

BHM11338

August 29, 2025

Via Email Transmittal
bryan@meredithlegal.com

SUBMITTED TO:

Mr. Bryan Meredith
Meredith Law Firm PLLC
1715 Aaron Brenner Drive, Suite 450
Memphis, Tennessee 38120

Report

EDT



Richard T. Edwards, P. E., BSMatSci
Mechanical Engineer
E redwards@edtengineers.com

Birmingham District Office
P 205.838.1040
2748 Alton Road, Suite 104
Birmingham, Alabama 35210
Certificate of Authorization: 7074

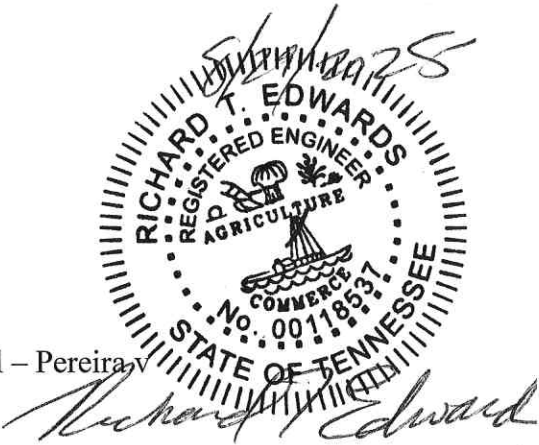
© Engineering Design & Testing Corp.

Engineering services in New York provided through the associated firm, Engineering Consultants, D.P.C.

Engineering services in North Carolina provided through the associated firm, EDT Engineers, P.C



August 29, 2025



REFERENCE: Evaluation of Foundation and Supporting Soil – Pereira
Regency Homebuilders
Location of Incident: Lakeland, Tennessee
EDT Case Number: BHM11338

Engineering Design & Testing Corp. (EDT) was asked to perform soil testing at the subject residence. Testing was performed on August 7, 2025 to determine the soil bearing capacity at four locations around the residence foundation footings. In addition, some of the available information from the construction of the residence was reviewed in the interest of this narrative. Figures 1–4 and two appendices are included to enhance the narrative of this seven-page report.

The conclusions and opinions stated herein are based on information available to the investigation as of this writing. It is conceivable that additional information may be forthcoming which bears on these conclusions and opinions. Therefore, the right is reserved to review and modify all conclusions and opinions at any future point in time should, in fact, additional information become available. Any repair recommendations provided in this report are general in nature and the preparation of detailed plans and specifications is beyond the scope of this project and report. All repairs shall be completed in accordance with manufacturer’s specifications and the applicable building code(s), including modifications by governing jurisdictions.

For ease of reading and convenience in presentation, this report has been divided into the following sections:

- A. Background Information and Work of Investigation
- B. Observations
- C. Discussion
- D. Conclusions

Figures 1-4 are included to amplify and clarify the following narrative.

Appendices

- I. B&W Engineering Geotechnical Report
- II. Spreadsheet of Foundation Fill Test Results, August 7, 2025

A. Background Information and Work of Investigation

Fill dirt and foundation for the home was performed in 2020. Shelby County, Tennessee requires that the foundation footings extend at least 13 inches into undisturbed soil or properly compacted soil. Geotechnical testing was performed on September 2, 2020 prior to foundation placement (Appendix I).

EDT tested the soils at the foundation footings on August 7, 2025 in three locations at the footing and one spot about five feet away from the footing. A dynamic cone penetrometer was used in accordance with the manufacturer's instructions. Plastic limits were performed on the fill material beneath the slab. Cracks in the slab and veneer were examined. Moisture content on the interior slab was also tested.

A previous excavation beneath the interior slab (between the foyer and kitchen) was performed to repair a drainage line that had developed a downward curvature from settling. The trap effect of the curvature prevented the proper function of the drain line.

The undersigned has been examined and passed the NCEES Civil Engineering P.E. examination in North Carolina, in addition to the P.E. metallurgical examination. Practicing as an engineer in metallurgical, mechanical and civil engineering since 1980 upon graduation from North Carolina State University, he has had many opportunities to assess foundation soils for homes and subdivision roadways. In this matter, dynamic cone penetrometer, moisture content and Atterberg plastic limits were evaluated to assess the condition of the client's sub-foundation soils. As a materials scientist, he has evaluated the soils as an engineering material for the support of the foundation of a two-story, brick veneer home that belongs to the Pereiras family. Primarily, soil bearing capacity was tested.

B. Observations

Testing results are summarized in the attached Appendix II. The tests show that the soil is loose and below the required bearing capacity of 1500 pounds per square foot (PSF). The upper 6 to 12 inches of soil exhibited adequate strength in some locations away from the foundation footings, but below 12 inches the bearing capacity deteriorated, sometimes to zero bearing capacity. Values of 260 PSF and 660 PSF were common below the foundation footings (Appendix II).

Plastic limits for soil samples from the site were evaluated at 21 percent (%), 24%, and 21% on three tests from the same area. These values roughly agree with Proctor optimum water content of 17.5 percent for compaction as determined by B&W Engineering (Appendix I).

Observations of footing depth found that the edges of the slab were 12 inches, 12.5 inches, and 13 inches at the three locations where the footing had been revealed by prior excavation.

The homeowner informed this investigation that a creek ran some distance behind their property line. An estimate from satellite images finds a possible watercourse at about 1000 feet or less to the west of the property.

According to the 2020 geotechnical report, fill to the original grade elevation was tested for the support of plumbing lines only. Blow counts were recorded as “12+” and bearing capacity was not reported. This report does not include testing information for the soil under the foundation footings but is limited to those locations expected to receive plumbing lines.

As tested in August 2025 by this investigation, the low bearing capacities were measured below the 12 inch depth and the footings extended to about 12 inches below grade, so the footings were affected.

The soil at the footings lacked the necessary bearing capacity or strength to support the house and patio. The soil beneath the footings does not show the necessary characteristics that

indicate proper compaction.

The plastic limit was checked on three samples from the foundation excavations at the residence. The plastic limit for the samples was 22 % +/- 1 %. This agreed with the test results by the preconstruction geotechnical crew.

Interior slab moisture was tested and found high out of range in most locations. Only the location above a previous postconstruction excavation found moisture contents within the instrument's limits of 50% saturation. The source of moisture may be presumed, to a reasonable degree of engineering certainty, to originate from under the slab. Figures 1-4 show the instrument results.

A 16-inch depth excavation next to the footing on the north side of the house exhibited a soft lean, gray clay with standing water on top. The clay in this spot did not exhibit an acceptable amount of bearing capacity at the footing.

C. Discussion

The presumptive minimum bearing capacity is 1500 PSF, according to chapter 4 of the International Residential Code. Tables in Chapter 4 of the code give the footing dimensions for a two-story, brick veneer house on soil exhibiting at least 1500 PSF. Soils under the foundation tested at 260-660 PSF. The original grade's bearing capacity was higher and met the presumptive bearing capacity requirement (Appendix II).

Prevailing high moisture content in the fill soil and interior slab is likely a major contributing factor of the low bearing capacity and high floor moisture. Clay has low permeability, and water cannot escape the confined space beneath the slab once the fill soil becomes saturated.

D. Conclusions

1. Based on dynamic cone penetrometer measurements of August 7, 2025, the house's foundation footings rest on fill that lacks a sufficient bearing capacity to prevent differential settlement. The current soil bearing capacity does not meet the minimum requirements of the International Residential Code.
2. Based on the soil capacity testing results, the residence will continue to experience differential settlement, causing further cracking in the slab and brick veneer.
3. Based on the history and life of the residence structure, high moisture levels under the slab will continue to prevent the installation of proper flooring on the residence's interior concrete slab.
4. The current report is limited to testing in the available areas.
5. Given the existence of an elevated water table, additional support for the slab foundation was and is warranted. Such support could consist of driven pilings, helical piers, or extended depth footings.

FIGURES



Figure 1 Concrete moisture reading inside



Figure 2 Concrete moisture reading at previous repair location



Figure 3 Concrete moisture reading at previous repair location



Figure 4 Concrete moisture reading at previous repair location

APPENDIX I

B&W Engineering Geotechnical Report

B & W Engineering Laboratories, Inc.

P.O. Box 341091

Memphis, Tennessee 38184-1091

(901) 373-7957

SOIL COMPACTION TEST REPORT

Project: 5055 Adagio Lane, Lakeland, TN

Client: Regency Homebuilders

Date Tested: 02 September 2020

Job No.: 9709

Report Ser. No.: D-2952

Technician: J. Carter

In - Place Density Test Results ASTM D-2922, ASTM D-3017

Test No.	Test Location and Elevation	Material Mark	Moisture Content (%)	Dry Density (pcf)	Percent Compaction Required	Percent Compaction Actual
1	Master Bath, SG - 0.5'	A	17.6	104.0	90	97
2	Master Bath, SG - 1.0' Previous Ground Surface 2.0' below SG, See Boring Log P-1	A	18.9	103.6	90	97
3	Half Bath, SG - 0.5'	A	18.9	103.4	90	97
4	Half Bath, SG - 1.0' Previous Ground Surface 2.0' below SG, See Boring Log P-2	A	18.8	103.9	90	97
5	Laundry, SG - 0.5'	A	18.1	102.9	90	96
6	Laundry, SG - 0.5' Previous Ground Surface 1.0' below SG, See Boring Log P-3	A	18.4	103.7	90	97
7	Kitchen, SG - 0.5'	A	23.0	98.8	90	93
8	Kitchen, SG - 0.5' Previous Ground Surface 3.0' below SG, See Boring Log P-4	A	22.1	99.0	90	93
9	Bath #2, SG - 0.5'	A	14.7	99.8	90	94
10	Bath #2, SG - 0.5' Previous Ground Surface 2.5' below SG, See Boring Log P-5	A	15.6	102.0	90	96

Laboratory Compaction Characteristics of Soil ASTM D-698

Material Mark	Soil Description and Source	Maximum Density (pcf)	Optimum Moisture (%)
A	Brown Silty Clay w/Trace of Sand	106.7	17.5

Note: SG=Graded Subgrade at time of testing. These density tests were performed to provide an indication of the adequacy of existing material for support of plumbing lines only.

Respectfully Submitted,

B & W Engineering Laboratories, Inc.



John L. Walton, Sr., P.E.

B & W Engineering Laboratories, Inc.

P.O. Box 341091

Memphis, Tennessee 38184-1091

(901) 373-7957

Log of Borings

Project: 5055 Adagio Lane, Lakeland, TN

Client: Regency Homebuilders

Date Tested: 02 September 2020

Job No.: 9709

Report Ser. No.: D-2952

Technician: J. Berryhill

Boring P-1, Master Bath Area

Sample Number	Sample Interval feet	N Value	Water Content Percent	Sample Description
1	0.0 - 0.5	9	18	Stiff Brown Silty Clay w/Trace of Sand
2	0.5 - 1.0	12+	19	Stiff Brown Silty Clay w/Trace of Sand
3	1.0 - 1.5	12+	17	Stiff Brown Silty Clay w/Trace of Sand
4	1.5 - 2.0	12+	16	Stiff Brown Silty Clay w/Trace of Sand
	2.0			Previous Ground

Boring P-2, Half Bath Area

Sample Number	Sample Interval feet	N Value	Water Content Percent	Sample Description
1	0.0 - 0.5	12+	19	Stiff Brown Silty Clay w/Trace of Sand
2	0.5 - 1.0	12+	19	Stiff Brown Silty Clay w/Trace of Sand
3	1.0 - 1.5	12+	17	Stiff Brown Silty Clay w/Trace of Sand
4	1.5 - 2.0	12+	15	Stiff Brown Silty Clay w/Trace of Sand
	2.0			Previous Ground

Boring P-3, Laundry Area

Sample Number	Sample Interval feet	N Value	Water Content Percent	Sample Description
1	0.0 - 0.5	10	18	Stiff Brown Silty Clay w/Trace of Sand
2	0.5 - 1.0	12+	18	Stiff Brown Silty Clay w/Trace of Sand
	1.0			Previous Ground

Boring P-4, Kitchen Area

Sample Number	Sample Interval feet	N Value	Water Content Percent	Sample Description
1	0.0 - 0.5	9	23	Stiff Brown Silty Clay w/Trace of Sand
2	0.5 - 1.0	11	22	Stiff Brown Silty Clay w/Trace of Sand
3	1.0 - 1.5	12+	20	Stiff Brown Silty Clay w/Trace of Sand
4	1.5 - 2.0	12+	17	Stiff Brown Silty Clay w/Trace of Sand
5	2.0 - 2.5	12+	17	Stiff Brown Silty Clay w/Trace of Sand and Gravel
6	2.5 - 3.0	12+	14	Stiff Brown Silty Clay w/Trace of Sand and Gravel
	3.0			Previous Ground

B & W Engineering Laboratories, Inc.

P.O. Box 341091

Memphis, Tennessee 38184-1091

(901) 373-7957

Log of Borings

Project: 5055 Adagio Lane, Lakeland, TN

Client: Regency Homebuilders

Date Tested: 02 September 2020

Job No.: 9709

Report Ser. No.: D-2952

Technician: J. Berryhill

Boring P-5, Bath #2 Area

Sample Number	Sample Interval feet	N Value	Water Content Percent	Sample Description
1	0.0 - 0.5	12+	15	Stiff Brown Silty Clay w/Trace of Sand
2	0.5 - 1.0	12+	16	Stiff Brown Silty Clay w/Trace of Sand
3	1.0 - 1.5	12+	15	Stiff Brown Silty Clay w/Trace of Sand
4	1.5 - 2.0	12+	15	Stiff Brown Silty Clay w/Trace of Sand
5	2.0 - 2.5	12+	15	Stiff Brown Silty Clay w/Trace of Sand
	2.5			Previous Ground

Note: These tests, together with the results of moisture/density tests presented on the first page of this report, indicate that the degree of fill compaction within the planned building area exceeds the 90% requirement of the Shelby County plumbing code.

Respectfully Submitted,

B & W Engineering Laboratories, Inc.



John L. Walton, Sr., P.E.

APPENDIX II

Spreadsheet of Foundation Fill Test Results, August 7, 2025

BHM11338 Dynamic Cone Testing of under slab fill

Test 1 at south side of residence

starting depth	1.95 (23.4")	Blows	Soil strength (PSF)	
plus2 inches		25.4	2	660
+2		27.4	1	260
+2		29.4	2	660
" +2		31.4	2	660
		33.4	3	1130
		36.4	4	1660
		38.4	4	1660

Footing depth 12"

Test 2 North Side of residence

Starting depth			
	9		
	11	1	260
	13	1	260
	15	1	260
	17	1	260
	19	1	260
	21	1	260
	23	3	1130
	25	0.5	0 <1 per 2"
	27	0.5	0 <1 per 2"
	31	1	260
	33	1	260
	37	1	0 <1

Test 3 Northwest corner

Starting Depth			
	14		
	16	1	260
	18	2	660
	20	2	660
	22	2	660
	24	2	660
	26	3	1130
	28	3	1130
	30	4	1660
	32	5	2230

West side away from foundation

Starting depth			
	6		
	8	10	4220

very dry

more sandy than the deeper samples