



June 28, 2019

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401 W Venice Avenue
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RE: Drainage Narrative – Murphy Oaks

1. Introduction

The proposed “**Murphy Oaks**” project consists of the development of 105 structures with the associated infrastructure of pavement, utilities and stormwater management ponds. A stormwater management system is proposed consisting of two (2) ponds for stormwater treatment and attenuation. Floodplain compensation for fill impacting the modeled 100-yr/24-hr DHWL will also be provided.

The proposed project site (Site) covers +/- 34.59 acres of contributing area into the associated project drainage basin (MURPHY OAKS) located east of N Auburn Road and south of Border Road in Sarasota County, FL in STR: 03-39S-19E ([See Drainage Report Figure 1](#)). The one (1) owned parcel (0399040001) will be utilized for the project. The remaining of the pervious area associated to the parcel along the outer perimeter are contained within the reduced limits of the existing drainage basins in the watershed model to continue on as historically done ([See Drainage Report Figure 7](#)).

2. Existing Topography and Drainage Pattern

As depicted on the Existing Conditions Model (ECM) Basin Delineation ([See Drainage Report Figure 2](#)) that is taken from the Sarasota County Roberts Bay Watershed Model dated 2016-10-27, the existing project site has multiple catchments that discharge towards the west and north draining towards the south into Curry Creek.

This project is a part of the Sarasota Bay – Peace – Myakka Group (WBID 2009C) with a listed impairment of Nutrients (Macrophytes). To provide the needed management for this impairment, SWFWMD has confirmed that providing a net improvement will be sufficient. Based on a net improvement analysis for the management of Nitrogen and Phosphorous, the permanent pool volume proposed for the project has a higher mass reduction and treatment percentage for both nutrients contained onsite when compared to the amount contained onsite prior to development. This will provide an improvement to the discharge from the property by having a reduced amount of Nitrogen and Phosphorous leaving the site which improves the conditions for the listed impairment. Please see [Drainage Report Appendix D](#) for associated impairment information and associated treatment analysis.

3. Existing Groundwater Conditions and Soils Analysis

Based on the SCS Sarasota County Soil Survey as shown in [Drainage Report Appendix B](#), the project consists of EauGallie and Myakka fine sands (Hydrologic Group B/D), Felda fine sands (Hydrologic Group D), Pineda fine sand (Hydrologic Group B/D), and Pople fine sand (Hydrologic Group C/D) soils. The seasonal high water level (SHWL) was defined by the project's hydrogeologist to be at elevation 11ft-NAVD.

4. Drainage Design Criteria

Drainage design criteria are based on the District Basis of Review (BOR) requirements. Design criteria are summarized below:

Runoff Methods:	Runoff is generated using Soil Conservation Service (SCS) methods outlined in TR-55, 1996
Design Storm:	Florida Modified Type II Rainfall Distribution-Zone 6 Hydrograph peaking factor = 256 25-yr/24-hr and 100-yr/24-hr return frequencies Pre and Post
Quantity Attenuation:	The project's pond will provide stormwater management for the associated drainage basin by retaining the resulting 25-yr/24-hr and 100-yr/24-hr post-development volumes. The post-development discharge rates for each storm event was designed with the model incorporation to have no adverse offsite stage increases. Appropriate volume recovery will be provided. Above the control elevation, recovery is provided within 36 hours.
Quality Treatment:	Wet detention with permanent pool compliant with SWFWMD standards.
Watershed Model	Post-Development conditions incorporated into the Sarasota County Roberts Bay Watershed Model dated 2016-10-27
Floodplain Compensation:	For the resulting fill between the existing elevations of the site and the modeled 100-yr/24-hr DHWL, floodplain compensation is provided. This was represented by incorporating the project into the Roberts Bay Watershed Model to compare with the existing storage removed where applicable to show no adverse impacts with the post-development model and onsite ponds' storage.

5. Basin Hydrology

Runoff hydrographs for all basins were generated with the Advanced Interconnected Channel and Pipe Routing Version 3 (AdICPR) computer model using the design criteria described above. Basin hydrology input parameters are summarized below, while detailed basin input and output data can be found in [Drainage Report Appendix E](#) for the pre-condition:

Basin Area:	Basin areas were delineated using AutoCAD and ArcMap.
Curve Numbers:	SCS Runoff curve numbers (CN) for all Pre-Developed and Post-Development basins were calculated based on the weighted CN value as shown on Table T-7 from the FDOT Hydrology Handbook, 2000 (See Drainage Report Appendix C).
Time of Concentration:	Total time of concentration (Tc) for all Pre-Developed basins were taken from the Roberts Bay Watershed Model. Post-Development basins assumed the minimum allowable value on the developed site.

6. Proposed Drainage Patterns

The proposed drainage pattern is illustrated in the Proposed Conditions Model (PCM) attached as [Drainage Report Figure 3](#) and [Drainage Report Figure 4](#). Storage has been added by way of the onsite ponds. The stormwater is treated, attenuated and finally released via control structures to the west into the N Auburn Road rights-of-way as discharged before.

The PCM also has added the control structure for the I-75 FDOT pond adjacent to the project. Please see [Drainage Report Appendix J](#) for the as-built drawing used.

A littoral shelf isn't proposed in the site's ponds and isn't being factored in the treatment analysis. Relative to the littoral shelf, the Harper Study cites that "a vast majority of the removal processes occurring in wet detention facilities occur within the permanent pool volume rather than in the littoral zone vegetation for the treatment volume (Harper, 1985; Harper 1988; Harper and Herr, 1993)." By not providing the littoral shelf the design provides approximately 32.5% more permanent pool volume than is required thus increasing residence time. In conjunction with the fact that if littoral shelves are not maintained properly they can actually increase pollutant loading the current design justifies exclusion of a littoral zone.

Note that the Survey, Construction Plans, Drainage Analysis and 2016 Roberts Bay Watershed model reference the North American Vertical Datum of 1988 (NAVD88).

The FDOT as-built plans used reference the National Geodetic Vertical Datum 1929 (NGVD29). The conversion factor used to be consistent with the Sarasota County model was 1.08ft.

7. FEMA Floodzone

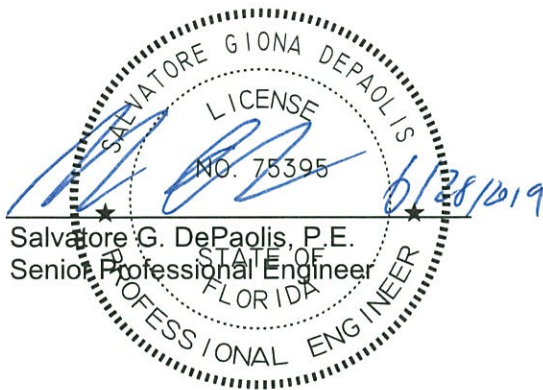
The site is within FEMA FIRM Panel #12115C0332F, effective on November 4, 2016 ([Drainage Report Appendix A](#)). It currently shows Flood Zones on the property which are consistent with the Sarasota County Roberts Bay Watershed Model floodplain limits. The updated post-development watershed model has factored in the modification to the existing storage as well as the proposed storage in the onsite ponds to show no adverse offsite stage increases. The results of the PCM 100-yr/24-hr storm show a neutral or reduced peak stage elevation surrounding the property when compared to the ECM. The few peak stage



de minimis increases in the model are isolated along Curry Creek and believed to be not adverse.

8. Results

The results meet drainage design criteria as summarized within Section 4 above. Additionally, this information has been added to the ECM and PCM Basin Delineations included as **Drainage Report Figures 2 and 3** respectively.



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