Project<br>Development<br>and<br>Environment (PD\&E) Study

## Final Pond Siting Report

S.R. 574 (Martin Luther King Jr. Boulevard)
from C.R. 579 to Mclntosh Road
Hillsborough County, Florida

WPI Segment No. 2558931
FAP No. 2081-018P

Florida Department of Transportation - District 7
Tampa, Florida

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Submitted to:
Florida Department of Transportation = District 7
Tampa, Florida

Submitted by:
$\frac{A 1 C=}{\text { ASSOCIATES }}$

July 2002

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### 1.0 INTRODUCTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD\&E) Study to document the preliminary engineering concept for improvements to S.R. 574 (Martin Luther King Jr. Boulevard) from C.R. 579 (Mango Road) to east of McIntosh Road in central Hillsborough County. The length of the Study corridor is approximately 3.6 miles. The purpose of the PD\&E Study is to provide environmental and engineering information, as well as the analyses necessary for the FDOT and the Federal Highway Administration (FHWA) to reach a decision regarding the type, design and location of the improvements to S.R. 574; and the impacts, if any, associated with the project.

This Pond Siting Report (PSR) is prepared to find and assess suitable land areas for storm water management and floodplain compensation ponds, using the following criteria: economic feasibility, federal and state protected species, hazardous materials, archaeological resources, utility corridors and easements, geological and hydrologic characteristics, current and proposed land uses, wildife cortidors, and drainage design considerations. Two alternative pond sites are identified and evaluated for each drainage basin, and an optimal site is recommended. It should be noted that information from the following separate technical memorandums of this Study was used for the PSR: Design High Water Report, Preliminary Bridge Analysis, and the Location Hydraulic Report.

## PROJECT DESCRIPTION

Within the S.R. 574 corridor, S.R. 574 is an east/west urban minor arterial. The limits of the Study corridor are from C.R. 579 (Mango Road) to McIntosh Road, a distance of approximately 3.6 miles. The project is located in central Hillsborough County and extends through the communities of Mango, Seffner and Dover. A project location map is shown in Figure 2-1.

The existing land use adjacent to the S.R. 574 corridor transitions through two areas of generalized land use characteristics. From the western terminus eastward, the land uses transition from dense development (medium scale shopping centers, office/professional office, medical facilities, service stations, restaurants and community facilities) to low density development (a mixture of agricultural, commercial, and planned and residential developments). Although vacant land exists within the Study corridor, future developments are planned for most of this area.
S.R. 574 is currently a six-lane urban section at C.R. 579 , which transitions to a three-lane rural section (with a two-way left-turn lane) east of Highview Road. The three-lane section continues to Kingsway Road, where the roadway transitions to a two-lane section up to Mclntosh Road. The existing posted speed limits along S.R. 574 are 45 mph and 50 mph .

The recommended alternative for the multi-laning of S.R. 574 from C.R. 579 to east of Mcintosh Road can be described with three typical roadway sections. The portion of the project between C.R. 579 and east of Parsons Avenue is proposed to be widened to a 5-lane urban typical section ( 40 mph design speed) that includes a two-way left turn lane. A 4-lane suburban typical section ( 45 mph design speed) is proposed in the portion of the project from east of Parsons Avenue to east of Kingsway Avenue. The remaining portion of the project from east of Kingsway Road to east of Mcintosh Road is proposed to be a 4-lane suburban typical ( 60 mph design speed). Both 4 -lane suburban typical sections can be expanded to 6 -lanes, and the right-of-way (ROW) requirements are 123.5 feet and 131.5 feet for the 45 mph and 60 mph design speeds, respectively. Figures 2-2 through 2-4 illustrate the recommended alternative typical sections.

The recommended alignment generally follows the existing centerline of the roadway with some realignment to reduce impacts to established commercial properties and to avoid a historical cemetery in the western portion of the project. The recommended alignment for the eastern portion of the project was based on a 25 -foot offset from the proposed ROW line to the centerline of the existing, active CSX railroad track.

This project also contains one bridge, which spans Baker Canal and is located in the existing two-lane section of the project west of Valrico Road (Figure 2-5 provides the typical sections of the existing bridge and the bridge replacement alternative).





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$123.5^{\prime}$

PRIEOWE AUENCE TO MWESWAV ROAD
(45 MPH DESIGN SPEED)
S.R. 574 (Martin Luther King Jr. Blvd.)

Project Development \& Environment (PD\&E) Study Hillsborough County, Florida


## RECOMMENDED ALTERNATIVE 4 - LANE SUBURBAR ROADWAY TYPICAL SECTION



BARER CANAL
S.R. 574 (Martin Luther King Jr. Blvd.)

4-LANE BRIDGE TYPICAL SECTION (BRIDGE REPLACEMENT ALTERMATIVE)

### 2.1 Existing Drainage Patterns

The existing drainage patterns and basin limits were developed utilizing USGS quadrangle maps, SWFWMD contour aerial photography, data collected during field visits and existing drainage studies (Hillsborough County Stormwater Management Master Plan and Hillsborough River Watershed Management Plan).

The limits of the Study corridor lie within two significant watersheds. From the beginning of the corridor eastward to Parsons Avenue, the project is part of the Tampa Bypass Canal Watershed (portion of the Hillsborough River Watershed). From Parsons Avenue eastward to the end of the corridor, the project is part of the Pemberton Creek/Baker Canal Watershed.

The Tampa Bypass Canal is a wide trapezoidal channel, and a regulated floodway that contains six major control structures operated by SWFWMD. The total watershed area served by the canal is 45.9 square miles, and the subwatershed that contains the corridor is identified as "Mango," which has a drainage area of 9.1 square miles. This sub-watershed originates at Lake Mango and flows through a main drainage ditch westward to the bypass canal. The open basins within this portion of the Study corridor ultimately discharge via this ditch system to the Tampa Bypass Canal. The closed basins within the Study corridor do not outfall to the Tampa Bypass Canal unless significant flooding and overtopping of the nearby CSX railroad tracks, to the south, occur.

The Pemberton Creek/Baker Canal (PBA) Watershed is 65.0 square miles in size, and contains six major conveyance systems and one outfall. The six conveyance systems are Flint Creek, Campbell Branch, Antioch Branch, Baker Creek, Pemberton Creek, and Baker Canal. Baker Creek receives storm water from the convergence of Pemberton Creek and Baker Canal, and flows one-mile northward into Lake Thonotosassa. This lake is the largest lake in Hillsborough County with a surface area of 819 -acres and an average depth of 11.5 feet. The lake outfalls through a control structure operated by SWFWMD into Flint Creek, which flows northward to the Hillsborough River.

The corridor is located in the Baker Canal sub-watershed, which is the southernmost sub-watershed in the PBA system (Pemberton Creek is north of this sub-watershed and east of Lake Thonotosassa, and originates in Plant City six-miles away). Baker Canal originates in Dover, east of the corridor, and flows westward to Lake Hooker. This lake receives storm water from two interconnected lakes to the south, Valrico Lake and Long Pond, and then discharges northward through two crossings beneath S.R. 574. The western most crossing proceeds to nearby Lake Weeks through a triple concrete pipe culvert, and Baker Canal crosses nearby through a bridge opening. The outfall of Lake Weeks connects to Baker Canal north of the corridor, and the canal then continues to the before-mentioned convergence with Pemberton Creek and ultimately to Lake Thonotosassa.

Figure 2-6 depicts the water shed and basin boundaries as well as the existing drainage patterns within the Study area. Tables 2-1 and 2-2 summarize the specific basin data (the basin numbers in the tables correspond to those shown

in the Figure), which are from the Hillsborough River Watershed Management Plan.

## -1: Tampa Bypass Canal Watershed

| asin | Corresponding <br> Study ID <br> Number | $25-$ Year <br> DHW <br> Elevation <br> (Feet) | $100-$ Year <br> DHW <br> Elevation <br> (Feet) | Open/ <br> Closed | Sub Basin <br> Area <br> (Acres) | TOC <br> (min.) | CN |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 615450 | 40.91 | 42.73 | Closed | 107.75 | 44.53 | 86.01 |
| 615660 | --- | ---- | Closed | 151.95 | 60.00 | 81.62 |  |
|  | 615500 | 44.33 | 45.24 | Open | 128.72 | 86.29 | 79.71 |

## -2: Baker Canal Watershed

asin \begin{tabular}{c|c|c|c|c|c|c|c|}

\hline ber \& | Corresponding |
| :---: |
| Study ID |
| Number | \& | $25-$ Year |
| :---: |
| DHW |
| (Fevation) | \& | $100-$ Year |
| :---: |
| DHW |
| Elevation |
| (Feet) | \& | Open/ |
| :---: |
| Closed | \& | Sub Basin |
| :---: |
| Area |
| (Acres) | \& | TOC |
| :---: |
| (min.) | \& CN <br>

\hline \& 0311007 \& 70.62 \& 71.53 \& Open \& 50.90 \& 29.00 \& 74.00 <br>
\hline \& 0309790 \& 64.90 \& 66.22 \& Closed \& 67.80 \& 34.00 \& 67.00 <br>
\hline \& 0309800 \& 46.86 \& 47.42 \& Open \& 299.60 \& 41.00 \& 73.00 <br>
\hline \& 0309596 \& 46.26 \& 47.32 \& Open \& 181.50 \& 68.00 \& 80.00 <br>
\hline \& 0309650 \& 46.26 \& 47.32 \& Open \& 75.20 \& 42.00 \& 81.00 <br>
\hline \& 0309680 \& 58.22 \& 58.41 \& Open \& 17.60 \& 44.00 \& 71.00 <br>
\hline \& 0310075 \& 58.48 \& 58.90 \& Open \& 51.90 \& 57.00 \& 72.00 <br>
\hline \& 0310060 \& 48.52 \& 49.90 \& Open \& 124.10 \& 85.00 \& 77.00 <br>
\hline \& 0310002 \& 47.38 \& 48.85 \& Open \& 28.70 \& 53.00 \& 80.00 <br>
\hline \& 0311000 \& 47.45 \& 48.97 \& Open \& 887.50 \& 148.00 \& 80.00 <br>
\hline \& 0311003 \& 72.33 \& 72.40 \& Open \& 29.90 \& 61.00 \& 57.00 <br>
\hline \& 0311005 \& 66.79 \& 67.66 \& Open \& 96.20 \& 29.00 \& 63.00 <br>
\hline
\end{tabular}

## Soils Information

The USDA's Soil Survey of Hillsborough County, Florida and field reconnaissance were used to identify the soil types within the Study corridor. In general, soils are sandy and range from poorly drained to excessively drained depending on elevation.

The Adamsville, Basinger, Myakka, Ona, St. Johns and Seffner soil senies represent the portion of the soils within the Study corridor that are poorly drained with seasonal high groundwater levels varying from 2 feet above the existing ground surface to 3.5 feet below the existing surface. These soil types are typically encountered on broad plains on the flatwoods and in swamps and
depressions and along the drainage ways of the flatwoods. For this Study, it is anticipated that these soil types would be present between Lenna Avenue and Shady Acres Road.

The remaining soil types within the Study corridor consist of Candler, Gainesville, Lake and Orsino Series. These soil types are moderately to excessively drained with seasonal high groundwater elevations varying from 3.5 feet to 5 feet deep to in excess of 6 feet below the existing ground surface. It should be noted that within the urban portion of the project debris as well as unsuitable material may be encountered.

As part of the preliminary investigation, a preliminary sinkhole/ground subsidence evaluation was conducted that consisted of field reconnaissance of the proposed roadway alignment as well as a study of available published data and field investigation information. Based on the data available, it was concluded that there was no evidence of sinkhole activity along the Study corridor; however, it should be noted that the ecological and hydrogeologic conditions within the Study corridor could potentially result in the development of sinkholes.

## Wetlands and Threatened and Endangered Species

Wetlands within the corridor were initially identified through review of mapping resources including the Natural Resources Conservation Service's (formerly the Soil Conservation Service) Soil Survey of Hillsborough County, Florida (1989), National Wetland Inventory mapping, and 1 inch $=200$ feet scale project aerial photography, which was documented in this Study's Draft Wetland Evaluation Report. Wetlands were identified in the field utilizing the United State Army Corps of Engineer's (USACOE's) Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1987). The wetlands were classified according to the United States Fish and Wildlife Service methodology; and wetlands that may be potentially affected were assessed for functional significance using the Wetland Rapid Assessment Procedure (WRAP), as developed by the South Florida Water Management District (SFWMD) and utilized by the USACOE. Sizes of potential wetland impacts were determined graphically from project aerial photographs and project concept plans.

The surface water systems are incised urban creeks within the S.R. 574 right-ofway that were natural in origin; however, they have been altered to function primarily for flood control. The natural systems in the project right-of-way are either connected to existing storm water management systems or isolated in nature.

Eight wetlands and natural surface waters and thirty other surface waters were identified within and along the project corridor. Wetland Rapid Assessment Procedure (WRAP) analyses were conducted for the eight wetlands and natural surface waters. These areas consisted primarily of scrub-shrub palustrine systems, palustrine systems with emergent vegetation, and palustrine systems with an unconsolidated bottom. The highest rated wetland, a palustrine scrub/shrub system, received a WRAP score of 0.58 .

Additionally, the Study area was evaluated for the potential of affecting designated "critical habitat" as defined by the USFWS. No "critical habitat" designated for listed species occurs within the project corridor.

Four "avian species listed as Species of Special Concern by the FWC were observed in wetlands along the corridor: little blue heron, snowy egret, white ibis, and brown pelican. In addition, one avian species listed as Endangered by the USFWS and FWC, the wood stork, was observed in a wetland within the project corridor. The presence of these species should not be a concern because they are highly mobile in nature.

As a result of the urban nature of the Study corridor, and according to a literature search (FNAI, FWC and USFWS databases for Hillsborough County) and field surveys, it was determined that no threatened and/or endangered species are expected to be adversely affected by the project. Informal consultation has been initiated with the USFWS and a no effect determination is anticipated.

## Floodplains

The corridor's floodplains are narrow areas associated with the slight overtopping of two man-made drainage channels, Lake Weeks Creek and Baker Canal, which traverse S.R. 574. These floodplains are bordered by low-density commercial and residential property and the CSX railroad. Although the channels provide important storm water conveyance, the floodplains beyond the channels do not provide any of the following benefits due to their small areas and their low frequency of inundation: water quality, groundwater recharge, wildlife habitat, natural beauty, recreation, agriculture, aquaculture or forestry. Constructing a longer culvert at Lake Weeks Creek and a wider bridge at Baker Canal will cause small impacts to these floodplains. Since these floodplains are associated with conveyance and not storage, mitigation for these impacts will be provided by demonstrating hydraulic equivalency for the two crossings in a 100year storm event (no storm water attenuation should be required to compensate for the filled areas). Best management practices should be implemented during construction and maintenance to prevent erosion and siltation. Wetland impacts would be within man-made ditches, and to wetlands of marginal quality that contain nuisance plant species and do not provide adequate wildlife habitats. Therefore, wetland mitigation is not expected to be required for the impacts within the floodplains that will be caused by the improved channel crossings.

The portion of the corridor from C.R. 579 to Parsons Avenue either drains westward to a large borrow pit, or to a self-contained french drain system. Since no large offsite areas drain to or across S.R. 574 there are no cross culverts that need to be evaluated; and though no 100-year flood zones are identified by FEMA mapping, storm water management facilities will need to be provided. These facilities are required to attenuate the storm water runoff from the additional pavement area of the build alternative. Due to the generally closed nature of the sub-basins this attenuation requirement should be based on a 100year storm event. This is due to the CSX railroad isolating the corridor from the main drainage ditch of the Mango sub-watershed.

The portion of the corridor from Parsons Avenue to Kingsway Avenue also contains french drains, but instead of being self-contained they have a means of discharging when the storm water reaches a high stage within the drains. This storm water proceeds to Lake Weeks Creek, which outfalls ultimately to Lake Thonotosassa and the Hillsborough River. Therefore, attenuation does not need to be based on the 100-year storm event but can be conceptually designed to the
 extended wet detention due to the lower elevations in the eastern portion of the project and proximity to the groundwater table. Conceptual drainage design for the portion of the corridor from Kingsway Avenue to beyond McIntosh Road would use this same approach, and would outfall to Lake Weeks Creek or the Baker Canal depending on the location of the drainage segment. There are two segments within this portion of the corridor that drain to large existing ditches that provide attenuation as well as conveyance, a 700' segment on the north-side of S.R. 574 and east of Kingsway Avenue and a 3,600' segment on the north side of S.R. 574 between Valrico Road and McIntosh Road. These basins will need to be conceptually designed to include compensation for lost ditch volume in addition to the difference in runoff from a 25 -year storm event.

### 3.0 POND SITING ANALYSIS

### 3.1 Drainage Approach and Development of Alternative Pond Sites

The Study corridor exists in two major watersheds and the existing high-points, as well as bridge \#100033 and two existing cross culverts, divide the project area into nine basins (refer to Section 2.1). These basin boundaries were in turn utilized to develop potential pond sites and to determine the anticipated storm water attenuation and treatment needs of each pond site.

The conceptual drainage design consists of constructing attenuation ponds to accommodate the additional runoff from the increased impervious areas of the build alternatives. The attenuation requirements are based on retaining the pre-construction/post-construction runoff volume difference in a 100-year, 10-day storm event ( 23.0 inches of rainfall) for the project's basins that are closed. This approach is used for the beginning portion of the project and proceeds eastward to Parsons Avenue. A portion of the project east of Mcintosh Road, though not a closed basin, must also provide compensation for lost ditch volume. In the portion of the project that begins east of Parsons Avenue, the basins drain toward Baker Canal and are considered to be open. The attenuation requirements for the ponds that are conceptually designed in this area of the Study, are based on detaining the pre-construction/post-construction peak runoff rate difference in a 25 -year, 24 -hour storm event ( 8.2 inches of rainfall).

Storm water treatment will meet SWFWMD criteria, and the conceptual design considers online treatment to avoid multiple cells or multiple ponds (this approach will be refined in the separate design phase). The treatment volume required is thus the runoff resulting from $1^{1 "}$ of rainfall over the total impervious area of the build alternative. Depending on the depth of the storm water pond, the pond area that is required for each drainage segment of the corridor will be controlled by either the treatment volume or the attenuation volume. It is expected that most of the ponds will utilize extended wet detention for the treatment method, except for the higher portion of the corridor around Parsons Avenue. The treatment volume in the pond is based on a maximum depth of $18^{n}$ above the control elevation, which is the estimated SHW elevation at the pond's outfall.

The conceptual ponds considered in the basins were sized utilizing the SCS Runoff Curve Number Method presented in the United States Department of Agriculture Publication, Urban Hydrology for Small Watersheds. The attenuation volume of the ponds within a closed basin (100-year, 10-day storm event) was calculated by averaging the top of pond elevation and the bottom of pond elevation and applying the depth of the pond. The attenuation volume of the ponds within an open basin (25-year, 24 -hour storm event) was determined utilizing the same methodology, except that one foot of freeboard was included in the calculations. The pond bottoms were established based on the lowest existing ground elevation within the parcels under consideration. This is a conservative approach to allow sufficient clearance from the water table, but still provides 6 to 7 feet of pond depth due to the existing ground slopes within the parcels (pond berms were applied as needed). The pond cross section was
established utilizing the following criteria: $2: 1$ slope between existing property lines and the top-of-berms, berm widths of 20 feet for maintenance purposes, and a 4:1 slope between the top-of-berm and the bottom-of-pond.

Table 3-1 provides the approximate pre-construction and post-construction pavement areas, roadway basin areas, and required attenuation volumes for each of the basins.

## Table 3-1: Drainage Sub-Basin Characteristics

| Sub- <br> Basin/ <br> Segment <br> Number | Sub-Basin Limits (Station) | Ruadway <br> Sub-Basin <br> Area | Pavement Area <br> (Acres) |  | Pre- <br> Const. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | $303+63.77$ To 314+58.69 | 4.39 | 2.21 | Attenuation <br> Ronst. | Required <br> (Acre-Feet) |
| 2 | $314+58.69$ To 326+00.00 | 3.11 | 1.20 | 2.64 | 3.45 |
| 3 | $326+00.00$ To 340+00.00 | 3.21 | 1.56 | 2.82 | 3.43 |
| 4 | $340+00.00$ To 371+00.00 | 9.83 | 4.38 | 8.48 | 5.50 |
| 5 | $371+00.00$ To 380+88.00 | 4.80 | 2.04 | 3.85 | 1.02 |
| 6 | $380+88.00$ To 414+21.60 | 9.84 | 2.59 | 6.09 | 2.52 |
| 7 | $414+21.60$ To 436+70.90 | 6.84 | 1.69 | 3.99 | 1.31 |
| 8 | $436+70.90$ To 466+2.27 | 10.22 | 3.25 | 5.97 | 2.02 |
| 9 | $466+22.27$ To 502+51.33 | 11.33 | 2.90 | 6.47 | 2.69 |

The following descriptions are provided for the conceptual drainage design within each basin:

Sub-basin No. 1 originates at the beginning of the Study limits (west of Highview Road) and terminates east of Lake Drive, approximately 0.207 miles ( 0.344 kilometers). Sub-basin No. 2 begins east of Lake Drive and terminates east of Oak Street South. Sub-basin No. 3 extends from east of Oak Street to west of Parsons Avenue. These sub-basins are considered to be within closed drainage basins. Due to the commercial development in the area, the application of long linear ponds is not practical. Therefore, partial or whole parcel takes within the vicinity of S.R. 574 will be required to provide storm water ponds that will accommodate the additional runoff volumes.

Sub-basin No. 4 begins west of Parsons Avenue and terminates west of Kingsway Road. This basin consists of french drains and is split by the high point at Parsons Avenue. West of Parsons Avenue the french drain is selfcontained and does not have an outfall, whereas east of Parsons Avenue the french drain has a built-in relief pipe that outfalls eastward. Sub-basin No. 5 extends from west of Kingsway Road to east of Oak Street. Sub-basin No. 6 originates east of Oak Street and terminates west of Chastain Road. Sub-basin No. 7 begins west of Chastain Road and ends west of Valrico Road. Sub-basin No. 8 extends from west of Valrico Road to west of McIntosh Road. Sub-basin No. 9 originates west of McIntosh Road and terminates at the end of the Study limits, east of McIntosh Road. Sub-basins 4 through 9 are considered to be within open drainage basins; however, sub-basin 9 requires compensation for lost ditch volume (all other existing roadside ditches along the project provide more conveyance than attenuation and thus do not require compensation).

Refer to the Appendices in this report for the conceptual drainage design calculations and the alternative pond sites for these segments, which are summarized in Table 3-2 (aerial exhibits are also provided in the appendix for the alternative pond sites).

Table 3-2: Summary of Proposed Pond Site Characteristics

| Pond | Segment <br> No. | Required <br> Tond of <br> Ronea <br> (Acres) | Storage <br> Volume <br> Provided <br> (Acre-Ft.) | Treatment <br> Volume <br> Provided <br> (Acre-Ft.) | Right-of- <br> way <br> Acquisition <br> Required <br> Acres |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1A | $1,2,3 \& 4^{*}$ | 3.18 | 14.25 | 0.88 | 2.20 |
| 1B | $1,2,3 \& 4^{*}$ | 3.18 | 14.25 | 0.88 | 2.20 |
| 2A | $4^{* \star} \& 5$ | 0.80 | 2.82 | 0.87 | 1.34 |
| 2B | $4^{* * ~ \& ~} 5$ | 0.96 | 3.14 | 0.87 | 1.48 |
| 3A | $6 \& 7$ | 1.23 | 5.99 | 0.84 | 2.19 |
| 3B | $6 \& 7$ | 1.14 | 3.86 | 0.84 | 1.68 |
| 4A | 8 | 0.95 | 2.30 | 0.50 | 1.53 |
| 4B | 8 | 1.02 | 2.37 | 0.50 | 1.58 |
| 5A | 9 | 1.34 | 6.96 | 0.54 | 2.05 |
| 5B | 9 | 1.34 | 6.93 | 0.54 | 2.03 |

*Portion of sub-basin 4 that is west of Parsons Avenue
**Portion of sub-basin 4 that is east of Parsons Avenue
The sites shown for segments 1,2,3 and a portion of 4 includes a FDOT owned parcel that is close to S.R 574 and is well located at the lowest point of the segment with an adjacent outfall source. A second site was preliminarily evaluated that was located on Taylor Road north of S.R 574, but was dropped due to low hydraulic benefits. It should be noted that a portion of the existing roadway contains french drains that properly function and have not required the high level of maintenance that has been experienced in other areas of the District. It is therefore recommended that a portion of the new roadway contain french drains as part of the storm sewer system to augment the pond's storm water attenuation and treatment capabilities. Though the proposed pond was conservatively sized to exclude the benefits of a french drain system, this approach should be revisited in the future design phase.

Two alternative sites (2A and 2B) were identified for the portion of the corridor from Parsons Avenue to east of Kingsway Road (Oak Street). Site 2A is a commercial property (Car Wash) that is located in a wedged shaped parcel west of Kingsway Road between S.R. 574 and the CSX Railroad. This site contains a small pond with concrete block walls, and the proposed pond would require total acquisition of the site and demolition of the car wash and existing pond structure. This site is in a natural low area, is immediately adjacent to S.R 574, and can easily outfall eastward in the existing railroad ditch. A retaining wall would need to be constructed along the south side of the pond to obtain sufficient attenuation volume. The second alternative site is located on the east side of Kingsway Road approximately 1000 feet north of S.R. 574, on currently vacant land in front of a church and across the street from a historic property (the Old Seffener

Schoolhouse). This site does not have a natural outfall; therefore, a diversion structure would need to be applied within the S.R. 574 storm sewer system. Both sites are expected to function as dry ponds for stormwater treatment.

Two alternative sites (3A and 3B) were identified for the portion of the corridor from east of Kingsway Road (Oak Street) to west of Valrico Road. Both of these sites are located in close proximity to Lake Weeks, which is the ultimate outfail for this portion of the corridor and contains the lowest land. Both sites are located in currently vacant land within a low density residential area, avoid impacting the park and proposed residential sub-division at the lake, and can be easily reached by storm sewer from S.R. 574. These sites also provide compensation for a portion of the roadway between Lake Weeks Creek and Baker Canal that discharges directly to the canal, and are expected to function as extended wet detention pands for stormwater treatment.

Two alternative sites (4A and 4B) were identified for the portion of the corridor from west of Valrico Road to west of Mcintosh Road. Site 4A is located in a low area that was determined to be jurisdictional late in the Study. However, the wetlands are disturbed and marginal in quality, and consideration is expected from the permitting agencies for wetland improvement by constructing an extended wet detention pond. Site 4B is located in an upland area immediately east of Site 4B, which is currently being rezoned for a residential sub-division. Both sites are located on the opposite side of the CSX tracks from S.R. 574; therefore, culvert crossings beneath the tracks and maintenance access along the railroad right-of-way from Valrico Road will be required.

Two alternative sites (5A and 5B) were identified for the portion of the corridor from west of Mcintosh Road to east of Mcintosh Road. Both sites include compensation for lost ditch volume, since the large existing ditch between S.R. 574 and the CSX railroad provides significant attenuation (4.20 acre-feet) before outfalling towards Baker Canai. The sites will also require retaining walls along the north and west sides of the ponds to provide sufficient volume, and are expected to function as wet detention ponds for stormwater treatment.

## Evaluation of Alternative Pond Sites

The existing and proposed land use data and planned developments were reviewed as part of the selection of the alternative pond sites. All proposed sites are located on currently vacant land except for the commercial properties at Pond Sites 2A and 5B, which would be significantly impacted by the recommended roadway improvements alone, and the residential properties at Pond Sites 5A and 5B. The sites have also been located in low areas convenient to the corridor for hydraulic purposes to avoid significantly increasing the roadway profile, pumping, or causing large areas of the corridor to have direct discharges and compensation requirements. Compensation for direct discharge should only be required for the short length of the corridor between Lake Weeks Creek and Baker Canal, as mentioned in section 3.1, and the only site that contains wetlands is Pond Site 4A, which are disturbed and marginal in quality. As mentioned in section 3.1, it is anticipated that the permitting agencies will consider Pond 4A as an improvement to this wetland by applying extended wet
detention and containing desirable plant species. However, mitigation costs under Senate Bill 1986 should be applied when comparing this site to its alternatives.

Since most of the alternative sites are in low development areas no significant utilities were observed except for Pond Sites 2A and 5B, which are commercial properties. Removal of existing utilities (including power, water and sanitary) will thus need to be included in the demolition of these sites, if they are acquired.

It should be noted that floodplain compensation is not required for the ponds since the only floodplain impacts are the culvert and bridge replacements at Lake Weeks Creek and Baker Canal, respectively. Since these impacts are to floodplain conveyance and not storage, the only compensation or mitigation that is required is to provide hydraulically equivalent structures (refer to the Study's separate LHR and Preliminary Bridge Analysis for additional information). The soils within the alternative pond sites are the same as those along the roadway, and consist of fine sands that either drain well (Lake and Candler soil types, pond sites $1 \mathrm{~A}, 1 \mathrm{~B}, 2 \mathrm{~A}$ and 2 B ) or drain moderately to poorly (Seffner soil type, pond sites $3 A, 3 B, 4 A, 4 B, 5 A$ and $5 B$ ). It should be noted that a poorly drained soil does not eliminate a pond site, but rather changes the storm water treatment method to extended wet detention. If a better soil type is available within a specific basin, then the advantages for a pond site would be greater pond depth and easier maintenance. However, this is not applicable to this Study's area.

The alternative sites were evaluated for archaeological and historical resources, potential contamination, and protected species and were included in the Study's separate environmental documents. None of these evaluations discovered resources that would exclude the use of these sites for ponds, nor require mitigation or special permitting for the above items.

Right-of-way costs and construction costs were obtained (refer to the appendices of this report) and are summanized in the table below.

Table 3-3: Right-of-way and Construction Costs for Proposed Pond Locations

| Fond Site Number | Pond Right-ol-way Cost | Pond Construcfion Gost |
| :---: | :---: | :---: |
| $1 A$ | $\$ 2,129,300.00$ | $\$ 180,400.00$ |
| $1 B$ | $\$ 1,648,100.00$ | $\$ 237,000.00$ |
| $2 A$ | $\$ 0.00^{*}$ | $\$ 317,100.00$ |
| $2 B$ | $\$ 1,020,500.00$ | $\$ 252,200.00$ |
| $3 A$ | $\$ 843,500.00$ | $\$ 104,800.00$ |
| $3 B$ | $\$ 261,300.00$ | $\$ 69,900.00$ |
| $4 A$ | $\$ 428,800.00$ | $\$ 56,300.00$ |
| $4 B$ | $\$ 1,479,700.00$ | $\$ 61,500.00$ |
| $5 A$ | $\$ 1,023,100.00$ | $\$ 504,300.00$ |
| $5 B$ | $\$ 646,100.00$ |  |

*Affected properties were damaged out as part of the mainline right-of-way acquisitions

## PERMIT REQUIREMENTS

Since there are no navigable waterways within the corridor, a United States Coast Guard permit is not required. Permitting will thus be met by a joint application for an Environmental Resource Permit to SWFWMD and USACOE. Wetland impacts will occur mostly in upland ditches; therefore, mitigation should only be considered for the impacts at Lake Weeks Creek and Baker Canal. These impacts are small and the existing wetlands are disturbed, do not provide wildlife habitat, and contain nuisance species, thus exemption from wetland mitigation should be pursued. An exception would be Pond Site 4A, as discussed in Sections 3.1 and 3.2 of this report.

A dredge and fill permit application may need to be processed with USACOE for the filling of the existing roadside ditches, but this is expected to meet Nationwide Permit requirements.

### 5.0 RECOMMENDATIONS

Segments 1, 2, 3 and a portion of 4 (from west of Highview Road to Parsons Avenue) - the recommended pond site is Pond Site 1B, which includes property owned by the FDOT, is located in a low area for this portion of the Study corridor, is not expected to have high groundwater constraints, and is adjacent to an available outfall. This site is recommended over Pond Site 1A due to lower anticipated right-of-way costs (all other features are nearly the same between the two sites).

Portions of segment 4 and segment 5 (from Parsons Avenue to east of Kingsway Road (Oak Street) - the recommended pond site is Pond Site 2A due to significantly lower right-of-way costs and simpler hydraulics (would not require constructing 1000 feet of stormsewer along Kingsway Avenue with a diversion structure, as would be needed for Pond Site 2B).

Segments 6 and 7 (from east of Kingsway Road (Oak Street) to west of Valrico Road) - Pond Sites 3A and 3B are similar in characteristics, benefits, and costs; however, Pond Site 3B is preferred due to a lower combined right-of-way and construction cost and less impacts to an adjacent commercial property.

Segment 8 (from west of Valrico Road to west of McIntosh Road) - Pond Site 4A is recommended due to a lower combined right-of-way and construction cost. It should be noted that if mitigation through Senate Bill 1986 is required, then approximately $\$ 150,000$ (depending on the year that the mitigation is applied) in additional costs will occur for Pond Site 4A. However, this site will still be the least expensive of the two alternatives.

Segment 9 (from west of Mcintosh Road to east of Mcintosh Road) - Pond Site 5B is recommended due to lower right-of-way costs, which more than offset the higher construction cost. These two sites slightly overlap and are very similar in most other features.
II. Basin Design
A. Segment Number 1
$\qquad$
$\qquad$
$\qquad$
$\qquad$


Egi Sta 303-63.77-Established based on the beginning of the SLave Alternative Alignment
a Stu. 314 458.69 - End of the Curb and Gutter Section (sprit $10340-3503$ )
-Construction

$$
\begin{aligned}
& \text { pervidis Area }=\left[(303+9572-303-63.77)(55 S]+\left[\frac{1}{2}+4\right)(3051824-\right. \\
& 303+95.72)]+[(313+50-305+95.72)(52)]+ \\
& {\left[\frac{1}{2}(14)(313+50-307+60)\right]+[(34-5169-} \\
& 313-50)(36)]+[(24)(73)+(24)(30)] t \\
& {[(24)(32)]+[(314+58.69-303+45.72)(2)(2)]+} \\
& {[(305+90-303+63.77)(6)+(307+20-} \\
& 303+63-77(6)+(314+58.64-307+3664) \\
& \text { (6) } 7
\end{aligned}
$$

previous Area $=96,241: 26 \mathrm{f}^{2} \cong 2.21$ acres talc based on Construction Plans, spa lo3xe-3505)

| 67.00 | Remarks | Prepared by SLN | Date $2 / 20 l o L$ |
| :--- | :--- | :--- | :--- |

Basin Design
H. Segment Number 8


Pre-Construction

$$
\begin{aligned}
\text { Area Total (Row) }= & 44,099.30+f=10,22 \text { acres } \\
\text { Impervious Area }= & {[(447+70-436+70.40)(32)]+[(452+70-} \\
& \left.447+70)\left(\frac{32+4016}{2}\right)\right]+[(453+20- \\
& \left.452+70)\left(\frac{44+56}{2}\right)\right]+[(457+16-453+20)(56)] \\
& +\left[(404+00-457+16)\left(\frac{5014+392}{2}\right)\right]+ \\
& {\left[(466+22.27-464+00)\left(\frac{35.5+346}{2}\right)\right]+} \\
& {[(24)(68)+(36)(624)] } \\
= & 41,359.26512=3.25 \text { acres }
\end{aligned}
$$

Post Construction
Area Total (ROW) $=445304.300^{2}=10.22$ acres Impervious Area $=259913.72 \mathrm{fi}^{2} \cong 5.97$ acres


| ND USE | CN | S | Q |
| :--- | ---: | ---: | ---: |
| RV | 39 | 15.6 | 1.2 |
|  | 98 | 0.2 | 8.0 |
| ND | 100 | 0.0 | 8.2 |

## E-CONSTRUCTION:

|  | AREA (AC) |  |  | RUN-OFF (IN) |  |  | TOTAL |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| GMENT | PERV | IMPERV | POND | PERV | IMPERV | POND | VOL (AC-FT) |
| 8 | 6.97 | 3.25 | 0.00 | 1.2 | 8.0 | 8.2 | 2.86 |
|  |  |  |  |  |  |  |  |
| TAL |  |  |  |  |  |  | 2.86 |

## ST-CONSTRUCTION:

|  | AREA (AC) |  |  | RUN-OFF (IN) |  |  | TOTAL |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| GMENT | PERV | IMPERV | POND | PERV | IMPERV | POND | VOL (AC-FT) |
| 8 | 4.25 | 5.97 | 0.69 | 1.2 | 8.0 | 8.2 | 4.88 |
|  |  |  |  |  |  |  |  |
| TAL |  | 5.97 |  |  |  |  | 4.88 |

TE: POND AREA IS THE SURFACE AREA AT SHW (ELEV. 42.2).

```
QUIRED TREATMENT VOL = 1" }\times5.97\textrm{Ac}=0.50\textrm{AC}-\textrm{FT
QUIRED ATTENUATION = (4.88-2.B6) = 2.02 AC-FT
```

-S PROVIDED
三IMMEDIATELY EAST OF BAKER CANAL (WETLAND):

| ID 4 A | EL (FT) | AREA (AC) | VOL (AC-FT) |
| :--- | :---: | :---: | :---: |
| $\mathrm{J}_{25}$ | 45.0 | 0.95 | 2.30 |
| 4TMENT | 43.7 | 0.83 | 1.14 |
|  | 42.2 | 0.69 | 0 |

FURTHER EAST OF BAKER CANAL (UPLAND):

| 3 ) 4 B | EL (FT) | AREA (AC) | VOL (AC-FT) |
| :--- | :---: | :---: | :---: |
| 5 | 45.0 | 1.02 | 2.37 |
| TMENT | 43.7 | 0.86 | 1.15 |
|  | 42.2 | 0.67 | 0 |

## ONDS 5A \& 5B, 25-YR/24-HR STORM EVENT, $P_{25}=8.22^{\prime \prime}$

| AND USE | $C N$ | $S$ | $Q$ |
| :--- | ---: | ---: | ---: |
| PRV | 39 | 15.6 | 1.2 |
| $P$ | 98 | 0.2 | 8.0 |
| DND | 100 | 0.0 | 8.2 |

## RE-CONSTRUCTION:

|  | AREA (AC) |  |  | RUN-OFF (IN) |  |  | TOTAL |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
|  | EGMENT | PERV | IMPERV | POND | PERV | IMPERV | POND |
| 9 | 8.43 | 2.90 | 0.00 | 1.2 | 8.0 | 8.2 | 2.78 |
|  |  |  |  |  |  |  | 2.78 |

SST-CONSTRUCTION:

|  | AREA (AC) |  |  | RUN-OFF (IN) |  |  | TOTAL |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
|  | EGMENT | PERV | IMPERV | POND | PERV | IMPERV | POND |
| VOL (AC-FT) |  |  |  |  |  |  |  |
| 9 | 4.86 | 6.47 | 0.98 | 1.2 | 8.0 | 8.2 | 5.47 |
|  |  |  |  |  |  |  |  |

DTE: POND AREA IS THE SURFACE AREA AT SHW (ELEV. 42.2). IN OTHER PORTIONS OF THE PROJECT THE EXISTING ROADSIDE DITCHES PROVIDE CONVEYANCE, WHICH WIL BE MAINTAINED BY THE BUILD ALTERNATIVE'S DRNG FEATURES. HOWEVER, THIS PORTION OF THE PROJECT SHOULD ALSO COMPENSATE FOR THE LOST STORAGE OF THE DITCHES (THE 25-YR, $24-H R$ CRITERIA IS STILL APPLICABLE).

| :QUIRED TREATMENT VOL $=1^{\prime \prime} \times 6.47 \mathrm{AC}=$ | $0.54 \mathrm{AC}-\mathrm{FT}$ |
| :--- | :--- |
| QUIRED ATTENUATION $=(5.47-2.78)=$ | $2.69 \mathrm{AC}-\mathrm{FT}$ |
| JS EXISTING DITCH VOL (SEE NOTE ABOVE) | -4.20 |
| TAL ATTENUATION |  |

## 'S PROVIDED

ミIMMEDIATELY WEST OF MCINTOSH RD (RESIDENTIAL PROPERTIES, AINING WALLS ON WEST \& NORTH SIDES):

| D 5A | EL (FT) | AREA (AC) | VOL (AC-FT) |
| :--- | ---: | :---: | :---: |
| $\mathbf{l}_{25}$ | 58.0 | 1.34 | 6.96 |
| ATMENT | 53.5 | 1.07 | 1.54 |
|  | 52.0 | 0.98 | 0 |

IMMEDIATELY WEST OF MCINTOSH RD (INCLUDES COMMERCIAL PROP'Y, INING WALL ON NORTH SIDE):

| $15 B$ | EL (FT) | AREA (AC) | VOL (AC-FT) |
| :--- | :---: | :---: | :---: |
| 5 | 58.0 | 1.34 | 6.93 |
| TMENT | 53.5 | 1.06 | 1.52 |
|  | 52.0 | 0.97 | 0 |



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& 500 \quad 440454 \times 51.50,55=5,000 \\
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