Advanced Structural Repair, LLC
PO Box 3185
Cary, NC 27519-3185 US
(919) 377-0796
irmab@advancedsr.com

ESTIMATE

ADDRESS	SHIP TO
Paul Pepe 14W. Landing Sanford, NC 27332	Paul Pepe 14 W. Landing Sanford, NC 27332

ESTIMATE #	DATE
2537	11/07/2018

DATE	ACTIVITY	QTY	RATE	AMOUNT
11/07/2018	**36 DRAINAGE** Drainage - We recommend installing a perforated interior perimeter crawlspace drain system with discharge through the low point of the perimeter foundation system at least 5' from the perimeter of the home onto soils adequately graded away from the structure. Transition to non-perforated pipe outside the footprint of the structure. A sump pump may be necessary to remove collected water from the crawlspace	257	25.00	6,425.00
11/07/2018	**SITE WORK** Site Work - Installation of a new 100% coverage vapor barrier.	1	1,875.00	1,875.00
11/07/2018	**05 MASONRY** Masonry - BACK KITCHEN WALL REMOVAL New 16"x16" hollow CMU piers with solid 8" caps over 28"x28"x10" thick poured concrete footings set at least 12" into suitable bearing soils at each of the ends of the new proposed opening and directly beneath the location of each of the two new columns (4 piers/footings total).	4	800.00	3,200.00
11/07/2018	**05 MASONRY** Masonry - BACK LIVING ROOM WALL REMOVAL New 16"x16" hollow CMU piers with solid 8" caps over 40"x40"x16" thick poured concrete footings set at least 12" into suitable bearing soils at each end of the new proposed opening (2 piers/footings total).	2	975.00	1,950.00

Please note: Payment is due upon completion of the job.

TOTAL **$13,450.00**

Accepted By

Accepted Date

If you have any questions feel free to contact any of us at the following:

Drew Vallery at: Drewv@advancedsr.com
Carlos Barahona at: Carlosb@advancedsr.com
Irma Barahona at: Irmab@advancedsr.com

October 23, 2018 Project No. 18-0716

Matt Brueshaber, PE
Stonewall Structural Engineering, PLLC
8358 Six Forks Rd, #201
Raleigh, NC 27615
(919)407-8663

STONEWALL
STRUCTURAL ENGINEERING

Paul Pepe
14 West Landing
Sanford, NC 27332

Re: Structural Observation — 14 *West Landing, Sanford, NC 27332*

Mr. Pepe,

At your request, on October 19th, 2018 we performed a visual structural observation of the reported water intrusion into the crawlspace and the potential foundation or structural damage related to the water intrusion at the 24 West Landing residence noted above. The structure is a conventionally framed, detached, two-story, single family residence with raised first floor framing over a pier/girder foundation system with perimeter masonry foundation walls *(see picture 1)*.

Our observations are listed below. Indicators such as "left," "right," "front," and "back" are referenced as viewing the front of the home.

WATER INTRUSION

- Signs of water intrusion were noted around the perimeter of the crawlspace *(see picture 2 for example)*.
  - The structure was noted to lack roof gutters along the low perimeter edges of the roof system *(see picture 3 for example)*.
  - The exterior grade was inadequately sloped away from the perimeter of the home *(see picture 4 for example)*.
  - Vents at various locations at the perimeter of the home were noted to have less than 4" of clearance from the bottom of the opening to the top of the exterior grade *(see picture 5 for example)*.
- The bottom of the wood joists were water stained *(see picture 6 for example)*.
  - Thorough probing revealed the joists were not deteriorated at this time.

ADDITIONAL OBSERVATIONS

- The piers that supported the girder beneath the back living room wall were not set over adequately sized footers. Additionally, two of the piers were undermined by an apparent excavation for HVAC *(see picture 7 for example)*.
- The perimeter sill was found to support floor joists over openings that were added in the perimeter foundation wall at the front of the master bathroom and at the back-left of the original crawlspace *(see pictures 8-9)*.
- Various framing members were out of contact with the masonry elements that were intended to support them *(see pictures 10-11 for examples)*.

Upon completion of our analysis we have concluded the following:

- The above-noted water intrusion has not caused any major structural concerns at this time. However, the water-stained joists and signs of water intrusion indicated high

moisture in the crawlspace. This can lead to deterioration of wood elements throughout the home.

- Crawlspaces require cross-ventilation to help prevent fungal growth and structural decay due to wood rot. Alternatively, closed-crawlspace systems require a ground vapor barrier and mechanical drying measures.

We recommend the following work be performed by a qualified general contractor:

- Remove the masonry piers over the inadequately sized footings noted above and replace using new 16"x16" hollow CMU piers with solid 8" caps, centered over 30"x30"x12" thick poured concrete footings set at least 12" into suitable bearing soils.
- Fasten all joists that currently bear on flat 2x sill plates over openings in the foundation wall to the perimeter rim beam using Simpson face hangers.
- All out of contact structural members should be shimmed into contact with the masonry elements below.
- Provide drainage improvements around the perimeter of the structure such that rainwater runoff is adequately diverted from the perimeter of the home. Drainage improvements are intended to help avoid the need for extensive foundation repair/stabilization work in the future.
  - Install a system of roof gutters and downspouts around the low edges of the roof system on the perimeter of the structure. Extend gutter downspouts for discharge at least 5' away from the structure onto soils inadequately sloped away from the home.
  - Install half-moon vent wells as needed such that all vent openings have at least 4" of clearance from the bottom of the opening to the top of the exterior grade.
  - Due to the infeasibility of achieving adequate cross-ventilation of the crawlspace, we recommend installation of a Code-approved closed crawlspace system with adequate vapor barrier and mechanical drying measures to help avoid future occasions of advanced framing deterioration due to wood rot.
  - We recommend installing a perforated interior perimeter crawlspace drain system with discharge through the low point of the perimeter foundation system at least 5' from the perimeter of the home onto soils adequately graded away from the structure. Transition to non-perforated pipe outside the footprint of the structure.
    - A sump pump may be necessary to remove collected water from the crawlspace.

The above-listed recommendations are not intended to be implemented in lieu of a regular home maintenance schedule. Most serious and costly structural damage in this area occurs due to improperly maintained drainage. Roof gutter systems and any in-ground drains should always remain clear of debris and should be periodically checked to verify positive flow. This can be done by visual examination during or immediately following rainstorms. If standing water, backed-up drainage, or surface water which flows within 5' of the home's foundation is ever found, this should be addressed right away by consulting with a drainage specialist.

The above-listed determinations were made in accordance with common engineering principles and the intent of the 2012 edition of the *North Carolina Residential Building Code.* Sequencing, means, and methods of construction are considered to be beyond the scope of this report. Contractor is to provide adequate temporary shoring prior to cutting or removing any structural load-bearing elements. All work is to conform to applicable provisions of current building standards. Please feel free to contact us, should you have any questions or concerns regarding this matter.

Sincerely,
Matt Brueshaber, PE
Stonewall Structural Engineering, PLLC
Lic. #P–0951

PICTURE ADDENDUM

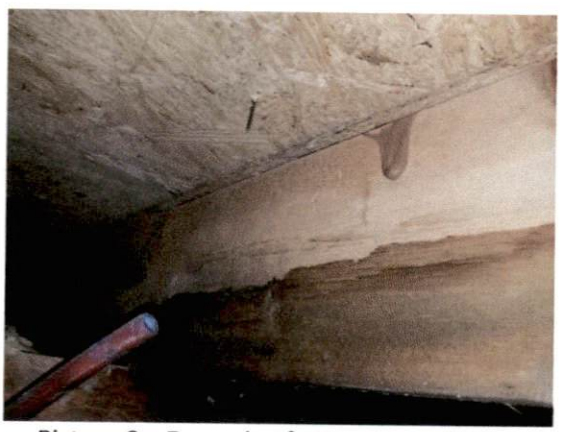
Picture 1 – 24 West Landing, Sanford, NC

Picture 2 – Example of evidence of water intrusion into crawlspace

Picture 3 – Example of missing roof gutters

Picture 4 – Example of inadequately sloped exterior grade

Picture 5 – Example of vent with less than 4" to top of exterior grade

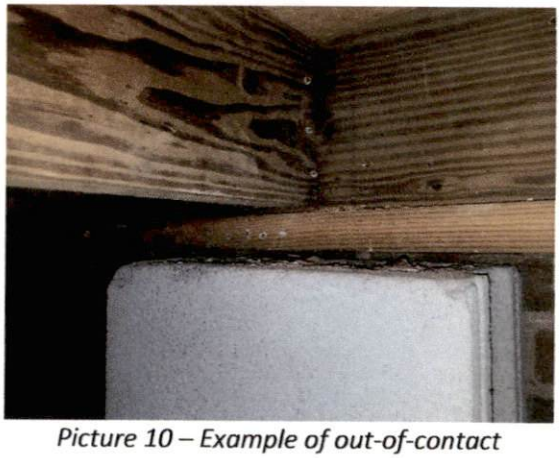


Picture 6 – Example of water-stained floor joists

Picture 7 – Example of undermined and inadequately sized piers

Picture 8 – Inadequately supported joists over foundation wall penetration

Picture 9 – Inadequately supported joists over foundation wall penetration



Picture 10 – Example of out-of-contact masonry support

Picture 11 – Example of out-of-contact masonry support