

C.L.



LEAKE ENGINEERING, LLC

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Project Address: 501 Station Ave, Haddon Heights, NJ 08035

Date: 05/12/2022

Scope of Work (SOW):

Engineer Evaluation. This inspection was completed on 05/11/2022 at the request of the owner to investigate possible structural issues observed.

Visual Structural Inspection. The building is a story commercial building with a stacked stone foundation and wood framing.

GOVERNING CODES:

1. International Building Code and Residential Code 2018 (IBC/IRC 2018)
2. AISC 14th Edition, Manual of Steel Construction
3. ACI 318-08, Building Code Requirements for Structural Concrete
4. ASCE/SEI 7-05, Minimum Design Loads for Buildings & Other Structures
5. AWC SDPWS-08, National Design Specifications for Wood Construction
6. ACI 530-08, Building Code Requirements for Masonry Structures

Findings Below:

Issue

Foundation. There are signs of water infiltration around the foundations. This water infiltration is caused by poor drainage and the soil conditions around and under the foundation. Water infiltration introduced into previously consolidated soil can induce secondary consolidation of the soil that will result in movement of the foundation.

Recommendation

Underpin. The process of underpinning involves excavating small sections underneath the existing foundation footer to a depth that could better provide the necessary soil bearing capacity to support the structure on top of it. Typically a new footer is poured using reinforced concrete inside of the earthen form created by the excavation.



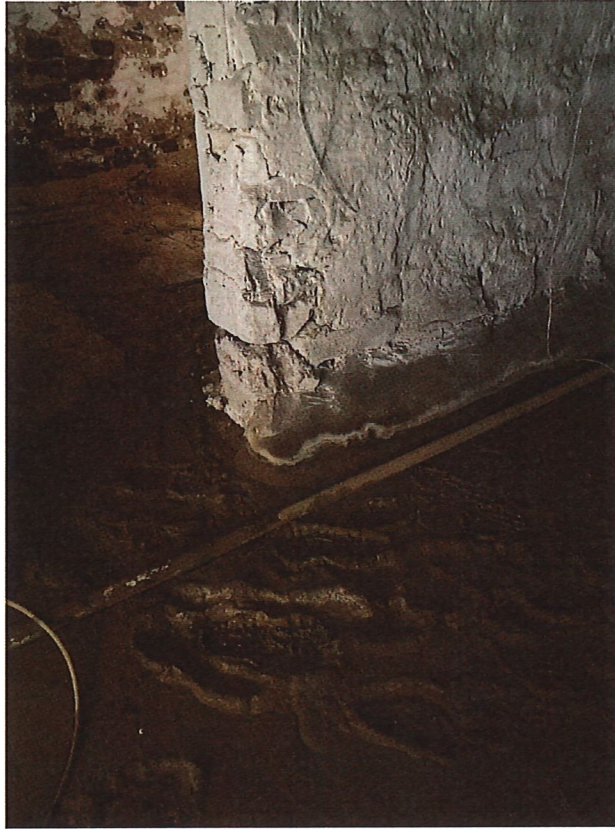
Issue

Foundation Undermined. Certain portions of the foundation for the building were undermined and are now unstable. Additionally the foundation for one of the main support columns was also undermined.

Recommendation (Two Options)

1. **Underpin.** Underpin the foundation walls to the desired depth. The process of underpinning involves excavating small sections underneath the existing foundation footer to a depth that could better provide the necessary soil bearing capacity to support the structure on top of it. Typically a new footer is poured using reinforced concrete inside of the earthen form created by the excavation.
2. **Benching.** Benching the foundation would include pouring a 1'x1' reinforced concrete bench around the perimeter of the basement to provide the exposed soil with lateral stability.





Issue

Foundation Damage There are large holes in the foundation wall. These holes are the result of the installation of various mechanical, electrical and plumbing systems. These holes greatly affect the integrity of the foundation.

Recommendation

Patch. Clean out the debris from the failing foundation wall. Install 3-#4 reinforcement bars going each way. Ensure the reinforcement bar is embedded into the adjacent wall a minimum of 3". Then form up the hole for concrete to be poured.



Issue

Beam Deflection. There is a beam installed in the basement which was intended to support the floor joists above it due to the floor sagging. This beam is deflecting for its purpose because of overload and deterioration.

Recommendation

Post/Footer. Support the mid-span of each beam section with a 4" steel column (HSS4x0.313) on top of a 24"x24"x12" reinforced concrete footer with 4-#4 reinforcement bars going each way. This new column should be connected to the existing beam and new footer with 4-½" steel bolts.



Issue

Joists Bearing Failure. The joists on the sides of the basement are compressing where they rest on the exterior wall. This type of failure is called a bearing failure and is the result of water infiltration on the exterior wall that is damaging the joists and causing it to compress. As a result of this compression the floors above the joists are starting to deflect and sag.

Recommendation (Two Options)

1. **Ledger.** Install a 2-2x12 ledger under the joists that are failing and attach the ledger to the wall using $\frac{3}{4}$ " bolts epoxy anchored into the foundation.
2. **Beam/Column/Footer.** Install a 2-2"x12" Beam under the deflecting joists where they rest on the exterior wall that spans a maximum of 10'. The beam should be supported on either side by a 4" steel post on top of a 20"x20"x10" concrete footer with 3-#4 reinforcement bars going each way.



Issue

Joist Deflection (Sagging). The 1st floor joists are deflecting and causing the floor above it to sag. This deflection is the result of damage and/or overloading due to the installation of various mechanical and plumbing systems. As a result the structural integrity of the damaged joists have been compromised and will need to be reinforced.

Recommendation

Sister. Sister any joists that are deflecting. Deflection can be detected by horizontal cracks in the middle of the joist. Also sister any joists that are damaged. Sistering joists requires that a new wood joist be attached to the damaged joists in order to reinforce the area that is compromised. Sister the damaged joists with 2"x members that match the depth of the existing members. The sisters should be attached using ½" bolts every 1' staggered top and bottom or with large construction screws meant for sistering. The new sister should run the entire length or as far as practical of the damaged joist.



Issue

Stair Header Undersized. The header for the stairs leading to the basement is undersized and starting to sag as a result. Stair headers are natural weak spots in the framing of any floor and need to be supported properly. If not supported properly the wood members around the header will begin to sag over time.

Recommendation (Two Options)

Column/Footer. Reinforce the stair header with a column on top of a reinforced concrete footer. Support the corners of the stair header with 4" steels posts on top of 16"x16"x6" concrete footers with 3-#4 reinforcement bars going each way. The post cap and bottom should be a ½" steel plate with 4-½" bolts.

Sister. Sister the damaged joists with 2x10 members. The sisters should be attached using ½" bolts every 1' staggered top and bottom.



Conclusion. The foundation for this building was compromised and is deemed unsafe. A feasible alternative to the recommendations above would be to demolish the building.

We reserve the right to amend these conclusions if additional information becomes available. This conclusion is based on data gathered by a field inspection and represents our opinion based on a reasonable degree of engineering certainty with the evidence gathered. Any site plans or details provided with this report are not meant to be used as construction documents. If construction documents can be provided for an additional fee. If you have any questions please contact Alex Bruno at 484 380 5419 or alex.bruno@leakeengineering.com.

Respectfully,

Alex Bruno

Alex Bruno, P.E.