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Tuesday, February 03, 2015

TO: Mr. Customer

RE: Foundation Performance and Repair Plan
611 Dumbledorf Drive
Roanoke, Texas 76205

The following report constitutes the engineering opinion requested on the foundation of the subject building. This report has been prepared in general accordance with the requirements of a "Level B" survey as defined by the Texas Chapter of the American Society of Civil Engineers (ASCE) and the Texas Board of Professional Engineers (http://texasce.org/associations/10803/files/RepairGuidelines.pdf). This report is provided for the exclusive use of the person or persons this report was prepared for as shown above. We have no contractual relationship with, or obligation to, any party other than the party for whom this report was prepared. The purpose of this inspection was to evaluate the foundation and determine what, if any, foundation repairs are necessary. The foundation was visually inspected and a floor elevation survey was performed. The opinions contained herein are based on the experience and judgment of the writer, as well as conditions observed without taking soil samples, performing plumbing leak tests, removing floor or wall coverings, or performing invasive tests or procedures. The opinions offered herein are based solely on the observations made at the time of the inspection, and do not take into consideration any changes in the condition of the foundation after that date. This report does not predict or warrant the future performance of the subject foundation. You are encouraged to review the "Agreements and Limitations" attached to the end of this report for other important limitations and standard recommendations.

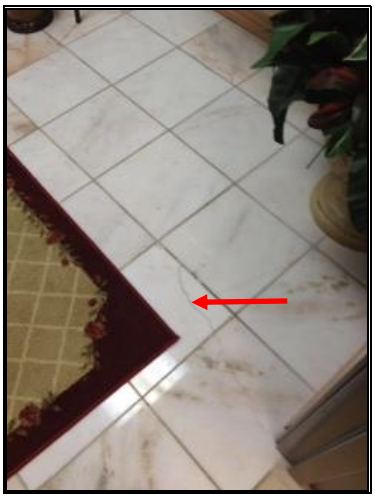
Observations

This structure is a one-story, CMU block and brick wythe structural walls with clear span steel trusses that span from exterior wall to exterior wall. The building has a flat roof with commercial grade tar and bitumen roof covering. The interior walls are non-load bearing, drywall with various finishes over the drywall including texture and paint. The foundation is a concrete perimeter stem wall and brick ledge and interior floating slab that is not connected to the stem wall. The building was constructed in 1983 per the Denton County Appraisal District Records. All directions in this report are annotated by left, right, front and rear as if looking at the front door.

Observations and Discussions:

1. This is a follow-up performance evaluation and repair plan for the above referenced building. Michael Gandy, PE physically inspected the building in November, 2012 to make a preliminary evaluation of the performance of the foundation and to offer conceptual recommendations for repair, if needed. The foundation was determined to be a non-monolithic stem wall design with an interior floating slab (not connected to the stem wall). Over time, these two components have moved against each other and settled at different rates, resulting in structural distress along the perimeter of the building and malfunction of some of the rear emergency egress doors.
2. Angela Galloway, EIT (under the direct supervision of Mike Gandy, PE) physically inspected the above referenced residence on January 24, 2013 to make an evaluation of the current foundation performance and to offer recommendations for repair. A Level "B" engineering analysis as defined by the Texas Chapter of the ASCE was performed. Careful observations of the interior and exterior were made for signs of drainage and foundation distress. An interior elevation survey denoted below and as shown on Drawing 1001 was performed.
3. Sightdown the brickline along the rear showed brickline deflections and some of the rear emergency egress doors along the rear were out of square and would not properly open or close.
4. Separations were noted between the floor and walls, with the most severe located at the back right corner of Suite 113 (See Photo 1 below).
5. Cracks were observed along the interior drywall, floor tiles, and concrete slab of Suites 111 through 116 (See Photos 2-6 below).
6. The interface of the stem wall was visible at the front of the building (See Photo 7 below).
7. Evidence of previous foundation repair was noted (See Photo 8 below).

Picture 1: Maximum vertical separation along the back wall due to displacement between the stem wall and the non-monolithic floating slab. Photo taken at back right corner of Suite 113 by egress door.
Picture 2: Crack along back left corner of Suite 115.
Picture 3: Ceiling tile buckling and crack along back left corner of Suite 114.



Picture 4: Drywall crack along right wall of Suite 114. Photo taken approximately fifteen (15) feet from back wall.
Picture 5: Cracking along floor tile in bathroom of Suite 112/113. Photo taken approximately ten (10) feet from back wall and fifteen (15) feet from left wall.
Picture 6: Minor drywall crack located along right wall of Suite 111, approximately halfway between the front and back walls.

Picture 7: Picture of floating slab interface along the front of the building. It is unusual to see the interface of the stem wall at the front of the building.
Picture 8: Previous foundation repair around the building.

Interior Elevation Survey

Interior floor elevations were taken with a Technidea Pro-2000 Ziplevel. Elevations were recorded to the nearest .1-inch throughout the home. A benchmark of 0.0 was established along the left wall of Suite 116 midway between the front and back walls and is shown on drawing no. 1001 with a star. An adjustment was made for floor coverings if they were a different elevation than the floor covering at the benchmark location. Elevation differentials (in regards to the floating slab alone) varied by a maximum of -2.5 vertical inches in thirty-five (35) horizontal feet. Elevation differentials (in regards to both the floating slab and the stem wall) varied by a maximum of -3.8 vertical inches in forty-five (45) horizontal feet. It should be noted that the elevation measurements include effects of elevation variation in the original construction which normally are 0.6 inches to 1.0 inches. A sketch of the house with the elevations is attached as Drawing 1001.

Conclusions

An elevation survey was performed on the building in Suites 111-116 and the cosmetic damage was reviewed to evaluate the performance of the foundation. The soil where the building is located has high shrink swell capacity. This soil can heave or settle depending on the moisture content in the soil. Some minor movement of the exterior driveways and sidewalks should be expected.

Based on review of the distress and the elevation survey, the building is concluded to have uneven settlement, caused by the stem wall and interior floating slab to pushing against each other and ultimately causing distress malfunctioning of the egress doors along the back wall. The settlement in the two slabs appears to be due to the moisture content in the soil lowering over time. As the moisture content in the soil is lowered the soil can consolidate and settle under the pressure of the above structure. Foundations are supported by the soil, and if the soil settles unevenly, the foundation may move unevenly resulting in structural distress and slopes in the foundation.

Recommendations

1. Perform a pre-lift plumbing leak test and repair any plumbing leaks that are found. This is critical for the installation of Uretek ICR, if there are plumbing leaks, the Uretek could fill the plumbing pipes.
2. Install eighteen (18) STEEL Pressed Piling Piers in the locations shown on attached drawing no. 1001. These piers are intended to lift and support the stem wall and, in turn, lift the CMU block wall and help to re-align the stem wall with the floating interior slab.
3. Inject Uretek ICR foam to the lift line locations indicated on Drawing no. 1001. Uretek ICR foam is intended to lift the interior floating slab to help re-align it with the lifted stem wall. Please consult with Uretek ICR to obtain technical data and risks.
4. Perform a post lift plumbing leak test and repair any plumbing leaks that are found.

Agreements and Limitations

Use of this report for any reason implies consent to all agreements and limitations of this report. This report is the professional opinion of Lighthouse Engineering, LLC and is based upon a limited evaluation of the property. This report is provided for the exclusive use of the addressee. We have no contractual relationship with, or obligation to, any party other than the addressee of this report.

This report does not constitute a structural warranty or performance contract with the purchaser of this report to or with any other party. It only states conditions observed at the time of the inspection. The evaluation of the property included a visual examination of the exposed interior and exterior finishes of the structure and the ground surfaces adjacent to the structure and to the taking of relative floor elevations. The taking and testing of soil samples was not included. Unless written in the report, the original design drawings and any design conditions were not known. Determination of construction to Building Code is best done during the original construction and is not a part of this evaluation. Testing for plumbing leaks was not performed but is recommended after foundation work is performed.

It is possible that future repairs could be required for the subject foundation. This evaluation only addresses the current condition of the foundation. Lighthouse Engineering, LLC does not offer or imply any warranty for the repairs or for the repair company's acts or omissions or for any other person conducting the repairs.

The fee collected is for this inspection only. Additional engineering services are available at an additional cost. Requests for these services must be made in a timely manner before commencement of work. Please contact this office for additional inspection scheduling and fee arrangements.

Sincerely,

Michael Gandy, P.E.
2/3/2015
Registered Engineering Firm F-9334