



**GROUND
DOWN**
ENGINEERING



**9232 RHEA DRIVE, SUITE L
ODESSA, FL 33556**

**REPORT OF GEOTECHNICAL EXPLORATION
PROPOSED RESIDENTIAL STRUCTURE
3473 GULF COAST DRIVE
HERNANDO BEACH, FLORIDA
HERNANDO COUNTY
GDE PROJECT NO.: 23-306**

Prepared For:

David Wilson
Harrington, DE

October 2023



October 3, 2023

David Wilson
1229 Staytonville Road
Harrington, DE 19952-1849

**Report of Geotechnical Exploration
Proposed Residential Structure
3473 Gulf Coast Drive
Hernando Beach, FL
Hernando County
GDE Project No.: 23-306**

Dear Mr. Wilson:

Ground Down Engineering, Inc. (GDE) has completed the geotechnical exploration for the referenced project that you authorized. The purposes of this study were to explore general subsurface conditions at the proposed site and to use the data obtained to develop engineering recommendations regarding the suitability of the site for the proposed residential construction, including foundation recommendations. This report describes our exploration procedure, presents the data obtained, and presents our conclusions and recommendations regarding the geotechnical engineering aspects of site and foundation design.

In summary, very soft silt and clay soils were encountered between depths of about 6 and 8 feet below existing grade at the SPT boring locations. To prevent excessive building settlements that could potentially occur from the consolidation of these very soft soils with the application of building loads, we recommend that the proposed house be supported by deep foundations consisting of driven timber piles. We also recommend a structurally supported slab be designed for this project.

GDE appreciates the opportunity to participate in this project and we trust that the information included in this report is sufficient for your design. If you have any questions or comments concerning the contents of this report, please contact us.

Sincerely,

Ground Down Engineering, Inc.
GDE FL Certificate of Authorization No. 9599

A handwritten signature in blue ink that reads "Brian D. Richardson".

Brian D. Richardson, P.E.
Senior Geotechnical Engineer
FL Reg. No. 84354

A handwritten signature in blue ink that reads "Laurel A. Hall".

Laurel A. Hall, P.E.
President
FL Reg. No. 38392

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PROJECT INFORMATION

Existing Site

Based on the information provided for our review, we understand that a new residential structure is planned for the site located at 3473 Gulf Coast Drive, Hernando Beach, Hernando County, Florida (Figure 1). Our study addresses geotechnical design and construction recommendations for the foundations of the residential structure along with recommendations for structural fill if required for the project.

Structural loading data was not available at the time of this report.

Project Approach

The objective of the geotechnical investigation for the proposed project was to obtain information concerning the general subsurface conditions at the site to make geotechnical engineering estimates and recommendations in each of the following areas:

- Soil stratigraphy at the boring locations and the development of the approximate soil profile.
- General location and description of potentially deleterious materials which may interfere with construction progress or new structure performance, including buried or surficial existing fills, organics, construction debris, etc.
- Identification of some critical design or construction details, including present groundwater levels and estimated wet season levels at the boring locations.
- Engineering criteria and recommendations for the placement and compaction of approved fill materials (if necessary) in and around the structure areas.
- Design and construction recommendations considering the water table conditions.

Scope of Work

To address the above objectives, our scope of work for this project included the following:

- Reviewed available published information on the site, including the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) soil survey data for Hernando County.
- Conducted a subsurface exploration program consisting of soil borings and subsurface sampling. Our exploration program for this project consisted of:
 - Performing 2 SPT borings to depths of 20 and 30 feet in the proposed structure footprint.
- Measured the stabilized groundwater levels at the boring locations.
- Reviewed and classified the recovered soils using the Unified Soil Classification System. Developed the general soil stratigraphy at the boring locations.
- Performed geotechnical engineering studies and analyses to develop geotechnical engineering recommendations for each of the objectives previously discussed for the proposed project.

- Prepared a geotechnical report that summarizes the course of our study, the field data generated, the subsurface conditions encountered, and our geotechnical engineering recommendations for the proposed project.

Soil Survey Review

According to the U.S.D.A. "Soil Survey of Hernando County", the soil types present on the subject site are:

- Arents-Urban land complex – Arents consists of somewhat poorly drained sand to a depth of 80 inches below grade. Historical seasonal high groundwater level is about 42 to 60 inches below grade. Urban land consists of residential and commercial developments, streets, parking lots, and other impervious groundcover that makes soil and groundwater level identification infeasible.

SUBSURFACE EXPLORATION

Field Exploration

The procedures used by Ground Down Engineering, Inc. for field sampling and testing are in general accordance with industry standards of care and established geotechnical engineering practice. GDE located the borings within the site as indicated per the attached Boring Location Plan (Figure 2). The field testing locations should be considered approximate.

Standard Penetration Test Borings

The SPT borings were advanced by means of a track-mounted drill rig employing wet rotary drilling techniques. The SPT testing was performed continuously in the upper ten feet and at five-foot intervals thereafter. The soil samples were obtained at the depths where the SPT testing was performed. The soil samples were then classified in the field according to the Unified Soil Classification System (ASTM D 2487).

The SPT borings were performed in general compliance with standard field penetration test procedures (ASTM D 1586-99). After drilling to the sampling depth and flushing the borehole, the standard two-inch O.D. split-barrel sampler was seated by driving it six inches into the undisturbed soil at the bottom of the borehole. The sampler was then driven an additional 12 inches by a 140-pound hammer falling 30 inches. The number of blows required to produce the 12 inches of penetration is recorded as the standard penetration test value (N). These values are plotted on the left side of the boring logs in Figure 3.

Sampling performed in the upper ten feet utilized a 24-inch long split spoon. The sampler was driven 24 inches and the blows required to drive the sampler the middle two 6-inch increments were recorded as the "N" value. Through this technique, the upper ten feet of the soil was sampled continuously. Detailed descriptions of the soils encountered during the advancement of the SPT borings are presented in the boring logs (Figure 3).

Soil Sample Handling and Classification

The soil samples obtained during the SPT borings were reviewed to confirm classifications, estimate the relative percentages of the soil's constituents (sand, clay, etc.), and identify pertinent structural features. The soils were classified according to the Unified Soil Classification System (ASTM D 2487). The stratification lines shown on the boring records represent our interpretation of approximate boundaries between soil types. The transition between strata may be gradual. Our classifications are based on an estimation of the soil properties and our engineering experience with the soils found in this geologic area.

RESULTS

Subsurface Conditions

Below 10 feet a rotary drilling technique was used along with the circulation of a clay bentonite drilling slurry to stabilize the borehole and prevent cave-in. The groundwater table was encountered at about 5 and 5.5 feet below existing grade at the SPT boring locations.

Boring B-1 generally encountered a sequence of fine SAND, LIMESTONE, slightly clayey SAND, LIMESTONE, sandy SILT with roots, silty SAND with roots, and LIMESTONE to a depth of 20 feet below existing grade. (“N” values ranged from 4 to 27 blows per foot of penetration.)

Boring B-2 generally encountered a sequence of fine SAND with roots and limestone, fine SAND with limestone, sandy CLAY with roots and limestone, and LIMESTONE to a depth of 30 feet below existing grade. (“N” values ranged from 1 to 35 blows per foot of penetration.)

Please note that the SPT “N” values are presented adjacent to the boring logs in Figure 3. The correlation of the SPT “N” values with relative density, unconfined compressive strength, and consistency are provided in the following table:

Coarse Grained Soils		Fine Grained Soils		
Penetration Resistance N (blows/ft)	Relative Density of Sand	Penetration Resistance N (blows/ft)	Unconfined Compressive Strength of Clay (tons/ft ²)	Consistency of Clay
0-4	Very Loose	<2	<0.25	Very Soft
4-10	Loose	2-4	0.25-0.50	Soft
10-30	Medium-Dense	4-8	0.50-1.00	Medium
30-50	Dense	8-15	1.00-2.00	Stiff
>50	Very Dense	15-30	2.00-4.00	Very Stiff
		>30	>4.00	Hard

Groundwater

Boring Number	Depth to Groundwater (feet)	Estimated Depth to Seasonal High Groundwater Table (ft)
B-1	5	4
B-2	5.5	4.5

*Groundwater measured September 2023

Significant fluctuations in the groundwater levels should be expected due to seasonal variations in rainfall, runoff, and other site-specific factors.

SUBSURFACE ANALYSIS

Foundation Analysis

Very soft silt and clay soils were encountered between depths of about 6 and 8 feet below existing grade at the SPT boring locations. If built on conventional shallow footings, we anticipate that the building settlements generated from the consolidation of these very soft soils will exceed the settlement tolerance of the proposed structure. To prevent excessive building settlements and associated damage, we recommend that the proposed structure be supported by deep foundations consisting of driven timber piles. The piles will transfer the building loads below the deleterious soils to competent limestone bedrock.

Timber Pile Foundation Recommendations

We have performed a pile capacity analysis for driven timber piles using the soil conditions encountered at the site and a factor of safety of 2. The ground should be predrilled at the pile locations to a depth of approximately 8 feet below existing grade. Predrilling at the pile locations prior to pile driving is a precautionary measure used to prevent pile damage from additional driving, allows for straighter pile installation, and reduces the potential for damage to adjacent structures from vibrations created from pile driving. We estimate that pile installation depths will range from 20 to 30 feet below existing grade.

Generally, timber piles with minimum 8-inch-wide tips driven to competent limestone bedrock should achieve allowable axial compression capacities of 15 tons per pile.

We recommend that pile cutting shoes or points be used for the project. A pile shoe/point made of structural grade steel attached to the tip of the pile allows for the pile to be driven into hard material that would otherwise damage the pile or cause the pile to walk. Pile shoes/points will enable the piles to be driven through the weaker limestone bedrock encountered between about 13.5 and 25 feet below existing grade to hard limestone bedrock to achieve the above recommended capacity.

Structural Slab Recommendations

As discussed previously, due to the potential unsuitable amount of settlement caused by the deleterious soil conditions encountered in the borings, we recommend that a structurally supported slab be designed for the project.

Structural Fill

Definition

If needed, soil used for structural fill can be defined as clean fine sand containing less than twelve percent material by weight that is finer than a number 200 sieve (fines) (material conforming to SP to SP-SM in the Unified Soil Classification System) and less than 5 percent organics by weight. However, materials containing up to 25 percent fines (materials conforming to SC or SM in the Unified Soil Classification System) may be utilized as structural fill, if their plasticity index is less than 20 and the working subgrade is at least 2 feet above water or groundwater level.

If fill material with higher fines content is used (< 25 percent fines), the material will require the use of compaction equipment designed for clayey soils. This includes a sheeps foot or vibratory pad foot roller. In addition, a disk could be required to assist with drying the clayey soils in order to place them at or near their optimum moisture content. These materials must be placed in 6-inch thick maximum lifts so that they can be effectively compacted with a vibratory pad foot roller.

Placement

Fill should be placed in lifts not to exceed one foot thick. The fill material should be compacted to at least 95 percent of its modified Proctor maximum dry density (ASTM D 1557). Confined areas, such as utility trenches, should be compacted with manually operated vibratory compaction equipment.

TESTING AND MONITORING

Construction monitoring and testing are essential to proper site construction and performance. Compliance with the recommended construction specification for compaction and soil types must be verified by our engineering technician familiar with the project construction. Observation of site preparation work is an integral part of the engineering recommendations contained in this report. Density tests should be performed for each lift of structural fill placed and per Hernando County Specifications.

LIMITATIONS

This report has been prepared for the exclusive use of **David Wilson** for the specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering geology practice in the state of Florida. No other warranty is expressed or implied.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from our subsurface exploration, and our experience. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our borings and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

As is true with this area of Florida, the site is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden. Construction in a sinkhole prone area is therefore accompanied by some risk that internal soil erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole related problems. In any event, the Owner must understand and accept this risk.

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

If changes are made in the overall design or the location of the proposed facilities, or if the finish grades differ from those discussed herein, the recommendations presented in this report must not be considered valid unless the changes are reviewed by our firm and recommendations modified or verified in writing. We should be given the opportunity to review the foundation plan, grading plan and the applicable portions of the project specifications when the design is finalized. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

APPENDIX

FIGURES

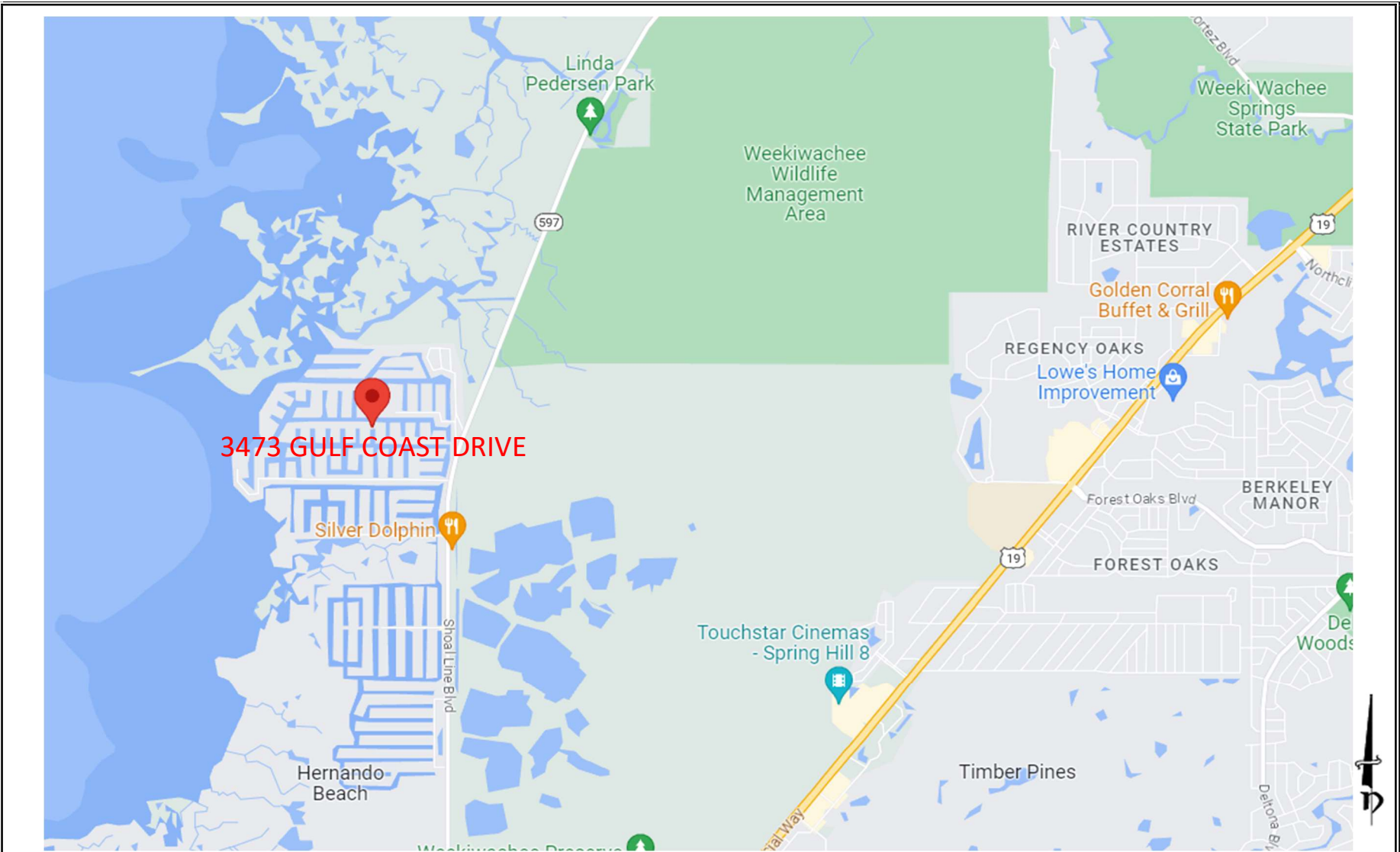


IMAGE FROM GOOGLE MAPS



PROPOSED RESIDENTIAL STRUCTURE
VICINITY MAP
HERNANDO COUNTY

DATE: 9/28/2023
 Checked by: LH
 Drawn by : BR

GDE JOB: 23-306
FIGURE 1
 PAGE 1 OF 1




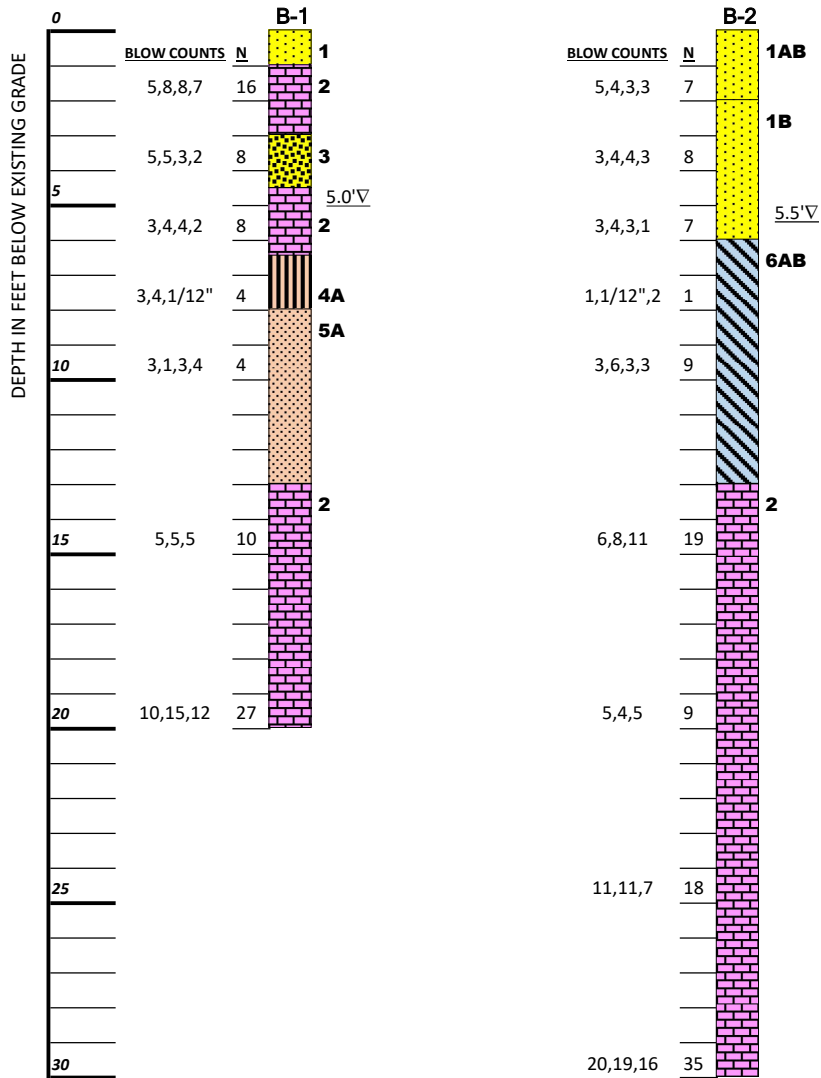
ABOVE AERIAL IMAGE FROM HERNANDO COUNTY PROPERTY APPRAISER.

LEGEND

B-1  APPROXIMATE LOCATION OF SPT BORING



	PROPOSED RESIDENTIAL STRUCTURE BORING LOCATION PLAN HERNANDO COUNTY	DATE: 9/28/2023 GDE JOB: 23-306
		Checked by: LH Drawn by: BR
		FIGURE 2 PAGE 1 OF 1



LEGEND

-  **1** BROWN FINE SAND (SP)
-  **2** CREAM LIMESTONE
-  **3** BROWN SLIGHTLY CLAYEY SAND (SP-SC)
-  **4** DARK GRAY SANDY SILT (ML)
-  **5** BROWN SILTY SAND (SM)
-  **6** GRAY SANDY CLAY (CL)

- A** WITH ROOTS
- B** WITH LIMESTONE
- SP: UNIFIED SOIL CLASSIFICATION GROUP SYMBOL
- N: STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
- 0.0'∇ DEPTH TO GROUNDWATER AT TIME OF DRILLING

NOTES: BORINGS PERFORMED ON SEPTEMBER 28, 2023



PROPOSED RESIDENTIAL STRUCTURE
SPT BORING LOGS
HERNANDO COUNTY

DATE: 9/28/2023

GDE JOB: 23-306

Checked by: LH

FIGURE 3

Drawn by: BR

PAGE 1 OF 1

SOIL SURVEY



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

Custom Soil Resource Report for Hernando County, Florida

3473 Gulf Coast Drive



Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

Custom Soil Resource Report

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

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

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

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

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

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

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

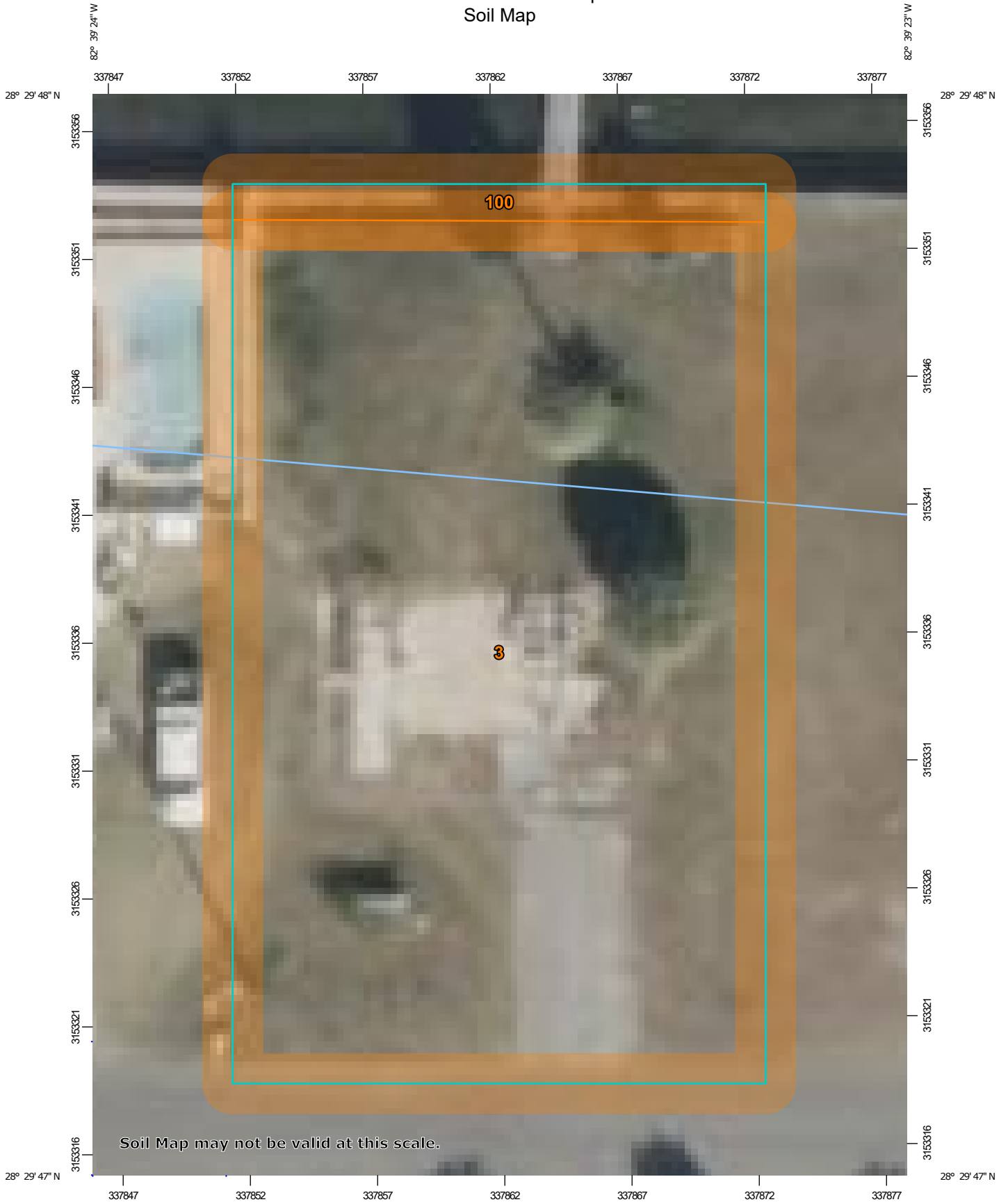
Custom Soil Resource Report

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

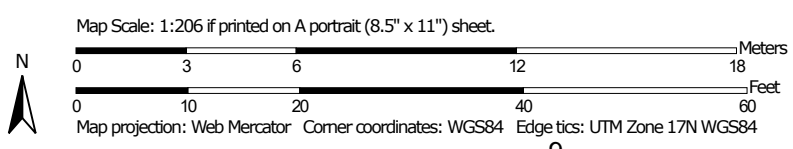
Soil Map

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

Custom Soil Resource Report Soil Map




Soil Map may not be valid at this scale.





MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






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

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


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Hernando County, Florida
 Survey Area Data: Version 19, Sep 1, 2022

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

Date(s) aerial images were photographed: Jan 6, 2022—Jan 30, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Arents-Urban land complex	0.2	95.9%
100	Waters of the Gulf of Mexico	0.0	4.1%
Totals for Area of Interest		0.2	100.0%

Map Unit Descriptions

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

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

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

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

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onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Hernando County, Florida

3—Arents-Urban land complex

Map Unit Setting

National map unit symbol: bt53
Elevation: 0 to 20 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 309 to 339 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 50 percent
Urban land: 31 percent
Minor components: 19 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

AC - 0 to 80 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: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 49.88 in/hr)
Depth to water table: About 42 to 60 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 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
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
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: Unranked

Minor Components

Udalfic arents

Percent of map unit: 14 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 (G154XB999FL)
Hydric soil rating: No

Water

Percent of map unit: 5 percent
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: Unranked

100—Waters of the Gulf of Mexico

Map Unit Composition

Waters of the gulf of mexico: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waters Of The Gulf Of Mexico

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: Unranked

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