



## *WHITAKER LABORATORY, INC.*

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March 15, 2018

McSweeney Engineers, LLC  
123 Cannon St.  
Charleston, SC 29403  
Office: (843) 974-5621 Ext. 302

Attention: Mr. William D. Barna, P.E.  
[bill@mcsweeneyengineers.com](mailto:bill@mcsweeneyengineers.com)  
Cell: (843) 327-5735

Referencing: Report of Geotechnical Evaluation  
Bulkhead Wall – James L Taylor Drive  
Ridgeland, SC  
Report No.: 3-15-18-2

Dear Mr. Barna:

We understand that James L Taylor Drive is experiencing distress along the south side shoulder of the road. The south side of the road contains an existing drainage canal. It appears that the bottom of the canal resides approximately 4+ feet below the roadway pavement surface. Based upon visual inspection, it appears that the embankment/slope along the shoulder of the road is eroding and/or experiencing slope failure causing the shoulder of the road to fail (sluff off into the canal). We understand that a bulkhead wall is planned to be constructed along the shoulder of this road in an effort to stabilize the road from further distress.

In accordance with our proposal dated February 22, 2018, Whitaker performed geotechnical evaluation services at the above referenced site in an effort to identify subsurface soil conditions within the planned area of the bulkhead for others to design such a wall. Geotechnical evaluation services consisted of advancing two, soil test borings extending to depths reaching 30 feet each below the ground surface. Borings were advanced along the shoulder of James L Taylor Drive within the area of concern. We have provided the boring logs and boring location plan in the Appendix of this report for your reference and review.

### **Findings:**

- Pavement section consisted of 2 to 2 ½ inches of asphalt pavement with 6 to 7 inches of stone base material.
- Firm to very loose sands with organics (SM-PT) were encountered below the pavement section and extending to depths reaching 6 feet below existing grades.
- Very loose organic sands (SM-PT) were specifically encountered bracketing elevations 3 to 6 feet below existing grades within both borings performed.
- Below 6 feet, firm to very firm sands (SP) were encountered and extended to depths reaching 12 feet below existing grades.
- Below 12 feet, stiff to hard clayey type soils (CL and CH) were encountered and extended to the termination depth of the borings at 30 feet below the ground surface.
- Groundwater levels were measured at each boring location at the time of boring. Groundwater was encountered at depths approximating 5 ½ feet below the ground surface at the time of boring. Please note that the groundwater level shall be expected to fluctuate with the season of the year, rainfall/storm events and/or subsurface conditions within the general area. Groundwater levels identified in this report shall be considered approximate and valid only for the time and date of observation.

### **Recommendations:**

Earth pressure coefficients should be selected by the designer based on the type of wall, whether the wall is braced or un-braced and other conditions. For “worst case” design conditions where positive drainage is not provided or is temporarily interrupted, the hydrostatic pressure will have to be added to the earth pressure on the wall. For this design groundwater should be assumed to reside within close proximity to the pavement surface (instances where the canal is nearly full of water).

Based upon the SPT testing performed, Whitaker Laboratory, Inc. is providing the following soil parameters for your use in the design and construction of the planned bulkhead wall:

**B-1 & B-2**

Depth (ft, below ground surface)	SPT "N" Range	Soil Classification	Approximate Soil Unit Weight (pcf)		Internal Friction Angle (degrees)	Cohesion (psf)	Earth Pressure Coefficients		
			Sat	Submerged			Active K <sub>a</sub>	Passive K <sub>p</sub>	
0 - 3	15 - 28	SM-PT	118	55.6	28	0	0.36	2.77	
3 - 6	2 - 4	SM-PT	110	47.6	20	0	0.49	2.04	
6 - 12	18 - 27	SP	118	55.6	32	0	0.31	3.25	
12 - 17	10 - 14	CL & CH	120	57.6	0	750	1	1	
17 - 22	22 - 26	CH	123	60.6	0	1000	1	1	
22 - 30	42 - 64	CH	126	63.6	0	1500	1	1	

Any backfill/fill for this project should consist of a clean, free draining granular soil. The soil should be free of objectionable roots, clay lumps, organics and other debris. Soils classified as SW, SP or SM-SP with a maximum of 12% passing a #200 sieve will be acceptable. All backfill/fill should be placed in 8 to 10 inch thick, loose lifts and compacted by conventional compaction equipment to 95% density in accordance with ASTM D-1557.

Assuming all backfill/fill consists of and is placed in accordance with the recommendations provided above, soil parameters provided in the below table should be used in the design of the wall corresponding to any fill/backfill placed:

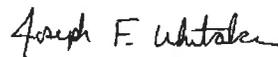
Soil Classification For Backfill	Approximate Soil Unit Weight (pcf)		Internal Friction Angle (degrees)	Cohesion (psf)	Earth Pressure Coefficients		
	Sat	Submerged			Active, K <sub>a</sub>	Passive, K <sub>p</sub>	
SP-SM & SM	115	52.6	30	0	0.33	3.0	

It was a pleasure to serve you and we look forward to further opportunities to assist you on this and other projects. If you have any questions or if we can be of further assistance, please do not hesitate to contact us at our office.

Respectfully submitted,  
 WHITAKER LABORATORY, INC.



Jason H. Follo, P.E.  
 Project Engineer



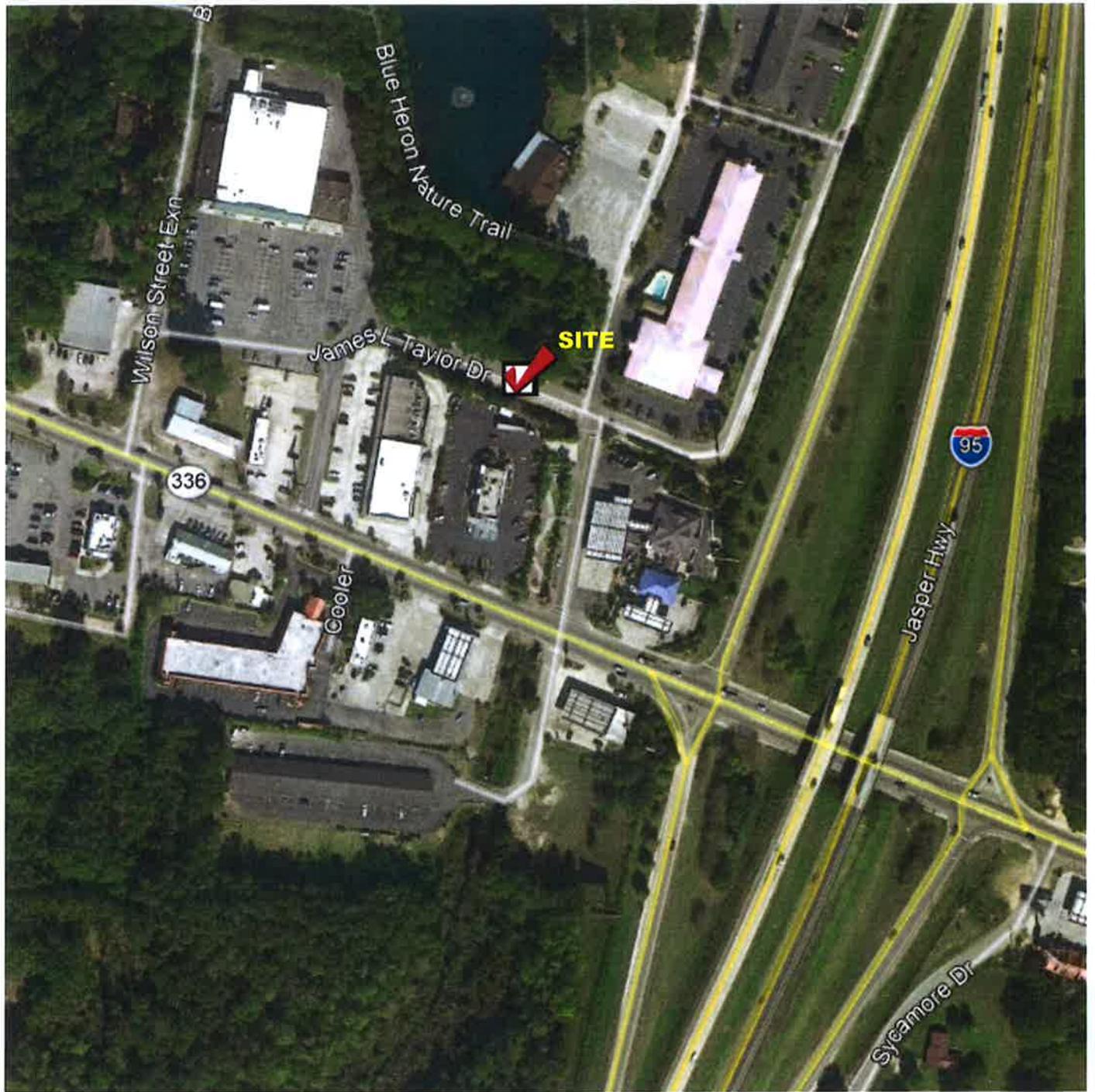
Joseph F. Whitaker, P.E.  
 Vice President

# **Attachments**

**Site Vicinity Map**

**Boring Location Plan**

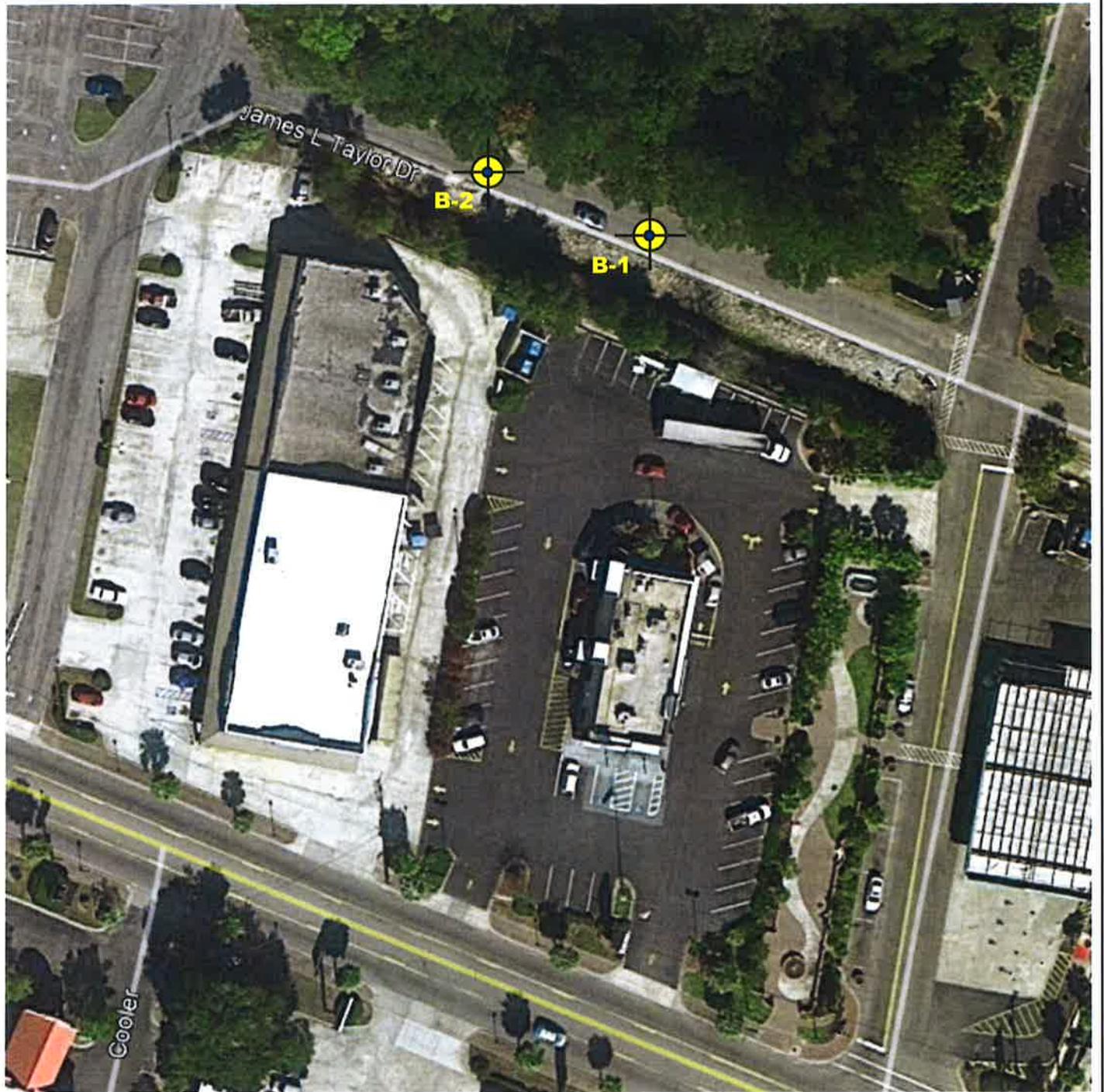
**Boring Logs**



## Site Vicinity Map

Bulkhead Wall  
James L. Taylor Drive  
Ridgeland, Jasper County, South Carolina





# Boring Location Plan

Bulkhead Wall  
James L. Taylor Drive  
Ridgeland, Jasper County, South Carolina



ALL BORING LOCATIONS ARE APPROXIMATE, & ARE BASED ONLY ON FIELD ESTIMATES.



Client: McSweeney Engineers, LLC

**Boring No. B-1**

Project: Bulkhead Wall - James Taylor Drive

Date: 3/9/18

Location: Ridgeland, SC

Engineer: Follo

SUBSURFACE PROFILE		Sample		Standard Penetration Test blows/ft. (Corrected to N60) 10 20 30 40 50 60 70 80 90	Water Table	Remarks
Depth	Description	Depth	Blows/ft			
0	Ground Surface	0				
	<b>SM-PT</b> Firm to loose, brown silty sand with organics	1	28			2.5" asphalt 6" stone
		2	18			
5		5	2			
	<b>SP</b> Very firm, tan coarse to fine sand	4	27			
10		10	27			
	<b>CH</b> Stiff, gray clay	15	10			
20		20	22			
	<b>CH</b> Very stiff to hard, olive-green clay	25	45			
30	End of Borehole	30	64			
35		35				

Drilled By: Wilkerson (Simco 2400) **HITAKER LABORATORY, INC.**  
 Drill Method: H. S. Auger  
 Drill Date: 3/9/18  
 2500 Tremont Road  
 Savannah, GA 31405

Hole Size: 6.5"  
 Datum:  
 Sheet: 1 of 1

Client: McSweeney Engineers, LLC

**Boring No. B-2**

Project: Bulkhead Wall - James Taylor Drive

Date: 3/9/18

Location: Ridgeland, SC

Engineer: Follo

SUBSURFACE PROFILE		Sample		Standard Penetration Test blows/ft. (Corrected to N60) 10 20 30 40 50 60 70 80 90	Water Table	Remarks
Depth	Description	Depth	Blows/ft			
0	Ground Surface	0				
	<b>SM-PT</b> Firm to loose, silty sand with organics	1	20			2" asphalt 7" base
		2	15			
5		5	4			
	<b>SP</b> Firm, tan to gray coarse to fine sand	4	20			
10		10	18			
	<b>CL</b> Stiff, gray silty clay	15	14			
15		15	14			
	<b>CH</b> Very stiff to hard, olive-green clay	20	26			
20		20	26			
25		25	42			
30	End of Borehole	30	46			
35		35				

Drilled By: Wilkerson (Simco 2400) **HITAKER LABORATORY, INC.**  
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