Alexander Lamb Ph.D., P.E.

September 17, 2020

Mr. Tim Flintoff
Principal
4545 Architecture and Design, PLLC.
4545 Commonwealth St., Detroit, MI 48208

RE: 2221 Wabash – Structural Condition Evaluation

Project No. 19-1005

Dear Mr. Flintoff:

In accordance with your request, we have completed our evaluation process of the above captioned project on September 16, 2020.

A site visit was performed on 09/13/2020 at which time the existing cottage and its structural framing elements were inspected. The structure consists of wood floor and roof decks supported on wood stud walls which are supported on shallow concrete foundations. At the time of the visual inspection, significant structural deteriorations were observed in many locations throughout the cottage. The main issues identified are as follows:

1. Roof Structure:
    a. Many roof framing members are showing signs of water exposure, efflorescence, and rot
    b. Roof framing members (2x4's at 24" O.C.) are structurally deficient for current code required wind and snow loads – refer to Photograph P1
    c. Roof framing is missing critical stability elements such as ties and hold downs
    d. Roof at rear of cottage has collapsed and is no longer attached to the main area framing
2. Wall Structure:
    a. Walls are leaning both in plane and out of plane significantly – refer to Photograph P2
    b. No suitable lateral force resisting system exists – refer to Photographs P3 and P4
    c. Wall studs are significantly smaller than nominal 2x4 dimensions as a result of the manufacture process - some studs appear to have been split from logs as opposed to rough sawn
        i. Wall studs are structurally deficient for current code required wind and snow loads – refer to Photograph P5
    d. Wall stud spacings range from 16" O.C. to 64" O.C. – refer to Photograph P5
    e. Many wall studs are not continuous from the sill plate to the top plate forming an internal hinge which compromises the stability of the walls for out of plane wind forces – refer to Photograph P6
3. Floor Structure:
    a. Floor structure deflects noticeably under the weight of a person - approx. 1.5" as measured at entrance threshold under walking loads
    b. Floor framing members have experienced heavy rot likely a result of water exposure – refer to Photograph P7
    c. Floor framing members have experienced significant section loss likely a result of insect infestation – refer to Photograph P7
    d. Floor structure has a considerable slope - approx. 1V:8H

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4. Foundations:
    a. Foundations do not extend to frost depth – refer to Photograph P8
        i. Foundations supporting the cottage consist of a 4” thick concrete blocks laid 4” to 8” below grade – refer to Photograph P9
    b. Foundation differential settlements were measured to be in the range of 4”-6”
    c. Foundation concrete materials were spalling/crumbling throughout
    d. Foundation sizes that were measured were undersized by a factor of approximately 4

Based on the severity of the structural conditions present, and their widespread nature, the finding indicate the structure cannot be safely brought into a safe and serviceable condition which would see any portion of the existing structural elements re-used. Accordingly, it is implicit to the findings of this evaluation report that the structure be demolished in order to mitigate the current and future safety risk it poses.

If you have any questions regarding the contents of this evaluation report, please do not hesitate to contact me directly.

Sincerely,

Alexander Lamb, Ph.D., P.E.
Registered Professional Engineer (Michigan)
248-561-2035 alexander@mjlamb.net

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REFERENCED PHOTOGRAPHS:

P1: Roof Framing Members

Photograph P1
Roof is framed of 2x4's with no ties at the ridge preventing separation for wind uplift forces. Roof framing members are significantly undersized and the roof configuration is unstable

P2: Bearing Wall Leaning

Photograph P2
Exterior walls are leaning significantly as a result of structurally deficient lateral force resisting and roof framing systems.

P3: Representative Lateral System

Photograph P3
The existing lateral force resisting system consists of members which do not form a complete load path and are otherwise not suitable to serve their intended purpose both in terms of strength and performance.

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P4: Representative Lateral System

Photograph P4
Alternate condition to P3 – refer to P3 commentary

P5: Wall Framing Conditions

Photograph P5
Wall studs are in many cases portions of a rough sawn 2x4. Most wall studs are also discontinuous near the middle third of their span. Stud spacing are also irregular throughout the cottage with studs spaced at 64-inches on center in the most extreme circumstances

P6: Wall Framing Conditions

Photograph P6
Many wall studs are not connected at the sill plates. They appear to be hanging from a combination of the wall top plate and the slat sheeting.

P7: Floor Structure Deterioration

Photograph P7
Framing has been exposed to moisture and the environment. Rot and insect infestation were observed and appear to occur through the structural framing of the first floor.

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P8: Foundation Above Frost Depth

Photograph P8

The foundation system does not extend to frost depth and consists of approximately 4-inch thick concrete blocks laid close to grade elevation (foundations are approximately 4-8-inches below exposed grade at the cottage). The unreinforced strength of the concrete block is insufficient to safely carry current code required loads and is otherwise structurally deficient.

P9: Foundation Above Frost Depth

Photograph P9

Alternate perspective photograph of foundation identified in P8 - refer to P8 for commentary.