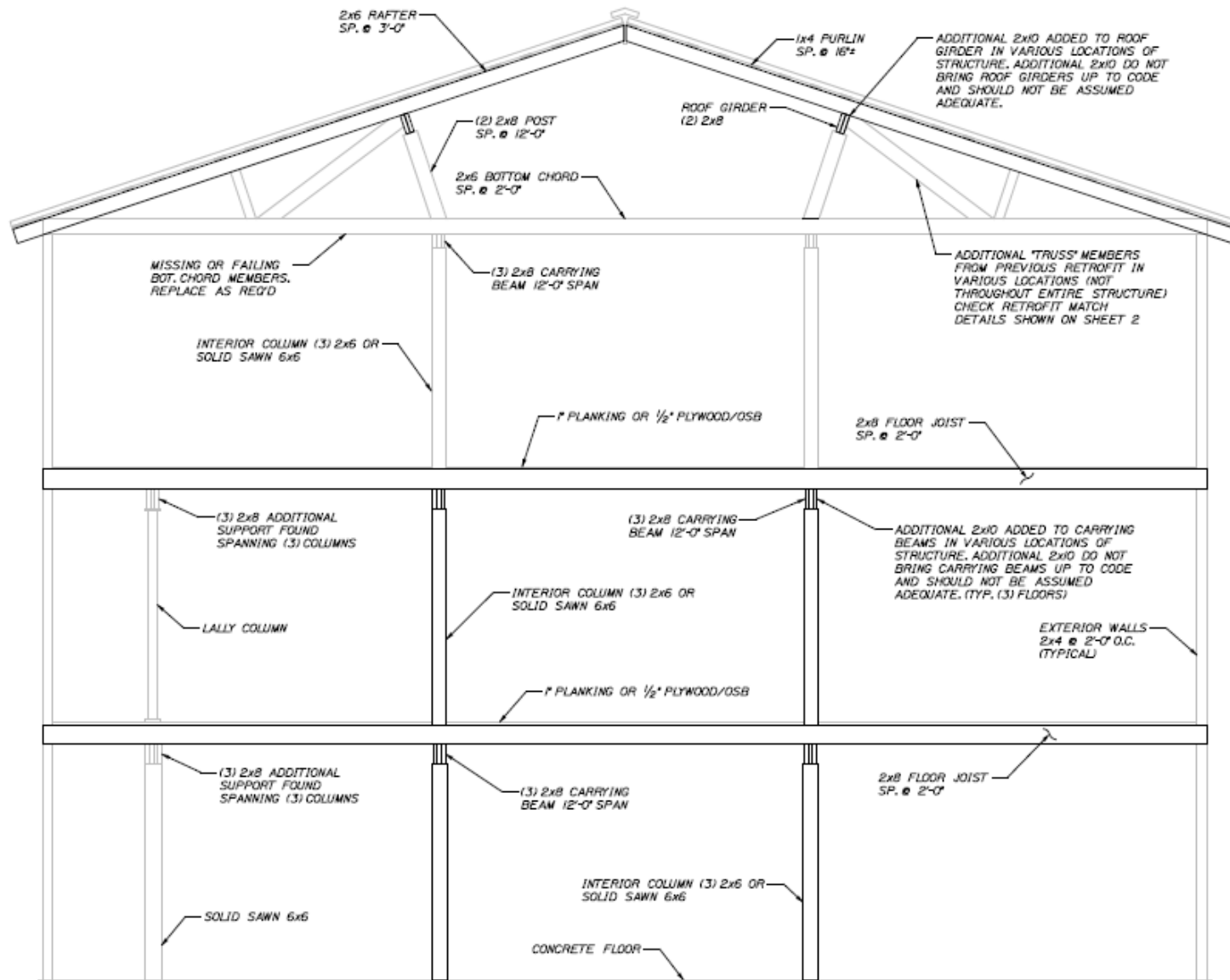


BOWDOINHAM RECYCLING CENTER

Public Meeting: 9-8-2020

Existing Building Analysis

- Calderwood Engineering has previously analyzed the building in 2008 and 2013.
- 2008
 - Town requested that we determine the capacity of the existing structure
 - We determined that the existing floor is rated to carry 27.6psf
 - This is not adequate capacity for a storage area per ASCE 7 or IBC
 - This is the capacity that a crawlspace or attic would be expected to have
- 2013
 - Town requested that we develop a plan to bring the building up to code.
 - Storage Warehouse for Light Storage = 125psf
 - Existing roof members are also undersized (already a roof failure)
 - Modifications to building designed to meet this requirement



TYPICAL SECTION ~ LOOKING AWAY FROM THE ROAD

1/2" - 1'-0"
 NOTE: MEMBERS IN BOLD ARE UNDERSIZED AND NEED RETROFIT TO BE ABLE TO SUPPORT DESIGN LOADS

GENERAL NOTES

1. LAMINATED VENEER LUMBER SHALL HAVE A MINIMUM MODULUS OF ELASTICITY OF E=2,000,000 PSI AND A MINIMUM F =3100 PSI
2. ALL SAWN DIMENSION LUMBER IS NOMINAL SIZE, SPF #2 GRADE
3. ALL STEEL SHALL BE IN NEW OR GOOD USED CONDITION
4. ALL STEEL TO MEET THE REQUIREMENTS OF ASTM A36 OR BETTER
5. ALL BOLTS SHALL BE A325 BOLTS
6. ALL MATERIALS STORED ON THE PROJECT SHALL BE PROTECTED FROM THE ELEMENTS BY BEING STORED INDOORS ABOVE GROUND LEVEL ON SUITABLE DUNNAGE.
7. ALL DIMENSIONS WITHIN THESE DETAILS ARE APPROXIMATE, THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE EXACT DIMENSIONS IN THE FIELD.
8. ANY CONFLICT BETWEEN THESE PLANS AND EXISTING CONDITIONS SHOULD BE ADDRESSED BY THE ENGINEER OF RECORD, DO NOT PROCEED WITH DEPENDENT WORK UNTIL ANY CONFLICT HAS BEEN ADDRESSED BY THE ENGINEER OF RECORD.
9. ALL MATERIALS REQUIRED TO BE REMOVED AND REUSED, SHALL BE MAINTAINED IN SERVICEABLE CONDITION, STORED IN A MOISTURE FREE ENVIRONMENT INDOORS, AND ABOVE THE GROUND LEVEL.
10. ALL MODIFICATION WORK MUST BE DONE WITH ONLY STRUCTURAL DEAD LOAD, DO NOT PERFORM THIS WORK WHEN THE STRUCTURE IS SUBJECT TO SNOW OR LIVE LOAD CONDITIONS.
11. THESE DESIGNS ARE BASED ON TYPICAL SECTIONS OF THE WHOLE OF THE BUILDING, THERE ARE LOCATIONS WHERE THESE DESIGNS WILL NEED TO BE MODIFIED ACCORDING TO THE EXISTING SECTION, THOSE LOCATIONS WILL BE ADDRESSED ON A CASE BY CASE BASIS.

Why these repairs are necessary:

- These repairs are necessary because the building is unsafe in its current configuration.
 - The roof, the existing flooring, the floor joists and beams, and the columns supporting floors 2 and 3 are undersized to carry the required storage loading.
- The overloading of these members has caused noticeable deterioration of the existing structure







Short-Term Solution

- In order for the Town to continue using the building with the smallest amount of work possible, the Town and the building owner should stop using the 2nd and 3rd floors for storage, which would remove the need to strength the floor elements and the columns.
- Short term required repairs:
 - Roof repairs per our 2013 recommendation.
 - Replace existing water-damaged 2x members in wall as shown.
 - Install OSB sheathing/ 1/2 "Plywood minimum to exterior wall in place of plastic tarping.
 - Repair wall disconnected from floor next to exterior door.
 - May need to perform some repairs to floor and columns beneath living space

Fire Marshall's Report: Short Term

- Exit doors shall be free of obstructions, including unapproved step-ups creating a tripping hazard per NFPA 101, Chapter 7, Section 7.2.2.3.3.2. (1st floor exit doors)
- Exit doors shall swing in the direction of travel. All Exit doors currently swing inward.
- Interior finish shall meet or exceed Class C. Unfinished exterior walls have plastic enclosing areas throughout the building on all 3 levels. NFPA 101, Chapter 40, Section 40.3.3.1 * Chapter 10, Section 10.2.
- Suspended heater is accessible by the occupants on the 2nd floor. This unit becomes hot to touch when in use. Maintain 3 ft of clearance with secured noncombustible separation mounted to the floor or the wall. NFPA 101, Chapter 40, Section 40.5.2; Chapter 9, Section 9.2.1 & NFPA 90B, 2018 Edition
- The building lacks compliant emergency lighting. All areas shall be equipped with emergency lighting per NFPA 101, Chapter 40, 40.2.9 & Chapter 7, Section 7.9.

Fire Marshall's Report: Short Term

- 2nd Floor Storage area is currently used for storing combustibles to fuel the wood burning furnace.
- 3rd Floor Landlord Storage is currently used to store large amounts of vehicle tires and toilets. Engineering judgment required to assess the floor load.
- 1st Floor compacting side of the facility has an exit that leads through hazardous waste. NFPA 101, Chapter 7
- Corridor door to the boiler does not meet 1-hour fire-rating. The door lacks required rated hinges, rated handle hardware, rated door frame and self-closing positive-latching hardware. NFPA 101, Chapter 7, Section 7.2.1.4.1
- Exposed wiring was found throughout the entire building. All wiring shall be capped and confined to covered junction boxes.
- Provide annual fire alarm system inspection report.
- Fall protection shall be provided for all heights above 30". Plastic has been installed as the exterior of a large portion of the exit stairwell walls. NFPA 101, Chapter 7, Section 7.2.2.5.2.2

Long-Term Solution

- In order for the Town to use the 2nd and 3rd floor for storage, the flooring elements and columns need to have the modifications as outlined in our 2013 report.
- Additionally, several other modifications must be done to bring the building in line with the Fire Marshall's report.

Fire Marshall's Report: Long Term

- Exit stairwells shall be equipped with graspable handrails per NFPA 101, Chapter 7, Sections 7.2.2.4.1 & 7.2.2.5.5.3.
- Exit stairwell guardrails shall be equipped with balusters spaced less than 4" apart per NFPA 101, Chapter 7, Section 7.2.2.4.6.
- Exit stairwells shall be enclosed and protected from the remainder of the facility with 1 hour fire barrier per NFPA 101, Chapter 7, Section 7.2.2.5.
- Two exits are required from each story per NFPA 101, Chapter 40, Section 40.2.4.1 unless it can be determined that the common path of travel from all occupiable spaces is a maximum of 50ft
- Emergency lights on the 3rd Floor did not illuminate when the test button was pressed. NFPA 101, Chapter 40, 40.2.9 & Chapter 7, Section 7.9.
- Headroom throughout the facility shall be maintained at 6'8". NFPA 101, Chapter 40, Section 40.2.2.3, Chapter 7/7.1.5
 - The second floor has cross beams that measure 6'2"

Fire Marshall's Report: Long Term

- 2nd Floor exit door to the 3rd Floor apartment exit stairwell does not meet 1-hour fire-rating. The door lacks required rated hinges, rated handle hardware, baseplate, rated door frame and self-closing positive-latching hardware. NFPA 101, Chapter 40, Section 40.3.1 & Chapter 8, 8.6
- Staff informed us that the 2nd Floor Storage area front exit stairwell door does not open freely in the winter as it bends with the cold weather. NFPA 101, Chapter 7, Section 7.2.1.4.1
- Additional illuminated exit signage shall be installed in the center of the 2nd Floor Storage area by the rear exit stairs. The exit route is not obvious. NFPA 101, Chapter 40, 40.2.10 & Chapter 7, 7.10.
- 3rd Floor Landlord Storage exit door does not meet 1-hour fire-rating. The door lacks required rated hinges, rated handle hardware, rated door frame, self-closing positive-latching hardware. NFPA 101, Chapter 40, Section 40.3.1 & Chapter 8, 8.6
- 3rd Floor Landlord Storage exit door does not open freely as it gets stuck on the floor. NFPA 101, Chapter 7, Section

Fire Marshall's Report: 3rd Floor Apartment

- An apartment was constructed on the 3rd floor of this industrial occupancy without obtaining an approved construction permit from the State Fire Marshal's Office. NFPA 101, Chapter 40.1.1.6 & NFPA 241, 2013 Edition.
- 3rd Floor apartment could not be confirmed to be separated from the industrial occupancy by 2-hour fire-rated construction. The interior of the apartment was not accessed during inspection. NFPA 101, Chapter 6, Section 6.1.14.4.1 and Table 6.1.14.4.1(a).
- 3rd Floor apartment is not equipped with a 1-hour fire-rated exit stairwell that leads directly to ground level discharge. NFPA 101, Chapter 40, Section 40.3.1 & Chapter 8, 8.6
- 3rd Floor apartment shall be equipped with interconnected smoke detection tied in to the current fire alarm system. NFPA 101, Chapter 40, Section 40.3.4.1.