



FORENSIC™

ANALYSIS & ENGINEERING

November 12, 2018

Mr. Ken Strand
State Farm Insurance
PO Box 106169
Atlanta, GA 30348-6169

Re: Damage from Falling Tree
State Farm Claim: #33-5770-G43
Insured: Randall & Kathy Griffen
D.O.L.: 9/14/2018
FAEC File No.: 500-248-NC-18

Dear Mr. Strand:

FORENSIC ANALYSIS & ENGINEERING CORPORATION (FAEC) is pleased to provide the following report that summarizes our investigational activities in this assigned loss. We trust that it will be found to be informative and suitable for its intended purposes.

BACKGROUND INFORMATION

FAEC was contacted on October 22, 2018 and requested to travel to the insured residence in Erwin, NC to perform an engineering investigation and evaluation into the claimed loss. Specifically, we were asked to examine the structure of the insured property located at 505 East H Street and to provide an objective expert opinion, including supporting rationale, that fulfills the following provided request:

- Inspect the structure, focusing on the left rear quadrant where a falling tree uplifted the home.
- Determine the extent of structural damage to the home and provide recommendations for repair, addressing the applicable building codes as well.

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Upon arrival at the subject property on November 1, 2018 we were met by the insured, Mr. Griffen and yourself. We completed our physical examination and photographic documentation of the property and provided a preliminary verbal summary of our technical findings to you on that day.

Access was granted the structure by the insured. The inspection involved visual observations with no invasive measures and was limited to readily visible elements. Selected photographs from the inspection are attached.

The insured risk is a 2,610-sf, two-story residential structure built in 1903. The home has wood siding, an asphalt shingle roof, and a brick pier crawlspace foundation. The insured purchased the home in June of 2000. The structure faces south.

On the date of loss, Hurricane Florence struck the North Carolina coast and inland areas. WeatherUnderground reports winds of 10-mph gusting to 33-mph from the north and northeast during the day. Precipitation was recorded at 1.96-in for the date of loss.

OBSERVATIONS & FINDINGS

FAEC was asked to perform an engineering investigation and evaluation concerning the structural damage caused by a falling tree at the home of Randall & Kathy Griffen in Erwin, NC. All directional references in this report are from the point of view of an observer standing in front of the structure on East H Street and facing the building, unless otherwise stated.

Based upon the information identified during the course of our onsite investigation, FAEC was able to determine the following:

- This home is in an urban neighborhood of similar homes. The tree that fell was located immediately adjacent to the rear exterior wall of the home on the left side with a root structure that extended well under the home. The tree fell to the northeast. The uplifted root ball lifted the left rear corner of the home at least 1-ft vertically.
- Two brick support piers, one on each side of the tree, failed as a result of the tree movement. The leftmost pier that was damaged was the pier at the left rear corner of the home.
- On the interior, there is a hallway over the immediate area of the tree root. The kitchen is along the rear wall to the right of this hallway. The sill beam of the rear



wall under this hallway has been uplifted at least 12-in at the rear wall, with the hall floor following. The common interior wall within the kitchen shows a significant diagonal crack to the front of the door leading from the hallway into the kitchen. The kitchen floor is uplifted and that uplift decreases as one moves to the right away from the tree location.

- The finish walls in the hallway are T&G wood plank. These show distress, and the rear wall is pushed out to the rear a few inches at its bottom. The window on the left wall near the left rear corner is wracked significantly. The hallway also contains a stairway that leads to the second floor. The floors on the second floor are also uplifted, following the first-floor lead.
- A screened porch is located on the left side of the house, with the rear wall set forward approximately 5-ft from the rear wall of the main structure. This porch shows distress along its rear wall.
- On the exterior, the sill beam along the rear wall is not completely visible but is uplifted at its left end. The rear wall of the home in the area of the hallway projects out several inches at the bottom from the remaining portions of that wall to the left.
- The body of the stump is supporting the left rear corner of the house in its elevated position.
- The crawlspace under was accessed with difficulty. The floor framing under the hallway runs front-to-back and are ledgered to a left-to-right girder placed an estimated 12-ft- from the rear wall of the home and supported by brick piers at each end. At least one of the floor joists, the one immediately above the tree root ball, is broken.
- The girder pier on the left side is intact, although the brick face wall between that pier and left rear corner is leaning inward.
- A significant tree root, at least 4-in in diameter extends up the floor joists bay towards the front of the home. This root has pushed the subfloor up locally.
- The floor framing under the wall between the kitchen and the hallway is also a girder, and the joists under the kitchen run left-to-right. These joists appear to be in good condition, but the joists along the rear wall are not fully visible. The right corner pier does not show damage, although the rear face wall is damaged.

ANALYSIS AND DISCUSSION

Basically, this house is being supported by the right corner pier and the right center pier under the kitchen area and by the tree root, which is supporting the left rear quadrant in its elevated position.

The damage to the framing is more due to displacement caused by the uplift movement of the root ball than by structural failure of the framing members. Only one failed floor joist was observed, although there may be more, including a sill beam that may turn out to be damaged. The two piers to the left side of the rear wall of the home have failed as well.

Once the tree is removed from under the rear wall and the rear wall is re-supported, then the framing misalignments both vertically and laterally can be made through normal carpentry techniques. This will involve stripping the wall surfaces in the affected rooms.

The issue is how to support the rear wall while the tree stump is removed. I have suggested to the insured that a specialty foundation contractor inspect the site. It is possible that helical piers can be installed to support the left rear v-corner while the stump is removed, then readjusted to support the home at a normal level or removed in the event that new footings and piers are constructed after the tree is out of the way.

OPINIONS

The conclusions and opinions presented in this report are based on the results of FAEC's investigation and analysis of this incident based upon the facts, as we know them to be at this time. If additional information or facts become available which materially affect the analysis performed, the conclusions and opinions presented herein are subject to revision accordingly. Based upon our onsite evaluation, examination of the physical evidence and information that was provided to FAEC, we have been able to conclude the following:

1. This home is repairable with normal carpentry procedures once it is stabilized with the tree stump and root ball removed. The issue is how to support the home in its elevated position while the tree is removed.
2. The wood framed structure under the hallway and partially under the kitchen has been uplifted by the root ball of a large tree that was located immediately adjacent to the rear wall of the home behind an interior hallway on the left side of the home. Structural damage to the framing is minimal with only one (but possible other) floor members damaged. The damage to the home is primarily from displacement and misalignment of the structure in both the vertical and lateral directions.



3. Two brick piers that previously supported the rear wall at the left corner area have been damaged and require replacement or reconstruction. The brick foundation face wall on the left side and along the rear of the main portion of the home require replacement. The face wall is not a structural wall.
4. The floor and wall surfaces in the affected area of the hallway and leading into the kitchen will be required to be striped to the studs and floor/ceiling framing for repair access and to determine if there is hidden internal damage. Once the structure is stable and reasonably level with replaced piers in place, the framing damage is easily repaired by an NC-licensed general contractor familiar with and highly experienced in repair of aged homes.
5. Some electrical and plumbing damage is present and will require assessment and repair by an NC-licensed electrician and NC-licensed plumber, respectively.
6. A specialty foundation contractor should be contacted to determine the best method or stabilizing the home in its elevated position and returning it to its normal position after the tree stump is removed.

APPLICABLE BUILDING CODES

The applicable building code for the repairs to this structure is the 2017 North Carolina Existing Building Code. This Code generally allows repairs to be made with like materials without compliance with current building codes. The basic criteria for the repairs are found in *Section 404, Repairs* and *Chapter 6, Repairs* of this Code.

In accord with the requirements of Section 404, this structure has not sustained "substantial structural damage" to the vertical elements of the lateral force-resisting system of the roof structure, or to the gravity load-carrying components. Thus, the damaged structure can be repaired in such a way that restores the building to its pre-damaged state, based on material properties and design strengths applicable at the time of original construction.

The NC Existing Building Code also has additional provisions that relate to the installation of interconnected battery backup smoke detectors and to the installation of carbon monoxide detectors. These particular code upgrades are specifically required by law in NC and will be enforced by the local inspection authority.



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Policyholder: Randall & Kathy Griffen
Claim Number: 33-5770-G43
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Date of Loss: 9/14/2018

PHOTOGRAPHS

Taken by
Dana F. Shave, P.E.
on November 1, 2018



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We have appreciated the opportunity to be of support to State Farm Insurance and your insured in this matter. We trust that you will find our report to be suitable for its intended purposes. We look forward to earning an opportunity to prove our technical competence once again in the near future.

Respectfully submitted,
FORENSIC ANALYSIS & ENGINEERING CORPORATION

E-SIGNED by Dana Shave
on 2018-11-12 19:36:00 UTC

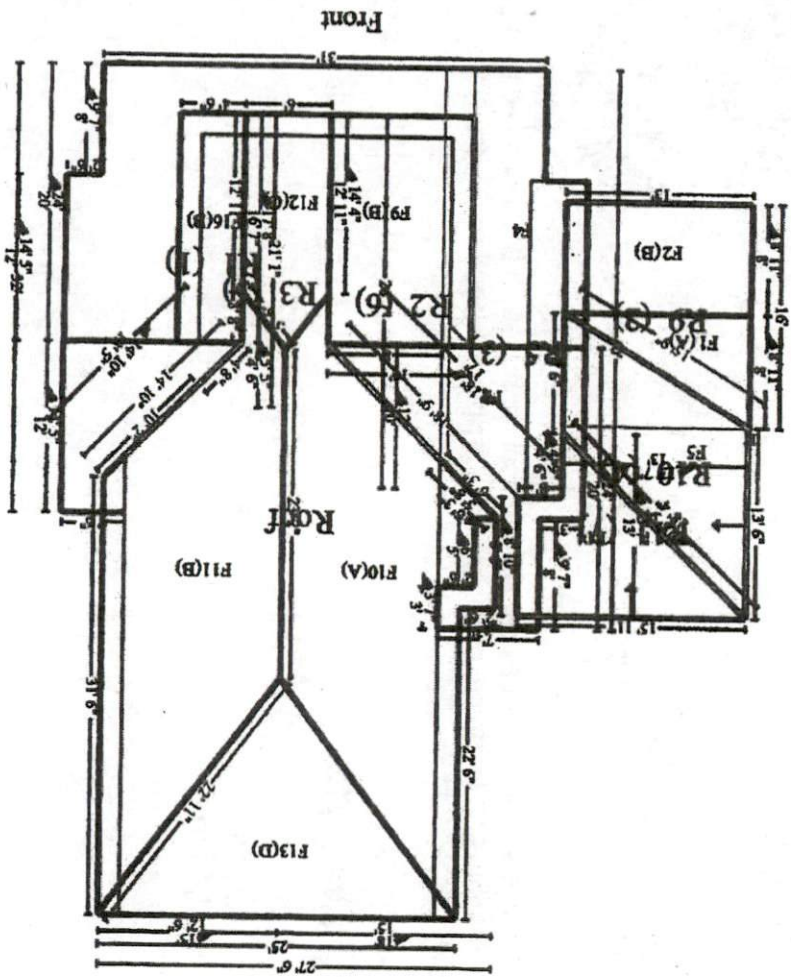
Dana F. Shave, P. E.
Vice President, Engineering
North Carolina PE License 031625



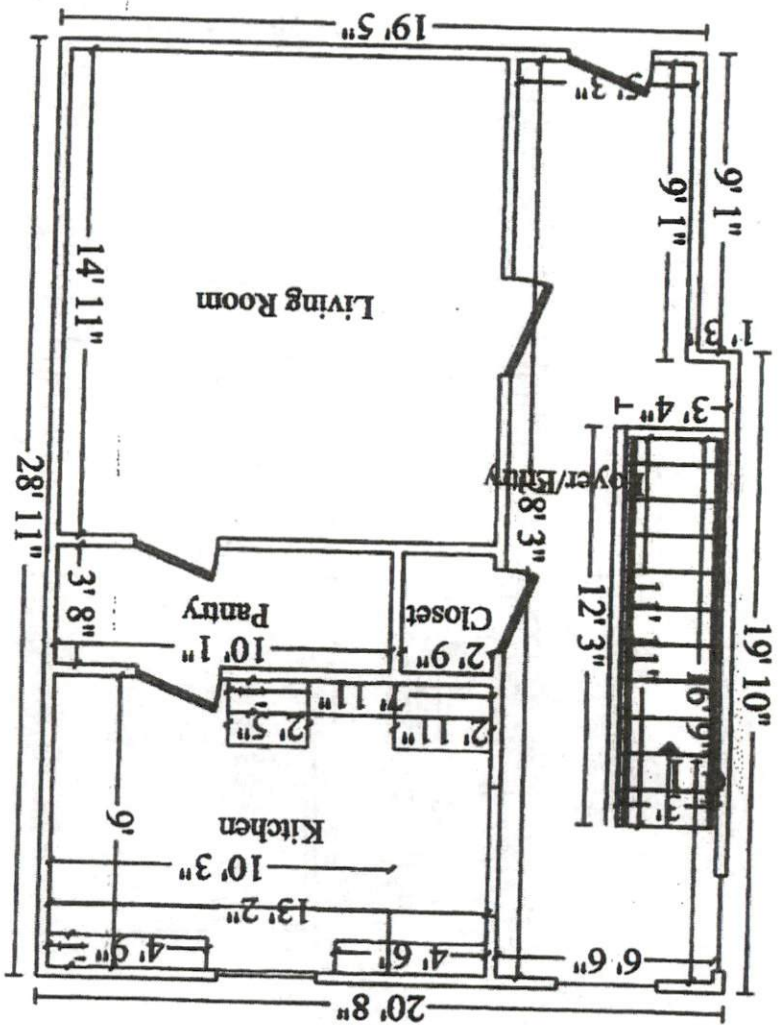
This firm follows a practice of having all technical reports read and reviewed by a peer for understanding and technical accuracy. This report has been reviewed by the undersigned for the firm.

E-SIGNED by Kevin Pruemer
on 2018-11-12 17:35:38 UTC

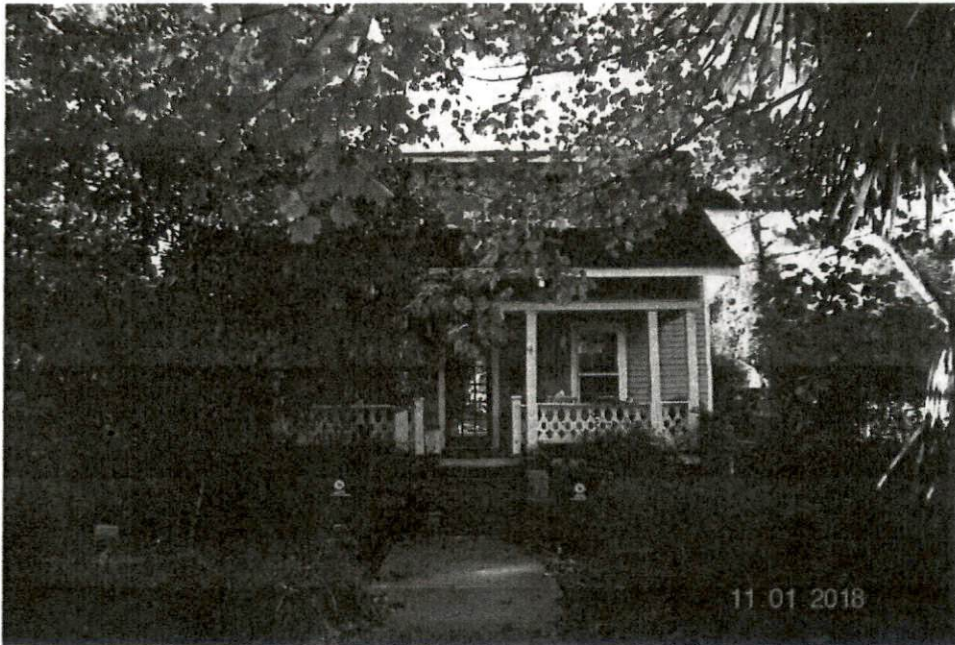
Kevin Pruemer, P.P.
Vice President, Engineering



Exterior



Main flr



Photograph No. 1 – The insured risk was uplifted at the left rear corner by a large tree that was immediately adjacent to the rear wall and fell away from the house such that the root ball lifted the house framing.



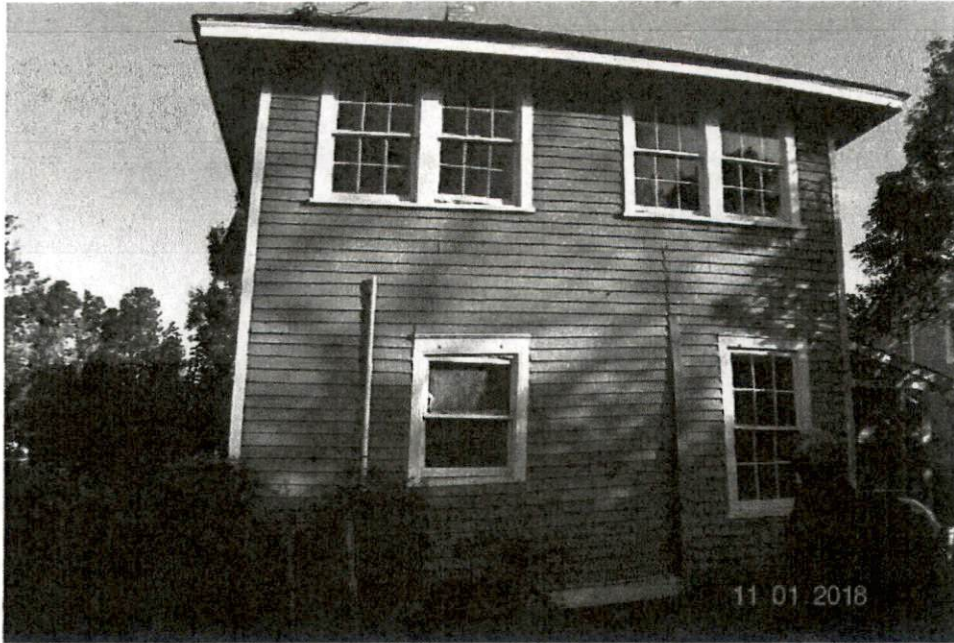
Photograph No. 2 – A view of the home from the right front.



Photograph No. 3 – This is the left rear corner of the home. The tree fell toward the left in this photo, uplifting the left rear corner of the home.



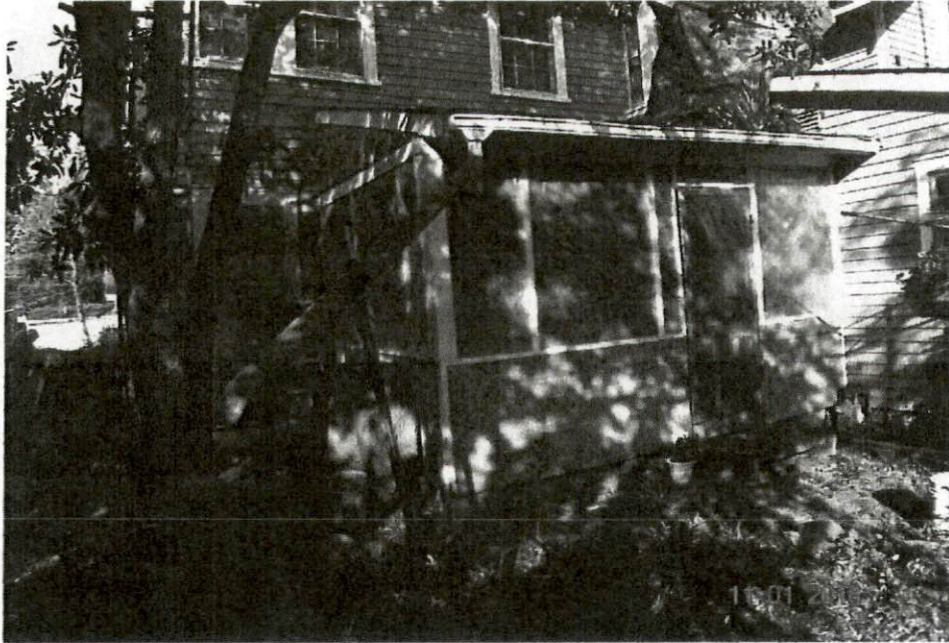
Photograph No. 4 – This is that tree stump. Note the failed brick face wall to the left. There is also a pier in that area that failed.



Photograph No. 5 – The rear of the home. The right side in this photo is uplifted and the tree stump is holding it in that elevated position.



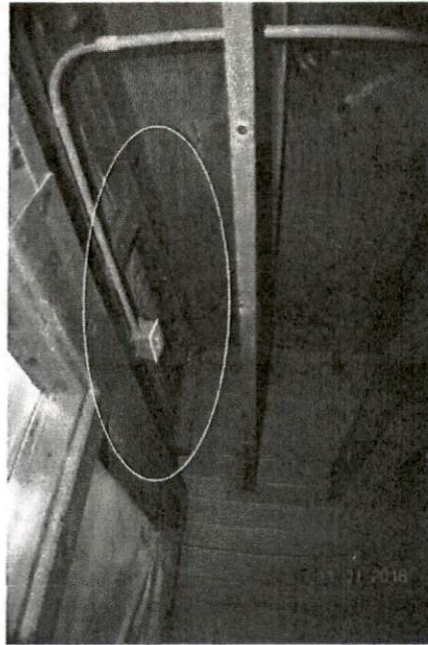
Photograph No. 6 – The left corner pier is damaged. Note the sill beam.



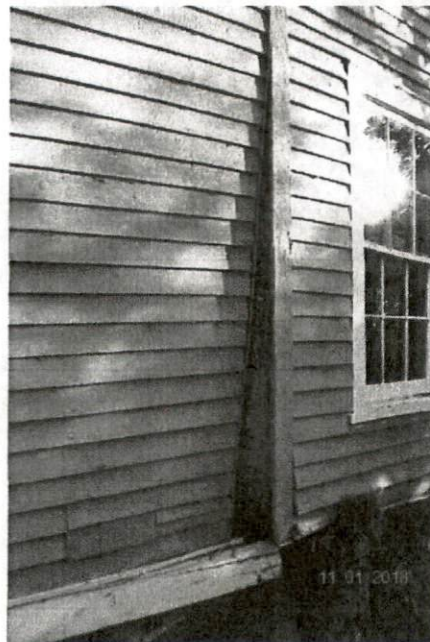
Photograph No. 7 – This is the screened porch along the left side of the home and towards the left rear corner.



Photograph No. 8 – Another view of the porch and the left rear corner that is uplifted. The rear of the porch also lifted a bit.



Photograph No. 9 – The interior framing of the porch showing some separation at the house.



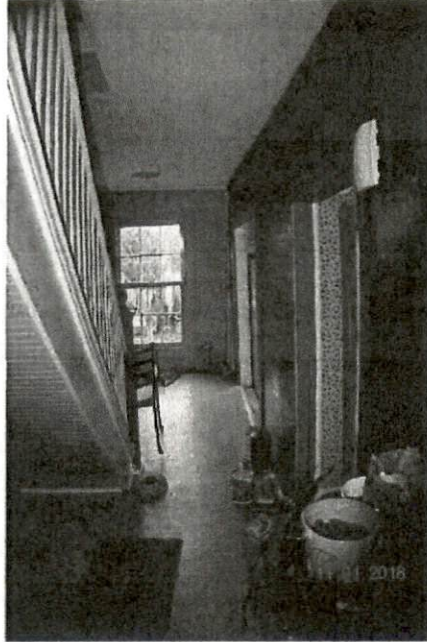
Photograph No. 10 – There is a load bearing wall between the hallway and kitchen. The floor is framed differently on each side of this wall. The hallway side (to the right in this photo) of the rear wall is pushed out a bit.



Photograph No. 11 – The kitchen is on the right side of the rear wall, and the hallway is on the left. This photo looks from the kitchen to the hallway. Note the uplift in the hallway floor.



Photograph No. 12 – The stump is right underneath this hallway.



Photograph No. 13 – That hallway as seen from the front of the house.



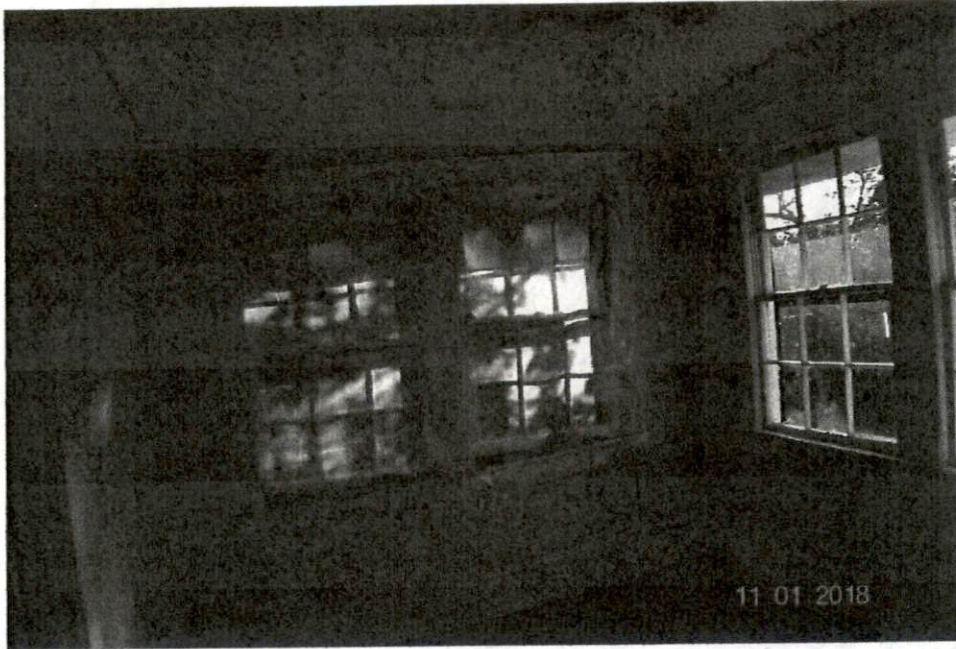
Photograph No. 14 – The rear wall is pushed out a bit.



Photograph No. 15 – This window on the left side at the left rear corner is wracked.



Photograph No. 16 – The room immediately above went along for the ride and shows some distress...



Photograph No. 17 – ...as does the room at the right rear above the kitchen.



Photograph No. 18 – Looking from the crawlspace under to the rear, showing the root ball.



Photograph No. 19 – The pier supporting the left-to-right girder on the left wall is in good shape...



Photograph No. 20 – ... but the face wall is not. The face wall is not a structural component.



Photograph No. 21 – The only damaged framing member observed is this floor joists above the tree stump. There may be other framing members damaged but they are not visible at this time. We cannot see the sill beam beyond the stump and this may be damaged.



Photograph No. 22 – A root that extended well under the floor framing.



Photograph No. 23 – This photo is taken looking under the kitchen from the left toward the right rear corner. The framing under the kitchen appears undamaged.



Photograph No. 24 – This photo is taken from the front looking to the right side of the rear wall. The face wall along the rear is damaged.



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Respectfully submitted,
FORENSIC ANALYSIS & ENGINEERING CORPORATION

E-SIGNED by Dana Shave
on 2018-11-12 19:36:00 UTC

Dana F. Shave, P. E.
Vice President, Engineering
North Carolina PE License 031625



This firm follows a practice of having all technical reports read and reviewed by a peer for understanding and technical accuracy. This report has been reviewed by the undersigned for the firm.

E-SIGNED by Kevin Pruemer
on 2018-11-12 17:35:38 UTC

Kevin Pruemer, P.P.
Vice President, Engineering