



July 24, 2019

Hong Pham

Re: Limited Structural Inspection
113 Stokesay Court
Cary, NC

Dear Ms. Pham:

At your request, a limited structural inspection of the above property was performed on July 18, 2019. The report that follows has been prepared based on that inspection. The inspection was performed by Harrison N. Luttmann, PE of Giles Flythe Engineers. Three previous inspections were conducted by Giles Flythe Engineers with associated reports dated January 27, 2014; November 17, 2014; and October 6, 2016 being produced.

The scope of this project was limited to inspection and evaluation of the cracks in the perimeter foundation walls. The report is intended to cover only those premises that may be examined visually without excavation, removing surface materials, and disassembling components.

No tests, measurements, or calculations have been made except as described in this report. We have not investigated for toxic materials or wastes, or examined public records regarding this property. The scope of the inspection does not assure that the property conforms to any regulations, restrictions, or building codes that may be in effect at its location.

DESCRIPTION

The 2-story wood-framed home (with a crawlspace) is constructed on concrete masonry unit (CMU) perimeter foundation walls with masonry piers supporting floor girders. The house was built in 1991 according to Wake County Real Estate Tax Records. For purposes of this report, all directions (left, right, rear, etc.) are taken from the viewpoint of an observer standing outside and facing the front door of the home.

Upon our arrival, access to the interior was provided by the homeowner. The interior and exterior walls, visible conditions of the foundation, and conditions in the crawl space were subsequently inspected.

Note that the builder was not interviewed and no plans for construction of this home were provided. The information presented in this report is gathered from the conditions visible at the site, as they existed at the time of the inspection. A limited photo log is included with this report.

OBSERVATIONS

1. In the interior, no significant drywall cracking was observed. Minor floor slope was measured, along the right side of the home (first floor) up to 3/8" vertical over 4' horizontal.
2. At the driveway, consisting of concrete slab on grade, uncontrolled cracks up to 5/8" were observed. The slab was observed with vertical displacement at the aforementioned crack.
3. On the exterior, cracks in the perimeter wall(s) (brick veneer) were noted in the following locations:
 - a. A vertical crack up to 1/8" was noted at the front left reentrant corner to the right of the garage.
 - b. A vertical/stair-step crack up to 1/8" was noted in the front perimeter wall near the right corner.
 - c. A previously sealed crack was noted on the right perimeter wall approximately 12' from the front perimeter wall and was observed to be approximately 3/16" out of plane.
 - d. A previously sealed crack was noted on the right perimeter near the rear right corner and was observed to be approximately 1/4" out of plane.

Note: The cracks on the right perimeter wall have not exhibited significant further movement since the October 2016 inspection.

4. In the crawl space, evidence of moisture intrusion in the form of efflorescence and water staining was noted on the perimeter foundation walls. Cracks were also noted in the foundation wall in the following locations:
 - a. Previously sealed cracks (2) were observed along the right perimeter wall coincident with previously sealed cracks on the exterior (Observations #3c-d).
 - b. A previously sealed crack was observed adjacent to the right reentrant corner along the front perimeter wall. No significant propagation since the previous inspection was observed.
 - c. A vertical crack, up to 1/4" was noted at the front left reentrant corner. The crack expanded in size along the height of the wall. A corresponding crack was noted in the garage during the 2016 inspection.
5. Gutters and downspouts were noted installed on the home. Grade was noted as relatively neutral slope along the rear and left perimeter wall(s) of the home.

DISCUSSION

The cracks in the foundation walls noted above are likely due to limited differential foundation settlement. The clay soils in this area are considered "expansive" type soils and will typically expand and contract with fluctuations in the moisture content. This expansion and contraction of load-bearing soil materials can lead to soil consolidation and foundation cracking. The condition of the foundation wall does not appear to be a significant structural deficiency at this time. If conditions around the foundation remain relatively dry, the likelihood of future significant settlement will be reduced, but we cannot predict the extent of future settlement. Continuing to improve/maintain exterior drainage and monitoring cracks for additional settlement is an acceptable approach at this time.

Positive grade away from the foundation should be creating to reduce moisture infiltration under the foundation. Additional soil consolidation and settlement can occur due to water infiltration into soils and subsequent drought conditions which dry out the soils below foundations. Creating positive drainage away from the perimeter foundation wall(s) is vital to the long-term structural integrity of the foundation.

The movement of the driveway slab is likely the result of the aforementioned soil consolidation in combination with poor compaction with subgrade. The concrete slab of the driveway is not an integrated structural component of the home and as such is not a significant structural concern. The slab may be repaired as desired for aesthetic purposes; however, no structural repairs are required.

The recommendations presented in this report are based on our experience and understanding of the concerns to provide a reasonable solution based on the conditions that were visible and/or known to us on the date of inspection. As this report is based on the circumstances at one point in time, conditions may change which may result in additional repair recommendations. Further, the recommendations are the opinion of the Engineer to address significant structural-related concerns and may not rectify cosmetic issues.

RECOMMENDATIONS

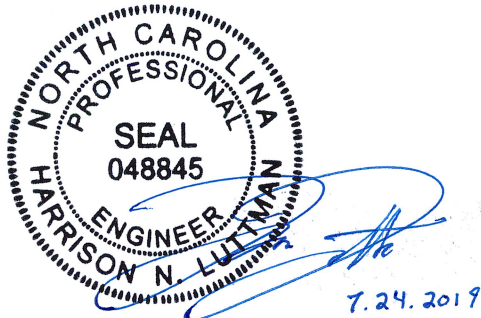
If there are any questions or concerns regarding location or method of repair contact the engineer prior to construction.

1. No structural repairs required at this time.
2. Monitor the cracks in the brick veneer and foundation walls. If the cracks widen significantly (expand by additional 1/8") or additional significant cracks (greater than 1/4" wide) propagate, then further evaluation and/or additional stabilization may be required. Special care should be taken to monitor the front right corner of the garage as further movement at this location will likely result in the need for stabilization. Note, if further movement is observed at the location of the existing helical piers, readjustment of those piers may be required.
3. As recommended on the previous inspection report (2016), if additional movement along the right-side of the foundation is observed, we recommend hiring an experienced foundation contractor to stabilize the center area of the right-side foundation. We believe (2) helical piers will be sufficient to stabilize the foundation. Locate (1) pier at the crack on the center of right perimeter wall. The remaining pier shall be installed up to 6-feet on the right perimeter wall toward the front corner.
4. We also recommend ensuring that stormwater drains positively away from the home to minimize the risk of future water infiltration. This can be accomplished by installing leaders on downspouts and ensuring gutters, downspouts, and leaders remain clear of debris and properly functioning to direct the drainage away from the home. Also, creating a positive grade around the rear and left perimeters of the home will aid in stormwater evacuation. Water infiltration can cause further undermining of the soil and foundation settlement.

CONCLUSION

We trust that this report provides the information you require. Please contact us 919-465-3801 if you have any questions. Thank you for the opportunity to be of assistance to you.

Sincerely,



Harrison N. Luttman, PE
Project Manager
Giles Flythe Engineers Inc.
NC Lic. No. C-2871

Enclosed: Limited Photo Log

Description

General view of front of home.



Photo No.
1

Description

Crack in concrete slab
on grade driveway.



Photo No.
2

Description

Crack in the front
perimeter wall.



Photo No.
3

Description

Previously sealed crack
in crawlspace at front
right reentrant corner.



Photo No.
4

Description

Vertical crack at front
left reentrant corner
(adjacent to the garage).

Photo No.
5



Description

Typical previously sealed
crack

Photo No.
6

