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P.O. BOX 314
WASHBURN, ME 04786
TEL 207 455-4717
207 945-0131
800 509-5193
FAX 207 455-8090
EMAIL criterium-brown@criterium-brown.com

December 17, 2014

Town of Addison Board of Selectmen
Attn: John Woodward
P.O. Box 142
Addison, ME 04606

Re: Structural Inspection – November 13, 2014
Addison Town Hall, 334 Water Street, Addison, Maine

INVOICE

For engineering services rendered:

Investigation, evaluation, and report (9.75 hrs. @ $125.00/hr.)	$1218.75
Photographs	$ 41.00
Mileage (50 miles @ $0.56/mile)	$ 28.00
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BR-14-394

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STRUCTURAL INSPECTION

ADDISON TOWN HALL
334 WATER STREET
ADDISON, MAINE

Prepared for:
Town of Addison Board of Selectmen
P.O. Box 142
Addison, ME 04606

Prepared by:

Criterium Brown Engineers
71 Story Street
P.O. Box 314
Washburn, Maine

December 17, 2014

Inspection No. BR-14-394
Date of Inspection: November 13, 2014
Engineer: Keith R. Brown, P.E., BCIE

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1.0 INTRODUCTION

At the request of the Town of Addison, Board of Selectmen, a structural inspection was performed at the Addison Town Hall, 334 Water Street on November 13, 2014. The report that follows has been prepared based on that inspection. The primary purpose of the inspection and this report is to provide the Board of Selectmen with a professional opinion as to the structural condition of the building.

This inspection was performed by and report written by Keith R. Brown, P.E., Board Certified Building Inspection Engineer. For your interest, a copy of Mr. Brown's resume is attached.

This report is based on an examination of exterior walls from ground level, the crawl space, interior finished spaces and the roof framing. The mechanical room addition was not entered. This report is an opinion about the structural condition of the building only. It is based on visual evidence available during a diligent inspection of all reasonably accessible areas. No surface materials were removed, no destructive testing undertaken, or furnishings moved. This report is not an exhaustive technical evaluation. Life safety, heating, ventilating and electrical systems were not addressed. Such an evaluation would cost many times more.

This inspection and report do not include code compliance, mold investigations, environmental investigations, indoor air quality analysis, municipal regulatory compliance, subsurface investigation, or records research related to this building.

Indoor air quality is a growing concern. Mold and mildew, fostered by moisture accumulation, can lead to respiratory discomfort and aggravate allergies and other respiratory conditions for some people. While we may comment on readily visible evidence of mold infestations this inspection and report should not be considered a mold investigation of any kind. Individuals specifically trained and qualified for such work should undertake such an investigation. We understand that others prior to and independent of this inspection performed an indoor air quality analysis. That report should be considered in conjunction with this report.

Our inspection and report have been conducted in compliance with the standards of practice of Criterium-Brown Engineers and in a manner consistent with that level of care and skill that is ordinarily exercised by members of the profession practicing under similar conditions at the time the services are performed.

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

During the inspection of November 13, 2014, Daria Alexander and Dan Fortin (revitalization committee members) and Keith Brown (Criterium-Brown Engineers) were present.

2.0 BUILDING DESCRIPTION and BACKGROUND INFORMATION

For purposes of this report, Water Street is assumed to be on the front of the building. All directions (left, right, rear, etc.) are taken from the viewpoint of an observer standing in front of the building and facing it.

The Addison Town Hall building is a wood-framed, two-story structure that has wood shingle siding on the exterior walls and a composition shingle roof surface. The original structure is approximately 40 feet wide and extends approximately 80 feet from front to back. There is a single story addition attached to the left half of the back wall that serves as a mechanical room. Further, there are wood framed entrance structures at front center and back right, and an exterior staircase and landing that services the second floor, which is attached at the right side exterior (photos 1 - 4).

There is a crawl space under the main section of this building that was mostly accessible for inspection. A cast in place concrete slab on grade foundation supports the mechanical room addition.

The building is estimated to be approximately 100 years old. According to information provided by the Revitalization Committee, the cast-in-place concrete perimeter foundation walls were placed circa 1980, and the building has been painted three times over the past five years.

3.0 OBSERVATIONS

The following observations are listed in no particular order of importance

3.1 The building's exterior walls, roof system and one-half of the floor loads are supported by a cast in place concrete foundation. The depth of the foundation could not be determined within the scope of this inspection. We observed approximately 12 inches of exposed concrete within the crawl space and above grade on the exterior. There is a single row of hollow core concrete masonry units between the top of the concrete portion of the foundation and the lower edge of the timber sills.

The cast in place concrete portion of the foundation is in good condition. There are a few cracks, which is typical for this type of support system. We observed no indication of settlement or differential movement of the foundation itself.

While we observed no indication of distress or deterioration of the concrete masonry units, their installation can best be described as casual and their current condition presents a weak link in the buildings resistance to lateral movement. As such, the building is susceptible to lateral (side-to-side or front-to-back) movement relative to the foundation as a result of seismic activity, high winds or other stresses induced by structural rot and deterioration.

The concrete masonry unit cores are empty (no grout fill has been installed). While most of the concrete masonry units have been mortared in place, several of the units are loose. At many locations, dimensional variations in the sill timbers have resulted in voids between the top of the masonry units and the sill timbers to the extent that light front the exterior passes through the voids.

The building superstructure (the wood framing) in its current state has no anchorage to the foundation other than the resistance to movement created by the weight of the building itself. We observed no anchor bolts or tie-downs to resist lateral movement or uplift from wind or seismic activity. Any mortar that exists between the lower edge of the concrete masonry units and the top of the foundation provides negligible resistance to lateral movement. This is evidenced by the ease at which several masonry units have been removed to create observation ports.

3.2 Interior portions of the first and second floor framing are supported primarily by two rows of piers at approximately third points relative to the right and left sides, likely below the visible columns in the meeting room and the left wall of the meeting room. The supports consist of original granite block piers and more recently constructed cast in place concrete piers (photos 5, 6, 7). Several of the original piers have settled out of position and are no longer providing support, while others are still in contact with the center carrying beam.

The first floor framing below the below the bathroom area is supported by loosely stacked wood blocking that is in direct contact with the ground surface (photo 8). The wood blocking in contact with the ground surface has rotted, and this is allowing settlement to occur in this area.

3.3 The crawl space was entered from a floor hatch in the kitchen closet and a floor hatch in the front stairwell. The crawl space is not readily accessible for maintenance or repair work, and the air quality (based on odors and observed dust) is such that the writer had to wear a half-face respirator to investigate the area. The crawl space is very shallow and was extremely difficult to traverse.

Most of the clearances in the crawl space do not meet recommended clearances between the ground surface and the underside of the framing (photos 9 - 12). At a minimum there should be 12 inches of clearance between the ground surface and the bottom of any carrying beam, and a minimum of 18 inches between the ground and the bottom of the floor joists.

No provision has been made for crawl space ventilation. The floor and wall framing exposed to the crawl space was in all instances very damp, and at several locations, saturated with moisture.

3.4 We observed no standing water within the crawl space, but observations made at the exterior of the building suggest that the crawl space environment is strongly influenced by ground water levels. We observed standing water in the Water Street drainage ditch in front of the building that could be an indication of ground water levels below the subject structure. Ground water at this elevation provides water vapor that can migrate through the soil and infiltrate the crawl space and associated framing (photo 13).

A PVC pipe riser was observed at the exterior front right corner of the foundation that appears to be part of a foundation drainage system (photo 14). The pipe is not capped and it has been filled with dirt and debris. This suggests that any foundation drainage system that does exist may not be functional.

3.5 The first floor framing consists of dimensional lumber floor joists that span from side to side of the structure. Heavy timber sills support the joists at the right and left sidewalls. Carrying beams discussed earlier in this report of similar dimensions as the sills span from front to back supporting the floor joists at the interior. The floor joist system as originally constructed was adequate to provide long-term service to the structure. However, casual modifications to several areas of the floor framing system, along with moisture related rot and deterioration has compromised the overall integrity of the floor system.

Substandard floor framing was installed at some point in time after initial construction either as a repair or to fill a former opening at the front left corner of the building. The original floor joists were cut and a single header was installed at the cut ends of these joists between the front sill and the adjacent un-cut joist (photos 15 - 18). Light duty floor framing was installed between the single header and the left side sill member. The Town Office is located above this area, and there are four, very heavy fire rated file cabinets above this light duty floor framing (photos 19, 20). Observations made within the town office indicate that the floor below these cabinets has settled, and anecdotal information obtained at the time of the inspection is that the settlement has been occurring at an ever increasing rate in recent months. Given the nature of the floor framing at this corner, some settlement over time was likely to occur, even without the presence of the file cabinets. However the file cabinets and their contents impart a significant concentrated load on the floor in this area and have aggravated this condition considerably.

A portion of the first floor framing below the back left bathroom area was replaced in the not too distant past. The existing floor joists were cut at a point approximately mid span between the left wall and the carrying beam, and as mentioned earlier, the cut ends of the original joists and the inboard end of the new joists bear on wood blocking that in turn bears on the dirt floor.

The timber sill at the back wall of the building has experienced significant rot damage to the extent that it has begun to compress under the weight of the building. The sill member is easily penetrated full width with a steel probe, and water seeps from openings in the sill that were created by the probe (photos 21, 22, 23). This is likely one of the primary reasons why the back exit door does not function well.

The ends of the floor joists and the perimeter rim (a.k.a. band) joist have experienced significant rot damage along the back portions of the right and left sides of the building (photos 24 - 29). Approximately 1/3 to ½ the length of the building on both the right and left sides has been affected. Limited access to the back wall prevented close examination of the rim joist in that area, but given the extent of sill rot, it can be assumed that similar conditions exist there as well.

3.6 The exterior walls are constructed of wood studs using a method known as "balloon framing" that was common practice when the building was constructed. The studs bear on the top of the perimeter sill timbers, and the floor joists are nailed to the sides of the studs. Due to the nature of this type of construction, rot damage to rim joist, floor joist and sill framing has a direct impact on the stability of the lower ends of the studs and as such the overall stability of the building. We observed some advanced rot in the outer third of

several of the lower ends of various studs in those areas of advanced rim joist and floor joist rot (photo 30).

Evidence of significant wall framing rot was observed from the exterior, primarily coincidental with the areas of rim joist rot discussed above. The exterior walls easily deflect inward with a very light application of lateral pressure exerted by one's hand or foot. Rot results from moisture accumulating either behind the siding or within wall cavities, should the normal drying process be restricted by insulation or other obstacles. We observed some fiberglass insulation in the lower edge of the wall cavities when viewed from within the wall space. It is our understanding that the Town Hall building has been painted three times in the past five years or so. The inability to hold paint is another indication of moisture accumulation within wall cavities.

The extent of structural rot in the wall cavities could not be determined within the scope of this limited visual inspection that did not undertake invasive action. Further investigation is needed, including opening up walls or drilling into wall cavities to determine the full amount of damage that has occurred.

The right side exterior wall of the building bows outward at its base, and the left side exterior wall bows inward at its base (photos 31, 32). Again, without invasive inspection of the wall cavities, it cannot be determined if the bows in the walls are the result of structural deterioration or distortion that occurred when the building was jacked for installation of the current foundation.

The back door does not function well. The door rubs against the frame (photos 33, 34). The misalignment of the door is likely due to building movement related to the conditions discussed above. This is an emergency exit door and must remain functional at all times. We strongly recommend that this door be opened and left ajar whenever the meeting room is occupied so that it can be easily opened by any person wishing to pass through it.

3.7 The roof framing consists of 2"x 8" braced rafters spaced on 30-inch centers. Collar ties (ceiling joists) are of 2"x 6" construction. Rafter braces are of 1-inch nominal lumber. The roof framing is in average to good condition (photos 35, 36, 37).

There is no insulation above the second floor ceiling.

3.8 A wood framed canopy, steps and ramp service the back emergency exit door. The ramp is also the only means of access to the first floor for persons with disabilities. The canopy is very lightly framed. The steps associated with this entrance have settled, have non-uniform risers and present a fall hazard if not used with caution. The cast in place concrete support pier at the back right has moved out of position and is not leaning to the point that its ability to support applied loads has been compromised. The ramp as configured does not meet current ADA standards (photos 38, 39, 40).

3.9 The exterior, second floor landing and staircase serves as an emergency egress point from the second floor. The landing and staircase utilizes angle braces, the lower points of which are attached to the building by a timber ledger secured to the building with lag bolts (photos

41 - 44). Angle braces are a poor method of support because the braces impart pull-out forces at the point where the landing attaches to the wall. Further, the base of the angle braces is anchored at one of the locations of known rot in the rim joist and possible the wall framing, and this has likely compromised the load capacity of this structure.

4.0 EVALUATIONS AND RECOMMENDATIONS

4.1 Current standards require buildings in the Addison area to be able to withstand a three second wind gust of 100 miles per hour. Although no calculations were conducted as a part of this inspection, it is unlikely that the building as currently configured could withstand such a wind gust without experiencing movement relative to the foundation. If this building is undergo any rehabilitation, it will be necessary to install a system of anchors to attach the superstructure framing to the cast in place concrete foundation. As a matter of life safety, consideration should be given to installation of an anchorage system regardless of any future renovation plans.

Voids between the lower edge of the timber sills and the upper edge of the concrete masonry units should be filled with a good quality, non-shrink grout to establish bearing to the extent possible. Wherever possible, masonry unit interior cells should be filled with grout.

4.2 If the building is to undergo a rehabilitation, the locations of the interior piers will need to be surveyed and compared to the locations of the columns in the meeting room. Interior piers should be installed below each support column in the meeting room and at regular intervals below the partition wall between the meeting room and office/kitchen/restroom spaces.

The wood blocking that is currently supporting a portion of the bathroom area floor framing should be replaced soon with concrete blocks or other durable material resistant to rot.

4.3 The crawl space area, in its current condition should be considered a hazardous space. Persons should not undertake entry into this space unless equipped with appropriate personal protective equipment. Reference should be made to any available air quality reports prior to entry into this space.

Rescue of a person injured in this area would be extremely difficult. Workers entering the crawl space will need to follow OSHA confined space entry procedures.

Insufficient crawl space ventilation, the absence of a vapor barrier, and insufficient separation between the crawl space floor and the framing have contributed to the observed rot and deterioration of the sill framing, joists and lower portions of the wall framing.

Any future rehabilitation of this structure will need to include provision for adequate crawl space ventilation, installation of a vapor barrier over the entire crawl space floor, removal of accumulated debris from the crawl space, and creation of additional access points for future inspection and maintenance.

4.4 The PVC riser pipe at the front right corner of the building should be cleaned, and the extent of the foundation drainage system should be determined by closed circuit television or other suitable means. The outlet pipe discharge point should be located, the entire foundation drainage system cleared of any obstructions, the discharge equipped with a rodent screen, and marked so that it can be maintained as needed.

4.5 All of the file cabinets at the front left corner of the building should be emptied at one time and the empty cabinets carefully relocated to another location, preferably along a sidewall in the front half of the building. This should be done soon.

When the wood blocking supporting a portion of the restroom floor framing is upgraded, the floor framing should be further examined and upgraded as necessary.

The band joist and sill framing should be exposed along the back half of the right and left sides of the building and along the entire back of the building. The timber sill at the back wall will need to be replaced. It is quite possible that the back ends of the interior carrying beams have also rotted, and it may be necessary to install piers below these beams at a point in front of the back wall to re-establish proper support for these beams.

The back door of the meeting room ***must*** remain functional at all times the building is occupied. The door should be altered or adjusted to provide easy operation. Until then, the door must be opened and left ajar to provide efficient egress in the event of an emergency whenever the building is occupied.

If the building is to be rehabilitated, the ends of the floor joists at the back half of the left and right sides will need to be more closely examined. Rehabilitation plans should include sistering of these joists with new members of equal length. Because of the past moisture accumulation, partial sistering of new lumber onto the existing lumber without providing bearing at the interior carrying beams is not recommended.

4.6 ***Further invasive investigation of the wall framing should be undertaken as soon as possible to quantify the extent of rot that as occurred in the wall studs.*** The preferred method, given the current time of year would be to remove interior finishes (drywall or plaster) to explore the wall cavities. Another less informative method would be to drill 1/8" dia. holes into the walls, through the studs to gauge the overall integrity of the studs. ***This is very important*** and should be undertaken soon whether or not plans to renovate this building are to be pursued. The condition of the wall framing may be the determining factor as to whether or not the meeting room and for that matter the Town Office should remain in service.

Criterium-Brown Engineers can assist with this exploration or provide a work plan for others to follow, upon request.

4.7 No work is needed at the roof framing at this time. If future rehabilitation plans include installation of insulation the roof structure will need to be more closely examined and

analyzed, as the addition of insulation will increase anticipated snow loads on the roof system.

4.8 The wood framed canopy steps should be removed and replaced with more substantial units, including hand rails. Consideration should be given to upgrading the ramp as soon as the ramp and landing have several aspects that are not compliant with current ADA standards.

4.9 The second floor egress landing and steps should be used minimally until the condition of the framing to which the angled brace ledger can be verified. For this reason we recommend limiting activities on the second floor to those that are absolutely necessary. The connecting points of this assembly need to be kept under very close observation, and use of the assembly prevented in entirety if any movement is noted.

5.0 CONCLUSION

It is our professional opinion that portions of the the Addison Town Hall floor and wall framing are in fair to poor structural condition, and these areas are in need of extensive repair in order to assure safe continued use. The full extent of necessary repairs cannot be quantified until invasive investigation of the walls is undertaken, and this investigation should be undertaken in the near future. However, at a minimum, replacement of sills, band joists and many of the floor joists at the back half of the building should be anticipated in addition to repairs to the back and second floor back left egress systems.

There is no one-way to build or repair an old, wood-framed building such as this. As a result, you may encounter others whose opinions will differ from ours. We cannot be responsible for any action you may take based on those opinions unless we have the opportunity to review the situation and examine the relevant conditions before any repairs and/or modifications are made.

This report has been prepared in strict confidence with you as our client. Further, we will not release this report to anyone without your permission.

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.

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

Sincerely,

Keith R. Brown, P.E., CBIE

KRB/shb

APPENDIX A

PHOTOGRAPHS

Prepared for: Town of Addison
Property: Addison Town Hall, 334 Water Street, Addison, Maine

1. Front exterior
2. Front and right side exterior
3. Right side exterior
4. Back exterior
5. Granite floor support pier
6. Granite floor support pier, no longer in contact with timber floor framing
7. Concrete floor support pier
8. Stacked wood blocking in contact with dirt floor below bathroom area
9. Clearance between first floor framing and crawl space floor
10. Clearance between floor support framing and crawl space floor
11. Clearance between first floor framing and crawl space floor
12. Clearance between first floor framing and crawl space floor
13. Standing water in Water Street ditch at front of building
14. Blocked riser pipe at exterior front right of foundation
15. Single header (in background) supporting long floor joists at front left of building
16. Light duty single joist header, original floor joists (left) and light duty floor framing (right)
17. Light duty floor framing at front left of crawl space
18. Light duty floor framing at front left of crawl space
19. File cabinets at front left of building
20. Floor surface below file cabinets at front left
21. Rotted rim joist and floor joists, back left
22. Rotted band joist, back left
23. Rotted rim joist
24. Mold on rotted rim joist, back right
25. Rotted rim joist and floor joist, back right
26. Mold growth and deterioration at along back portion of right side wall
27. Rotted stud at back right of building
28. Outward bow in right side wall
29. Inward bow at left side wall
30. Back exterior door
31. Abraded paint at location where door rubs frame
32. Roof framing
33. Roof framing
34. Roof framing
35. Back entrance ramp and canopy

36. Support pier at back entrance
37. Steps at back entrance
38. Second floor egress staircase and landing
39. Angle support braces at second floor egress staircase and landing
40. Support ledger at right side staircase and landing
41. Support ledger at right side staircase and landing
42. Rot at back sill
43. Rot at back sill
44. Rot at back sill