MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

GEOTECHNICAL ENGINEERING REPORT

OKALOOS ISLAND MARINA PROJECT
OKALOOSA COUNTY, FLORIDA

PREPARED FOR:
Mr. Bryan Osborne, P.E.
Anchor CEI
450 Magnolia Avenue
Panama City, Florida 32401

429 FLORIDA AVENUE
LYNN HAVEN, FLORIDA 32444
TELEPHONE (850) 258.0994

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

June 30, 2025

Mr. Bryan Osborne, P.E.
Anchor CEI
450 Magnolia Avenue
Panama City, Florida 32401

SUBJECT: Okaloosa Island Marina Project - Geotechnical Services
Okaloosa County, Florida
Project Number: M125-120-1012

Dear Mr. Osborne:

This letter forwards the results of our Geotechnical exploration for the proposed development. The subsurface exploration was conducted to provide information needed in the design of an effective foundation, pavement system, and stormwater management area for the proposed project.

The following report presents the results of our study as well as our evaluation and recommendations pertaining to the geotechnical aspects of the project.

Project Information

The subject site is located north of US Highway 98 and west of Gulf National Sea Shore Drive in Okaloosa County, Florida. At the time of our exploration, an existing asphalt road was present along the eastern portion of the site. Adjacent to the marina, temporary office buildings were present. The remaining portions of the site was undeveloped and clear.

Based on our conversations and information provided, it is our understanding that the proposed new construction will consist of a new restaurant and ship store. Each structure will be constructed using conventional wood framing, supported off-grade on timber piling. Roof trusses in the restaurant and ship store are projected to clear span full width. No structural information has been provided at the writing of this report.

Our exploration consisted of Five (5) 30-feet deep Standard Penetration Test (SPT) borings in the proposed building areas. Six borings were proposed, but due to obstruction from office trailer, we were not able to access boring B-2. In addition, Eight (8) 5 feet to 6 ½ feet deep hand auger borings were performed in the proposed pavement and stormwater management areas. Also, Two (2) Double Ring Infiltrometer Tests (DRI's) were performed in the proposed stormwater management areas. Upon completion of our field testing, the samples were brought back to the office for visual inspection, classification, and analysis by our engineering staff.

If any of the above information is incorrect, please inform Magnum Engineering, Inc. (MEI) so that we can review and update our recommendations, as needed.

Subsurface Conditions

Figure #1 show the Boring Location Plan and Figure #2 shows the Logs of Borings for Standard Penetration Test borings B-1 through B-6 and hand auger boring HA-1 through HA-8. The test locations were established in the field using the provided site plan, a measuring wheel, and estimating right angles with reference to existing site landmarks. Therefore, the boring locations should be considered approximate.

The Standard Penetration Test (SPT) borings were performed in accordance with ASTM D-1586. The borings were advanced using mud-rotary techniques. Split-Spoon samples were obtained using a 2-inch O.D. split spoon sampler every two feet in the top 10 feet of the borings and every 5 feet thereafter until the boring termination depth was reached.

The soil types encountered at specific boring locations are presented in the form of Logs of Boring and are attached as Figure #2. The stratifications presented are based on visual examination of the recovered soil samples and the interpretation of field logs by a geotechnical engineer. Included with the profiles are the N-values for the SPT borings. The N-values have been empirically correlated with various soil properties and are indicative of the relative density of cohesionless soils and the consistency of cohesive soils. Also included with the Logs of Boring are the groundwater levels measured at the time the borings were performed.

Soil Conditions

The SPT borings (B-1 and B-3 through B-6) generally encountered loose to medium dense clean fine sands and slightly silty fine sands from the existing ground surface to the boring termination depth of 30 feet below existing grade. To avoid hitting any unmarked underground utilities, the top 4 feet of borings B-1, B-3, and B-4 were advanced using a hand auger.

The hand auger borings (HA-1 through HA-8) generally encountered slightly silty fine sands and clayey fine sands from the existing ground surface to approximately 8 feet below existing grade underlain by soft to very soft sandy clay and clay to roughly 38 feet below existing grade underlain by medium stiff peat to roughly 43 feet below existing grade underlain by medium dense to loose slightly silty fine sands to the boring termination depth of 50 feet below existing grade.

The above subsurface descriptions are of a generalized nature, provided to highlight the major soil strata encountered. The Logs of Boring should be reviewed for specific subsurface conditions at each boring location. The stratifications shown on the Logs of Boring represent the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and may occur between boring locations and should therefore be expected. The stratifications represent the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

Please refer to the attached Logs of Borings presented as Figure #2 for a detailed description of the subsurface conditions encountered.

Groundwater Conditions

Groundwater was encountered from roughly 2.0 feet to 9.5 feet below existing grade at the time of drilling (May 27, 28, 2025), which was during a period of normal seasonal rainfall. By definition, the normal seasonal high groundwater table elevation is the highest level of the saturated zone in the soil during a year with normal rainfall. The procedure used in estimating the seasonal high groundwater table is based on adjusting the existing groundwater table encountered upward or downward, taking into consideration factors such as antecedent rainfall, redoximorphic features (identifying soil mottling) and vegetative indicators. **We have estimated the seasonal high groundwater table at each pond boring location. Please refer to the table provided below for groundwater data at each pond location.**

TABLE #1

Location	Groundwater Depth Below Existing Grade	Estimated Seasonal High Groundwater Depth Below Existing Grade
HA-1	2.8 feet*	1.5 feet
HA-2	5.6 feet	4.0 feet

*Note that boring HA-1 was performed in the bottom of the existing pond area.

Large fluctuations are possible under severe weather conditions. We recommend that the Contractor verify the actual groundwater levels at the time of construction to determine potential impacts groundwater will have on construction procedures.

Double Ring Infiltrometer Tests

Two (2) Double Ring Infiltrometer tests were performed in the field in general accordance with the procedures outlined in ASTM D-3385, ``Infiltration Rate of Soils in Field using Double Ring Infiltrometers". Testing consisted of initially clearing all surface vegetation and topsoil from within the test area. The Infiltration test was performed just below existing ground surface at location DRI-1 and two feet below existing grade at DRI-2. The outer ring, which is approximately 24 inches in diameter, was then driven to a depth of 6 inches below the exposed ground surface. The inner ring, approximately 12 inches in diameter, was then centrally located within the outer ring and driven to a depth of 2 inches. The two rings were then simultaneously filled with water to a height of 4 inches above the exposed ground surface test soils. The water level was maintained at this height throughout the test period, with the required amount of water added to maintain this level in both rings recorded at time intervals of 5 minutes.

The infiltration rate for the inner ring and the annular space between the rings is determined by dividing (a) the water volume used (within each specific area) during the stabilized flow period of the test, by (b) the specific area and (c) the time interval. Infiltration rates are generally converted to units of inches per hour. The infiltration rate for the inner ring, if different than the infiltration rate of the annular area between the rings, according to ASTM, should be used as the infiltration rate for the soils.

INFILTRATION DATA

LOCATION	ORIENTATION	TEST DEPTH (feet)	SUSTAINED INFILTRATION RATE (in/hr)
DRI-1	$K_{V\ (unsaturated)}$	Just below surface	10.6*
DRI-2	$K_{V\ (unsaturated)}$	2 feet	34.5*

***Note: The above infiltration rates have not been factored and it is up to the designer to apply an appropriate factor of safety.**

We recommend using a transformation ratio of 1 horizontal to 1 vertical (i.e. the estimated ratio of horizontal to vertical permeability).

ENVIRONMENTAL RESOURCE PERMITTING (ERP) DESIGN PARAMETERS

DESCRIPTION	LOCATION	DESIGN PARAMTER
SUSTAINED INFILTRATION RATE (K_{VU})	DRI-1 and DRI-2	Shown in Table Above
TEST DEPTH	DRI-1	Just Below Existing Grade
	DRI-2	2.0 Ft Below Existing Grade
FILLABLE POROSITY	DRI-1 and DRI-2	30%
DEPTH TO EXISTING GROUNDWATER TABLE	DRI-1	2.8 Ft Below Existing Grade
	DRI-2	5.6 Ft Below Existing Grade
DEPTH TO ESTIMATED SEASONAL HIGH GROUNDWATER TABLE	DRI-1	1.5 Ft Below Existing Grade
	DRI-2	4.0 Ft Below Existing Grade

CONCLUSIONS AND RECOMMENDATIONS

General

The following geotechnical related design recommendations have been developed based on the previously described project characteristics and subsurface conditions encountered. If there are any changes in these project criteria, including project location on the site, a review should be made by MEI to determine if modifications to the recommendations are warranted.

Once final design plans and specifications are available, a general review by MEI is required to confirm the evaluations and recommendations made in preparation of this report are correct and that the earthwork, stormwater and foundation recommendations are properly interpreted and implemented.

Site Preparation

The site should be cleared and grubbed of surface vegetation/organics. As a minimum, it is recommended the clearing operations extend at least five feet beyond the development perimeters.

Upon completion of the clearing and grubbing operations, the exposed subgrade soils should be compacted to at least 95 percent of the Modified Proctor (ASTM D-1557) maximum dry density to a depth of 12-inches below existing grade.

Engineered Fill

All fill used to raise the building and pavement areas to final grades should consist of sandy soils with less than 15 percent passing the No. 200 sieve. These soils should be free of rubble, organics, clay, debris and other unsuitable materials. Fill should be placed in lifts on the order of 12 inches or less (in loose thickness) and compacted to 95 percent of the soil's Modified Proctor maximum dry density, per ASTM D-1557.

Pile Foundation Recommendations

Restaurant and Ship Store

Table #2 below shows allowable pile capacities for 8-inch tip and 10-inch tip timber piles, jetted or pre-drilled from the ground surface to depths shown below and then driven to bearing depths shown below existing grade with an approved pile driving hammer. Note that the allowable pile capacities assume flooded conditions, no scour, pile butt at existing grade, and include a Factor of Safety of 2 in tension and compression.

TABLE #2

Pile Size	Pre-drill/Jetting Depth (below existing grade)	Embedment (below existing grade)	Tension Capacity (in tons)	Compression Capacity (in tons)
8” tip Timber Pile	10	20	2.8	7.3
8” tip Timber Pile	15	25	3.3	7.9
10” tip Timber Pile	10	20	3.9	11.0
10” tip Timber Pile	15	25	4.9	12.0

Field determination of the actual pile capacities developed should be analyzed using a dynamic pile driving formula (i.e. Hiley, WAVE, Gates, etc.). This analysis requires knowledge of the piles and pile driving equipment to be used on the site.

Pavement Recommendations

Based on the subsurface conditions encountered in the test borings, we recommend using a graded aggregate base, limerock, or crushed concrete). The base course should be compacted to a minimum soil density of 98% of the Modified Proctor Test (ASTM D1557).

Without benefit of traffic loads, volumes, and serviceability parameters, a pavement section cannot be designed. However, typical pavement in the local area generally consist of a minimum of 1½ inches of FDOT Superpave Mix SP-12.5 or SP-9.5 asphaltic concrete and a minimum of 6 inches of base. Moderate duty traffic areas (e.g. main entrance areas, delivery truck areas, etc.) typically have a minimum pavement section consisting of 2 inches of FDOT Superpave Mix SP-12.5 asphaltic concrete and 8 inches of base.

The above sections represent minimum thicknesses representative of typical, local construction practices, and as such periodic maintenance should be anticipated. All pavement materials and construction procedures should conform to FDOT and/or appropriate city or county requirements

While specific traffic loads and volumes for the project have not been provided, we are providing recommended light-duty and medium-duty pavement sections, which have been successfully utilized for this type of commercial development in the Northwest Florida area.

Light Duty (General roadway areas)

- 1 ½ inches Asphalt Concrete (FDOT Superpave Mix SP-12.5 or SP-9.5)
- 6 inches Crushed Limerock or Graded Aggregate Base (minimum LBR 100)
- 12 inches stabilized subgrade (minimum LBR 40)

Medium Duty(Entrance Lanes, Dumpster Pads)

- 2 inches Asphaltic Concrete (FDOT Superpave Mix SP-12.5)
- 8 inches Crushed Limerock or Graded Aggregate Base (minimum LBR 100)
- 12 inches Stabilized Subgrade (minimum LBR 40)

The above recommended pavement sections represent minimum design thicknesses and, as such, periodic maintenance should be anticipated. Also, these recommended pavement sections should be confirmed or modified by your Civil Engineer, based on actual traffic and the owner's requirements. The pavement section materials and construction should comply with the Florida DOT and local municipality requirements.

If the seasonal high groundwater level will be within 24 inches below the bottom of the base course, we recommend the medium duty pavement section be used.

Warranty and Limitations of Study

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied. MEI is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

Soil conditions at other locations may differ from those encountered in the test borings, and the passage of time may cause the soils conditions to change from those described in this report.

This report is intended for use by the designers of this project. While we have no objections to it being provided for review by parties to this project, it is not a specification document and is not to be used as a part of the specifications. If desired, we can assist in the development of specifications for this project based upon our exploration.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions at the time of construction and to verify the recommendations made in the preparation of this report are properly carried out. If significant variations or changes are in evidence, it may be necessary to reevaluate the recommendations in this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, if the project information contained in this report is incorrect or if additional information becomes available, a review must be made by this office to determine if any modifications in the recommendations will be necessary.

We hope this letter provides sufficient information for the present. If you have any questions or comments, please feel free to call.

Sincerely,
MAGNUM ENGINEERING. INC.

JAMES T. VICKERS, P.E.
Senior Geotechnical Engineer
Florida Registration # 56813

JAMES T. VICKERS LICENSE No. 56813 STATE OF FLORIDA PROFESSIONAL ENGINEER

James T. Vickers
Digitally signed by James T. Vickers
Date: 2025.06.30 14:25:06 -05'00'

Attachments: Figure #1 – Boring Location Plan
Figure #2 – Logs of Borings
Figure #3 – Double Ring Infiltrometer Field Test Results

This item has been digitally signed and sealed by James T. Vickers, P.E. on 6/30/2025

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

BORING LOCATION PLAN

FIGURE # 1

PARKING SPACES - Reduced

PARKING REGULATIONS FROM OKALOOSA COUNTY LDC SECTION 6.04.00 PAGES 35-43.

PARKING SPACES = 174 SPACES
ACCESSIBLE PARKING SPACES = 6 SPACES
TOTAL PARKING SPACES ON SITE = 180 SPACES

PROPOSED BORING LOCATIONS

HIGHWAY 98 - MIRACLE STRIP PKWY SE

HA-1/DRI-1
HA-2/DRI-2
HA-3
HA-4
HA-5
HA-6
HA-7
HA-8
B-1
B-2
B-3
B-4
B-5
B-6

PROPOSED GRAVEL PARKING 120 Spots Added
EXISTING ASPHALT PARKING 60 Spots Existing
PROPOSED PERMANENT PAVING
RETENTION
ENCLOSED UNDERDECK AREA
CART STORAGE
MECH. STORAGE
BEACH AMENITY ZONE
THE YARD AMENITY ZONE
TANKS
MARINA AMENITY

DAG Architects

5/22/25
WR
DAG

PROPOSED SITE PLAN

OKALOOSA ISLAND MARINA & RESTAURANT
Okaloosa Island Prime Prop LLC

1/64" = 1'- 0" SCALE

SCHEMATIC DESIGN
9 May 2025

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

LOGS OF BORINGS

FIGURE # 2

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER B-1

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/27/25 **COMPLETED** 5/27/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 9.5 ft
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Gray/Brown Slightly Silty Fine SAND (SP-SM)	AU									
		Brown/Orange Slightly Silty Fine SAND (SP-SM)										
5			SS 1		4-6-7-9 (13)							
		Brown Slightly Silty Fine SAND (SP-SM)	SS 2		4-7-9-8 (16)							
10		▽	SS 3		5-8-8-10 (16)							
15		Gray Fine SAND (SP)	SS 4		6-7-7 (14)							
20		Brown/Gray Slightly Silty Fine SAND (SP-SM)	SS 5		6-7-12 (19)							
25			SS 6		7-11-13 (24)							
30		Gray Slightly Silty Fine SAND (SP-SM)	SS 7		6-8-11 (19)							
		Boring Termination Depth at 30.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER B-3

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/27/25 **COMPLETED** 5/27/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.0 ft
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Asphalt Structural Course (2 1/4" Thick) Limerock Base Course (6" Thick) ▽ Gray/Brown Slightly Silty Fine SAND (SP-SM) Dark Gray Slightly Silty Fine SAND (SP-SM)	AU									
5		Brown/Orange Slightly Silty Fine SAND (SP-SM)	SS 1		10-10-11-13 (21)							
			SS 2		10-12-15-19 (27)							
10		Tan/Orange Slightly Silty Fine SAND (SP-SM)	SS 3		5-9-14-20 (23)							
15		Gray Fine SAND (SP)	SS 4		3-4-4 (8)							
20		Gray/Dark Gray Slightly Silty Fine SAND (SP-SM)	SS 5		9-11-15 (26)							
25		Gray Fine SAND (SP)	SS 6		5-8-10 (18)							
30			SS 7		7-10-14 (24)							
		Boring Termination Depth at 30.0 feet.										

GEOTECH BH COLUMNS OKALOOSA ISLAND MARINA.GPJ GINT STD US LAB.GDT 6/30/25

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER B-4

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/27/25 **COMPLETED** 5/27/25
GROUND ELEVATION ___ **HOLE SIZE** ___
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 9.5 ft
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Gray Slightly Silty Fine SAND with Trace of Orange Clayey Fine Sand (SP-SM)	AU									
		Brown Slightly Silty Fine SAND (SP-SM)										
5			SS 1		4-5-8-11 (13)							
			SS 2		6-9-11-13 (20)							
		Tan Slightly Silty Fine SAND (SP-SM)	SS 3		8-11-15-19 (26)							
10		▽										
15		Gray Fine SAND (SP)	SS 4		7-9-12 (21)							
20			SS 5		6-10-10 (20)							
25			SS 6		8-11-14 (25)							
30			SS 7		7-9-11 (20)							
		Boring Termination Depth at 30.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER B-5

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/27/25 **COMPLETED** 5/27/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 9.0 ft
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown/Orange Slightly Silty Fine SAND (SP-SM)	SS 1		2-3-4-4 (7)							
			SS 2		5-5-6-6 (11)							
5		Orange/Brown Slightly Silty Fine SAND (SP-SM)	SS 3		5-5-6-7 (11)							
			SS 4		6-7-8-8 (15)							
		Gray/Brown Slightly Silty Fine SAND (SP-SM) ▽	SS 5		10-13-17-21 (30)							
10												
		Gray Fine SAND (SP)	SS 6		12-16-20 (36)							
15												
			SS 7		11-14-19 (33)							
20												
			SS 8		10-13-19 (32)							
25												
			SS 9		10-12-15 (27)							
30		Boring Termination Depth at 30.0 feet.										

GEOTECH BH COLUMNS OKALOOSA ISLAND MARINA.GPJ GINT STD US LAB.GDT 6/30/25

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER B-6

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/27/25 **COMPLETED** 5/27/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 8.0 ft
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown/Gray Slightly Silty Fine SAND (SP-SM)	SS 1		2-3-4-6 (7)							
			SS 2		3-4-4-4 (8)							
5		Brown Slightly Silty Fine SAND (SP-SM)	SS 3		5-8-12-15 (20)							
			SS 4		5-5-6-12 (11)							
		▽ Gray/Brown Slightly Silty Fine SAND with Trace of Shell (SP-SM)	SS 5		5-7-8-11 (15)							
10												
15		Gray Fine SAND (SP)	SS 6		7-9-11 (20)							
20			SS 7		9-11-15 (26)							
25			SS 8		7-10-13 (23)							
30			SS 9		8-9-12 (21)							
		Boring Termination Depth at 30.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-1

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.8 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Gray/Tan Slightly Silty Fine SAND (SP-SM)										
		Gray/Light Gray Slightly Silty Fine SAND (SP-SM)										
2.5		▽	AU									
5.0		Boring Termination Depth at 5.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-2

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 5.6 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Dark Brown Slightly Silty Fine SAND (SP-SM)										
		Tan Slightly Silty Fine SAND (SP-SM)										
2.5		Light Gray Slightly Silty Fine SAND (SP-SM)	AU									
5.0		▽ Gray Slightly Silty Fine SAND (SP-SM)										
		Boring Termination Depth at 6.5 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-3

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 4.5 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)	AU									
2.5		Light Gray/Brown Slightly Silty Fine SAND (SP-SM) ▽										
5.0		Gray Slightly Silty Fine SAND (SP-SM)										
		Boring Termination Depth at 6.5 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-4

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 4.2 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)										
		Red/Orange Clayey Fine SAND (SC)										
		Light Gray Slightly Silty Fine SAND (SP-SM)										
2.5			AU									
		▽										
5.0												
		Boring Termination Depth at 6.5 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-5

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 4.6 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)										
		Light Gray Slightly Silty Fine SAND (SP-SM)										
2.5			AU									
		▽										
5.0		Dark Gray Slightly Silty Fine SAND (SP-SM)										
		Boring Termination Depth at 6.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-6

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 3.3 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)										
		Light Gray Slightly Silty Fine SAND (SP-SM)										
2.5		▽	AU									
		Dark Gray Slightly Silty Fine SAND with Roots (SP-SM)										
5.0		Boring Termination Depth at 5.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-7

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 4.7 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Gray Slightly Silty Fine SAND with Peat Chunks (SP-SM)										
		Tan Slightly Silty Fine SAND with Rocks (SP-SM)										
		Light Gray Slightly Silty Fine SAND (SP-SM)										
2.5			AU									
		▽										
5.0		Boring Termination Depth at 5.0 feet.										

Magnum Engineering, Inc.
429 Florida Avenue
Lynn Haven, FL 32444
Telephone: 850-258-0994

BORING NUMBER HA-8

CLIENT DAG Architects
PROJECT NAME Okaloosa Island Marina
PROJECT NUMBER M125-120-1012
PROJECT LOCATION Okaloosa County, Florida
DATE STARTED 5/28/25 **COMPLETED** 5/28/25
GROUND ELEVATION ___ **HOLE SIZE** ___
DRILLING CONTRACTOR ___
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 4.5 ft
LOGGED BY B. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES ___
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Dark Gray Slightly Silty Fine SAND (SP-SM)										
		Tan Slightly Silty Fine SAND (SP-SM)										
2.5		Gray Slightly Silty Fine SAND (SP-SM)	AU									
		▽										
5.0		Boring Termination Depth at 6.0 feet.										

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

DOUBLE RING INFILTROMETER FIELD TEST RESULTS

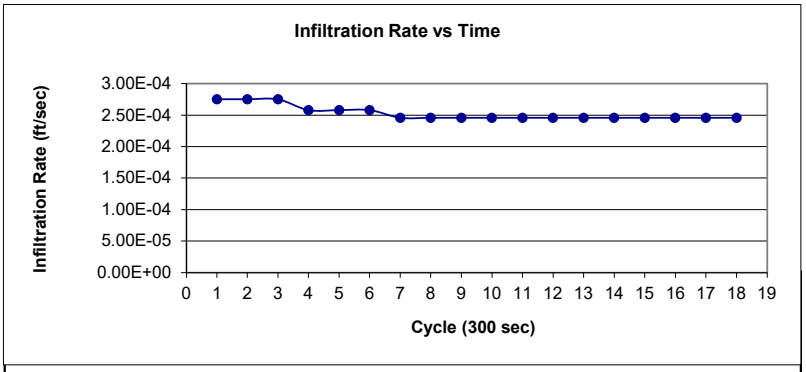
FIGURE # 3

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

Double-Ring Field Infiltration Test

Test Location:	DRI-1			
Project Name:	Okaloosa Island Marina Project			
Project Location:	Okaloosa County, Florida			
Test Depth:	Surface	ft		
Depth to GWT:	2.8	ft		
Inner Ring Diameter:	12	in	0.3048	m
Outer Ring Diameter:	24	in	0.6096	m
Pre-Saturation	30	min		
Area Outer Ring:	3.1416	ft^2	0.00202683	m^2
Area Inner Ring:	0.7854	ft^2	0.00050671	m^2
Net Outer Ring Area:	2.3562	ft^2	0.00152013	m^2

	Inner Ring		
Cycle	ElapTime (sec)	Vol Used (in^3)	Infiltration Rate (ft/sec)
1	300	112	2.75E-04
2	300	112	2.75E-04
3	300	112	2.75E-04
4	300	105	2.58E-04
5	300	105	2.58E-04
6	300	105	2.58E-04
7	300	100	2.46E-04
8	300	100	2.46E-04
9	300	100	2.46E-04
10	300	100	2.46E-04
11	300	100	2.46E-04
12	300	100	2.46E-04
13	300	100	2.46E-04
14	300	100	2.46E-04
15	300	100	2.46E-04
16	300	100	2.46E-04
17	300	100	2.46E-04
18	300	100	2.46E-04
Results	Sustained Rate	103	2.53E-04



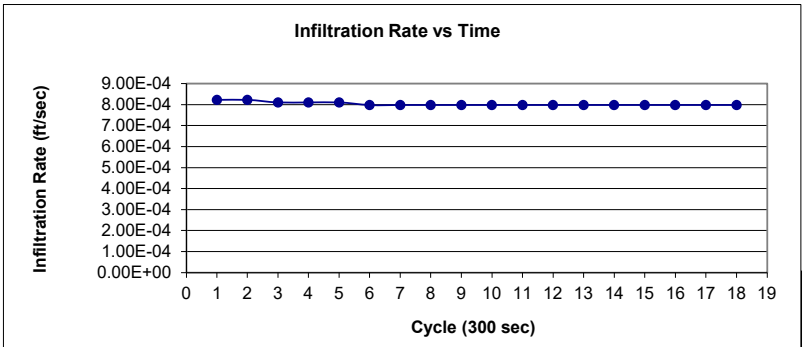
Infiltration Rate: **7.49E-03 cm/sec** **10.6 in/hr**

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

Double-Ring Field Infiltration Test

Test Location:	DRI-2			
Project Name:	Okaloosa Island Marina Project			
Project Location:	Okaloosa County, Florida			
Test Depth:	2.0	ft		
Depth to GWT:	5.6	ft		
Inner Ring Diameter:	12	in	0.3048	m
Outer Ring Diameter:	24	in	0.6096	m
Pre-Saturation	30	min		
Area Outer Ring:	3.1416	ft^2	0.00202683	m^2
Area Inner Ring:	0.7854	ft^2	0.00050671	m^2
Net Outer Ring Area:	2.3562	ft^2	0.00152013	m^2

	Inner Ring		
Cycle	ElapTime (sec)	Vol Used (in^3)	Infiltration Rate (ft/sec)
1	300	335	8.23E-04
2	300	335	8.23E-04
3	300	330	8.11E-04
4	300	330	8.11E-04
5	300	330	8.11E-04
6	300	325	7.98E-04
7	300	325	7.98E-04
8	300	325	7.98E-04
9	300	325	7.98E-04
10	300	325	7.98E-04
11	300	325	7.98E-04
12	300	325	7.98E-04
13	300	325	7.98E-04
14	300	325	7.98E-04
15	300	325	7.98E-04
16	300	325	7.98E-04
17	300	325	7.98E-04
18	300	325	7.98E-04
Results	Sustained Rate	327	8.03E-04



Infiltration Rate: **2.43E-02 cm/sec** **34.5 in/hr**