

GEOTECHNICAL ENGINEERING REPORT



Missing Link Multi-Use Trail Walton County, Florida

PREPARED FOR:
Genesis Halff, Inc.
1141 Jackson Avenue
Chipley, Florida 32428

NOVA Project Number: 10111-2019120

Revised June 3, 2020



Revised June 3, 2020

Genesis Halff, Inc.

1141 Jackson Avenue
Chipley, Florida 32428

Attention: Mr. Ray Hodges, P.E.
Senior Project Manager

Subject: Report of Subsurface Exploration and Geotechnical Engineering Services
MISSING LINK MULTI-USE TRAIL
Walton County, Florida
NOVA Project Number 10111-2019120

Dear Mr. Hodges,

NOVA Engineering and Environmental LLC (NOVA) has completed the authorized Geotechnical Engineering Report for the proposed project to be constructed in Walton County, Florida. The work was performed in general accordance with the Subcontract for Professional Services between NOVA and Genesis Halff, Inc. This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our findings, conclusions, and recommendations.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,

NOVA ENGINEERING AND ENVIRONMENTAL LLC

Andre Kniazeff, P.E.
Senior Geotechnical Engineer
Florida Registration No. 81315

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Copies Submitted: Addressee (electronic)

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1.0 SUMMARY

A brief summary of pertinent findings, conclusions, and recommendations are presented below. This information should not be utilized in design or construction without reading the report in its entirety and paying particular attention to the recommendations presented in the text and Appendix.

1.1 GENERAL

Our field exploration at the subject site included performing three (3) Standard Penetration Test (SPT) borings and four (4) auger borings along the proposed multi-use trail alignment. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

The borings generally encountered mixed strata of very loose to very dense fine-grained sands to silty fine-grained sands (USCS classifications of SP, SP-SM, and SM) with trace to many organics (organic silt) from the existing ground surface elevation to the maximum depth explored of about 25 feet below existing grade (BEG). The Test Boring Records and a summary of laboratory soil testing results are provided in the attached Appendix.

1.2 SITE PREPARATION

Prior to proceeding with construction, all topsoil, root systems, surficial vegetation as well as any other deleterious non-soil materials found to be present should be stripped from within the proposed construction limits and extending to a minimum clear distance of 2 feet outside the multi-use trail alignment (paved sections). NOVA suggests any existing utility locations should be reviewed to assess their impact on the proposed construction and relocated as appropriate.

After clearing and stripping, a NOVA geotechnical engineer should carefully evaluate the exposed subgrade soils along paved sections of the proposed multi-use trail alignment to determine if any soft/yielding areas are present. The exposed subgrade soils should be compacted to a minimum soil density of at least 95 percent of the maximum dry density as determined by the Modified Proctor test method (AASHTO T-180). The final 12 inches of subgrade (i.e., the Stabilized Subgrade Course) should be compacted to at least 98 percent and should be a material having a Limerock Bearing Ratio (LBR) value of at least 40. Any unstable materials observed during the evaluation and compaction operations should be undercut and replaced with structural fill or stabilized in-place by scarifying and re-densifying.

1.3 GROUNDWATER CONTROL

Groundwater was encountered in test borings at depths varying between approximately ½ foot to 3¾ feet BEG (with the differences in the depths to groundwater being attributed primarily to the differences in ground surface elevations at which the borings were drilled) at the time of our field exploration, which occurred during a period of relatively normal seasonal rainfall. Groundwater should be expected to impact the planned near surface construction within the lower-lying areas of the trail alignment (specifically for the proposed above-grade boardwalk).

1.4 PAVEMENTS

We understand that a flexible (asphalt) pavement section will be employed for a portion of the proposed trail alignment. Based on the results of our test borings, the subsurface conditions encountered appear to be generally adaptable for supporting this pavement section, provided that a minimum separation of at least 24 inches between the bottom of a crushed limerock or crushed concrete base course and the seasonal high groundwater (SHGW) table can be maintained. This separation may be reduced to 18 inches if Graded Aggregate Base (GAB) is employed for this project in lieu of crushed limerock or crushed concrete base.

1.5 DEEP FOUNDATIONS

As desired by the Client, a deep foundation system consisting of driven timber piles was evaluated for the proposed above-grade boardwalk section of the proposed multi-use trail. After the recommended site/subgrade preparation and any fill placement, the proposed boardwalk section may be supported on the desired deep foundation system, as recommended in **Section 5.4** within the body of this report.

Other viable deep foundation systems that could be implemented to support the proposed structure include composite fiberglass pile or helical pile (which provides little to no disturbance of the site) systems. Because each of this system is a proprietary one, the design and installation of either of this system should be performed by specialty firms (Hayward Baker, GeoStructures, Earth Tech, Alpha Foundations, etc.)

2.0 INTRODUCTION

2.1 PROJECT INFORMATION

Our understanding of the proposed development is based on recent conversations and email exchanges with select design team members, review of aerial photography of the site via internet-based GIS software; our site reconnaissance activities; and our experience with similar geotechnical conditions in the near vicinity to this project site.

2.1.1 Site Plans and Documents

We were furnished with the following document:

- Document: Preliminary Plans
Prepared by: Genesis Halff, Inc.
Dated: Not dated

2.1.2 Proposed Construction

The proposed improvements consist of the construction of a new multi-use trail through Walton County's easement located within Topsail Hill Preserve State Park adjacent to the County Road 30A right-of-way.

2.1.3 Site Grading

Final grading details were not available from the design team at the time of the issuance of this report; we have therefore assumed that site grades will not change more than ± 3 feet from existing grades along the proposed multi-use trail alignment. The proposed trail is anticipated to be about 10 feet in width and will consist of two (2) asphalt paved segments and a wooden boardwalk, elevated above surrounding site grades to minimize wetland impacts.

2.2 SCOPE OF WORK

Genesis Halff, Inc., engaged NOVA to provide geotechnical engineering consulting services for the proposed **Missing Link Multi-Use Trail** project. This report briefly discusses our understanding of the project, describes our exploratory procedures, and presents our findings, conclusions, and recommendations.

The primary objective of this study was to perform a geotechnical exploration along the proposed multi-use trail alignment and to assess the site's subsurface conditions as they pertain to the presence of organic materials, loose or otherwise unsuitable soils, and groundwater.

The authorized geotechnical engineering services included a site reconnaissance, seven (7) soil test borings and sampling, laboratory testing, engineering evaluation of the field and laboratory data, and the preparation of this report. These services were provided in general accordance with industry standards.

The assessment of site environmental conditions, including the presence of wetlands or detection of pollutants in the soil, rock or groundwater, laboratory testing of samples, or a site-specific seismic study was beyond the scope of this geotechnical study. If requested, NOVA can provide these services.

3.0 FIELD AND LABORATORY PROCEDURES

3.1 FIELD TESTING

Boring locations were established in the field by NOVA personnel using handheld GPS units. Consequently, referenced boring locations should be considered approximate. The approximate boring locations are shown in Appendix B. If increased accuracy is desired by the Client, NOVA recommends that the boring locations and elevations be surveyed. Our field exploration at the subject site included performing three (3), 25-foot deep Standard Penetration Test (SPT) borings and four (4), 5-foot deep auger borings along the proposed trail alignment.

SPT Borings: The SPT borings were performed using the guidelines of ASTM Designation D1586, "Penetration Test and Split-Barrel Sampling of Soils" A mud rotary drilling process was used to advance the borings. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-tube sampler. The sampler was first seated six inches and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance". The penetration resistance, when properly interpreted, is an index to the soil strength and density. Representative portions of the soil samples, obtained from the sampler, were placed in sealed containers and transported to our laboratory for further evaluation and laboratory testing

Hand Auger Borings: The hand auger borings were performed utilizing a 3-inch soil sampler in accordance with ASTM designations and industry standards. Representative portions of the soil samples, obtained from the sampler, were placed in sealed containers and transported to our laboratory for further evaluation and laboratory testing. Test Boring Records in Appendix B present the soil conditions encountered in the borings. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the recovered samples, laboratory test data, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual. Test Boring Records in Appendix B present the soil conditions encountered in the borings. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the recovered samples, laboratory test data, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual.

Groundwater Levels: The groundwater levels reported on the Test Boring Records represent measurements made at the completion of each soil test boring. The soil test borings were subsequently backfilled with the soil cuttings for safety concerns.

3.2 LABORATORY TESTING

A laboratory testing program was conducted to characterize materials which exist at the site using the recovered samples. Selected test data are presented on the Test Boring Records attached in the Appendix. The specific tests are briefly described below. It should be noted that all soil samples will be properly disposed of 30 days following the submittal of this NOVA subsurface exploration report unless you request otherwise.

3.2.1 Soil Classification

Soil classification provides a general guide to the engineering properties of various soil types and enable the engineer to apply past experience to current problems. In our explorations, samples obtained during drilling operations are observed in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on SPT N-Values), color and texture. These classification descriptions are included on our Test Boring Records. The classification system discussed above is primarily qualitative; laboratory testing is generally performed for detailed soil classification. Using the test results, the soils were classified using the Unified Soil Classification System. This classification system and the in-place physical soil properties provide an index for estimating the soil's behavior. The soil classification and physical properties obtained are presented in this report.

3.2.2 Moisture Content

The moisture content is the ratio expressed as a percentage of the weight of water in a given mass of soil to the weight of the solid particles and was conducted in general accordance with ASTM D-2216. A total of eight (8) moisture content tests were performed in this study.

3.2.3 Fines Content

The percentage of fines passing through the No. 200 sieve is generally considered to represent the amount of silt and clay of the tested soil sample. The sieve analysis testing was conducted in general accordance with ASTM Designations D-6913 and D-1140. A total of eight (8) fines content tests were performed in this study.

3.2.4 Organic Content

The organic content is the ratio expressed as a percentage of the weight of organic material in a given mass of soil to the weight of the solid particles and was conducted in general accordance with ASTM D-2974. A total of four (4) organic content tests were performed in this study.

4.0 SUBSURFACE CONDITIONS

4.1 GEOLOGY

The site is located in south Walton County, Florida and according to the United States Geological Survey (USGS), is situated within the Gulf Coastal Plain, separated from the Florida Platform by geologic structures known as the Gulf Trough and Apalachicola Embayment. These structures formed a bathymetric and environmental barrier from the earliest Eocene or earliest Oligocene periods into the Miocene.

According to the “Text to Accompany the Geologic Map of Florida” by Scott, 2001, the site is generally underlain by undifferentiated sediments deposited during the Quaternary period. These sediments typically consist of siliciclastics (sand), organics and freshwater carbonates. These soils are highly permeable and form the Sand and Gravel Aquifer of the surficial aquifer system.

Surficial soils in the region are primarily siliciclastic sediments deposited in response to the renewed uplift and erosion in the Appalachian highlands to the north and sea-level fluctuations. The extent and type of deposit is influenced by numerous factors, including mineral composition of the parent rock and meteorological events.

4.2 SOIL CONDITIONS

The following paragraph provides a generalized description of the subsurface profiles and soil conditions encountered in the borings conducted during this study. The Test Boring Records in the Appendix should be reviewed to provide detailed descriptions of the conditions encountered at each boring location. Conditions may vary at other locations and times.

The borings generally encountered fine-grained mixed strata of very loose to very dense fine-grained sands to silty fine-grained sands (USCS classifications of SP, SP-SM, and SM) with trace to many organics (organic silt) from the existing ground surface elevation to the maximum depth explored of about 25 feet below existing grade (BEG). The Test Boring Records and a summary of laboratory soil testing results are provided in the attached Appendix.

4.3 GROUNDWATER CONDITIONS

4.3.1 General

Groundwater in the Gulf Coastal Plain typically occurs as an unconfined aquifer condition. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix can affect

groundwater conditions. The groundwater table is expected to be a subdued replica of the original surface topography. Based on a review of topographic maps and our visual site observations, we anticipate the groundwater flow within the proposed path alignment to be generally towards the south.

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors. Groundwater levels in the south Walton County area are typically lowest in the late fall to winter and highest in the early spring to mid-summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times.

4.3.2 Soil Test Boring Groundwater Conditions

Groundwater was encountered in test borings at depths varying between approximately $\frac{1}{2}$ foot to $3\frac{3}{4}$ feet BEG (with the differences in the depths to groundwater being attributed primarily to the differences in ground surface elevations at which the borings were drilled) at the time of our field exploration, which occurred during a period of relatively normal seasonal rainfall. We therefore estimate that the normal permanent seasonal high groundwater (SHGW) table along the proposed trail alignment will occur approximately 1 foot to $1\frac{1}{2}$ feet above the groundwater levels measured in the test borings at the time of our field exploration.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on our understanding of the proposed construction, our site observations, our evaluation and interpretation of the field and laboratory data obtained during this exploration, our experience with similar subsurface conditions, and generally accepted geotechnical engineering principles and practices.

Subsurface conditions in unexplored locations or at other times may vary from those encountered at the specific boring locations. If such variations are noted during construction, or if project plans are changed, we request the opportunity to review the changes and amend our recommendations, if necessary.

As previously noted, boring locations were established by using handheld GPS units. If increased accuracy is desired by the Client, we recommend that the boring locations and elevations be surveyed.

5.1 SITE PREPARATION

Prior to proceeding with construction, all topsoil, root systems, surficial vegetation as well as any other deleterious non-soil materials found to be present should be stripped from within and extending to a minimum clear distance of 2 feet outside the multi-use trail alignment (paved sections, not inclusive of delineated wetlands which should remain undisturbed as much as practical). NOVA suggests any existing utility locations should be reviewed to assess their impact on the proposed construction and relocated as appropriate.

After clearing and stripping, a NOVA geotechnical engineer should carefully evaluate the exposed subgrade soils along paved sections of the proposed multi-use trail alignment to determine if any soft/yielding areas are present. The exposed subgrade soils should be compacted to a minimum soil density of at least 95 percent of the maximum dry density as determined by the Modified Proctor test method (AASHTO T-180). Any unstable materials observed during the evaluation and compaction operations should be undercut and replaced with structural fill or stabilized in-place by scarifying and re-densifying.

5.2 FILL PLACEMENT

5.2.1 Fill Suitability

Fill materials should be relatively clean sands with less than 12 percent fines (material passing the No. 200 sieve), and free of non-soil materials and rock fragments larger than 3 inches in diameter. Soils with fines contents between 13 and 25 percent may also be used as fill soils for this project, but we note that strict moisture control would be

required at the time of placement for these moisture-sensitive soils. On-site near surface soils that are categorized as slightly silty fine-grained sands and silty fine-grained sands (SP-SM, SM) based on the Unified Soil Classification System (USCS) are considered suitable for re-use as structural fill along the proposed trail alignment, provided that the materials are free of rubble, clay, rock, roots and organics, and are at/near their optimum moisture content at the time of placement and compaction.

All materials to be used for backfill or compacted fill construction should be evaluated and, if necessary, tested by NOVA prior to placement to determine if they are suitable for their intended use. Any off-site materials used as fill should be approved by NOVA prior to acquisition. Organic and/or debris-laden material is not suitable for re-use as structural fill.

5.2.2 Soil Compaction

Fill should be placed in thin, horizontal loose lifts (maximum 12-inch) and compacted to a minimum soil density of at least 95 percent of the Modified Proctor maximum dry density (AASHTO T-180). The final 12-inch lift of fill soils (i.e., the Stabilized Subgrade Course, or SSC) should be compacted to at least 98 percent. In confined areas, such as utility trenches if applicable to this project, portable compaction equipment and thinner loose fill lifts (3 to 4 inches) may be necessary.

Fill materials used in structural areas should have a target maximum dry density of 100 pcf or greater. If lighter weight fill materials are used, the NOVA geotechnical engineer should be consulted to assess the impact on design recommendations.

Soil moisture content should be maintained within 3 percent of the optimum moisture content. We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. ***Soils excavated from below the water table will likely require significant efforts to adjust the moisture contents prior to reuse as fill.***

A NOVA soils technician, who can assess suitability of materials used, and uniformity and appropriateness of compaction efforts, should observe all filling and subgrade preparation. Field tests, using thin-wall tube, nuclear or sand cone testing methods (ASTM D-2937, D-6938, or D-1556 respectively) should also be performed. When filling in small areas, at least one test per day per area should be required.

5.3 GROUNDWATER CONTROL

Groundwater was encountered in test borings at depths varying between approximately $\frac{1}{2}$ foot to $3\frac{3}{4}$ feet BEG (with the differences in the depths to groundwater being attributed primarily to the differences in ground surface elevations at which the borings were drilled) at the time of our field exploration, which occurred during a period of relatively normal seasonal rainfall. Groundwater should be expected to impact the planned near surface construction along lower-lying areas of the proposed trail alignment (and most specifically along the proposed above-grade boardwalk alignment).

As previously noted, groundwater levels are subject to seasonal, climatic and other variations and may be different at other times and locations. The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations. If required, the dewatering system should be capable of lowering the groundwater elevations to a minimum of 2 feet below the working platform. A local contractor familiar with similar site conditions common to the south Walton County area should be able to determine an adequate dewatering method for the subject property. Common local dewatering methods are dewatering by the use of temporary well points and trench drain systems.

5.4 DEEP FOUNDATION RECOMMENDATIONS

5.4.1 General

We understand the proposed improvements will include a boardwalk structure extended through existing delineated wetlands that will be supported on a deep foundation system consisting of driven timber piles. We have assumed that the required allowable design pile capacity will be limited to 3 tons per pile.

5.4.2 Deep Foundation System

Allowable pile (compression and uplift) capacities for driven timber piles of different sizes were evaluated for this project. The estimated allowable axial compression and uplift capacities and minimum embedment depth are provided in Table 1 on the next page.

Table 1 - Driven Timber Piles Deep Foundation Recommendations			
Pile Size - Type	Embedment Depth (ft)*	Allowable Capacities* (tons)	
		Compression**	Uplift***
4" Square, Timber	10	4	0.8
4" Square, Timber	15	5	1.5
6" Square, Timber	10	7	1
6" Square, Timber	15	10	2
8" Square, Timber	10	12	1.5
8" Square, Timber	15	16	2.5
6" Diameter, Timber	10	6	1
6" Diameter, Timber	15	8	1.5
8" Diameter, Timber	10	10	1
8" Diameter, Timber	15	13	2

*Referenced from the existing site grade elevation and boring B-1 results.

**Based on the Ultimate Pile Capacity and Factor of Safety of 2.

***Based on the Ultimate Side Friction and Factor of Safety of 3.

Installation Considerations: The pile-driving hammer should be sized to avoid overstressing the pile during driving. A drop hammer with a rated energy of 8,000 to 10,000 foot-pounds should be considered initially. NOVA should be allowed to evaluate the hammer pile system submitted by the contractor.

A minimum pile spacing of 3 diameters should be maintained. If a closer spacing is required, or if pile caps contain more than 5 piles, capacity reduction due to group effects should be considered.

Installation of driven piles, including probe and test piles should be monitored on a full-time basis. Detailed records should be maintained by the geotechnical engineer who will confirm pile size, location, installed lengths, driving resistance, tip elevation and other relevant installation information.

The engineer monitoring the installation of the production piles should be aware that the inter-layering of sandy soils and organic materials is common in the coastal areas. Our experience on projects in the surrounding area indicates that subsurface conditions can be highly erratic. If a pile(s) encounters refusal at a depth which appears to be inconsistent with the borings, probe piles or other nearby production piles, it may be necessary to replace the pile or reduce its capacity.

The installation of driving piling could adversely affect adjacent structures (if applicable). Therefore, we recommend performing pre/post inspection surveys, settlement monitoring, and vibration monitoring on any structure within a minimum distance of 100 feet of pile driving or equal to 0.5 times the square root of the impact hammer energy, in foot pounds. These structures should be monitored during all pile driving activities. Construction operations should be immediately stopped if the maximum peak particle velocity (PPV) is reached, movement of the structure is detected, or damage of the existing structures is observed.

Pile Load Test: We recommend a dynamic load testing program using PDA, including the driving of several test piles (i.e. approximately 5% of total number of production piles) in production pile locations spaced across the site to provide an indication of the potential variability in driving conditions and to confirm that the required axial capacity can be achieved in these variable conditions with the contractor's pile driving equipment. The purpose of the test pile program is to provide the contractor recommended production pile driving criteria required across the site developed based on the results and subsequent analyses of test pile program. Our experience with the PDA indicates that a significant cost savings (over static load testing of piles) may be realized if the PDA is properly utilized to monitor the installation as to pile driving stresses, capacities and integrity. Pile driving inspection is recommended for all production piles based on driving criteria developed based on the results of test pile program. Continuous driving and installation records should be maintained for each test and production pile for the geotechnical engineer's review.

Quality Control: An engineer or engineer's aide familiar with the installation of driven piles into subsurface soil conditions similar to those at this site and acting under the direction and supervision of the geotechnical engineer should witness the installation of the remaining production piles. His duties should include, but not be limited to, the following:

1. Verify that the pile or leads are either plumb or at correct batter prior to installation.
2. Keep an accurate record of pile installation and driving procedures.
3. Verify that all piles are installed to the proper driving resistance and to a depth indicative of the piles bearing in the desired bearing formation.
4. Confirm the pile driving equipment is operating properly.
5. Inspect the piles prior to installation for defects and confirm that the piles are not damaged during installation.

5.5 FLEXIBLE PAVEMENT SECTION

We recommend a minimum compaction requirement of 98 percent of the maximum dry density be specified for the base and stabilized subgrade courses as determined by the Modified Proctor test method (ASTM D-1557). A minimum separation of at least 24 inches between the bottom of an FDOT approved Crushed Limerock base course and the seasonal high groundwater table (or 18 inches separation for GAB) should be maintained. All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and FDOT requirements. We recommend using the parameters presented below for the proposed trail design.

RECOMMENDED FLEXIBLE PAVEMENT SECTION*	
Asphaltic Surface Course (9.5 mm SuperPave, FDOT approved mix)	2 inches
Graded Aggregate Base (GAB) or Limerock/Concrete Base Course from an approved FDOT source	4 inches
Stabilized Subgrade minimum LBR of 40	12 inches

*Note: Isolated path crossings (driveways, utility maintenance access, etc.) subjected to passenger vehicle or truck traffic should be evaluated on a case by case basis. Thicker flexible pavement sections or rigid pavement capable of handling vehicle loadings would most likely be necessary.

Based on visual classification of the near-surface materials encountered in the test borings, it appears that the native sandy soils may not meet the minimum LBR requirement of 40 for the stabilized subgrade course (SSC), and therefore stabilization of the native subgrade soils should be anticipated as being needed for this project if the pavement sections will be installed at/near current site grade elevations. An imported material having a minimum LBR value of 40 should be specified for the final (12-inch) lift of fill for pavement areas being installed over fill.

All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and FDOT. A NOVA technician should observe placement and perform density testing of the stabilized subgrade, base course material and asphalt.

6.0 CONSTRUCTION OBSERVATIONS

6.1 DEEP FOUNDATIONS

Installation of test and production piles should be monitored on a full-time basis by a NOVA representative. Detailed records should be maintained by the geotechnical engineer who will confirm pile size, location, date of installation, and rate of penetration.

6.2 PAVEMENTS

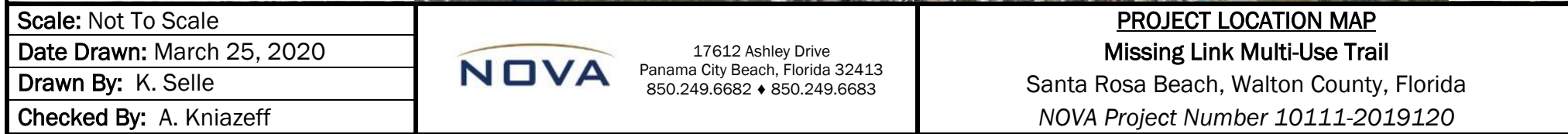
We recommend the pavement design be performed in accordance with the FDOT Flexible Pavement Design Manual and the method and placement of materials be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction (latest edition). NOVA should be retained during construction to confirm subgrade conditions are as anticipated and that the construction process is as required by the contract documents.

6.3 SUBGRADE

Once site grading is completed, the subgrade may be exposed to adverse construction activities and weather conditions. The subgrade should be well-drained to prevent the accumulation of water. If the exposed subgrade becomes saturated or frozen, the NOVA geotechnical engineer should be consulted.

APPENDIX A

Figures and Maps



Soil Map—Walton County, Florida
(Missing Link Multi-Use Trail, 10111-2019120)



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: Walton County, Florida

Survey Area Data: Version 19, Sep 17, 2019

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

Date(s) aerial images were photographed: Dec 31, 2009—Dec 10, 2017

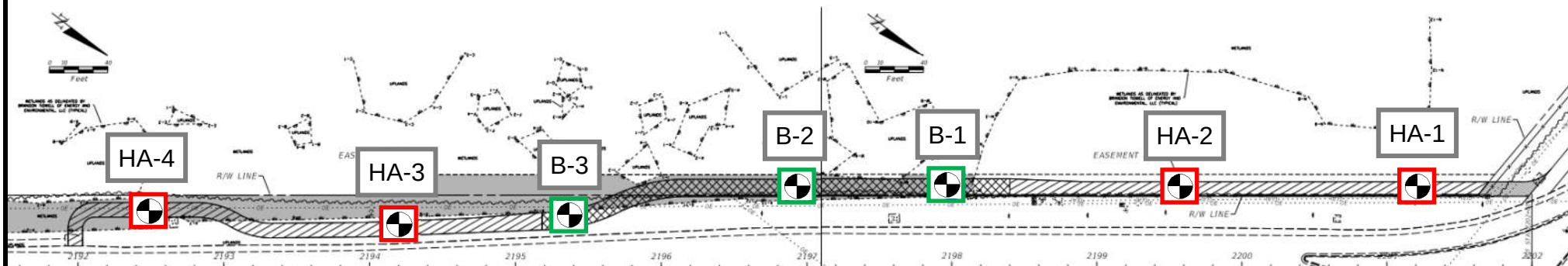
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
21	Leon sand, 0 to 2 percent slopes	0.9	67.3%
27	Rutlege fine sand, 0 to 2 percent slopes	0.5	32.7%
Totals for Area of Interest		1.4	100.0%

APPENDIX B

Subsurface Data



LEGEND



25' SPT Boring Locations (B-1, B-2 and B-3)



5' Hand Auger Boring Locations (HA-1 through HA-4)

Base map provided by **Genesis Halff, Inc.**



Scale: Not To Scale

Date Drawn: April 2, 2020

Drawn By: D. Ritzel

Checked By: A. Kniazeff



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BORING LOCATION PLAN

Missing Link Multi-Use Trail

Santa Rosa Beach, Walton County, Florida

NOVA Project Number 10111-2019120

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays	
		OL	Organic silts and organic silty clays of low plasticity	
	SILTS AND CLAYS Liquid limit greater than 50%	MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts	
		CH	Inorganic clays or clays of high plasticity, fat clays	
		OH	Organic clays of medium to high plasticity	
		PT	Peat, muck and other highly organic soils	

*Based on the material passing the 3-inch (75 mm) sieve

** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY

(Sands and Gravels)

Very loose – Less than 4 Blows/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY

(Sils and Clays)

Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Medium Stiff – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS

(Limestone)

Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample

Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample

Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample

Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%



TEST BORING RECORD B-1

PROJECT NAME: Missing Link Multi Use Trail

PROJECT NO.: 2019120 CLIENT: Genesis Halff, Inc.

PROJECT LOCATION: Santa Rosa Beach, Walton County, Florida

LOCATION: See Boring Location Plan

ELEVATION: Existing Grade

DRILLED BY: L. Griffin

LOGGED BY: D. Ritzel

DRILLING METHOD: Mud Rotary

DATE: 4/1/2020

INITIAL GW DEPTH: ▼ 0.8 feet

ESHW DEPTH: ▽ _____

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) PL LL
0							10 20 30 40 50 60 70 80 90
		Very loose grey slightly silty fine-grained SAND with trace organics - organic silt (SP-SM)		▼		2	●
		Loose light brown slightly silty fine-grained SAND (SP-SM)				4	●
5		Loose to medium dense grey/light grey fine-grained SAND (SP)				6	●
						16	●
						19	●
10							
						11	●
15							
						28	●
20							
		Dense grey slightly silty fine-grained SAND (SP-SM)				31	●
25		Boring Terminated at 25 feet					

Note:



TEST BORING RECORD B-2

PROJECT NAME: Missing Link Multi Use Trail

PROJECT NO.: 2019120 CLIENT: Genesis Halff, Inc.

PROJECT LOCATION: Santa Rosa Beach, Walton County, Florida

LOCATION: See Boring Location Plan

ELEVATION: Existing Grade

DRILLED BY: L. Griffin

LOGGED BY: D. Ritzel

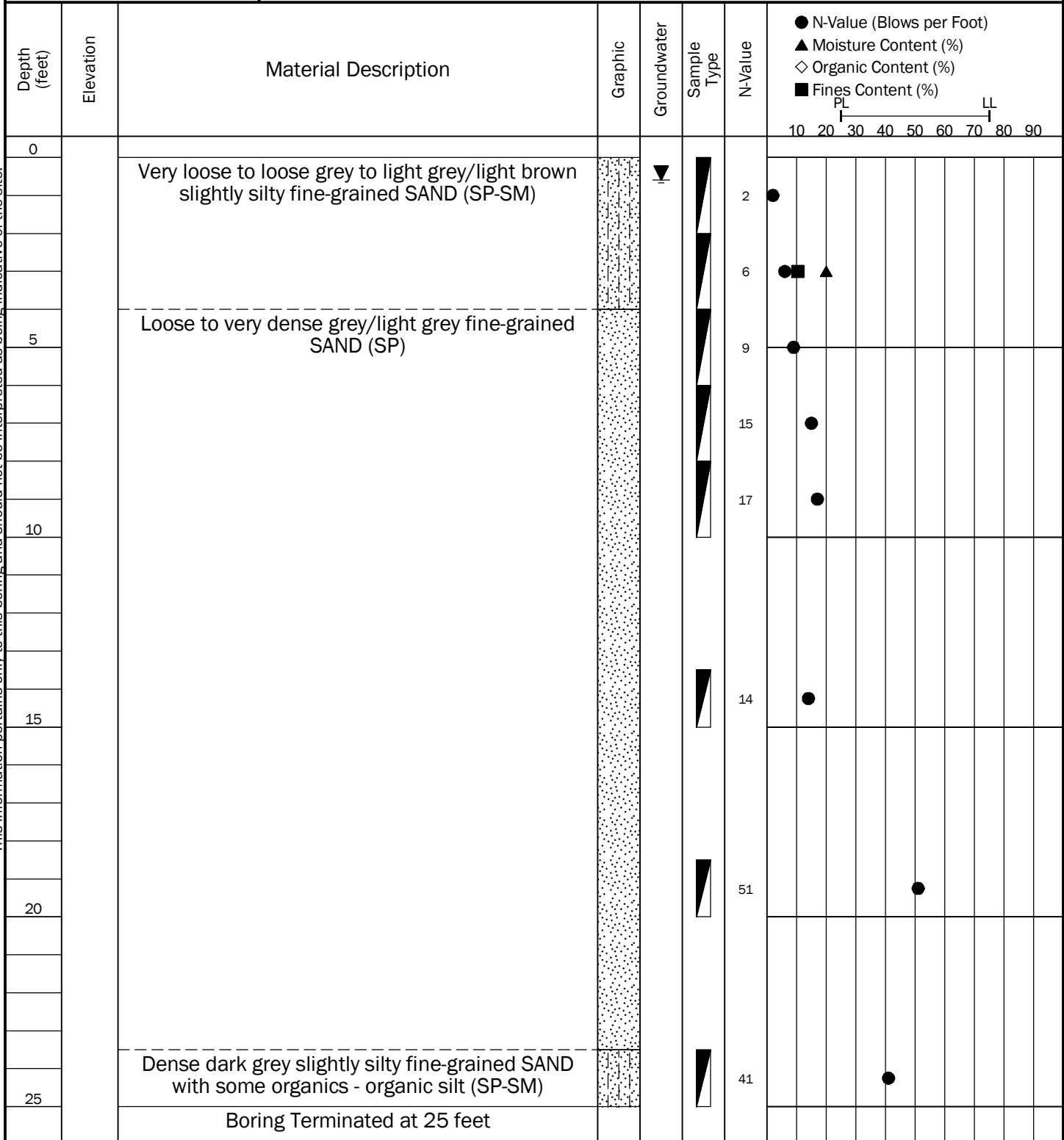
DRILLING METHOD: Mud Rotary

DATE: 4/1/2020

INITIAL GW DEPTH: 0.6 feet

ESHW DEPTH: 7.5 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.



Note:



TEST BORING RECORD B-3

PROJECT NAME: Missing Link Multi Use Trail

PROJECT NO.: 2019120 CLIENT: Genesis Halff, Inc.

PROJECT LOCATION: Santa Rosa Beach, Walton County, Florida

LOCATION: See Boring Location Plan

ELEVATION: Existing Grade

DRILLED BY: L. Griffin

LOGGED BY: D. Ritzel

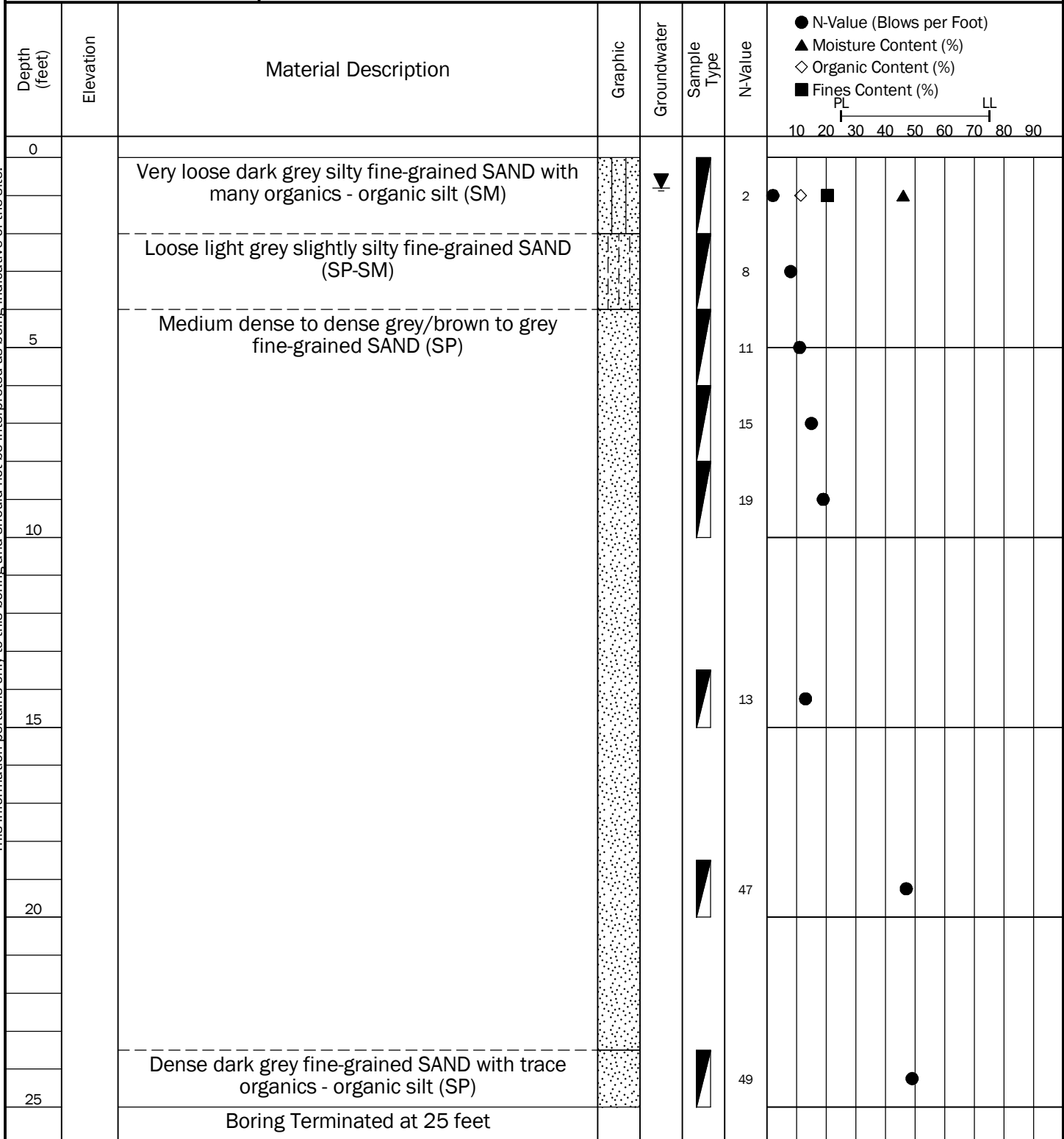
DRILLING METHOD: Mud Rotary

DATE: 4/1/2020

INITIAL GW DEPTH: ▼ 0.8 feet

ESHWG DEPTH: ▽

This information pertains only to this boring and should not be interpreted as being indicative of the site.



Note:



ESHWG DEPTH: 2.2 feet

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%)
0							PL LL 10 20 30 40 50 60 70 80 90
		Dark brown fine-grained SAND with trace organics - organic silt (SP)					
		Light brown to grey slightly silty fine-grained SAND (SP-SM)					■ ▲
		Light grey fine-grained SAND (SP)					
5		Boring Terminated at 5 feet					

Note:

This information pertains only to this boring and should not be interpreted as being indicative of the site.



TEST BORING RECORD HA-2

PROJECT NAME: Missing Link Multi Use Trail

PROJECT NO.: 2019120 CLIENT: Genesis Halff, Inc.

PROJECT LOCATION: Santa Rosa Beach, Walton County, Florida

LOCATION: See Boring Location Plan

ELEVATION: Existing Grade

DRILLED BY: K. Selle

LOGGED BY: D. Ritzel

DRILLING METHOD: Hand Auger

DATE: 3/26/2020

INITIAL GW DEPTH: 3.0 feet

ESHW DEPTH: 1.5 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) PL LL 10 20 30 40 50 60 70 80 90										
0																	
		Dark brown silty fine-grained SAND with some organics - organic silt (SM)					◇	■	▲								
		Light brown to grey slightly silty fine-grained SAND (SP-SM)															
		Dark brown slightly silty fine-grained SAND with trace organics - organic silt (SP-SM)															
		Brown fine-grained SAND (SP)															
5		Boring Terminated at 5 feet															

Note:



TEST BORING RECORD HA-3

PROJECT NAME: Missing Link Multi Use Trail

PROJECT NO.: 2019120 CLIENT: Genesis Halff, Inc.

PROJECT LOCATION: Santa Rosa Beach, Walton County, Florida

LOCATION: See Boring Location Plan

ELEVATION: Existing Grade

DRILLED BY: D. Ritzel

LOGGED BY: D. Ritzel

DRILLING METHOD: Hand Auger

DATE: 3/26/2020

INITIAL GW DEPTH: 3.4 feet

ESHW DEPTH: 1.9 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) PL LL 102030405060708090												
0																			
		Orange/brown silty fine-grained SAND (SM)																	
		Dark brown slightly silty fine-grained SAND (SP-SM)																	
		Dark brown silty fine-grained SAND with few organics - organic silt (SM)																	
		Light grey fine-grained SAND (SP)																	
5		Boring Terminated at 5 feet																	

Note:



TEST BORING RECORD HA-4

PROJECT NAME: Missing Link Multi Use Trail

PROJECT NO.: 2019120 CLIENT: Genesis Halff, Inc.

PROJECT LOCATION: Santa Rosa Beach, Walton County, Florida

LOCATION: See Boring Location Plan

ELEVATION: Existing Grade

DRILLED BY: D. Ritzel

LOGGED BY: D. Ritzel

DRILLING METHOD: Hand Auger

DATE: 3/26/2020

INITIAL GW DEPTH: 3.2 feet

ESHW DEPTH: 1.7 feet

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation	Material Description	Graphic	Groundwater	Sample Type	N-Value	● N-Value (Blows per Foot) ▲ Moisture Content (%) ◇ Organic Content (%) ■ Fines Content (%) PL LL 10 20 30 40 50 60 70 80 90												
0																			
		Dark brown silty fine-grained SAND with few organics - organic silt (SM)																	

Note:

APPENDIX C

Laboratory Data

SUMMARY OF CLASSIFICATION & INDEX TESTING

Missing Link Multi Use Trail
Santa Rosa Beach, Walton County, Florida
NOVA Project Number 10111-2019120

Boring Number	Sample Depth (ft)	Natural Moisture (%)	Percent (%) Passing Sieve #200	Organic Content (%)	USCS Soil Classification
HA-1	1.0 - 1.25	14	8.2	—	SP-SM
HA-2	0.0 - 0.5	24	13.9	4.9	SM
HA-3	0.0 - 1.0	10	16.7	—	SM
HA-4	0.0 - 2.0	20	16.8	3.4	SM
B-1	0.0 - 2.0	25	9.0	2.4	SP-SM
B-1	2.0 - 4.0	22	7.5	—	SP-SM
B-2	2.0 - 4.0	20	10.4	—	SP-SM
B-3	0.0 - 2.0	46	20.4	11.4	SM

APPENDIX D

Support Documents

QUALIFICATIONS OF RECOMMENDATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our past experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for NOVA to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings will differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this geotechnical report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to document that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observation and testing services.

This report is intended for the sole use of **GENESIS HALFF, INC.** only. The scope of work performed during this study was developed for purposes specifically intended by **GENESIS HALFF, INC.** and may not satisfy other users' requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Florida. This warranty is in lieu of all other statements or warranties, either expressed or implied.

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.



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