POND SITING REPORT

Florida Department of Transportation

District 1

SR 544 PD&E Study

Limits of Project: From Martin Luther King Boulevard to SR 17

Polk County, Florida

Financial Management Number: 440273-1-22-01

ETDM Number: 5873

Date: October 2023

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

PROFESSIONAL ENGINEER CERTIFICATION

POND SITING REPORT

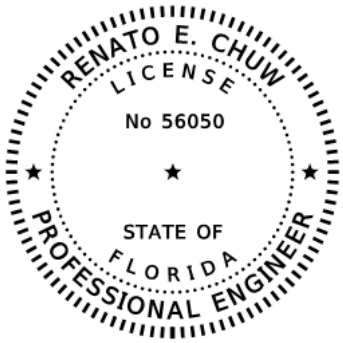
Project: S.R. 544 PD&E Study

ETDM Number: 5873

Financial Project ID: 440273-1-22-01

This Pond Siting Report contains engineering information that fulfills the purpose and need for the S.R. 544 Project Development & Environment Study from Martin Luther King Boulevard NW to SR 17. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Inwood Consulting Engineers, and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice for this project.



This item has been digitally signed and sealed by Renato Chuw, PE on the date adjacent to the seal.

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Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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Executive Summary

The State Road (SR) 544 (Lucerne Park Road) Project Development and Environment (PD&E) Study evaluated capacity, safety, and multi-modal improvements on Lucerne Park Road from MLK Boulevard to SR 17, a distance of approximately eight miles. This project involves the widening of SR 544 from two lanes to four lanes to meet future travel demands, improve safety and provide for bicycle and pedestrian features, such as a shared use path.

The purpose of this Pond Siting Report is to discuss, analyze, and identify the stormwater management plan for the proposed roadway improvements based on environmental, hydrological, hydraulic, and economic factors. Stormwater management for water quality treatment and runoff attenuation will be provided using wet detention and dry retention ponds. The design of the drainage and stormwater facilities will comply with the standards set forth by the FDOT Drainage Manual, the Southwest Florida Water Management District (SWFWMD) Environmental Resource Permit Applicant's Handbook, Polk County stormwater criteria, and Lake Region Lakes Management District (LRLMD).

Proposed pond sites have been identified along the project limits. The analysis estimates right-of-way needs using a volumetric approach which accounts for water quality treatment and water quantity for runoff attenuation. The total pond cost estimate found in this report is a budget tool used by the Department to estimate total acquisition costs associated with each pond site and to budget the appropriate funds for acquisition.

Please note that the volumetric analysis of the pond sites was performed with preliminary data, reasonable engineering judgment, and assumptions. Pond sites and configurations may change during final design as more detailed information on Seasonal High Water Table (SHWT), wetland hydrologic information (as applicable), and a final roadway design profile become available. Please refer to **Table 1-1** for a **Summary of Proposed Stormwater & Floodplain Compensation Pond Sites**.

Table 1-1: Summary of Proposed Stormwater & Floodplain Compensation Pond Sites

Basin/Pond Number	Pond Access Easement Area (ac)	Pond Right-of-Way Area (ac)	Total Required Right-of-Way Area (ac)	Total Pond Cost ($)*
1A	N/A	0.37	0.37	232,792
1	N/A	2.83	2.83	1,005,782
2	N/A	3.83	3.83	1,311,478
3	0.23	2.50	2.73	1,732,875
4	0.11	2.21	2.32	1,065,540
5	0.46	1.95	2.41	1,258,256
6	N/A	1.87	1.87	1,053,930
7	N/A	0.70	0.70	550,241
8	N/A	2.75	2.75	1,773,443
8A	N/A	0.57	0.57	259,168
9	N/A	1.25	1.25	417,565
10	N/A	2.28	2.28	747,288
FPCA 1	N/A	0.74	0.74	277,723
FPCA 2	N/A	1.62	1.62	643,156
FPCA 3	N/A	3.62	3.62	1,249,748
FPCA 4	N/A	4.84	4.84	827,595
FPCA 5	N/A	3.22	3.22	742,230
Totals:			**37.95**	**15,129,811**

*The cost evaluation for the stormwater management facility alternatives in this report include stormwater management facility construction costs, costs associated with wetland impacts, and parcel acquisition costs. The stormwater management facility construction costs include cost of installed drainage structures, drainage pipes and outfalls, clearing and grubbing, earthwork excavation and grading, berm construction, erosion protection, fencing, access accommodations, sodding and any potential impermeable liners. The associated parcel acquisition cost for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs and legal fees.

1.0 Project Overview

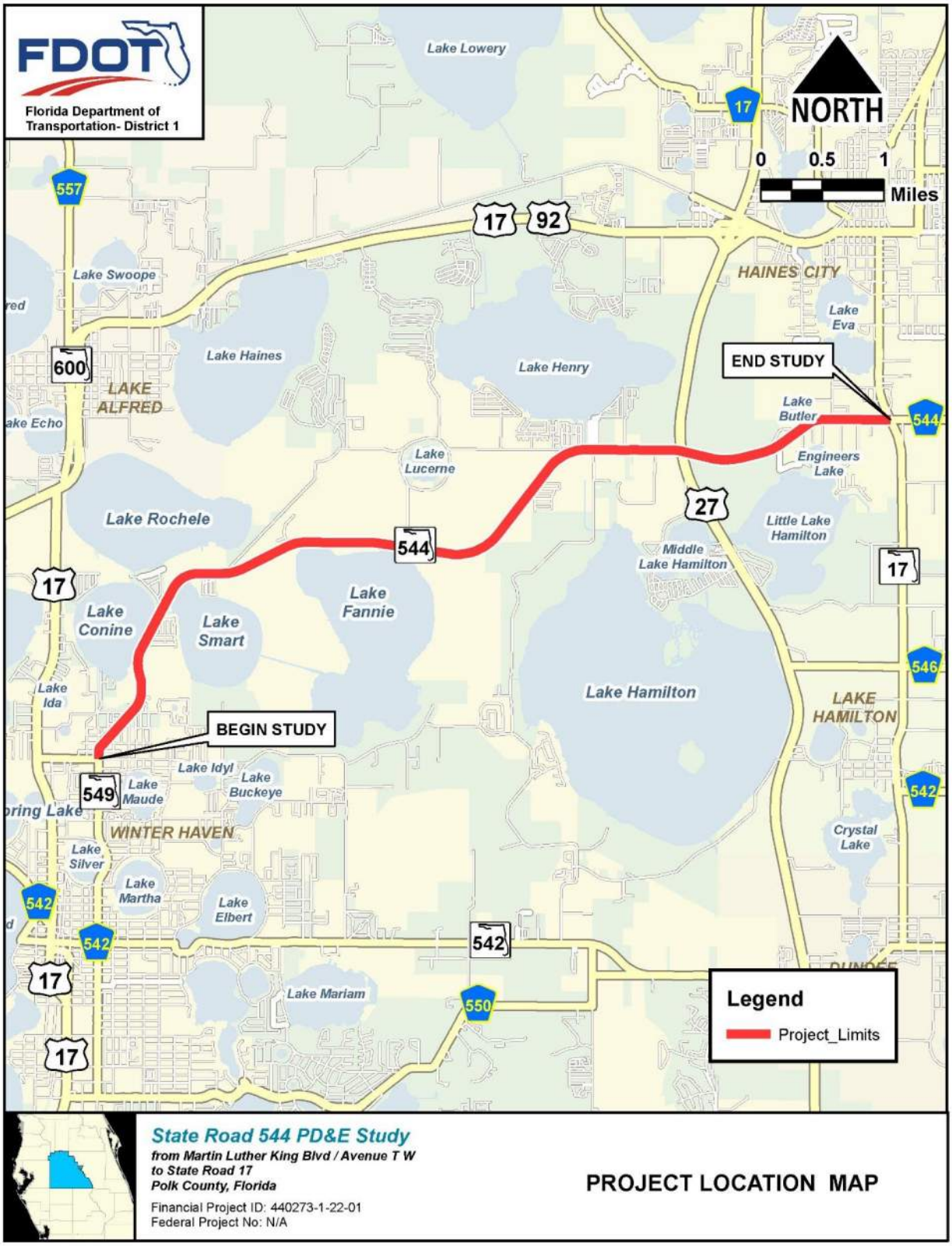
This project involves capacity and multi-modal improvements to SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County, a length of 7.96 miles. The project location map is provided as **Figure 1-1**. The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system; however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.2 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. Citrus Connection Route #60 (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing right-of-way along SR 544 (Lucerne Park Road) ranges from 50 feet to 85 feet from Martin Luther King Boulevard to Avenue Y, 90 feet to 170 feet from Avenue Y to US 27, and 60 feet to 140 feet from US 27 to SR 17.

In addition to widening from two to four lanes, the proposed improvements may include paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional right-of-way may be required depending on the proposed improvements and specific right-of-way requirements will be determined during this Project Development and Environment (PD&E) Study.

Figure 1-1: Project Location



1.1 Project Purpose and Need

The purpose of this project is to address roadway capacity deficiency along SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County to accommodate future travel demand as a result of projected population and employment growth in the area. Other goals of the project include enhancing mobility options and multi-modal access as well as supporting local economic development initiatives. The need for the project is based on the following criteria:

1.1.1 Improve Operational Conditions and Accommodate Projected Travel Demand

This project is anticipated to improve traffic operations along SR 544 (Lucerne Park Road) by increasing operational capacity to meet the projected travel demand as a result of Polk County population and employment growth and increased regional travel in the corridor.

The project segment occurs within two of the eight Polk County planning areas [Central Planning Area and East Planning Area] as depicted in Momentum 2040 [the Polk Transportation Planning Organization's (TPO) Long Range Transportation Plan (LRTP)]. Of the eight planning areas, the East Planning Area is expected to experience the highest increase in population growth between 2010 and 2040 with a 29% increase in single-family dwelling units and a 34% increase in multi-family dwelling units. The Central Planning Area is anticipated to experience the second highest increase in single family dwelling units (25% increase) during the same time period. Accordingly, the Central Planning Area will experience the highest increase in employment growth between 2010 and 2040 with a 42% increase in industrial employment, 34% increase in commercial employment, and a 32% increase in service employment. Likewise, the East Planning Area will experience the second highest increase in commercial employment (26% increase) and the third highest increase in service employment (21% increase) during the same time period. Countywide employment is expected to increase by 79% between 2010 and 2040. Growth within the project area may be attributed to the numerous developments that have been approved and continue to be approved by the City of Haines City.

The greater SR 544 corridor serves commuters of the area as it provides access to regional transportation facilities [including US 92, US 17, US 27, and SR 17] as well as residential and commercial hubs within central Polk County. The project segment of SR 544 (Lucerne Park Road) specifically facilitates local commuter traffic between the population and employment centers of Winter Haven and Haines City. Identified as a Secondary Freight Network Highway Corridor by the Polk TPO, SR 544 additionally serves as a freight distribution route as it connects to a Strategic Intermodal System (SIS) Highway Corridor [US 27], Regional Freight Network Highway Corridors as designated by the Polk TPO [US 92, US 27, and SR 17], and another designated Polk TPO Secondary Freight Network Highway Corridor [US 17]. Truck traffic composes between 7.0% and 9.9 % of the total daily traffic present along the project segment of SR 544 (Lucerne Park Road). As such, this roadway plays an important role in facilitating truck traffic and the distribution of goods to both local and regional destinations.

While the roadway currently operates at an acceptable LOS, conditions are anticipated to deteriorate below established standards if no improvements occur by 2040 as the roadway lacks the capacity to accommodate the projected travel demand. With the proposed improvement, the corridor is expected to continue to operate at acceptable LOS or improved LOS.

1.1.2 Enhance Mobility Options and Multi-Modal Access

Notable pedestrian and bicycle traffic in the corridor was observed in the field despite the fact that sidewalks and bicycle lanes are intermittent and disconnected along the corridor. In addition, a large transit dependent population is present, composed primarily of minority and low-income populations as well as housing units with no vehicle available. Compared to the demographic characteristics for Polk County, the project analysis area [which consists of United States census block groups within a 500-foot buffer surrounding the project] contains a significantly higher minority population percentage [20.1% higher], a higher percentage of housing units with no vehicle available [1.2% higher], and a notably lower median family income [$11,246 less]. This indicates a population with a higher propensity to walk, bike, or take transit to access essential services. The need for multi-modal options within the corridor is critical as growth in the area has created a latent demand for increased bicycle and pedestrian activity.

It should be noted that a portion of the project segment [from Ave T to Old Lucerne Park Road] is identified by the Polk TPO as a Future Complete Streets Corridor. A Complete Street is defined as a corridor that is designed to provide safe access and travel for all users [pedestrians, bicyclists, motorists, and transit riders] of all ages and abilities. Some of the treatments proposed as part of the Future Complete Streets Corridor have been applied to a section immediately south/adjacent to the project corridor [from Ave T to Ave O] and to the westernmost/southernmost section of the project segment [Ave T to Ave Y]. These treatments included the reconstruction of driveways to meet Americans with Disabilities Act (ADA) standards, the addition of pedestrian street lighting, and the construction of crosswalks on intersecting minor streets. New or enhanced sidewalks, landscaping, enhanced bus stops, improved signage, as well as a shared use path [Old Dixie Trail - ETDM Project #14328] are some of the additional improvements being considered/evaluated along the project corridor.

Overall, the proposed project is anticipated to meet the mobility needs of the area by alleviating future congestion on the corridor, providing multimodal travel options, and improving east-west access within east-central Polk County. The proposed bicycle and pedestrian facilities are to enhance multi-modal access and connections between community points of interest and to the regional trail network.

1.1.3 Support Economic Development

One Florida Opportunity Zone [formerly titled Florida Enterprise Zone] borders the northern portion of the project corridor from Old Lucerne Park Road to US 27. This program provides tax incentives for investments in low-income communities. In addition, the easternmost/northernmost section of the project corridor occurs within the Haines City Community Redevelopment Area. Further, the westernmost/ southernmost section of the project [Ave T to Ware Ave] occurs within the Florence Villa Community Redevelopment Area; the Winter Haven Community Redevelopment Agency fosters and promotes community redevelopment activities within this designated district of the City of Winter Haven. Community Redevelopment Areas are recognized as special districts under Florida Statute created to encourage investment within the district through a series of strategic and timely public investments; activities that occur within them are detailed in customized redevelopment plans and include: infrastructure improvements, streetscaping or beautification treatments, affordable housing, recreation and park facility improvements, economic development/redevelopment strategies, transportation improvements, and neighborhood enhancement.

The enhanced roadway operational conditions resulting from the project along with the bicycle and pedestrian facilities proposed for the corridor are intended to provide infrastructure to support commerce and customers as well as modal options to serve the Florida Opportunity Zone and other communities along the corridor. It will also renew the aesthetic appeal of the surrounding area, thereby stimulating economic growth/revitalization and investment in the adjacent communities. As such, the project aligns with the economic development initiatives of the proximate, local communities.

1.2 Alternatives Analysis Summary

In order to meet the Purpose and Need for the project, four-lane roadway typical sections were developed and discussed with FDOT District One's Planning Studio. It was decided that due to the high speeds along SR 544, on-road bicycle lanes would not be considered. Therefore, a single 4-lane divided roadway typical section was developed for a majority of the project that includes 12-foot-wide outside travel lanes and 11-foot wide inside travel lanes separated by a 22-foot raised median. 10-foot shared use paths would be provided along both sides of the road. However due to constrained right-of-way conditions and potential impacts to existing residences and businesses, additional typical sections were considered at each end of the project corridor.

Below is a summary of the roadway improvements considered for each evaluation segment and the intersection improvements considered for the nine study intersections.

1.2.1 Segment 1 – Martin Luther King Boulevard to North of Avenue Y

Four alternative typical sections were considered through this historic minority neighborhood including a two-lane urban typical, a three-lane urban typical, a four-lane undivided rural typical and a five-lane urban typical section. Due to impacts to dozens of residences, churches and businesses associated with the four lane and five lane typical sections, they were eliminated from consideration and this section of SR 544 is considered constrained by the Polk Transportation Planning Organization. The two-lane and three-lane typicals that were considered, include 8-foot-wide sidewalks along both sides of the road and raised median refuge areas at the mid-block crosswalk locations. These options were presented to the Florence Villa community at two separate neighborhood meetings and there was support for both alternatives.

1.2.2 Segments 2 through 7 – North of Avenue Y to LaVista Drive

For a majority of the corridor, from Avenue Y to LaVista Drive, the four-lane divided typical section described earlier was considered. Additional right-of-way would be needed to accommodate this typical section in most areas, so alternatives included widening to the north side of the road and to the south side of the road. Items affecting the comparison of north side vs. south side widening include planned development, publicly owned parks and recreation areas and a proposed Duke Energy transmission line that will be constructed adjacent to the SR 544 right-of-way in a new easement that Duke Energy is in the process of acquiring.

1.2.3 Segment 8 – LaVista Drive to SR 17

The proposed four lane divided typical section was considered in Segment 8 and alignments evaluated widening to the north, to the south, and centered widening. However, due to the large number of residential relocations that would result with any of these three options, two additional alternatives were considered. The first one considered maintaining the existing four-lane undivided roadway and adding eight-foot sidewalks along each

side of the road. The other option considered a four-lane divided roadway with a reduced median width and eight-foot wide sidewalks located at the back of curb on both sides of the road.

Nine project intersections were evaluated using FDOT's Intersection Control Evaluation (ICE) process.

1.2.4 Martin Luther King Boulevard intersection

The proposed improvements at the Martin Luther King Boulevard intersection include maintaining the existing traffic signal but adding a new southbound right turn lane at the intersection.

1.2.5 Avenue Y intersection

Several alternatives were considered for the Avenue Y intersection including a traffic signal and several roundabouts, including two mini-roundabout alternatives.

1.2.6 Old Lucerne Park Road (west end)

Intersection improvement options at the Old Lucerne Park Road (west end) included a traffic signal and a roundabout. However, due to residential impacts and access issues to some residences in the northwest and northeast quadrants, a concept to realign Old Lucerne Park Road (west end) to align with Vista Del Lago Drive was considered. Both a traffic signal and roundabout were considered for this new intersection.

1.2.7 Lucerne Loop Road intersection

Both a traffic signal and a roundabout were considered for this intersection.

1.2.8 Old Lucerne Park Road (east end)

Several alternatives were considered for the intersection of Old Lucerne Park Road with SR 544. In addition to the skew of Old Lucerne Park Road at the intersection, new developments are planned on the south side of SR 544 across from the intersection and in the northwest quadrant of the intersection. Both a traffic signal and roundabout were evaluated at this intersection.

1.2.9 Lake Hamilton Drive intersection

Several alternatives were considered for this intersection, but a traffic signal was considered as the only viable alternative. This option includes realigning the two internal roads for the developments on the north side of SR 544 so that they would intersect SR 544 at a single location for the north leg of the intersection. Also, the ICE process identified the signalized thru-cut option as a viable alternative.

1.2.10 Brenton Manor Avenue intersection

Because of the proximity of this intersection to the US 27 intersection with SR 544 and the two options that were found to be viable at the US 27 intersection, the intersection type at Brenton Manor Avenue is tied to the concepts considered at US 27. Both a roundabout (paired with the single point urban interchange at US 27) and a traffic signal (paired with the northwest quadrant roadway concept at US 27) were evaluated.

1.2.11 US 27 intersection

Two concepts were found to be viable for consideration at the US 27 intersection with SR 544. These include a quadrant roadway in the northwest quadrant of the intersection that would include an intersection at Brenton Manor Avenue (traffic signal) and a new intersection at US 27. The other viable option is a single point urban interchange.

1.2.12 SR 17 intersection

The only concept identified for the SR 17 intersection was a traffic signal. Only improvements on the west leg of the intersection would be involved.

1.3 Description of Preferred Alternative

Below is a summary of the preferred alternative for each roadway segment and intersection.

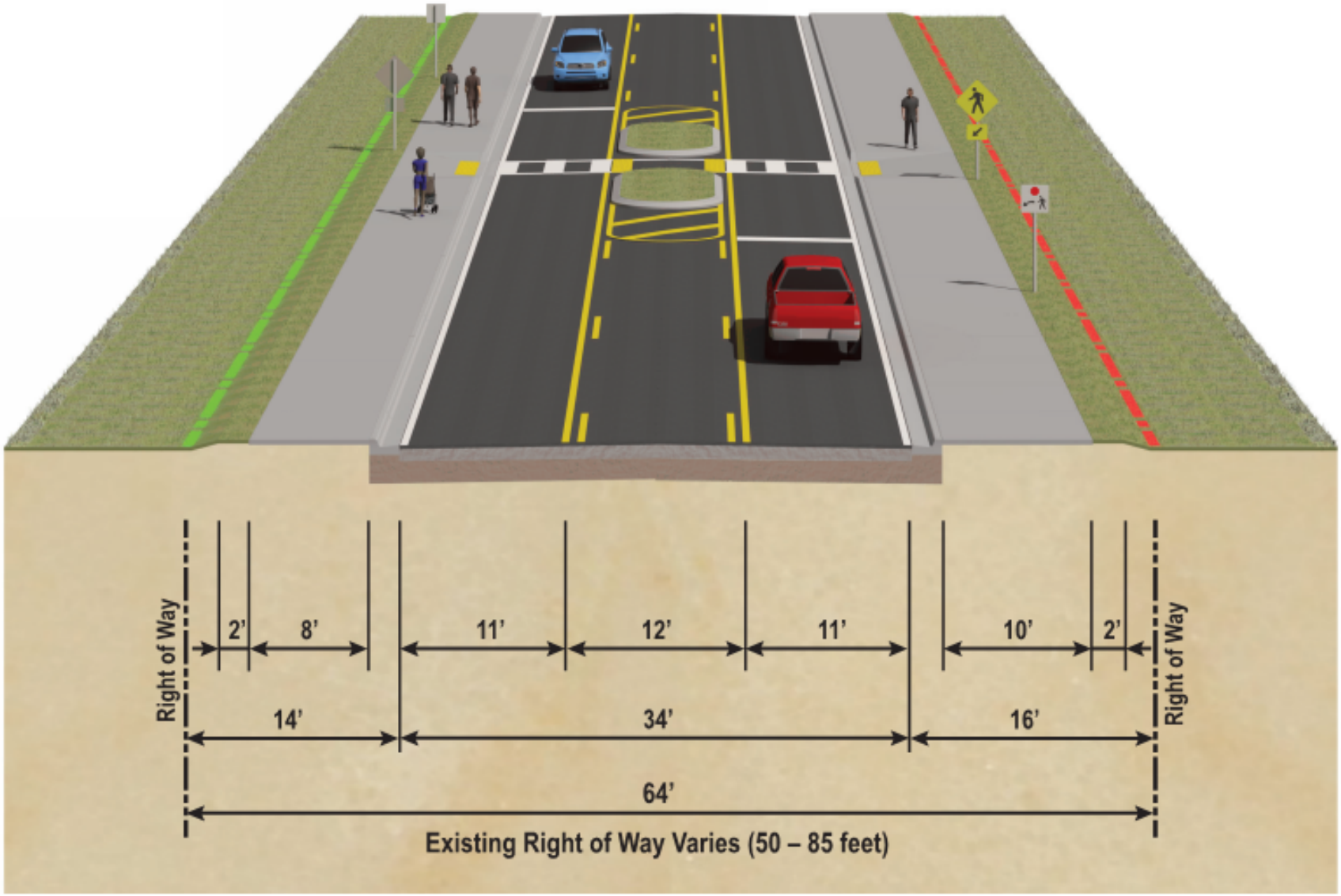
1.3.1 Segment 1 – Martin Luther King Boulevard to North of Avenue Y

The preferred typical section in Segment 1 is the three-lane typical section with a best fit alignment. It is slightly wider and will have minor right-of-way impacts (no residential relocations) than the two-lane alternative but will provide additional safety and capacity for turning vehicles with the center turn lane. Figure 1-2 illustrates this typical section.

The preferred improvement at the Martin Luther King Boulevard intersection is to maintain the existing traffic signal but add a new southbound right turn lane at the intersection. Improvements also include realigning the 1st Street NW intersection with SR 544 farther away from the Martin Luther King Boulevard intersection.

The mini-roundabout with the 90-foot inscribed diameter is recommended at Avenue Y. This concept will minimize impacts to the residences, businesses and church located at this intersection while providing an opportunity for an entrance feature to the historic Florence Villa neighborhood and speed control for vehicles entering the neighborhood.

Figure 1-2: Segment 1 Preferred Typical Section



1.3.2 Segment 2 – North of Avenue Y to East of Lake Conine Canal

The four-lane divided roadway is proposed with widening to the south side of the road. This alignment is recommended to avoid impacts to the Lake Conine Wetland Restoration Area and due to the proximity of the road to Lake Conine and wetlands along the lake. Figure 1-3 illustrates the proposed four-lane divided roadway typical section for Segments 2 through 7.

1.3.3 Segment 3 – East of Lake Conine Canal to East of Old Lucerne Park Road (west end)

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to existing residential developments on the south side of SR 544 and due to the proximity of the road to Lake Smart and wetlands along the lake.

The preferred concept at the Old Lucerne Park Road (west end) intersection is to realign Old Lucerne Park Road (west end) to align with Vista Del Lago Drive and to provide a roundabout at the intersection. The roundabout will help with speed control along SR 544 and improve safety when compared to the traffic signal option.

1.3.4 Segment 4 – East of Old Lucerne Park Road (west end) to East of Lucerne Loop Road

The four-lane divided roadway is proposed with centered widening. The existing road right-of-way can accommodate the proposed four-lane divided roadway in this segment.

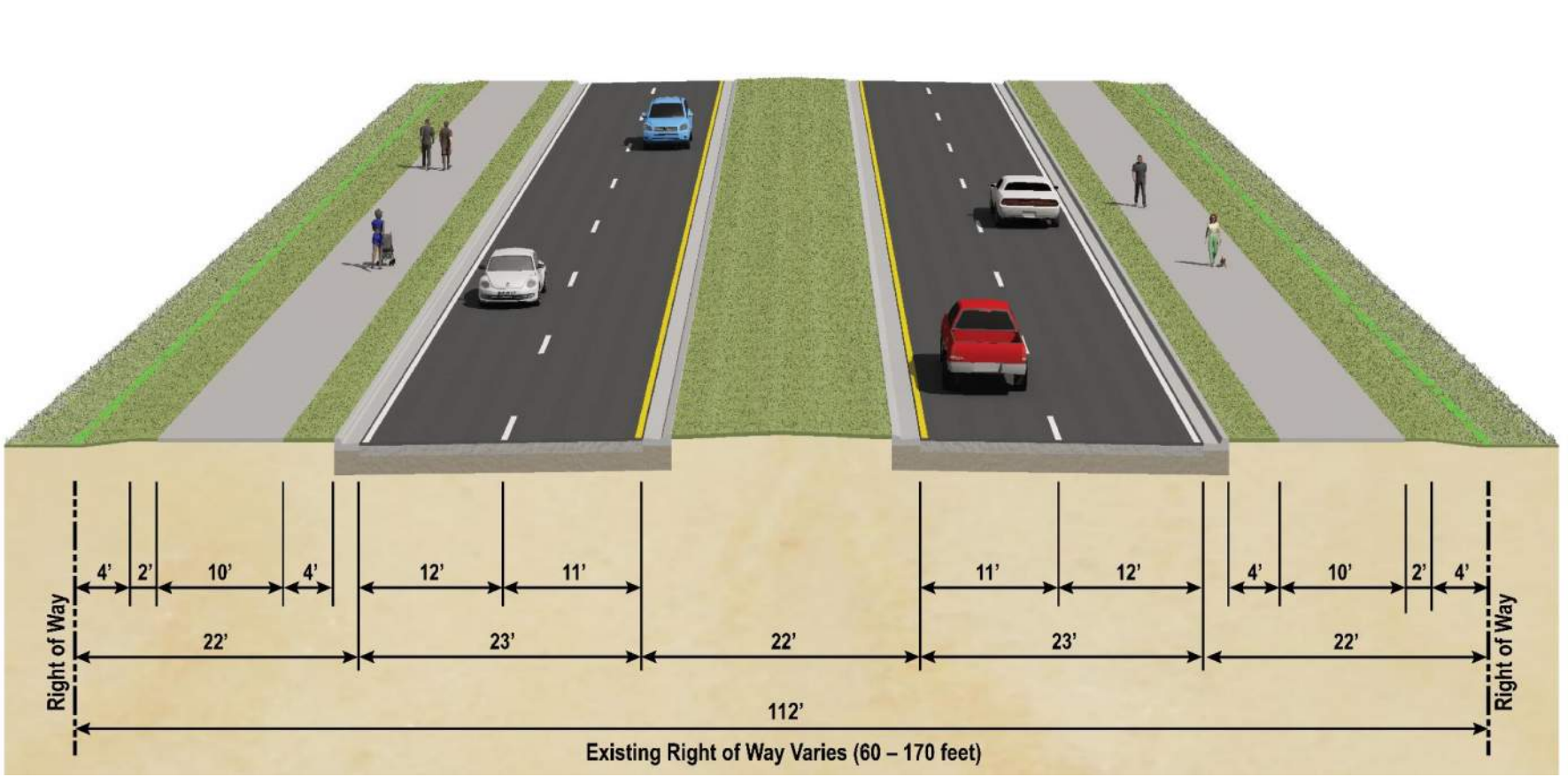
The preferred improvement at the Lucerne Loop Road intersection is the roundabout. It will help with speed control along SR 544 and improve safety when compared to the traffic signal option.

1.3.5 Segment 5 – East of Lucerne Loop Road to East of Lake Hamilton Canal

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to the Lake Region Lakes Management District boat ramp on the south side of the road and also to avoid impacts to the proposed Duke Energy transmission easement/poles on the south side of the road.

The preferred improvement at the Old Lucerne Park Road (east end) intersection is the roundabout. It will help with speed control SR 544 and increase safety when compared to the traffic signal option at this skewed intersection.

Figure 1-3: Segment 2 through Segment 7 Preferred Typical Section



1.3.6 Segment 6 – East of Lake Hamilton Canal to West of Brenton Manor Avenue

The four-lane divided roadway is proposed with widening to the north side of the road. This alignment is recommended to avoid impacts to the Duke Energy transmission easement/poles and existing commercial development on the south side of the road.

The signalized thru-cut alternative is recommended at the Lake Hamilton Drive intersection. This option includes realigning the two internal roads for the developments on the north side of SR 544 so that they intersect SR 544 in a single location (north leg of the intersection).

1.3.7 Segment 7 – West of Brenton Manor Avenue to LaVista Drive

The four-lane divided roadway is proposed with widening to the north side of the road west of US 27 and to the south side of the road east of US 27. This alignment is recommended to avoid impacts to Duke Energy transmission easement/poles that switch from the south side of the road to the north side of the road through the US 27 intersection.

The preferred intersection improvement at Brenton Manor Avenue is the roundabout. This intersection concept is paired with the recommended single point urban interchange at US 27.

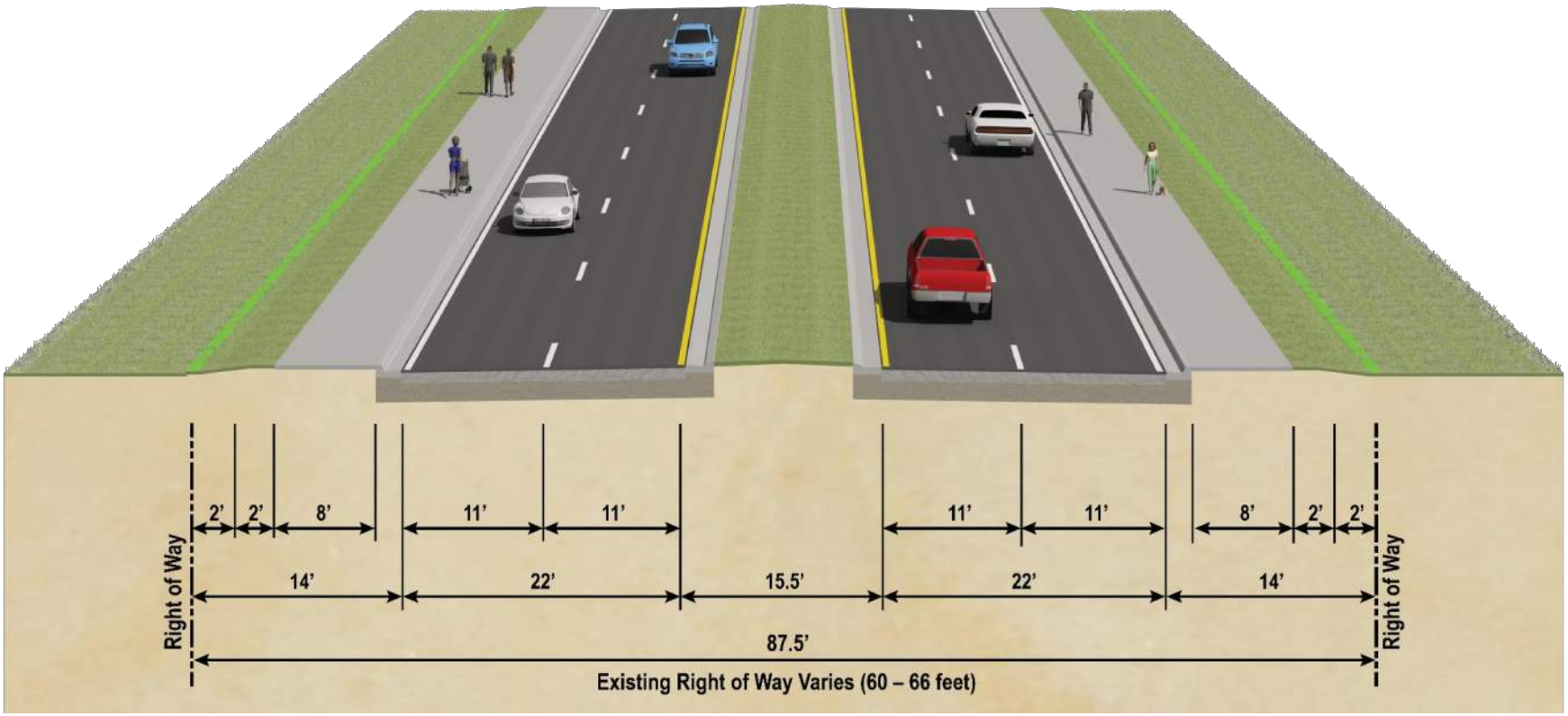
The single point urban interchange is the recommended improvement at the US 27 intersection due to the lower predicted life cycle crash costs with this concept compared to the northwest quadrant roadway with three signalized intersections.

1.3.8 Segment 8 – LaVista Drive to SR 17

The reduced four-lane divided roadway is proposed with centered widening through this segment. This alignment is recommended to minimize residential relocations through this segment of the project but providing access control with the raised median. Figure 1-4 illustrates this typical section.

The preferred concept for the SR 17 intersection is a traffic signal with only improvements to the west leg of the intersection.

Figure 1-4: Segment 8 Preferred Typical Section



2.0 Design Criteria

The design of the stormwater management facilities for the project is governed by the rules set forth by the SWFWMD, FDOT, Polk County, and Lake Region Lakes Management District, where applicable. Water treatment and attenuation requirements will comply with the guidelines as defined in Chapter 62-330 of the Florida Administrative Code (F.A.C) and the SWFWMD Environmental Resource Permit Applicant's Handbook (Volume II).

Wet detention and dry retention ponds will provide for water quality improvements as well as water quantity attenuation for the project runoff. The stormwater ponds are designed and sized for the most conservative typical section for each segment. Please refer to the sections below for the water quality, water quantity, and detention/retention pond facilities configuration criterion used for the project.

2.1 SWFWMD Criteria

- **Water Quality**:
  - Wet Detention Ponds: Treatment will be provided for one inch (1") over the Directly Connected Impervious Areas (DCIA) for alterations to existing public roadway projects.
    - An outfall control structure shall be designed to drawdown the system's treatment volume in no less than 120 hours (5 days) with no more than one half the total volume being discharged within the first 60 hours (2.5 days). Only that volume which drains below the overflow elevation within 36 hours may be counted as part of the volume required for water quantity storage.
  - Dry Retention Ponds: Treatment will be provided for one-half inch (0.5") over DCIA for alterations to existing public roadway projects.
    - The entire treatment volume is to be infiltrated within 72 hours after a storm event.

The project traverses three (3) Waterbody IDs (WBIDs) within SWFWMD: 1504B Lake Hamilton Drain, 1504 Lake Hamilton Outlet, and 1500A Lake Hamilton Canal. Additionally, the corridor is adjacent to or nearby six (6) WBIDs which ultimately receive runoff from SR 544: 1488U Lake Connie, 1488A Lake Smart, 14882 Lake Fannie, 15041 Lake Hamilton, 15002 Middle Lake Hamilton, and 15102 Lake Butler. According to the current FDEP 303(d) list of impaired water bodies, WBID 1488A Lake Smart is impaired for nutrients. Additionally, Lake Hamilton was recently delisted and now falls under the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see Section 5.2.2 for more information). Since the majority of the project outfalls to Lake Hamilton, nutrient loading analysis has been performed for the entirety of the project limits. Please refer to the **WBID Map**, **Figure 6** in **Appendix A** for more information.

- **Water Quantity**:
  - For a project or portion of a project located within an open drainage basin, the allowable discharge is:
    - Historic discharge, which is the peak rate at which runoff leaves the parcel of land by gravity under existing site conditions, or the legally allowable discharge at the time of permit application; or
    - Amounts determined in previous District permit actions relevant to the project.

Offsite discharges and peak stages for the existing and proposed conditions shall be computed using the SWFWMD's 25-year/24-hour rainfall maps and the Natural Resources Conservation Service (NRCS) Type II Florida Modified 24-hour rainfall distribution with and Antecedent Moisture Condition (AMC) II.

- For a project or portion of a project located within a closed drainage basin, the required retention volume shall be:
  - The post development runoff volume less the pre-development runoff volume

The runoff volume is computed using the SWFWMD's 100-year/24-hour rainfall map and the NRCS type II Florida Modified 24-hour rainfall distribution with an AMC II. The total post development volume leaving the site shall be no more than the total pre-development volume leaving the site for the design 100-year storm. The rate of runoff leaving the site shall not cause adverse offsite impacts. Maintenance of pre-development offsite low flow may be required in hydrologically sensitive areas.

- **Detention/Retention Pond Configuration**:
  - Littoral Zone – Manmade wet detention systems shall include a minimum of 35 percent littoral zone, concentrated at the outfall and shall be no deeper than 3.5 feet below the design overflow elevation.
  - Width – Wet detention water quality treatment systems shall be designed with a 100 feet minimum width for linear areas in excess of 200 feet length. Area and width requirements will be waived for projects to be operated by single owner entities, or entities with full time maintenance staffs (i.e. FDOT).
  - Depth – The detention facility shall not be excavated to a depth that breaches the aquitard such that it would allow for lesser quality water to pass, either way, between the two systems. In those geographical areas of the district where there is not an aquitard present, the depth of the pond shall not be excavated to within two feet of the underlying limestone which is part of a drinking water aquifer.
  - Side Slopes – All retention and detention facilities should have stabilized side slopes no steeper than 1V:4H out to a depth of two feet below the control elevation, unless for purposes of public safety, side slopes designed or permitted steeper than 1V:4H will require a six foot chain link fence or other protection sufficient to prevent accidental incursion into the retention or detention area.
  - Bottom Elevation – For wet detention systems, the bottom elevation of the pond must be at least one foot below the control elevation.
  - Maintenance Access – Perimeter maintenance and operation easements, with a minimum width of 20 feet and slopes no steeper than 1V:4H, should be provided landward of the control elevation water line. Widths less than 20 feet are allowed when it can be demonstrated that equipment can enter and perform the necessary maintenance for the system.

2.2 FDOT Criteria

- **Water Quality**: That which is specified in Section 2.1 above.
- **Water Quantity**: Critical Duration as defined by Chapter 14-86 F.A.C.
  - Open Basins:

- Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the critical duration (1-hour through 3-day) storm and up to the 100-year storm. This applies only to basins subject to historical flooding.

– Closed Basins:
  - Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the critical duration (1-hour through 10-day) storm and up to the 100-year storm.
  - The retention volume must recover at a rate such that one-half of the volume is available in seven days, with the total volume available in 30 days.

- **Detention/Retention Pond Configuration**:
  – Maintenance Berm: Provide a minimum 20 feet of horizontal clearance between the top edge of the control elevation and the right-of-way line. Provide at least 15 feet adjacent to the pond at a slope of 1:8 or flatter. Create the inside edge of the maintenance berm to have a minimum radius of 30 feet and be a minimum of one foot above the maximum design stage elevation.
  – Freeboard: Provide at least one foot of clearance between the maximum design stage of the pond and the inside edge of the berm. For linear treatment swales, the minimum freeboard is 0.5 foot.
  – Side Slopes: Provide a slope of 1V:4H or flatter. Install fences around ponds only when a documented maintenance need for restricted access has been demonstrated (Section 5.4.4.2 from the FDOT Drainage Manual) or when pond side slopes above the normal water level are steeper than 1V:4H and are unavoidable. A design variation is required to install fences around stormwater management facilities.
  – Permanent (Normal) Pool Depth: For facilities designed to be wet, provide a minimum permanent pool depth of six feet to minimize aquatic growth.

2.3 Polk County Criteria

- **Water Quality**: That which is specified in Section 2.1 above.
- **Water Quantity**:
  – Open Basins:
    - Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the 25-year/24-hour storm.
  – Closed Basins:
    - Ponds shall be sized such that the post development discharge rate does not exceed the pre-development discharge rate for the 100-year/24-hour storm.
- **Detention/Retention Pond Configuration**:
  – Maintenance Berm: Provide a “sufficient” easement, with slopes no steeper than 1V:4H around stormwater management systems for proper operation and maintenance.

3.0 Data Collection

The design team collected and reviewed data from the following sources:

- FDOT Drainage Manual, January 2023
- FDOT Drainage Design Guide, January 2023
- Polk County Land Development Code – Chapter 7, Section 740 (July 2023)
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel Nos. 12105C0365G, 12105C0355G, 12105C0358G, 12105C0359G, and 12105C0380G for Polk County, dated 12/22/2016
- United States Geological Survey (USGS) Quadrangle Maps
- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soils Survey of Polk County, FL (Current)
- Field Reconnaissance (July 2020)
- Existing Permit Databases (SWFWMD)
- 1-ft LIDAR Data Source: United States Geological Survey (USGS) 2018-2020
- Lake Hamilton Chain of Lakes Pollutant Reduction Plan (2010)
- FDOT Straight Line Diagram (August 2021)

4.0 Existing Drainage Conditions

4.1 Topography & Hydrologic Features

Topography along the project is generally hilly with flat areas surrounding the water bodies. Existing ground elevations vary between 125 feet and 220 feet along the roadway corridor, with the highest elevations occurring at the beginning and end of the project limits. All elevations mentioned in this report are in reference to the North American Vertical Datum of 1988 (NAVD) unless otherwise stated. Where information was available only in the National Geodetic Vertical Datum of 1929 (NGVD), it was converted to NAVD using the conversion NAVD = NGVD – 0.88 feet. Please refer to the **USGS Quadrangle Map**, **Figure 2** in **Appendix A**. SR 544 does not traverse any OFWs. It traverses three (3) different water body IDs (WBIDs) and ultimately outfalls to an additional six (6) nearby WBIDs, which have all been reviewed for impairments. Please refer to **Table 4-1: Summary of WBIDs and Impairments** for more information. Please refer to the **WBID Map**, **Figure 6** in **Appendix A**. There are seventeen (17) existing cross drains underneath SR 544 and one (1) bridge within the project limits allowing for conveyance of offsite and onsite runoff to flow beneath the road toward its historical path. The cross drains include two major conveyances – one 12'x12' concrete box culvert that is traversed by boat traffic and one 26' wide bridge culvert. The size and geometry of all cross drains and bridges have been estimated from the FDOT straight line diagram (dated 8/23/2021), 1-foot LiDAR contours, existing plans, and during field reconnaissance but should be verified during design. Please refer to **Table 4-2** for a **Summary of Existing Cross Drains and Bridges.**

Table 4-1: Summary of WBIDs and Impairments

WBID	Waterbody Name	Impaired	Limiting Nutrients
1504B	Lake Hamilton Drain	No	N/A
1488U	Lake Conine	No	N/A
1488A	Lake Smart	Yes	TN
14882	Lake Fannie	No	N/A
1504	Lake Hamilton Outlet	No	N/A
15041	Lake Hamilton	Yes*	N/A
1500A	Lake Hamilton Canal	No	N/A
15002	Middle Lake Hamilton	No	N/A
15102	Lake Butler	No	N/A

*Lake Hamilton was delisted from the Comprehensive Verified List in the 2020-2022 delist cycle due to ongoing restoration activities of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan.

Table 4-2: Summary of Existing Cross Drains and Bridges

Structure No.	Station	Description	Remarks
CD-1	35+67	Single 36" RCP	
CD-2	46+53	Single 36" RCP	
CD-3	61+81	Single 30" RCP	
CD-4	70+74	Single 24" RCP	
CD-5	75+15	12' x 12' CBC	Canal connecting Lake Smart to Lake Conine
CD-6	86+68	Single 30" RCP	
CD-7	120+14	Double 30" RCP	
CD-8	133+61	Single 36" RCP	
CD-9	154+93	Single 54" RCP	
CD-10	183+65	Single 36" RCP	
CD-11	187+13	Single 48" RCP	
CD-12	233+56	Single 36" RCP	
CD-13	252+10	Triple 24" RCP	
Bridge	289+31	100' Bridge	Lake Henry Canal
CD-14	296+21	Single 30" RCP	
CD-15	348+10	26' Bridge Culvert	Lake Hamilton Creek
CD-16	365+13	Single 30" RCP	
CD-17	389+17	Single 15" RCP	

4.2 Soils Data and Geotechnical Investigations

The soil survey of Polk County, Florida (dated 2020) published by the USDA NRCS has been reviewed within the project vicinity. USDA Soil Survey Geographic database (SSURGO) data was also obtained from NRCS to create a soils map for the project limits using GIS ArcMap. The soil survey map for the project vicinity is illustrated in **Figure 3** of **Appendix A.**

The soils encountered along the project limits are within Hydrologic Soil Groups (HSG) A, A/D, B/D, C, and C/D. Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sand or gravel and have a high rate of water transmission. Group B soils have moderately low runoff potential when thoroughly wetted. They consist chiefly of sandy soils with loam, silt, or sandy clay loam. Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission. If a soil is assigned to a dual HSG, the first letter is for drained areas and the second is for un-drained areas. Soils are only assigned a dual class if they are group D in their natural condition. According to the Soil Survey, there are 24 different soil types located along the project limits within Polk County. **Table 4-3 – USDA NRCS Soil Survey Information for Polk County** summarizes and lists the soil types and relevant

information. The ground water depth varies from +2 feet above the ground to >6 feet below the ground, along the project.

Table 4-3: USDA NRCS Soil Survey Information for Polk County

Soil No.	USDA Soil Name	Seasonal High Ground Water		HSG	Soil Classification		
		Depth* (feet)	Duration (months)		Depth (inches)	Unified	AASHTO
3	Candler sand	>6.0	---	A	0-6	SP-SM, SP	A-3
					6-63	SP-SM, SP	A-2-3, A-3
					63-80	SP-SM	A-2-4, A-3
7	Pomona fine sand	0.5-1.5, 0.0-1.0	---	A/D	0-6	SP-SM, SP	A-2-4, A-3
					6-21	SP-SM, SP	A-2-4, A-3
					21-26	SP-SM, SM	A-2-4, A-3
					26-48	SP-SM, SP	A-2-4, A-3
					48-73	SC-SM, SC, SM	A-2, A-4, A-6
					73-80	SP-SM, SM	A-2-4, A-3
13	Samsula muck	+2.0-0.0	---	A/D	0-24	PT	A-8
					24-32	PT	A-8
					32-35	SP-SM, SM	A-2-4, A-3
					35-44	SP-SM, SM	A-2-4, A-3
					44-80	SP-SM, SM	A-2-4, A-3
14	Sparr sand	1.5-3.5	---	A/D	0-8	SP-SM, SM	A-2-4, A-3
					8-57	SP-SM, SM	A-2-4, A-3
					57-80	SC-SM, SC	A-2-4, A-2-6, A-7-6
15	Tavares fine sand	3.5-6.0	---	A	0-5	SP-SM, SP	A-2-4, A-3
					5-80	SP-SM, SP, SM	A-2-4, A-3
16	Urban land	---	---	---			
17	Smyrna and Myakka fine sands	0.5-1.5, 0.0-1.0	---	A/D	0-7	SP-SM, SP	A-3
					7-25	SP-SM, SP	A-3
					25-36	SP-SM, SM	A-2-4, A-3
					36-80	SP-SM, SP	A-3
21	Immokalee sand	0.5-1.5, 0.0-1.0	---	B/D	0-7	SP-SM, SP	A-3
					7-39	SP-SM, SP	A-3
					39-58	SP-SM, SM	A-2-4, A-3
					58-66	SP-SM, SP	A-3
					66-80	SP-SM, SM	A-2-4, A-3
23	Ona-Ona, wet, fine sand	0.5-1.5, 0.0-1.5	---	B/D	0-9	SP-SM, SP	A-3
					9-16	SP-SM, SM	A-2-4
					16-80	SP-SM, SM	A-2-4, A-3
25	Placid and Myakka fine sands	+2.0-0.0	---	A/D	0-18	SP-SM, SM, SP	A-2-4, A-3
					18-80	SP-SM, SM, SP	A-2-4, A-3
26	Lochloosa fine sand	2.5-5.0	---	C	0-6	SP-SM, SM	A-2-4, A-3
					6-36	SP-SM, SM	A-2-4, A-3
					36-65	SC-SM, SC	A-2-6, A-4, A-6
					65-80	SC-SM, SC	A-2-6 A-4, A-6
30	Pompano fine sand	0.0-0.5	---	A/D	0-15	SP-SM, SP	A-3
					15-80	SP-SM, SP	A-3

Soil No.	USDA Soil Name	Seasonal High Ground Water		HSG	Soil Classification		
		Depth* (feet)	Duration (months)		Depth (inches)	Unified	AASHTO
31	Adamsville fine sand	1.5-3.5	---	A/D	0-7	SP-SM, SM, SP	A-2-4, A-3
					7-20	SP-SM, SM, SP	A-2-4, A-3
					20-80	SP-SM, SM, SP	A-2-4, A-3
32	Kaliga muck	+2.0-0.0	---	C/D	0-25	PT	A-8
					25-35	SC, SM	A-2-4, A-4, A-7-6
					35-60	CL, SC-SM	A-4, A-6
					60-80	CL, SC, SM	A-4, A-6
35	Hontoon muck	+2.0-0.0	---	A/D	0-75	PT	A-8
					75-80	SC-SM, SC, SM	A-2-4, A-6
36	Basinger mucky fine sand	+2.0-0.0	---	A/D	0-7	SP-SM, SM	A-2-4, A-3
					7-19	SP-SM, SM	A-2-4, A-3
					19-39	SP-SM, SM	A-2-4, A-3
					39-80	SP-SM, SM	A-2-4, A-3
40	Wauchula fine sand	0.5-1.5, 0.0-1.0	---	C/D	0-7	SP-SM	A-2-4, A-3
					7-18	SP-SM	A-3, A-2-4
					18-26	SP-SM, SM	A-2-4, A-4
					26-33	SP-SM, SM	A-2-4, A-3
					33-70	SC-SM, SC, SM	A-2-4, A-2-6, A-4, A-6
					70-80	SC-SM, SC	A-2-4, A-2-6
42	Felda fine sand	0.0-1.0	---	A/D	0-5	SP-SM, SP	A-3
					5-22	SP-SM, SP	A-3
					22-50	SC-SM, SC, SM	A-2-4, A-2-6
					50-80	SP-SM, SP	A-2-4, A-2-6
47	Zolfo fine sand	1.5-3.5	---	A	0-5	SP-SM, SM	A-2-4, A-3
					5-59	SP-SM, SM	A-2-4, A-3
					59-80	SP-SM, SM	A-2-4, A-3
49	Adamsville-Urban Land complex	2.0-3.5	---	A	0-6	SP-SM	A-2-4, A-3
					6-80	SP-SM, SP	A-2-4, A-3
50	Candler-Urban Land complex	>6.0	---	A	0-6	SP-SM, SP	A-3
					6-63	SP-SM, SP	A-3
					63-80	SP-SM	A-2-4, A-3
59	Arents-Urban Land complex	1.5-3.0	---	A	0-80	SP-SM, SP	A-2-4, A-3
63	Tavares-Urban Land complex	3.5-6.0	---	A	0-8	SP-SM, SP	A-3
					8-80	SP-SM, SP	A-3
76	Millhopper fine sand	3.5-6.5	---	A	0-7	SP-SM, SM	A-2-4
					7-59	SC-SM, SP-SM, SM	A-2-4
					59-64	CL, SC	A-2-4, A-6
					64-80	CL, SC	A-7-6, A-6

*Seasonal High Ground Water Table: Depth is referenced below existing grade, except where indicated as "+".

4.2.1 Contamination Screening

Contamination Screening was conducted by AIM. As a result of the contamination screening evaluation, 39 sites have been assigned Contamination Risk Potential Ratings (CRPR). The CRPR rating system was developed by FDOT and incorporates four levels of risk: No, Low, Medium, and High. Of the 39 sites, 30 were identified as Low/No

Risk, 6 as Medium Risk, and 3 as High Risk sites. High Risk sites were identified near pond sites 1A and 7 and Medium Risk sites were identified near pond sites 1 and 10. All other pond sites are Low/No risk for contamination.

The sites, business operations and/or facilities identified, to date, and the risk rankings given to them are preliminary. It should be understood that these risk rankings may change pending receipt of information which indicates a discharge occurred on-site or in nearby surrounding areas. Variables that may change the risk ranking include a facility's non-compliance to environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change, additional assessment of the facilities should be conducted.

For any sites with a risk ranking of "Medium" or "High", Level II field screening should be conducted if it is determined during the project's design that construction activities could be within their vicinity. Please refer to **Appendix I - Contamination Screening Evaluation Report** for relevant excerpts from the CSER.

4.3 Environmental Characteristics

4.3.1 Land Use Data

The project corridor is predominately residential, commercial, and industrial with higher density urban areas located near the project beginning and end. Areas of undeveloped forest and wetland, agriculture, and open lakes are also present along the corridor. Several major trucking facilities existing along the corridor including a Walmart Distribution Center and the Century Commercial truck parking facility. Please see **Figures 4A and 4B** for the **Existing and Proposed Land Use Maps** in **Appendix A**. The widening of SR 544 does not alter the existing or future land uses in the area.

4.3.2 Cultural Features

A Phase I cultural resource assessment survey (CRAS) has been conducted by Archaeological Consultants, Inc. The Area of Potential Effects (APE) was defined to include footprint of construction including pond sites. The historical APE includes the footprint of construction and immediately adjacent parcels where resources within 200 feet of the existing right-of-way were identified. Additionally, the historical APE included resources with 100 feet of the proposed pond sites. The archaeological survey consisted of systematic shovel testing and pedestrian survey of the project corridor and pond footprints (i.e., the archaeological APE). A total of 84 shovel tests were conducted within the pond sites and 134 shovel tests were conducted within the project corridor. No Pre-Contact period or historic archaeological sites were discovered.

The architectural survey resulted in the identification and evaluation of 108 historic resources within the SR 544 APE, of which three are located within the pond site footprints. Resource 8PO05391 (Peace Creek Drainage Canal) is located within Pond 5, 8PO10054 (1966 Frame Vernacular style building) is located adjacent to Pond 5, and 8PO10075 (1974 Masonry Vernacular style building) is located adjacent to Pond 6. All three resources appear ineligible for listing in the National Register of Historic Places (NRHP).

The CRAS narrative is located in **Appendix G**.

4.3.3 Natural and Biological Features

The proposed project has potential to involve several State and/or Federally listed protected wildlife species. These species and their anticipated involvement are identified in the Natural Resources Evaluation Report located in Appendix H.

The project corridor was evaluated for the presence of potentially occurring protected species. A species-specific survey was conducted for the Audubon's crested caracara, during which no caracara were observed. The preferred alternative "may affect, but is not likely to adversely affect" the continued existence of the caracara. Due to the lack of suitable habitat or defined conservation measures for the species, the preferred alternative "may affect, but is not likely to adversely affect" the continued existence of the eastern black rail, eastern indigo snake, Everglade snail kite, wood stork, and federally protected plant species. Full acoustic and roost surveys were conducted to determine Florida bonneted bat activity within the study corridor. No evidence of roosting or foraging was detected and the project is therefore anticipated to have "no effect" on the Florida bonneted bat. The project is also considered to have "no effect" on the Florida grasshopper sparrow and Florida scrub-jay. The project "may affect and is likely to adversely affect" the sand skink and blue-tailed mole skink until a species-specific survey has been completed. "No adverse effect is anticipated" for state listed species including the Florida burrowing owl, Florida pine snake, Florida sandhill crane, gopher tortoise, short-tailed snake, southeastern American kestrel, imperiled wading birds, and state listed plant species.

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area. A wetland assessment was performed for these wetlands and other surface waters in accordance with the Uniform Mitigation Assessment Method (UMAM) as described in Chapter 62-345, FAC to determine the functional value provided by the wetlands and other surface waters. Other surface waters classified as upland cut ditches and permitted reservoirs were included in the assessment; however, mitigation will not be required for impacts to these other surface waters. Based on the wetland assessment, approximately 8.66 acres of direct impacts to wetlands are associated with the preferred alternative. Direct wetland impacts of 3.86 acres are associated with the preferred pond alternatives and floodplain compensation sites.

4.4 Floodplains/Floodways

According to the Federal Emergency Management Agency (FEMA), the relevant Flood Insurance Rate Map (FIRM) panel numbers are 12105C0365G, 12105C0355G, 12105C0358G, 1210C0359G, and 12105C380G, dated 12/22/2016.

According to the FEMA FIRMs, portions the project intersect Zone AE of the 100-year floodplain. These areas are associated with the various lakes in the region and have a 1% probability of flooding every year. Predicted flood water elevations range from 124.2 FT to 132.2 FT NAVD across the project limits, varying by lake. There are no federally regulated floodways within the project limits. Please refer to **Appendix A – Figure 5** for the **FEMA Floodplains Map**.

4.4.1 Flooding History and Maintenance Concern

A flooding complaint was identified by FDOT near SR 544, immediately east of the Lake Henry Canal. The complaint was logged by residents of the adjacent Lakeside Ranch Estates mobile home community who reported flooding issues on their properties. FDOT investigated the complaint and determined that the issues were a result of poor

maintenance of the drainage along SR 544 and the associated outfall ditch. On the north side of SR 544, there is a depressional area that collects water from SR 544 via an open ditch system and a cross drain underneath SR 544 (CD-14). Note, this depressional area is not a permitted stormwater pond and is recommended to be utilized and expanded as the Pond 6 site. An outfall ditch exists between the depressional area and Lake Henry to the north and is intended to allow the depression to overflow into the lake when needed. However, FDOT determined that lack of maintenance through this area is preventing the outfall from performing and causing stormwater to instead stage up into adjacent properties. A resolution to this issue has not been documented. The original flooding investigation document is located in **Appendix K – Correspondence**.

4.5 Existing Drainage Permits

There are currently fifty-two (52) SWFWMD permits within the project limits that are adjacent to or along SR 544 and may be impacted by the proposed improvements. The sections below briefly describe the permitted condition and the impacts to the permit associated with the proposed improvements. Generally, permits are listed in order from the beginning of the project to the end (west to east).

4.5.1 Permit No. 13706.001

This permit was issued in 2002 for the resurfacing of SR 544 from north of Avenue Y to west of US 27. The project also includes extension of several cross drains. All improvements associated with this permit will be impacted by the proposed SR 544 widening. This permit was used to collect cross drain data. Relevant information from this permit can be found in **Appendix F**.

4.5.2 Permit No. 8491.000 and 8491.001

These permits were issued in 1990 and 2007 for the construction of a church building with associated parking at the northwest corner of the intersection of Avenue Y and SR 544. Both permits are marked as deleted in the SWFWMD system; however, it appears that at least the building was constructed at some point between 1990 and 2007. It is unclear whether the permitted retention pond, located near the back of the parcel, was ever constructed. The widening of SR 544 is anticipated to impact a portion of the church parcel including a conveyance ditch that drains from Avenue Y.

4.5.3 Permit No. 40341.000 and 40341.001

These permits were issued in 2011 and 2017 for the construction of the Lake Conine Treatment Wetland, a Polk County Parks project, providing regional stormwater treatment improvements on the south side of Lake Conine. This project was discussed with SWFWMD as a potential opportunity for joint-use, but SWFWMD indicated that the treatment system does not have any additional capacity or credits to be used for SR 544. See **Section 6.0** for more information. It is not anticipated that this permit will be impacted by the widening of SR 544.

4.5.4 Permit No. 18182.000

This permit was issued in 1998 for the expansion of the Pentecostal Church of God in Winter Haven including an additional building, parking area, and dry retention pond. The site also has a previously constructed dry retention pond at the front of the parcel that serves the original buildings and parking area, for which no permit was found. The widening of SR 544 is not anticipated to impact the newer pond but is likely to impact the original ponds.

4.5.5 Permit No. 43213.000

This permit was issued in 2018 for the construction of the Lake Smart Properties single-family residential development. The proposed development will have two dry retention ponds, one of which is located adjacent to SR 544. There may be minor impacts to this pond – and therefore the permit – associated with the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

4.5.6 Permit No. 9134.000

This permit was issued in 1991 for the Winter Ridge Condominium Complex and associated roads and facilities. The project area is served by a wet detention pond located along the western and northern property lines and adjacent to both the SR 544 right-of-way and the canal that connects Lake Smart and Lake Conine. This pond will likely be impacted to some extent by the widening of SR 544 as well as potential box culvert extension or replacement in the canal. Relevant information from this permit can be found in **Appendix F**.

4.5.7 Permit No. 29579.000

This permit was issued in 2006 for The Rock of Winter Haven's Lake Rochelle Landing residential development. The permit was deleted and the project was never constructed; however, surveyed information in the plans was used to collect cross drain data.

4.5.8 Permit No. 25800.000 and 25800.001

These permits were issued in 2004 and 2005, respectively, for Lake Rochelle Estates single-family residential development and associated improvements to SR 544 for the addition of a turn lane. The project area is served by three dry retention ponds, two of which will be likely impacted by the widening of SR 544. The two ponds, Ponds 1A and 1B, also discharge into the SR 544 right-of-way via a control structure located in Pond 1B. Additionally, the SR 544 improvements under Permit 25800.001 will be impacted. Relevant information from these permits can be found in **Appendix F**.

4.5.9 Permit No. 32476.001

This permit was issued in 2022 for the Water's Edge single-family residential development. This permit replaces a former expired permit on the same site under the name Blue Lake (32476.000). The project area is served by two dry retention ponds located adjacent to Lake Rochelle. It is not anticipated that this permit will be impacted by the widening of SR 544. A separate permit is anticipated (but has not been filed) for a new turn lane on SR 544. This permit will be impacted by the widening of SR 544.

4.5.10 Permit No. 28977.000

This permit was issued in 2006 for the Lake Smart Estates residential development. The project area is served by two wet detention ponds, which are not expected to be impacted by the widening of SR 544.

4.5.11 Permit No. 23595.000

This permit was issued in 2002 for the Villas at Lake Smart residential development including the construction of Vista Del Lago Drive for access. At the intersection of Vista Del Lago Drive and SR 544, a roundabout is proposed

which may impact permitted stormwater collection systems. The ponds associated with Villas at Lake Smart are not expected to be impacted. This permit was used to collect cross drain information.

4.5.12 Permit No. 29879.000

This permit was issued in 2006 for the Willowbrook residential development surrounding an existing golf course. The permit has been modified several times for subsequent project phases, however it does not appear that any phases have begun construction. The widening of SR 544 may result in intersection improvements that impact this permit if the project is constructed prior to the SR 544 project.

4.5.13 Permit No. 3144.000

This permit was issued in 1988 for Phases I & II of the Winter Haven Industrial Park. This permit has a total of 17 revisions to date, most recently in 2017. The project area is served by several ponds that were constructed over multiple phases and are not anticipated to be impacted by the widening of SR 544.

4.5.14 Permit No. 3368.000

This permit was issued in 1988 and amended in 1992 for Phase II of Sandpiper Sales, part of the Winter Haven Industrial Park. The project area is served by two ponds which are not expected to be impacted by the widening of SR 544.

4.5.15 Permit No. 17984.000

This permit was issued in 1998 for the construction of the Lucerne Fire Station for the City of Winter Haven. The project area is served by one retention pond that is not anticipated to impacted by the widening of SR 544. This permit was used for the collection of cross drain data.

4.5.16 Permit No. 45207.000

This permit was issued in 2021 for PB of Central FL. The project area is served by three dry retention ponds which are not expected to be impacted by the widening of SR 544.

4.5.17 Permit No. 43262.001

This permit was issued in 2022 for the construction of “Keep it Safe” Storage. The project area consists of a building, parking area, wet detention pond and floodplain compensation area. Impacts to this permit, including the buildings and pond, are anticipated due to the widening of SR 544 and proposed roundabout at this intersection. Relevant information from this permit can be found in **Appendix F**.

4.5.18 Permit No. 8506.000

This general permit was issued in 1990 for TECO Substation at Lucerne Park by the Tampa Electric Company. No documents are available for this permit. The parcel is likely to be slightly impacted by the proposed roundabout at this intersection but it does not appear that any on-site stormwater systems will be impacted.

4.5.19 Permit No. 7726.000

This general permit was issued in 1990 for the initial construction of Lucerne Loop Road by the City of Winter Haven. There are no documents available for this permit, but the intersection at SR 544 was amended under Permit No. 13706.001 (see below) which is anticipated to be impacted by the widening of SR 544.

4.5.20 Permit No. 13706.000 and 13706.003

These permits were issued in 1995 and 2008, respectively, for improvements at the intersection of SR 544 and Lucerne Loop Road. The first permit includes construction of a stormwater pond at the northeast corner of this intersection and the second permit modifies the pond slightly. It is anticipated that this pond, and therefore these permits, will be impacted by the widening of SR 544 and the proposed roundabout at this intersection. However, the parcel on which the pond sits has additional space available and the pond can be reshaped to maintain its current capacity. Relevant information from Permit No. 13706.003 can be found in **Appendix F**.

4.5.21 Permit No. 7322.002

This permit was issued in 1996 for the construction of Walmart Food Distribution Center No. 71. It is a revision to a previous permit that was deleted. The project area is served by multiple retention ponds, which are not anticipated to be impacted by the widening of SR 544.

4.5.22 Permit No. 30509.000

This permit was issued in 2006 for the Lakeside Landings residential development. The permit was modified several times to include additional project phases. The project area is served by multiple wet detention ponds, which are not anticipated to be impacted by the widening of SR 544.

4.5.23 Permit No. 43208.000

This permit was issued in 2018 for the construction of Tucker Paving office buildings and parking areas. The project also includes a proposed turn-lane addition on SR 544, but a permit for this does not appear to have been filed yet. The project area is served by several retention ponds which may be impacted due to the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

4.5.24 Permit No. 30448.002

This permit was issued in 2021 for Phase I construction of the Winter Haven Commerce Center. This permit is a revision to a previous permit. The project area is served by one retention pond which is not anticipated to be impacted by the widening of SR 544.

4.5.25 Permit No. 2235.000 and 2235.001

These permits were issued in 1987 and 1988, respectively, for the construction of Brookhaven Village residential development. These permits are not expected to be impacted by the widening of SR 544.

4.5.26 Permit No. 27164.001 and 27614.002

These permits were issued in 2007 and 2019, respectively, for the construction of Lucerne Professional and Blackwell Framing commercial buildings. These projects are served by their own stormwater ponds. The dry

retention pond that serves Lucerne Professional may be impacted by the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

4.5.27 Permit No. 45204.000

This permit was issued in 2021 for the construction of The Harbor at Lake Henry residential development. One wet detention pond serves the project area and is not likely to be impacted by the widening of SR 544.

4.5.28 Permit No. 11867.002

This permit was issued in 2021 for the construction of stormwater improvements for MTI Enterprises. It is not anticipated that this permit will be impacted by the widening of SR 544. This permit was used for the collection of cross drain data.

4.5.29 Permit No. 18195.000

This permit was issued in 1998 for the construction of StoreRight and was modified several times for various expansions. The project area is served by a wet detention pond and this permit is not expected to be impacted by the widening of SR 544.

4.5.30 Permit No. 3257.000 and 3257.003

These permits were issued in 1988 and 2021, respectively for the construction and expansion of Winter Haven Storage. The project area is served by dry retention ponds located adjacent to the SR 544 right-of-way; however, it is not anticipated that these ponds will be impacted by the widening of SR 544.

4.5.31 Permit No. 34264.001

This permit was issued in 2014 for the construction of Dollar General. The project area is served by two dry retention ponds, one of which is located is adjacent to the SR 544 right-of-way, but is not anticipated to be impacted by the widening of SR 544.

4.5.32 Permit No. 7611.000

This permit was issued in 1998 for the construction of PDQ Carwash (now “Wash Me”) and later modified to include the addition of an ice cream stand. The project area is served by two dry retention ponds. One of the ponds is located adjacent to the SR 544 right-of-way and is anticipated to be impacted by the proposed roundabout at the intersection of SR 544 and Brenton Manor Ave. Relevant information from this permit can be found in **Appendix F**.

4.5.33 Permit No. 9344.000

This permit was issued in 1991 for the construction of the First National Bank of Polk County. The project area is served by three retention ponds. One of the ponds is located adjacent to the SR 544 right-of-way and is expected to be impacted by the widening of SR 544. Relevant information from this permit can be found in **Appendix F**.

4.5.34 Permit No. 10159.001

This permit was issued in 2007 for mass grading of the commercial site at the southwest corner of SR 544 and US 27. The mass grading permit included leveling of the ground and a proposed stormwater pond for future

development. It appears that the grading was completed, but the pond was never constructed. Subsequent permits within this area created additional changes to this site which are detailed in the following sections.

4.5.35 Permit No. 10159.004

This permit was issued in 2013 for intersection improvements at SR 544 and US 27. The improvements include the addition of two turn lanes, along with a new FDOT maintained dry retention pond for stormwater attenuation. The turn lanes were exempt from treatment requirements; however, the previous mass grading permit filled in a historic depression and this pond was designed to replace the lost capacity.

4.5.36 Permit No. 10159.005

This permit was issued in 2013 for the construction of Race Trac convenience store and gas station at the southwest corner of SR 544 and US 27. It is a revision to the original mass grading permit. This permit includes construction of a dry retention pond that serves the Race Trac site and access road improvements. The Race Trac property is anticipated to be impacted by the widening of SR 544; however, it is not anticipated that the stormwater pond will be impacted.

4.5.37 Permit No. 10159.008

This permit was issued in 2020 for the construction of Century Commercial Vehicle Parking at the southwest corner of SR 544 and US 27. This permit includes relocating the FDOT pond that was constructed under Permit No. 10159.004 to the south to accommodate a parking lot area. Additionally, this permit includes construction of a new stormwater pond to serve the proposed parking areas. The proposed widening of SR 544 may require modifications to the permitted conveyance system that drains to the FDOT pond in order to keep consistent the amount of runoff collected in the pond. As part of the SR 544 widening project, a new stormwater management facility is proposed on the north side of SR 544 (Swale 7). During the design phase, it should be considered how to best utilize the existing pond along with the proposed new pond in this basin. As of the date of this report, the parcel is currently under construction. Relevant information from this permit can be found in **Appendix F**.

4.5.38 Permit No. 23431.000

This permit was issued in 2002 for the widening of US 27 from SR 544 to Blue Heron Boulevard with the construction of new stormwater ponds. Two of the stormwater ponds are anticipated to be impacted by the widening of SR 544 and the associated proposed improvements at the US 27 intersection. Pond 2 is a wet detention pond location approximately 2000 feet north of SR 544. This pond is not anticipated to be impacted by the proposed improvements, but it is anticipated that the basin limits will be modified. Pond 10 is a dry retention swale system located just south of SR 544. The proposed improvements will eliminate this pond. Please see Sections 5.3.8 through 5.3.9 for more information regarding the basins in this area. Relevant information from this permit can be found in **Appendix F**.

4.5.39 Permit No. 33368.000

This permit was issued in 2007 for the widening of US 27 from CR 546 to south of SR 544 with the construction of new stormwater ponds. One of the stormwater ponds is anticipated to be impacted by the widening of SR 544 and the associated proposed improvements at the US 27 intersection. Pond 2 is a wet detention pond location approximately 4000 feet north of SR 544. This pond is not anticipated to be impacted by the proposed

improvements, but it is anticipated that the basin limits will be modified. Please see Section 5.3.10 for more information regarding the basin in this area. Relevant information from this permit can be found in **Appendix F**.

4.5.40 Permit No. 17482.000

This permit was issued in 1998 for improvements to a bank facility at the northeast intersection of SR 544 and US 27. A permitted treatment system does not appear to be present based on available documents. The entire property, and therefore this permit, are anticipated to be impacted by the widening of SR 544 and associated intersection improvements at US 27.

4.5.41 Permit No. 43156.000 and 43156.001

This permit and modification were issues in 2017 and 2018, respectively, for the construction of Bellaviva, a single-family residential development located on the south side of SR 544 which is served by multiple stormwater ponds, two of which are adjacent to the SR 544 right-of-way. The widening of SR 544 is not anticipated to impact these permits.

4.5.42 Permit No. 21355.000

This permit was issued in 2000 for the construction of the First Presbyterian Church of Haines City and an associated dry retention stormwater pond. The pond is adjacent to the SR 544 and may have minor impacts due to the widening of SR 544.

4.5.43 Permit No. 13875.001

This permit modification was issued in 1995 (the original permit was denied) for the construction of the La Vista Subdivision single-family residential development. There are no documents available for the permit, however, a retention pond near the back of the site is visible in aerials. There may be minor impacts to the properties within this permit but impacts to the stormwater management system are not anticipated.

4.5.44 Permit No. 24585.000

This permit was issued in 2003 for the construction of the Estates at Lake Butler single-family residential development. The project area is served by a series of dry retention ponds located adjacent to the SR 544 right-of-way, which are anticipated to have minor impacts due to the widening of SR 544.

4.5.45 Permit No. 30115.001

This permit was issued in 2013 for the construction of the Peninsular Heights single-family residential development. The project was never constructed. If the project is constructed prior to the widening of SR 544, impacts to the stormwater management system are not anticipated.

4.5.46 Permit No. 29791.000 and 29791.001

This permit and modification were issued in 2006 and 2013, respectively, for the construction of the Peninsular Ridge single-family residential development. The project site is served by a dry retention pond located adjacent to the SR 544 right-of-way. There may be minor impacts to this pond due to the widening of SR 544.

4.5.47 Permit No. 9486.000

This permit was issued in 1991 for the Na-Dell Heights Subdivision single-family residential development. No documents are available, however, stormwater ponds are visible toward the back of the property in aerials. It is not anticipated that this permit will be impacted by the widening of SR 544.

4.5.48 Permit No. 13334.000

This permit was issued in 1995 for the Haines City Senior Center. No documents are available, however, a stormwater pond is visible on the property adjacent to the SR 544 right-of-way. There may be minor impacts to the pond due to the widening of SR 544.

4.5.49 Permit No. 17938.000 and 17938.002

This permit and modification were issued in 1998 and 2005, respectively, for the construction of an additional access road for Alta Visa Elementary School and a subsequent classroom addition. No documents are available, however, a stormwater pond is visible toward the back of the property in aerials. It is not anticipated that this permit will be impacted by the widening of SR 544.

4.5.50 Permit No. 20694.000

This permit was issued in 2000 for the construction of Kingdom Hall Haines City. The project site is served by a dry retention pond located adjacent to the SR 544 right-of-way. There may be minor impacts to this pond due to the widening of SR 544.

4.5.51 Permit No. 12168.001

This permit was issued in 2003 for the Lamb of God Lutheran Church. No documents are available, however, there appear to be two small retention ponds near the front of the property (adjacent to SR 544) and a larger pond near the back of the property. One of the ponds adjacent to the SR 544 right-of-way may have minor impacts due to the widening of SR 544.

4.5.52 Permit No. 40900.001

This permit was issued in 2012 for the reconstruction of SR 17 from SR 544 to US 17/92, including the addition of a closed drainage system. SR 17 is the terminus of this Study, and while it is not anticipated that the existing stormwater management system along SR 17 will be impacted by the widening of SR 544, improvements at this intersection could result in minor impacts to the permitted system.

4.6 Existing Drainage Basins

4.6.1 Basin 1A

Basin 1A begins at Avenue T (station 04+80) and continues north to station 13+84. Runoff from SR 544 is collected in curb inlets which discharge north to ditches located in Basin 1. There is no permitted stormwater treatment system for this basin. This is an open basin that outfalls to Lake Conine.

4.6.2 Basin 1

Basin 1 begins at station 13+84 and continues north to the high point over CD-5 (station 75+00), which is a navigable box culvert connecting Lake Conine with Lake Smart. From the beginning of the basin to Avenue Y (station 29+00), runoff from SR 544 is collected in curb inlets which discharge north to roadside ditches that collect runoff throughout the remainder of the basin. There is no permitted stormwater treatment system for this basin. There are five (5) cross drains located within the basin limits. CD-1 through CD-4 convey stormwater from the east side of SR 544 to the wetlands and Lake Conine located on the west side. CD-5 is a 12' x 12' CBC that connects Lake Conine with Lake Smart. This is an open basin that outfalls to Lake Conine.

4.6.3 Basin 2

Basin 2 begins at station 75+00 and continues northwest to a high point at station 106+50. Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There is one (1) cross drain located within the basin limits, CD-6, which conveys stormwater from the west side of SR 544 to Lake Smart. This is an open basin that outfalls to Lake Smart.

4.6.4 Basin 3

Basin 3 begins at station 106+50 and continues northwest to a high point at station 155+00. Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There are three (3) cross drains located within the basin limits. CD-7 and CD-8 convey stormwater from the south side of SR 544 to wetlands along the south side. CD-9 conveys stormwater from the north side of SR 544 into Lake Fannie. This is an open basin that outfalls to Lake Fannie.

4.6.5 Basin 4

Basin 4 begins at station 155+00 and continues west to a high point just west of Lakeside Landing Boulevard (station 218+50). Runoff from SR 544 is collected in roadside ditches. A portion of the intersection of SR 544 and Lucerne Loop Road is treated in a stormwater pond located at the northeast corner of the intersection and permitted under Permit No. 12706.003. The remainder of this basin is not treated. There are two (2) cross drains located within the basin limits, CD-10 and CD-11, which convey stormwater from the north side of SR 544 into Lake Fannie. This is an open basin that outfalls to Lake Fannie.

4.6.6 Basin 5

Basin 5 begins at station 218+50 and continues northwest to the bridge over Lake Henry Canal (station 289+00). Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There are two (2) cross drains located within the basin limits, CD-12 and CD-13, which convey stormwater from the north side of SR 544 into wetlands along the south side. This is an open basin. From the beginning of the basin limits to Old Lucerne Park Road, the ditches drain to the wetlands and from Old Lucerne Park Road to the end of the basin, they drain directly into Lake Henry Canal. Both the wetlands and the canal outfall to Lake Hamilton.

4.6.7 Basin 6

Basin 6 begins at station 289+00 and continues west to a high point at station 314+10. Runoff from SR 544 is collected in roadside ditches which drain to an existing depressional area located on the north side of the road at approximately station 295+50. This depressional area is not a permitted stormwater retention pond and is the subject of a flooding complaint logged by FDOT in 2015 (please refer to **Appendix K – Correspondence** for documentation). The complaint indicates that the depression is intended to drain to the north into the Lake Henry Canal through a series of ditches, but that lack of maintenance has caused the ditches and depression to become overgrown and a private road has cut off the natural drainage path, resulting in the depression overtopping into nearby properties instead. The study concluded that FDOT was not contributing to the flooding issue. There is one (1) cross drain located within the basin limits, CD-14, which conveys stormwater from the south side of SR 544 into the depression. Currently, this basin functions as a closed basin with stormwater collecting in the depressional area; however, it is intended to operate as an open basin that outfalls to the Lake Henry Canal and into Lake Hamilton.

4.6.8 Basin 7

Basin 7 begins at station 314+10 and continues west to US 27 (station 331+50). Along the north side of SR 544, runoff is directed into roadside ditches, while along the south side of SR 544, curb and gutter is present and collects runoff in curb inlets. SR 544 drains to a permitted dry detention pond (the ditches on the north are collected in a DBI and routed to the pond) that is located to the south of SR 544 in between the South State Bank and the Race Trac. The pond was originally permitted under SWFWMD Permit No. 10159.004 in 2013 (a modification to previous permits that were never constructed) in a temporary location to accommodate runoff from intersection improvements conducted by FDOT and to mitigate flooding that had been caused by the developer of the site filling in an existing depressional area without constructing their new stormwater pond. In 2021, a permit modification was issued under Permit No. 10159.008 for the development of the parcel into a commercial truck parking site, which includes the permanent relocation of the FDOT stormwater pond further south within the same parcel. As of the date of this report, the parcel is currently under construction. This is a closed basin and the relocated FDOT pond will not have an outfall structure.

4.6.9 Basin 8

Basin 8 begins at station 331+50 and continues west to the high point over CD-15 (station 348+00). Along the south side of SR 544, stormwater runoff is collected in roadside ditches. From the beginning of the basin to approximately station 336+50, stormwater runoff to the north side of SR 544 is collected in curb inlets, and for the remainder of the basin it is collected in roadside ditches. Basin 8 encompasses the limits of an existing basin, Basin 10, which was permitted under Permit No. 23431.000 and contains a dry treatment swale system (Pond 10). This swale system will be completely eliminated by the proposed intersection improvements at SR 544 and US 27. A portion of Basin 8 overlaps the existing Basin 1, which was also permitted under Permit No. 23421.000 but is treated through compensation in another basin and does not contain its own treatment system. The remainder of Basin 8 does not have a permitted treatment system. There are no cross drains located within this basin, however, the bridge culvert CD-15 is located at the basin divide. CD-15 conveys the Lake Hamilton Creek underneath SR 544. This is an open basin that outfalls to Lake Hamilton Creek.

4.6.10 Basin 8A

Basin 8A covers the portion of US 27 located south of Basin 8 that will be impacted by the proposed intersection improvements at SR 544 and US 27. The basin is approximately 540 feet long, but no station numbers have been assigned to US 27. Stormwater is collected in roadside ditches that drain south to Lake Hamilton Creek. There are no cross drains located within this basin. This is an open basin that outfalls to Lake Hamilton Creek.

4.6.11 Basin 9

Basin 9 begins at station 348+00 and continues west to Lake Hamilton Drive (station 374+00). Runoff from SR 544 is collected in roadside ditches. There is no permitted stormwater treatment system for this basin. There is one (1) cross drain within the basin limits (excluding the bridge culvert at the basin divide), CD-16, which conveys stormwater from the south side of SR 544 to the ditch on the north side. This is an open basin that outfalls to Lake Hamilton Creek.

4.6.12 Basin 10

Basin 10 begins at station 374+00 and continues west to the end of the project at SR 17 (station 424+50). From the beginning of the basin to approximately station 393+00, runoff from SR 544 is collected in roadside ditches. For the remainder of the basin, runoff is collected in curb inlets which discharge into the ditches at the west end of the basin. There is no permitted stormwater treatment system for this basin. There is one (1) cross drain within the basin limits, CD-17, which conveys stormwater from the south side of SR 544 to Lake Butler. This is an open basin that outfalls to Lake Butler.

5.0 Proposed Drainage Conditions

The stormwater runoff from the project limits will be collected and conveyed via curb and gutter to the proposed offsite detention ponds. The ponds will discharge at or near the same cross drains that carry the roadway runoff in the existing condition, or directly into canals or wetlands where appropriate. The proposed ponds have been sized to achieve the required water quality treatment and water quantity attenuation and serve as a budget tool for right-of-way estimation for the project to the Department.

5.1 Proposed Basins

There are currently twelve (12) proposed drainage basins within the project limits. One (1) pond site alternative has been identified and analyzed for each basin.

The onsite roadway basin areas draining to the ponds were determined to be the areas within the proposed right-of-way limits. The limits of the proposed basins begin and end at the same locations as the existing condition. Basin 1 was split into two smaller basins, Basin 1A and Basin 1. Additionally, another basin (Basin 8A) was added to provide a pond alternative for minor improvements on US 27, south of the intersection with SR 544. Attenuation in the proposed ponds is provided in all basins. Please refer to the Basin Maps in **Appendix B** for the pond locations. **Table 5-1: Summary of Proposed Drainage Basins** provides a summary of the proposed basin limits.

Table 5-1: Summary of Proposed Drainage Basins

Basin Name	From Station	To Station
1A	04+80	13+84
1	13+84	75+00
2	75+00	106+50
3	106+50	155+00
4	155+00	218+50
5	218+50	289+00
6	289+00	314+10
7	314+10	331+50
8	331+50	348+00
8A	N/A	N/A
9	348+00	374+00
10	374+00	424+50

5.2 Methodology of Pond Determination

5.2.1 General Process

The pond sizing analysis assumes that all ponds will be designed using wet detention or dry retention pond design criteria as appropriate. Most ponds were sized on the assumption that offsite runoff would bypass the pond site alternative toward its historical path, with the exception of Ponds 1, 2, and 7A which are sized to provide attenuation for offsite runoff that flows directly toward the pond location. The report focuses on the preliminary estimate of required pond volumes necessary for each roadway drainage basin. A 20% upsize in the required pond right-of-way area has been applied for all the ponds to account for preliminary parameters such as the estimated average wet seasonal water elevations, ground elevations and potential natural contouring of the ponds.

In Segment 1, within the Florence Villa historical area, the ponds were sized to accommodate two (2) 12-foot travel lanes, one (1) 12-foot turn lane, curb and gutter, and two (2) 8-foot sidewalks, one on each side. In Segments 2-7, the remainder of the project limits, the ponds were sized to accommodate two (2) 11-foot travel lanes, two (2) 12-foot travel lanes, curb and gutter, and two (2) 10-foot shared use paths, one on each side.

The locations of potential pond sites were selected by first considering proximity to the outfall location, then by considering site features such as estimated average wet seasonal water elevations, soil types, land use, and aesthetic features. The majority of selected pond sites are vacant parcels including vacant or unused agricultural lands, vacant residential properties, and vacant commercial properties. Two of the selected pond sites (Ponds 4 and 6) utilize existing depressional areas that appear to be former borrow pits or livestock watering areas but are not permitted stormwater ponds. It is not anticipated that any of the pond site alternatives will alter existing or future land uses of surrounding properties or significantly impact existing landscapes. During the final design, additional consideration should be given to aesthetic features to comply with the Highway Beautification Act including softening of the pond contours, landscaping, and other aesthetics features.

The following parameters were considered in determining the size and location of the potential pond sites:

- Hydrologic and hydraulic factors such as existing ground elevations, soil types, estimated average wet seasonal water elevations (AWSWE) stormwater conveyance feasibility and allowable hydraulics grade line (HGL);
- Environmental resource impacts including wetlands and threatened or endangered species;
- Floodplain Impacts;
- Major utility conflict potential;
- Parcel descriptions and land usage;
- Impacts to cultural resources;
- Impacts to contamination sites;

5.2.2 Nutrient Loading Analysis

The proposed project limits intersect WBIDs 1504B, 1488U, 1488A, 14882, 1504, 15041, 1500A, 15002, and 15102. According to the Comprehensive Verified List, only WBID 1488A (Lake Smart) is impaired for nutrients (TN). However, all of these WBIDs eventually outfall to WBID 15041 (Lake Hamilton) which was delisted during the 2020-2022 delist cycle due to ongoing restoration activities of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan. In order to be consistent with the goals of reducing nutrients in Lake Hamilton, nutrient loading analysis has been performed on all basins to ensure no adverse effects to the downstream waters. All analysis was performed using BMPTRAINS 2020 software, developed by the University of Central Florida Stormwater Management Academy. Results of the analysis are included in **Appendix D – Nutrient Loading Analysis** and summarized below in **Table 5-2**. All of the ponds showed a reduction in the phosphorus loading when compared to the pre-development condition. When reviewed individually, several of the ponds were unable to provide sufficient reduction in nitrogen loading; however, when reviewed for the entire project, the total nitrogen output is less than the pre-development output and nitrogen loading requirements are met. Additionally, for the three individual basins that outfall to Lake Smart (Basins 1, 1A, and 2), nitrogen loading requirements were met. During the design phase, it is recommended that additional best management practices (BMPs) be considered to increase nitrogen removal. Other BMPs include the use of Bio-sorption Activated Media (BAM), pre-treatment swales, or baffle boxes.

More information on the Lake Hamilton Chain of Lakes Pollutant Reduction Plan can be found at the following link: https://polk.wateratlas.usf.edu/upload/documents/WinterHavenChainWQMgmtPlanPart2.pdf

Table 5-2: Summary of Nutrient Removal

Basin	Pre-Development Nitrogen Loading (kg/yr)	Post-Development Nitrogen Loading (kg/yr)	Nitrogen Removal Met?	Pre-Development Phosphorus Loading (kg/yr)	Post-Development Phosphorus Loading (kg/yr)	Phosphorus Removal Met?
1A	7.66	1.74	YES	0.997	0.227	YES
1	34.02	0.90	YES	4.773	0.123	YES
2	14.93	14.31	YES	1.976	0.593	YES
3	23.76	36.48	NO	3.095	2.560	YES
4	33.93	33.38	YES	4.419	2.211	YES
5	33.28	39.69	NO	4.335	3.164	YES
6	10.83	11.46	NO	1.411	0.653	YES
7	45.99	23.88	YES	5.991	3.110	YES
8	45.90	34.66	YES	5.979	2.174	YES
8A	5.60	1.54	YES	0.730	0.200	YES
9	10.75	12.94	NO	1.400	0.907	YES
10	26.31	0.81	YES	3.428	0.105	YES
TOTAL:	**292.96**	**211.79**	**YES**	**38.534**	**16.027**	**YES**

5.3 Stormwater Pond Evaluation

The following sections detail each proposed basin and the proposed pond site location. The full Pond Site Evaluation Matrix is available in **Appendix E**. Please note that since there is only one pond site per basin, the Matrix is provided to summarize the features of each pond, not to compare alternatives. The estimated total costs for each pond site include the cost of right-of-way acquisition, construction, and wetland mitigation unless otherwise noted in the Pond Site Evaluation Matrix.

5.3.1 Basin 1A

Basin 1A begins at Avenue T (station 04+80) and continues north to station 13+84. Runoff from SR 544 is collected in curb inlets which discharge north to ditches located in Basin 1. This is an open basin that outfalls to Lake Conine. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton), which is impaired for nutrients. A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 1A, is a dry retention pond that is sized to provide treatment and attenuation for Basin 1A. Pond 1A is located west of SR 544 at approximately station 09+00 (LT). This pond site sits within a remnant parcel created by the realignment of 1st Street North. The pond size has no impacts to wetland or floodplains. According to the Polk County Soil Survey, the site consists of Tavares-Urban Land Complex (HSG A). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 151.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 1A will be a dry pond with the bottom elevation set at 146.50 feet NAVD, which is one and a half feet above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 0.31 acres of area; however, the full remnant parcel of 0.37 acres is recommended to be used. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall back into the SR 544 right-of-way and the outfall will be conveyed to Lake Conine through Basin 1.

5.3.2 Basin 1

Basin 1 begins at station 13+84 and continues north to the high point over CD-5 (station 75+00), which is a navigable box culvert connecting Lake Conine with Lake Smart. This is an open basin that outfalls to Lake Conine. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 1, is a dry retention pond that is sized to provide treatment and attenuation for Basin 1. Pond 1 is located east of SR 544 at approximately station 41+00 (RT). This pond site sits within two (2) parcels (26-28-16-000000-013020 and 26-28-16-000000-031060). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Candler sand (HSG A) and Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 135.00 feet NAVD near the front of the site, adjacent to the R/W. This parcel is steeply sloped upward, and the existing ground elevation at the back of the proposed pond site is at approximately 151.00 feet NAVD. An additional 48’ buffer has been provided along the back of the pond site in order to tie up to an elevation of 151.00 at a 1:3 slope. Additionally, since the back of the parcel slopes toward the pond and runoff from the

offsite areas will naturally flow toward the pond, the offsite area has been included in the attenuation calculation. With the data compiled from NRCS soil data and available permits, it was determined that Pond 1 will be a dry pond with the bottom elevation set at 130.00 feet NAVD, which is one foot above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 2.83 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-2) which drains to Lake Conine.

5.3.3 Basin 2

Basin 2 begins at station 75+00 and continues northwest to a high point at station 106+50. Runoff from SR 544 is collected in roadside ditches. This is an open basin that outfalls to Lake Smart. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 2, is a wet detention pond that is sized to provide treatment and attenuation for Basin 2. Pond 2 is located west of SR 544 at approximately station 86+00 (LT). This pond site sits within one (1) parcel (26-28-09-530000-000042). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Candler sand (HSG A) and Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 131.00 feet NAVD near the front of the site, adjacent to the R/W. This parcel is steeply sloped upward, and the existing ground elevation at the back of the proposed pond site is at approximately 138.00 feet NAVD. An additional 21' buffer has been provided along the back of the pond site in order to tie up to an elevation of 138.00 at a 1:3 slope. Additionally, since the back of the parcel slopes toward the pond and runoff from the offsite areas will naturally flow toward the pond, the offsite area has been included in the attenuation calculation. With the data compiled from NRCS soil data and available permits, it was determined that Pond 2 will be a wet pond with the control elevation set at 130.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 3.83 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-6) which drains to Lake Smart.

5.3.4 Basin 3

Basin 3 begins at station 106+50 and continues northwest to a high point at station 155+00. This is an open basin that outfalls to Lake Fannie. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 3, is a wet detention pond that is sized to provide treatment and attenuation for Basin 3. Pond 3 is located north of SR 544 at approximately station 131+00 (LT). This pond site sits within one (1) parcel (26-28-10-530500-002601). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site for Pond 3 consists of Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 128.50 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 3 will be a wet pond with the control elevation set at 127.00 feet NAVD. Preliminary pond sizing calculations indicate that this

pond requires 2.50 acres of area and will require a 0.23 acre easement, for a total area of 2.73 acres. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-8) which drains to the wetland system around Lake Fannie.

5.3.5 Basin 4

Basin 4 begins at station 155+00 and continues west to a high point just west of Lakeside Landing Boulevard (station 218+50). This is an open basin that outfalls to Lake Fannie. This basin is located within WBID 1504B (Lake Hamilton Drain) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 4, is a wet detention pond that is sized to provide treatment and attenuation for Basin 4. Pond 4 is located north of SR 544 at approximately station 183+00 (LT) and utilizes an existing wet depressional area that appears to be a former borrow pit. This pond site sits within one (1) parcel (26-28-02-521500-002400). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Wauchula fine sand (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 128.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 4 will be a wet pond with the control elevation set at 126.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 2.21 acres of area and will require a 0.11 acre easement, for a total area of 2.32 acres. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-10) which drains to Lake Fannie.

5.3.6 Basin 5

Basin 5 begins at station 218+50 and continues northwest to the bridge over Lake Henry Canal (station 289+00). This is an open basin that outfalls to Lake Hamilton. This basin is located within WBID 1504 (Lake Hamilton Outlet) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 5, is a wet detention pond that is sized to provide treatment and attenuation for Basin 5. Pond 5 is located south of SR 544 at approximately station 250+00 (RT). This pond site sits within one (1) parcel (26-28-12-531502-000100). The pond site has approximately 1.05 acres of impacts to wetlands and 1.41 acre-ft of impacts to Zone AE floodplains (BFE 124.30). According to the Polk County Soil Survey, the site consists of Immokalee sand (HSG B/D) and Kaliga muck (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD in the upland portion (east side of the parcel) and 123.00 feet within the floodplain area (western side). With the data compiled from NRCS soil data and available permits, it was determined that Pond 5 will be a wet pond with the control elevation set at 123.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 1.76 acres of area and a 0.46 acre easement for a total of 2.22. However, the full remnant parcel of 1.95 acres is recommended to be used, and with the 0.46 acre easement the total recommended pond area is 2.41 acres. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to the wetland system that drains to Lake Hamilton.

5.3.7 Basin 6

Basin 6 begins at station 289+00 and continues west to a high point at station 314+10. This basin is intended to operate as an open basin that outfalls to the Lake Henry Canal (see **Section 4.6.7** for more information). Construction of a new stormwater pond and proper maintenance will allow this basin to function as an open basin as it did historically, and will help alleviate some of the flooding issues in the area. This basin is located within WBID 1504 (Lake Hamilton Outlet) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 6, is a wet detention pond that is sized to provide treatment and attenuation for Basin 6. Pond 6 is located north of SR 544 at approximately station 297+00 (LT) and would expand an existing wet depressional area that appears to be used currently as a water source for livestock. This pond site sits within one (1) parcel (27-28-06-000000-033070). The pond site has approximately 0.33 acres of impacts to wetlands and no floodplain impacts. According to the Polk County Soil Survey, the site consists of Adamsville fine sand (HSG C) and Basinger mucky find sand (HSG D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 130.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 6 will be a wet pond with the control elevation set at 129.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 1.69 acres of area; however, the full parcel of 1.87 acres is recommended to be used. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to the Lake Hamilton via the Lake Henry Canal.

5.3.8 Basin 7

Basin 7 begins at station 314+10 and continues west to US 27 (station 331+50). This basin includes a portion of the SPUI intersection at US 27. This is a closed basin. This basin is located within WBID 1504 (Lake Hamilton Outlet) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Swale 7 (Pond 7), is a dry retention swale that is sized to provide treatment and attenuation for Basin 7. Additionally, the swale is sized to provide an additional 0.28 ac-ft of attenuation to replace the existing FDOT pond, under the assumption that the FDOT pond would be removed after improvements are completed on SR 544 (see Section 4.6.8 for more information on the existing pond). Swale 7 is located north of SR 544 at approximately station 323+00 (LT). This pond site sits within one (1) parcel (27-28-06-000000-013010). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Tavares fine sand (HSG A). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 129.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Swale 7 will be a dry swale with the bottom elevation set at 128.00 feet NAVD, which is one foot above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 0.70 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** An emergency outfall will discharge to the existing depressional area located adjacent to the swale.

5.3.9 Basin 8

Basin 8 begins at station 331+50 and continues west to the high point over CD-15 (station 348+00). This basin includes the majority of the SPUI intersection at US 27 and encompasses an existing basin (Basin 10) permitted under Permit No. 2341.000 for the widening of US 27. This is an open basin that outfalls to Lake Hamilton Creek. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 8, is a wet detention pond that is sized to provide treatment and attenuation for Basin 8. Additionally, the pond is sized to provide an additional 0.58 ac-ft of attenuation to replace the existing permitted FDOT pond which will be removed for the proposed SPUI (see Section 4.6.9 for more information on the existing pond). Pond 8 is located south of SR 544 at approximately station 338+00 (RT). This pond site sits within one (1) parcel (27-28-06-000000-012070). The pond site has approximately 1.59 acres of impacts to wetlands and 1.72 acre-ft of impacts to Zone AE floodplains (BFE 124.20). According to the Polk County Soil Survey, the site for Pond 8 consists of Samsula muck (HSG B/D) and Smyrna and Myakka fine sands (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD at the west side of the property and 122.0 feet at the east side. An additional 21' buffer has been provided in order to tie back to the existing elevations on either side of the pond site. With the data compiled from NRCS soil data and available permits, it was determined that Pond 8 will be a wet pond with the control elevation set at 122.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 2.75 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to Little Lake Hamilton via the Lake Hamilton Creek.

5.3.10 Basin 8A

Basin 8A encompasses the southern end of the US 27 improvements associated with the SPUI intersection. This area falls under Permit No. 33368.000 where compensating treatment is provided in an existing pond located south of the project. This is an open basin that outfalls to the Haines City Drainage Canal. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

Due to the proposed improvements in this basin and the current lack of direct treatment or attenuation, a separate pond alternative has been identified. The proposed pond site for this basin, Swale 8A (Pond 8A) is a dry retention swale that is sized to provide treatment and attenuation for Basin 8A. Swale 8A is located south of SR 544 (west of US 27) at approximately station 331+00 (RT) and 1800 feet south of SR 544. This pond site sits within the existing US 27 right-of-way. The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site consists of Smyrna and Myakka fine sands (HSG B/D). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Swale 8A will be a dry swale with the bottom elevation set at 124.00 feet NAVD, which is one foot above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 0.57 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** The swale will outfall to the Haines City Drainage Canal.

5.3.11 Basin 9

Basin 9 begins at station 348+00 and continues west to Lake Hamilton Drive (station 374+00). This is an open basin that outfalls to Lake Hamilton Creek. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 9, is a wet detention pond that is sized to provide treatment and attenuation for Basin 9. Pond 9 is located north of SR 544 at approximately station 351+00 (LT). This pond site sits within one (1) parcel (27-28-05-000000-031010). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site for Pond 9 consists of Smyrna and Myakka fine sands (HSG B/D) and Adamsville fine sand (HSG C). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 126.00 feet NAVD. With the data compiled from NRCS soil data and available permits, it was determined that Pond 9 will be a wet pond with the control elevation set at 123.00 feet NAVD. Preliminary pond sizing calculations indicate that this pond requires 1.25 acres of area. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to Little Lake Hamilton via the Lake Hamilton Creek.

5.3.12 Pond 10

Basin 10 begins at station 374+00 and continues west to the end of the project at SR 17 (station 424+50). This is an open basin that outfalls to Lake Butler. This basin is located within WBID 1500A (Lake Hamilton Canal) but ultimately outfalls to WBID 15041 (Lake Hamilton) which is part of the Lake Hamilton Chain of Lakes Pollutant Reduction Plan (see **Section 5.2.2** for more information). A nutrient loading analysis has been performed and can be found in **Appendix D**.

The proposed pond site for this basin, Pond 10, is a dry retention pond that is sized to provide treatment and attenuation for Basin 10. Pond 10 is located south of SR 544 at approximately station 387+00 (RT). This pond site sits within one (1) parcel (27-28-05-000000-031010). The pond site has no impacts to wetlands or floodplains. According to the Polk County Soil Survey, the site for Pond 10 consists of Candler sand (HSG A). According to LIDAR data obtained for this pond site, the existing ground elevation is at approximately 133.00 feet. With the data compiled from NRCS soil data and available permits, it was determined that Pond 10 will be a dry pond with the bottom elevation set at 128.00 feet NAVD, which is 1.2 feet above the estimated SHWT. Preliminary pond sizing calculations indicate that this pond requires 1.64 acres of area; however, in order to avoid a small remnant parcel, a full parcel take of 2.28 acres is recommended. All calculations and parameters for the pond site are located in **Appendix C.** This pond will outfall to an existing cross drain (CD-17) which drains to Lake Butler.

5.3.13 Floodplain Compensation

Six (6) Floodplain Impact Areas (FIAs) have been identified within the project limits. Each FIA consists of a floodplain or multiple floodplain areas that are hydraulically connected. For the FIA located just west of the US 27 intersection, it is recommended that the County considers amendment of the current FEMA floodplain map which was approved in 2016 and does not reflect recent development within the area (including the construction and relocation of the existing FDOT pond). A Floodplain Compensation Site (FPC) has not been sited for this FIA. For each of the other five FIAs, one (1) FPC site has been identified. All of the proposed FPCs are offsite scraped down areas adjacent to or hydraulically connected to the 100-year floodplain. Compensation is provided between the SHWT of the FPC site and the lowest of either the pond top of bank or the 100-year floodplain elevation. The majority of the floodplains within the project limits are Zone AE floodplains with Base Flood Elevations (BFEs) ranging from 124.20 FT to 132.20 FT NAVD across the project limits and are associated with various lakes. A few areas of Zone A floodplains are present, mainly associated with roadside ditches or existing detention ponds. Elevations for these floodplain areas have been estimated from LIDAR data or adjacent Zone AE BFEs. More information about the floodplain compensation sites is provided in the following sections.

Floodplain compensation alternatives have been sized as a conservative measure for right of way estimation; however, it is recommended that alternative approaches are considered during the design phase. This may include developing a floodplain model to demonstrate no increase in the 100-year floodplain elevations associated with the improvements along SR 544, combining FPCs, or utilizing capacity in stormwater ponds. All calculations and parameters for each alternative are located in the Location Hydraulics Report.

5.3.13.1 FPC 1

FPC 1 is a scraped down area located south of SR 544 at approximately station 102+00 (RT). This site is located within one (1) parcel (26-28-09-530000-000110). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 58+00 to 99+00. These floodplains are associated with Lake Conine, Lake Smart, and a roadside ditch. The 100-year floodplain elevation throughout this area ranges from 129.90 feet to 130.0 feet NAVD and the impacts total approximately 0.99 ac-ft of floodplain volume. It is anticipated that there will be 0.09 acres of wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Samsula muck (HSG B/D) and Adamsville fine sand (HSG C). The estimated SHWT elevation for this site is 128.00 feet. The 100-year floodplain elevation that intersects the site is 129.90 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 131.00 feet NAVD. With the data compiled it was determined that FPC 1 will be a 0.74 acre site which will provide approximately 1.07 acre-feet of compensating volume.

5.3.13.2 FPC 2

FPC 2 is a scraped down area located north of SR 544 at approximately station 129+00 (LT). This site is located within one (1) parcel (26-28-10-530500-002601). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 118+00 to 130+00. These floodplains are associated with Lake Rochelle and Lake Smart. The 100-year floodplain elevation throughout this area ranges from 128.3 feet to 130.10 feet NAVD and the impacts total approximately 3.35 ac-ft of floodplain volume. It is anticipated that there will be no wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Adamsville fine sand (HSG C). The estimated SHWT elevation for this site is 127.00 feet. The 100-year floodplain

elevation that intersects the site is 130.10 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 130.50 feet NAVD. With the data compiled it was determined that FPC 2 will be a 1.62 acre site which will provide approximately 3.64 acre-feet of compensating volume.

5.3.13.3 FPC 3 (A & B)

FPC 3 is a set of two scraped down areas (A & B) located north of SR 544 at approximately station 183+00 (LT). This site is located within one (1) parcel (26-28-02-521500-002400). The site was split into two areas to allow the proposed pond site also on this parcel (Pond 4) to utilize the existing wet depressional area located in between the proposed FPC areas. This approach was discussed with the Department. This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 147+00 to 206+00. These floodplains are associated with Lake Fannie and various roadside ditches. The 100-year floodplain elevation throughout this area ranges from 127.20 feet to 128.50 feet NAVD and the impacts total approximately 6.53 ac-ft of floodplain volume. It is anticipated that there will be no wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Wauchula fine sand (HSG B/D). The estimated SHWT elevation for this site is 126.00 feet. The 100-year floodplain elevation that intersects the site is 128.30 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 129.00 feet NAVD. With the data compiled it was determined that FPC 3 will consist of a 2.29 acre FPC (A) and a 1.33 acre FPC (B) for a total area of 3.62 acres, which will provide approximately 6.53 acre-feet of compensating volume.

5.3.13.4 FPC 4

FPC 4 is a scraped down area located south of SR 544 at approximately station 252+00 (RT). This site is located within one (1) parcel (26-28-12-531502-000100). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 227+00 to 259+00 and for impacts created by Pond 5. These floodplains are associated with a wetland system that drains to Lake Hamilton. The 100-year floodplain elevation throughout this area ranges from 124.30 feet to 128.90 feet NAVD and the impacts total approximately 4.57 ac-ft of floodplain volume. It is anticipated that there will be 0.76 acres of wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Immokalee sand (HSG B/D) and Kaliga muck (HSG B/D). The estimated SHWT elevation for this site is 123.00 feet. The 100-year floodplain elevation that intersects the site is 124.30 feet NAVD. According to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 124.00 feet NAVD. With the data compiled it was determined that FPC 4 will be a 4.84 acre site which will provide approximately 5.11 acre-feet of compensating volume.

5.3.13.5 FPC 5

FPC 5 is a scraped down area located north of SR 544 at approximately station 354+00 (LT). This site is located within one (1) parcel (27-28-05-000000-031010). This site compensates for roadway impacts to the 100-year floodplain within the approximate stations of 337+00 to 367+00 and for impacts created by Pond 8. These floodplains are associated with Lake Hamilton Creek. The 100-year floodplain elevation throughout this area is 124.20 feet NAVD and the impacts total approximately 3.14 ac-ft of floodplain volume. It is anticipated that there will be 1.66 acres of wetland impacts associated with this site. According to the Polk County Soil Survey, the site consists of Smyrna and Myakka fine sands (HSG B/D) and Hontoon muck (HSG B/D). The estimated SHWT elevation for this site is 123.00 feet. The 100-year floodplain elevation that intersects the site is 124.20 feet NAVD. According

to LIDAR data obtained for this floodplain compensation site, the existing ground is at approximately 124.00 feet NAVD. With the data compiled it was determined that FPC 5 will be a 3.22 acre site which will provide approximately 3.16 acre-feet of compensating volume.

6.0 Environmental Look Arounds (ELAs)

Environmental Look Arounds (ELAs) provide a unique opportunity to team up with regional stakeholders to explore watershed wide stormwater needs and alternative permitting approaches for the project. Areas of potential cooperation are documented in this report for future follow up as the design moves forward.

During the course of the project, meetings were held with FDOT Drainage, Southwest Florida Water Management District (SWFWMD), and the Lake Region Lakes Management District (LRLMD) regarding the proposed pond site alternatives and potential for ELA opportunities. Key discussions from these meetings are summarized below and meeting minutes from each meeting are located in **Appendix K – Correspondence**.

No significant ELA opportunities were identified for this project. There are no adjacent FDOT or municipal projects that would serve for development of a joint-use pond. Some opportunities with LRLMD initially seemed feasible, but were eliminated due to potential setbacks.

Preliminary Pond Site Coordination Meeting

This meeting was held on November 2nd, 2020 with representatives from FDOT and Inwood. Inwood presented their preliminary pond site alternatives. For several basins, Inwood proposed that it would be feasible to combine basins and reduce the overall number of stormwater ponds required by utilizing compensating treatment. However, FDOT indicated that due to nutrient impairments in the area, it was their preference to site a pond site alternative for each basin. At the time of this meeting, the proposed alternative for Basin 7 was to expand the existing FDOT pond rather than site a new pond. Inwood moved forward with changes as recommended. Inwood mentioned at this meeting that they would be scheduling an ELA meeting with LRLMD.

Pond Site Coordination Meeting

This meeting was held on August 12, 2021, with representatives from FDOT and Inwood to discuss updates to the pond sites since the initial coordination meeting. Inwood summarized changes to the proposed pond sites which resulted from the first meeting's recommendations, changes to the roadway concepts, and new permits in the area that caused several sites to move. In Basin 7, it was discussed that the existing FDOT pond would now be relocated as part of an ongoing site development project, and FDOT would prefer to site a separate alternative for this basin. Since two different intersection alternatives at US 27 were being evaluated at the time within this basin, a pond alternative was developed for each. FDOT concurred with all other pond sites with minor changes anticipated as concepts are refined.

SWFWMD Pre-Application Meeting

This meeting was held on September 1, 2021 with representatives from SWFWMD, FDOT, and Inwood to discuss SWFWMD permitting requirements and potential ELA opportunities. Inwood briefly discussed the Lake Conine Stormwater Park, which is a wetland treatment project located adjacent to SR 544 near the beginning of the project. Prior to the study beginning, Inwood had discussed this project with SWFWMD and LRLMD who indicated that it was not designed to provide credits to other projects and would not be an ELA opportunity for SR 544.

LRLMD ELA Meeting

This meeting was held on November 30th, 2021 with representatives from LRLMD, FDOT, and Inwood with the goal of identifying potential regional stormwater opportunities. Inwood inquired about the Lake Conine Stormwater Park and it was confirmed by LRLMD that this was not available for joint-use opportunity. Inwood also mentioned that previously, the LRLMD had indicated that they were open to participate in a joint-use pond within one of their boat ramp sites, particularly the Lake Fannie boat ramp. However, since these sites are Section 4(f) resources, it was decided that this opportunity would not be pursued. LRLMD was not aware of any other potential joint-use opportunities within the area.

7.0 Total Pond Cost Estimate

The total pond cost estimate for each alternative site includes construction costs of the stormwater facility, any costs associated with mitigation of wetland impacts and preliminary right of way cost estimates which include any administrative costs and legal fees. The total pond cost estimate for each alternative is available in **Appendix E – Pond Alternatives Evaluation Matrix**. The preliminary right-of-way cost estimates are a budget tool used by the Department to estimate total acquisition costs associated with each pond site and to budget the appropriate funds for acquisition. Right-of-way cost estimates are not real estate appraisals and do not reflect market value. In addition, FDOT used appraisals that comply with the Uniform Standards of Professional Appraisal Practice (USPAP) for acquisition purposes.

8.0 Conclusions and Recommendations

Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric analysis, which accounts for water quality treatment and water quantity for runoff attenuation. Please note that the estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data calculations, reasonable engineering judgment, and assumptions. Pond sizes and configurations may change during final design as more detailed information on SHWT, wetland normal pool elevation, final roadway profile design, etc. become available. Please refer to **Table 8-1** for **Preferred Stormwater Pond Requirements** and **Table 8-2** for **Preferred FPC Site Requirements**.

Table 8-1: Preferred Stormwater Pond Requirements

Basin	From Station	To Station	Required Treatment + Attenuation (ac-ft)	Provided Treatment + Attenuation (ac-ft)	Pond R/W Area (including easements) (ac)
1A	04+80	13+84	0.09	0.20	0.37
1	13+84	75+00	1.62	3.29	2.83
2	75+00	106+50	2.53	3.10	3.83
3	106+50	155+00	2.49	2.51	2.73
4	155+00	218+50	2.50	2.50	2.32
5	218+50	289+00	3.06	3.08	2.41
6	289+00	314+10	1.68	1.68	1.87
7	314+10	331+50	0.37	0.39	0.70
8	331+50	348+00	3.60	4.02	2.75
8A	N/A	N/A	0.06	0.19	0.57
9	348+00	374+00	2.13	2.14	1.25
10	374+00	424+50	2.46	3.37	2.28

Table 8-2: Preferred FPC Site Requirements

FIA	From Station	To Station	Required Floodplain Compensation (ac-ft)	Provided Floodplain Compensation (ac-ft)	FPC R/W Area (incl. easements) (ac)
1	58+00	99+00	0.99	1.07	0.74
2	118+00	131+00	3.35	3.64	1.62
3	147+00	206+00	6.53	6.53	3.62
4	227+00	259+00	4.57	5.11	4.84
5	335+00	367+00	3.14	3.16	3.22