Parakeet-Gumbo Environmental Resource Permit Supporting Narrative Report

Date: June 26, 2025
Project Name: Parakeet-Gumbo
Prepared For: St. Johns River Water Management District
Project no: K4018368

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This item has been electronically signed and sealed by Mitchell Lee Griffin on the date adjacent to the seal.

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Mitchell Lee Griffin
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Introduction

Parakeet-Gumbo is a project that consists of an enclosed building with a supporting driveway, parking area, sidewalk, and miscellaneous concrete pads. This project is being developed within a larger commercial Planned Unit Development (PUD) known as Town Center of Palm Coast in Flagler County (Figure 1). The overall Town Center of Palm Coast development was previously permitted by the St. Johns River Water Management District (SJRWMD) with a conceptual permit (No. 4-035-88948-3). Phase 1 was permitted to construct the stormwater treatment ponds (No. 4-035-88948-2). Individual parcels were to be developed and a construction Environment Resource Permit (ERP) to be obtained under the conceptual stormwater master permit. Mitigation (preserves), wetlands, and easements have already been established for the Town Center and this project will fit under the current permit(s) without additional provisions.

This application is for the construction permit for a new commercial building and parking lot (Parakeet-Gumbo). The conceptual permit expired in October 2024. This project intended to apply under the conceptual permit (modification) but the ownership of the property was unresolved until now. Consequently, this application is for a modification to the Phase 1 permit. However, the treatment volumes and regulations related to the previous conceptual permit still applies per Section 3.1.2.(i) “Grandfathered Activities.”

Parakeet-Gumbo Complies with Conceptual Permit Assumptions

The Parakeet-Gumbo project area is part of the Town Center permitted subbasin 22-TB. This subbasin drains to a stormwater pond labeled in the conceptual permit as Pond22. This pond was constructed as permitted and the site cleared for future work as a Phase 1 activity. Subbasin 22 was 33.23 acres in the master plan, Parakeet-Gumbo will be constructed on 7.054 acres contained in the middle of the larger subbasin, on Parcel 7B. Runoff from the project site will be piped south and discharged into Pond22. Table 1 lists some pertinent data from the Conceptual Permit for this basin.

Table 2 lists future use that will include an enclosed data center with electrical transformer and generators located on a rock covered utility pad. Parking, driveway, and sidewalks will be part of the site, but the rest will be grassed. The property is in FEMA flood zone X (not in floodplain, minimal risk). Stormwater will be collected and piped to Pond22. The seasonal high-water table is assumed to be the same as Pond22 (Elevation 25). The site will be raised about 3-feet over the current landscape to keep the facility out of potential standing water in surrounding land.

Table 1. Permitted and Constructed Pond22 in the Conceptual ERP Permit Documentation

Pond ID	Contributing Basin ID	Drainage Area (ac)	Impervious Area (ac)	Planned % Open Area	Planned Open Area (ac)
Pond22	22-TB	33.23	24.01	15%	4.24

Source: SAI Report for ERP (2004). See ERP Attachments for excerpts.

Table 2. Proposed Parakeet-Gumbo Project in Basin 22-TB.

	Area (ac)	
Entire Parcel	7.05	100%
Limits of Disturbance	6.27	89%
Impervious Area (building, pavement, sidewalk)	3.10 (0.80 ac is main building)	44% (11%)
Pervious Area	3.17	45%

Source: Design drawings included in this application.

Water Quantity (Flows) are Met

The Phase 1 construction built the permitted stormwater ponds throughout the Town Center in the 2000s. The stormwater quantity and quality criteria were previously addressed in the stormwater master plan and permit. The Parakeet-Gumbo project is part of the PUD and falls within the scope of the Stormwater Master Plan. Runoff from this project will be routed to Pond22. No further stormwater quantity or quality treatment is required. An erosion control plan will be utilized to protect Pond22, as well as the required NPDES Stormwater Permit for Construction. No additional hydrologic modeling was completed. The water quality demonstration is provided in the next section.

Water Quality Treatment Goals are Met

Attached is a BMP Trains analysis to demonstrate that there will be a net improvement with the permitted stormwater pond. In this analysis the pre-development is what was present prior to the permit. Post-development only includes the 7.05-acre Parakeet-Gumbo project. All soils are Myakka and Valkaria fine sands. Natural soils are well-drained (HSG=A/D) with a pervious curve number of 84 (high water table). The pre-development land use is mesic hardwood, and post-development the same for the undisturbed area. The new facility was assigned a land use of low-intensity commercial, but there will be low traffic to the site as it is not a retail building. The estimated loads demonstrated that the pond provided sufficient treatment to reduce post-development to below pre-development levels.

Environmental Considerations were Addressed Previously

Zev Cohen and Associates, Inc. conducted a site review for the development of the project site to assess potential environmental concerns, including the presence of wetlands, state and federally protected wildlife (Zev Cohen 2023). This review included parcel 7B and south into Parcel 7A that included the stormwater pond Pond22.

A total of 5.17 acres of wetlands and 5.13 acres of surface waters were observed. Onsite wetlands were previously delineated and placed under Reserve Conservation Easement and will not be impacted by the development on Parcel 7B. The onsite surface waters were previously permitted and will not be impacted by this project.

A wildlife survey was conducted to evaluate the presence of state and federally protected wildlife. No federally or state listed protected species were observed onsite and none are expected to be impacted by development. No trees or standing water at the specific project location (Parcel 7B) will attract migratory or wading birds. A 15 percent gopher tortoise survey was conducted, and no burrows were found.

Since the site has already been cleared and prepared for development, no historical or tribal artifacts are expected. The proposed building and parking areas will be filled and raised above the existing ground surface.

Dewatering Needs are Small

Incidental dewatering activities for foundations and excavations will be minor and conducted by conventional methods, covered under the NPDES Construction General Permit. Dewatering fluid will be discharged onsite into a temporary depression and be allowed to percolate. The proposed duration will not exceed 30 days, the dewatering quantity will be less than 300,000 gallons per day on average, and the dewatering activity meets all the other exemption criteria in Rule 40C-2.051(7), F.A.C. No Consumptive Use Permit is needed.

Project Schedule

Parakeet-Gumbo plans to select contractors for the project in fall 2025, and have construction start by the end of 2025. The project is anticipated to take approximately 1.5 years or less to complete.

Operations and Maintenance Plan

This facility is a closed office building with a parking lot. There is no operation of the stormwater facilities except for good housekeeping practices, including: trash management and disposal, grounds landscaping maintenance, and an occasional inspection of inlets for sediment build-up. There is no infrastructure expected to be replaced. The stormwater pond is part of the Town Center and not owned or operated by Parakeet-Gumbo.

References

Florida Department of Environmental Protection (FDEP). 2024. Environmental Resource Permit Applicant's Handbook Volume I (General and Environmental. June 28. https://www.flrules.org/Gateway/reference.asp?No=Ref-15342

St. Johns River Water Management District (SJRWMD). 2004. Environmental Resource Permit Town Center of Palm Coast – Conceptual. Permit Number: 4-035-88948-3. Phase 1 Construction Permit Number: 4-035-88948-2. October 12, 2004. Includes supporting documents obtained from SJRWMD permit database (accessed August 28, 2024).

Zev Cohen and Associates (Zev Cohen). 2023. Environmental Assessment for Project Orchid. Prepared for Michael Baker International, Jacksonville, FL. (Report included Project Parakeet-Gumbo on Parcel 7B, and Parcel 7A for another project(s)). August 21.

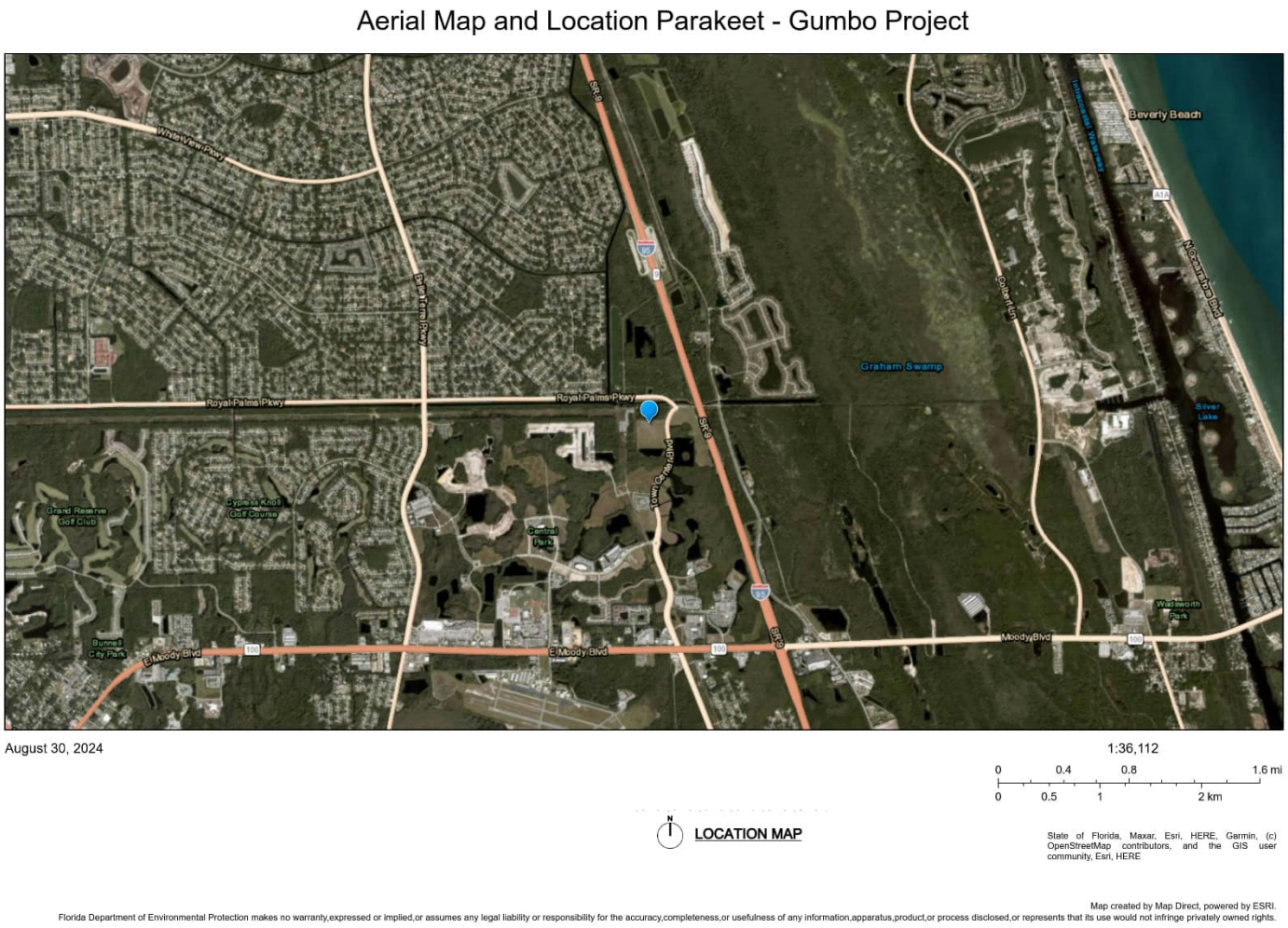
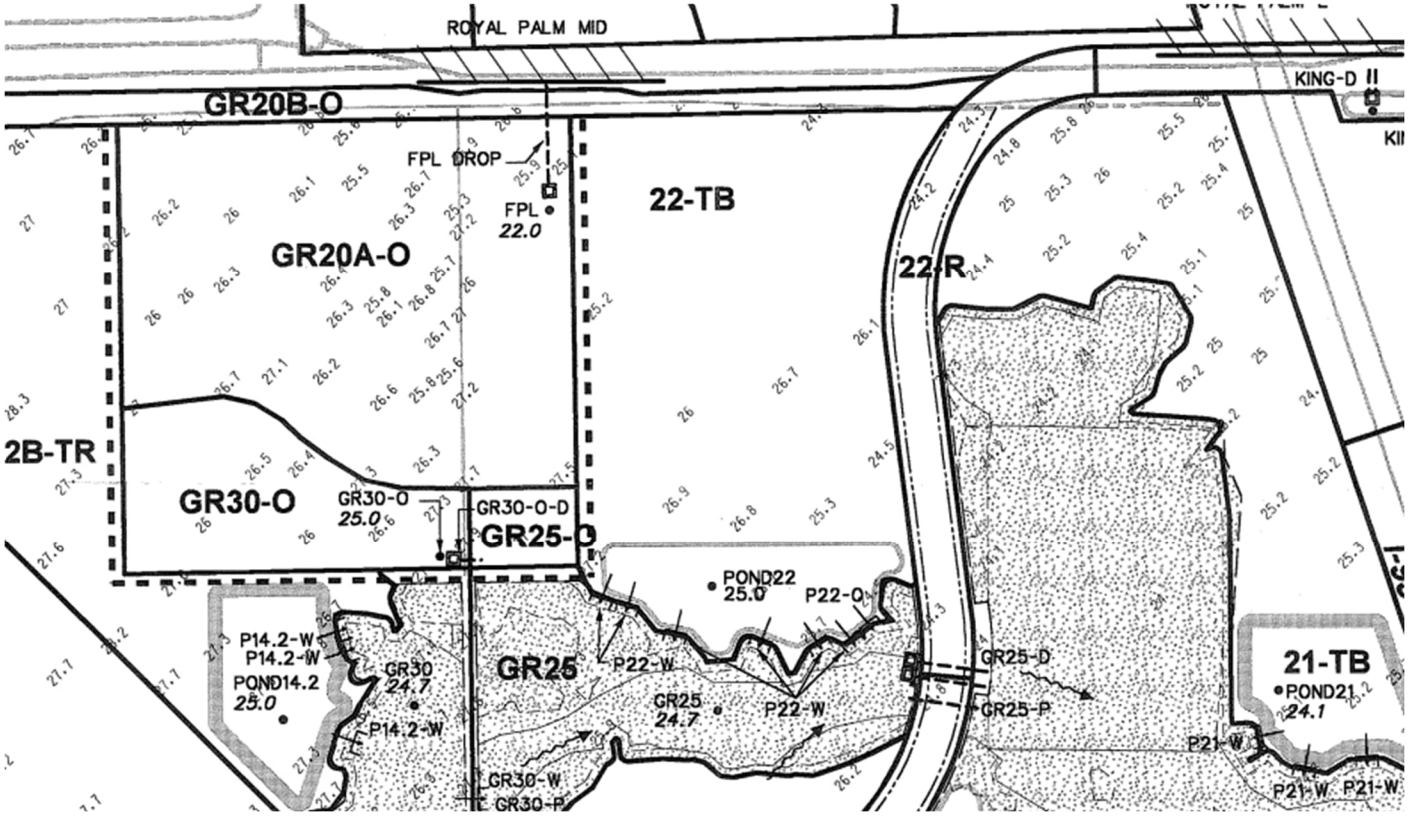


Figure 1. Location is on South Side of Palm Coast

ERP Attachments

From ERP Plans (by SAI):

Project Gumbo occupies a lot in subbasin 22-TB and drains to Pond22. Town Center Parkway adjacent to parcel is 22R and is already built, as is Pond22.



Note that Subbasin 22-TB is also ID as Lots 7A and 7B by and the adjacent wet pond on the boundary survey (Orchid).

From ERP Final RAI Response (by SAI).

The following areas are what was permitted. Project is in Basin ID 22-TB.

Table 9: Wet Detention Treatment Requirements - 21 Day Residence Time

Date: 7/1/2002,7/18/02, 12/17/03, 8/25/04

Pond ID	Contributing Basin ID	Drainage Area (ac)	Planned % Open area	Planned Open area (ac)	Impervious area (ac)	Planned (15%) Pond Area (ac)	Actual Pond Area (ac)	Adjusted Open area (ac)	Reqd. Treatment Volume - 1 in (acft)	Reqd. Treatment Volume - 2.5 in (acft)	Reqd. Treatment Volume (acft)	Runoff Coefficient (C)	*Required Perm. Pool Volume (acft)	Provided Pond Area at NWL (ac)	Total Pond Area (ac)	% Pond	Provided Treatment Volume (acft)	Provided Perm. Pool Volume (acft)
Pond21	21-TB	25.64	15%	3.27	18.52	3.85	3.23	3.88	2.14	3.86	3.86	0.81	5.82	2.59	3.23	13%	5.30	18.35
Pond22														4.22	5.28		6.55	32.45
	22-R	7.00	44%	3.08	3.92	0.00	0.00	3.08	0.58	0.82	0.82	0.60	1.34					
	22-TB	33.23	15%	4.24	24.01	4.98	5.28	3.94	2.77	5.00	5.00	0.84	7.49					

BMP Trains Report

Complete Report (not including cost) Ver 4.3.5

Project: Parakeet Gumbo
Date: 1/13/2025 3:30:14 PM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	22-TB-un	Parakeet-Gumbo
Rainfall Zone	Florida Zone 2	Florida Zone 2
Annual Mean Rainfall	51.00	51.00

Pre-Condition Landuse Information

Landuse	Undeveloped - Mesic Flatwoods: TN=1.09 TP=0.043	Undeveloped - Mesic Flatwoods: TN=1.09 TP=0.043
Area (acres)	33.23	0.00
Rational Coefficient (0-1)	0.15	0.00
Non DCIA Curve Number	84.00	84.00
DCIA Percent (0-100)	0.00	0.00
Nitrogen EMC (mg/l)	1.090	1.090
Phosphorus EMC (mg/l)	0.043	0.043
Runoff Volume (ac-ft/yr)	21.212	0.000

Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	28.509	0.000
Phosphorus Loading (kg/yr)	1.125	0.000

Post-Condition Landuse Information

Landuse	Undeveloped - Mesic Flatwoods: TN=1.09 TP=0.043	Low-Intensity Commercial: TN=1.13 TP=0.188
Area (acres)	26.17	7.05
Rational Coefficient (0-1)	0.15	0.44
Non DCIA Curve Number	84.00	84.00
DCIA Percent (0-100)	0.00	44.00
Wet Pond Area (ac)	5.28	0.00
Nitrogen EMC (mg/l)	1.090	1.130
Phosphorus EMC (mg/l)	0.043	0.188
Runoff Volume (ac-ft/yr)	13.335	13.186
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	17.922	18.372
Phosphorus Loading (kg/yr)	0.707	3.057

Catchment Number: 1 Name: 22-TB-un

Project: Parakeet Gumbo
Date: 1/13/2025

Wet Detention Design

Permanent Pool Volume (ac-ft)	32.450
Permanent Pool Volume (ac-ft) for 31 days residence	1.133
Annual Residence Time (days)	888
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	26.17
Contributing Area (acres)	20.890
Non-DCIA Curve Number	84.00
DCIA Percent	0.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	51.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	44
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	93

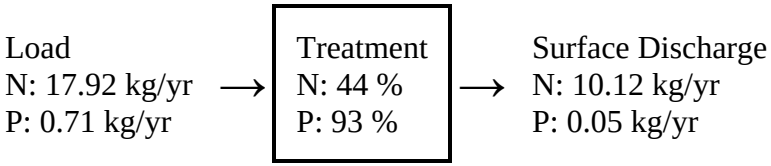
Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)



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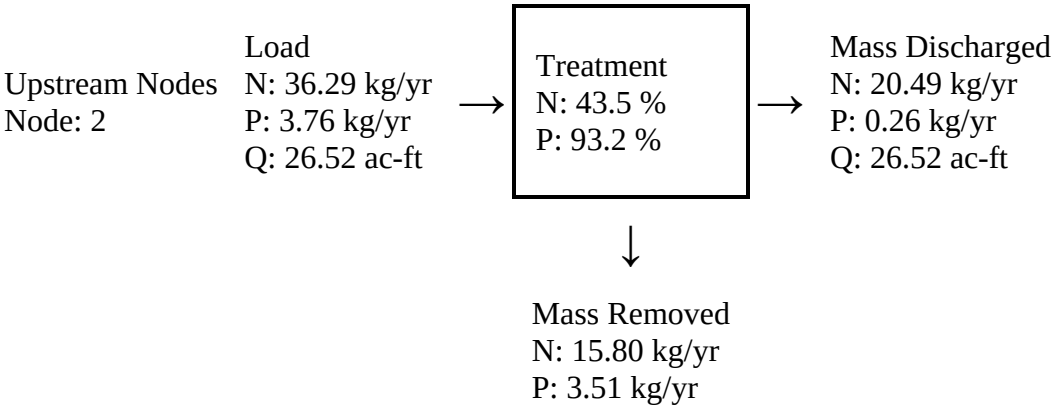
Mass Reduction
N: 7.80 kg/yr
P: 0.66 kg/yr

Load Diagram for Wet Detention (As Used In Routing)



Catchment Number: 2 Name: Parakeet-Gumbo

Project: Parakeet Gumbo
Date: 1/13/2025

None Design

Watershed Characteristics

Catchment Area (acres)	7.05
Contributing Area (acres)	7.050
Non-DCIA Curve Number	84.00
DCIA Percent	44.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	51.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	100
Provided TN Treatment Efficiency (%)	
Required TP Treatment Efficiency (%)	100
Provided TP Treatment Efficiency (%)	

Media Mix Information

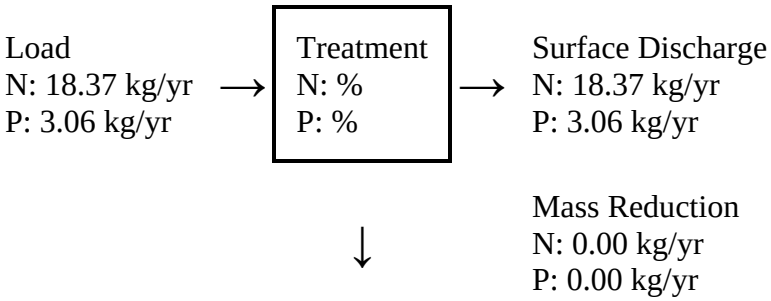
Type of Media Mix	Not Specified
Media N Reduction (%)	0.000
Media P Reduction (%)	0.000

Groundwater Discharge (Stand-Alone)

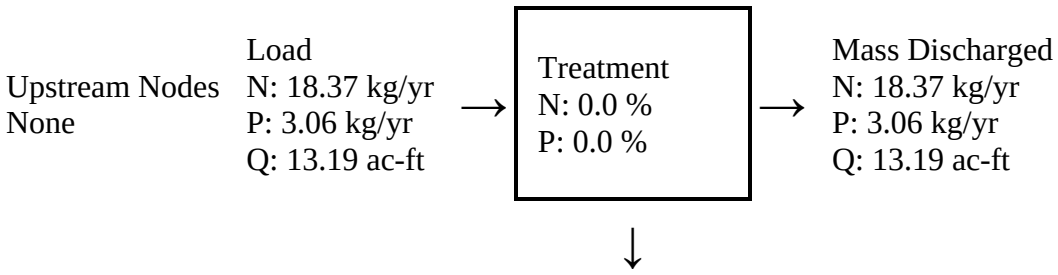
Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000

TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for None (stand-alone)



Load Diagram for None (As Used In Routing)



Mass Removed
N: 0.00 kg/yr
P: 0.00 kg/yr

Summary Treatment Report Version: 4.3.5

Project: Parakeet Gumbo

Analysis Type: Net Improvement
BMP Types:
Catchment 1 - (22-TB-un) Wet Detention
Catchment 2 - (Parakeet-Gumbo) None
Based on % removal values to the nearest percent

Date:1/13/2025

Routing Summary
Catchment 1 Routed to Outlet
Catchment 2 Routed to Catchment 1

Total nitrogen target removal met? **Yes**
Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	28.51 kg/yr	
Total N post load	36.29 kg/yr	
Target N load reduction	21 %	
Target N discharge load	28.51 kg/yr	
Percent N load reduction	44 %	
Provided N discharge load	20.49 kg/yr	45.19 lb/yr
Provided N load removed	15.8 kg/yr	34.84 lb/yr

Phosphorus

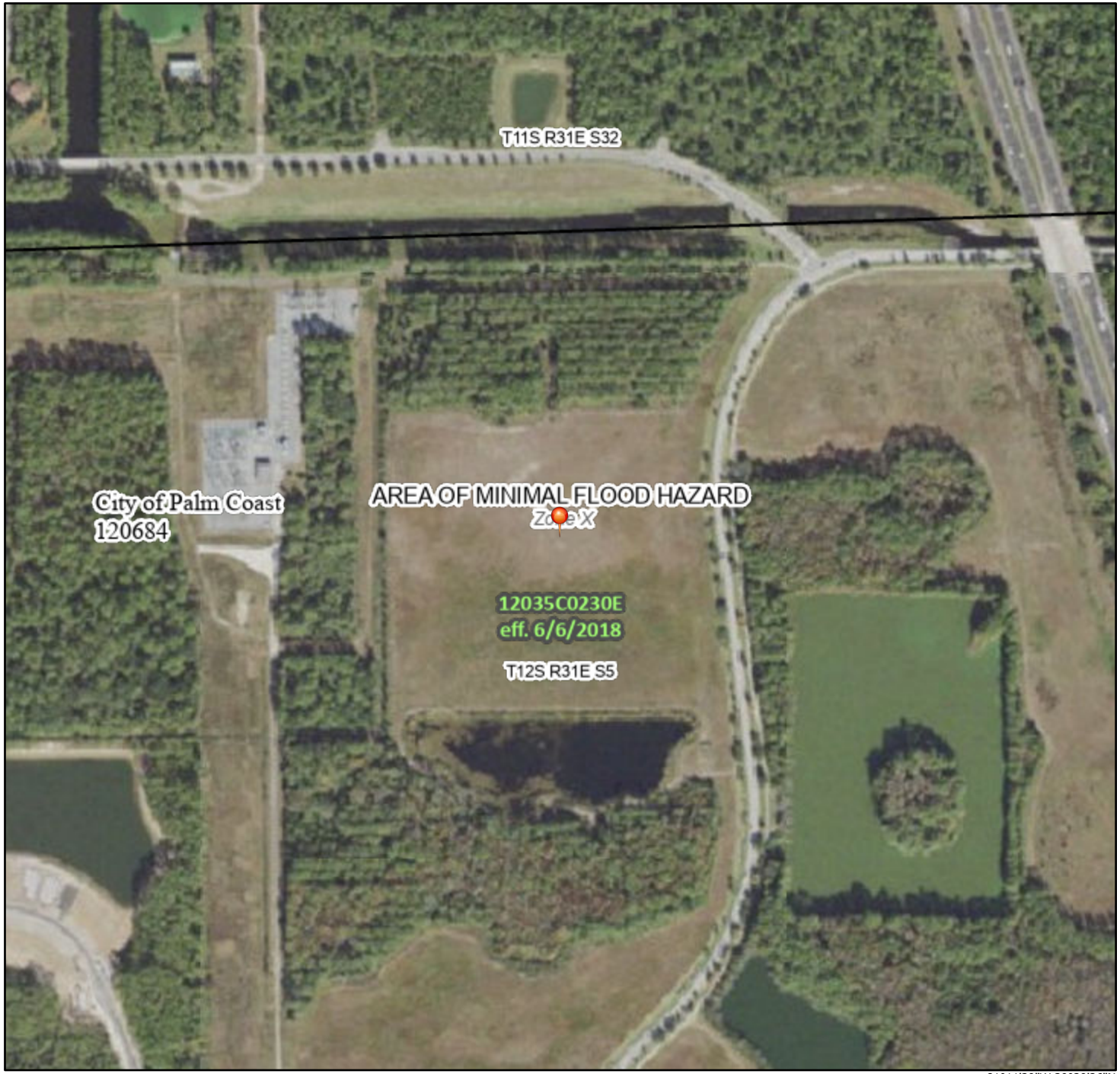
Surface Water Discharge

Total P pre load	1.125 kg/yr	
Total P post load	3.764 kg/yr	
Target P load reduction	70 %	
Target P discharge load	1.125 kg/yr	
Percent P load reduction	93 %	
Provided P discharge load	.256 kg/yr	.56 lb/yr
Provided P load removed	3.508 kg/yr	7.735 lb/yr

National Flood Hazard Layer FIRMette

FEMA

81°12'6"W 29°29'57"N



81°11'29"W 29°29'26"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/14/2025 at 11:27 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Flagler County, Florida

Parcel 7A and 7B

July 10, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

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

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 1:15,800.

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: Flagler County, Florida
Survey Area Data: Version 23, Aug 21, 2024

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

Date(s) aerial images were photographed: Jan 6, 2022—Feb 10, 2022

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
11	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	9.0	27.5%
12	Placid, Basinger, and St. Johns soils, depressional	0.0	0.1%
19	Valkaria fine sand, 0 to 2 percent slopes	23.3	71.2%
21	Smyrna fine sand, 0 to 2 percent slopes	0.4	1.1%
Totals for Area of Interest		**32.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Flagler County, Florida

11—Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2twt7
Elevation: 0 to 160 feet
Mean annual precipitation: 38 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 310 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Myakka and similar soils: 70 percent
Myakka, wet, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 20 inches: fine sand
Bh - 20 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Myakka, Wet

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 20 inches: fine sand
Bh - 20 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Eaugallie

Percent of map unit: 5 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Placid

Percent of map unit: 5 percent
Landform: Depressions on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

12—Placid, Basinger, and St. Johns soils, depressional

Map Unit Setting

National map unit symbol: 1nbgy
Elevation: 0 to 50 feet
Mean annual precipitation: 44 to 52 inches
Mean annual air temperature: 66 to 73 degrees F
Frost-free period: 305 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Placid, depressional, and similar soils: 42 percent
Basinger, depressional, and similar soils: 28 percent
St. johns, depressional, and similar soils: 27 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Placid, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 15 inches: fine sand
Cg - 15 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Basinger, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 2 inches: fine sand
E - 2 to 29 inches: fine sand
E/Bh - 29 to 50 inches: fine sand
C - 50 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of St. Johns, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 10 inches: fine sand
E - 10 to 34 inches: fine sand
Bh - 34 to 39 inches: fine sand
C - 39 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Hontoon, depressional

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Samsula, depressional

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

19—Valkaria fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzw5
Elevation: 0 to 110 feet
Mean annual precipitation: 44 to 61 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Valkaria and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valkaria

Setting

Landform: Drainageways on flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear

Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 16 inches: fine sand
Bw - 16 to 51 inches: fine sand
C - 51 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 5 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 4 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Satellite

Percent of map unit: 2 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

21—Smyrna fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svzh
Elevation: 0 to 130 feet
Mean annual precipitation: 38 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Smyrna and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 13 inches: fine sand

Bh - 13 to 18 inches: fine sand
C/Bw - 18 to 49 inches: fine sand
C - 49 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 2 percent
Landform: Depressions on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Pomello

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Parcel 7A and 7B)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is

given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause

damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Physical Soil Properties–Flagler County, Florida														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
11—Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes														
Myakka	0-6	94-95-100	0- 2- 4	0- 3- 3	1.53-1.55	42.00-141.00	0.02-0.05	0.0-0.3	1.0-2.0	.02	.02	5	1	250
	6-20	93-96- 97	1- 2- 7	0- 2- 3	1.58-1.60	42.00-141.00	0.02-0.05	0.0-0.3	0.0-0.5	.02	.02			
	20-36	90-93- 99	0- 3- 9	1- 5- 8	1.40-1.54	4.00-42.00	0.10-0.15	0.1-0.8	2.0-8.0	.10	.10			
	36-80	89-94- 95	0- 4- 10	0- 3- 5	1.59-1.67	42.00-141.00	0.02-0.05	0.0-0.4	0.0-0.5	.02	.02			
Myakka, wet	0-6	94-95-100	0- 2- 4	0- 3- 3	1.53-1.55	42.00-141.00	0.02-0.05	0.0-0.3	1.0-2.0	.02	.02	5	1	250
	6-20	93-96- 97	1- 2- 7	0- 2- 3	1.58-1.60	42.00-141.00	0.02-0.05	0.0-0.3	0.0-0.5	.02	.02			
	20-36	90-93- 99	0- 3- 9	1- 5- 8	1.40-1.54	4.00-42.00	0.10-0.15	0.1-0.8	2.0-8.0	.10	.10			
	36-80	89-94- 95	0- 4- 10	0- 3- 5	1.59-1.67	42.00-141.00	0.02-0.05	0.0-0.4	0.0-0.5	.02	.02			

Physical Soil Properties–Flagler County, Florida														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
12—Placid, Basinger, and St. Johns soils, depressional														
Placid, depressional	0-15	-95-	0- 2- 15	0- 4- 10	1.20-1.40	42.00-141.00	0.15-0.20	0.0-2.9	2.0-10.0	.02	.02	5	1	250
	15-80	-95-	0- 1- 15	0- 4- 10	1.30-1.60	42.00-141.00	0.05-0.08	0.0-2.9	0.3-0.8	.02	.02			
Basinger, depressional	0-2	-97-	0- 1- 15	0- 2- 4	1.40-1.55	42.00-141.00	0.05-0.10	0.0-2.9	1.0-8.0	.02	.02	5	1	250
	2-29	-98-	0- 1- 15	0- 2- 4	1.40-1.55	42.00-141.00	0.05-0.10	0.0-2.9	0.3-0.8	.02	.02			
	29-50	-97-	0- 1- 15	1- 2- 3	1.40-1.65	42.00-141.00	0.10-0.15	0.0-2.9	0.1-0.5	.02	.02			
	50-80	-97-	0- 1- 15	1- 2- 3	1.50-1.70	42.00-141.00	0.05-0.10	0.0-2.9	0.0-0.3	.02	.02			
St. johns, depressional	0-10	-97-	0- 1- 15	1- 3- 4	1.30-1.50	42.00-141.00	0.10-0.15	0.0-2.9	2.0-4.0	.02	.02	5	1	250
	10-34	-97-	0- 1- 15	1- 2- 3	1.50-1.70	42.00-141.00	0.03-0.08	0.0-2.9	0.3-0.8	.02	.02			
	34-39	-95-	0- 1- 15	2- 4- 6	1.50-1.58	1.40-14.00	0.10-0.30	0.0-2.9	2.0-5.0	.15	.15			
	39-80	-97-	0- 1- 15	1- 3- 4	1.50-1.65	42.00-141.00	0.03-0.08	0.0-2.9	0.3-0.8	.02	.02			
19—Valkaria fine sand, 0 to 2 percent slopes														
Valkaria	0-5	95-98- 99	0- 1- 4	1- 1- 3	1.57-1.59	42.34-141.14	0.06-0.10	0.0-0.4	1.0-4.0	.05	.05	5	1	250
	5-16	95-98- 99	0- 1- 4	0- 1- 2	1.59	42.34-141.14	0.06-0.10	0.0-0.1	0.0-0.5	.02	.02			
	16-51	95-97- 99	0- 1- 5	0- 2- 5	1.62-1.63	42.34-141.14	0.06-0.10	0.0-0.5	0.0-0.5	.05	.05			
	51-80	95-98- 99	0- 1- 4	1- 1- 5	1.53-1.58	42.34-141.14	0.06-0.10	0.0-0.5	0.0-0.5	.02	.02			

Physical Soil Properties–Flagler County, Florida														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
21—Smyrna fine sand, 0 to 2 percent slopes														
Smyrna	0-4	90-98-100	0- 1- 10	0- 2- 8	1.51-1.59	42.34-141.14	0.06-0.10	0.0-0.9	1.0-5.0	.05	.05	5	1	250
	4-13	90-98-100	0- 1- 9	0- 1- 7	1.57-1.60	42.34-141.14	0.06-0.10	0.0-0.7	0.1-1.0	.05	.05			
	13-18	90-96- 99	0- 1- 9	1- 4- 10	1.53-1.55	4.23-42.34	0.12-0.16	0.0-1.1	0.8-6.0	.10	.10			
	18-49	90-96- 99	0- 1- 9	1- 3- 8	1.53-1.65	42.34-141.14	0.06-0.10	0.0-0.6	0.1-1.5	.10	.10			
	49-80	92-98-100	0- 1- 7	1- 2- 5	1.54-1.59	42.34-141.14	0.06-0.10	0.0-0.4	0.1-0.5	.02	.02			

Engineering Properties (Parcel 7A and 7B)

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

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

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

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

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

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Flagler County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
11—Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes														
Myakka	70	A/D	0-6	Fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-93-100	7- 9- 16	0-0 -19	NP-0 -1
			6-20	Sand, fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	88-94-100	6- 8- 15	0-0 -14	NP
			20-36	Fine sand, sand, loamy fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-94-100	8-12- 20	0-27 -37	NP-1 -4
			36-80	Fine sand, sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	84-91-99	7-10- 19	0-0 -18	NP-0 -2
Myakka, wet	15	A/D	0-6	Fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-93-100	7- 9- 16	0-0 -19	NP-0 -1
			6-20	Sand, fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	88-94-100	6- 8- 15	0-0 -14	NP
			20-36	Fine sand, sand, loamy fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-94-100	8-12- 20	0-27 -37	NP-1 -4
			36-80	Fine sand, sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	84-91-99	7-10- 19	0-0 -18	NP-0 -2

Engineering Properties–Flagler County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
12—Placid, Basinger, and St. Johns soils, depressional														
Placid, depressional	42	A/D	0-15	Fine sand	SM, SP, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	90-95-100	1-11- 20	0-7 -14	NP
			15-80	Loamy fine sand, fine sand, sand	SM, SP, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	90-95-100	1-11- 20	0-7 -14	NP
Basinger, depressional	28	A/D	0-2	Fine sand	SP	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-93-100	1- 3- 4	0-7 -14	NP
			2-29	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-93-100	2- 7- 12	0-7 -14	NP
			29-50	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-93-100	2- 7- 12	0-7 -14	NP
			50-80	Fine sand, sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-93-100	2- 7- 12	0-7 -14	NP
St. johns, depressional	27	B/D	0-10	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	75-85-95	3- 7- 10	0-7 -14	NP
			10-34	Fine sand, sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-90-95	3- 7- 10	0-7 -14	NP
			34-39	Loamy fine sand, fine sand, sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-90-95	5-13- 20	0-7 -14	NP
			39-80	Fine sand, sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-85-90	2- 6- 10	0-7 -14	NP

Engineering Properties–Flagler County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
19—Valkaria fine sand, 0 to 2 percent slopes														
Valkaria	85	A/D	0-5	Fine sand	SM, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	89-94-100	7-10- 14	0-0 -0	NP
			5-16	Fine sand	SM, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	89-94-100	6-10- 13	0-0 -0	NP
			16-51	Fine sand, sand	SM, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	87-94-100	7-11- 15	0-0 -0	NP
			51-80	Fine sand, sand	SM, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	87-94-100	7-10- 14	0-0 -0	NP
21—Smyrna fine sand, 0 to 2 percent slopes														
Smyrna	85	A/D	0-4	Fine sand	SP-SM, SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	89-94-100	8-10- 17	0-0 -0	NP
			4-13	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	88-94-100	8-10- 17	0-0 -0	NP
			13-18	Fine sand, sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	88-94-100	10-12- 19	0-0 -0	NP
			18-49	Fine sand, sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	88-94-100	9-12- 18	0-0 -0	NP
			49-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	87-94-100	8-10- 15	0-0 -0	NP

References

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