



L & L STRUCTURAL
ENGINEERING SERVICES, INC.
Six Q Street
South Portland, ME 04106
Telephone: 207 767-4830

July 12, 2016

Pat Tryon
1 Saint Lawrence Street
Portland, Maine 04102

Subject: Building located at 1 Saint Lawrence Street, Portland, Maine
Three Story Exterior Deck/Porch Assessment

Dear Pat,

As per your request, we reviewed and analyzed the existing three story exterior deck/porch attached to the residential building located at 1 Saint Lawrence Street in Portland, Maine. Our review and analysis is limited to the existing deck/porch structure and the connections of the deck/porch structure to the existing main building. Our analysis and review of the structure was performed utilizing the 2009 International Building Code (IBC) adopted by the City of Portland, Maine and most local municipalities. The analysis and review considered the Building Code Requirements for Wood Construction (NDS-latest edition) published by the National Forest Products Association.

The existing deck/porch structure is approximately 16'-0" wide by 7'-0" deep at the first floor level and 8'-0" wide x 7'-0" deep at the second and third floor levels. In addition, there is an existing shed roof structure adjacent to the second floor deck over the first floor porch and entry. The existing deck/porch structure is conventionally constructed with dimensional timber materials. We discovered several structural deficiencies with the existing deck/porch structure that require repair or replacement with properly designed and constructed structure as follows:

1. The existing timber post at the right side of the first floor deck and the beam on top are deteriorated and require replacement. The replacement of the beam will require temporary support of the existing structure above to remove and replace the compromised timber post and beam. In addition, the post is continuous through the first floor deck and therefore replacement will require temporary support and partial disassembly of the first floor deck as well. The rainwater that currently penetrates the third and second floor decks has been directed with a tarp to a gutter attached to the interior face of the existing second floor beam in an attempt to keep water off of the first floor deck. The system does not appear to be functioning properly and water/moisture has become trapped within finish boards against the interior face of the existing timber beam and top of the post causing the deterioration to occur. We recommend abandoning the current rainwater diverter system until something more permanent and properly directed is able to be installed.
2. The existing beam on the right side of the center post is not adequately supported on the existing center post. The right beam is only supported approximately 1/2" on the existing post. In addition, the existing beam is experiencing some deterioration at the support on the post as well. Furthermore, the post above (which supports the third floor deck) is offset approximately 6" (center to center) from the existing post at the first floor below which exacerbates the lack of bearing issue as well as overstresses the existing beam beneath the second floor deck. This condition is unsafe and shall be remedied immediately.

2. (cont.) We instructed the contractor to install a 2-2x6 post fastened to the existing 4x4 post to temporarily support the existing beam until the unsafe condition is able to be permanently remedied and to discontinue the use of the exterior decks. If an additional post is to be installed adjacent to the existing post to support the existing beam, an additional foundation system will be required to support the new post and the existing first floor structure will need to be modified and re-supported to allow the new post to be installed.
3. The second floor deck is not adequately braced to resist lateral (wind and/or seismic) loads imposed on the structure. The existing shed roof system offers a timber diaphragm at that level which is adequate to resist the imposed lateral loads. However, the timber roof diaphragm and /or roof structure is inadequately fastened to the existing main building structure and there is probably inadequate structure within the main building (to be determined) to resist the lateral shear and tension/compression loads resulting from the diaphragm. The second floor deck requires adequate bracing to be installed.
4. The third floor deck is grossly inadequately braced to resist lateral (wind and/or seismic) loads imposed on the structure. The third floor deck structure (diaphragm) is inadequately fastened to the existing main building structure and there is probably inadequate structure within the main building (to be determined) to resist the lateral shear and tension/compression loads resulting from the diaphragm. We imposed a relatively small force (force of a man pushing) on the side of the existing post beneath the third floor deck and the deck moved approximately 1" laterally. In addition, the existing 4x4 timber posts beneath the existing third floor deck do not have sufficient strength to be used along with the existing third floor deck beam to create a braced frame by adding corner braces. Hence, the existing post would require reinforcement if used as part of a braced frame to resist lateral loads. The third floor deck requires adequate bracing to be installed and reinforcement or replacement of the existing posts.
5. The existing roof rafters and deck joists are not adequately supported from the existing ledger with metal joist hangers which will need to be installed.
6. The existing ledger at the second floor deck (and adjacent shed roof) and the ledger at the third floor deck are not adequately fastened to the structure in the main building. Additional fasteners are required into to the assumed balloon framed stud wall system (to be confirmed) to adequately support the code stipulated loads imposed on the decks.
7. The existing ledger at the first floor deck is not adequately fastened to the structure in the main building. Additional fasteners are required into to the existing brick wall foundation system to adequately support the code stipulated loads imposed on the decks.
8. The existing guardrail system does not appear to have adequate strength nor connection to the deck structure to resist the code stipulated loads. The existing guardrail system would need to be reinforced, supplemented or replaced with a properly designed and installed guardrail system.

The structural deficiencies that we discovered, especially items #2 and #4, are a safety hazard and the decks are in imminent danger of collapse. We recommend abandoning the use of the decks until a permanent properly designed and installed reinforcement is able to be implemented or the decks are able to be replaced with a properly designed and constructed deck/porch structure.

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We discussed the structural deficiencies with the existing deck/porch structure that we discovered and the proposed remediation options to reinforce or replace the existing structure with you, the other two owners and Jeff Verrill (Jeffrey R. Verrill Contracting Services, proposed contractor). We understand that Jeff has provided rough cost estimates to either reinforce the existing structure or replace the existing decks/porch with a new properly designed structure and it became cost prohibitive to salvage the existing decks compared to replacement. Therefore, upon your authorization, we designed, prepared and submitted structural drawings (S1 thru S4) for the triple level exterior deck re-construction at 1 St. Lawrence Street in Portland, Maine dated 28th June, 2016.

If you have any questions or require any additional technical assistance, please do not hesitate to call.

Sincerely,

L&L Structural Engineering Services, Inc.

Joseph H. Leasure, P.E.
Principal
File

