives for Basins
 - i. Basin 1 – Ridley USA property, City of Lakeland property, Joint-use with US 98.
 - ii. Basin 2 – Polk County/City of Lakeland – Crystal Lake Drainage Improvements.
4. SWFWMD Meeting Overview
 - a. Southern Basin Discussion
 - i. Preferred alternative - joint-use option with US 98 project.
 - ii. Second alternative – consider traditional pond sites to accommodate treatment
 - b. Permitting
 - i. Individual Permit placed under existing Combee Road ERP (#4722081).
 - ii. Letter of modification to
 1. US 98 permit
 2. Crystal Lake pond ERP (#4010422)
5. Potential Pond Approach for Basin 1
 - a. SMF 1-A
 - b. SMF 1-B
 - c. SMF 1-C
6. Discussion and Action Items
 - a. Further Action items
 - b. Minutes by PGA
 - c. Other



Project Number: 440274-1-22-01

Project Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive

Meeting Name: ELA Meeting 3

Date: February 19, 2019

Location: D1- HQ

Attendees:

Patrick Bateman (FDOT), Sergio Figueroa (FDOT), Nicole Monies (FDOT), Bill Hartmann (FDOT), Lauren Peters (FDOT), Phil Irvén (Polk County), Matt Dockins (RKK), Michael Garau (Kimley-Horn), Gretchen Suárez-Peña (PGA)

The following notes reflect our understanding of the discussions and decisions made at this meeting. If you have any questions, additions, or comments, please contact us. We will consider the minutes to be accurate unless written notice is received within 5 working days of the date issued.

Meeting Minutes

Gretchen Suárez-Peña started the meeting by directing Michael Garau to address the changes in the analyzed typical section. Michael stated that at this time the buffered bike lanes typical section is the preferred alternative that is being considered for the PD&E study. Gretchen then went on to provide an overview of what was discussed in the second ELA meeting. The Banana Lake, or southern basin, was not able to secure a regional alternative. The City of Lakeland Parcel originally pursued as an option was fatally flawed for its use as a maintenance facility for Lakeland Electric. The joint-use option with the US 98 project at the time of the second ELA meeting also did not seem to be tenable. For the northern basin, which is part of the Saddle Creek basin and discharges into Crystal Lake, the preferred alternative is to use the Polk County pond. Located north of Crystal Lake. This improvement was an alternative recommended in the City of Lakeland TMDL report. It was discussed that a maintenance agreement between the County, FDOT be discussed now, within the PD&E study as there will be additional water going to the Polk County Pond. The study also plans to recommend improvements at the southern ditch, located between S. Crystal Lake Drive and Skyview Drive, this ditch discharges directly into Crystal Lake. These improvements will help the overall water quality for Crystal Lake.

Since the last ELA meeting, PD&E staff coordinated with the US 98 design team further. The US 98 team plans to modify pond 2A currently permitted by FDOT. The permitted pond provides the treatment volume of 0.73 ac-ft for the basin that it treats. The US 98 project plans to accommodate an additional 0.38 ac-ft of volume. The US 98 project only needs about 0.10 ac-ft of volume. This leaves an additional 0.28 ac-ft of available volume for our Combee project. This is very close to the treatment volume needed for the Combee Road southern basin. The US 98 Project is planning to over attenuate as it will be attenuating for all the directly connected impervious area in the project. This includes existing pavement that is currently not being attenuated. This over attenuation can also help in the attenuation needs for Combee Road. The US 98 design team plans to document the potential for compensatory treatment in the Combee Road project within their document as does the PD&E staff within the Combee Road PSR.



MEETING MINUTES

However, due to the timing of the construction and permitting of this project, the PD&E staff has is considering traditional potential pond sites adjacent to the study corridor. Two approaches, US 98 pond and traditional pond sites, were presented to the South West Florida Water Management District (SWFWMD) staff at a preapplication meeting conducted on February 6th. SWFWMD staff indicated that for the compensatory treatment approach to work, the volume of compensatory treatment and attenuation within Pond 2A should not have been utilized for other parts of the US 98 project. SWFWMD stated that this project would require an individual permit. There is an existing general permit for this corridor. A letter of update on this general permit along with Crystal Lake pond permit and US 98 permit would be needed during the design phase and permit application process for this project.

The potential pond sites being considered for this project are SMF 1-A, SMF 1-B, and SMF 1-C. SMF 1-A is located on the Ridley USA property located slightly northwest of the Combee Road and US 98 intersection. SMF 1-B is located on several parcels south of Maine Ave: one owned by the FDOT and the other four are part of two residences. SMF 1-C is located behind a business east of the corridor just south of the CSX railway. Please see the attached exhibit for a visual of these pond sites. Currently right-of-way costs are being estimated for these parcels.

Sergio mentioned that the Pond Siting Report (PSR) should address all the coordination and potential for use of the US 98 pond for compensatory treatment, but that the worst-case scenario should be addressed in the PSR. This worst-case scenario includes all the potential costs and concerns associated with the pond sites. SMF 1-A needs to be sensitive to the needs of CSX railroad and the piping and maintenance along County streets. SMF 1-B is a relocation issue with residences that will need to be addressed if it comes out as the preferred alternative. SMF 1-C may have hydraulic issues, as it is towards the northern end of the project. This will all need to be provided in the pond siting matrix.

Action Items

- PD&E staff will set-up a meeting with FDOT and Polk County maintenance to coordinate an agreement involving the following:
 - Polk County Pond north of Crystal Lake
 - Intersection and connection of Atlantic Avenue, Eaton Avenue and Combee Road
 - Discuss potential easement for piping on Lyonal Drive and McJunkin Road for SMF 1-A option
 - Looking for trade-offs with the County
 - Those invited to the meeting should include Sharon Harris, Brent Setchell, Amy Perez, Sergio Figueroa, Patrick Bateman, Lauren Peters, Nicole Monies, Lavinia Toole, Marke Barnes, Jay Jarvis and Phil Irven, along with the PD&E study team.
- Consider worst-case scenario in PSR include all costs including right-of-way, fencing, jack and bore option under CSX railway, piping etc
- Investigate who maintains the rail spur on the Ridley USA property

Exhibits from the Meeting and the Sign-In sheet are attached to these minutes.



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MEETING MINUTES

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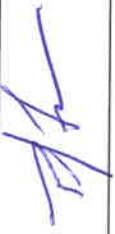
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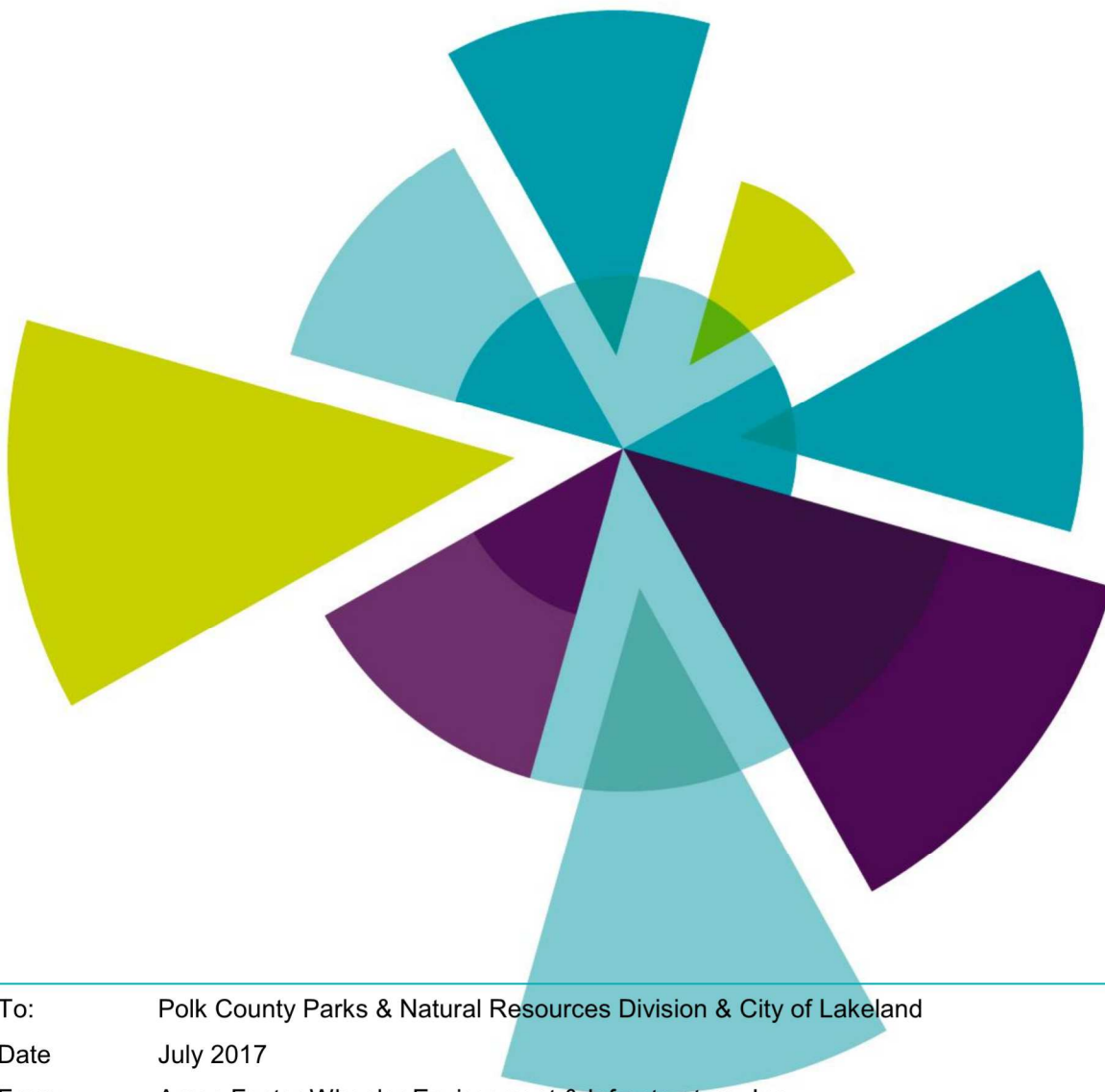
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	Jay Patel	Inwood	407-971-8850	jpatel@inwoodinc.com
	Matt Dockins	RKK	813-386-1460	mdockins@rkk.com
	Michael Garau	Kimley-Horn	407-427-1618	Michael.Garau@kimley-horn.com
	Gretchen Suarez-Pena	PGA	863-533-7317 ext. 202	Gretchen.Suarez-Pena@patelgreene.com



Crystal Lake TMDL Implementation Final Report

Results of Select Monitoring/Data Collection



To: Polk County Parks & Natural Resources Division & City of Lakeland
Date: July 2017
From: Amec Foster Wheeler Environment & Infrastructure, Inc.



**CRYSTAL LAKE TMDL IMPLEMENTATION FINAL REPORT
RESULTS OF SELECT MONITORING/DATA COLLECTION**

Prepared for

City of Lakeland
407 Fairway Avenue
Lakeland, Florida



And

Polk County Parks & Natural Resources Division
4177 Ben Durrance Road
Bartow, Florida



Prepared by

Amec Foster Wheeler Environment & Infrastructure, Inc.
2000 E. Edgewood Drive, Suite 215
Lakeland, Florida

Amec Foster Wheeler Project No. 600319.5

July 2017

2.0 DATA COLLECTION

2.1 Stormwater Collection

Figure 2 shows eleven MS4 outfalls discharging to Crystal Lake as documented by the City of Lakeland and Polk County. Details for these MS4 outfalls are summarized in **Table 2**. Due to the predominant landuse of single family residential, outfalls representing that landuse were selected for monitoring. County outfall 842101 is associated with a wet detention facility located on the north side of the boardwalk located in the park on the northern limits of the lake. The associated control structure of this facility was flooded during the period of study and this outfall was eliminated as a candidate for monitoring. The six identified Florida Department of Transportation (FDOT) outfalls associated with Combee Road located on the east side of the lake consist of four flume outfalls, a pipe discharge from the north and a ditch discharge from the south. Landuse of the catchment area draining to these outfalls consists of a mix of commercial and residential along with the highway right-of-way. These outfalls, with their limited drainage area, mixed landuse, and physical conditions were not considered candidates for useful stormwater monitoring data for this study. The prioritized outfall basins selected for monitoring included the following two sites:

- Basin CL020/842802: This outfall is currently in both the City and County outfall inventories, most likely due to the contributing drainage basin including areas from both jurisdictions. It is located in the southwestern corner of Crystal Lake. The 28.3± acre drainage basin is generally bounded by S. Crystal Lake Drive (north), Crystal Grove Lane (south), Lowry Avenue (west), and Sparrow Drive (east). This location was designated as Site 1 for the monitoring efforts.
- Basin CL005/842104: This outfall is currently in both the City and County outfall inventories, most likely due to the contributing drainage basin including areas from both jurisdictions. It is located in the northwestern corner of Crystal Lake. The 27.3± acre drainage basin is generally bounded by the southern portion of Honeytree Place apartments (north), North Crystal Lake Drive (south), Mt. Airy Avenue (east), and Lowry Avenue (west). This location was designated as Site 2 for the monitoring efforts. Field investigations indicated that drainage from Crystal Lake Middle School does not contribute stormwater runoff to this outfall as originally thought.

Qualifying rainfall event criteria for laboratory analysis included a 0.16" minimum rainfall amount and no more than 0.10" of rainfall for the preceding 72 hours.

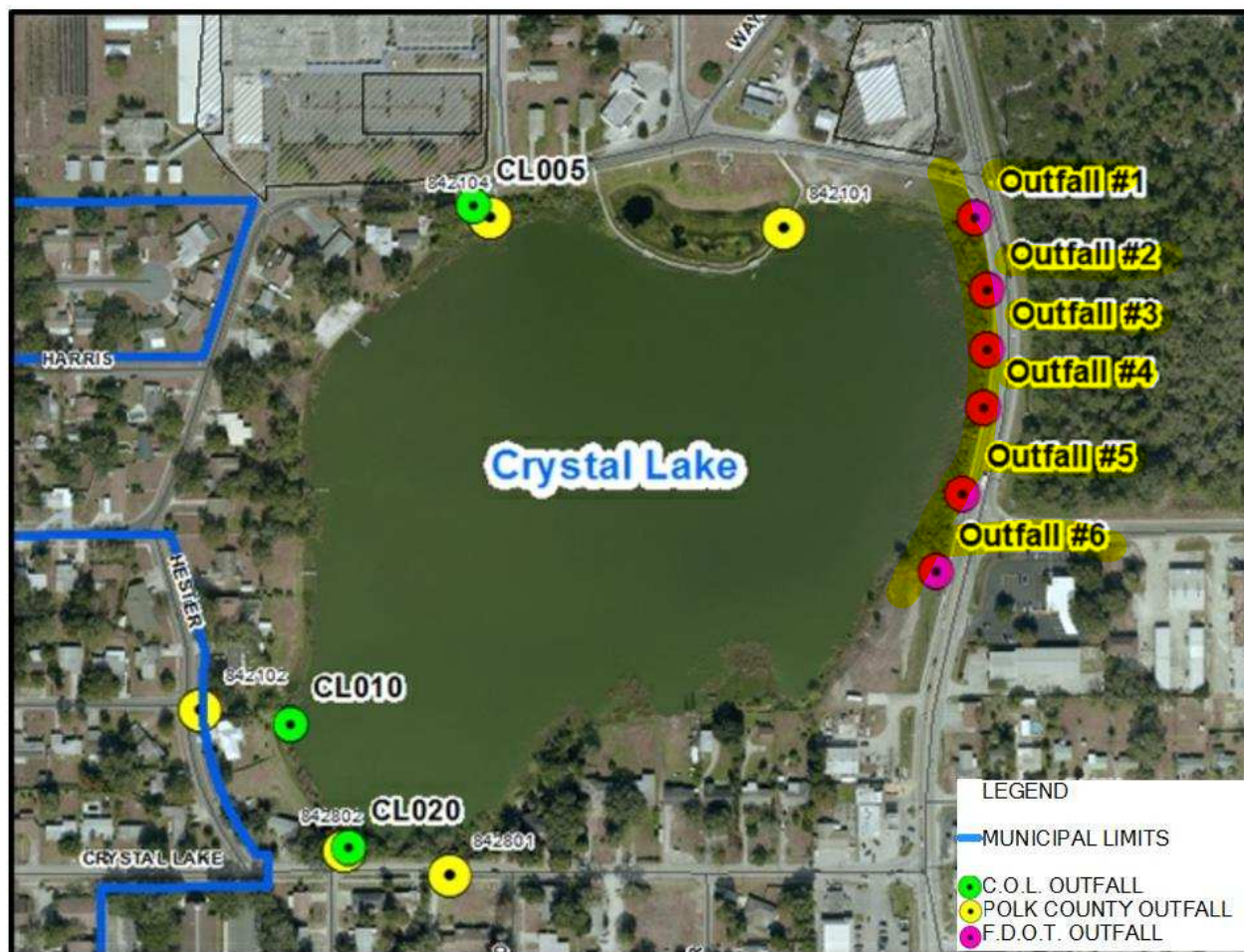
The following is a discussion of each storm stormwater water sampling station including the results of the stormwater sampling. All sampling activities were conducted in accordance with FDEP Standard Operating Procedures for water quality sampling.

TABLE 2
MS4 Outfall Inventory for Crystal Lake

OUTFALL ID	DRAINAGE AREA (AC)	COMMENTS
CL020/842802	28.3	Much served by very small City dry detention pond; church has BMP (sheetflow to grassed area) as well.
CL005/842104	27.3	
CL010/842102	20.0	
842101	29.8	Served by Lakeside Retrofit-Wet Detention BMP
842801	25.7	South of Lake Basin
FDOT #1	5.0	Non-major pipe outfall
FDOT #2 through #5	0.6	4 non-major flume outfalls
FDOT #6	4.4	Non-major ditch outfall

Note: 14.6 acres of lakeside area drains directly into the lake. This is primarily SFR landuse.

FIGURE 2
MS4 Outfalls Discharging into Crystal Lake



3.2 Conceptual BMPs for the Top Ranked Basins

The sediment characterization section established the fact that lake sediments are the primary source of total phosphorus to Crystal Lake. This can be seen in **Table 20** where the TMDL-estimated nutrient contributions by source are compared with those estimated from this project. It is clear that the lake sediments contribute the vast majority of pollutant load for TP. The TN to TP ratio is 17.25 for Crystal Lake, suggesting that it is likely TP-limited. Therefore, it is reasonable to conclude that without some form of reduction in the in-lake source of TP, the TMDL cannot be achieved. Additionally, pollutant load reductions by the MS4 dischargers will likely not result in improved water quality in Crystal Lake.

TABLE 20
Comparison of TMDL and Study-Estimated Nutrient Contributions by Source

	TMDL-ESTIMATED VALUE		STUDY-ESTIMATED VALUE		REDUCTION REQUIRED BY TMDL OF TMDL VALUES	
	TN	TP	TN	TP	TN	TP
Annual Mass from Benthic Flux	207 kg	14.5 kg	-	534 ¹	75 % (155 kg or 342 lb. / year)	75 % (10.9 kg or 24 lb. / year)
% of Total Load	47.3 %	24.6 %	-	91%		
Annual Mass from Upland Contribution Area	231 kg	44.5 kg	359	52	51.3% (118.5 kg or 261 lb. / year)	79.2% (35.2 kg or 78 lb. / year)
% of Total Load	52.7%	75.4 %	-	9%		

¹⁻ This is the “nominal” estimated value as taken from Table 17.

In an effort for the City of Lakeland to continue to maintain compliance with its MS4 permit, the City must prepare and implement a Supplemental Stormwater Management Plan (SSWMP) for Crystal Lake since it is one of the City’s priority TMDL waterbodies. The City’s SSWMP for Crystal Lake will include some reasonable BMPs that will meet Maximum Extent Practicable (MEP) requirements of the MS4 permit yet still consider the fact that the lake sediments most significantly impact the impairment status of the lake. Some conceptual stormwater BMPs are introduced in the following text and are recommended for consideration because of the favorable benefit to cost relationships that these BMPs can provide.

The City of Lakeland has only three outfalls discharging to Crystal Lake and they are all “shared” with Polk County as both jurisdictions previously claimed the outfalls in their MS4 inventories. In addition to those three outfalls, Polk County has two more outfalls with one associated with an existing wet detention stormwater facility and one is a larger basin on the south side of the watershed with an appreciable nutrient pollutant load to Crystal Lake. **FDOT has six outfalls that discharge into Crystal Lake, none of which are known to be “major”.**

3.2.1 All Outfalls- Street Sweeping BMP

The quality of stormwater runoff observed from the sampled sites clearly shows that the EMCs for this area exceed the published state averages for similar land uses (See Tables 6 and 12). Not noted in the tables was the higher TSS values with an average concentration of 60 mg/L for the two sites and a statewide average concentration for TSS of 37.5 mg/L for single family residential landuses.

4.0 CONCLUSIONS

Corroborative stormwater sampling on Crystal Lake was implemented by the City of Lakeland and Polk County. Crystal Lake is likely phosphorus limited and the phosphorus loads from the MS4 were estimated to be 122.7 lbs/year. Estimates of the volume and aerial extent of unconsolidated sediments in the lake were obtained during this study. Nutrient flux from the sediments was not performed in this study however a regionally-specific phosphorus flux model was used to develop a potential range of phosphorus flux loads based on varying dissolved oxygen conditions above the sediments. The phosphorus flux from the sediments using this model was estimated to be in the range of 1,177 lbs/year to 26,813 lbs/year with a mean value of 13,994 lbs/year.

Based on the above estimates, it is clear that the lake sediments are the primary contributor of phosphorus in Crystal Lake. Therefore, any improvements made by the City of Lakeland or Polk County on reducing pollutant loads from their respective MS4s should be for MS4 permit compliance. Such load reductions in and of themselves will not result in improved water quality conditions in the lake, however they will help to reduce pollutants discharged to the water column and contribution to the existing lake sediments.

This report mentions several potential BMPs for reducing the MS4 pollutant loads to the lake including:

- More frequent street sweeping cycles;
- Conversion of an existing City of Lakeland dry detention pond to a retention design to improve performance; and
- **Redirection of untreated stormwater to the existing Polk County wet detention system.**

The above BMPs all have favorable benefit/cost characteristics and give the City and County good options for reducing the existing pollutant loads from their respective MS4s to the maximum extent practicable. Beyond these actions, investment of more significant resources by the stakeholders within the watershed will be required to actually succeed in achieving the TMDL for Crystal Lake. Several such options include dredging the lake's unconsolidated sediments or using proprietary treatment alternatives such as Phoslock™ to reduce the availability of soluble reactive phosphorus within the sediments.

5.0 REFERENCES

Amec Foster Wheeler, 2015. NPDES Pollutant Load Comparison 1999, 2006, 2014.

City of Lakeland Lakes and Stormwater, 2010. 2009 Lakes Report. City of Lakeland, Lakeland, Florida.

Florida Department of Environmental Protection (FDEP) and Water Management Districts, 2010. Environmental Resource Permit Stormwater Quality Applicant's Handbook, Design Requirements for Stormwater Treatment Systems in Florida.

Hupfer, M., Gächter, R., Giovanoli, R., 1995. Transformation of phosphorus species in settling seston and during early sediment diagenesis. *Aquatic Sciences* 57:305-324.

APPENDIX D: Pond Siting

CSX Manual Excerpt

Cost Estimates

Pond Site Matrix

Pond Site Exhibits



Public Project Information

For Construction and
Improvement Projects That
May Involve the Railroad

*Prepared by the Public Projects Group
CSX Transportation Inc.
Jacksonville, Florida
(last revised July 2017)*



- d. The use of any equipment where, if tipped and laid flat in any direction (360 degrees) about its center pin, can encroach within twenty five feet (25'-0") of the nearest track centerline. This is based upon the proposed location of the equipment during use, and may be a function of the equipment boom length. Note that hoisting equipment with the potential to foul must satisfy the 150% factor of safety requirement for lifting capacities.
- e. Any work where the scatter of debris or other materials has the potential to encroach within twenty five feet (25'-0") of the nearest track centerline.
- f. Any work where significant vibration forces may be induced upon the track structure or existing structures located under, over, or adjacent to the track structure.
- g. Any other work which poses the potential to disrupt rail operations, threaten the safety of railroad employees, or otherwise negatively impact railroad property, as determined by CSXT.

12. *ROW – Right of Way*; Refers to CSXT Right-of-Way as well as all CSXT property and facilities. This includes all aerial space within the property limits, and any underground facilities.

13. *Submission Review Period* - A minimum of 30 days will be required for the initial review response. Up to an additional 30 days may be required to review any/all subsequent submissions or resubmission.

14. *Theoretical Railroad Live Load Influence Zone* – A 1 horizontal to 1 vertical theoretical slope line starting at bottom corner of tie.

15. *TOR – Top of Rail*. This is the base point for clearance measurements. It refers to the crown (top) of the steel rail; the point where train wheels bear on the steel rails. Use the higher of the two rails when track is superelevated.

16. *Track Structure* – All load bearing elements which support the train. This includes, but is not limited to, the rail, ties, appurtenances, ballast, sub-ballast, embankment, retaining walls, and bridge structures.

17. *Vertical Clearance* – Distance measured from TOR to the lowest obstruction, within six feet (6'-0") of the track centerline, in either direction.

II. CSXT GENERAL DESIGN REQUIREMENTS

A. Refer to CSX's Design & Construction Standard Specifications for Pipeline Occupancies, last dated February 24, 2010, for the design requirements for all pipes and drainage structures under the railroad.

B. All pipes, ditches, and other structures carrying surface drainage on CSXT property and/or under CSXT track(s) shall be designed to carry the run-off from the 100-year, 24-hour design storm without ponding of water against the roadbed.

C. Pipe(s) used to carry surface drainage on CSXT's right-of-way shall have a minimum diameter of 24 inches (24").

D. When calculating the capacity of existing or proposed drainage structures, under CSXT's track(s), the headwater calculation at the structure shall not be greater than one (1):

$$HW/D \leq 1.$$

E. Rate and quantity of storm water runoff from any proposed development shall not exceed the rate and quantity of runoff prior to development. This standard shall be maintained for all design storms up to the 100-year storm event.

F. Pipes (casing or carrier) placed under CSXT tracks shall not be less than 5.5 (5½'-0") feet from base of rail to top of pipe at its shallowest point.

G. Pipelines laid longitudinally on CSXT's right-of-way, 50 feet (50'-0") or less from centerline of track shall be buried not less than 4 feet (4'-0") from ground surface to top of pipe. Where the pipeline is laid more than 50 feet (50'-0") from centerline of track, the minimum cover shall be at least 3 feet (3'-0").

H. Erosion prevention methods shall be used to protect railroad ditches and other drainage facilities during construction on and adjacent to CSXT's right-of-way.

1 Unit costs based on the FDOT 12 month moving average 6/1/2020 to 5/31/2021 rounded up to the nearest \$10

Summary of Construction Costs

SMF 1-A-1 (McJunkin Road Inflow)

Pay Item No.	Description	Unit	Quantity	Unit Cost ¹	Total Cost
425-2-41	Manholes, P-7, <10'	EA	4	\$ 4,830.00	\$ 19,320.00
430-175-130	Pipe Culvert Optional Material, Round, 30" S/CD	LF	870	\$ 130.00	\$ 113,100.00
430-982-133	Mitered End Section, Optional, Round, 30" CD	EA	1	\$ 2,970.00	\$ 2,970.00
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	LF	55	\$ 110.00	\$ 6,050.00
430-982-129	Mitered End Section, Optional, Round, 24" CD	EA	1	\$ 1,990.00	\$ 1,990.00
425-1-541	Inlet, Ditch Bottom, Type D, <10	EA	1	\$ 3,870.00	\$ 3,870.00
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	LF	892	\$ 20.00	\$ 17,840.00
				Subtotal:	\$ 165,140.00
	Contingency	LS	1	25%	\$ 41,285.00
				TOTAL:	\$ 206,425.00

SMF 1-A-2 (Lyonel Drive Inflow)

Pay Item No.	Description	Unit	Quantity	Unit Cost ¹	Total Cost
425-2-41	Manholes, P-7, <10'	EA	3	\$ 4,830.00	\$ 14,490.00
430-175-130	Pipe Culvert Optional Material, Round, 30" S/CD	LF	600	\$ 130.00	\$ 78,000.00
430-185-130	Pipe Culvert Optional Material, Round, Jack & Bore, 30" S/CD	LF	155	\$ 730.00	\$ 113,150.00
430-982-133	Mitered End Section, Optional, Round, 30" CD	EA	1	\$ 2,970.00	\$ 2,970.00
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	LF	55	\$ 110.00	\$ 6,050.00
430-982-129	Mitered End Section, Optional, Round, 24" CD	EA	1	\$ 1,990.00	\$ 1,990.00
425-1-541	Inlet, Ditch Bottom, Type D, <10	EA	1	\$ 3,870.00	\$ 3,870.00
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	LF	910	\$ 20.00	\$ 18,200.00
				Subtotal:	\$ 238,720.00
	Contingency	LS	1	25%	\$ 59,680.00
				TOTAL:	\$ 298,400.00

SMF 1-B

Pay Item No.	Description	Unit	Quantity	Unit Cost ¹	Total Cost
425-2-41	Manholes, P-7, <10'	EA	3	\$ 4,830.00	\$ 14,490.00
430-175-130	Pipe Culvert Optional Material, Round, 30" S/CD	LF	415	\$ 130.00	\$ 53,950.00
430-982-133	Mitered End Section, Optional, Round, 30" CD	EA	1	\$ 2,970.00	\$ 2,970.00
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	LF	90	\$ 110.00	\$ 9,900.00
425-1-541	Inlet, Ditch Bottom, Type D, <10	EA	1	\$ 3,870.00	\$ 3,870.00
425-1-531	Inlet, Ditch Bottom, Type C Modified, <10	EA	1	\$ 3,320.00	\$ 3,320.00
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	LF	1155	\$ 20.00	\$ 23,100.00
				Subtotal:	\$ 111,600.00
	Contingency	LS	1	25%	\$ 27,900.00
				TOTAL:	\$ 139,500.00

SMF 1-C

Pay Item No.	Description	Unit	Quantity	Unit Cost ¹	Total Cost
425-2-41	Manholes, P-7, <10'	EA	4	\$ 4,830.00	\$ 19,320.00
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	LF	590	\$ 110.00	\$ 64,900.00
430-982-129	Mitered End Section, Optional, Round, 24" CD	EA	1	\$ 1,990.00	\$ 1,990.00
430-175-118	Pipe Culvert Optional Material, Round, 18" S/CD	LF	175	\$ 85.00	\$ 14,875.00
425-1-541	Inlet, Ditch Bottom, Type D, <10	EA	1	\$ 3,870.00	\$ 3,870.00
425-1-531	Inlet, Ditch Bottom, Type C Modified, <10	EA	1	\$ 3,320.00	\$ 3,320.00
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	LF	1443	\$ 20.00	\$ 28,860.00
				Subtotal:	\$ 137,135.00
	Contingency	LS	1	25%	\$ 34,283.75
				TOTAL:	\$ 171,418.75

Florida Department of Transportation
 FPID 440274-1-22-01, Combee Road PD&E

Prepared by: Patel, Greene, and Associates

Done By: DKA
 Date: 8/23/2021
 Checked By: KDY
 Date: 8/23/2021

1 Unit costs based on the FDOT 12 month moving average 6/1/2020 to 5/31/2021 rounded up to the nearest \$10

Summary of Construction Costs

SMF 2A-1

Pay Item No.	Description	Unit	Quantity	Unit Cost ¹	Total Cost
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	EA	30	\$ 110.00	\$ 3,300.00
430-982-129	Mitered End Section, Optional, Round, 24" CD	LF	1	\$ 1,990.00	\$ 1,990.00
430-175-118	Pipe Culvert Optional Material, Round, 18" S/CD	EA	60	\$ 85.00	\$ 5,100.00
430-982-125	Mitered End Section, Optional, Round, 18" CD	LF	1	\$ 1,660.00	\$ 1,660.00
425-1-541	Inlet, Ditch Bottom, Type D, <10	EA	1	\$ 3,870.00	\$ 3,870.00
				Subtotal:	\$ 15,920.00
	Contingency	LS	1	25%	\$ 3,980.00
				TOTAL:	\$ 19,900.00

SMF 2A-2

Pay Item No.	Description	Unit	Quantity	Unit Cost ¹	Total Cost
425-2-41	Manholes, P-7, <10'	EA	3	\$ 4,830.00	\$ 14,490.00
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	LF	430	\$ 110.00	\$ 47,300.00
430-982-129	Mitered End Section, Optional, Round, 24" CD	EA	1	\$ 1,990.00	\$ 1,990.00
430-175-118	Pipe Culvert Optional Material, Round, 18" S/CD	LF	60	\$ 85.00	\$ 5,100.00
430-982-125	Mitered End Section, Optional, Round, 18" CD	EA	1	\$ 1,660.00	\$ 1,660.00
425-1-541	Inlet, Ditch Bottom, Type D, <10	EA	1	\$ 3,870.00	\$ 3,870.00
				Subtotal:	\$ 74,410.00
	Contingency	LS	1	25%	\$ 18,602.50
				TOTAL:	\$ 93,012.50

Florida Department of Transportation
 FPID 440274-1-22-01, Combee Road PD&E

Done By: JRW
 Date: 10/23/2020
 Checked By: EMB
 Date: 10/29/2020

Prepared by: Patel, Greene, and Associates

SMF 1-A Lyonal Drive Inflow		
Pay Item	Item	Remarks
425-2-41	Manholes, P-7, <10'	
	Each	1 from Combee trunkline, 2 to get to the inflow
	3	
430-175-130	Pipe Culvert Optional Material, Round, 30" S/CD	
	LF	Matching size of existing trunkline of 30 inches inflow pipe
	600	
430-185-130	Pipe Culvert Optional Material, Round, Jack & Bore, 30" S/CD	
	LF	Under CSX spur line
	155	
430-982-133	Mitered End Section, Optional, Round, 30" CD	
	Each	
	1	
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	
	LF	
	910	

SMF 1-A McJunkin Road Inflow		
Pay Item	Item	Remarks
425-2-41	Manholes, P-7, <10'	
	Each	1 from Combee trunkline, 3 to get to the inflow
	4	
430-175-130	Pipe Culvert Optional Material, Round, 30" S/CD	
	LF	Matching size of existing trunkline of 30 inches inflow pipe
	870	
430-982-133	Mitered End Section, Optional, Round, 30" CD	
	Each	
	1	
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	
	LF	
	892	

SMF 1-A Outflow		
Pay Item	Item	Remarks
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	
	LF	
	55	
430-982-129	Mitered End Section, Optional, Round, 24" CD	
	Each	
	1	
425-1-541	Inlet, Ditch Bottom, Type D, <10	
	Each	Control structure
	1	

Right-of-way Costs	\$270,000
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Florida Department of Transportation
 FPID 440274-1-22-01, Combee Road PD&E

Prepared by: Patel, Greene, and Associates

Done By: JRW
 Date: 10/23/2020
 Checked By: EMB
 Date: 10/29/2020

SMF 1-B Inflow		
Pay Item	Item	Remarks
425-2-41	Manholes, P-7, <10'	
	Each	1 from Combee trunkline, 2 to get to the inflow
	3	
430-175-130	Pipe Culvert Optional Material, Round, 30" S/CD	
	LF	Matching size of existing trunkline of 30 inches inflow
	415	
430-982-133	Mitered End Section, Optional, Round, 30" CD	
	Each	
	1	
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	
	LF	
	1155	

SMF 1-B Outflow		
Pay Item	Item	Remarks
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	
	LF	
	90	
425-1-541	Inlet, Ditch Bottom, Type D, <10'	
	Each	Control structure
	1	
425-1-531	Inlet, Ditch Bottom, Type C Modified, <10'	
	Each	connection to trunkline
	1	

Right-of-way Costs	\$740,000
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Florida Department of Transportation
 FPID 440274-1-22-01, Combee Road PD&E

Prepared by: Patel, Greene, and Associates

Done By: JRW
 Date: 10/23/2020
 Checked By: EMB
 Date: 10/29/2020

SMF 1-C Inflow		
Pay Item	Item	Remarks
425-2-41	Manholes, P-7, <10'	
	Each	1 from Combee trunkline, 2 to get to the inflow
	3	
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	
	LF	Matching size of existing trunkline of 30 inches inflow
	590	
430-982-129	Mitered End Section, Optional, Round, 24" CD	
	Each	
	1	
550-10-210	Fencing, Type B, 0.0-5.0', Standard Feat	
	LF	
	1443	

SMF 1-C Outflow		
Pay Item	Item	Remarks
430-175-118	Pipe Culvert Optional Material, Round, 18" S/CD	
	LF	
	175	
425-1-541	Inlet, Ditch Bottom, Type D, <10	
	Each	Control structure
	1	
425-1-531	Inlet, Ditch Bottom, Type C Modified <10'	
	Each	connection to trunkline
	1	

Right-of-way Costs	\$300,000
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Florida Department of Transportation
 FPID 440274-1-22-01, Combee Road PD&E

Prepared by: Patel, Greene, and Associates

Done By: DKA
 Date: 8/23/2021
 Checked By: KDY
 Date: 8/23/2021

SMF 2A-2 Inflow		
Pay Item	Item	Remarks
425-2-41	Manholes, P-7, <10'	
	Each	
	3	
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	
	LF	
	430	
430-982-129	Mitered End Section, Optional, Round, 24" CD	
	Each	
	1	

SMF 2-A Outflow		
Pay Item	Item	Remarks
430-175-118	Pipe Culvert Optional Material, Round, 18" S/CD	
	LF	
	60	
425-1-541	Inlet, Ditch Bottom, Type D, <10	
	Each	Control structure
	1	
430-982-125	Mitered End Section, Optional, Round, 18" CD	
	Each	
	1	

Right-of-way Costs	N/A
--------------------	-----

Florida Department of Transportation
FPID 440274-1-22-01, Combee Road PD&E

Prepared by: Patel, Greene, and Associates

Done By: DKA
Date: 8/23/2021
Checked By: KDY
Date: 8/23/2021

SMF 2A-1 Inflow		
Pay Item	Item	Remarks
430-175-124	Pipe Culvert Optional Material, Round, 24" S/CD	
	LF	
	30	
430-982-129	Mitered End Section, Optional, Round, 24" CD	
	Each	
	1	

SMF 2-B Outflow		
Pay Item	Item	Remarks
430-175-118	Pipe Culvert Optional Material, Round, 18" S/CD	
	LF	
	60	
425-1-541	Inlet, Ditch Bottom, Type D, <10	
	Each	Control structure
	1	
430-982-125	Mitered End Section, Optional, Round, 18" CD	
	Each	
	1	

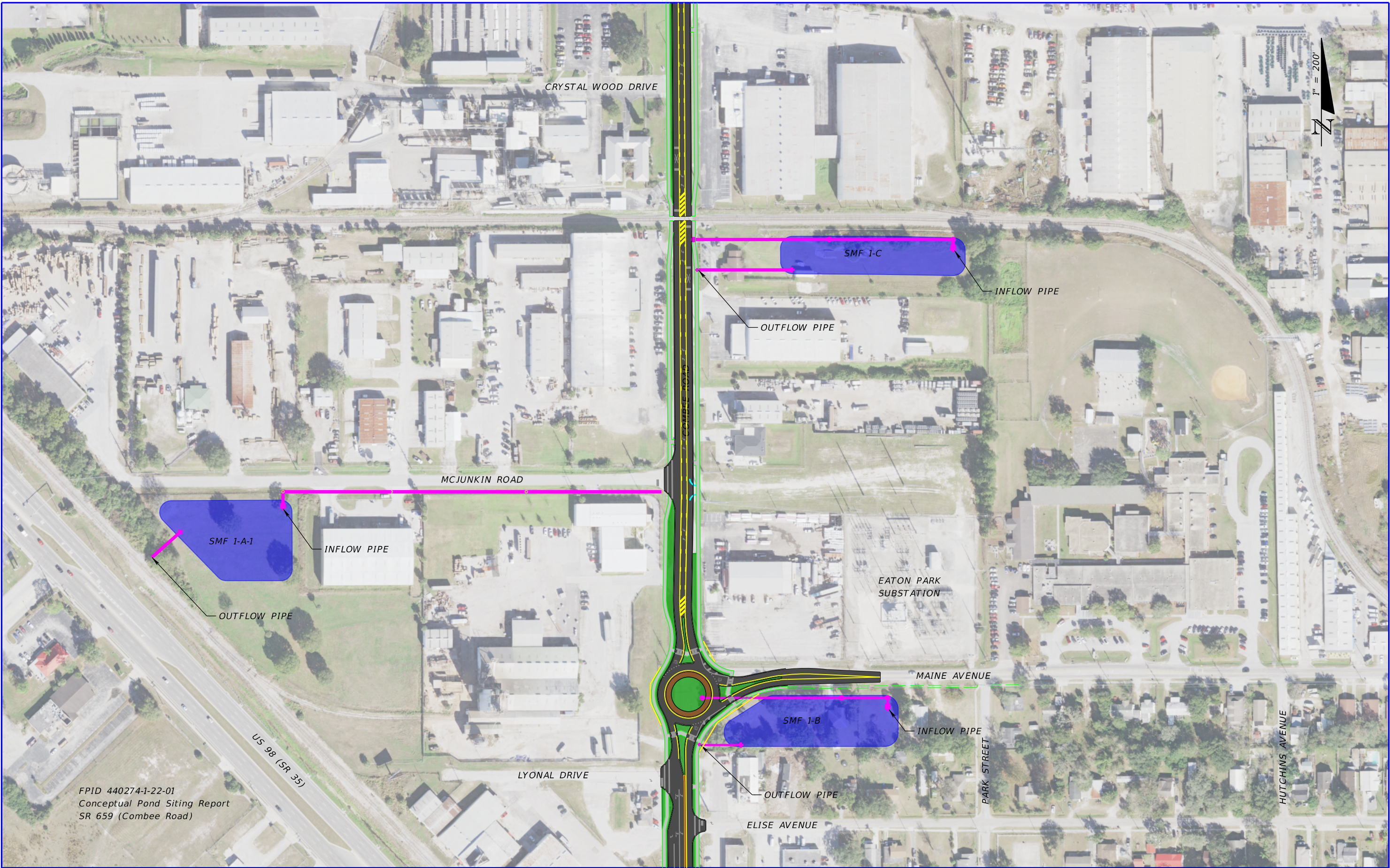
Right-of-way Costs	\$43,000
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Subject: FPID 440274-1-22-01, Combee Road

Pond Siting Matrix

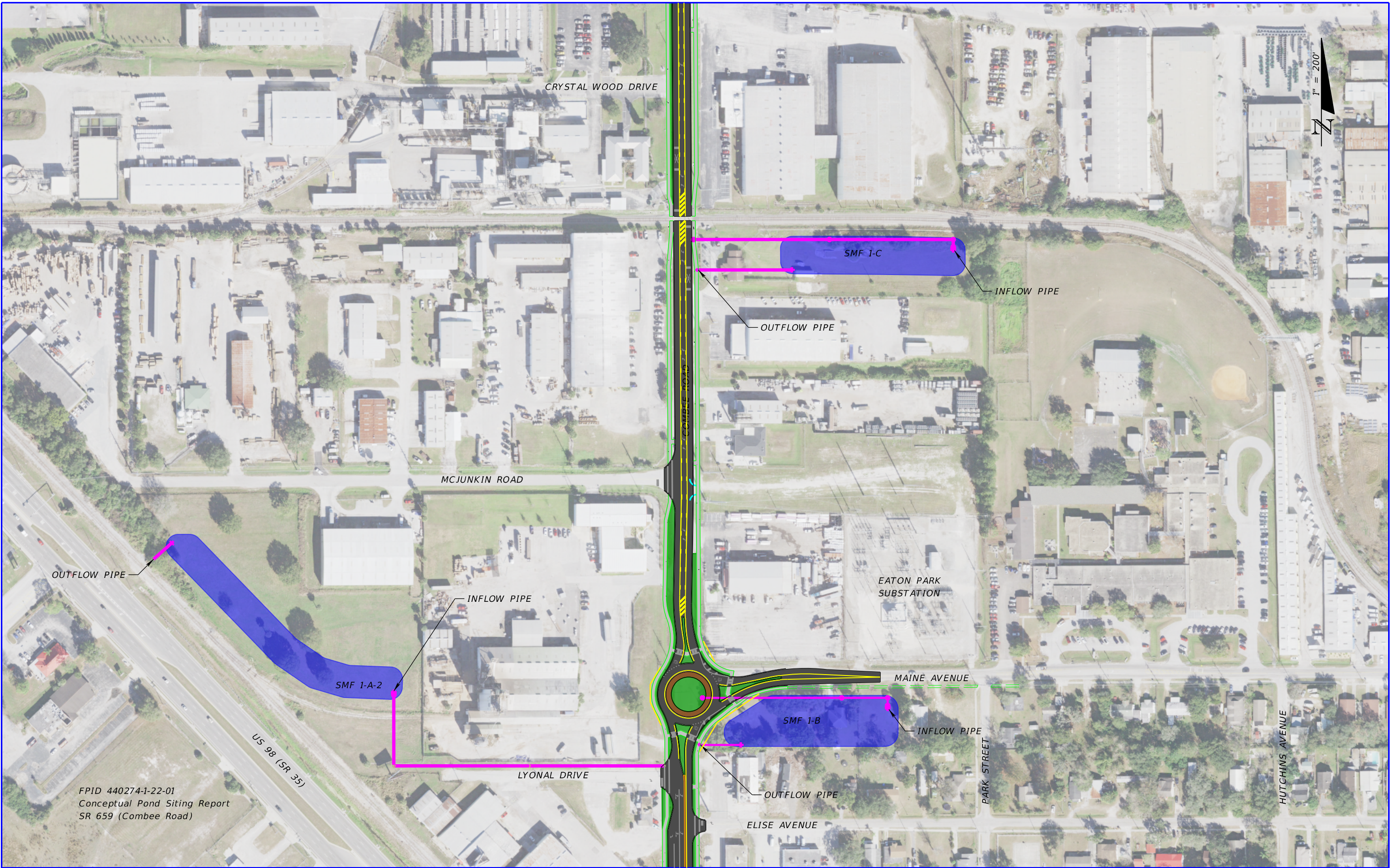
Basin 1 Pond Site Scores				
Consideration	SMF 1-A	SMF 1-B	SMF 1-C	Comments for most advantageous
R/W cost	8	4	7	The lowest cost
Construction Cost	4	7	6	The lowest cost
Pond Size	5	3	7	smallest most efficient use of space
Land Use	7	5	3	The one that does not impede growth or disrupt growth/development
Hydraulic Feasibility	6	3	5	Closest to the corridor and outfall
Utilities	8	6	6	Least amount of utility conflicts
Contamination	5	8	8	Least likely to have contamination
Threatened and Endangered Species	10	10	10	Little to no impacts to species
Wetlands	10	10	10	Little to no impacts to wetlands
Section 4(f)	10	10	10	Little to no impacts to 4(f) properties
Construction	6	8	8	Easiest to construct, proximity to corridor
Maintenance	6	8	8	Easiest to maintain
Aesthetics	8	6	6	Out of view to the public or aesthetic appeal
Public Opinion and Adjacent Residency Concerns	7	1	3	Most likely to be agreeable to the public
Total	100	89	97	

Comments: Scores are given from 1 to 10, with a score of 10 reflecting the site that best meets the preferred criteria.



FPID 440274-1-22-01
Conceptual Pond Siting Report
SR 659 (Combee Road)

REVISIONS					STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			COMBEE ROAD POND SITES ALTERNATIVE 1- SOUTH BASIN	SHEET NO. D-1
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 659	POLK	440274-1-22-01		



FPID 440274-1-22-01
Conceptual Pond Siting Report
SR 659 (Combee Road)

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			COMBEE ROAD POND SITES ALTERNATIVE 2- SOUTH BASIN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 659	POLK	440274-1-22-01		D-2



FPID 440274-1-22-01
Conceptual Pond Siting Report
SR 659 (Combee Road)

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			COMBEE ROAD POND SITES - NORTH BASIN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 659	POLK	440274-1-22-01		D-3

APPENDIX E: Correspondence

**City of Lakeland/Lakeland
Electric**

US 98 Design Team

Polk County

SWFWMD Meeting

Gretchen Suárez-Peña

From: Edwards, Cole <Cole.Edwards@lakelandgov.net>
Sent: Monday, October 29, 2018 9:47 AM
To: Gretchen Suárez-Peña; Schilling, Jessica
Cc: Smith, Laurie; Garau, Michael; Matt Dockins
Subject: RE: 440274-1-22-01//Combee Road PD&E//City of Lakeland Parcel
Attachments: 600319.5 - City of Lakeland - Crystal Lake Implementation Combined Final....pdf

Follow Up Flag: Follow up
Flag Status: Completed

CAUTION: This email originated from outside the organization. Use caution with links and attachments.

Good Morning Gretchen,

I have sent an inquiry to Lakeland Electric about the property and am awaiting a response. As soon as they decide how important the parcel is to them, I'll give you an update on that part. As far as the Crystal Lake study you reference, I've attached the TMDL Implementation Report above. Please let me know if there is anything else we assist with.

Cole Edwards, P.E., C.F.M.

Engineer I – Stormwater Utility & Floodplain Administrator

Public Works | Lakes & Stormwater

[City of Lakeland](#)

p. 863.834.3307

f. 863.834.3308

[facebook.com/lakelandgov](https://www.facebook.com/lakelandgov)

[@lakelandgov](#)



From: Gretchen Suárez-Peña [mailto:Gretchen.Suarez-Pena@patelgreene.com]
Sent: Monday, October 29, 2018 8:56 AM
To: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; Edwards, Cole <Cole.Edwards@lakelandgov.net>
Cc: Smith, Laurie <Laurie.Smith@lakelandgov.net>; Garau, Michael <Michael.Garau@kimley-horn.com>; Matt Dockins <mdockins@rkk.com>
Subject: 440274-1-22-01//Combee Road PD&E//City of Lakeland Parcel

Good Morning Jessica and Cole,

Thank you again for coming to the first ELA meeting. I wanted to follow-up with you concerning some action items for the Combee Road project.

I wanted to check on that City of Lakeland Parcel located across from McJunkin Road on the east side of Combee Road (see attached). Were you able to find out if the city is using this parcel for anything in particular? I wanted to know if there was any potential for using it as a pond site option.

Also, can you send any information you have concerning the feasibility study being conducted on Crystal Lake? The more information on the water quality of the lake we have, the better a recommendation we can provide for treatment options for this area.

Thanks,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Fowler, Scott <Scott.Fowler@lakelandelectric.com>
Sent: Tuesday, December 18, 2018 10:05 AM
To: Gretchen Suárez-Peña
Subject: RE: 440274-1-22-01//Combee Road//

CAUTION: This email originated from outside the organization. Use caution with links and attachments.

Hello Gretchen,

I received it this time!

Thank you,

Scott Fowler

Manager of Substation Operations

Energy Delivery

[Lakeland Electric](#)

863.834.6594

[facebook.com/MyLakelandElectric](https://www.facebook.com/MyLakelandElectric)

[@mylkldelectric](#)



From: Gretchen Suárez-Peña [mailto:Gretchen.Suarez-Pena@patelgreene.com]
Sent: Tuesday, December 18, 2018 9:35 AM
To: Fowler, Scott <Scott.Fowler@lakelandelectric.com>
Subject: FW: 440274-1-22-01//Combee Road//

Hi Scott,

I believe I misspelled your last name in this last email. Please let me know if you receive this email.

Kind Regards,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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[Website](#) [Facebook](#) [LinkedIn](#) [Twitter](#) [Instagram](#)

From: Gretchen Suárez-Peña
Sent: Tuesday, December 18, 2018 9:33 AM
To: 'Michael.Siebold@lakelandelectric.com' <Michael.Siebold@lakelandelectric.com>;
'Scott.Faller@lakelandelectric.com' <Scott.Faller@lakelandelectric.com>; 'Matt.pennell@lakelandelectric.com'

<Matt.pennell@lakelandelectric.com>

Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; 'Edwards, Cole' <Cole.Edwards@lakelandgov.net>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>

Subject: 440274-1-22-01//Combee Road//

Michael and Scott,

Thank you for speaking with me this morning. I appreciate your input on the City of Lakeland parcel and it's use in accessing the Eaton Park substation by Lakeland Electric. At this time, we are going to consider it as a potential pond site for the Combee Road PD&E. In the coming weeks, we will provide you with a potential layout for you to consider. If you could, at this time, consider letting us know if the Maine Avenue entrances are sufficient for your needs or if you will need continued access through the Combee Road driveway.

Thank you again for your time,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Fowler, Scott <Scott.Fowler@lakelandelectric.com>
Sent: Wednesday, January 16, 2019 8:27 AM
To: Gretchen Suárez-Peña
Cc: Schilling, Jessica; Edwards, Cole; Matt Dockins; Garau, Michael; Timothy Polk; Siebold, Michael; Pennell, Matt; Goostree, Dwayne; Smith, Kenny
Subject: RE: 440274-1-22-01//Combee Road//

CAUTION: This email originated from outside the organization. Use caution with links and attachments.

Thank you Gretchen.

If necessary we can meet with you in person to discuss.

Scott Fowler

Manager of Substation Operations
Energy Delivery
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863.834.6594
[@mylkdelectric](https://www.facebook.com/MyLakelandElectric)



From: Gretchen Suárez-Peña [mailto:Gretchen.Suarez-Pena@patelgreene.com]
Sent: Wednesday, January 16, 2019 8:01 AM
To: Fowler, Scott <Scott.Fowler@lakelandelectric.com>
Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; Edwards, Cole <Cole.Edwards@lakelandgov.net>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>; Siebold, Michael <Michael.Siebold@lakelandelectric.com>; Pennell, Matt <Matt.Pennell@lakelandelectric.com>; Goostree, Dwayne <Dwayne.Goostree@lakelandelectric.com>; Smith, Kenny <Kenny.Smith@lakelandelectric.com>
Subject: RE: 440274-1-22-01//Combee Road//

Hi Scott,

Thank you for the information, considering the constrained parcel and your needs for access, I can understand that this pond location may not be ideal. Thank you for coordinating with us. Combee Road is an important transportation corridor for the City of Lakeland. The improvement of Combee Road will require substantial stormwater management, and at this time, pond acquisition is the primary right-of-way costs for this project. I will be consulting with our project manager and the DOT about other alternatives. I'll document our correspondence in our study efforts. If in the future we need to dialogue more about this, I will get back in touch with you and also Dwayne Goostree and Kenny Smith.

Thank you again for your time,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Fowler, Scott <Scott.Fowler@lakelandelectric.com>

Sent: Tuesday, January 15, 2019 3:07 PM

To: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>

Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; Edwards, Cole <Cole.Edwards@lakelandgov.net>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>; Siebold, Michael <Michael.Siebold@lakelandelectric.com>; Pennell, Matt <Matt.Pennell@lakelandelectric.com>; Goostree, Dwayne <Dwayne.Goostree@lakelandelectric.com>; Smith, Kenny <Kenny.Smith@lakelandelectric.com>

Subject: RE: 440274-1-22-01//Combee Road//

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Hello Gretchen,

I've just spoken with our T&D Operation group and your proposal doesn't look like it will work for us. We have 230kV & 69kV transmission lines and poles that are bordering the proposed berm/access road. In order to access these lines and poles we need space for large boom trucks to setup and maneuver and I don't think this plan supports this. If you want to pursue this option further please include Dwayne Goostree (Manager of T&D Operations) and Kenny Smith (T&D Operations Supervisor) in the discussion.

Thank you,

Scott Fowler

Manager of Substation Operations

Energy Delivery

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From: Gretchen Suárez-Peña [<mailto:Gretchen.Suarez-Pena@patelgreene.com>]

Sent: Tuesday, January 15, 2019 1:38 PM

To: Fowler, Scott <Scott.Fowler@lakelandelectric.com>

Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; Edwards, Cole <Cole.Edwards@lakelandgov.net>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>; Siebold, Michael <Michael.Siebold@lakelandelectric.com>; Pennell, Matt <Matt.Pennell@lakelandelectric.com>

Subject: RE: 440274-1-22-01//Combee Road//

Hi Scott,

Attached is a new exhibit. Note that the locations of the poles, shown in pink, and the dimensions are an approximation. The access road is over the berm. We need access to our maintenance berm as well and often will put a driveway to access the berm. The maintenance berm will likely be about the same elevation to possibly 1 ft higher than the roadway. Hopefully, this is more clear. Let me know if you have additional questions.

Thanks,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Fowler, Scott <Scott.Fowler@lakelandelectric.com>

Sent: Monday, January 14, 2019 2:04 PM

To: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>

Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; Edwards, Cole <Cole.Edwards@lakelandgov.net>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>; Siebold, Michael <Michael.Siebold@lakelandelectric.com>; Pennell, Matt <Matt.Pennell@lakelandelectric.com>

Subject: RE: 440274-1-22-01//Combee Road//

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Hello Gretchen,

Can you provide more detail as to what the drawing shows, i.e., is the “green outline” a berm? The green outline is directly over the “blue outline” (access road/right-of-way?) near the Combee Rd (southwest) access . . . is there any elevation change or does the road height remain the same? Also, can you provide the transmission pole locations and distances in reference to the proposed roadway and “green outline?”

Thank you,

Scott Fowler
Manager of Substation Operations
Energy Delivery
[Lakeland Electric](#)
863.834.6594
[facebook.com/MyLakelandElectric](https://www.facebook.com/MyLakelandElectric)
[@mylkIdelectric](#)



From: Gretchen Suárez-Peña [<mailto:Gretchen.Suarez-Pena@patelgreene.com>]

Sent: Monday, January 14, 2019 1:14 PM

To: Siebold, Michael <Michael.Siebold@lakelandelectric.com>; Pennell, Matt <Matt.Pennell@lakelandelectric.com>; Fowler, Scott <Scott.Fowler@lakelandelectric.com>

Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; Edwards, Cole <Cole.Edwards@lakelandgov.net>; Matt

Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>

Subject: RE: 440274-1-22-01//Combee Road//

Hello Michael and Scott,

We spoke last month concerning the Combee Road PD&E study and addressed the City of Lakeland parcel currently used to access the Eaton Park substation by Lakeland Electric. Attached you will find a concept plan view design of a pond within this site. I've tried to incorporate continued access over the pond berm if necessary, but again limiting access through this site would be advantageous to this project. Has any more research gone in to finding out if the Maine Avenue entrances are sufficient for your needs?

Kind regards,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: [1-863-533-7317](tel:1-863-533-7317) Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Gretchen Suárez-Peña

Sent: Tuesday, December 18, 2018 9:33 AM

To: 'Michael.Siebold@lakelandelectric.com' <Michael.Siebold@lakelandelectric.com>;

'Scott.Faller@lakelandelectric.com' <Scott.Faller@lakelandelectric.com>; 'Matt.pennell@lakelandelectric.com'

<Matt.pennell@lakelandelectric.com>

Cc: Schilling, Jessica <Jessica.Schilling@lakelandgov.net>; 'Edwards, Cole' <Cole.Edwards@lakelandgov.net>; Matt

Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>

Subject: 440274-1-22-01//Combee Road//

Michael and Scott,

Thank you for speaking with me this morning. I appreciate your input on the City of Lakeland parcel and it's use in accessing the Eaton Park substation by Lakeland Electric. At this time, we are going to consider it as a potential pond site for the Combee Road PD&E. In the coming weeks, we will provide you with a potential layout for you to consider. If you could, at this time, consider letting us know if the Maine Avenue entrances are sufficient for your needs or if you will need continued access through the Combee Road driveway.

Thank you again for your time,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: [1-863-533-7317](tel:1-863-533-7317) Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Renato Chuw <rchuw@inwoodinc.com>
Sent: Monday, October 29, 2018 10:03 AM
To: Gretchen Suárez-Peña; Barry Switzer; Jay Patel; Mark Hales; Mirta Laos
Cc: Garau, Michael; Matt Dockins; Brice Shrader
Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds
Attachments: 197562-4_US 98_SWFWMD Meeting Notes_09-06-17.pdf

Follow Up Flag: Follow up
Flag Status: Completed

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Gretchen,

A pre application was conducted with SWFWMD on September 2017. See attached meeting notes.

Renato

Renato E. Chuw, P.E.

Associate Principal - Senior Drainage Engineer

INWOOD CONSULTING ENGINEERS

3000 Dovera Dr., Suite 200, Oviedo, FL 32765

P: 407-971-8850 (Main)

P: 407-542-0145 (Direct)

C: 407-212-8391

From: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>
Sent: Monday, October 29, 2018 9:31 AM
To: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>; Mark Hales <mhales@inwoodinc.com>; Mirta Laos <mlaos@inwoodinc.com>
Cc: Garau, Michael <Michael.Garau@kimley-horn.com>; Matt Dockins <mdockins@rkk.com>; Brice Shrader <brice.shrader@tlpeng.com>
Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds

Thank you,

I'll also invite Brice to the next ELA meeting. Any answers you can provide to those questions below would be great. I've put what you (Barry) have answered in red.

- Can you tell me how much volume you need for treatment and attenuation for your project?
- Will you be modifying a permit or getting a new permit? **Modifying the existing permit.**
- **Do you know how much of US 98 is currently being treated? Currently none of US 98 within our project limits is being treated. Within the proposed pond basin, US 98 is being reconstructed, so all the impervious area will be**

required to be treated. However, we could collect runoff from existing pavement beyond our basin limits to help compensate for your project.

- Have you already met with SWFWMD for preapplication meeting? No.
- If you use pond 2A, will you be modifying the pond itself or the control structure? We are currently evaluating both options.
- What is the timeline for submitting you PSR, plans, and when will construction begin on this project? The draft PSR is due to Inwood for their review in mid November.

Thank you,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Barry Switzer <barry.switzer@tlpeng.com>

Sent: Monday, October 29, 2018 9:29 AM

To: Jay Patel <jpatel@inwoodinc.com>; Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>; Renato Chuw <rchuw@inwoodinc.com>; Mark Hales <mhales@inwoodinc.com>; Mirta Laos <mలాos@inwoodinc.com>

Cc: Garau, Michael <Michael.Garau@kimley-horn.com>; Matt Dockins <mdockins@rkk.com>; Brice Shrader <brice.shrader@tlpeng.com>

Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds

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Gretchen,

Brice Shrader in our office is taking over the PSR for TLP. I can answer some of your questions; see below.

Barry J. Switzer, P. E.

We Have Moved!



**Engineering
Consultants**

450 S. ORANGE AVE | SUITE 450 | ORLANDO, FL 32801

Office: 407.901.5060 (Ext. 5852)

Direct: 407.574.5852

Cell: 321.506.5247

Fax: 407.512.6560

Email: barry.switzer@tlpeng.com

<http://www.tlpeng.com/>

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From: Jay Patel <jpatel@inwoodinc.com>
Sent: Monday, October 29, 2018 9:02 AM
To: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>; Barry Switzer <barry.switzer@tlpeng.com>; Renato Chuw <rchuw@inwoodinc.com>; Mark Hales <mhales@inwoodinc.com>; Mirta Laos <mlos@inwoodinc.com>
Cc: Garau, Michael <Michael.Garau@kimley-horn.com>; Matt Dockins <mdockins@rkk.com>
Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds

Gretchen,

Renato and Barry can get you these answers.

Thanks.

Jaymin Patel, PE
Project Engineer

INWOOD CONSULTING ENGINEERS
3000 Dovera Dr., Suite 200, Oviedo, FL 32765
P: 407-971-8850
www.inwoodinc.com

From: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>
Sent: Monday, October 29, 2018 8:37 AM
To: Jay Patel <jpatel@inwoodinc.com>; barry.switzer@tlpeng.com
Cc: Garau, Michael <Michael.Garau@kimley-horn.com>; Matt Dockins <mdockins@rkk.com>
Subject: 440274-1-22-01//Combee Road// US 98 Ponds

Hi Jay and Barry,

Thank you again for coming to the first ELA meeting. I wanted to follow-up with you concerning some action items for the Combee Road project.

- Can you tell me how much volume you need for treatment and attenuation for your project?
- Will you be modifying a permit or getting a new permit? Modifying the existing permit.
- Do you know how much of US 98 is currently being treated? Currently none of US 98 within our project limits is being treated. Within the proposed pond basin, US 98 is being reconstructed, so all the impervious area will be required to be treated. However, we could collect runoff from existing pavement beyond our basin limits to help compensate for your project.
- Have you already met with SWFWMD for preapplication meeting? No.
- If you use pond 2A, will you be modifying the pond itself or the control structure? We are currently evaluating both options.
- What is the timeline for submitting you PSR, plans, and when will construction begin on this project? The draft PSR is due to Inwood for their review in mid November.

We will start out with this information first. I may have additional questions later but this information will be helpful.

Thanks,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Barry Switzer <barry.switzer@tlpeng.com>
Sent: Thursday, November 29, 2018 9:04 AM
To: Gretchen Suárez-Peña
Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds

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Gretchen,

This project has been assigned to someone else in our office, although I will be responsible and will attend the ELA meetings. We will have a new hire (starting on 12/7) take over this project, and I can get the necessary volumes to you shortly after that.

Barry J. Switzer, P. E.

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Office: 407.901.5060 (Ext. 5852)
Direct: 407.574.5852
Cell: 321.506.5247
Fax: 407.512.6560
Email: barry.switzer@tlpeng.com
<http://www.tlpeng.com/>

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From: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>
Sent: Thursday, November 29, 2018 8:11 AM
To: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Mark Hales <mhales@inwoodinc.com>; Mirta Laos <mlaos@inwoodinc.com>; Jim Myers <jim.myers@tlpeng.com>
Cc: Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>
Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds

Hi Barry,

Thank you for responding. I don't think that the Greenfield Five LLC parcel will work hydraulically for this project. It may work if we have compensatory treatment. At this time, it would be advantageous to have the treatment and attenuation

volume necessary for your project to see what a combined volume would be needed for a joint-use pond. I think that the best opportunity for a joint-use pond would be at the Ridley USA property.

Since you are still finalizing information, we will keep you all as part of the dialogue and will have you be part of the next ELA meeting. Again, having your necessary volumes would be helpful in our analysis.

Thank you again,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Barry Switzer <barry.switzer@tlpeng.com>

Sent: Wednesday, November 28, 2018 4:36 PM

To: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>; Jay Patel <jpatel@inwoodinc.com>; Mark Hales <mhales@inwoodinc.com>; Mirta Laos <milaos@inwoodinc.com>; Jim Myers <jim.myers@tlpeng.com>

Cc: Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>

Subject: RE: 440274-1-22-01//Combee Road// US 98 Ponds

CAUTION: This email originated from outside the organization. Use caution with links and attachments.

Gretchen,

We are still working on finalizing the Pond Siting Report for US 98 and haven't ruled out any of our alternatives, which would need to be approved by FDOT. Due to the RW Costs, we are also looking at options to provide WQ treatment within our existing RW. The US 98 project (197562-4) is split funded for ROW in fiscal years 2020, 2021, and 2022. FDOT currently does not have construction funded within their 5-year work program. Based on the ROW funding the earliest construction could be programmed would be FY 2023. Does this timing allow a joint-use pond?

If we end up buying a pond site, it would most likely be the Greenfield Five LLC parcel, which would be a total take (5 acres) and would be able to provide additional treatment for a feasible joint-use pond with your project.

Barry J. Switzer, P. E.

We Have Moved!



450 S. ORANGE AVE | SUITE 450 | ORLANDO, FL 32801

Office: 407.901.5060 (Ext. 5852)

Direct: 407.574.5852

Cell: 321.506.5247

Fax: 407.512.6560

Email: barry.switzer@tlpeng.com

<http://www.tlpeng.com/>

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From: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>
Sent: Wednesday, November 28, 2018 7:39 AM
To: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Mark Hales <mhales@inwoodinc.com>; Mirta Laos <mloos@inwoodinc.com>; Brice Shrader <brice.shrader@tlpeng.com>
Cc: Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>
Subject: 440274-1-22-01//Combee Road// US 98 Ponds

Hello All,

After looking at this project more closely, it looks like an opportunity for a joint-use pond with the US 98 project and the Combee Road project may not be feasible.

We are looking at the Ridley USA property as a potential pond site for our southern basin. Please let me know if this is currently a front runner for your project. If it is, and this is potential joint-use opportunity, I would need to know the treatment and attenuation volume needs for your project. We can then continue to coordinate.

If it is not, and you also believe a joint-use pond is not feasible, we will excuse your presence at our next ELA meeting. Please let me know your thoughts.

Thank you for your time,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)
215 East Main Street | Bartow, FL 33830
Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Steve Johnston <steve.johnston@tlpeng.com>
Sent: Tuesday, December 18, 2018 3:57 PM
To: Mark Hales; Gretchen Suárez-Peña; Matt Dockins
Cc: Barry Switzer; Jay Patel; Renato Chuw; Matt Dockins; Garau, Michael; Jen Rehrl; Timothy Polk
Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Follow Up Flag: Follow up
Flag Status: Completed

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Gretchen,

I am working on the PSR now and we anticipate having it over to Inwood on the 9th. As far as required treatment and attenuation volumes go, it'll depend upon what treatment method you are looking at for the combined pond.

We are adding approximately 1.1ac of impervious area to the basin where we are widening. The total area of the basin where improvements are being constructed is 16.90ac.

If the pond is wet detention and will not be conveying flood discharges, we can use 1" over the new pavement area for the treatment volume per SWFWMD ERP AH-II Section 4.5.a.1. This yields a treatment volume of 0.1 acft. If it is dry retention and will not convey flood discharges, that can be reduced to 0.05 acft.

If the pond will be a conveyance path for flood discharges, the required treatment volume is 1" over the entire basin for wet detention. That yields a treatment volume of 1.40acft. If it is to be dry retention and will convey flood discharges (and total area is less than 100ac) then this can be reduced to 0.70acft.

Our current calculations show a required 25yr/24hr attenuation volume of 0.42acft when ignoring the pond area.

If your project was to assume an additional 2.0 acft of volume to accommodate the treatment and attenuation needs of this project, I believe that would be a reasonably conservative assumption.

I will keep you posted as we refine these numbers and ready the final report. Please let me know if there is any other information that you need.

Sincerely,

Steve Johnston, P.E.

We Have Moved!



430 S. ORANGE AVE | SUITE 430 | ORLANDO, FL 32801

Office: 407.901.5060 (Ext. 5658)

Direct: 407.574.5658

Fax: 407.512.6560
Email: steve.johnston@tlpeng.com
<http://www.tlpeng.com/>

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From: Mark Hales <mhales@inwoodinc.com>
Sent: Tuesday, December 18, 2018 2:42 PM
To: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>; Matt Dockins <mdockins@rkk.com>; Steve Johnston <steve.johnston@tlpeng.com>
Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Jen Rehl <Jen.Rehl@patelgreene.com>; Timothy Polk <Tim.Polk@patelgreene.com>
Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Barry & Steve

Please see below. Can you respond to the first question?

Regarding question #2 we have not spoken with the owner of the Ridley USA property. Thanks

Mark Hales, P.E.
Principal - Project Manager
Inwood Consulting Engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
Office: 407-971-8850
Direct 407-542-0141
Mobile: 321-246-7128

From: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>
Sent: Monday, December 17, 2018 1:26 PM
To: Mark Hales <mhales@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>
Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Jen Rehl <Jen.Rehl@patelgreene.com>; Timothy Polk <Tim.Polk@patelgreene.com>
Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Hi Mark,

We had our second ELA meeting today. We will get you the minutes soon. I did want to know a couple of things:

1. Do you all have any volume numbers we can look at? A draft PSR? Again, I just want to see if we can accommodate both sets of volumes into one pond if we go that route?

2. How far in the process did you all get with the Ridley USA property? Did you all talk with the owners? We are considering that site for our project.

Thank you again,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Mark Hales <mhales@inwoodinc.com>

Sent: Wednesday, December 12, 2018 11:45 AM

To: Matt Dockins <mdockins@rkk.com>; Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>

Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>

Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

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Matt & Gretchen

I was looking at this meeting on my calendar for next Monday and I don't think that our team has any new information to add. I spoke with Barry and he said that he is on track to provide you with our drainage calculations from the draft PSR by the end of this week. I appreciate you all keeping us up to speed however having nothing new to add we are going to pass on this meeting. It would be great if you could still provide us with a copy of the meeting minutes though. I also spoke with Brent Setchell and he was ok with us not attending.

If there is anything you need from us prior to the meeting please let me know and we will get it to you. Thanks☺

Mark Hales, P.E.

Principal - Project Manager

Inwood Consulting Engineers

3000 Dovera Drive, Suite 200, Oviedo, FL 32765

Office: 407-971-8850

Direct 407-542-0141

Mobile: 321-246-7128

-----Original Appointment-----

From: Matt Dockins <mdockins@rkk.com>

Sent: Monday, October 29, 2018 12:13 PM

To: Matt Dockins; Gretchen Suárez-Peña; michael.garau@kimley-horn.com; Setchell, Brent; Figueroa, Sergio; Peters, Lauren; Hartmann, William; Austin, Teresa; Monies, Nicole; patrick.bateman@dot.state.fl.us; Barry Switzer; Irven, Phil; Jay Patel; Schilling, Jessica; cole.edwards@lakelandgov.net

Cc: Jarvis, Jay; Toole, Lavenia; Mark Hales; Harris, Sharon Hedrick; Timothy Polk

Subject: FW: SR 659 (Combee Rd) PD&E ELA Meeting 2

When: Monday, December 17, 2018 8:30 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).

Where:

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Gretchen Suárez-Peña

From: Steve Johnston <steve.johnston@tlpeng.com>
Sent: Tuesday, January 22, 2019 8:22 AM
To: Gretchen Suárez-Peña; Mark Hales; Matt Dockins
Cc: Barry Switzer; Jay Patel; Renato Chuw; Matt Dockins; Garau, Michael; Jen Rehrl; Timothy Polk
Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Follow Up Flag: Follow up
Flag Status: Completed

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No Problem Gretchen,

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Let me know if you need anything else.

Sincerely,

Steve Johnston, P.E.



450 S. ORANGE AVE | SUITE 450 | ORLANDO, FL 32801

Office: 407.901.5060 (Ext. 5658)

Direct: 407.574.5658

Fax: 407.512.6560

Email: steve.johnston@tlpeng.com

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Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Jen Rehl <Jen.Rehl@patelgreene.com>; Timothy Polk <Tim.Polk@patelgreene.com>
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Hi Steve,

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Our final ELA meeting will take place in mid to late February. I will send out an invitation to include you in that meeting.

Thank you again,

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Sent: Tuesday, December 18, 2018 3:57 PM
To: Mark Hales <mhales@inwoodinc.com>; Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>; Matt Dockins <mdockins@rkk.com>
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We are adding approximately 1.1ac of impervious area to the basin where we are widening. The total area of the basin where improvements are being constructed is 16.90ac.

If the pond is wet detention and will not be conveying flood discharges, we can use 1" over the new pavement area for the treatment volume per SWFWMD ERP AH-II Section 4.5.a.1. This yields a treatment volume of 0.1 acft. If it is dry retention and will not convey flood discharges, that can be reduced to 0.05 acft.

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I will keep you posted as we refine these numbers and ready the final report. Please let me know if there is any other information that you need.

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Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Barry & Steve

Please see below. Can you respond to the first question?

Regarding question #2 we have not spoken with the owner of the Ridley USA property. Thanks

Mark Hales, P.E.

Principal - Project Manager
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Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

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Thank you.

Gretchen Suárez-Peña

From: Steve Johnston <steve.johnston@tlpeng.com>
Sent: Monday, January 28, 2019 9:44 AM
To: Gretchen Suárez-Peña; Mark Hales; Matt Dockins
Cc: Barry Switzer; Jay Patel; Renato Chuw; Matt Dockins; Garau, Michael; Jen Rehrl; Timothy Polk
Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

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Gretchen,

That is correct. There is not space within the existing RW to modify the pond to treat a full 1" over the impervious area. We are taking the approach of using a diversion structure so that the pond is off-line to the new basin, which should reduce the required treatment volume to 0.5" over the impervious area. We will be handling attenuation by over-attenuating the existing runoff coming into the pond. This has been used in other locations in the district and has been accepted.

Feel free to call or email if there is anything else you need. I'll be happy to help.

Sincerely,

Steve Johnston, P.E.



450 S. ORANGE AVE | SUITE 450 | ORLANDO, FL 32801

Office: 407.901.5060 (Ext. 5658)

Direct: 407.574.5658

Fax: 407.512.6560

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Sent: Monday, January 28, 2019 8:53 AM
To: Steve Johnston <steve.johnston@tlpeng.com>; Mark Hales <mhales@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>
Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>;

Jen Rehl <Jen.Rehl@patelgreene.com>; Timothy Polk <Tim.Polk@patelgreene.com>

Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Hi Steve,

Thank you for this response. I was finally able to read this email thoroughly. If I'm understanding this correctly you can modify the pond to accommodate an extra 0.38ac-ft. However, all you need is 0.1ac-ft, leaving about 0.28ac-ft of additional treatment volume.

If you are to provide treatment for the 8.02 ac of asphalt not currently being treated, you would need 0.67ac-ft of available volume, based on a treatment calculation of 1 inch over the area. Would you be able to accommodate this volume in your anticipated design?

Regardless, we need about 0.29 ac-ft of treatment volume for our greatest typical section. So, if the typical section chosen is less than this one, we should be able to accommodate the volume within this pond. We will still need to provide some other facility to attenuate flows.

Please confirm that what I've written here is correct. Thank you again for your cooperation.

Kind regards,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

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No Problem Gretchen,

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Let me know if you need anything else.

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Mark Hales, P.E.

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To: Mark Hales <mhales@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>
Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Jen Rehl <Jen.Rehl@patelgreene.com>; Timothy Polk <Tim.Polk@patelgreene.com>
Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

Hi Mark,

We had our second ELA meeting today. We will get you the minutes soon. I did want to know a couple of things:

1. Do you all have any volume numbers we can look at? A draft PSR? Again, I just want to see if we can accommodate both sets of volumes into one pond if we go that route?
2. How far in the process did you all get with the Ridley USA property? Did you all talk with the owners? We are considering that site for our project.

Thank you again,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)

215 East Main Street | Bartow, FL 33830

Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Mark Hales <mhales@inwoodinc.com>

Sent: Wednesday, December 12, 2018 11:45 AM

To: Matt Dockins <mdockins@rkk.com>; Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>

Cc: Barry Switzer <barry.switzer@tlpeng.com>; Jay Patel <jpatel@inwoodinc.com>; Renato Chuw <rchuw@inwoodinc.com>

Subject: RE: SR 659 (Combee Rd) PD&E ELA Meeting 2

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Matt & Gretchen

I was looking at this meeting on my calendar for next Monday and I don't think that our team has any new information to add. I spoke with Barry and he said that he is on track to provide you with our drainage calculations from the draft PSR by the end of this week. I appreciate you all keeping us up to speed however having nothing new to add we are going to pass on this meeting. It would be great if you could still provide us with a copy of the meeting minutes though. I also spoke with Brent Setchell and he was ok with us not attending.

If there is anything you need from us prior to the meeting please let me know and we will get it to you. Thanks☺

Mark Hales, P.E.

Principal - Project Manager

Inwood Consulting Engineers

3000 Dovera Drive, Suite 200, Oviedo, FL 32765

Office: 407-971-8850

Direct 407-542-0141

Mobile: 321-246-7128

-----Original Appointment-----

From: Matt Dockins <mdockins@rkk.com>

Sent: Monday, October 29, 2018 12:13 PM

To: Matt Dockins; Gretchen Suárez-Peña; michael.garau@kimley-horn.com; Setchell, Brent; Figueroa, Sergio; Peters, Lauren; Hartmann, William; Austin, Teresa; Monies, Nicole; patrick.bateman@dot.state.fl.us; Barry Switzer; Irven, Phil; Jay Patel; Schilling, Jessica; cole.edwards@lakelandgov.net

Cc: Jarvis, Jay; Toole, Lavenia; Mark Hales; Harris, Sharon Hedrick; Timothy Polk
Subject: FW: SR 659 (Combee Rd) PD&E ELA Meeting 2
When: Monday, December 17, 2018 8:30 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where:

-----Original Appointment-----

From: Matt Dockins <mdockins@rkk.com>
Sent: Monday, October 29, 2018 9:16 AM
To: Matt Dockins; Gretchen Suárez-Peña; michael.garau@kimley-horn.com; Setchell, Brent; Figueroa, Sergio; Peters, Lauren; Hartmann, William; Austin, Teresa; Monies, Nicole; patrick.bateman@dot.state.fl.us; Barry Switzer; Irvén, Phil; Jay Patel; Schilling, Jessica; cole.edwards@lakelandgov.net
Cc: Jarvis, Jay; Lavenia Toole; Mark Hales
Subject: SR 659 (Combee Rd) PD&E ELA Meeting 2
When: Monday, December 17, 2018 8:30 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where:

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MEETING NOTES
Pre-Application Meeting
With
Southwest Florida Water Management District

FPID 197562-4-52-01
US 98 from Edgewood to Main
Polk County, Florida

Wednesday September 6, 2017 - 2:30 PM
SWFWMD Conference Room

ATTENDEES

David Kramer – SWFWMD	Sergio Figueroa – FDOT
Al Gagne – SWFWMD	Lorraine Edwards– FDOT
Brent Setchell – FDOT	Jim Myers – TLP Engineering
Nicole Monies – FDOT	Renato Chuw – Inwood (via Conf. Call)

The following is our understanding of the subject matter covered in this meeting. If this differs from your understanding, please notify us within five working days from receipt of these minutes.

Project Description:

- This project begins at Edgewood Drive North and continues to Main Street
- The FDOT completed a PD&E Study in 1996 which concluded US 98 needs to be six lanes
- In 2011, Inwood/TLP was contracted to perform the six-lane widening
- Due to right-of-way issues, recently the scope of work has been reduced to include only the following:
 - Intersection improvements between north and south Crystal Lake Drive and at the intersection of Bonny Park/Dreadnought Drive (Lakeland High School entrance)
 - Improvements between Edgewood Drive North and Sylvester Road which include widening for a new through lane in each direction on US 98
 - Other minor improvements to median openings and driveways throughout the project limits

Discussion Items:

- Purpose of meeting is to identify SFWMD drainage/environmental criteria that may apply to project
- David and Al provided the following feedback:
 - The two intersection improvements and minor median/driveway adjustments will be exempt from permitting as long as they meet the exemption criteria in 62-330.051(4)(c), F.A.C.
 - Since there is an existing permit for Lakeland High School, a minor modification will be needed for any improvements on High School property
 - The improvements between Edgewood Drive North and Sylvester Road will require stormwater facilities to provide water quality and water quantity volumes
 - Treatment will be required for 1 inch over the net new impervious area



- Attenuation will be required for the 25 year – 24 hour storm event since outfall is into the Polk County Regional Drainage Facility
- Discharge is into Impaired for Nutrients WBID #1549A, Banana Lake Canal
- There are no OFW's within the permit area
- There are no FEMA Floodplain impacts anticipated
- All improvements, including exemptions, can be included in one new permit

Action Items:

None

Gretchen Suárez-Peña

From: Irlen, Phil <PhillIrlen@polk-county.net>
Sent: Monday, October 29, 2018 12:38 PM
To: Gretchen Suárez-Peña
Cc: Garau, Michael; Matt Dockins; Jarvis, Jay
Subject: RE: 440274-1-22-01//Combee Road PD&E//Polk Maintenance

CAUTION: This email originated from outside the organization. Use caution with links and attachments.

Hi Gretchen,

I forwarded the invite to Jay. It really comes down to funding and man power, but we can have those discussions.

Phil J. Irlen

Roads and Drainage Coordinator
Polk County Roads & Drainage
863-535-2200 phone
philirven@polk-county.net



From: Gretchen Suárez-Peña [mailto:Gretchen.Suarez-Pena@patelgreene.com]
Sent: Monday, October 29, 2018 12:21 PM
To: Irlen, Phil
Cc: Garau, Michael; Matt Dockins
Subject: [EXTERNAL]: 440274-1-22-01//Combee Road PD&E//Polk Maintenance

Hi Phil,

As we discussed at the first Combee Road PD&E ELA meeting, we'll need input from maintenance. Who from Polk County Maintenance should we invite to the next ELA meeting on December 17th? You can either forward the invitation you received or let me know their email address and I can forward the invitation.

Thank you,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)
215 East Main Street | Bartow, FL 33830
Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Jarvis, Jay <JayJarvis@polk-county.net>
Sent: Wednesday, December 19, 2018 1:32 PM
To: Gretchen Suárez-Peña; Irven, Phil
Cc: Matt Dockins; Garau, Michael; Timothy Polk; Jen Rehrl
Subject: RE: 440274-1-22-01//Combee Road//

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Gretchen,

Financial assistance is always a good option. Anything else would need to be discussed between all parties on any “trade-off” that is mutually beneficial to all parties.

Thanks,

Jay M. Jarvis, P.E., Director
Polk County Roads & Drainage Division
3000 Sheffield Road
Winter Haven, FL 33880
(863) 535-2200 Office
(863) 534-7339 Fax

From: Gretchen Suárez-Peña [mailto:Gretchen.Suarez-Pena@patelgreene.com]
Sent: Monday, December 17, 2018 1:17 PM
To: Irven, Phil; Jarvis, Jay
Cc: Matt Dockins; Garau, Michael; Timothy Polk; Jen Rehrl
Subject: [EXTERNAL]: 440274-1-22-01//Combee Road//

Hi Phil and Jay,

Thank you for coming to today’s ELA meeting. I know we discussed a lot about maintenance and the County’s ability to assist in that. We are genuinely considering the Polk County pond north of Crystal Lake as a main treatment facility for the second, northern basin. As Brent mentioned, we may have to look at an easement but the County would continue its maintenance of the facility.

Question: under what circumstances would the County find it favorable to assist in the maintenance of new structures like CDS unit or sun tree units? Would it be financial assistance or some other trade-off? I would like us to consider all options of working together, especially for the Crystal Lake area since all municipalities are co-permittees on the MS4 permit.

Thank you again for your time,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)
215 East Main Street | Bartow, FL 33830
Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Gretchen Suárez-Peña

From: Corcoran, Brian <BrianCorcoran@polk-county.net>
Sent: Tuesday, February 12, 2019 11:19 AM
To: Gretchen Suárez-Peña
Subject: RE: Floodplain Management _Combee Road

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Gretchen

Nice talking to you this morning, per our conversation based upon the un-numbered A flood zone located to the east of Crystal Lake Drive N if a copy of the modeling and resulting BFE could be provided to the county when the study is completed that would be great.

Thanks

Brian Corcoran CFM
Floodplain Manager
Polk County Board of County Commissioners
330 W. Church St. Drawer GM03
P.O. Box 9005
Bartow, FL 33831-9005

briancorcoran@polk-county.net
Phone (863) 534-6765
Fax (863) 534-7646

From: Gretchen Suárez-Peña <Gretchen.Suarez-Pena@patelgreene.com>
Sent: Tuesday, February 12, 2019 9:22 AM
To: Corcoran, Brian <BrianCorcoran@polk-county.net>
Cc: Irvén, Phil <PhillIrvén@polk-county.net>; Matt Dockins <mdockins@rkk.com>; Garau, Michael <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>
Subject: [EXTERNAL]: RE: Floodplain Management _Combee Road

Hi Brian,

I tried calling you today and last week to speak about the Combee Road project. It seems we are playing a little bit of phone tag. Please feel free to call me. My contact information is below. I'll be in the office today until 2pm.

Thanks,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)
215 East Main Street | Bartow, FL 33830
Office: 1-863-533-7317 Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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From: Gretchen Suárez-Peña
Sent: Tuesday, February 5, 2019 1:21 PM
To: 'BrianCorcoran@polk-county.net' <BrianCorcoran@polk-county.net>
Cc: Irven, Phil <PhyllIrven@polk-county.net>; 'Matt Dockins' <mdockins@rkk.com>; 'Garau, Michael' <Michael.Garau@kimley-horn.com>; Timothy Polk <Tim.Polk@patelgreene.com>
Subject: Floodplain Management _ Combee Road

Hi Brian,

I am the drainage engineer on record for a Project Development and Engineering Study of Combee Road. The study evaluates the proposed widening of SR 659 (Combee Road) from US 98 to North Crystal Lake Drive in Polk County. As part of the Location Hydraulics Report, we want to document coordination with the Polk County Floodplain Management to ensure that the project is consistent with any floodplain plans and to have you provide any floodplain concerns for the area.

At this time, the FDOT is proposing to widen Combee Road using a three-lane typical section consisting of a two-way left turn lane and one travel lane in each direction. The typical section includes seven-foot wide buffered bicycle lanes, curb and gutter, and six-foot wide sidewalks on both sides. Dedicated right turn lanes will be provided at the intersections of US 98, Commerce Point Drive, South Crystal Lake Drive, and North Crystal Lake Drive to help ease congestion.

The only designated FEMA floodplain in the area is located at and around Crystal Lake at the northern limits of the project (FIRM 12105C0320G, dated 12/22/2016). At this time, there are no significant encroachments into the base floodplain along the project or of Crystal Lake and the project will not affect any floodplain values.

Your response to this email with any comments or concerns would be greatly appreciated.

Kind regards,

Gretchen L. Suárez-Peña, PE
Senior Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)
215 East Main Street | Bartow, FL 33830
Office: [1-863-533-7317](tel:1-863-533-7317) Ext. 202 | Cell: 1-863-670-6380 | Email: gretchen@patelgreene.com

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Patel, Greene, and Associates, PLLC

Meeting Agenda

Project: FPID 44027412201

Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive PD&E

Meeting: SWFWMD Pre-application Meeting

Date/Time: 2/6/19 @ 2:00 pm

Location: SWFWMD Tampa Service Office

Introductions / Sign-in Sheet

1. Background

- a. Project Limits – SR 659 Combee Road from US 98 to North Crystal Lake Drive
- b. Proposed Study
 - 1. Adding a center turn lane and pedestrian features
 - 2. The Buffered Bike Lane Alternative – This typical section is comprised of two 11-foot travel lanes, one 13-foot two-lane left turn median, a 7-foot buffered bike lane on each side and a 6-foot sidewalk on each side.
- c. Drainage Basins
 - i. Banana Lake to the South- neighborhood sub-basin
 - ii. Saddle Creek to the north- Crystal Lake

2. Existing Permits

- a. Combee Road Drainage Improvements SWFWMD Permit 4722081
- b. Polk County Pond north of Crystal Lake SWFWMD Permit 4010422
- c. Offsite business permit
- d. Not SWFWMD but MS4 for Crystal Lake
 - i. Stakeholders – Polk County, FDOT, City of Lakeland (COL)

3. Floodplain

- a. FIRM Nos. panel 12105C0320G (eff. Date 12-22-2016) - Crystal Lake is zone AE EL. 139.1

4. Wetlands

- a. Crystal Lake
- b. Northeast corner of the intersection of Combee Road and Skyview Drive

5. Protected Species

- i. None listed. No impacts expected

6. Drainage Approach Options

- a. North Basin Saddle Creek- proposed improvements of Crystal Lake pond
 - i. ELA Meeting
 - ii. Recommendations of Crystal Lake TMDL Implementation Final Report by COL
 - iii. Southern portion improvements
- b. Southern Basin
 - i. ELA meeting – issues
 - ii. Option 1- COL parcel -utility fatal flaw
 - iii. Option 2- Innovative LID – maintenance issues
 - iv. Option 3- US 98 joint use



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Meeting Agenda

1. Modification of Pond 2A available 0.28 ac-ft of treatment after their treatment accommodated
2. DCIA existing non-treated pavement
3. Over attenuating
4. Let Combee “go”
- v. Option 4- Traditional Pond Sites with treatment and attenuation or attenuation only
 1. Ridley USA
 2. Residential parcel
 3. Business parcel

7. **Permits**

- a. Modify SWFWMD Permit 4722081 for traditional drainage changes and possible ponds
- b. Modify SWFWMD Permit 4010422 for Crystal Lake
- c. Modify FDOT Pond 2A to address the Combee Road compensatory plan



Patel, Greene and Associates, PLLC

Meeting Minutes

Project: FPID 440274-1-22-01

Description: SR 659 Combee Road from US 98 to North Crystal Lake Drive PD&E

Meeting: SWFWMD Pre-application Meeting

Date/Time: 2/6/19 @ 2:00 pm

Location: SWFWMD Tampa Service Office

Attendees:

Brent Setchell (FDOT), Sergio Figueroa (FDOT), Nicole Monies (FDOT), Al Gagne (SWFWMD), Dave Kramer (SWFWMD), Gretchen Suarez-Pena (PGA)

Introductions / Project Overview

Brent Setchell had everyone introduce themselves. Gretchen Suarez-Pena then described the project. This is a Project Development and Environmental Study (PD&E) for SR 659 Combee Road from US 98 to North Crystal Lake Drive. The proposed improvements include adding a center turn lane and pedestrian features. The proposed typical section is comprised of two 11-foot travel lanes, one 13-foot two-lane left turn median, a 7-foot buffered bike lane on each side and a 6-foot sidewalk on each side. The existing drainage basins are Banana Lake to the South from Kiwanis Avenue to US 98 and Saddle Creek to the north with the corridor discharging primarily to Crystal Lake. The new impervious area will need to be addressed based on SWFWMD water quality and water quantity requirements.

Existing Permitting

Gretchen went on to state that there are several existing permits along the corridor. They include: Combee Road drainage improvements ERP 4722081 and Polk County Pond north of Crystal Lake ERP 4010422. Likewise, the Municipal Separate Storm Sewer Systems (MS4) permit has the regional stakeholders including FDOT, Polk County and City of Lakeland. The FEMA FIRM panel is 12105C0320G with effective date 12-22-2016. The main flood zone is AE with elevation 139.1 in and around Crystal Lake. The main wetland is also Crystal Lake and across from Crystal Lake at the northeast corner of the intersection of Combee Road and Skyview Drive. There are no protected species or impacts to protected species expected based on the improvements.

The drainage approach for this study was to first find regional alternatives for the water quality and water attenuation. For this study, Environmental Look Around (ELA) meetings were conducted to accomplish this. For the northern basin, Saddle Creek, basin the ELA meetings have rendered a regional alternative to provide the water quality treatment and attenuation in the Polk County Pond located in the northern area of Crystal Lake. This was recommended by the Crystal Lake TMDL Implementation Final report by the City of Lakeland. This option will retrofit the closed flume inlets that discharge directly to Crystal Lake, into curb inlets and pipe runoff to the pond area on the north side of the lake. Likewise, there is a southern ditch adjacent to Crystal Lake that will be recommended to be retrofitted as a linear treatment pond. There is treatment and attenuation volume available within this linear pond.

For the southern basin, regional approaches have been more difficult to secure. The first option considered was to use a parcel that is owned by the City of Lakeland. This parcel is currently used by Lakeland Electric to access the Eaton Park sub-station. In coordinating with Lakeland Electric, it was



Patel, Greene and Associates, PLLC

Meeting Minutes

determined that this parcel was not feasible for a pond, as the equipment needed to access the site would need most of the parcel. A second option was to incorporate innovative low impact design (LID) alternatives for the project to address water quality. However, the maintenance for these alternatives can be cumbersome and the funding from Polk County, City of Lakeland or FDOT is not adequate to address the maintenance needs for these alternatives. Therefore, those options were eliminated.

Another option considered during the ELA meetings, was to provide a joint-use pond to be used by both the Combee Road project and a project currently in design along US 98 from Edgewood Drive to Main Street. The US 98 project is undergoing its own Pond Siting Report. The preferred pond site for this project is to modify the existing permitted FDOT pond 2A, which was permitted under the US 98 South of Brooks Street to South of Edgewood Drive North road project under SWFWMD permit number 44019176.001. The permitted pond provides the treatment volume of 0.73 ac-ft for the basin that it treats. The US 98 project plans to accommodate an additional 0.38 ac-ft of volume. The US 98 project only needs about 0.10 ac-ft of volume. This leaves an additional 0.28 ac-ft of available volume for our Combee project. This is very close to the treatment volume needed for the Combee Road southern basin. The US 98 Project is planning to over attenuate as it will be attenuating for all the directly connected impervious area in the project. This includes existing pavement that is currently not being attenuated. This over attenuation can also help in the attenuation needs for Combee Road.

If the joint-use option with the US 98 project is not available for the treatment volume, the final option is to consider traditional pond sites to accommodate the treatment and attenuation volume for the project. Pond locations are limited, and at this time are in the Ridley USA property that is adjacent to the CSX right-of-way, which poses a constructability problem. Other sites may relocate residences or a business and are not favorable.

The preferred alternative is currently is to collaborate with the US 98 project and utilize their extra treatment and attenuation as compensatory for this project.

Al Gagne and Dave Kramer said that SWFWMD would agree with this compensatory approach linked to the US 98 project. It would depend on the timing of the permitting and construction of the US 98 project. The US 98 project would need to be constructed and permitted first. Also, the volume in that project used for Combee Road should not be spoken for as compensatory for some other part of the project.

For permitting, the Combee Road project would submit an Individual Permit application that could be placed under the existing Combee Road Environmental Resource Permit (ERP) number 4722081. A letter of minor modification or administrative authorization will be added to the US 98 permit and the Crystal Lake pond ERP 4010422 for the treatment and attenuation volumes to be utilized from their permitted stormwater management facilities.

All of this will be documented in the PD&E drainage documents.

Recommendation re: Cooperative Funding Grant Agreement with the Southwest Florida Water Management District for Crystal Lake Water Quality Improvement Study

The City of Lakeland has been awarded a reimbursable 50% matching Cooperative Funding Initiative (CFI) grant from the Southwest Florida Water Management District (SWFWMD) for the Crystal Lake Water Quality Improvement Study. The proposed project consists of a feasibility study to evaluate nutrient reduction sediment treatment options to improve water quality in Crystal Lake. Crystal Lake does not meet current water quality standards and has a Florida Department of Environmental Protection (FDEP) mandated nutrient reduction plan. A previous study showed that sediment cycling contributes over 90 percent of the phosphorus load to the lake. The feasibility study will evaluate options to reduce the phosphorus flux from the sediments to improve water quality.

The attached Cooperative Funding Agreement (Type 3) between SWFWMD and the City of Lakeland for the Crystal Lake Water Quality Improvement Study (Q178) outlines the obligations of both parties, deliverables, project schedule and budget.

The parties anticipate the total cost of the project will be \$200,000. SWFWMD, through the Agreement, agrees to reimburse the City for 50% of all allowable costs up to \$100,000. Funding for this project is provided in the FY21 Stormwater Utility Fee budget. It should also be noted that Polk County Parks & Natural Resources Division has agreed to continue to co-fund water quality assessment, monitoring and restoration projects at 30% of the costs incurred via reimbursement to the City of Lakeland upon completion of the project.

PROJECT BUDGET:

DESCRIPTION	DISTRICT	COOPERATOR	TOTAL
Data Collection Plan	\$4,600	\$4,600	\$9,200
Data Collection	\$46,850	\$46,850	\$93,700
Permitting Coordination	\$5,800	\$5,800	\$11,600
Product Application	\$14,250	\$14,250	\$28,500
Data Compilation & Analysis	\$12,650	\$12,650	\$25,300
BMP Alternatives Analysis	\$5,800	\$5,800	\$11,600
Draft and Final Report	\$10,050	\$10,050	\$20,100
TOTAL	\$100,000	\$100,000	\$200,000

It is recommended that the City Commission authorize the appropriate City officials to execute the Cooperative Funding Agreement (Type 3) with the Southwest Florida Water Management District for Crystal Lake Water Quality Improvement Study (Q178).