

LIMITED STRUCTURAL INSPECTION

6678 River Road
Fuquay-Varina, NC

January 11, 2024

Mahmood Sayed

SCOPE AND BACKGROUND

At your request, a limited structural inspection of the above property was performed on January 8, 2024. The report that follows has been prepared based on that inspection. The inspection was performed by Sean Casady, PE of Built Up Engineers, PLLC.

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.

The scope of this project was limited to the inspection and evaluation of floor framing damage below the oldest central section of the building as per an excerpt of a home inspection report provided. These items included cracks in the slab on grade foundation and cracking of the interior drywall. The report is intended to cover only those premises that may be examined visually without excavation, removing surface materials, and disassembling components.

DESCRIPTION

The subject portion of the church building was originally constructed in 1871 per Harnett County Real Estate Tax Records. The building is constructed on a masonry pier and curtain wall foundation, with wood timber framing. For purposes of this report, all directions (left, right, rear, etc.) are taken from the viewpoint of an observer standing in front of the building and facing it.

Upon our arrival, the crawlspace area was inspected. No interior access was provided as a part of the inspection. 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 photo log is enclosed with this report.

Should there be any questions or concerns regarding this report, contact us at sean@builtupengineers.com or 919-817-9915. Our mailing address is 7283 NC HWY 42 STE 102-148, Raleigh, NC, 27603. Our website is Builtupengineers.com

OBSERVATIONS

1. The subject central section of the building was accessible via a crawlspace door on the rear. The subject area included the original sanctuary area (approximately 50 feet deep by 40 feet wide) and the rear office/classroom space (approximately 40 feet wide by 16 feet deep).
2. The front sanctuary space appeared to be the oldest portion of the building and was supported on a perimeter brick pier and curtain wall with a timber perimeter band and stacked stone piers below the main timber band along the front, center, and rear. It appeared that additional dropped timber girders (installed on brick piers) had been installed at the midspans of the framing to the right and left of the main central girder.
3. The floor framing was comprised of round wood joists (approximately 8" in diameter) spaced approximately 24" on-center.
4. We noted extensive damage to the floor framing below the sanctuary building of varying amounts. The damage appeared to be due to a combination of wood-destroying insect infestation and moisture damage. Samples of the framing and joists were probed in each section, to help determine the extent of the damages. The extent of the damages varied significantly depending on the location but varied between approximately ¼" and 2" of damage into the cross-section of the subject joist. Note that the damages were generally limited to the round timber framing and intermediate drop girders in the center and left side.
5. The crawlspace area below the front entrance was inaccessible due to low clearance, but we noted significant damages to the (joists and girders) near the front area.
6. We noted a joist on the left side which was rotted through the full cross-section and had fallen to the ground.
7. The original stone piers were observed to be deteriorated/cracked in numerous locations and the mortar within the piers was observed to be very soft. The masonry walls along the perimeter of the building were observed to be deteriorated and cracked in multiple locations.
8. We noted a leaning pier below the right intermediate girder on the right side, at the third span from the rear band of the original sanctuary building.
9. We noted a missing pier at the front-right corner of the building.
10. We noted indications of significant water infiltration on the left side, which appeared to be originating near the front. Various erosion was observed along the left side of the subject crawlspace from the front all the way to the rear.
11. The soils in the crawlspace were wet/damp at the time of the inspection and no vapor barrier was installed in the subject crawlspace area.
12. On the exterior, the grade was relatively flat along the perimeter walls. We noted an area of slight negative slope towards the building on the left side. Note that multiple foundation vents were at or below the perimeter grade elevation. No gutters were installed on the building.

DISCUSSION

The observed damage to the building is likely the result of a combination of prolonged elevated moisture conditions in the crawlspace, wood-destroying insect infestation, and water infiltration to exterior drainage deficiencies.

While extensive framing damage is present, measures to help prevent future water infiltration and damage to the foundation due to continued water infiltration are more urgent than the majority of the framing repairs. Positive grade away from the foundation should be maintained to 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. Maintaining positive drainage away from the perimeter foundation wall(s) is vital to the long-term structural integrity of the foundation. We have provided drainage repair recommendations below.

The observed framing damage, while more significant in some areas may not be as readily apparent on the interior as the original timber framing has some redundancy due to its size and relatively short spans. Note that the extent of the damages varied significantly, and may require additional evaluation and support by the engineer during repairs. Further, failure to mitigate moisture damages will likely result in future damages due to prolonged elevated moisture levels. We have provided repair recommendations below.

Concerning the foundation components, the original stone piers are in poor condition, and this is likely related to the prolonged moisture conditions in the crawlspace. The stone piers will require replacement over the long term. The brick piers and sections of curtain wall will require re-pointing in some areas. We have provided recommendations below.

Note, that some components of the framing (spans, spacings, connections, wall bracing, etc.) do not meet current building code requirements (100 PSF) for an assembly area such as the sanctuary. The scope of the inspection was to identify areas of repair, and the specified repairs may not bring all aspects of the framing up to current building code requirements.

No areas of the structure were reviewed other than those explicitly described in this report. The review used a standard of care consistent with other local design professionals limited by the scope and budget. This report was at a flat rate and has a liability limitation of 10 times the fees collected. It represents the best judgment of the staff of Built Up Engineers, PLLC given the information available at the time of writing. No review of organic growth, mildew, or any other building science issue was performed except as noted. All opinions are subject to revision based on new or additional information. No responsibility will be taken for conditions that could not be easily seen or are outside the scope of this review. Any use that a third party makes of this report, or any reliance upon, decisions made in response to or in any way influenced by this report are the responsibility of the such third party. Recommendations are provided to address structural-related issues, and may not rectify cosmetic issues.

RECOMMENDATIONS

If there are any questions or concerns about the specified recommendations, contact the engineer prior to construction.

Drainage Repairs

1. We recommend installing vent wells along the foundation vents within 6" of grade.
2. We recommend adjusting the site grade along the perimeter as possible to achieve positive slope away from the foundation (ideally 6" of fall within the first 10 feet). Grade adjustments shall be achieved by cutting soils.
3. We recommend the installation of gutters (6" K style seamless with 3x4 corrugated downspouts) on the original church building. The gutters shall be extended away from the building (minimum 5-feet) using leader pipes (discharging into an area of positive slope away from the building).
4. The installation of foundation drains may be required in the future if water infiltration issues persist.



Framing Repairs

5. We recommend fully sistering (bearing point to bearing point) the damaged joists with 2x8 pressure-treated members on **both** sides. Attach the new joists to the round member with 4" long Simpson SDWS screws at 16" on-center. At the bearing points of the new joists at the girders, provide 2x4 pressure-treated ledgers below the joist with (3) 16d nails below each joist.
6. We recommend replacing the damaged spans of the intermediate girders with 4-2x8 or 4-2x10 (match existing depth) pressure-treated members with all plies continuous between bearing points and 8" of bearing at each supporting pier.
7. We recommend installing a new 6 mil vapor barrier in the crawlspace to cover 100% of the exposed soils. We recommend the foundation vents be opened in the warm season to promote air circulation. The moisture levels in the crawlspace should be monitored. If moisture levels remain high, the installation of a dehumidifier may be required.

Foundation Repairs

8. We recommend replacing the following piers with new 16x16 solid grouted CMU block piers on 24"x24"x10" thick concrete footings. Provide pressure-treated blocking or flashing between non-treated wood members.
 - a) The original stone piers throughout the crawlspace.
 - b) The missing pier at the front-right corner of the crawlspace (Observation #9).
 - c) The leaning pier below the right intermediate girder (Observation #8).
9. We recommend re-pointing the piers and damaged sections of the curtain wall throughout the crawlspace with new Type N mortar materials. A surface bonding cement shall be installed following re-pointing repairs. Pointing mortar shall be prehydrated in accordance with the following procedures to reduce shrinkage after installation. Mortar shall be used within approximately 30 minutes of final mixing. The addition of water or "retempering" is prohibited.
 - a) Thoroughly mix all dry ingredients.
 - b) add only enough water to produce a damp workable consistency that just retains its shape.
 - c) Allow the mix to stand in dampened condition for 1 to 1 1/2 hours.
 - d) Add water to bring the mortar to a workable consistency.
 - e) Proportions of mortar for repointing shall be determined based on the mix proportions of the existing mortar

General Notes:

- Wood 2x pressure-treated blocking utilized shall be sufficiently dried out to help reduce shrinkage due to the evaporation of excess moisture over time. Alternatively, kiln-dried pressure-treated lumber may be utilized.
- The contractor should verify all dimensions prior to ordering materials.
- If the contractor has any questions or concerns regarding the method of construction or if conditions vary from what is described below, the engineer should be consulted.
- Likewise, if any changes to sizes or modifications to the structure are desired other than what is explicitly described below, the engineer should be consulted.
- All construction and workmanship shall adhere to the 2018 NC Building Code, Residential Code.



- All new lumber should be SPF or SYP No.2 or equivalent. All lumber exposed to concrete/masonry or weather must be pressure-treated.
- Contractor to confirm minimum soil-bearing capacity of 2000 psf. All footings shall be installed a minimum of 12" below grade and in no case less than the frost depth.
- All new concrete is to have a minimum 28-day strength of 3000 psi.
- All new metal hangers/ties/clips are to be installed per manufacturer specifications.
- All fasteners/connections are to be installed per table R602.3 of the 2018 NC Building Code, Residential Code.
- With any structural changes, finish material cracks and minor movements are typical and expected. These are associated with settlement generally observed after the construction of an addition or significant remodel.

CONCLUSION

We trust that this report provides the information you require. Please contact us at 919-817-9915 if you have any questions. Thank you for the opportunity to be of assistance to you.

Sincerely,

Sean Casady, PE
Project Engineer
Built Up Engineers PLLC
NC Lic. No. P-2664



Enclosed, photo log



Description

View of the front of the building.



Photo No.
1

Description

Side view of the building.



Photo No.
2

Description

View of a foundation vent at grade.



Photo No.
3

Description

View of erosion at the front-left corner.



Photo No.
4

Description

View of the rear
classroom/office area.



Photo No.
5

Description

Typical view of the
crawl space.



Photo No.
6

Description

Typical view of a stone pier.



Photo No.
7

Description

Typical view of stone pier.



Photo No.
8

Description

Typical damage to the floor joists.



Photo No.
9

Description

Typical damage to the floor joists.



Photo No.
10

Description

View of the leaning pier below the right intermediate girder.



Photo No.
11

Description

View of erosion and wet soils on the right side.



Photo No.
12

Description

View of the fallen joist near the front-left corner.



Photo No.
13

Description

Typical view of the rear portion of the crawlspace.



Photo No.
14



BUILT UP

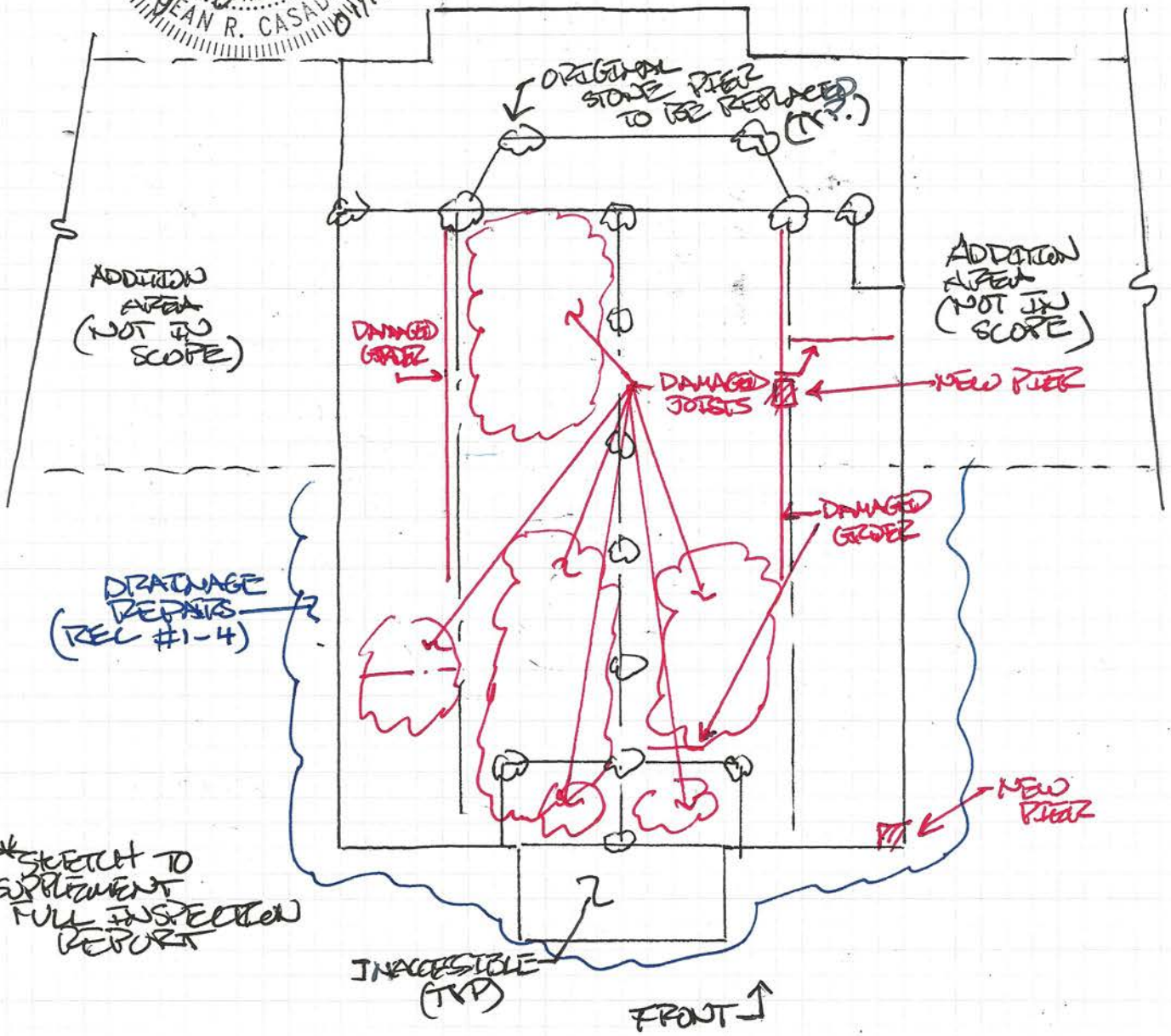
ENGINEERS

6678 RIVER RD
FUQUAY-VARINA

PROJECT

DATE

01/11/2024



*SKETCH TO SUPPLEMENT FULL INSPECTION REPORT