Florida Geotechnical Engineering, Inc.

May 4, 2021

Cindy Alexopoulos, LCAM
**Sentry Management, Inc.**
2605 Enterprise Road, East, Suite 200
Clearwater, Florida 33759

**Re: Privacy Wall Geotechnical Investigation**
**Huntington HOA**
**Safety Harbor Florida**
**FGE Project Number 201452**

Dear Ms. Alexopoulos:

At your request, Florida Geotechnical Engineering, Inc (FGE) completed a geotechnical investigation at the referenced property. The purpose of this investigation was to assess subsurface conditions and relatively quantify the strength characteristics of the soils supporting the privacy wall generally located along the perimeter of the Huntington HOA property. Enclosed herein is a summary of the investigative activities performed by FGE and our recommendations regarding the wall.

As part of the investigation, FGE was provided quote from Mott's Contracting Services to repair damages to the wall. In the quote, various damage mechanisms were discussed that mainly centered around moisture entering the wall. In general, FGE agrees with the assessments of Mott's Contracting Services although no geotechnical evaluations were provided. This report provides geotechnical context to the evaluation of the wall damages and repair.

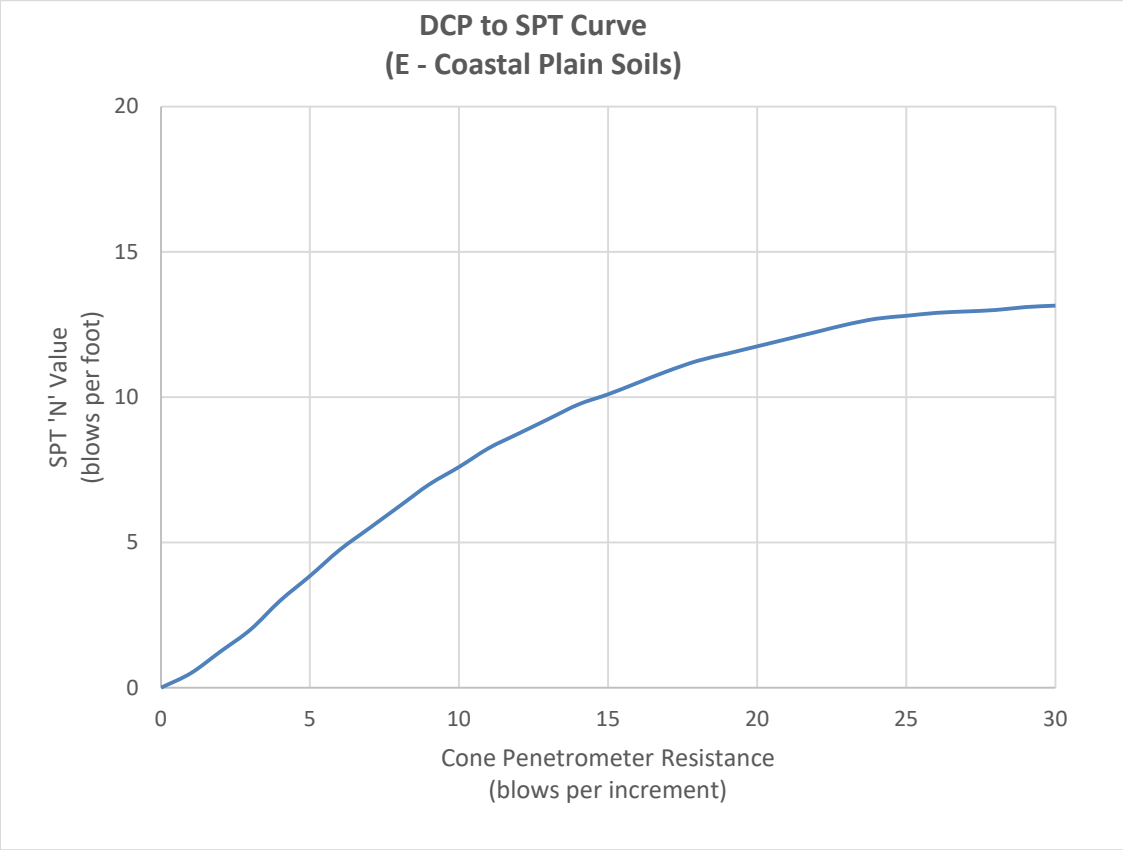
## GEOTECHNICAL ASSESSMENT

FGE performed a field investigation at the subject property that consisted of a visual damage assessment of the wall, ten (10) hand auger borings, five (8) foundation test pits, and laboratory analysis of nine (9) soil samples.

### HAND CONE PENETROMETER MEASURMENTS

The single mass dynamic cone penetrometer consists of a measuring instrument, a probing rod and a cone tip. The penetrometer is pushed perpendicular into the soil and provides a method of assessing soil strength via relative density. The penetrometer is equipped with a 45-degree conical tip and a 15-lb slide hammer that free falls 20-inches. Dynamic cone penetrometer readings were collected during the hand

auger borings to estimate the relative density and/or consistency of the surficial soils. The relative density designations are calculated based on soil type and the below graph.




*Source: Humboldt Mfg. Co. Dynamic Cone Penetrometer Manual H-4202A*

| SANDY SOILS | |
|---|---|
| 'N' Value *(Blows per foot)* | Relative Density |
| 0 – 4 | Very Loose |
| 5 – 10 | Loose |
| 11 – 30 | Medium Dense |
| 31 – 50 | Dense |
| 50+ | Very Dense |

| CLAYEY & SILTY SOILS | |
|---|---|
| 'N' Value *(Blows per foot)* | Relative Consistency |
| 0 – 2 | Very Soft |
| 3 – 4 | Soft |
| 5 – 8 | Firm |
| 9 – 15 | Stiff |
| 16 – 30 | Very Stiff |
| 30+ | Hard |

Based on the cone penetrometer readings, the equivalent SPT 'N' values range from 1 to 13 blows per foot. These measurements indicate primarily very loose to medium dense relative densities for the shallow sandy soils and soft to stiff consistencies for the shallow clayey soils.

**HAND AUGER BORINGS**

The hand auger borings were completed using a stainless-steel bucket type auger that allows samples to be collected and visually classified at approximate 12-inch intervals. Dynamic hand cone penetrometer data was also gathered from the hand auger borings which were completed adjacent to the privacy wall.

Ten (10) hand auger borings were performed as part of the investigation to determine the soil types adjacent to, and below, the wall foundation(s). The soil descriptions are based on visual inspection of the hand auger samples, and the soil classifications were performed in general accordance with the Unified Soil Classification System (USCS). The hand auger borings were performed to a maximum depth of seven (7) feet and the groundwater table was only encountered in two (2) borings at approximately 6.5 feet below land surface (ft-bls). The hand auger boring logs are presented in **Attachment A**.

The HA borings encountered sand, clayey sand, and sandy clay. The layering of the soil types is significantly variable. The majority of the shallow sandy soil is very loose to loose, and the majority of the clayey soils is firm.

## Laboratory Analysis

Nine (9) soil samples from the soil borings were submitted for laboratory testing. The samples were collected and tested in accordance with the American Society for Testing and Materials (ASTM) specifications and processed to verify the Unified Soil Classification System (USCS) soil descriptions and properties. The complete analytical results are presented in **Attachment B**.

Eight (8) clayey soil samples were analyzed for liquid and plastic limits and moisture content, and one sample was analyzed for organic content. The soil samples were analyzed in accordance with ASTM D-1140 and ASTM 2974-07a.

The laboratory analysis of the clayey soil samples shows that the shallow clayey soils have the ability to shrink and swell in response to moisture changes. The organic analysis of one sample from HA-9 contained an organic content of 9.2%. Soils with organic contents greater than 5% are generally considered unsuitable as foundation bearing soils.

## Test Pit Excavations

Eight (8) test pit excavations were performed to evaluate the construction, adequacy and dimensions of the wall foundation(s). The results of test pit excavations generally show that the wall is supported on a

shallow strip foundation, although the foundation construction is highly variable. While the variable foundations are not ideal, the variability is common given the length of the wall. The test pits show the foundation embedment ranged from 7 to 31 inches, the width ranged from 8 to 29 inches, and the thickness from 4 to 7.5 inches.

## CONCLUSIONS

Based on the subsurface data and our visual inspection of the privacy wall, the wall has sustained settlement-related damage. The settlement related damage is due to the shallow soil conditions primarily, with a minor degree of damage being the result of variable wall support based on the foundation(s) construction, which is highly variable.

One significant issue is the prominent presence of very loose shallow sandy soil. This soil is susceptible to densification due to environmental factors such as traffic vibrations and water infiltration. The wide presence of very loose shallow soil below the wall indicates very little, if any, vibratory compaction was performed at the time the foundation(s) was poured and the wall was constructed. This condition can only be addressed by compacting the soils below the wall (remove and replace wall) or stabilizing the soils below and adjacent to the wall in situ using chemical grout injection.

The other significant factor in the wall stability is the presence of shallow clayey soils with the ability to shrink and swell in response to changes in moisture. The soils shrink during dry periods (settle) and expand during wet periods (swell); both conditions can move the wall and cause damage. This condition can be addressed by removal of the shallow clayey soil (remove and replace wall) or via the installation of pier supports.

The result of this investigation is that the wall has damage because of movement, because of the way the wall foundation(s) was constructed, and normal aging of the building materials. The damages that are the result of aging building materials is normal and can be maintained via normal maintenance. The damages that are the result of soil conditions will require more than normal maintenance and should be expected to continue.

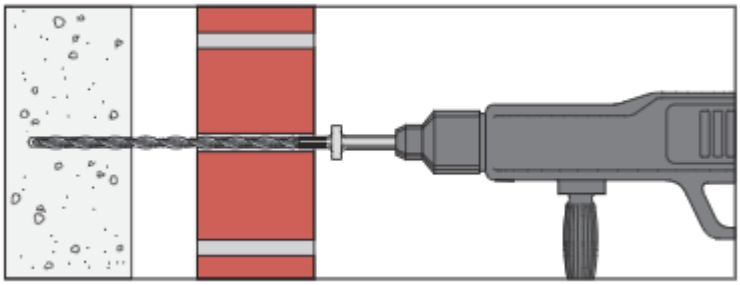
RECOMMENDATIONS

Based on the subsurface conditions and considering the age of the wall structure, it is recommended that the Board budget for replacement of the wall in the next 5-10 years. Considering the subsurface conditions that caused a majority of the damages, we would recommend the Board consider a more flexible style of wall system, often referred to as a Post-and-Panel wall type. It consists of a pre-cast concrete post that is set into a shallow caisson (cylindrical concrete shaft ~36" in diameter and 8 feet deep). The fence panels are also pre-cast with decorative concrete formed sides that can look quite decorative depending on the design. The panels are lowered into a concrete track on the post for placement. This type of wall, while rigid in construction and able to withstand hurricane force winds, the

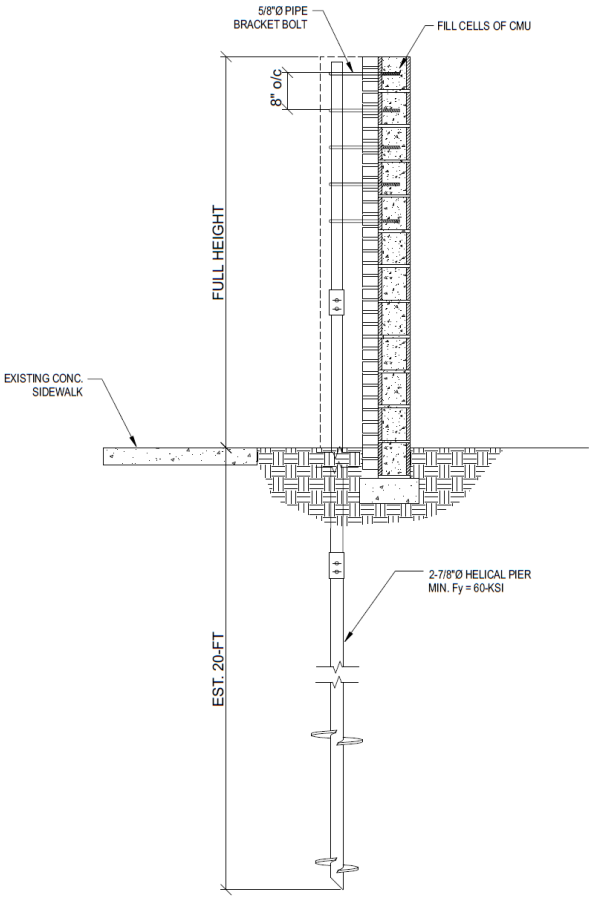
track connection allows for flexibility when it comes to localized differential movement. Additionally, the panels are rigid enough to withstand any localized heaving of the shallow soils in response to the clay.

In the interim, some temporary repairs can be made to allow the existing wall to safely operate while funds for a new wall are procured. Generally there are three (3) grades of damage that have been observed. The first is the least significant, and generally is comprised of cosmetic cracks. These can be filled with a flexible elastomeric filler and repainted.

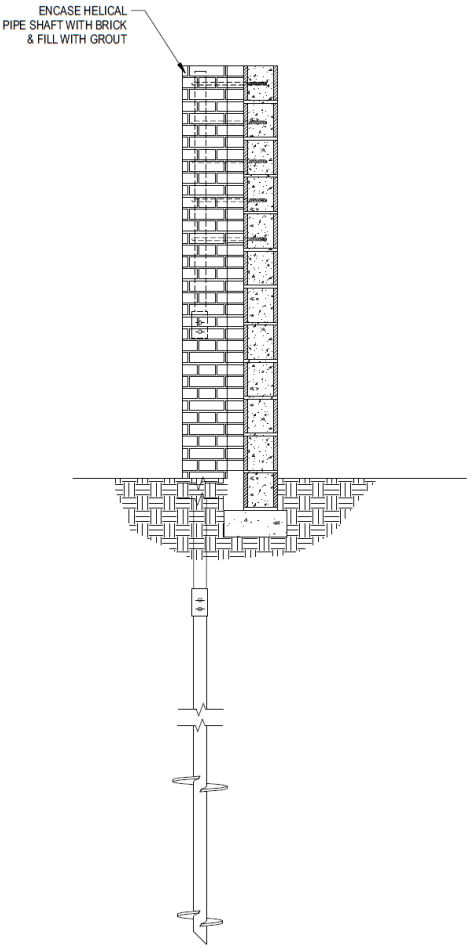
The second are primarily where the brick fascia is detaching from the wall (likely to water intrusion). This can be repaired by installing a retrofit brick repair tie. A good quality and readily available type is the Simpson Heli-Tie™ Helical Wall Tie. The ties are simply drilled into the mortar bed of the existing brick and epoxied in-place to reconnect the brick to the wall structure.



The third type of damage is a little more severe where the walls are leaning out of plumb. Two options to repair this are available. The first requires at least 10-ft of land directly next to the wall, and is referred to as a butress. The second, can be installed in limited access areas. It is a customized repair method designed by FGE for your situation. See below.

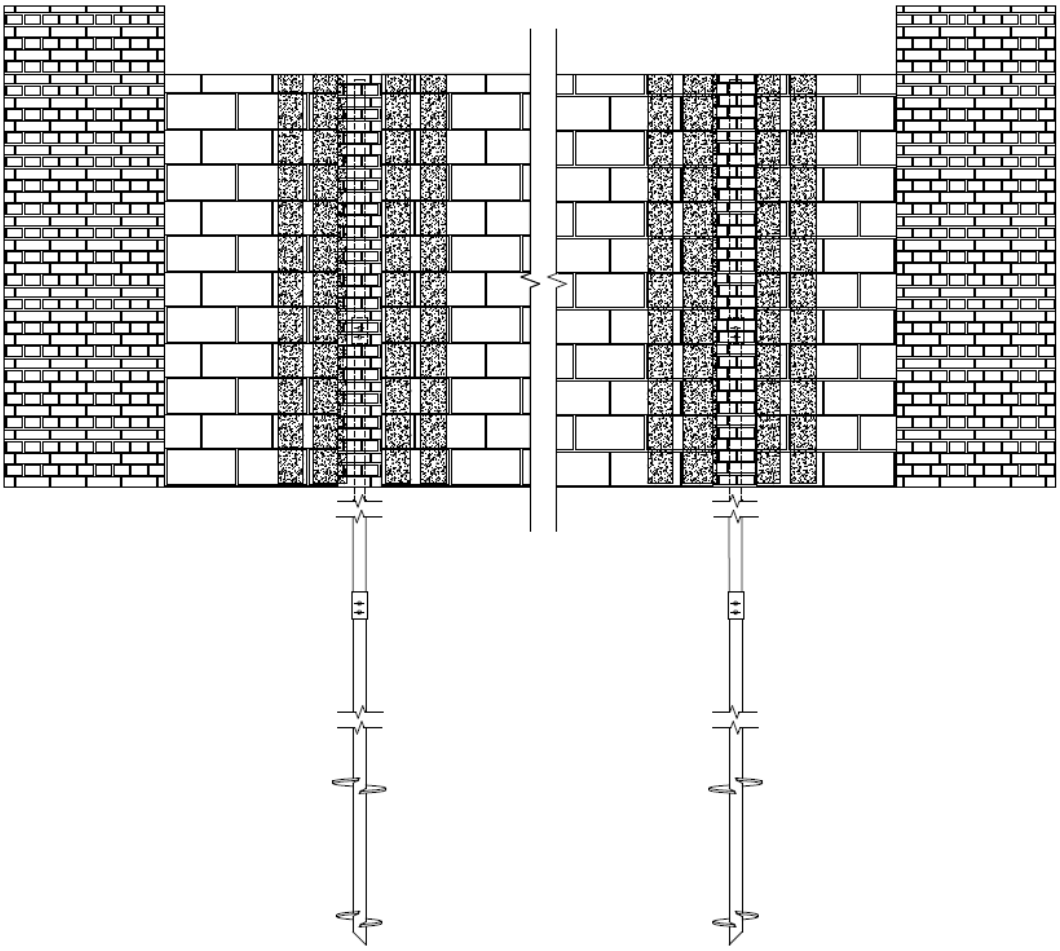



Section View - No Brick




Section View - Brick Finish

The Helical pile would be installed to a design depth, then mechanically fastened to the wall as shown above. Then can be encased in a brick finish for ascetics. This will provide the wall adequate lateral stability to be safely operated while funds for a new wall are procured.



Elevation View

FGE will be providing additional detail regarding these repaires, but wanted to provide this information for the purposes of the Boards meeting.

We greatly appreciate the opportunity to support you with this effort and we are available to provide additional assistance regarding the recommendations presented herein upon request.

Sincerely,

**FLORIDA GEOTECHNICAL ENGINEERING, INC.**

John R. Edwards, P.E.
Senior Geotechnical Engineer
FL License No. 46584

Attachments (2)

**ATTACHMENT A**

Florida Geotechnical Engineering, Inc.
P.O. Box 76006
Tampa, Florida 33675
Telephone: 813-248-4720
Fax: 813-248-4835

# BORING HA-1



**CLIENT** Sentry Management
**PROJECT NAME** Huntington Privacy Wall
**PROJECT NUMBER** 201452
**PROJECT LOCATION** Safety Harbor, FL
**DATE** 3/23/21
**GROUND ELEVATION** 20 ft
**DRILLING CONTRACTOR** FGE
**SHGWT LEVEL**
**DRILLING METHOD** ASTM D-1452
**GROUND WATER LEVEL** --- Not Encountered to 7 ft-bls
**BORING LOCATION** See Figure 2 - Site Plan and Testing Locations
**LOGGED BY** D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose, slightly silty, fine grained, brown | | | HA | 3 |
| | | CLAYEY SAND (SC) Loose, fine grained, brown to light brown | | | HA | 10 |
| | | SANDY CLAY (CL) Soft, brown to light brown to grey | | | HA | 4 |
| 17.5 | 2.5 | | | | HA | 4 |
| | | CLAYEY SAND (SC) Very Loose to Loose, fine grained, grey | | | HA | 1 |
| 15.0 | 5.0 | | | | HA | 1 |
| | | | | | HA | 6 |

Bottom of borehole at 7.0 feet.

EQUIVALENT SPT N VALUE
5 10 15

FGE
Florida Geotechnical Engineering, Inc.
P.O. Box 76006
Tampa, Florida 33675
Telephone: 813-248-4720
Fax: 813-248-4835

# BORING HA-2



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
GROUND WATER LEVEL --- Not Encountered to 7 ft-bls
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose to Loose, slightly silty, fine grained, brown | | | HA | 4 |
| | | Minor rocks from 0 to 2 ft-bls | | | HA | 7 |
| | | SANDY CLAY (CL) Soft, light brown | | | HA | 4 |
| 17.5 | 2.5 | SAND (SP) Very Loose, slightly silty, fine grained, brown | | | | |
| | | CLAYEY SAND (SC) Loose, fine grained, brown to light brown | | | HA | 8 |
| | | | | | HA | 10 |
| 15.0 | 5.0 | SANDY CLAY (CL) Medium Stiff, grey-green to light brown | | | HA | 6 |
| | | | | | HA | 7 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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Tampa, Florida 33675
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Fax: 813-248-4835

# BORING HA-3



**CLIENT** Sentry Management
**PROJECT NAME** Huntington Privacy Wall
**PROJECT NUMBER** 201452
**PROJECT LOCATION** Safety Harbor, FL
**DATE** 3/23/21
**GROUND ELEVATION** 20 ft
**DRILLING CONTRACTOR** FGE
**SHGWT LEVEL**
**DRILLING METHOD** ASTM D-1452
**GROUND WATER LEVEL** --- Not Encountered to 7 ft-bls
**BORING LOCATION** See Figure 2 - Site Plan and Testing Locations
**LOGGED BY** D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose, slightly silty, fine grained, brown<br>Minor rocks and roots from 0 to 1 ft-bls | | | HA | 3 |
| | | CLAYEY SAND (SC) Loose, fine grained, brown to light brown | | | HA | 9 |
| 17.5 | 2.5 | SAND (SP) Medium Dense, slightly silty, fine grained, light brown | | | HA | 13 |
| | | SANDY CLAY (CL) Soft ot Medium Stiff, dark grey to pale green to light brown to orange | | | HA | 3 |
| | | | | | HA | 6 |
| 15.0 | 5.0 | | | | HA | 6 |
| | | | | | HA | 5 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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# BORING HA-4



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
GROUND WATER LEVEL --- Not Encountered to 7 ft-bls
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose, slightly silty, fine grained, brown | | | HA | 2 |
| | | CLAYEY SAND (SC) Very Loose to Loose, slightly silty, fine grained, brown | | | HA | 6 |
| | | | | | HA | 2 |
| | | | | | HA | 2 |
| 17.5 | 2.5 | SANDY CLAY (CL) Soft to Medium Stiff, light brown to brown to grey to orange | | | HA | 5 |
| | | | | | HA | 4 |
| 15.0 | 5.0 | | | | HA | 5 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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P.O. Box 76006
Tampa, Florida 33675
Telephone: 813-248-4720
Fax: 813-248-4835

# BORING HA-5



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
GROUND WATER LEVEL --- Not Encountered to 7 ft-bls
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose, slightly silty, fine grained, brown | | | HA | 1 |
| | | CLAYEY SAND (SC) Loose to Medium Dense, fine grained, brown to light brown | | | HA | 5 |
| | | | | | HA | 9 |
| | | | | | HA | 8 |
| | | | | | HA | 12 |
| 17.5 | 2.5 | | | | | |
| 15.0 | 5.0 | SAND (SP) Loos, slightly silty, fine grained, brown | | | HA | 6 |
| | | SANDY CLAY (CL) Medium Stiff, grey | | | HA | 6 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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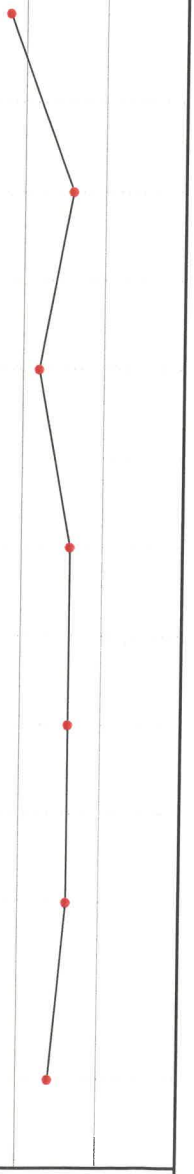
# BORING HA-6



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
GROUND WATER LEVEL --- Not Encountered to 7 ft-bls
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | CLAYEY SAND (SC) Loose, light brown | | | HA | 9 |
| | | SANDY CLAY (CL) Stiff, light brown to grey | | | HA | 13 |
| 17.5 | 2.5 | | | | HA | 11 |
| | | CLAYEY SAND (SC) Medium Dense, light brown to grey to orange | | | HA | 13 |
| | | | | | HA | 13 |
| 15.0 | 5.0 | | | | HA | 13 |
| | | SAND (SP) Medium dense, slightly silty, fine grained, brown | | | HA | 12 |
| | | Bottom of borehole at 7.0 feet. | | | | |

EQUIVALENT SPT N VALUE
5 10 15



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P.O. Box 76006
Tampa, Florida 33675
Telephone: 813-248-4720
Fax: 813-248-4835

# BORING HA-7



**CLIENT** Sentry Management
**PROJECT NAME** Huntington Privacy Wall
**PROJECT NUMBER** 201452
**PROJECT LOCATION** Safety Harbor, FL
**DATE** 3/23/21
**GROUND ELEVATION** 20 ft
**DRILLING CONTRACTOR** FGE
**SHGWT LEVEL**
**DRILLING METHOD** ASTM D-1452
**GROUND WATER LEVEL** --- Not Encountered to 7 ft-bls
**BORING LOCATION** See Figure 2 - Site Plan and Testing Locations
**LOGGED BY** D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Loose, slightly silty, fine grained, brown | | | HA | 5 |
| | | CLAYEY SAND (SC) Loose, brown to grey to red<br>Minor rocks from 1 to 2 ft-bls | | | HA | 10 |
| 17.5 | 2.5 | SAND (SP) Lose, slightly silty, fine grained, brown | | | HA | 8 |
| | | | | | HA | 5 |
| | | CLAYEY SAND (SC) Loose, fine grained, light brown | | | HA | 5 |
| | | SANDY CLAY (CL) Medium Stiff, light brown to brown to grey to red | | | HA | 6 |
| 15.0 | 5.0 | | | | HA | 6 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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# BORING HA-8



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
GROUND WATER LEVEL --- Not Encountered to 7 ft-bls
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Loose, slightly silty, fine grained, brown | | | HA | 6 |
| | | SANDY CLAY (CL) Soft to Medium Stiff, grey to red to green to light brown | | | HA | 6 |
| 17.5 | 2.5 | | | | HA | 6 |
| | | | | | HA | 8 |
| | | | | | HA | 4 |
| 15.0 | 5.0 | | | | HA | 5 |
| | | | | | HA | 5 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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# BORING HA-9



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
▽ GROUND WATER LEVEL 6.50 ft / Elev 13.50 ft
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | GRAPHIC LOG | GWT | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose to Medium Dense, slightly silty, fine grained, brown to light brown | | | HA | 8 |
| | | | | | HA | 4 |
| 17.5 | 2.5 | | | | HA | 1 |
| | | | | | HA | 9 |
| | | | | | HA | 11 |
| 15.0 | 5.0 | | | | HA | 8 |
| | | Organics | | | | |
| | | CLAYEY SAND (SC) Very Loose, fine grained, brown to light borwn to grey | | | | |
| | | SANDY CLAY (CL) Soft, brown to light brown to grey | | ▽ | HA | 3 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

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# BORING HA-10



CLIENT Sentry Management
PROJECT NAME Huntington Privacy Wall
PROJECT NUMBER 201452
PROJECT LOCATION Safety Harbor, FL
DATE 3/23/21
GROUND ELEVATION 20 ft
DRILLING CONTRACTOR FGE
SHGWT LEVEL
DRILLING METHOD ASTM D-1452
▽ GROUND WATER LEVEL 6.50 ft / Elev 13.50 ft
BORING LOCATION See Figure 2 - Site Plan and Testing Locations
LOGGED BY D. Penkava

| ELEVATION (ft) | DEPTH (ft) | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | BLOW COUNTS (N VALUE) |
|---|---|---|---|---|
| 20.0 | 0.0 | SAND (SP) Very Loose to Loose, slightly silty, fine grained, brown | HA | 3 |
| | | | HA | 7 |
| 17.5 | 2.5 | CLAYEY SAND (SC) Medium Dense, fine grained, brown | HA | 11 |
| | | SANDY CLAY (CL) Medium Stiff, brown to grey to red | HA | 8 |
| | | CLAYEY SAND (SC) Loose, fine grained, brown to red | HA | 6 |
| 15.0 | 5.0 | SANDY CLAY (CL) Medium Stiff, brown to grey to red | HA | 3 |
| | | CLAYEY SAND (SC) Very Loose, fine grained, brown to grey to pale green | HA | 3 |

EQUIVALENT SPT N VALUE
5 10 15

Bottom of borehole at 7.0 feet.

FGE HA/DCP - FGE GEOTECH LOG.GDT - 4/22/21 10:21 - X:\PROJECT FOLDERS FGE\BORING LOG DATABASE FILES\PROJECTS\201452 HUNTINGTON.GPJ

**ATTACHMENT B**

Florida Geotechnical Engineering, Inc.

PO Box 76006
Tampa, Florida 33675
Tel: (813) 248-4720
Fax: (813) 248-4835
www.flgeotech.com

| | |
|---|---|
| Project No.: | 201452 |
| Project Name: | Huntington H.O.A. |
| Project Address: | Subdivision located in Section 33, Township 28 S, Range 16 E, Safety Harbor, FL |
| Client: | Huntington H.O.A. |
| Date Tested: | 4/5/2021 |
| Test By: | D. Penkava |
| Checked By: | |

| | |
|---|---|
| ASTM Standard: | D 1140 |
| Test Method: | Moisture - A / Passing #200 Sieve |
| Sample Location: | (1) HA-8; (4-5') |
| | (2) HA-8; (1-2') |
| | (3) HA-6; (4-5') |
| | (4) HA-1; (3') |

# Moisture Content/Minus #200 Sieve Analysis

| Sample | $W_C + S_W$ (g) | $W_C + S_D$ (g) | $W_C$ (g) | Solids Content (%) | Moisture Content (%) | $W_C + S_R$ (g) | <#200 (%) |
|---|---|---|---|---|---|---|---|
| 1 | 179.95 | 138.98 | 4.58 | 76.6% | 30.5% | 66.50 | 53.9% |
| 2 | 176.62 | 149.93 | 4.55 | 84.5% | 18.4% | 104.31 | 31.4% |
| 3 | 172.18 | 138.73 | 4.58 | 80.0% | 24.9% | 66.58 | 53.8% |
| 4 | 169.40 | 145.13 | 4.56 | 85.3% | 17.3% | 104.87 | 28.6% |
| | | | | | | | |

| Sample | Soil Description |
|---|---|
| 1 | CL, brown, gray and red. |
| 2 | CL, pale green, gray and light brown. |
| 3 | SC, light brown, gray and orange. |
| 4 | CL, brown, light brown and gray. |
| | |

## Formulas

$W_c$ – Weight of Container

$S_w$ – Weight of Wet Sample

$S_D$ – Weight of Dry Sample

$S_R$ – Weight of Sample Retained

$$\text{Solids Content (\%)} = \left(\frac{S_D}{S_W}\right) \times 100$$

$$\text{Moisture Content (\%)} = \left[\frac{(S_W - S_D)}{S_D}\right] \times 100$$

$$\text{Fines Content (\%)} = \left[\frac{S_D - (S_R - W_C)}{S_D}\right] \times 100$$

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| Project No.: | 201452 |
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| Client: | Huntington H.O.A. |
| Date Tested: | 4/5/2021 |
| Test By: | D. Penkava |
| Checked By: | |

| | |
|---|---|
| ASTM Standard: | D 1140 |
| Test Method: | Moisture - A / Passing #200 Sieve |
| Sample Location: | (5) HA-2; (5-6') |
| | (6) HA-3; (3-4') |
| | (7) HA-4; (6-7') |
| | (8) HA-7; (5-6') |

# Moisture Content/Minus #200 Sieve Analysis

| Sample | $W_C + S_W$ (g) | $W_C + S_D$ (g) | $W_C$ (g) | Solids Content (%) | Moisture Content (%) | $W_C + S_R$ (g) | <#200 (%) |
|---|---|---|---|---|---|---|---|
| 5 | 186.10 | 136.85 | 4.64 | 72.9% | 37.3% | 41.73 | 71.9% |
| 6 | 177.37 | 137.73 | 4.62 | 77.1% | 29.8% | 81.12 | 42.5% |
| 7 | 192.53 | 146.19 | 4.60 | 75.3% | 32.7% | 71.85 | 52.5% |
| 8 | 199.26 | 159.76 | 4.61 | 79.7% | 25.5% | 92.55 | 43.3% |
| | | | | | | | |

| Sample | Soil Description |
|---|---|
| 5 | CL, gray and green. |
| 6 | CL, dark gray. |
| 7 | CH, light brown, gray and orange. |
| 8 | CL, light brown, brown, gray and red. |
| | |

## Formulas

$W_c$ – Weight of Container

$S_w$ – Weight of Wet Sample

$S_D$ – Weight of Dry Sample

$S_R$ – Weight of Sample Retained

$$\text{Solids Content (\%)} = \left(\frac{S_D}{S_w}\right) \times 100$$

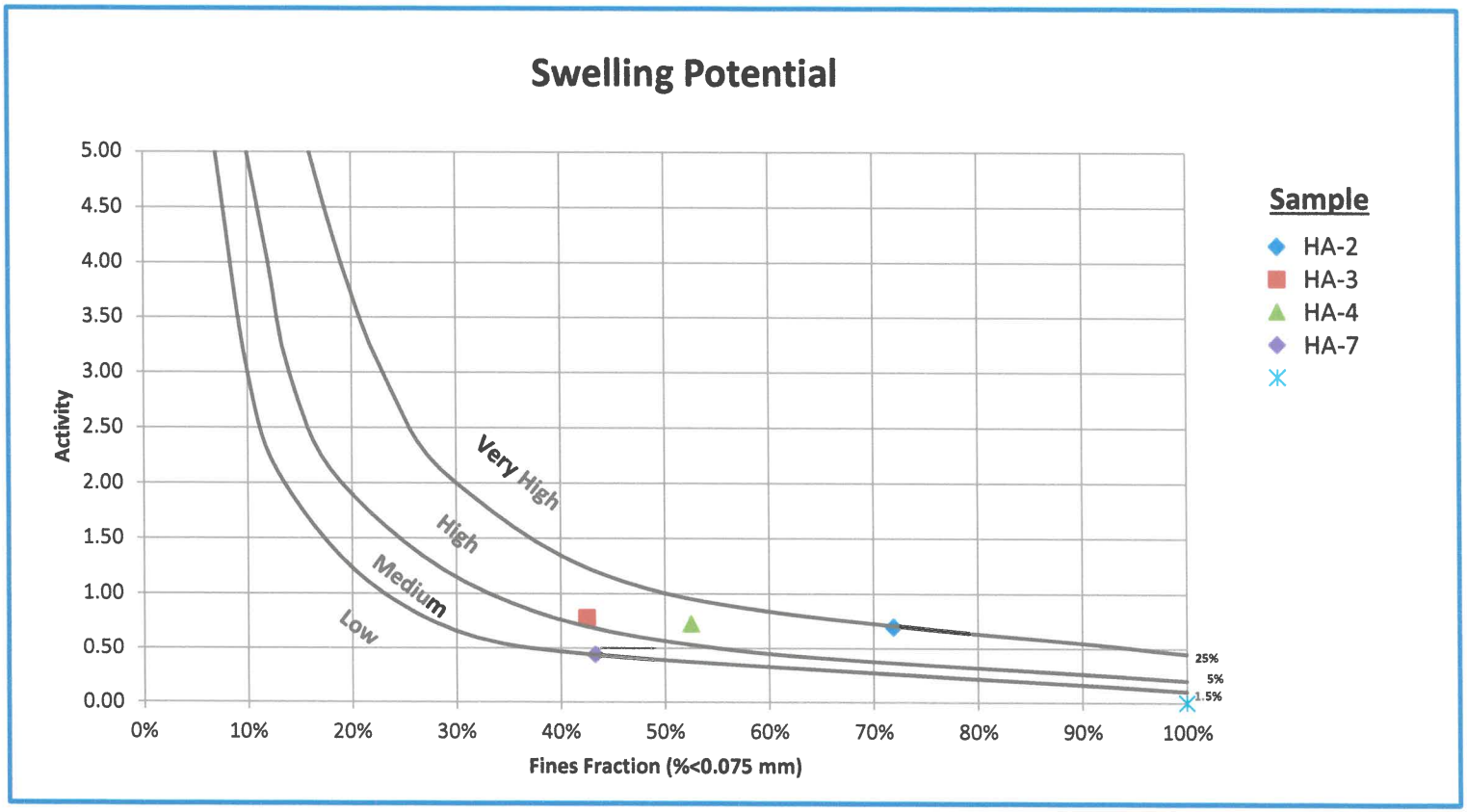
$$\text{Moisture Content (\%)} = \left[\frac{(S_w - S_D)}{S_D}\right] \times 100$$

$$\text{Fines Content (\%)} = \left[\frac{S_D - (S_R - W_c)}{S_D}\right] \times 100$$

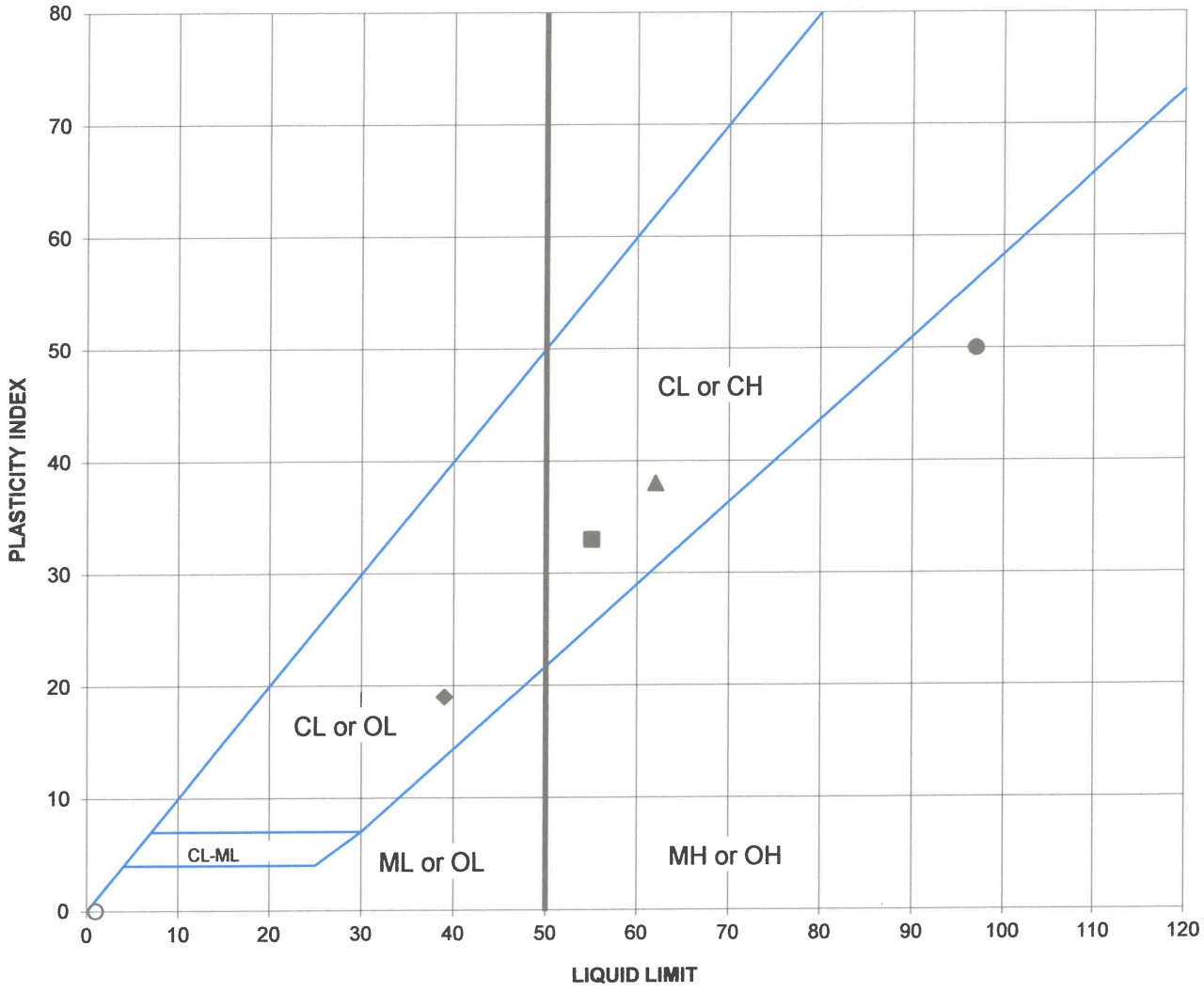
Florida Geotechnical Engineering, Inc.

# Laboratory Report
## Swelling Potential

| Sample | USCS | Fines Fraction % <0.075mm | Activity | Plastic Limit % | Liquid Limit % | Plasticity Index % |
|---|---|---|---|---|---|---|
| HA-2 | CL | 72% | 0.70 | 47 | 97 | 50 |
| HA-3 | CL | 43% | 0.78 | 22 | 55 | 33 |
| HA-4 | CH | 53% | 0.72 | 24 | 62 | 38 |
| HA-7 | CL | 43% | 0.44 | 20 | 39 | 19 |
| | | | | | | |



# LIQUID AND PLASTIC LIMITS




| Symbol | Source | Depth | USCS | In-situ Moisture Content, % | Plastic Limit | Liquid Limit | Plasticity Index | Liquidity Index |
|---|---|---|---|---|---|---|---|---|
| ● | HA-2 | 5-6' | CL | | 47 | 97 | 50 | |
| ■ | HA-3 | 3-4' | CL | | 22 | 55 | 33 | |
| ▲ | HA-4 | 6-7' | CH | | 24 | 62 | 38 | |
| ♦ | HA-7 | 5-6' | CL | | 20 | 39 | 19 | |
| | | | | | | | | |

FGE Florida Geotechnical Engineering, Inc.

**Client:** Huntington H.O.A.

**Project:** Huntington H.O.A.

**Tested By:** D. Penkava

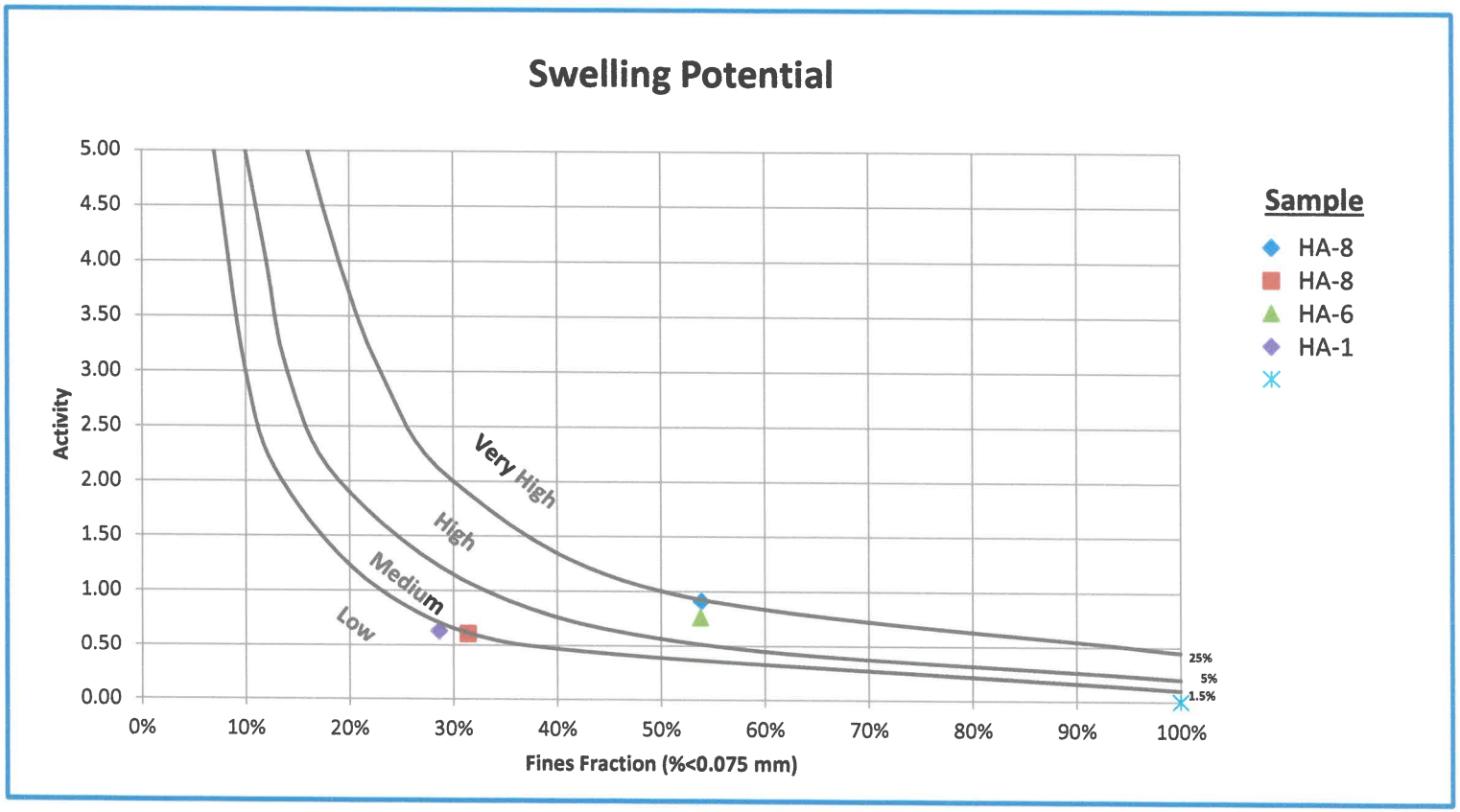
**Project No.:** 201452 **Figure:** 1

Florida Geotechnical Engineering, Inc.

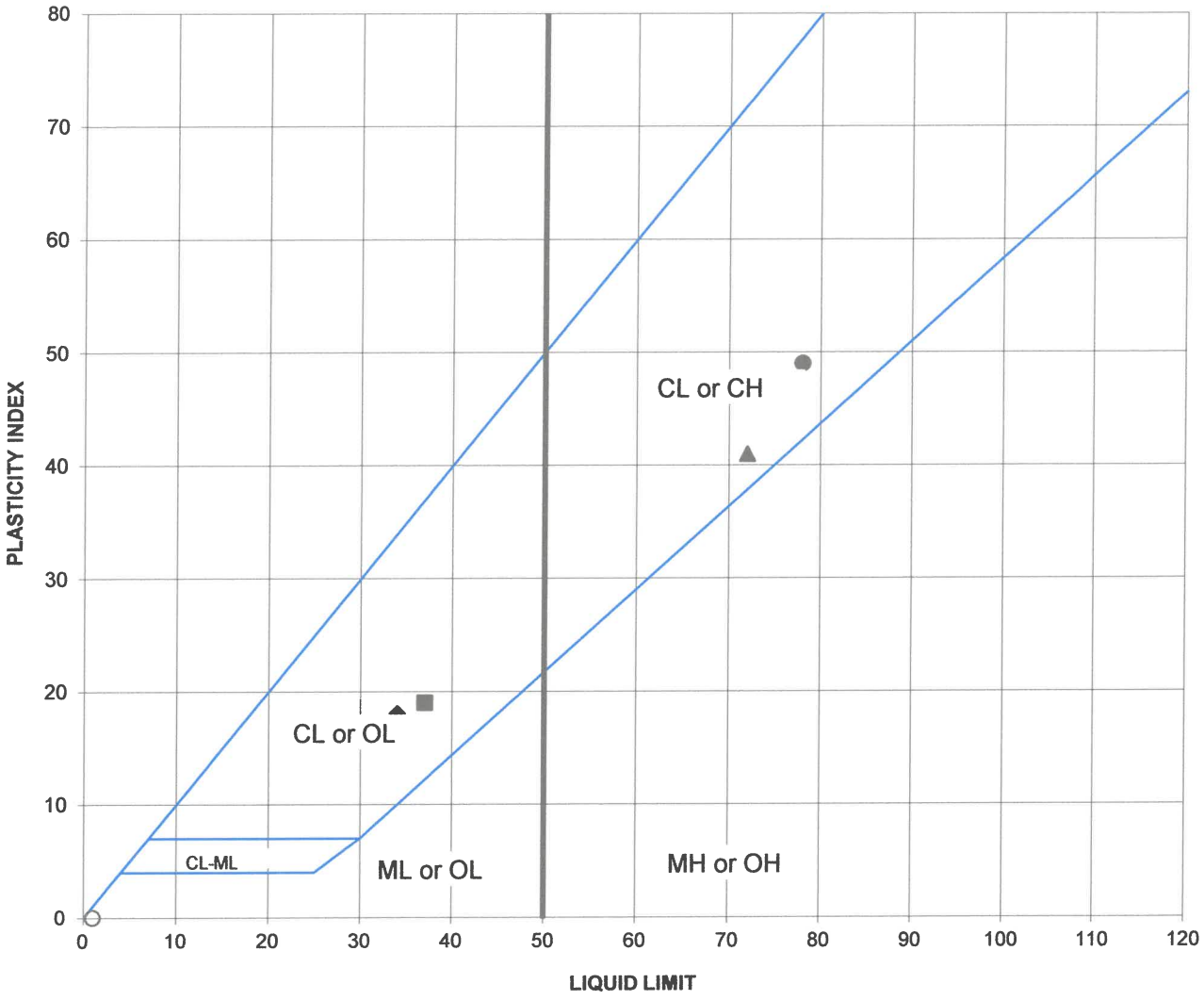
# Laboratory Report

## Swelling Potential

| Sample | USCS | Fines Fraction % <0.075mm | Activity | Plastic Limit % | Liquid Limit % | Plasticity Index % |
|---|---|---|---|---|---|---|
| HA-8 | CL | 54% | 0.91 | 29 | 78 | 49 |
| HA-8 | CL | 31% | 0.61 | 18 | 37 | 19 |
| HA-6 | SC | 54% | 0.76 | 31 | 72 | 41 |
| HA-1 | CL | 29% | 0.63 | 16 | 34 | 18 |
| | | | | | | |



# LIQUID AND PLASTIC LIMITS




| Symbol | Source | Depth | USCS | In-situ Moisture Content, % | Plastic Limit | Liquid Limit | Plasticity Index | Liquidity Index |
|---|---|---|---|---|---|---|---|---|
| ● | HA-8 | 4-5' | CL | #DIV/0! | 29 | 78 | 49 | #DIV/0! |
| ■ | HA-8 | 1-2' | CL | #DIV/0! | 18 | 37 | 19 | #DIV/0! |
| ▲ | HA-6 | 4-5' | SC | #DIV/0! | 31 | 72 | 41 | #DIV/0! |
| ♦ | HA-1 | 3' | CL | #DIV/0! | 16 | 34 | 18 | #DIV/0! |
| | | | | | | | | |

Florida Geotechnical Engineering, Inc.

**Client:** Huntington H.O.A.

**Project:** Huntington H.O.A.

**Tested By:** D. Penkava

**Project No.:** 201452 **Figure:** 1