STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT COVERSHEET

650-050-38
ENVIRONMENTAL
MANAGEMENT
08/22

GEOTECHNICAL TECHNICAL MEMORANDUM

Florida Department of Transportation

District Four

Interstate 95 (I-95) / State Road 9 (SR 9) Project Development and Environment (PD&E) Study

Limits of Project: Miami-Dade/Broward County Line to north of Griffin Road

Broward County, Florida

Financial Management Number: 439170-1-22-02

ETDM Number: 14500

Date: March 16, 2026

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

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SECTION 1
Introduction

1.1 Project Description

The project proposes to improve traffic operations at the existing interchanges and cross streets and enhance the managed lanes along I-95 (State Road (S.R. 9)) from the Miami-Dade/Broward County Line to north of Griffin Road. The I-95 project corridor is approximately 6.5 miles in Broward County, Florida. This project is within the City of Hallandale Beach, Town of Pembroke Park, City of Hollywood, and City of Dania Beach. The existing interchanges and cross streets that will be evaluated include Sheridan Street (S.R. 822), Stirling Road (S.R. 848), and Griffin Road (S.R. 818). Improvements to the bicycle and pedestrian accommodations along the cross streets will be considered as part of the project. The project location map, **Figure 1-1,** shows the study area for the project.

Figure 1-1 Project Location Map

I-95 is the primary north-south interstate facility that links numerous major cities along the Atlantic coast and is one of the most important transportation systems in southeast Florida. I-95 is part of the Florida Department of Transportation (FDOT) Strategic Intermodal System (SIS), the National Highway Freight Network, and is a designated evacuation route according to the Florida Division of Emergency Management and Broward County. The limited access facility connects major employment centers and residential areas within the South Florida tri-county area. In Broward County, I-95 is one of the several major expressways such as I-595, I-75, and Florida's Turnpike.

I-95, within the study limits, is functionally classified as an Urban Principal Arterial Interstate and has a posted speed limit of 65 miles per hour. This segment consists of eight general use lanes (four in each direction) and the managed lanes vary between four (two in each direction) and two lanes (one in each direction). The access management classification for the I-95 study corridor is Class 1. There is a total of six existing interchanges within the study limits; however, only three interchanges in the northern section are proposed for improvements as part of this project. All three of these interchanges have diamond configuration. The cross streets at the interchanges are all six lane divided facilities with varying functional classifications. Sheridan Street is classified as an Urban Principal Arterial Other to the west of the I-95 interchange, and to the east it is classified as an Urban Minor Arterial. Stirling Road is classified as an Urban Minor Arterial. Griffin Road is classified as an Urban Principal Arterial Other.

1.2 Purpose & Need

The purpose of the study is to improve traffic operations at the existing interchanges, cross streets, and managed lanes, address existing and future traffic demand, and enhance safety along S.R. 9/I-95 from Miami-Dade/Broward County Line to north of Griffin Road in Broward County, Florida. The project will also address social demands, economic development, and modal interrelationships.

1.3 Purpose of this Geotechnical Study

The purpose of this geotechnical study was to perform a preliminary geotechnical engineering data review (a desktop review of available geotechnical data from United States Department of Agriculture (USDA) Soil Survey, United States Geological Survey (USGS) and from previous projects, and provide a technical memorandum.

SECTION 2
Review of Existing Subsurface Information

2.1 Review of USDA Soil Survey

Based on a review of the Broward County Area Soil Map published by USDA-NRCS, the soil-mapping units noted in the vicinity are provided in **Table 1** below along with the approximate seasonal high groundwater tables and typical soil profile. The complete USDA Soil Survey data is presented in the Appendix. Available data includes water features (upper and lower limit, ponding, and flooding), engineering properties (USDA and AASHTO soil classification, typical grain-sizes, and Atterberg Limits), soil features (restrictive layer, subsidence, and risk of corrosion), and physical soil properties (depth and % of sand, silt and clay, moist bulk density, saturated hydraulic conductivity, available water capacity, and organic matter).

Table 1 – Summary of USDA NRCS Soil Survey

Map Unit	Project Location	Soil Name	Groundwater Table (inches)	Typical Soil Profile			
				Depth (inches)	USDA TEXTURE	USCS	AASHTO
Broward County							
2	East of Mainline: M.P. 0.0 to 0.2 M.P. 3.9 to 4.2 M.P. 4.6 to 4.6 M.P. 5.4 to 5.8	Arents-Urban land complex	18 – 36	0 – 4 5 - 99 9 – 32 32 – 60	Cobbly sand Cobbly sand Sand, fine sand Sand, fine sand	SP-SM, SP SP-SM, SP SP-SM, SP SP-SM, SP	A-1-b, A-2-4, A-3 A-1-b, A-2-4, A-3 A-2-4, A-3 A-2-4, A-3
3	West of Mainline: M.P. 2.4 to 3.6 East of Mainline: M.P. 2.5 to 3.1 M.P. 3.3 to 3.4 M.P. 3.5 to 3.9 M.P. 5.3 to 5.4 M.P. 6.2 to 6.3	Arents, organic substratum-Urban land complex	24 – 36	0 – 12 12 – 38 38 – 52 52 – 72	Gravelly sand Sand, fine sand Muck Sand, fine sand	SP-SM, SP SP-SM, SP PT SP-SM, SP	A-1-b, A-2-4, A-3 A-2-4, A-3 A-8 A-2-4, A-3
4	West of Mainline: M.P. 5.2 to 5.4 East of Mainline: M.P. 0.0 to 0.6	Basinger fine sand, 0 to 2 percent slopes	0 – 12	0 – 2 5 - 18 18 – 36 36 – 80	Fine sand Fine sand Fine sand Fine sand	SP-SM, SP SP-SM, SP SP-SM, SP SP-SM, SP	A-2-4, A-3 A-2-4, A-3 A-2-4, A-3 A-2-4, A-3
9	West of Mainline: M.P. 1.9 to 2.4 M.P. 4.0 to 4.1 M.P. 4.8 to 5.2 M.P. 6.0 to 6.2 East of Mainline: M.P. 4.2 to 4.6	Dade fine sand	60 – 72	0 – 6 6 – 27 27 – 35 35 – 39	Fine sand Fine sand Fine sand, sand Weathered bedrock	SP-SM, SP SP-SM, SP SP-SM, SP -	A-3 A-3 A-3 -

Map Unit	Project Location	Soil Name	Groundwater Table (inches)	Typical Soil Profile			
				Depth (inches)	USDA TEXTURE	USCS	AASHTO
	M.P. 5.0 to 5.3 M.P. 5.8 to 6.6						
11	East of Mainline: M.P. 0.2 to 0.6 M.P. 1.5 to 2.5	Dade-Urban land complex	60 – 72	0 – 8 8 – 27 27 – 35 35 - 39	Gravelly sand Fine sand Fine sand, sand Weathered bedrock	SP-SM, SP SP-SM, SP SP-SM, SP -	A-3 A-3 A-3 -
19	East of Mainline: M.P. 4.6 to 5.0	Margate fine sand, occasionally ponded, 0 to 1 percent slopes	0 – 18	0 – 8 8 – 16 16 – 28 28 – 32 32 - 42	Fine sand Fine sand, sand Fine sand, sand Very gravelly fine sand, very gravelly sand Bedrock	SP-SM, SM SP-SM, SM SP-SM, SM GP-GM, GW -	A-2-4, A-3 A-2-4, A-3 A-2-4, A-3 A-1-a, A-1-b, A-2-4 -
20	West of Mainline: M.P. 3.6 to 4.1 M.P. 6.2 to 6.3	Matlacha, limestone substratum-Urban land complex	24 – 36	0 – 23 23 – 27 27 – 48 48 – 52	Gravelly fine sand Fine sand Fine sand Unweathered bedrock	SP-SM, SP SP-SM, SP SP-SM, SP -	A-3 A-3 A-3 -
21	East of Mainline: M.P. 3.1 to 3.6	Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes	0	0 – 31 31 – 65	Muck Fine sand, sand	PT SP-SM, SM	A-8 A-2-4
38	Mainline Alignment: M.P. 0.0 to 6.6	Udorthents, shaped	24 – 48	0 – 30 30 – 50 50 – 54	Gravelly sand Sand, fine sand Weathered bedrock	GP-GM, SP-SM, SP SP-SM, SP -	A-1-b, A-2-4, A-3 A-2-4, A-3 -
39	West of Mainline: M.P. 6.2 to 6.3	Udorthents-Urban land complex	24 – 48	0 – 30 30 – 50 50 – 54	Gravelly sand Fine sand, sand Weathered bedrock	GP-GM, SP-SM, SP SP-SM, SP -	A-1-b. A-2-4, A-3 A-2-4, A-3 -
40	West of Mainline: M.P. 0.0 to 2.4 M.P. 4.1 to 4.8 M.P. 5.4 to 6.0 East of Mainline: M.P. 0.6 to 1.5	Urban land, 0 to 2 percent slopes	-	-	-	-	-
99	Mainline: M.P. 3.445 to 3.469 M.P. 4.628 to 4.649 M.P. 6.451 to 6.577 East of Mainline: M.P. 3.3 to 3.4	Water	-	-	-	-	-

2.2 Review of USDA Soil Survey Seasonal High Groundwater Information

Seasonal high groundwater table (SHGWT) levels are expected to be controlled by existing drainage features present along the project corridor. According to USDA-NRCS, the estimated SHGWT levels are expected to range from natural ground surfaces to depths of 72 inches.

The Broward County 2060 Future Conditions Average Wet Season Groundwater Elevation (July 9, 2024) is often used to set control elevations. The future average wet season groundwater elevations along the alignment are provided in following table.

Table 2 – Broward County 2060 Future Conditions Average Wet Season Groundwater Elevation

Approximate Location	Groundwater Elevation (feet, NAVD 88)
0 – 0.5	1.5
0.5 – 1.7	1.0
1.7 – 2.2	0.5
2.2 – 3.0	1.0
3.0 – 5.3	1.5
5.3 – 5.7	2.0
5.7 – 6.6	1.5

It should be noted that several improvement/widening projects have been implemented in the past within and around the project area. Hence, we recommend the project design be coordinated also with the existing permits from previous constructions, profiles of existing roadway and drainage structures, and the SHGWT and Design High Water (DHW) elevations be adjusted accordingly for a smooth transition in roadway and drainage profiles.

2.3 Review of Subsurface Information from Previous Projects

Subsurface information in the project vicinity from previous projects was reviewed. For this, TSFGeo has reviewed the available geotechnical data reports, roadway plans, and structural plans from the following projects:

- FPID 433108-8-32-01, I-95 Express Phase 3C, Broward County.
- FPID 422796-1-52-01 & 422796-2-52-01, I-95 Express Lanes, Broward and Miami-Dade County.
- FPID 429804-1-22-01, PD&E Study for SR-9/I-95 from SR 848/Stirling Road to North of SR 816/Oakland Park Boulevard, Broward County.
- FPID 430291-2-92-01, ITS Device Replacement Project, Miami-Dade County.
- FPID 441628-1-52-01, NE Corner of I-95 & SR 858, Broward County.
- FDOT Proj. No. 86070-3422, I-95 & Griffin Road Retaining Walls, Broward County.
- FDOT Proj. No. 86070-3469, I-95 Retaining Wall Structures, Broward County.
- FDOT Proj. No. 86070-3468, I-95 HOV Lanes, Broward County.

SECTION 3
Engineering Evaluation and Preliminary Recommendations

3.1 General

A review of USDA Soil Survey Maps, geotechnical data reports, roadway plans, and structural plans indicate that the shallow subsoils in the project vicinity are mostly fill consisting of sandy limestone, along with clean sands to silty sands (A-3 and A-2-4) with limerock. Review of existing data also indicates the presence of areas of shallow organic soils (A-8) and plastic soils (A-4) along the project corridor.

Removal of organic soils and plastic soils should be performed in accordance with Index 120-002 of FDOT Standard Plans. Backfill should consist of materials conforming to Index 120-001 of FDOT Standard Plans and compacted in accordance with Section 120-9 of the Standard Specifications for Road and Bridge Construction.

3.2 Embankment Construction

We anticipate that fills will be required for the proposed roadway improvements. Assuming proper subgrade preparation and adequate fill materials are utilized, we recommend that all proposed permanent side slopes be constructed on 2.0 horizontal to 1.0 vertical (2H:1V) or flatter. To prevent minor sloughing at the surface, we recommend that the slopes be seeded, mulched and maintained to enhance slope stability soon after being completed.

3.3 Excavations

All excavations should be performed in accordance with Index 120-002 of FDOT Standard Plans, the latest Standard Specifications for Road and Bridge Construction, and in accordance with OSHA Standards. We recommend that sides of temporary excavations be sloped to 2H:1V or flatter or supported by temporary shoring.

3.4 Groundwater Control

In our opinion, groundwater may not have a significant impact on the proposed roadway widening provided the proposed finish level is at the existing roadway level. However, depending upon groundwater levels at the time of construction, some form of dewatering may be required for utility excavations. Permits will be required for any dewatering needs during construction in areas requiring fill.

3.5 Vibration Activities and Monitoring Existing Structures

Vibration producing construction activities such as pile driving, sheet pile installation and extraction, drilled shaft casing installation and extraction, drilled shaft excavations, and compaction with vibratory rollers can cause vibration induced settlement and damage to the adjacent structures. An aerial review shows the presence of buildings adjacent to right-of-way on both sides throughout the project corridor and near interchange improvements. Hence, monitoring of existing structures (inspection and documentation of existing conditions, settlement monitoring and vibration monitoring) will be required. Mitigation efforts (like preformed pile holes for pile installations, predrilling and use of non-vibratory methods to install and extract sheet piles, non-vibratory methods to install and extract temporary casings for drilled shaft construction, compaction operations in static mode at close vicinity to existing buildings) may be evaluated as necessary to minimize vibration impacts.

3.6 General Guideline for Design Phase Geotechnical Study

A design phase geotechnical study will be required for this project during the design phase of the project and should be performed in accordance with FDOT Soils and Foundations Handbook.

SECTION 4
Evaluation of Bridge Foundations

4.1 Existing Bridges

There are nineteen (19) existing bridge structures located within the project limits. These structures carry I-95 (SR 9) across other roadways or canals.

As part of the PD&E Study, TSFGeo has reviewed available existing structures plans for the previously listed bridges to evaluate existing soil data and to determine the foundation systems used to support the existing structures. These plans included Plan and Elevation sheets, Report of Core Borings sheets, foundation layout sheets, and pile driving records.

The deeper subsurface soil conditions along the project alignment consist of varying layers of very loose to very dense sand and sandy limestone. The limestone is inconsistent and highly variable with a Recovery of 0 to 100% (average of 63% and standard deviation of 30), and a Rock Quality Designation (RQD) of 0 to 100% (average of 30% and standard deviation of 32)

The following table provides summaries of the bridge data obtained from the existing structures plans and available pile driving records for each bridge location including foundation type, size, design load, test or production length, and PDA capacity and tip elevation (if available).

Table 3 – Existing Bridge Data Summary

Bridge No.	Location	Year	Foundation Type	Drilled Shaft Design Load (tons)	Design Shaft Tip Elevation (ft., NGVD29)	Pile Design Load or NBR (tons)	Test or Production Length (feet)	PDA Capacity (tons)	Pile Tip Elev. (ft., NAVD)
860529	SR 858 /Hallandale Beach Boulevard	1990	5-ftΦ Drilled Shafts	310 to 405	-74.5 to -81.5	-	-	-	-
		1990	18-inch PSCP	-	-	20 to 40	44 to 55	-	-
		2013	18x135 Steel H-piles	-	-	106 to 171	75 to 85	115 to 213	-46.9 to -100.7
860531	SR 824/Pembroke Road	1990	5-ftΦ Drilled Shafts	310 to 405	-58.5 to -67.5	-	-	-	-
		1990	18-inch PSCP	-	-	20 to 40 tons	45 to 65	-	-
		2013	18x135 H-piles	-	-	54 to 201	65 to 70	127 to 331	-29.7 to -68.7
860530	SR 820 / Hollywood Boulevard	1990	5-ftΦ Drilled Shafts	310 to 405	-61 to -73	-	-	-	-
		1990	18-inch PSCP	-	-	20 to 40	50 to 65	-	-
		2013	18x135 Steel H-piles	-	-	106 to 171	80 to 100	119 to 228	-52.6 to -103.5
860102/860202	Johnson Street	1990	18-inch PSCP	-	-	20 to 45	25 to 35	-	-
		2022	18”Φ Steel Pipe	-	-	72 to 86	65 to 94	NA	NA
860574/860575	C-10 / Hollywood Canal	1990	18-inch PSCP	-	-	40 to 70	70	-	-
		2024	18-inch PSCP	-	-	100 to 147	65 to 76	NA	NA
860104	Taft Street	1964	18” PSCP	-	-	30	55	-	-
		1990	18" PSCP	-	-	45 to 60	50	-	-
		2021	18”Φ Steel Pipe	-	-	140 to 171	78 to 107	NA	NA
860576/860577	Sheridan Street	1990	18-inch PSCP	-	-	50 to 70	55	-	-
860578	C-10 Spur Canal	1990	18-inch PSCP	-	-	35 to 45	55	-	-
		2020	18-inch PSCP	-	-	94 to 180	60 to 65	NA	NA
860579/860580	Stirling Road	1990	18-inch PSCP	-	-	45 to 70	65	-	-
		2014	18”Φ Steel Pipe	-	-	211 to 234	104 to 126	119 to 276	-62.4 to -132.0
860554/860555	Griffin Road	1990/1989	18-inch PSCP	-	-	50 to 70	50 to 55	-	-
		2022	18-inch Steel Pipe	-	-	(-38), 162 to 246	90 to 125	NA	NA
860109/860209	Dania Cut-Off Canal	1965	18-inch PSCP	-	-	30	50	-	-
		1989	18-inch PSCP	-	-	35	50	-	-
		2023	18-inch PSCP	-	-	147 to 280	110 to 113	NA	NA
860546	SB CD over C-11 Dania Cut-Off Canal	1988	18-inch PSCP	-	-	N/A	N/A	-	-
860592	Griffin Road over Dania Cut-Off Canal	1984	18&20-inch PSCP	-	-	40 to 65	56 to 93	-	-

NA - Not Available

4.2 Feasibility of Foundation Alternatives

The feasibility of typical foundation alternatives for the future widening or replacement of the project bridge structures is discussed below. Based on the review of published information and available geotechnical information from past projects, the project soil conditions do not appear to pose any extraordinary concerns related to the design and construction of the various alternatives. However, specific geotechnical explorations at the project bridge structures and cost analyses will better define suitable foundation alternatives.

4.2.1 Scour Depths

Anticipated scour depths have not been developed during the PD&E Study for bridges over water. However, scour should be considered when assessing the total axial capacity and lateral stability of bridge foundations.

4.2.2 Shallow Foundations

Where conditions permit, shallow foundations are often the most cost-effective option. This foundation type transfers structural loads to the underlying soils and design considerations are typically governed by the allowable bearing pressure and settlement limits, and predicted settlements often exceed acceptable tolerances for bridge structures. In addition, the risk of scour may necessitate deeper footing embedment and the implementation of scour protection measures. As a result, shallow foundations may be considered less favorable.

4.2.3 Deep Foundations

Based on the existing conditions and our experience with similar projects, it is our opinion that deep foundations are the most appropriate option for the proposed bridge structures. The following deep foundation types are reasonable options:

- Square Prestressed Concrete Piles
- Steel Piles (H-pile, closed and open-ended pipe piles)
- Drilled Shafts
- Augercast Piles

4.2.3.1 Square Prestressed Concrete Piles

Square prestressed concrete piles are considered a suitable foundation option. They are the most common foundation type for bridge structures in Florida, with prior experience demonstrating their overall cost-effectiveness. Standard pile sizes used in similar applications include 18- and 24-inch-square prestressed concrete piles.

4.2.3.2 Steel Piles

Steel pipe piles and H-section piles are a viable foundation alternative; however, experience in Florida has shown that they are generally more costly than square prestressed concrete piles. Steel piles are particularly advantageous in subsurface conditions with high variability in anticipated driving depths, where frequent splicing is expected. They also offer improved drivability in dense strata when deeper embedment is required. Despite these advantages, steel piles typically provide lower capacities than square prestressed concrete piles of comparable size and driving depth.

4.2.3.3 Drilled Shafts

Drilled shafts represent another feasible foundation alternative for the project. Drilled shafts can develop high axial and lateral capacities within a single foundation element, making them

advantageous for structures requiring significant load resistance. However, their performance is highly dependent on construction methods and strict quality control. This foundation type is commonly selected where competent bearing materials, such as limestone or very dense soils, are encountered at relatively shallow depths. An additional benefit is that drilled shaft installation generally produces lower construction-induced vibrations compared to driven piles. Minimum diameters for drilled shaft bridge foundations are 42-inch for redundant shafts and 48-inch for nonredundant shafts. It should be noted that artesian groundwater conditions must be carefully evaluated, as elevated potentiometric levels can present significant challenges during drilled shaft construction.

4.2.3.4 Auger Cast Piles

In recent years auger cast piles have become an acceptable bridge foundation alternative for bridge foundations. Auger cast piles offer several advantages including cost-effectiveness, rapid installation, minimal noise and vibration, suitable for various soil conditions, limited headroom application, easily adjustable (length and diameter), and do not require casing for installation. However, they do have several disadvantages including their performance is highly dependent on construction methods and strict quality control (like drilled shafts), may have limited load capacity compared with other foundation types, difficult installation in highly variable soil conditions and with high groundwater tables, and excessive grout flow in weathered and vuggy limestone. Minimum pile diameters are provided in FDOT's Structures Manual Table 3.5.20-1.

SECTION 5
Report Limitations

Our Geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned improvements is based on existing subsurface information and our understanding of the project.

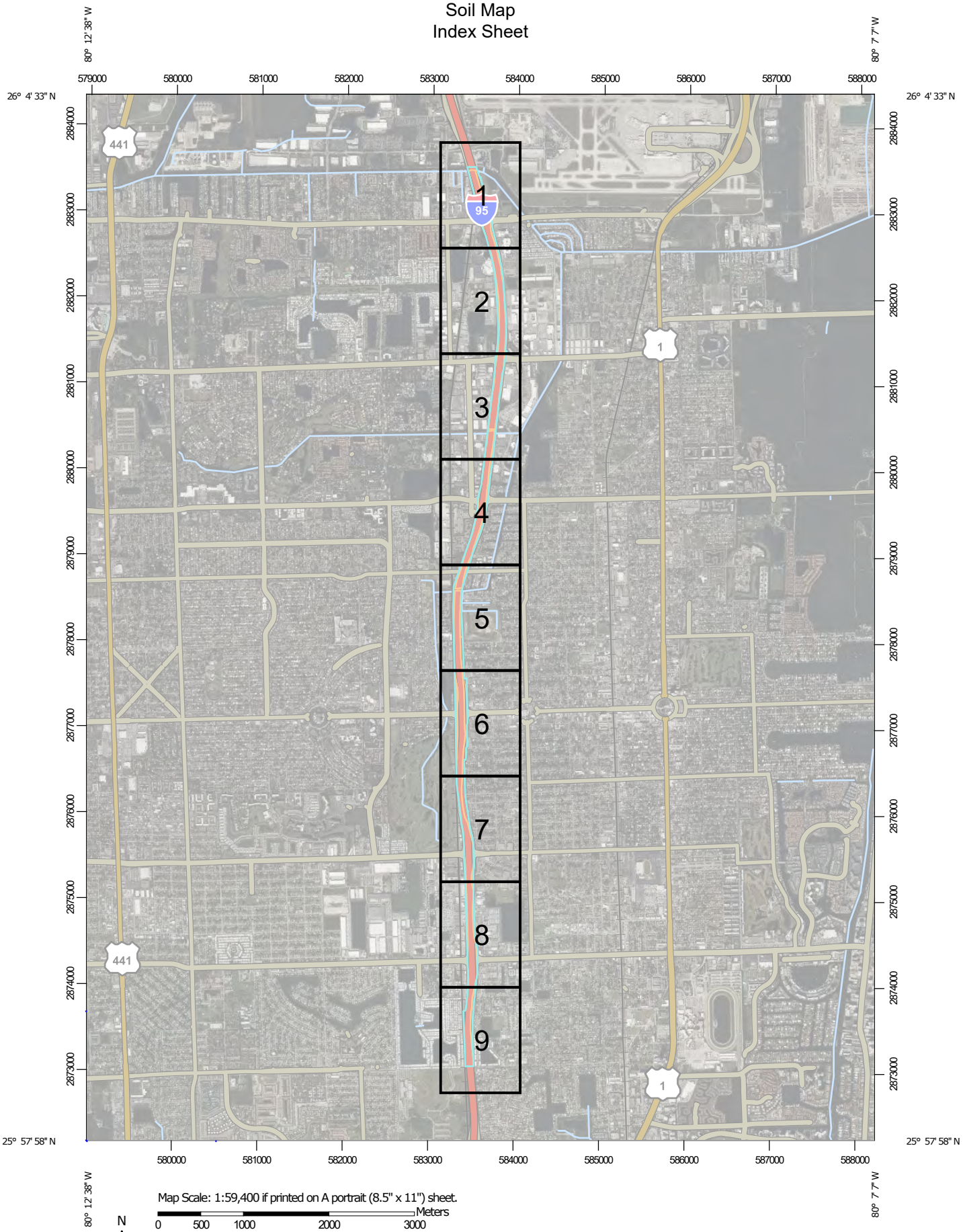
The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

We recommend that a detailed geotechnical study should be performed in accordance with FDOT Soils and Foundations Handbook during the design phase of the project.

APPENDIX

USDA-NRCS Soil Survey Information

Custom Soil Resource Report
Soil Map
Index Sheet



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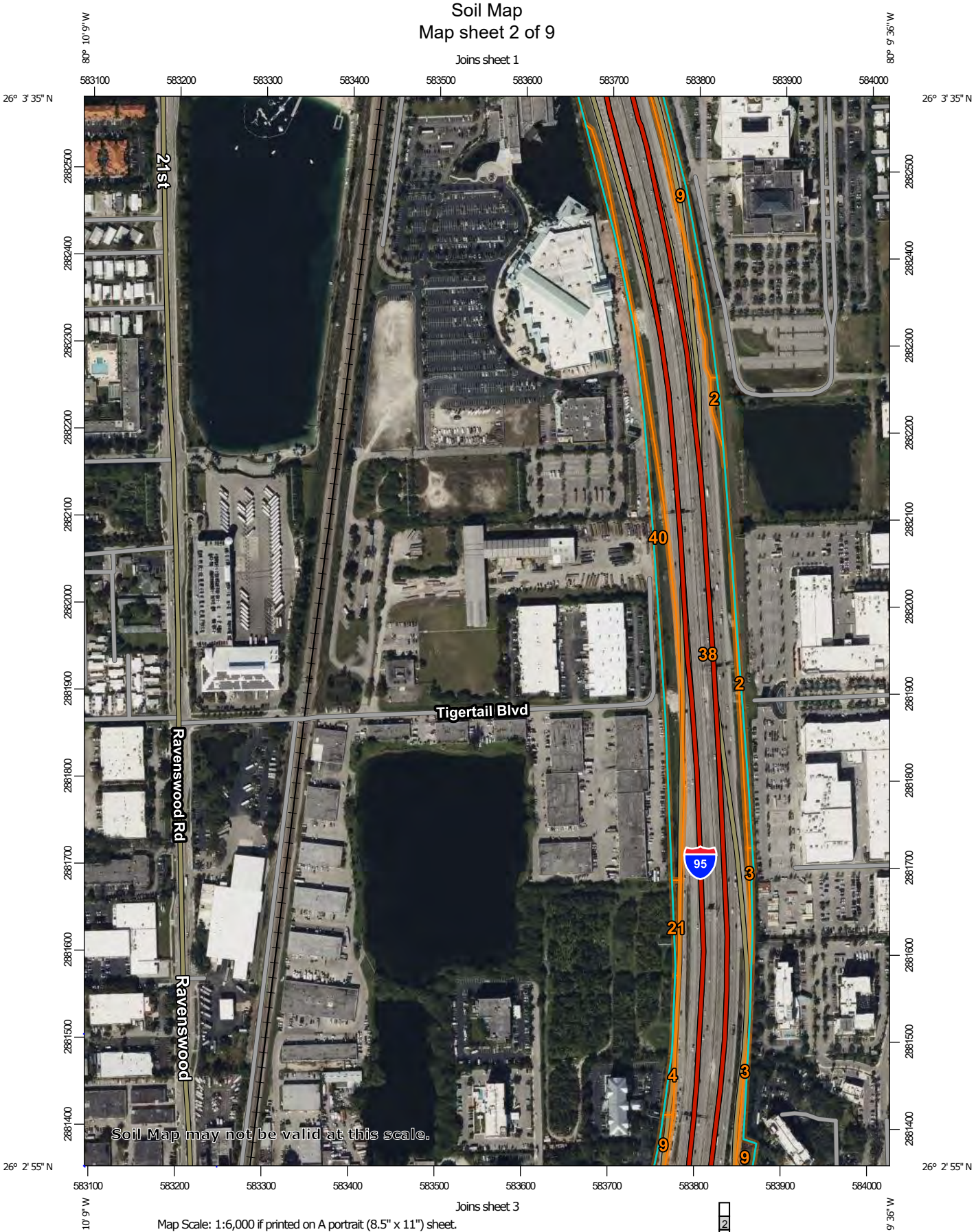
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Custom Soil Resource Report
Soil Map
Map sheet 1 of 9

Custom Soil Resource Report
Soil Map
Map sheet 2 of 9



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Map Sheet Location

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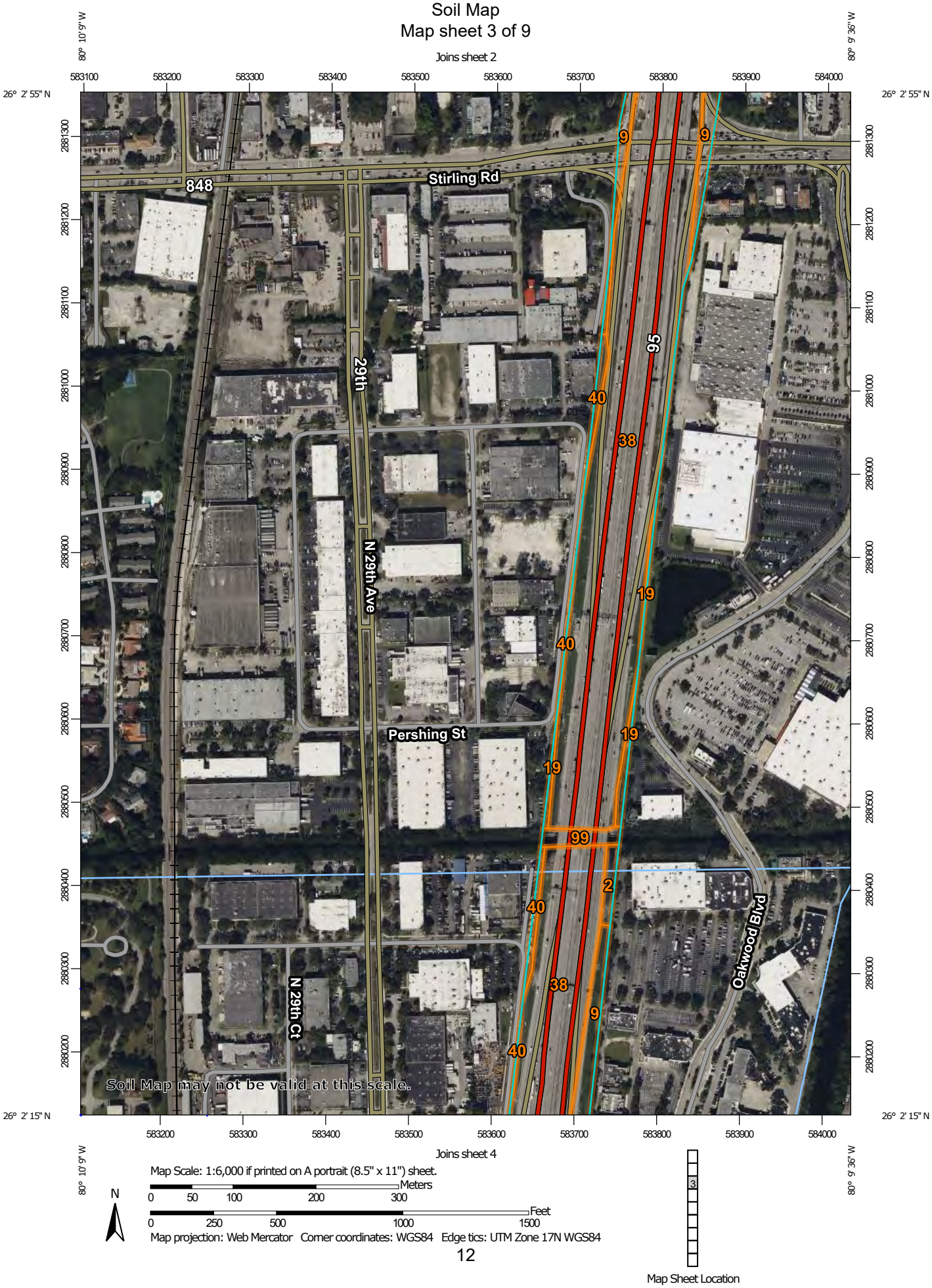
Map sheet 3 of 9



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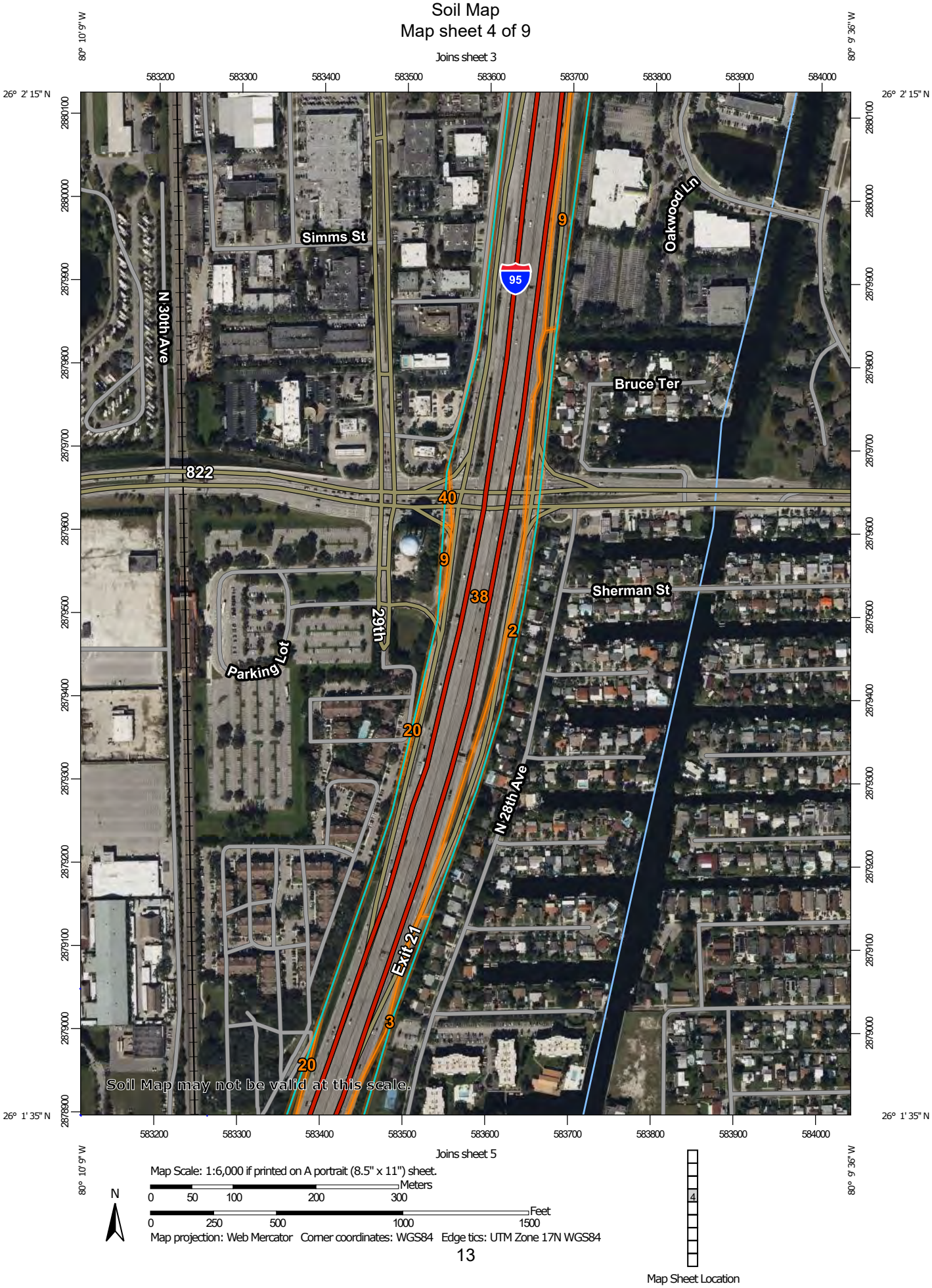

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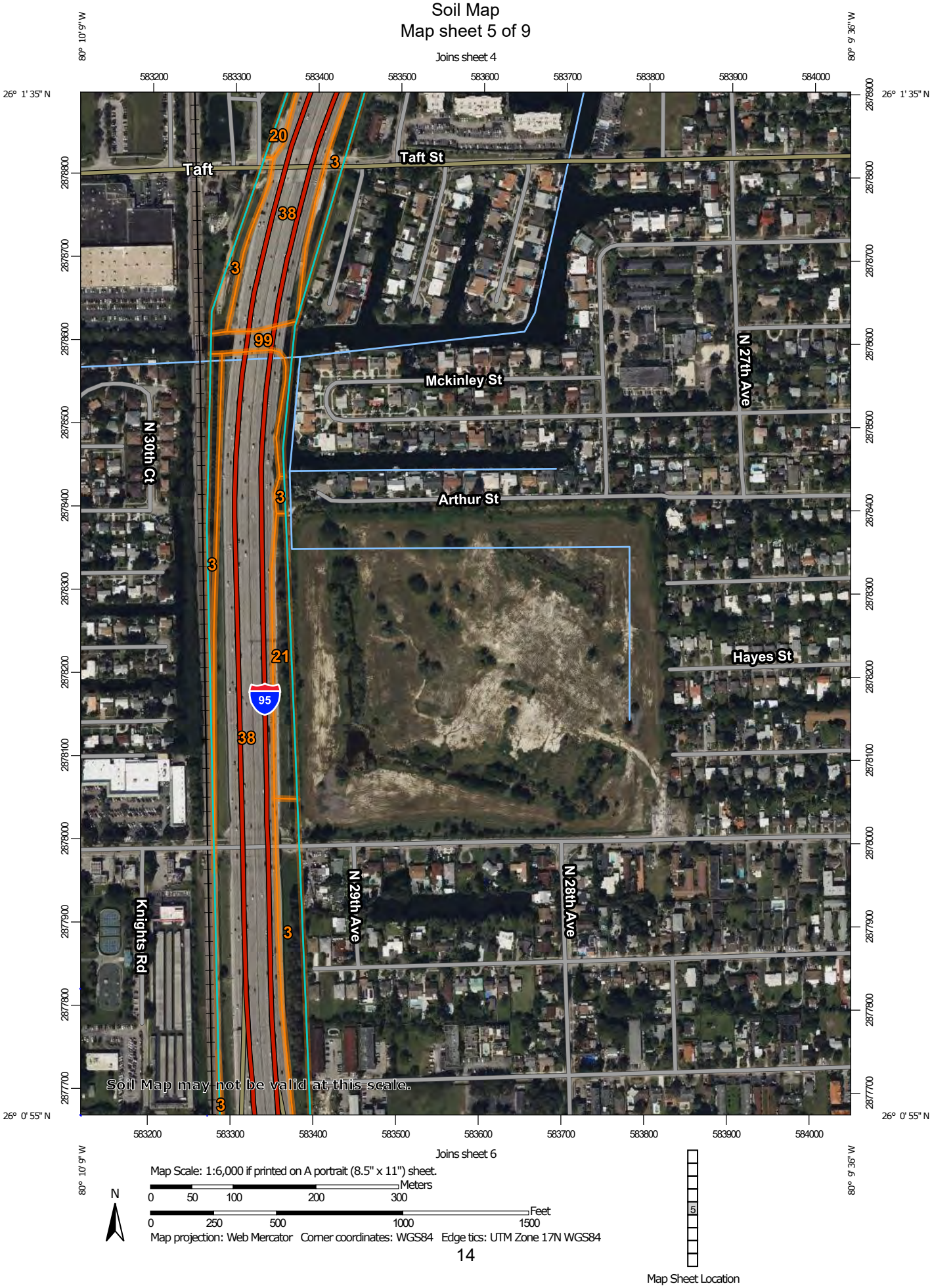

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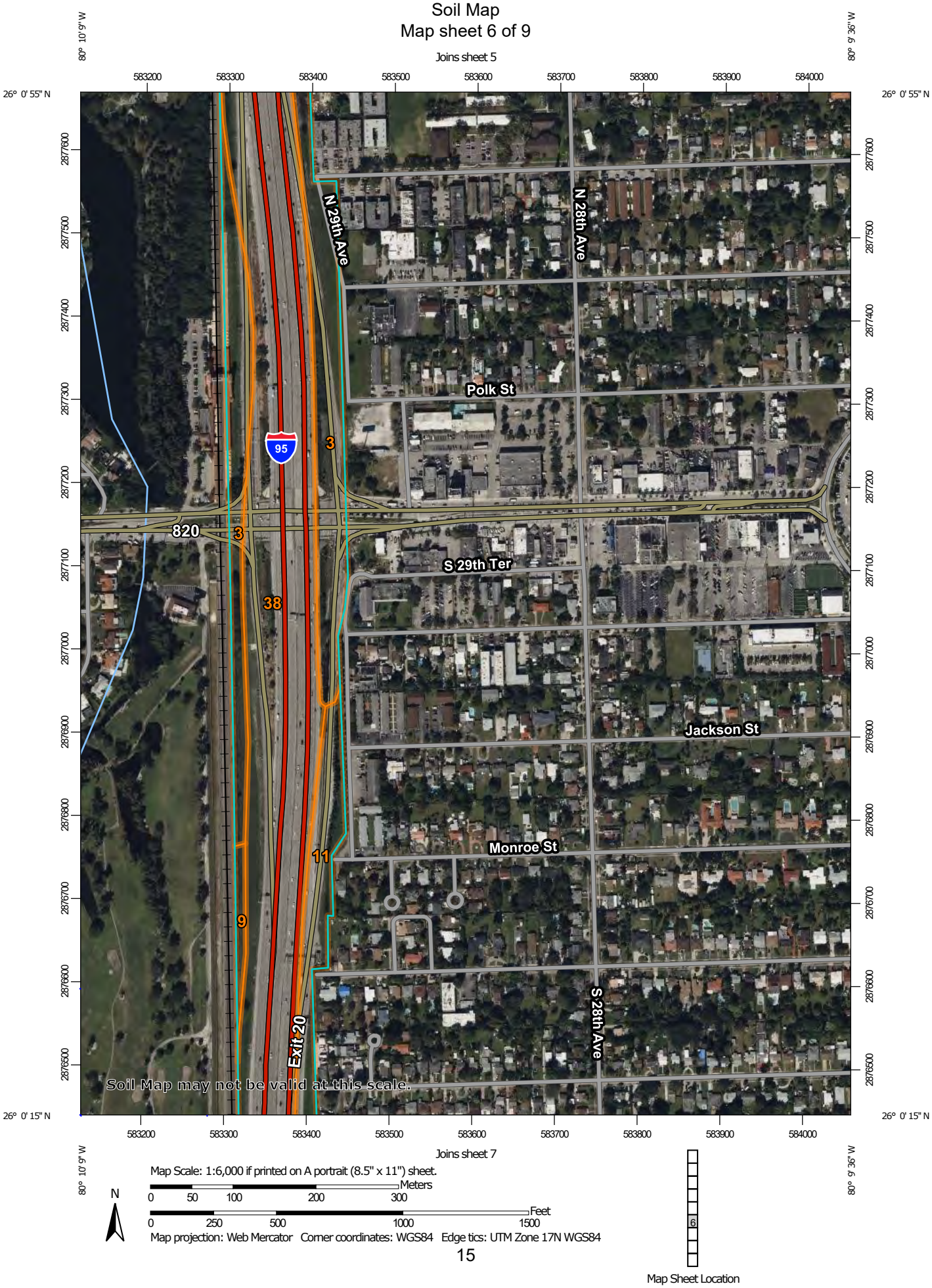

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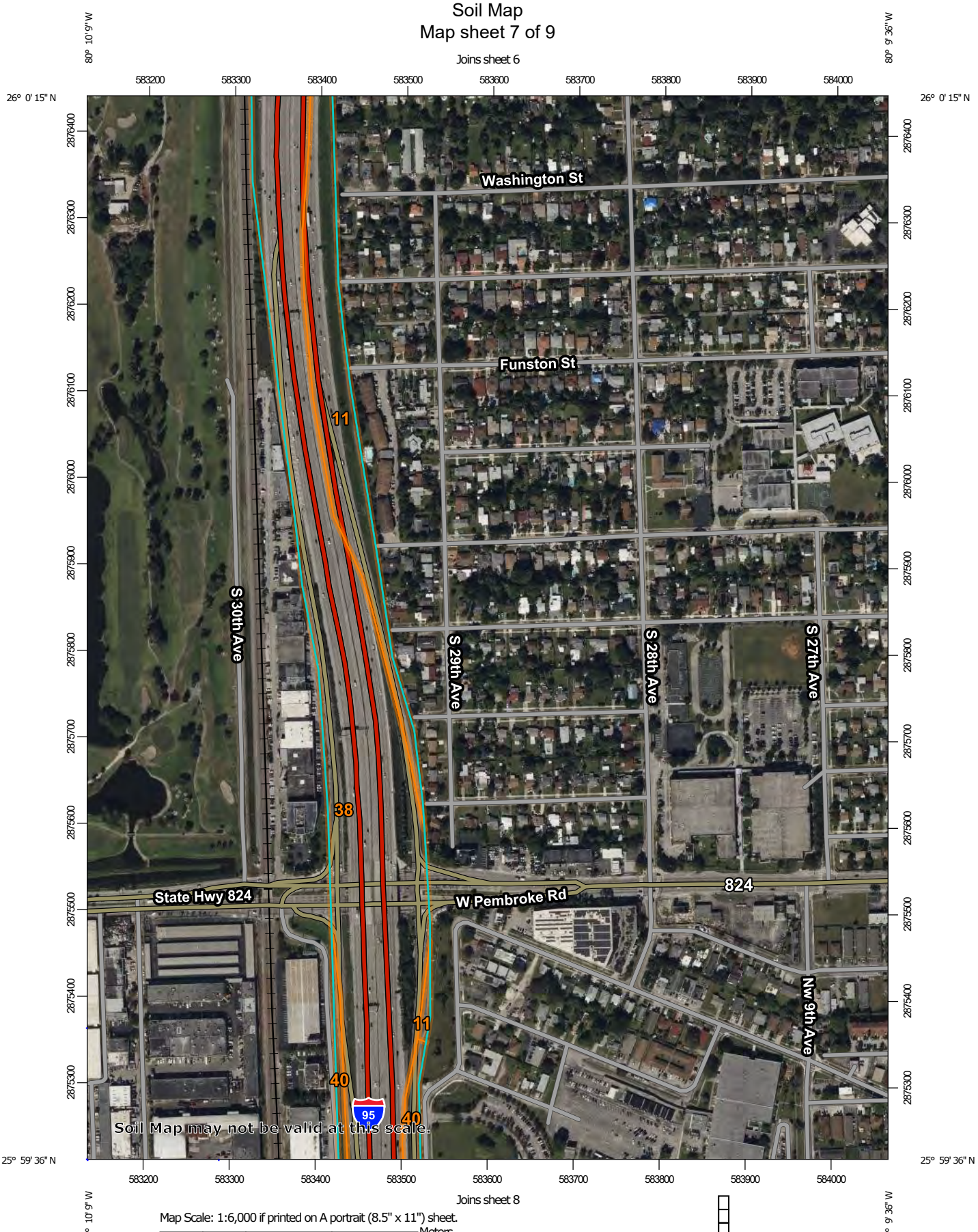

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Map Sheet Location

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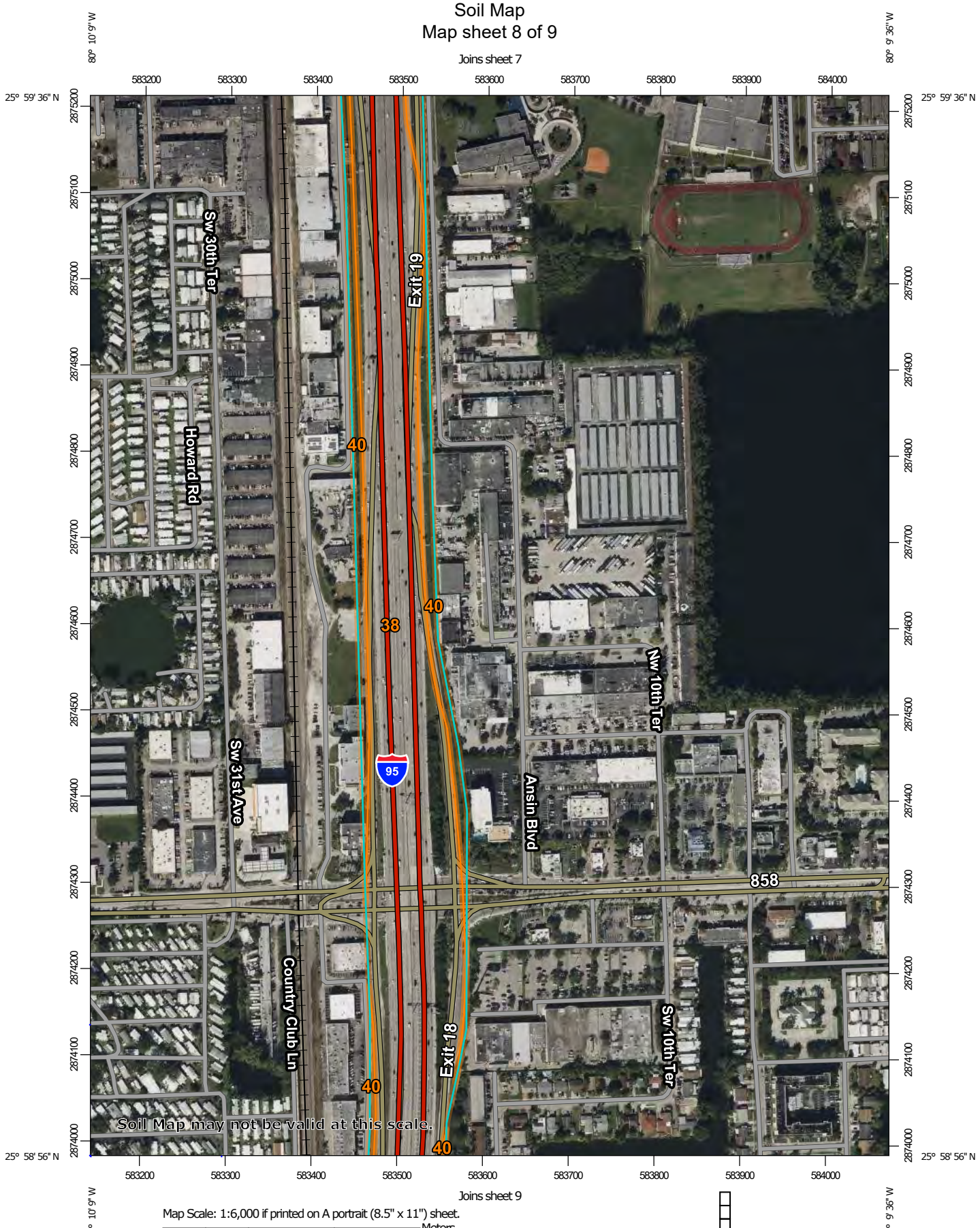
Soil Map
Map sheet 8 of 9



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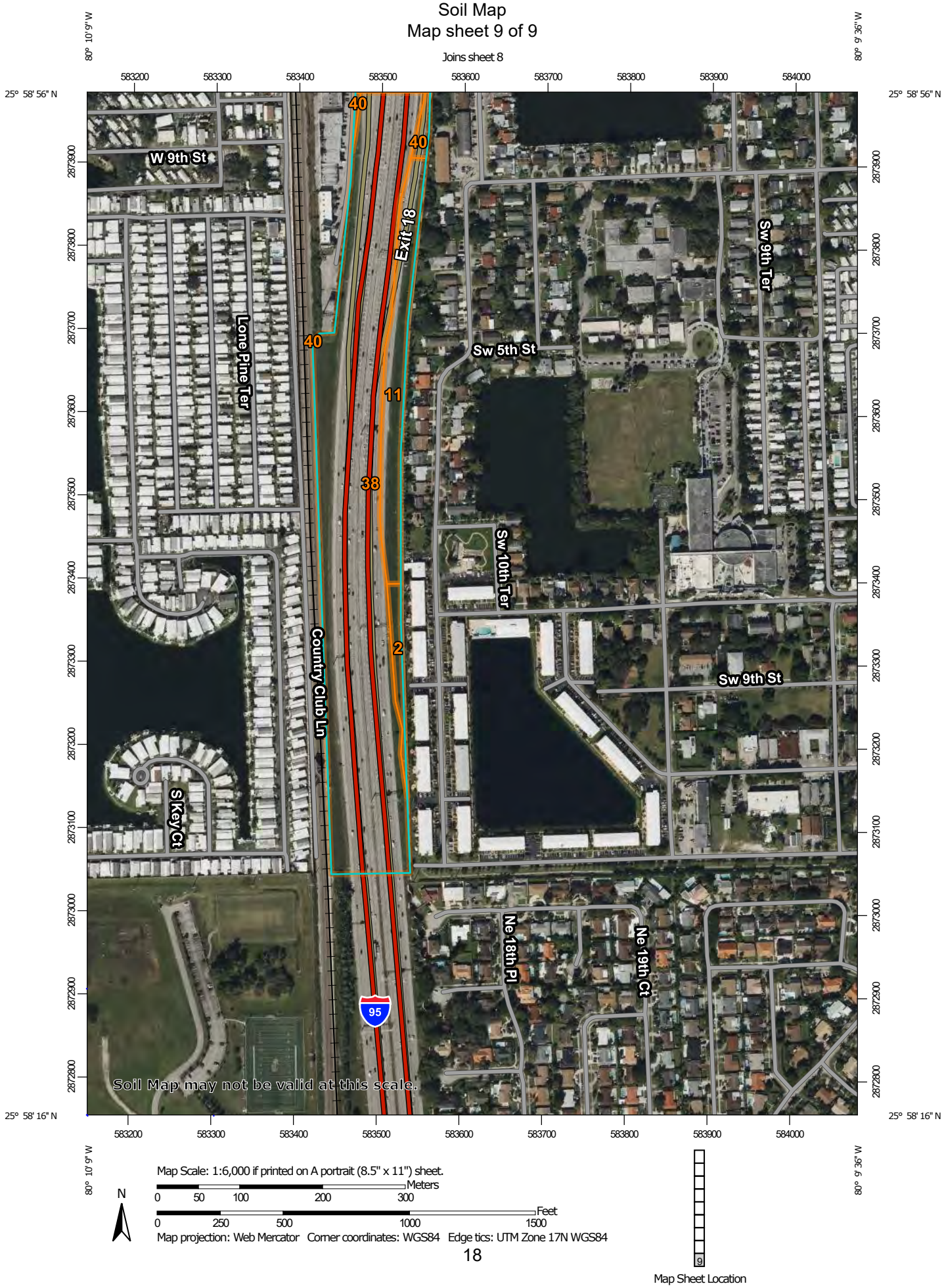
Soil Map
Map sheet 9 of 9



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Feet: 0 250 500 1000 1500

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

Map Sheet Location

Broward County, Florida, East Part

2—Arents-Urban land complex

Map Unit Setting

National map unit symbol: 1hn8f
Elevation: 0 to 210 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

A - 0 to 4 inches: cobbly sand
C1 - 4 to 9 inches: cobbly sand
C2 - 9 to 32 inches: sand
2C - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
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 18 to 36 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: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Arents, organic substratum

Percent of map unit: 3 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Udorthents, marly substratum

Percent of map unit: 2 percent
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

3—Arents, organic substratum-Urban land complex

Map Unit Setting

National map unit symbol: 1hn8g
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents, organic substratum and similar soils: 55 percent

Urban land: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents, Organic Substratum

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy dredge spoils over organic material over sandy marine deposits

Typical profile

A - 0 to 12 inches: gravelly sand
C - 12 to 38 inches: sand
Oa - 38 to 52 inches: muck
2C - 52 to 72 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
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 24 to 36 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: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

4—Basinger fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svym
Elevation: 0 to 100 feet
Mean annual precipitation: 42 to 63 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

Basinger and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basinger

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

Ag - 0 to 2 inches: fine sand
Eg - 2 to 18 inches: fine sand
Bh/E - 18 to 36 inches: fine sand
Cg - 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: 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 5.9 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: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
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

Immokalee

Percent of map unit: 4 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

Placid

Percent of map unit: 4 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

Pompano

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
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

Felda

Percent of map unit: 1 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: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

9—Dade fine sand

Map Unit Setting

National map unit symbol: 1hn8n
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Dade and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dade

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over soft limestone

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 27 inches: fine sand
Bh - 27 to 35 inches: fine sand
Cr - 35 to 39 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 60 to 72 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: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Other vegetative classification: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Hydric soil rating: No

Minor Components

Basinger

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
Hydric soil rating: Yes

Duette

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G156AC121FL)
Hydric soil rating: No

Margate

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Hydric soil rating: Yes

Immokalee, limestone substratum
Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
Hydric soil rating: No

11—Dade-Urban land complex

Map Unit Setting
National map unit symbol: 1hn8q
Elevation: -20 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Dade and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dade

Setting
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over soft limestone

Typical profile
A - 0 to 8 inches: gravelly sand
E - 8 to 27 inches: fine sand
Bh - 27 to 35 inches: fine sand
Cr - 35 to 39 inches: weathered bedrock

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 60 to 72 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: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Basinger

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Immokalee, limestone substratum

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Margate

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

19—Margate fine sand, occasionally ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2sm5l
Elevation: 0 to 30 feet
Mean annual precipitation: 55 to 70 inches
Mean annual air temperature: 72 to 81 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Margate

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy marine deposits over limestone

Typical profile

A - 0 to 8 inches: fine sand
E - 8 to 16 inches: fine sand
Bw - 16 to 28 inches: fine sand
C - 28 to 32 inches: very gravelly fine sand
2R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
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: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Hydric soil rating: Yes

Minor Components

Plantation

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: R156AY320FL - Subtropical Freshwater Non-Forested Wetlands of Miami Ridge/ Atlantic Coastal Strip
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: 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

Matlacha

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf

Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

20—Matlacha, limestone substratum-Urban land complex

Map Unit Setting

National map unit symbol: 1hn90
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Matlacha, limestone substratum, and similar soils: 50 percent
Urban land: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Matlacha, Limestone Substratum

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy mine spoil or earthy fill over limestone

Typical profile

C - 0 to 23 inches: gravelly fine sand
2Ab - 23 to 27 inches: fine sand
2Eb - 27 to 48 inches: fine sand
3R - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent

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: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Margate

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

21—Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzwc

Elevation: 0 to 40 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Okeelanta, drained, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Okeelanta, Drained

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa - 0 to 31 inches: muck
Cg - 31 to 65 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
Calcium carbonate, maximum content: 2 percent
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: Very high (about 14.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R156BY020FL - Histisol Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G156AC645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Minor Components

Sanibel

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear

Across-slope shape: Concave
Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Tequesta

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F156BY040FL - Sandy Pine Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

38—Udorthents, shaped

Map Unit Setting

National map unit symbol: 1hn9l
Elevation: 0 to 50 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, shaped and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Shaped

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Altered marine deposits

Typical profile

C1 - 0 to 30 inches: gravelly sand
C2 - 30 to 50 inches: sand
2R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 0 to 45 percent
Depth to restrictive feature: 40 to 72 inches to paralithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 24 to 48 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: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 10 percent
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

39—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 1hn9m
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

C1 - 0 to 30 inches: gravelly sand
C2 - 30 to 50 inches: sand
2R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 40 to 72 inches to paralithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 24 to 48 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: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)

Hydric soil rating: Unranked

Minor Components

Arents

Percent of map unit: 5 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

40—Urban land, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9fc
Elevation: 0 to 200 feet
Mean annual precipitation: 40 to 68 inches
Mean annual air temperature: 68 to 79 degrees F
Frost-free period: 345 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills on marine terraces, ridges on marine terraces, knolls on marine terraces, rises on marine terraces, flatwoods on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Matlacha

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

St. augustine

Percent of map unit: 3 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 1 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Brynwood

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka

Percent of map unit: 1 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Paola

Percent of map unit: 1 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
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Pomello

Percent of map unit: 1 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
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 1 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Apopka

Percent of map unit: 1 percent
Landform: Hills on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)

Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Forage suitability group: Forage suitability group not assigned (G156AC999FL)

Other vegetative classification: Forage suitability group not assigned (G156AC999FL)

Hydric soil rating: Unranked

Engineering Properties

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.

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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."

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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).

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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.

Report—Engineering Properties

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–Broward County, Florida, East Part														
Map unit symbol and soil name	Pct. of map unit	Hydro-logic 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*
2—Arents-Urban land complex														
Arents	55	A/D	0-4	Cobbly sand	SP-SM, SP	A-1-b, A-2-4, A-3	—	0- 0- 0	75-90-95	60-73-85	40-47-60	2- 8- 12	0-7 -14	NP
			4-9	Cobbly sand	SP-SM, SP	A-1-b, A-2-4, A-3	—	0- 0- 0	75-90-95	60-73-85	40-47-60	2- 8- 12	0-7 -14	NP
			9-32	Sand, fine sand	SP-SM, SP	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-88-95	2- 7- 12	0-7 -14	NP
			32-60	Sand, fine sand	SP-SM, SP	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-88-95	2- 7- 12	0-7 -14	NP

Engineering Properties–Broward County, Florida, East Part														
Map unit symbol and soil name	Pct. of map unit	Hydro-logic 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*
3—Arents, organic substratum-Urban land complex														
Arents, organic substratum	55	A	0-12	Gravelly sand	SP-SM, SP	A-1-b, A-2-4, A-3	—	0- 0- 0	60-88-93	50-73-80	40-48-70	2- 7- 12	0-7 -14	NP
			12-38	Sand, fine sand	SP-SM, SP	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-88-95	2- 7- 12	0-7 -14	NP
			38-52	Muck	PT	A-8	0- 0- 0	0- 0- 0	100-100-100	100-100-100	100-100-100	100-100-100	—	—
			52-72	Sand, fine sand	SP-SM, SP	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-88-95	2- 7- 12	0-7 -14	NP
4—Basinger fine sand, 0 to 2 percent slopes														
Basinger	80	A/D	0-2	Fine sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	87-94-100	7-10- 15	0-0 -0	NP
			2-18	Fine sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-94-100	6- 9- 14	0-0 -0	NP
			18-36	Fine sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	87-94-100	7-11- 16	0-0 -0	NP
			36-80	Fine sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	87-94-100	7-11- 16	0-0 -0	NP
9—Dade fine sand														
Dade	94	A	0-6	Fine sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	1- 4- 6	0-7 -14	NP
			6-27	Fine sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	1- 4- 6	0-7 -14	NP
			27-35	Fine sand, sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	2- 5- 8	0-7 -14	NP
			35-39	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties–Broward County, Florida, East Part														
Map unit symbol and soil name	Pct. of map unit	Hydro-logic 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—Dade-Urban land complex														
Dade	55	A	0-8	Gravelly sand	SP-SM, SP	A-3	0- 1- 2	0-10- 15	80-90-100	70-85-100	60-70-100	1- 4- 6	0-7 -14	NP
			8-27	Fine sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	1- 4- 6	0-7 -14	NP
			27-35	Fine sand, sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	2- 5- 8	0-7 -14	NP
			35-39	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
19—Margate fine sand, occasionally ponded, 0 to 1 percent slopes														
Margate	85	A/D	0-8	Fine sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-94-100	9-11- 17	0-0 -0	NP
			8-16	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	9-11- 16	0-0 -0	NP
			16-28	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	9-11- 17	0-0 -0	NP
			28-32	Very gravelly fine sand, very gravelly sand	GP-GM, GW	A-1-a, A-1-b, A-2-4	0- 6- 11	0- 6- 11	35-48-57	29-43-53	26-41-52	3- 7- 11	0-0 -0	NP
			32-42	Bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties–Broward County, Florida, East Part														
Map unit symbol and soil name	Pct. of map unit	Hydro-logic 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*
20—Matlacha, limestone substratum-Urban land complex														
Matlacha, limestone substratum	50	B	0-23	Gravelly fine sand	SP-SM, SP	A-3	—	0- 8- 15	70-78-85	70-78-85	60-70-80	2- 6- 10	0-7 -14	NP
			23-27	Fine sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	2- 6- 10	0-7 -14	NP
			27-48	Fine sand	SP-SM, SP	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	2- 6- 10	0-7 -14	NP
			48-52	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—
21—Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes														
Okeelanta, drained	90	A/D	0-31	Muck	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			31-65	Fine sand, sand	SP-SM, SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	88-94-100	11-13-18	0-0 -0	NP
38—Udorthents, shaped														
Udorthents, shaped	90	A	0-30	Gravelly sand	GP-GM, SP-SM, SP	A-1-b, A-2-4, A-3	0- 1- 2	10-15-40	50-65-80	40-55-70	30-45-60	2- 7- 12	0-7 -14	NP
			30-50	Sand, fine sand	SP-SM, SP	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-88-95	2- 7- 12	0-7 -14	NP
			50-54	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties–Broward County, Florida, East Part														
Map unit symbol and soil name	Pct. of map unit	Hydro-logic 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*
39—Udorthents-Urban land complex														
Udorthents	55	A	0-30	Gravelly sand	GP-GM, SP-SM, SP	A-1-b, A-2-4, A-3	0- 1- 2	10-15-40	50-65-80	40-55-70	30-45-60	2- 7- 12	0-7 -14	NP
			30-50	Fine sand, sand	SP-SM, SP	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-88-95	2- 7- 12	0-7 -14	NP
			50-54	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Broward County, Florida, East Part
Survey Area Data: Version 21, Aug 29, 2025

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features–Broward County, Florida, East Part									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
2—Arents-Urban land complex									
Arents		—	—		—	—	None	High	Moderate
Urban land		—	—		—	—			
3—Arents, organic substratum-Urban land complex									
Arents, organic substratum		—	—		—	—	None	High	Moderate
Urban land		—	—		—	—			
4—Basinger fine sand, 0 to 2 percent slopes									
Basinger		—	—		0	0	None	High	High
9—Dade fine sand									
Dade	Paralithic bedrock	20-35-40	—	Moderately coherent	—	—	None	Low	Low
11—Dade-Urban land complex									
Dade	Paralithic bedrock	20-35-40	—	Moderately coherent	—	—	None	Low	Low
Urban land		—	—		—	—			

Soil Features–Broward County, Florida, East Part									
Map symbol and soil name	**Restrictive Layer**				**Subsidence**		**Potential for frost action**	**Risk of corrosion**	
	Kind	**Depth to top**	**Thickness**	**Hardness**	**Initial**	**Total**		**Uncoated steel**	**Concrete**
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
19—Margate fine sand, occasionally ponded, 0 to 1 percent slopes									
Margate	Lithic bedrock	20-32-40	10-10	Indurated	0	0	None	High	High
20—Matlacha, limestone substratum-Urban land complex									
Matlacha, limestone substratum	Lithic bedrock	40-48-60	—	Indurated	—	—	None	Low	Moderate
Urban land		—	—		—	—			
21—Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes									
Okeelanta, drained		—	—		16-20	16-30	None	High	Moderate
38—Udorthents, shaped									
Udorthents, shaped	Paralithic bedrock	40-50-72	—	Moderately coherent	—	—	None	Low	Moderate

Soil Features–Broward County, Florida, East Part									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
39—Udorthents-Urban land complex									
Udorthents	Paralithic bedrock	40-50-72	—	Moderately coherent	—	—	None	Low	Moderate
Urban land		—	—		—	—			
40—Urban land, 0 to 2 percent slopes									
Urban land		—	—		0	0			
99—Water									
Water		—	—		—	—			

Data Source Information

Soil Survey Area: Broward County, Florida, East Part
Survey Area Data: Version 21, Aug 29, 2025

Water Features

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. The water features table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table. The kind of water table, apparent or perched, is given if a seasonal high water table exists in the soil. A water table is perched if free water is restricted from moving downward in the soil by a restrictive feature, in most cases a hardpan; there is a dry layer of soil underneath a wet layer. A water table is apparent if free water is present in all horizons from its upper boundary to below 2 meters or to the depth of observation. The water table kind listed is for the first major component in the map unit.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Report—Water Features

Map unit symbol and soil name	Hydrologic Group	Surface Runoff	Most likely Months	Water Table			Ponding			Flooding	
				Upper limit	Lower limit	Kind	Surface Depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*		*Ft*				
2—Arents-Urban land complex											
Arents	A/D	High	Jan-May	—	—	—	—	—	None	—	None
			Jun-Nov	1.5-3.0	6.0	Apparent	—	—	None	—	None
			Dec	—	—	—	—	—	None	—	None
Urban land				—	—	—	—	—	—	—	
3—Arents, organic substratum-Urban land complex											
Arents, organic substratum	A	High	Jan-May	—	—	—	—	—	None	—	None
			Jun-Nov	2.0-3.0	6.0	Apparent	—	—	None	—	None
			Dec	—	—	—	—	—	None	—	None
Urban land				—	—	—	—	—	—	—	
4—Basinger fine sand, 0 to 2 percent slopes											
Basinger	A/D	Negligible	Jan	0.5-2.5	6.0	Apparent	—	—	—	—	None
			Feb	1.0-5.0	6.0	Apparent	—	—	—	—	None
			Mar	1.5-5.0	6.0	Apparent	—	—	—	—	None
			Apr-May	2.0-6.0	6.0	Apparent	—	—	—	—	None
			Jun	0.5-1.5	6.0	Apparent	—	—	—	—	None
			Jul-Oct	0.0-1.0	6.0	Apparent	0.0-0.5	Brief (2 to 7 days)	Frequent	—	None
			Nov	0.5-1.5	6.0	Apparent	—	—	—	—	None
			Dec	0.5-2.5	6.0	Apparent	—	—	—	—	None

Map unit symbol and soil name	Hydrologic Group	Surface Runoff	Most likely Months	Water Table			Ponding			Flooding	
				Upper limit	Lower limit	Kind	Surface Depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*		*Ft*				
9—Dade fine sand											
Dade	A	Negligible	Jan-May	—	—	—	—	—	None	—	None
			Jun-Sep	5.0-6.0	6.0	Apparent	—	—	None	—	None
			Oct-Dec	—	—	—	—	—	None	—	None
11—Dade-Urban land complex											
Dade	A	Negligible	Jan-May	—	—	—	—	—	None	—	None
			Jun-Sep	5.0-6.0	6.0	Apparent	—	—	None	—	None
			Oct-Dec	—	—	—	—	—	None	—	None
Urban land				—	—	—	—	—	—	—	
19—Margate fine sand, occasionally ponded, 0 to 1 percent slopes											
Margate	A/D	Negligible	Jan	0.5-2.5	6.0	Apparent	—	—	—	—	None
			Feb	1.0-5.0	6.0	Apparent	—	—	—	—	None
			Mar-Apr	1.5-5.0	6.0	Apparent	—	—	—	—	None
			May	1.5-6.0	6.0	Apparent	—	—	—	—	None
			Jun	0.5-1.5	6.0	Apparent	—	—	—	—	None
			Jul-Oct	0.0-1.5	6.0	Apparent	0.0-1.0	Brief (2 to 7 days)	Frequent	—	None
			Nov	0.5-1.5	6.0	Apparent	—	—	—	—	None
			Dec	0.5-2.5	6.0	Apparent	—	—	—	—	None
20—Matlacha, limestone substratum-Urban land complex											
Matlacha, limestone substratum	B	Low	Jan-May	—	—	—	—	—	None	—	None
			Jun-Oct	2.0-3.0	6.0	Apparent	—	—	None	—	None
			Nov-Dec	—	—	—	—	—	None	—	None
Urban land				—	—	—	—	—	—	—	

Map unit symbol and soil name	Hydrologic Group	Surface Runoff	Most likely Months	Water Table			Ponding			Flooding	
				Upper limit	Lower limit	Kind	Surface Depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*		*Ft*				
21—Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes											
Okeelanta, drained	A/D	Negligible	Jan-May	0.0	5.4	Apparent	—	—	—	—	None
			Jun-Oct	0.0	5.4	Apparent	0.0-1.0	Long (7 to 30 days)	Frequent	—	None
			Nov-Dec	0.0	5.4	Apparent	—	—	—	—	None
38—Udorthents, shaped											
Udorthents, shaped	A	Low	Jan-Dec	2.0-4.0	6.0	Apparent	—	—	None	—	None
39—Udorthents-Urban land complex											
Udorthents	A	Low	Jan-Dec	2.0-4.0	6.0	Apparent	—	—	None	—	None
Urban land				—	—	—	—	—	—	—	
40—Urban land, 0 to 2 percent slopes											
Urban land		Very high		—	—	—	—	—	—	—	
99—Water											
Water				—	—	—	—	—	—	—	

Data Source Information

Soil Survey Area: Broward County, Florida, East Part
Survey Area Data: Version 21, Aug 29, 2025

Physical Soil Properties

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)

Report—Physical Soil Properties

Physical Soil Properties–Broward County, Florida, East Part														
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*					
2—Arents-Urban land complex														
Arents	0-4	-94-	0- 1- 15	1- 6- 10	1.35-1.55	42.00-141.00	0.02-0.08	0.0-2.9	0.0-0.5	.02	.02	5	1	220
	4-9	-94-	0- 1- 15	1- 6- 10	1.35-1.55	42.00-141.00	0.02-0.08	0.0-2.9	0.0-0.5	.02	.02			
	9-32	-94-	0- 1- 15	1- 6- 10	1.35-1.55	42.00-141.00	0.02-0.08	0.0-2.9	0.0-0.5	.02	.02			
	32-60	-94-	0- 1- 15	1- 6- 10	1.35-1.55	42.00-141.00	0.02-0.08	0.0-2.9	0.0-0.5	.02	.02			
Urban land	—	—	—	—	—	—	—	—	—					
3—Arents, organic substratum-Urban land complex														
Arents, organic substratum	0-12	-94-	0- 1- 15	1- 6- 10	1.35-1.55	42.00-141.00	0.02-0.10	0.0-2.9	0.0-0.5	.02	.02	5	1	220
	12-38	-94-	0- 1- 15	1- 6- 10	1.35-1.55	42.00-141.00	0.02-0.10	0.0-2.9	0.0-0.5	.02	.02			
	38-52	—	—	—	0.20-0.40	42.00-141.00	0.30-0.50	—	62.0-80.0					
	52-72	-95-	0- 2- 15	1- 3- 5	1.35-1.55	42.00-141.00	0.02-0.10	0.0-2.9	0.0-1.0	.02	.02			
Urban land	—	—	—	—	—	—	—	—	—					

Physical Soil Properties–Broward County, Florida, East Part														
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*					
4—Basinger fine sand, 0 to 2 percent slopes														
Basinger	0-2	90-98-100	0- 1- 8	1- 1- 4	1.51-1.59	42.00-141.00	0.06-0.10	0.0-0.5	1.0-3.0	.05	.05	5	1	250
	2-18	90-99-100	0- 1- 8	0- 1- 2	1.59	42.00-141.00	0.06-0.10	0.0-0.1	0.0-0.5	.02	.02			
	18-36	90-97- 99	0- 1- 7	1- 3- 5	1.56-1.59	42.00-141.00	0.12-0.16	0.0-0.5	0.8-2.0	.02	.02			
	36-80	90-97-100	0- 1- 8	1- 2- 5	1.54-1.60	42.00-141.00	0.06-0.10	0.0-0.3	0.0-0.5	.02	.02			
9—Dade fine sand														
Dade	0-6	-98-	0- 1- 15	0- 1- 2	1.45-1.60	141.00-282.00	0.02-0.05	0.0-2.9	0.0-0.5	.05	.05	3	1	250
	6-27	-98-	0- 1- 15	0- 1- 2	1.45-1.60	141.00-282.00	0.02-0.05	0.0-2.9	0.0-0.5	.02	.02			
	27-35	-96-	0- 1- 15	1- 3- 5	1.45-1.60	141.00-282.00	0.02-0.05	0.0-2.9	0.0-2.0	.10	.10			
	35-39	—	—	—	—	14.00-141.00	—	—	—					
11—Dade-Urban land complex														
Dade	0-8	-98-	0- 1- 15	0- 1- 2	1.45-1.60	141.00-282.00	0.02-0.05	0.0-2.9	0.0-0.5	.02	.05	3	1	220
	8-27	-98-	0- 1- 15	0- 1- 2	1.45-1.60	141.00-282.00	0.02-0.05	0.0-2.9	0.0-0.5	.02	.02			
	27-35	-96-	0- 1- 15	1- 3- 5	1.45-1.60	141.00-282.00	0.02-0.05	0.0-2.9	0.0-2.0	.10	.10			
	35-39	—	—	—	—	14.00-141.00	—	—	—					
Urban land	—	—	—	—	—	—	—	—	—					

Physical Soil Properties–Broward County, Florida, East Part														
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*					
19—Margate fine sand, occasionally ponded, 0 to 1 percent slopes														
Margate	0-8	90-97- 99	0- 1- 8	1- 3- 7	1.52-1.58	42.00-141.00	0.06-0.10	0.0-1.0	0.0-4.0	.02	.02	2	1	250
	8-16	90-97-100	0- 1- 8	0- 2- 5	1.57-1.59	42.00-141.00	0.06-0.10	0.0-0.5	0.0-0.5	.02	.02			
	16-28	90-97- 99	0- 1- 8	1- 3- 7	1.62-1.64	42.00-141.00	0.06-0.10	0.0-0.9	0.0-0.5	.02	.02			
	28-32	90-92- 99	0- 1- 9	1- 7- 10	1.57-1.68	42.00-141.00	0.06-0.10	0.0-0.8	0.0-0.5	.02	.02			
	32-42	—	—	—	—	14.00-141.00	—	—	—					
20—Matlacha, limestone substratum-Urban land complex														
Matlacha, limestone substratum	0-23	-95-	0- 1- 15	3- 4- 8	1.65-1.75	14.00-42.00	0.05-0.08	0.0-2.9	0.0-3.0	.02	.02	3	1	250
	23-27	-98-	0- 1- 15	1- 1- 2	1.50-1.65	42.00-141.00	0.03-0.05	0.0-2.9	0.0-0.5	.05	.05			
	27-48	-98-	0- 1- 15	1- 1- 2	1.50-1.65	42.00-141.00	0.03-0.05	0.0-2.9	0.0-0.5	.02	.02			
	48-52	—	—	—	—	14.00-141.00	—	—	—					
Urban land	—	—	—	—	—	—	—	—	—					

Physical Soil Properties–Broward County, Florida, East Part														
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—Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes														
Okeelanta, drained	0-31	—	—	—	0.11-0.27	42.00-141.00	0.35-0.45	—	60.0-90.0			1	2	134
	31-65	90-95- 99	0- 3- 9	1- 2- 5	1.58-1.65	42.00-141.00	0.06-0.10	0.0-0.8	0.0-1.0	.02	.02			
38—Udorthents, shaped														
Udorthents, shaped	0-30	-95-	0- 2- 15	1- 3- 5	1.35-1.45	42.00-141.00	0.02-0.05	0.0-2.9	0.5-1.5	.02	.02	4	1	220
	30-50	-95-	0- 1- 15	1- 4- 10	1.35-1.55	42.00-141.00	0.02-0.08	0.0-2.9	0.0-0.5	.02	.02			
	50-54	—	—	—	—	14.00-141.00	—	—	—					
39—Udorthents-Urban land complex														
Udorthents	0-30	-95-	0- 2- 15	1- 3- 5	1.35-1.45	42.00-141.00	0.02-0.05	0.0-2.9	0.5-1.5	.02	.02	4	1	220
	30-50	-95-	0- 1- 15	1- 4- 10	1.35-1.55	42.00-141.00	0.02-0.08	0.0-2.9	0.0-0.5	.02	.02			
	50-54	—	—	—	—	14.00-141.00	—	—	—					
Urban land	—	—	—	—	—	—	—	—	—					
40—Urban land, 0 to 2 percent slopes														
Urban land	—	—	—	—	—	—	—	—	—					

Physical Soil Properties–Broward County, Florida, East Part														
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*					
99—Water														
Water	—	—	—	—	—	—	—	—	—					

Data Source Information

Soil Survey Area: Broward County, Florida, East Part
Survey Area Data: Version 21, Aug 29, 2025