CRITERIUM® ENGINEERS

January 8, 2016

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STATE OF MAINE
JESSE C. NASH
12967
LICENSED PROFESSIONAL ENGINEER

01/8/2016
5 PAGES PLUS
AS-BUILT SKETCH

Bobby Soucy
28 Harvey Street
Portland, ME 04102

Re: **28 Harvey Street, Portland, ME**
Limited Structural Evaluation - Phase 1 Dormer Design

Attached: **As-Built Sketch of the Existing Framing Plan**

Dear Mr. Soucy:

At your request, a limited structural evaluation of your residence at 28 Harvey Street in Portland, Maine was conducted on December 17, 2015. The purpose of this evaluation was to evaluate the feasibility of adding a new dormer and recommendations for how to approach the dormer design.

The inspection was conducted by, and this report written by Jesse C. Nash, P.E., of Criterium Engineers. This inspection report is limited to observations made from visual evidence. 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. The report is not to be considered a guarantee of condition and no warranty is implied.

DESCRIPTION

The home at 28 Harvey Street is a 1-1/2 story bungalow style residence. It has wood shingle siding on the exterior walls and a composition asphalt shingle roof surfacing. The basic construction of the home consists of wood framed walls, floors and roof on a full basement constructed with concrete block foundation walls and a poured concrete slab. The house is approximately ninety years old.

Bobby Soucy, the homeowner of the property, requested a structural evaluation because he intends to add a new shed dormer off northwest side of the existing hip roof.

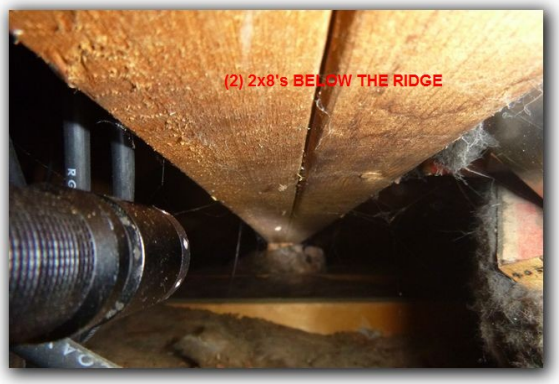
OBSERVATIONS

For the purposes of our report, all directions (left, right, rear, etc.) are taken from the viewpoint of an observer standing on Lucas Street and facing the house. A plan of the home as it currently exist is attached to this report for reference.

First floor framing consists of 2x8 lumber at roughly 16 to 18-inches on center. The floor joists span from the front and rear foundation walls to a 6x8 solid wood girder. The girder is supported by three steel columns and the right and left foundation walls. Second floor framing appeared to be 2x8 lumber, but was not accessible to verify size and spacing. The second floor framing is supported by the front and rear exterior walls and an interior bearing wall that runs above the first floor girder.

The roof is framed as a hip roof with two existing dormers. A small hip dormer extends off the left roof and a large shed dormer extends off the rear roof (photos above). Roof rafters generally consist of 2x6 lumber at 24-inches on center. The framing at the rear dormer was inaccessible, but appeared to be 2x8 dimensional lumber at 12" on center (photos below).

The hip rafters and ridge are 2x8 lumber. A double 2x8 is installed below the ridge and appears to be supported by two 4x4 posts (photos below). The support below the 4x4's was concealed.



Where visible, the walls, columns and framing appeared to be plum and square with no visual displacement or deflection observed during the inspection.

EVALUATION & DESIGN RECOMMENDATIONS

The overall structural condition of the house appears to be good. The observed conditions do not indicate any issues that would prevent the addition of a dormer off the northwest side of the existing hip roof.

Based on information provided by the owner, Bobby Soucy, the new shed dormer will be approximately 12-feet wide and the roof would run from the existing ridge-line to the exterior wall with a 3/12 pitch. The existing second floor partition wall below the ridge-line would be removed. Then, new walls on each side of the ridge would be added to create a second floor hallway as well as an additional bedroom at the added dormer.

To accomplish the layout described by the homeowner, we recommend designing the east added hallway wall as a bearing wall that would align vertically with the first floor bearing wall below. This wall would extend to the underside of the roof rafters at the existing rear dormer. These rafters would then cantilever over the added bearing wall and support the ridge. The ridge (and cantilevered rafters) would inturn support one side of the roof rafters at the added dormer. A bearing wall would also be added along the exterior wall to support the other end of the roof rafters at the added dormer. Walls at the ends of the existing and new dormers (the walls running perpendicular to the roof ridge) would serve to provide lateral resistance for the roof.

We expect this plan to be relatively easy to construct because we expect it will eliminate the need for adding a ridge beam and/or providing temporary support curing construction. The rafters at the existing rear dormer would need to be analyzed and additional rafters added as necessary. The end walls at the existing dormer would be analyzed and reinforced (if needed) with plywood to provide lateral support. Then, the new inner bearing wall could be erected. The existing 2x8 ridge beam could likely remain in place, but would need to be analyzed and condition inspected more closely. The existing rafters where the dormer is being added could be removed, and the new bearing wall along the exterior erected as well as the dormer itself.

Criterium would expect the design for the new dormer to include a plan of the second floor and the roof. These plans would include the layout and size of the new structural components. Also, approximately six details would be expected: details of the top and bottom of each added bearing wall (4), detail of the connection at the ridge, and a detail for the end walls providing lateral support.

Some conditions should be investigated more closely prior to the start of the design. Specifically:
- Determine the size, spacing and lumber grade of the roof rafters at the existing rear dormer
- Expose and investigate the condition of the existing ridge beam
- Expose and investigate the second floor framing where the two bearing walls will be added

There are also some additional design, egress, and layout considerations that must be met in order to comply with the International Residential Building Code:
- Meet room dimensions, area, and ceiling height requirements (see IRC sections below)
- Egress requirements should be reviewed, which may affect the windows at the new dormer
- Special considerations are required for roofing installed on pitches less than 4/12

International Residential Building Code sections:
SECTION R304
MINIMUM ROOM AREAS
R304.1 Minimum area. *Every dwelling unit shall have at least one habitable room that shall have not less than 120 square feet (11 m^2) of gross floor area.*
R304.2 Other rooms. *Other habitable rooms shall have a floor area of not less than 70 square feet (6.5 m^2).* ***Exception:*** *Kitchens.*
R304.3 Minimum dimensions. *Habitable rooms shall not be less than 7 feet (2134 mm) in any horizontal dimension.* ***Exception:*** *Kitchens.*
R304.4 Height effect on room area. *Portions of a room with a sloping ceiling measuring less than 5 feet (1524 mm) or a furred ceiling measuring less than 7 feet (2134 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required habitable area for that room.*

SECTION R305
CEILING HEIGHT
R305.1 Minimum height. *Habitable space, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm).*
Exceptions:
1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) at the center of the front clearance area for fixtures as shown in Figure R304.1. The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower

or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) above a minimum area 30inches (762 mm) by 30 inches (762 mm) at the showerhead.
R305.1.1 Basements. *Portions of basements that do not contain habitable space, hallways, bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).*
Exception: *Beams, girders, ducts or other obstructions may project to within 6 feet 4 inches (1931 mm) of the finished floor.*

CONCLUSION

Based in the information provided to us and observations during our inspection, we feel the proposed new dormer is feasible. The aforementioned design, egress, and layout considerations should be achievable. However, we recommend you, or your contractor, verify those considerations prior to developing the structural design.

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.

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.

Additionally, Criterium is available to assist in designing a structural plan for the dormer addition that would be stamped and signed by a licensed Maine Professional Engineer. Please let us know if you would like us to submit a proposal to you.

Thank you for the opportunity to provide you with this engineering service. Please call if you have any questions.

Sincerely,

Jesse Nash, P.E.
Criterium Engineers