

***REPORT OF  
HYDRAULIC CONDUCTIVITY TESTING***

**DEESON SUBDIVISION**

**Polk County, Florida**

***PREPARED FOR:***

**SWAN CAMPBELL RD LLC**

**6706 North Nebraska Avenue #9797  
Tampa, Florida 33604**

***FES PROJECT NO.: 21-5064.1***

**September 16, 2021**

***PREPARED BY:***



**2734 Causeway Center Drive  
Tampa, Florida 33619**

September 16, 2021

Mr. Eric K. Swanson  
Swan Campbell Rd LLC  
6706 North Nebraska Avenue # 9797  
Tampa, Florida 33604

**RE: Report of Hydraulic Conductivity Testing  
Deeson Subdivision  
Lakeland, Polk County, Florida  
FES Project No.: 21-5064.1**

Dear Mr. Swanson:

**Faulkner Engineering Services, Inc. (FES)** has completed permeability testing for the referenced project. We provided our services in general accordance with Change Order # 1 dated July 26, 2021. The purpose of our testing was to measure the permeability rate of the shallow subsurface soils at the property to aid in drainage design. This report summarizes the field evaluation performed by FES and presents our findings.

### **PROJECT INFORMATION**

#### **Existing site**

Deeson Subdivision is a planned residential development located at 4235 Deeson Road in Lakeland, Polk County, Florida within Section 20, Township 27 South, and Range 23 East.

#### **Soil Survey Review**

According to the "Soil Survey of Polk County, Florida", as prepared by the U.S. Department of Agriculture Natural Resource Conservation Service (formerly the Soil Conservation Service) the subject property is primarily underlain by:

- *Pomona fine sand (Map Unit Symbol 7)* – The NRCS describes this soil unit as poorly drained located on flatwoods on marine terraces. The NRCS indicates that this soil unit has a surface layer of fine sand to a depth of 48 inches below ground surface (bgs) followed by a layer of fine sandy loam from 48 to 73 inches bgs followed by a layer of loamy sand from 73 to 80 inches bgs. The NRCS indicates the seasonal high ground water table (SHGWT) is about 6 to 18 inches bgs.
- *Samsula muck, frequently ponded, 0 to 1 percent slopes (Map Unit Symbol 13)* – The NRCS describes this soil unit as very poorly drained located on depressions on marine terraces. The NRCS indicates that this soil unit has a surface layer of muck to a depth of 32 inches bgs followed by a layer of sand from 32 to 80 inches bgs. The NRCS indicates the SHGWT is about 0 inches bgs.
- *Tavares fine sand, 0 to 5 percent slopes (Map Unit Symbol 15)* – The NRCS describes this soil unit as moderately well drained located on ridges and knolls on marine terraces. The NRCS indicates that this soil unit has a surface layer of fine sand to a depth of 80 inches bgs. The NRCS indicates the SHGWT is about 42 to 60 inches bgs.

- *Placid and Myakka fine sands, depressional (Map Unit Symbol 25)* – The NRCS describes this soil unit as very poorly drained located on depressions on marine terraces. The NRCS indicates that this soil unit has a surface layer of fine sand to a depth of 80 inches bgs. The NRCS indicates the SHGWT is about 0 inches bgs.
- *Kaliga muck, frequently ponded, 0 to 1 percent slopes (Map Unit Symbol 32)* – The NRCS describes this soil unit as very poorly drained located on depressions on flatwoods on marine terraces. The NRCS indicates that this soil unit has a surface layer of muck to a depth of 25 inches bgs followed by a layer of fine sandy loam from 25 to 35 inches bgs underlain by a layer of sandy clay loam from 35 to 80 inches bgs. The NRCS indicates the SHGWT is about 0 inches bgs.
- *Hontoon muck, frequently ponded, 0 to 1 percent slopes (Map Unit Symbol 35)* – The NRCS describes this soil unit as very poorly drained located on depressions on marine terraces. The NRCS indicates that this soil unit has a surface layer of muck to a depth of 75 inches bgs followed by a layer of sandy loam from 75 to 80 inches bgs. The NRCS indicates the SHGWT is about 0 inches bgs.

The NRCS soil classifications are based on interpretation of a combination of factors including but not limited to aerial photographs and widely spaced hand auger borings. Borders shown on the map included in **Appendix A**, between mapping units are approximate, and the transitions between soil units will be gradual. In addition to various minor inclusions within a mapped soil unit, areas of dissimilar soils can also occur. However, the soil survey provides a good basis for an initial evaluation of shallow soil conditions in the area, and can provide an indication of various historic activities such as development, mining and filling operations at the site.

## **SUBSURFACE SOIL EVALUATION AND FINDINGS**

### **Field Evaluation**

During our field evaluation, nine (9) hand auger borings were advanced to a depth of approximately 2 to 5 feet bgs within the planned stormwater ponds (1 per pond) to sample soils for laboratory hydraulic conductivity testing and measure existing groundwater. The procedures used by FES for field sampling and testing were in general accordance with ASTM procedures, industry standards of care, and established geotechnical engineering practice.

The test locations were located in the field by FES personnel. The test locations were obtained by superimposing the provided site sketch over an aerial image using Google Earth. Because of the methods used in locating, the test locations shown on **Figure 1** should be considered approximate.

The hand auger borings were advanced by rotating a small diameter bucket auger into the subsurface soils. The cuttings brought to the surface were logged in the field and representative samples obtained at each change in soil stratigraphy. Upon completion, the boreholes were backfilled with cuttings to the surface.

Groundwater was encountered at depths ranging from 1.0 to 4.6 feet bgs at the time of fieldwork.

### Soil Sample Handling, Classification, and Laboratory Testing

The soil samples obtained during our geotechnical engineering evaluation were placed in sealed containers to retain moisture and returned to our laboratory. The samples were visually classified by a geotechnical engineer in accordance with ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) and reviewed by a senior professional engineer.

Nine (9) soil samples were collected within the planned stormwater ponds at depths of approximately 1-5 feet bgs for laboratory hydraulic conductivity testing. The soil samples were obtained from the hand auger borings and transported to our soils laboratory for testing. Hydraulic conductivity testing was performed on the collected soil sample in accordance with ASTM D2434, using constant head method. The results of the hydraulic conductivity tests are presented below.

Location	Soil Description	Groundwater Table (feet, bgs)	Depth Below Ground Surface (feet, bgs)	Laboratory Saturated Vertical Hydraulic Conductivity, $k_v$ (inches/hour)	Estimated Saturated Horizontal Hydraulic Conductivity, $k_H$ (inches/hour)
PERM-1	Brown fine sand (SP)	1.0	1 - 2	6	8
PERM-2	Brown fine sand (SP)	2.3	2 - 3	3	4
PERM-3	Brown fine sand (SP)	3.3	3 - 4	8	11
PERM-4	Brown fine sand (SP)	4.1	2.5 – 3.5	3	4
PERM-5	Brown fine sand (SP)	4.6	3 - 4	1	1
PERM-6	Brown fine sand (SP)	4.1	2 – 3	3	4
PERM-7	Brown fine sand (SP)	3.1	2 – 3	5	7
PERM-8	Brown fine sand (SP)	2.3	2 – 3	3	4
PERM-9	Brown fine sand (SP)	2.4	2 – 3	7	10

Laboratory results indicated that the saturated vertical hydraulic conductivity of the collected soil samples were generally within or higher than the range of values presented by NRCS (0.2 – 1.98 in/hr) for the site soils. In addition, based on the measured vertical hydraulic conductivity and the composition of the soils encountered, we estimate the saturated horizontal hydraulic conductivity as shown above. We also estimate the soil porosity to be about 25 percent. It should be noted that the hydraulic conductivity values presented above are un-factored.

### **Use of Information**

It should be noted that subsurface conditions can vary across this site. Conditions can also vary in areas not explored by our borings. FES cannot be responsible for interpretations made by others based on the information contained in this report and the attachments.

### **LIMITATIONS**

This report has been prepared for the exclusive use of **Swan Campbell Rd LLC** for the specific application to the project previously discussed. No other warranty is expressed or implied.

Our results are based on the data obtained from the previously described subsurface evaluation, laboratory testing, and professional judgment. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our borings and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

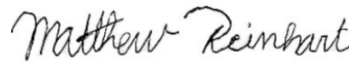
The scope of our services does not include any environmental assessments or studies for the possible presence of hazardous or toxic materials in the soil, groundwater or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring logs regarding unusual subsurface conditions and/or composition, odor, staining, origin or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem.

**CLOSING**


Faulkner Engineering Services, Inc. appreciates the opportunity to be of service to **Swan Campbell Rd LLC**, by providing these geotechnical consulting services and we look forward to assisting you through project completion. If you have any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

**Faulkner Engineering Services, Inc.**



Matthew J. Reinhart, E.I  
Staff Geotechnical Engineer



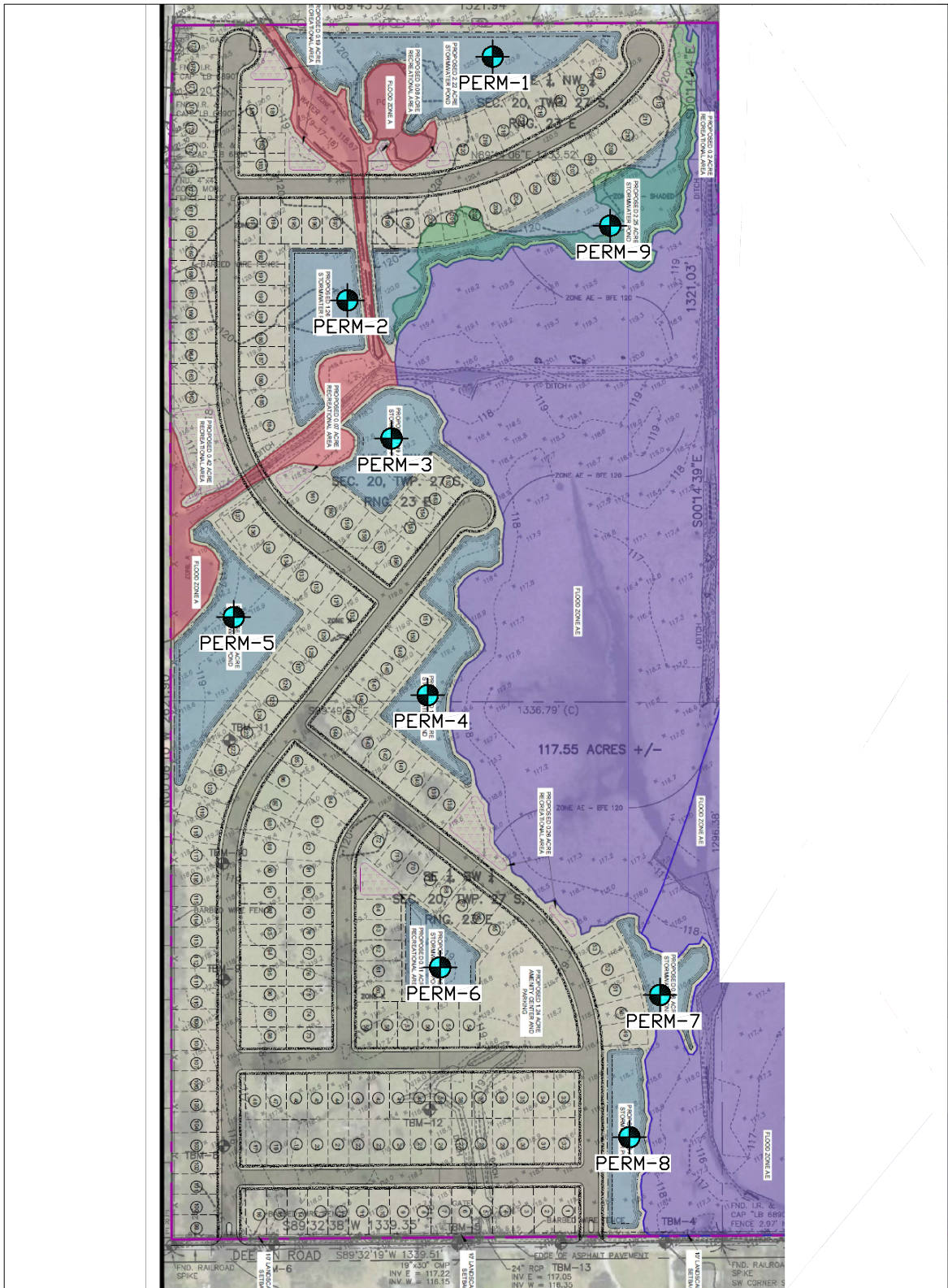
Pavan K. Kolukula, P.E.  
Senior Geotechnical Engineer  
Florida License No. 83670

This item has been digitally signed and sealed by Pavan K. Kolukula, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Attachments: Figure 1: Permeability Test Location Plan

Appendix A: Soil Survey

# PERMEABILITY TEST LOCATION PLAN



## LEGEND

 PERMEABILITY TEST LOCATION

**Note:**  
Basemap prepared by  
Otero Engineering


**APPENDIX A**  
**Soil Survey**

# Custom Soil Resource Report Soil Map




### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

**Water Features**

 Streams and Canals

**Transportation**

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

**Background**

 Aerial Photography

### MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Polk County, Florida  
 Survey Area Data: Version 18, Jun 11, 2020

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

Date(s) aerial images were photographed: Oct 18, 2018—Feb 8, 2019

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

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7	Pomona fine sand	81.0	86.5%
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	9.1	9.8%
15	Tavares fine sand, 0 to 5 percent slopes	0.6	0.7%
25	Placid and Myakka fine sands, depressionial	0.8	0.9%
32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	0.4	0.5%
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	1.6	1.7%
<b>Totals for Area of Interest</b>		<b>93.6</b>	<b>100.0%</b>