



The Moorings Condominiums
Building 8 - Club House

450 Moorings Cove Drive
Tarpon Springs, FL 34689
B.A.S.I.C. File No.: B2020-018

March 1st, 2021



FINAL REPORT



Bay Area Sinkhole Investigation & Civil Engineering
2601 E. 7th Avenue, Tampa, FL 33605
Ph: (813) 885-4144 | Fx: (813) 885-4166
www.basic-engineering.com

To: The Moorings Condominiums Association
Attn: Karen Cleary, President
450 Moorings Cove Drive
Tarpon Springs, FL 34689

Date: 03/01/2021

Project # B2020-018

Subject: Injection Pin Pile, Compaction and Chemical Grouting
The Moorings Condominiums | Building 8 – Club House
450 Moorings Cove Drive, Tarpon Springs, FL 34689

Dear Ms. Cleary,

We have reviewed a Structural Damage Evaluation and Subsidence Investigation report by SDII Global, (SDII), dated May 8th, 2018, a Geologic/Geotechnical Testing and Evaluation report by Applied Engineering & Geosciences (AEG), dated September 23rd, 2018, a Sinkhole Loss Determination report by Structural Engineering and Inspections, Inc, (SEI), dated November 28th, 2018, a Peer Review report by SDII Global, (SDII), dated January 11th, 2019, a Neutral Evaluation report by Andreyev Engineering, Inc., (AEI), dated March 16th, 2020 and field work and engineering design performed by B.A.S.I.C. Engineering.

Based on the aforementioned reports, you have asked us to recommend and monitor a remediation program. B.A.S.I.C. Engineering recommended utilizing injection pin piles. We have provided you with a Site Plan indicating the location of the injection pin piles and their estimated depths of installation. However, we were unable to accurately predict the amount of grout that would be required prior to actual field installation.

Injection Pin Piles are recommended in similar situations whereby the property requires lifting or other foundation support in addition to sealing off the limestone interface to prevent future sinkhole activity from occurring. The installation of the Injection Pin Piles is a process whereby high carbon steel pilings are hydraulically driven into the ground until a predetermined pressure reading is attained or refusal occurs where lifting of the structure takes place. The Injection Pin Piles are then grouted through a patented process allowing grout to be pumped directly at the limestone interface (Figures 8a and 8b).

In addition to the installation of the Injection Pin Piles, a high slump pressure grouting program is recommended as a means of sealing deep openings into underlying cavernous zones, fill in void zones, consolidate/densify the loose soils, prevent downward migration of soil particles and also to provide greater lateral stability to the steel pilings. A 4-6 inch slump grout is recommended by B.A.S.I.C. Engineering so that it may be accurately pumped below the structure and it may flow through the grout holes and densify soil voids with greatest efficiency.

MONITORING

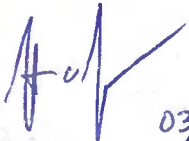
As requested, we have completed the monitoring of the subsurface injection pin piles operations as conducted by Helicon Foundation Repair Systems, Inc., (Helicon). This work was completed utilizing the TMG Injection Pier System. The remediation was started on December 21st, 2020 and completed on January 21st, 2021. A technician from our firm was present during the remediation operations to monitor operations and perform applicable grout slump tests.

Helicon installed a total of 49 injection pin piles around the property as per our site plan recommendations, as shown in figure 8a. Due to the site conditions, four (4) points were omitted from our original recommendations. (Injection Pin Pile Numbers 19, 20, 35 and 44). The depths of installation ranged from a low of 28 feet to a high of 63 feet below grade. Each pin pile was hydraulically driven into the soil until enough pressure was reached for refusal. The hydraulic gauge reading (psi) was recorded for each injection pin pile along with the installed depth (Figure 8a). The contractor then accepted delivery of a 1500-psi pressure grout from Pasco Ready Mix. The grout was a high slump 4-6 inch pressure grout. A grout gun was connected to each of the 49 injection pin piles pumped by Helicon, utilizing a TK-40 pump. The grout was pumped until a pressure gauge reading of up to 400-psi was reached on the in-line gauge. The amount of grout pumped for each injection pin pile was recorded (Figure 8a). A total of 100.83 cubic yards of grout was pumped in various quantities through 49 injection pin piles points.

It is our opinion that the injection pin piles were installed in accordance with industry standards and are an effective method to fill voids, cracks, fractures and cavities and to stabilize granular material, thus improving the physical properties of soil and rock at The Moorings Condominiums | Building #8- Club House. The proven technology utilized by the pier manufacturer and the ability to solve foundation settlement problems using a combination of injection pin piles, compaction grout and chemical grout, has demonstrated success without additional settlement. This report is not a guarantee that sinkhole activity will not continue to exist at the subject property but rather a summary and certification of the work completed by Helicon Foundation Repair Systems, Inc.

We thank you for the opportunity to provide the services to you on this project. We trust that the information provided in this letter is satisfactory. Should you have any questions, or require additional assistance, please do not hesitate to call.

Sincerely,



03/01/2021

Justin D. James, P.E.

Florida P.E. # 60886

C.O.A. # 25869

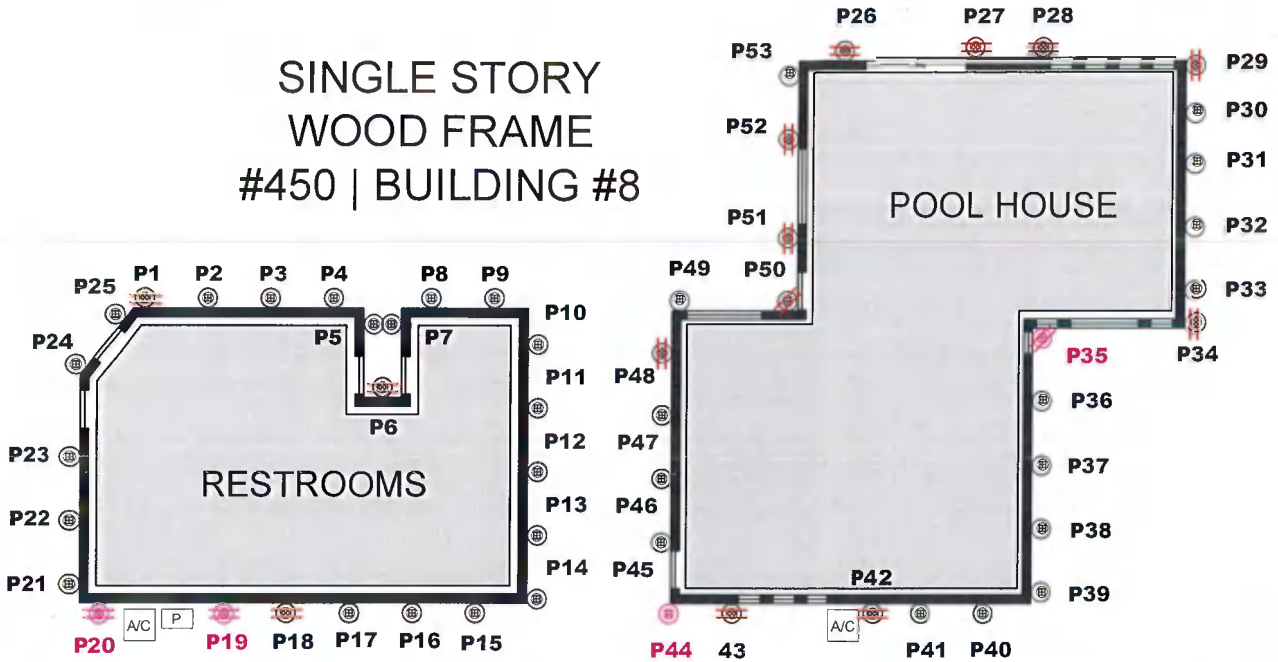
Attachments

TECHNICAL NOTES:

- ⊕ - INJECTION PIN PILE
- ⊗ - SPREADER BEAM
- SEE FIGURE 8b FOR PIN PILE DETAIL
- ⊖ - POINTS OMMITTED
- NOT FOR PERMITTING

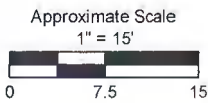


SINGLE STORY WOOD FRAME #450 | BUILDING #8



Points #	PSI	Depth (ft)	Strokes	Actual Grout (cy)
1	2500	30.0	2	0.04
2	2600	50.0	190	3.77
3	2600	50.0	7	0.14
4	2500	50.0	5	0.10
5	2600	50.0	2	0.04
6	2600	40.0	3	0.06
7	2600	50.0	1	0.02
8	2700	30.0	221	4.31
9	2600	34.0	7	0.13
10	2600	35.0	21	0.37
11	2700	51.0	258	4.83
12	2700	51.0	212	3.79
13	2600	50.0	13	0.22
14	2000	50.0	3	0.06
15	2500	36.0	3	0.70
16	2200	40.0	3	0.06
17	2700	50.0	93	1.75
18	2700	32.0	152	2.87
19	-	-	-	-
20	-	-	-	-
21	2500	28.0	50	0.99
22	2600	29.0	5	0.10
23	2400	29.0	1	0.02
24	2300	31.0	50	0.99
25	2400	29.0	6	0.12
26	2600	30.0	36	0.64
27	2700	50.0	283	5.06

Points #	PSI	Depth (ft)	Strokes	Actual Grout (cy)
28	2800	51.0	20	0.39
29	2700	63.0	6	0.12
30	2600	50.0	585	11.49
31	2500	45.0	9	0.18
32	2600	52.0	2	0.04
33	2500	52.0	211	4.18
34	2600	50.0	4	0.08
35	-	-	-	-
36	2700	51.0	375	7.20
37	2600	51.0	5	0.09
38	2600	51.0	176	3.29
39	2500	27.0	441	7.89
40	2500	51.0	4	0.07
41	2600	31.0	206	3.78
42	2700	55.0	433	8.22
43	2500	50.0	511	8.99
44	-	-	-	-
45	2600	50.0	4	0.07
46	2800	49.0	1	0.02
47	2800	54.0	3	0.05
48	2700	48.0	2	0.03
49	2400	33.0	2	0.04
50	2800	35.0	289	5.21
51	2300	49.0	96	1.73
52	2300	44.0	123	2.21
53	2500	37.0	239	4.28
TOTALS:	2134.0	5374	100.83	



2601 E 7TH AVENUE, TAMPA, FL 33605 | PH: 813-885-4144 * FX: 813-885-4166
WWW.BASIC-ENGINEERING.COM

THE MOORINGS CONDO ASSOC.
BLDG #8 | CLUB HOUSE
450 MOORINGS COVE DRIVE, TARPON SPRINGS, FL 34689
PINELLAS COUNTY

CONSTRUCTION INJECTION PLAN

FIGURE NO.: 8a

FILE NO.: B2020-018

DATE: 03/01/2021

CHECKED BY: JJ

Wood Frame on Spread Footer:
Injection Pin Pile Detail
 (NOT FOR PERMITTING)

