3030 N. Rocky Pointe Drive West, Suite 530
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# Flood Damage Assessment

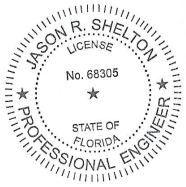
EFI Global File No.: 035.24812
November 22, 2024

Insured: Linda Soileau
16107 Gulf Blvd.
St. Petersburg, Florida 33708

Date of Loss: September 26, 2024
Claim No.: 20240225

Prepared For:
Attn: Claims Department
Auto Club South
Post Office Box 2057
Kalispell, Montana 59903

Report Authored By:




Digitally signed by: Jason R Shelton
DN: CN = Jason R Shelton C = US O = EFI Global Inc.
Date: 2024.11.22 16:35:24 -05'00'

Jason R. Shelton, PE
District Engineering Principal
Florida PE License No. 68305

This item has been digitally signed and sealed by Jason R. Shelton, PE on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Technical Review By:

Ahmet Colakoglu, PE
Vice President
Florida PE License No. 69688

EFI Global, Inc. Florida COA #26950, Expiration: N/A.

## ASSIGNMENT

In accordance with your request, EFI Global, Inc. (EFI) has completed an engineering examination at the subject property located at the above loss location.

The scope of this assignment was to:

- Determine if the structure was damaged by hydrostatic and/or hydrodynamic forces associated with the reported flood event, the extent of pre-existing damage, or if the damage was due to other causes.
- Determine the cause and origin of the reported wall cracks.

In response to this request, Jason Shelton, P.E., (EFI) visited the site on November 7, 2024. The insured was present during our site visit, provided access to the property, and background information.

EFI's findings, analysis, and conclusions are included herein. This report contains a discussion of the information gathered during the assessment and an analysis and conclusions with respect to the condition of the subject property at the time of EFI's assessment. The conclusions contained herein are based on information available to date.

## METHODOLOGY

The collection and analysis of information for this project followed an application of engineering principles to the investigation analysis.

The procedures followed included:

- Conducted an interview with the insured to establish a timeline of the damage and develop an understanding of the primary concerns.
- Visually observed the affected portions of the structure to document, photograph, and evaluate the observed damage.
- Reviewed available weather information and data concerning the weather event that caused the reported flood.
- Performed an engineering evaluation of the information gathered at the site to assess the observed conditions which included:
    - Analysis with respect to our engineering judgment, experience, and education with similar conditions in the general vicinity of the subject property.

- Prepared this report, in general consistency with analysis and reports prepared by other reputable members of our profession, summarizing the results of the field investigation along with EFI 's evaluation, conclusions, and recommendations.

## BACKGROUND

Data from the Pinellas County Property Appraiser's on-line database indicated the structure was built in 1951, and the insured has owned the subject property since March 2016.

The following information was gathered during the site visit and through an interview of the insured.

- The flooding resulted in damages to the interior of the home.
- Following the flooding, the insured noted cracks to the rear patio wall supports.

## BUILDING SYSTEM DESCRIPTION

The subject structure is a one-story, concrete masonry unit house supported on an apparent concrete slab-on-grade foundation system (Photographs 1 through 4). For the purposes of this report, EFI references the southwest elevation of the residence as the front elevation.

## SITE OBSERVATIONS

Observations were limited to visual examinations and measurements of accessible portions of the subject property. Removal of finish materials, qualitative testing, excavation, or other work not specifically described herein was not conducted.

Observations were photographed to document distress and relevant conditions at the subject property on the date of the site visit. Not all damage or distress that may be present was necessarily observed or photographed; however, the selected photographs provide an indication of their types, severity, and distribution. They may also document unusual or contributing conditions that may exist. Photographs captured to document findings and observations are attached to this report. During this investigation, the following observations were made:

- A water line was observed at approximately 43-inches within the residence (Photograph 5).
- The lower portions of the drywall were removed prior to our evaluation (Photograph 6).
- No separations were observed along the wall-to-wall or wall-to-ceiling interfaces within the rear enclosed patio area (Photograph 7). A cracked/split door frame was observed (Photograph 8).
- Stucco cracking was observed along the roof-to-wall interface at the rear of the residence (Photograph 9). These occurred above the water level within the home.

- Separations were noted within the rear patio column/support framing (Photographs 10 , 11, and 12).
- No listing/leaning of the structure was observed (Photograph 11).
- A vertical stucco crack was observed along the exterior perimeter of the home (Photograph 13).
- The site grading was generally flat adjacent to the structure.

## RESEARCH

***Types of Damage:***

Visible damage to buildings and other structures has traditionally been divided to three categories (Skempton and Mac Donald, 1956; Bromhead, 1984; Boscardin and Cording, 1989; Feld and Carper, 1997):

Architectural distress: This type of damage affects the appearance of the building and is usually related to minor cracks in the wall, floors, and finishes.

Serviceability: This type of distress affects the use of the building, such as jammed doors and windows, extensively cracked and falling plaster, and the tilting of walls and floors. Damage which leads to premature deterioration of materials or leaking roofs and facades.

Structural damage: This type of damage affects the stability of the buildings. Examples include cracking and distortions to support members such as beams, columns, or load carrying walls.

***Weather Conditions:***

Below is an excerpt from an article published by weather.com, by Jonathan Erdman and Chris Dolce on 9/29/2024:

“Hurricane Helene plowed into Florida with catastrophic storm surge and damaging winds, then dumped prolific rainfall inland over the Southeast, triggering historic, devastating river flooding in the Carolinas and Tennessee.

A historic landfall: Helene made landfall at 11:10 p.m. EDT Sept. 26 about 10 miles west-southwest of Perry, Florida, at Category 4 intensity packing 140-mph winds, and a pressure of 938 millibars, according to the National Hurricane Center. Helene was the strongest hurricane on record to landfall in Florida's Big Bend region, stronger than 2023's Idalia, which made a Category 3 landfall with 115 mph winds and a pressure of 950 millibars, and an 1896 Cedar Keys hurricane's 125 mph winds. Helene was also the third hurricane to landfall in Florida's Big Bend region in just under 13 months. Three of the last five hurricanes to landfall in the mainland U.S. have done so in this Big Bend region.

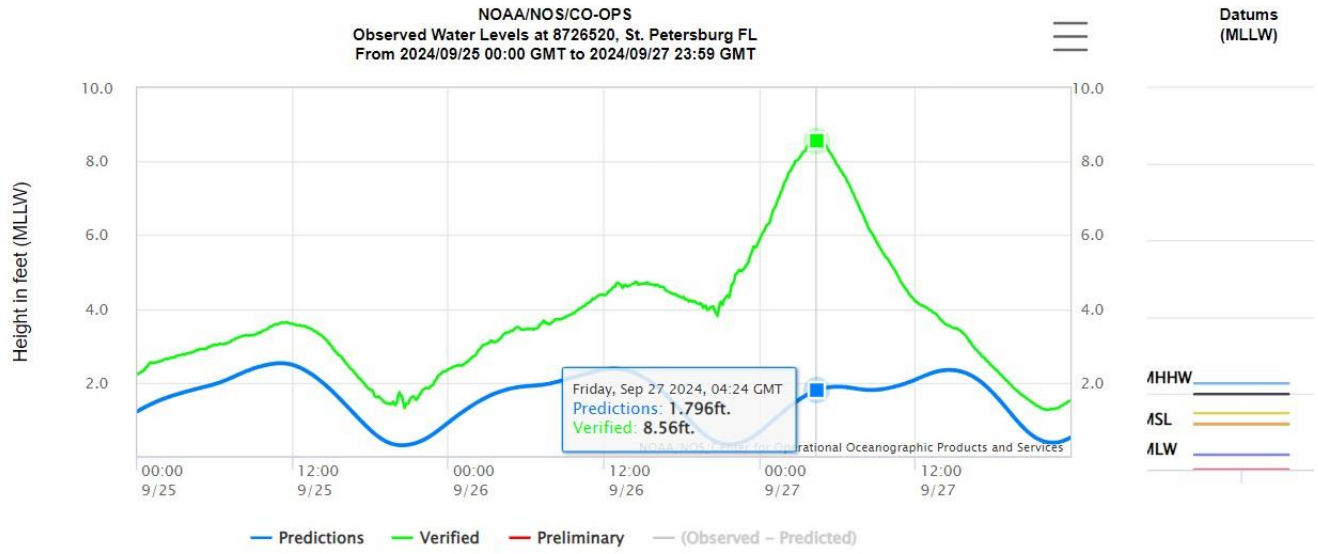
Storm surge: A peak storm surge is estimated to have reached more than 15 feet above ground in the Florida Big Bend region based on post-storm modeling. The area will be surveyed at a later time to

reveal the actual measured storm surge heights. In Cedar Key, an estimated 9.3 feet of inundation and peak surge of 10.33 feet appeared to surpass the town's record surge from an 1896 hurricane. Helene's surge also appeared to break modern-day record levels for the Tampa-St. Petersburg metro area, with inundation of 6 to 7.2 feet above ground level recorded by tidal gauges. Clearwater Beach topped its surge record from the March 1993 Superstorm, while St. Petersburg bested their record from Hurricane Elena in 1985. Significant flooding was also reported at Ft. Myers Beach and Naples, where gauges measured 4 to 5 feet of surge inundation. According to a ham radio operator, water 5 to 6 feet above normal levels was observed in the Punta Gorda Canal Network.

Rainfall flooding: The combination of heavy rain a day ahead of Helene - something meteorologists call a "predecessor rain event" - and Helene's rain over hilly and mountainous terrain triggered catastrophic flash and river flooding from Georgia to the western Carolinas, eastern Tennessee and southwestern Virginia. Record flood crests were measured in at least eight locations in North Carolina and Tennessee, including the Pigeon River in Newport, Tennessee, French Broad River at Rosman, North Carolina, and the Swannanoa River at Biltmore (near Asheville), North Carolina. In parts of western North Carolina, records that had stood since the "Great Flood" of July 1916 were smashed. Floodwaters coursed through parts of Asheville and Boone, North Carolina. They washed at least one section of Interstate 40, flooded a Tennessee hospital prompting rooftop helicopter evacuations and compromised a dam, forcing the evacuation of Newport, Tennessee.

At one time on Sept. 27, the National Weather Service had over 20 flash flood emergencies - their highest level flash flood alert - in effect from the Atlanta, Georgia, metro to southwest Virginia. That was the most issued for any day in at least 13 years. Rainfall totals topped a foot in parts of Florida, Georgia, North Carolina and South Carolina. The top total is nearly 30 inches near Busick, North Carolina. Asheville, North Carolina, smashed their all-time 24-hour (8.37 inches), two-day (9.89 inches) and three-day (13.98 inches) all-time rainfall records that had stood for almost 106 years, according to weather historian Christopher Burt and the Southeast Regional Climate Center. Atlanta also smashed its all-time 48-hour rainfall record (11.12 inches) that had stood since 1886.…”

EFI also evaluated the available weather data from the NOAA Tides and Currents website. According to the nearest data point to the subject property, the verified water level was approximately 6.76 feet above the predicted normal water level.




It should be noted that although EFI has reviewed the previously referenced documents or data acquired by others and relied on their content, EFI does not guarantee the accuracy of the referenced information.

## DISCUSSION AND ANALYSIS

### *Hydrostatic Loads and Buoyancy*

Hydrostatic loads occur when floodwaters come into contact with a building or building component. Differential hydrostatic pressures / forces associated with floodwaters act laterally and are typically caused by unequal levels of floodwaters that act upon components of a structure. An inward acting hydrostatic pressure / force can occur when floodwaters rise to a higher level on the exterior of a building than within the building. An outward acting hydrostatic pressure / force can occur when floodwaters enter interior parts of a structure, and subsequently do not recede concurrently with exterior floodwaters. The unequal hydrostatic pressure / force created by these scenarios can result in displacement or collapse of the affected building components.

Buoyancy is the vertical force that results when a building or building component is submerged in floodwater. Buildings or building components can be damaged or in some cases completely lifted if they are not sufficiently anchored to the ground or supporting structure. The amount of buoyant force created by floodwaters is based on Archimedes' Principle. Archimedes' Principle states that the upward buoyant force exerted on a body immersed in a fluid, whether fully or partially submerged, is equal to the weight of the fluid that the body displaces.

> EFI did not observe any evidence of lateral or vertical displacement of the walls, floors, or other components which was consistent with the effects of hydrostatic force of floodwaters or any flotation of the building or its components due to buoyancy.

***Hydrodynamic Loads and Debris Impact***

Water flowing around a building or structural element imposes lateral forces on the building and building components. These lateral forces are a function of flow velocity, structure geometry, and wave action, and include frontal contact on the upstream side, drag along the sides, and suction on the downstream side. These lateral forces are referred to as hydrodynamic forces and are created by moving floodwaters. The magnitude of the hydrodynamic forces may exceed those generated by hydrostatic pressure. Forces generated by moving water associated with a storm surge, coastal flooding, and riverine or inland waterways flooding are very strong and can cause substantial damage to the lower portions of affected structures. On the other hand, forces applied during high wind events are greater with increasing height and result in a damage profile that is generally more severe at the upper portions of structures than the lower portions. Forces associated with moving water are magnitudes greater than forces associated with elevated winds due to the far greater mass of water as compared to the mass of air.

> EFI did not observe any evidence of lateral or vertical displacement of the building or its components that was consistent with hydrodynamic forces caused by the velocity of floodwaters.

Moving floodwaters may also carry flood-borne debris that can impart impact loads onto a structure. Damage to the building system or components due to flood-borne debris can be substantial and is the result of lateral forces imparted by the impact loading from the moving debris.

> EFI did not observe any evidence of impacts to the exterior components of the building consistent with impact of flood-borne debris.

***Scour and Erosion***

The velocity of moving floodwater can also damage a building if the foundation is undermined and weakened by scour and erosion of the supporting soils. The loss of soils that support the structure, or portions thereof, can result in displacement that can cause structural damage to the building.

> EFI did not observe any evidence of scoured or eroded foundation soils resulting from the velocity of moving floodwater.

***Settlement***

Settlement of a foundation can occur for months or years after the completion of construction of a building. The fundamental cause of settlement is the volumetric reduction of the soil matrix. There are many factors that can contribute to this including poor compaction, poor site drainage, changes in the moisture content of the soil, changes in the overburden loading of the soil, changes in the dissipation rate of the pore pressure (e.g. nearby excavation), or degradation of organic portions of the matrix. A flood event can exacerbate the settlement of the soil. Inundation of the soil and the resulting buoyancy effect can allow particles to modify their orientation. This, coupled with capillary stresses imposed by receding flood waters and pore pressure changes, can result in settlement.

Structures that have not settled uniformly are said to have been exposed to differential foundation movement. If the entire structure does not settle uniformly, brittle finish materials (and sometimes even the structural supporting members themselves) may exhibit evidence of distress. Distress to these materials / components typically manifests as cracks, spalls, warping, separations, delamination, and deflection associated with the differential vertical displacement of the structure. This distress can be observed for sharp edges that are free of paint, carpet glue, mastic, or other construction related materials that would indicate the distress predates the flood event.

Evidence of long-term differential foundation movement would be expected to manifest itself in the form of cracks in concrete materials and brittle finish materials with rounded edges with a weathered appearance and evidence of previous repairs to the foundation or finishes.

EFI did not observe evidence of damage consistent with settlement.

***Exterior Evaluation***

The cracking/separations observed to the rear patio columns/framing is most consistent with long-term aging of the framing members. Construction materials exposed to elements deteriorate and crack due to fluctuation in temperature and moisture content. Water intrusion and corresponding swelling of the wood materials during the flooding event exacerbated this condition.

The stucco cracking observed to the residence is not consistent with resulting from a flooding event, as the cracking extends above the observed water level and located where stress concentration occurs along the roof-to-wall interface.

## CONCLUSIONS AND RECOMMENDATIONS

Based on our observations at the subject residence, review of file material, and subsequent engineering evaluation, EFI renders the following professional opinion:

- The effects of hydrostatic loads, buoyancy, and hydrodynamic loads from the reported flood event have not caused structural damage.
- We did not observe any evidence of scour and erosion, settlement, or impact of flood borne debris, from the reported flood event.
- The cracking/separations observed to the rear patio columns/framing is most consistent with long-term aging of the framing members. Water intrusion and corresponding swelling of the wood materials during the flooding event exacerbated this condition. We estimate this damage to be 75% caused by flooding and 25% to be pre-existing. Removal and replacement of the damaged framing members should be completed to remediate this condition.
- The stucco cracking observed to the residence was not caused by the flooding event.

## APPENDICES

Representative photographs are included with this report. Additional photographs captured at the time of the inspection are available upon request.

- Appendix A – Photographs

## LIMITATIONS

The information presented in this report addresses the limited objectives related to the evaluation of this assignment. The opinions presented in this report have been made to a reasonable degree of scientific and engineering certainty based upon the information available at the time this report was authored. This report only describes the conditions present at the time of EFI's examination and is only based upon the observations made. This analysis was limited to the scope of work outlined in this report. This report is not intended to fully delineate or document every defect or deficiency throughout the subject property.

The opinions contained within this report are limited to the circumstances associated with this assignment, and are based on this author's education, experience, and training. Should additional information which relates to this evaluation become known, EFI reserves the right to alter the opinions contained in this report as necessary. In some cases, additional studies may be warranted to fully evaluate conditions noted.

This report is furnished as privileged and confidential to the addressee. Release to any other company, concern, or individual is solely the responsibility of the addressee. Any verbal statements made before, during, or after the course of the assignment were made as a courtesy only and are not considered a part of this report.

## CLOSING

EFI appreciates this opportunity to provide consulting services related to this matter. Please contact us at flood@efiglobal.com, should any questions arise concerning this report, or if we may be of further assistance.

## ENGINEER STAMP

This report has been transmitted electronically. If requested, a hard copy of the report with a "wet-stamp" can be provided. The signature and stamp image on the front is for demonstrative purposes. This report has been electronically signed and sealed by this author on the referenced date. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copy.

It is a violation of law for any person to alter this document in any way, unless acting under the direction of a licensed professional engineer. If a document bearing the seal of an engineer is altered, the altering engineer shall affix to the document their seal and the notation "altered by" followed by their signature and the date of such alteration, and a specific description of the alteration.

# APPENDIX A

PHOTOGRAPHS


Photo No. 1: Front elevation.

Photo No. 2: Right elevation.

Photo No. 3: Rear elevation.

Photo No. 4: Left elevation.

Photo No. 5: Water line at approximately 43-inches within residence.

Photo No. 6: View of rear enclosed patio.

Photo No. 7: No separations along walls or ceilings within rear enclosed patio.

Photo No. 8: Cracked door frame in rear enclosed patio.

Photo No. 9: Stucco cracking along rear roof overhang.

Photo No. 10: Reported cracking/separation at rear patio column/support framing.


Photo No. 11: No listing/leaning observed to structure (typical).

Photo No. 12: Cracking/separation of rear patio framing.

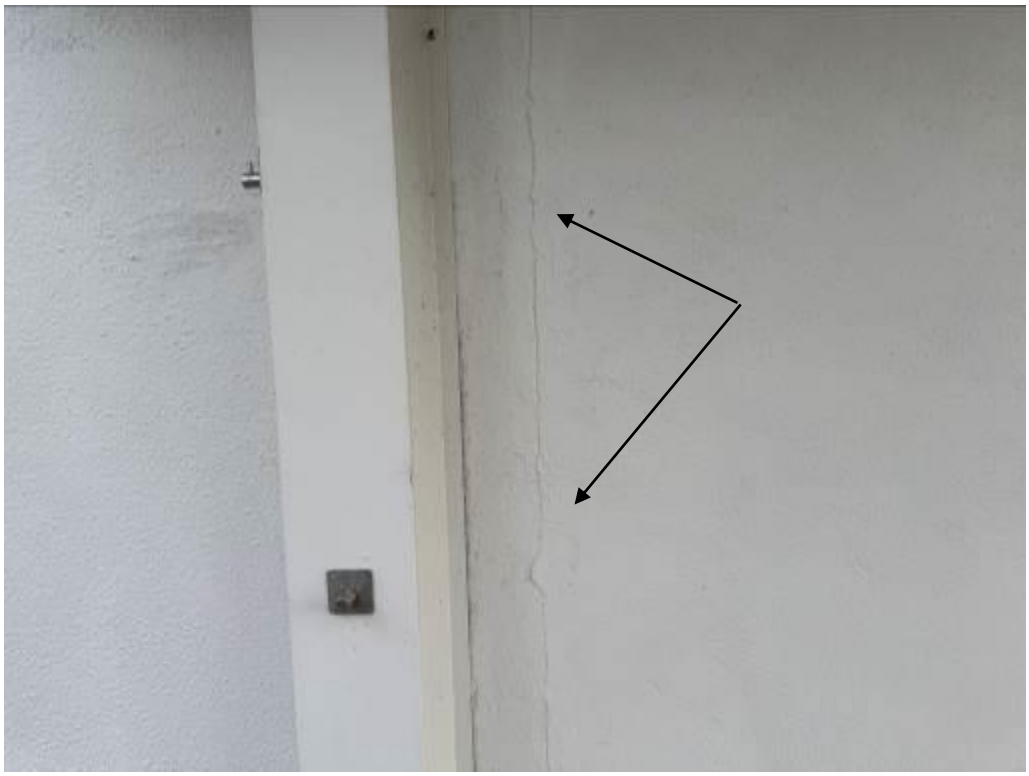


Photo No. 13: Vertical stucco crack.