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March 5, 2025 – *Revised from February 5, 2025*

Larry Thompson

Re: Limited Structural Inspection
140 Tylerstone Drive
Fuquay-Varina, NC

Dear Mr. Thompson:

At your request, a limited structural inspection of the above property was performed on February 4, 2025. The report that follows has been prepared based on that inspection. The inspection was performed by Joshua Gale, EI of Giles Flythe Engineers.

The scope of this project was limited to the inspection and evaluation of interior finish material cracks/separations and general structural concerns in the crawl space framing/foundation components. 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/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 1-story, wood-framed home (with a crawl space) is constructed on perimeter masonry foundation walls with masonry piers supporting floor girders. The house was built in 2005 according to Harnett 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 items detailed above in the scope were subsequently inspected.

Note that the original builder was not interviewed and no plans for the 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

Interior:

1. Separation (up to 1/4" wide) was observed between the ceiling and the crown molding in the front kitchen wall spanning left to right located approximately 13'-0" from the rear exterior wall and 23'-0" from the right garage wall. Floor slope was not observed at this location.
2. Separation (up to 1/8" wide) was observed in the finish flooring spanning front to rear located approximately 28'-0" from the right garage wall.
3. Multiple additional minor separations (up to 1/16" wide) were observed between the crown molding and the ceiling throughout the home. Multiple minor drywall cracks (less than 1/16" wide) were observed in the wall finish materials throughout the home.

Exterior:

4. Gutters and downspouts (with leaders) were noted installed on the home. Grade was noted with a relatively neutral slope along the perimeter walls of the home.

Crawl Space:

5. The floor framing was noted to consist of 2x10 floor joists spaced at 16" on-center spanning left to right supported by 4-2x10 flush girders bearing on masonry piers typically spaced approximately 9'-0" apart.
6. Damage was observed to the floor joists at the front-left corner of the crawl space beginning approximately 18'-0" from the front wall and extending to the front wall, and beginning approximately 23'-0" from the right garage wall and extending to the right garage wall.
7. Damage was observed to the front (2) spans of the (2) flush girders located approximately 23'-0" and 11'-0" from the right garage wall.
8. Flared framing (with separation between plies up to 1/4" wide) was observed as follows:
 - a. Flaring was observed in the double joist spanning from the left crawl space wall to the right crawl space wall located approximately 13'-0" from the rear foundation wall.
 - b. Flaring was observed in the girder spanning front to rear located approximately 23'-0" from the right garage wall and 13'-0" from the rear foundation wall.
 - c. Flaring was observed in the double joist spanning left to right at the left of the crawl space located approximately 6'-0" from the rear foundation wall.
9. A full vapor barrier was installed throughout the crawl space. Water staining and what appeared to be organic substances were also noted on the wood framing. Multiple moisture content readings (less than 8.0%) were taken in the floor framing with a General MMD4E moisture meter.

DISCUSSION

The interior wall/floor separations and the damaged/flared floor framing components noted above (Observations #1-3 and 6-8) are likely the result of prolonged elevated moisture levels in the crawl space. It appeared that there were previously greatly elevated moisture levels in the crawl space that have since been reduced, which can often result in deflection of the framing components. The moisture content of the floor framing noted in the crawl space at the time of the inspection was considered acceptable; however, moisture levels of the framing can fluctuate based on weather conditions and seasonal changes in humidity. Prolonged elevated moisture content of the framing can lead to excessive deflection and structural damage. We recommend monitoring the moisture content of the crawl space framing throughout the seasons. The damaged and flared floor framing noted above are considered structural concerns and we have provided recommendations below to address the issues. *We have also provided recommendations below if additional stiffness in the floor system is desired.*



Positive grade away from the foundation should be created, where possible, to help reduce moisture infiltration under the foundation. 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 is vital to the long-term structural integrity of the foundation.

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 alter our opinions or result in additional repair recommendations. Further, the recommendations are the opinion of the Engineer to address structural-related concerns and may not rectify cosmetic issues.

RECOMMENDATIONS

The contractor should verify all dimensions prior to ordering materials. If there are any questions or concerns regarding location or method of repair contact the engineer prior to construction.

1. We recommend fully replacing the damaged flush girder sections noted above (Observation #7) with new 4-2x10 girders spanning a maximum of 5'-0" between the new/existing piers. Appropriate flashing should be installed between the girders and the piers or the new girders should be pressure treated. We recommend fastening the girder plies together from both sides with minimum (3) 6" Simpson SDWS screws staggered at 16" on-center, for a net 8" on-center spacing. Install flat pressure-treated blocking (min. 3/4" thick) and/or flat metal shims as required to provide full-width, uniform bearing of the new girders onto the new/existing block piers (angled shims are not acceptable).
 - a) This will require the installation of new mortared and fully grouted 8"x16" CMU block piers installed at the midspan of the girders to achieve a maximum girder span of 5'-0" between the load bearing points. The new piers should bear on minimum 24"x24"x12" concrete footings with minimum (3) #4 reinforcement bars equally spaced each way in the bottom of the footings.
 - i. *As an alternative to CMU block piers, steel posts with ICC-ES evaluation reports (IntelliJack or approved equivalent) may be utilized. The posts should be positively fastened to the framing and concrete footings.*
 - b) This will likely require cutting back the floor joists to replace the damaged flush girders. We recommend fully sistering (bearing point to bearing point) the damaged floor joists noted above (Observation #6) and any joists cut back with new equivalently sized members, attached with (3) 10d common nails at 16" on-center. Ensure a snug condition against the subfloor/damaged members and proper bearing at the ends.
2. We recommend temporarily clamping the plies of the flared framing noted above (Observation #8) to bring them into full contact (to the greatest extent practical without damaging the members) and positively re-attaching the plies with (3) Simpson SDS screws (or approved equivalent) of sufficient length to penetrate all plies. The screws should be staggered at 16" on-center, alternating sides.
 - a) Alternatively, the flared framing plies may be reconnected with (2) staggered rows of 5/8" diameter through bolts (with nuts and washers), installed at 16" on-center (one every 8") along the top and bottom edges of the member. Maintain a minimum 2-1/2" edge distance between bolts and the edge of the wood member(s). Take care to not over-tighten the bolts and crush the wood fibers.

3. We recommend monitoring the moisture content of the crawl space framing throughout the seasons. We recommend opening the foundation vents in the warm seasons and ensuring the vents are clear of debris to allow air circulation and closing the vents during the cold seasons. If the moisture levels are consistently high (greater than 15%), we recommend installing an appropriately sized dehumidification system per the manufacturer's specifications to help further reduce and regulate moisture levels in the crawl space. Note, additional deflection or movement of the framing may occur as moisture is removed from the wood resulting in finish material cracks above.
4. We recommend ensuring that stormwater drains positively away from the home to minimize the risk of future water infiltration. This can be accomplished by ensuring gutters, downspouts, and leaders remain clear of debris and properly functioning. Also, creating a positive grade, where possible, away from the perimeter of the home will aid in the stormwater evacuation.
5. *If additional stiffness in the floor system at the interior wall to ceiling separation noted above (Observation #1) is desired, the double joist below this location may be fully sistered (bearing point to bearing point) with an equivalently sized member fastened with (3) 4.5" Simpson SDS screws (or approved equivalent) staggered at 16" on-center. Ensure a snug condition against the subfloor/double joist and proper bearing at the ends.*
6. *If additional stiffness in the floor system at the interior wall to ceiling separation noted above (Observation #1) is desired, we recommend installing a steel post with an ICC-ES evaluation report (IntelliJack or approved equivalent) at the midspan of the double joist below this location. The steel post should bear on a minimum 24"x24"x12" concrete footing and be positively fastened to the framing and the footing.*

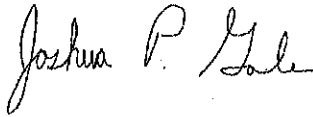
General Notes:

- All new lumber should be SPF No.2 or equivalent. All lumber exposed to concrete/masonry or weather must be pressure treated. All metal components exposed to weather or pressure-treated lumber shall be galvanized.
- Install flat pressure-treated blocking (min. 3/4" thick) and/or flat metal shims as required to provide full-width, uniform bearing of the above floor framing onto the new/existing block piers (angled shims are not acceptable).
- All new concrete is to have a minimum 28-day compressive strength of 3000 psi and all grout is to have a minimum strength of 2000 psi.
- New concrete footings are to be installed a minimum 12" below grade (to the bottom of the footing) and in no case less than frost depth.
- Soils below new foundation components to be contractor verified to be a minimum 2000 psf bearing capacity.
- All metal hangers/ties/clips/fasteners are to be installed per the manufacturer's specifications.
- All fastening shall conform to R602.3(1) in the 2018 NC Building Code: Residential Code.
- All notching, cutting and drilling shall conform to R502.8(1) in the 2018 NCBC:RC.
- Installation of the above recommended repairs may require temporary shoring of the in-place structural components. Shoring methods are the responsibility of the contractor.
- Care should be taken to not excessively jack the framing. Excessive jacking of the framing may result in a crown in the floor and/or excessive interior finish material damage.
- With any structural changes, finish material cracks and minor movements are typical and expected. These are associated with settlement and allowable deflection generally observed after construction of an addition, significant remodel, or repair.

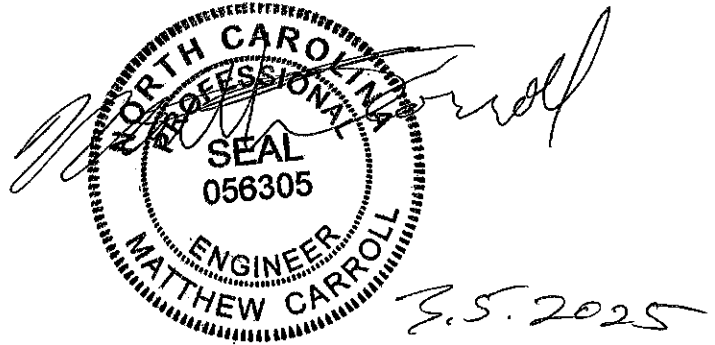
CONCLUSION

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

Sincerely,



Joshua P. Gale, EI
Project Engineer
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Matthew Carroll, PE
Project Manager
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Enclosed: Limited Photo Log

Description

General view of the front of the home (for reference).



Photo No.
1

Description

Typical view of crown molding separation.



Photo No.
2

Description

View of finish flooring separation.

Photo No.
3



Description

Typical view of exterior drainage.

Photo No.
4



Description

Typical view of crawl
space
framing/foundation
components.



Photo No.
5

Description

Typical view of
damaged floor joists.



Photo No.
6

Description

Typical view of partially
sistered member repairs.

Photo No.
7



Description

View of damaged floor
girders.

Photo No.
8



Description

View of flared double joist.

Photo No.
9



Description

View of a flared girder.

Photo No.
10

