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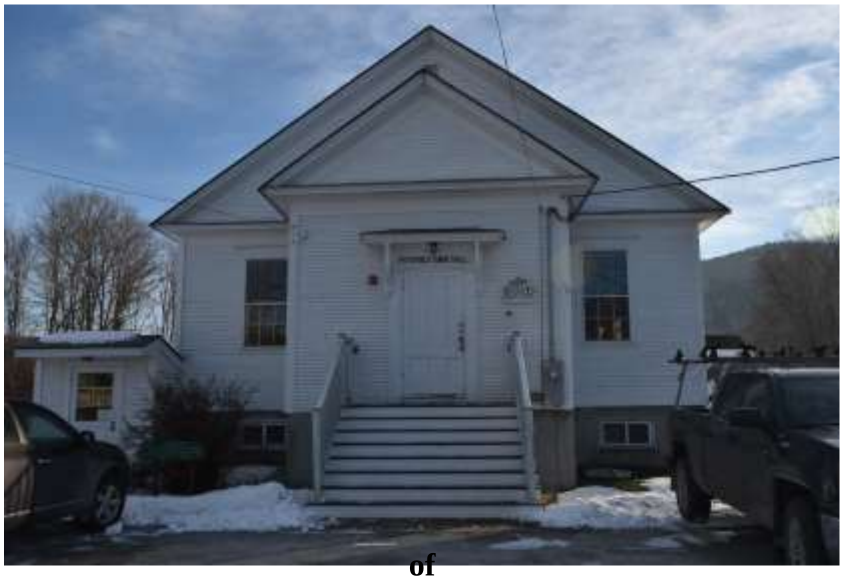
BUILDING INSPECTION REPORT



of
40 Village Green Rd
Pittsfield, VT 05762

for
Town of Pittsfield
Attn: Mr. Charles Piso & Ms. Tricia L. Fryer
Job #:18-40165.20

by
Christopher C. Benda, P.E.

Report Date:
January 2, 2019

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January 2, 2019

Town of Pittsfield
Attn: Mr. Charles Piso & Ms. Tricia L. Fryer
40 Village Green Rd
Pittsfield, VT 05762

Re: Your Property
40 Village Green Rd
Pittsfield, VT 05762
Job #18-40165.20

Dear Mr. Piso & Ms. Fryer:

At your request an inspection and structural analysis of the above property was performed on December 20, 2018. The report that follows has been prepared based on that inspection and analysis. The primary purpose of the inspection and this report is to provide a structural engineering opinion about the load capacity of the first floor framing system and preliminary assessment of the roof framing.

This inspection and analysis was performed by and report written by Christopher C. Benda. For your interest, a copy of Mr. Benda's resume is attached.

This report is based on an examination and structural analysis of the first floor framing members and a visual inspection the accessible roof framing. This report is an opinion about the condition of this portion of the property. It is based on evidence available during a diligent inspection of all reasonably accessible areas and a structural analysis of the visible floor components. No surface materials were removed, no destructive testing undertaken, nor furnishings moved. This report is not an exhaustive technical evaluation. Such an evaluation would cost many times more.

As Professional Engineers, it is our responsibility to evaluate available evidence relevant to the purpose of this inspection. We are not, however, responsible for conditions that could not be seen or are not within the scope of our service at the time of inspection.

This inspection report is limited to observations made from visual evidence. No destructive or invasive testing was performed. The report is not to be considered a guarantee of condition and no warranty is implied.

We performed a limited structural inspection and analysis per our agreement for services. A copy of this agreement is attached for your reference.

For purposes of this report, all directions (left, right, rear, etc.) are taken from the viewpoint of an observer standing in front of the building and facing it.

For your reference while reading the report that follows, the following definitions may be helpful:

Good - Component or system is sound and performing its function. Although it may show signs of normal wear and tear, some minor rehabilitation work may be required.

Fair - Component or system falls into one or more of the following categories: a) Evidence of previous repairs not in compliance with commonly accepted practice, b) Workmanship not in compliance with commonly accepted standards, c) Component or system is obsolete, d) Component or system approaching end of expected performance. Repair or replacement is required to prevent further deterioration or to prolong expected life.

Poor - Component or system has either failed or cannot be relied upon to continue performing its original function as a result of having exceeded its expected performance, excessive deferred maintenance, or state of disrepair. Present conditions could contribute or cause the deterioration of other adjoining elements or systems. Repair or replacement is required.

All ratings are determined by a comparison to other buildings of similar age and construction type. Further, some details of workmanship and materials will be examined more closely in higher quality properties where such details of workmanship and materials typically become more relevant.

As Professional Engineers, it is our responsibility to evaluate available evidence relevant to the purpose of this inspection. We are not, however, responsible for conditions that could not be seen or are not within the scope of our service at the time of inspection.

Description

This property is a one-story, average sized building with wood and composite clapboard siding on the exterior walls and an asphalt fiberglass shingle roof surfacing.

There is a basement under all of this building, most of which is finished off.

The building is currently configured for use as a meeting area on the upper level and a large group kitchen and dining area in the basement level.

Observations

Our evaluation of this structure is based on many indirect observations. Because we cannot see a significant portion of the framing, we look for cracks, bulges, and other evidence of distress or deterioration to help us evaluate the structural condition. As with any limited inspection, it is possible that there are structural deficiencies that cannot be seen.

The following areas are inaccessible and limited the extent of our structural inspection:

- Attic area remote from the access opening.

- Roof framing connections in the attic where insulated with spray foam and blown in cellulose insulation.

- Sills and sill pockets where insulated with spray foam insulation.

- Tie rod to beam connections where covered with spray foam insulation (see Figure 1).

- Foundation walls where finished off and insulated with spray foam insulation.

Figure 1, Floor Truss Tie Rod Connection

Access to the attic area is provided by an access hatch in the front entry. Conditions in the attic area were observed by entering the space.

The timber posts that support the roof ridge beam are supported by timber and steel-rod attic truss members that span from sidewall to sidewall. A photo for the steel-rods and vertical elements for attic trusses are shown in Figure 2. The posts have notably separated from the ridge beam indicating that the truss members have settled. The cause of this separation could not be determined from the evidence available.

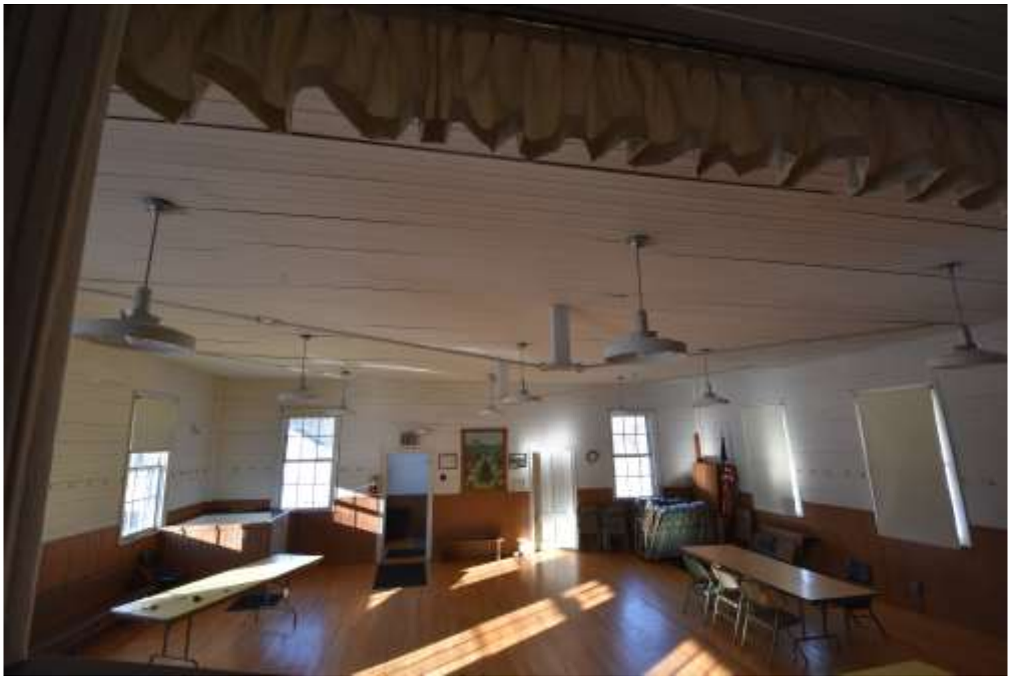

Figure 2, Visible Elements of Attic Floor Trusses

The condition of the upper portions of the attic truss members and the associated structural connections are not visible due to the presence of cellulose and spray foam insulation. Furthermore, there is evidence that the roof has experienced some racking which is likely due to snow loading. Snow loads have likely increased in the years since the addition of the insulation, as snow is not melting as readily between storms. It was noted that the diagonal brace at the front of the building has pulled away from the ridge beam as shown in Figure 3.

As noted in our October 22, 2018 inspection report prepared by Michael J. Foster, the first floor is supported with similar timber and steel rod trusses. There has been some notable settlement in the first floor and the floor is somewhat bouncy.

The floor trusses consist of a pair of 1.5-inch diameter steel rods that make up the bottom chord and a 9 inch square timber top chord member. There are two heavy steel posts between the top and bottom chords located at approximately the third points of the 35-foot truss span (Figure 4). The trusses are spaced at approximately 9 foot 9 inches on center.

Figure 3, Separation of Diagonal Brace and Ridge Beam

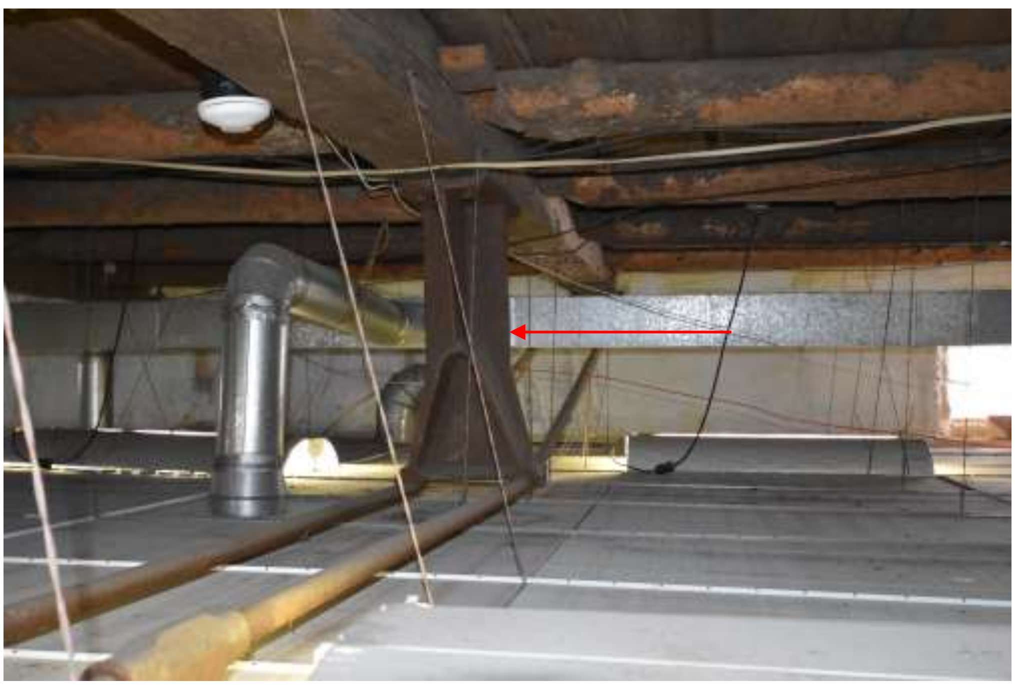

Figure 4, Truss post

Log floor joists spaced at approximate 38 inch on center span between the floor trusses. The logs vary in diameter between 5 ½ inches and 7 inches and the species appear to be spruce. The logs are connected to the top chord truss beams with mortise and tenon joints. This joinery tends to weaken the timber beam where the mortise has been cut and reduces available cross section for shear load resistance at the tenon location at the ends of the floor joists. A photo of the weakened section and horizontal splitting at the mortise and tenon joint above one of the truss posts is shown in Figure 5.

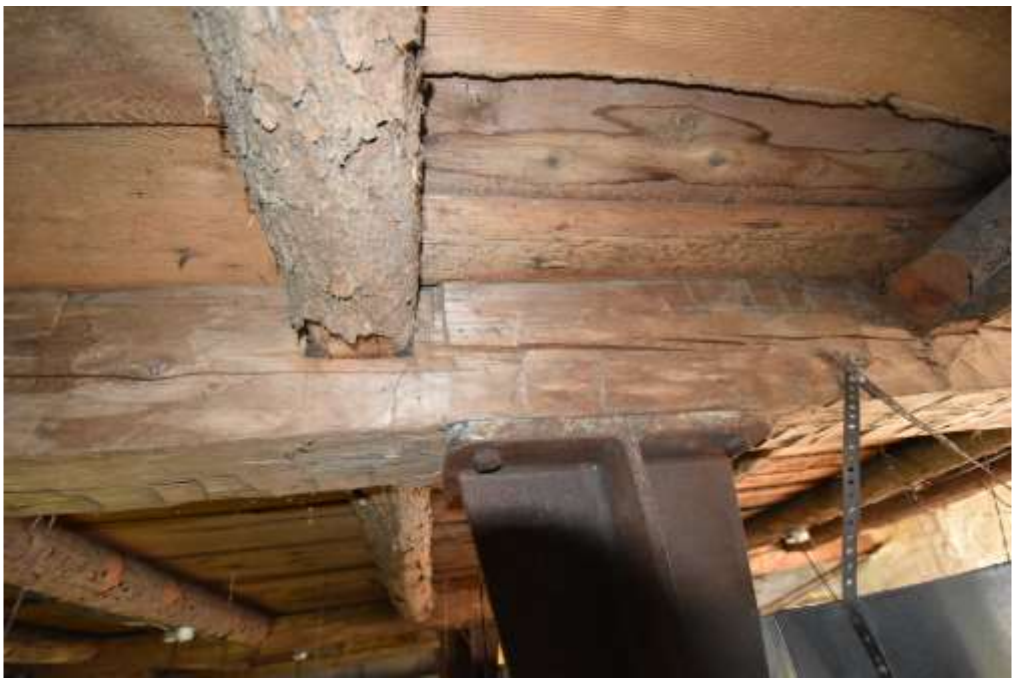

Figure 5, Splitting of Beam near Mortise and Tenons Joint above Truss Post

Structural Analysis of First Floor Support System

We performed a preliminary structural analysis of the first-floor framing system including the timber and steel rod trusses and the log floor joists. For the purposes of this analysis we assumed engineering design properties for the log and timber members consistent with the 2015 National Design Specification for Wood Construction for Number 2 visually graded Spruce-Pine-Fir (SPF). The loading used in the modeling for live load of 100 pounds per square foot (psf) is consistent with that outlined in Table 1607.1 of the 2012 International Building Code (IBC) for assembly areas with moveable seating. An assumed value of 15 psf was used for dead loading to account for the weight for floor system, suspended ceiling, lighting and duct work.

Structural modeling for the floor trusses was completed in RISA 2D version 18.0.0 software and the analysis of the log floor joists was completed in StruCalc version 10.0.1.6 software. The preliminary modeling did not account for reductions in cross section at the mortises in the top chord or for the reduced floor joist shear capacity at the tenons. Furthermore, no analysis of the tie rod bottom chord end connections was completed as the configuration of the connection was not visible during our inspection.

The results of the preliminary modeling indicate the log joists and the floor trusses are significantly undersized for the IBC assembly area loading and the floor system should be reinforced before the space is used for public assemblies. Since the connection configuration and bearing area of the trusses could not be verified and inspected, a safe floor live loading value cannot be provided at this time. A safe live load for the log joists is estimated to be 25 psf which is one quarter of the IBC loading.

Recommendations

The following recommendations are based on our site visit and preliminary structural evaluation of the first-floor framing system and an inspection of the visible portion of the roof system.

- The first floor should not be used for public assembly and group gatherings until the floor system is properly reinforced.

- The connection and bearing areas at the ends of the floor trusses should be exposed so that the configuration and condition can be determined.

- We recommend reinforcing the existing 9 inch by 9 inch top chord members with laminated veneer lumber (LVL) beams. These beams would be through bolted to the sides of the existing beams, span the entire length of the truss, and would be supported at each end on the existing foundation walls, new columns or short bearing walls. Intermediate columns could be added in the basement area to reduce the size of the new LVL members.

- To facilitate installation of the new LVL members as well as simplify a floor joist upgrade, we recommend removing the existing log floor joists and replacing them with new 2x10 joists spaced at 16 inches on center.

- The integrity of roofing system structural members should be further investigated, and reinforcement made as necessary. In the interim, additional diagonal bracing of the roof system is recommended to prevent further racking of the roof under snow and wind loading.

Conclusion

An inspection and structural analysis of the existing floor system indicate the timber and steel rod truss members and log floor joists are undersized and the space should not be used for public assembly or group gatherings until appropriate upgrades to the floor system have been made.

This report has been prepared in strict confidence with you as our client. No reproduction or re-use is permitted without express written consent. Further, we will not release this report to anyone without your permission.

This report is not to be construed as a guaranty, or warranty of the premises or equipment therein or of their fitness for use.

Many things have been discussed in this report. However, we realize that there may still be other things of interest to you that have not been discussed. Therefore, we encourage you to call with any additional questions you may have and to discuss how to proceed with the further investigations and floor system modifications outlined herein.

Thank you for the opportunity to be of assistance to you.

Sincerely,

Christopher C. Benda

STATE OF VERMONT
CHRISTOPHER C. BENDA
CE/STR
No. 4308
LICENSED
PROFESSIONAL ENGINEER

CCB/ss
Enclosures

CRITERIUM
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www.criterium-lalancette.com

December 17, 2018

CLIENT AUTHORIZATION:

FOR: Town of Pittsfield
Attn: Mr. Charles Piso & Ms. Tricia L. Fryer

RE: 40165.20 Town of Pittsfield

I hereby authorize Criterium-Lalancette Engineers to undertake the engineering services assignment(s) as described in the accompanying letter dated December 17, 2018 and guarantee payment of all fees and expenses when invoiced. I further agree to make payment for the services rendered in accordance with the attached Standard Terms and Conditions of Criterium-Lalancette Engineers or as otherwise stated. I have read and understand the attached description of services to be provided, any noted limits on those services, and the Standard Terms and Conditions.

[signatures] 12/18/18

Name Date

✓ Paying the engineer at the inspection with a check (your credit card on file will not be billed if you give the engineer a check at the inspection).

___ We require a credit card on file in order to secure an inspection appointment. If no credit card information has been given to us, please complete the following:

Name on card: on file Card type: ☐ MC ☐ VISA ☐ AMEX ☐ Discover

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PROFESSIONAL QUALIFICATIONS AND EXPERIENCE

Christopher C. Benda, P.E.

Area of Expertise

Christopher Benda is a licensed, Professional Engineer in Vermont, New Hampshire, Maine and Michigan specializing in structural, geotechnical and civil engineering. Chris has 38 years of structural design, construction, materials and geotechnical engineering experience. In addition to his engineering background, Chris has experience in all phases of new home construction and renovation and is a licensed property inspector in Vermont.

Qualifications

Before joining Criterium-Lalancette Engineers in 2005, Chris was employed by the State of Vermont, Agency of Transportation where he worked as a civil and structural engineer in the Agency's structural design and materials engineering sections.

Most recently, Chris has been the geotechnical engineering manager in responsible charge of foundation design and analysis, land slide investigations, materials testing and retaining wall assessment. He has co-authored several papers for technical publications including the American Society of Civil Engineers' Journal of Geotechnical and Geoenvironmental Engineering, for the Transportation Research Board and for the Deep Foundations Institute. Chris is also a member of the board of directors of the New England Transportation Training and Certification Program and has been on a number of Federal Highway Administration Technical Working Groups.

Chris is also an adjunct professor at Norwich University in the Civil Engineering program where he teaches classes on Materials and Geotechnical Engineering.

Chris has built and renovated several homes and produces custom furniture.

Education

Chris is a licensed, Professional Engineer in Vermont, New Hampshire, Maine and Michigan. He holds both a Bachelor of Science and Master of Science degree in Civil Engineering from the University of Vermont where he was a member of two engineering honor societies. Additionally, Chris holds an Associate of Science degree in Civil Engineering Technology from Vermont Technical College. Chis is also a licensed State of Vermont Property Inspector.