



Project Scope and Narrative: 12 Bean Road

July 17, 2019

Submitted to:

Meg Tenney
P.O. Box 137
6 Log Cabin Drive
Cornish Flat, NH 03746

Project:

Apartment Building
12 Bean Road
Meriden, NH 03770

Dear Ms. Tenney,

Nortech Systems (Nortech) is providing code consulting services to Meg Tenney, with respect to fire and life safety, for the construction of an apartment building in Meriden, New Hampshire. Currently, the site contains a house and a barn. These structures are connected by a carriage house. The carriage house will be removed, and the barn will be converted into a three-unit apartment building. Excluding exterior construction, the house will remain untouched and is outside the project scope of work. The apartment building will comply with applicable portions of the New Hampshire State Building Code (RSA 155-A). Specifically, the International Existing Building Code (IEBC-2009). The building will also comply with the New Hampshire State Fire Code (Saf-C 6000). Including, but not limited to, the Fire Code (NFPA 1-2009) and the Life Safety Code (NFPA 101-2015).

1 Construction Type

- 1.1 The exterior walls use combustible or limited combustible materials. Interior walls, as well as the ceiling-roof assembly, are not rated.
- 1.2 According to the National Fire Protection Association (NFPA), the building is of Type V (000) construction.
 - 1.2.1 New building elements will be of Type V (000) construction.
- 1.3 According to the International Code Council (ICC), the building is of Type 5B construction.
 - 1.3.1 New building elements will be of Type 5B construction.

2 Level of Exit Discharge (LED)

- 2.1 The level of exit discharge is defined in Section 3.3.85.1 of NFPA 101-2015. It is the lowest story from which not less than 50 percent of the required number of exits and not less than 50 percent of the required egress capacity from such a story discharges directly outside to the finished ground level. Thus, the building's main level is deemed to be the level of exit discharge. NFPA counts stories from the level of exit discharge. Thus, per NFPA, the building will be two stories tall.
 - 2.1.1 When no story meets the above-mentioned conditions, the story that is provided with one or more exits that discharge directly to the outside to the finished ground level via the smallest elevation change is deemed the LED.

3 Story Above Grade Plane

3.1 A story above grade plane is any story having its finished floor surface entirely above grade plane, or in which the finished surface of the next floor is: more than 6 feet above grade plane, or more than 12 feet above the finished ground level at any point. The ICC counts stories starting with the story above grade plane and ending with the highest occupiable story containing the occupancy considered. Thus, per ICC, the building will be two stories tall.

4 Use and Occupancy

4.1 NFPA considers the building to be a mix of Apartment and Storage Occupancies. According to the ICC, the Apartment Occupancy is classified as a Residential (R-2) Use Group and the Storage Occupancy is classified as a Utility (U) Use Group.

4.1.1 Per Section 406.1.1 in IBC-2009, the private garage is classified as a Utility (U) Use Group.

4.2 The building will comply with Section 6.1.14.3 in NFPA 101-2015 for mixed occupancies.

4.2.1 Occupancies will not be separated by fire-resistance rated construction.

4.2.2 The building will comply with the most restrictive requirements of the occupancies involved.

4.3 Quantities of hazardous materials will not exceed the maximum allowable quantities of hazardous materials per control area. Thus, the building will not contain a Hazardous Use Group.

5 Work Area

5.1 The barn will be converted into a three-unit apartment building. According to IBC-2009 and NFPA 101-2015, this is a change of use to a higher hazard category. Thus, the change of use will comply with the International Building Code (IBC-2009) for new construction. With respect to NFPA 101-2015, the apartment building will comply with the requirements of the Code applicable to new construction.

6 Building Height and Area

6.1 Per Section 503.1 in IBC-2009, the building height and area will not exceed that which is permitted in Chapter 5. The two-story, 2,934 square foot building will not exceed the maximum heights and area, as catalogued in Table 6.1.

6.1.1 Per Section 508.2.1 in IBC-2009, the Utility (U) Use Group is not an accessory occupancy as its area exceeds ten percent of the building area of the story in which it's located.

Table 6.1: Allowable Building Heights and Area (Sprinklered, Type VB)

Use Group	Allowable Height (Stories)	Allowable Height (Feet)	Allowable Area (Square Feet)
Residential (R-2)	3	60	21,000 ¹
Utility (U)	2	60	16,500 ¹

¹ Tabular allowable area per floor, without increase for frontage.

7 Means of Egress

- 7.1 Per Section 1007.1, Exception 1, in IBC-2009, the building will not be equipped with accessible means of egress.
 - 7.1.1 Per Section 1107.6.2.1 in IBC-2009, the building will not have accessible units (Type A or B) or routes since it will contain less than four dwelling units.
- 7.2 Per Section 1003.2 in IBC-2009, the means of egress will have a ceiling height of at least 7 feet 6 inches.
 - 7.2.1 Stairways will have a minimum headroom clearance of 80 inches, measured vertically from the edge of nosings.
- 7.3 Per Section 1014.2.3 in IBC-2009, means of egress will not pass through sleeping areas or bathrooms.
- 7.4 Per Section 1014.2.4 in IBC-2009, means of egress will not pass through storage rooms, closets, or spaces used for similar purposes.
 - 7.4.1 Per Section 1014.2.4, Exception 1, means of egress are allowed through kitchen areas serving adjacent rooms that are part of the same dwelling unit.
- 7.5 Per Section 1015.1 in IBC-2009, where necessary, spaces will be equipped with at least two exit access doorways.
- 7.6 Per Section 1015.1 in IBC-2009 and Section 30.2.4.6 in NFPA 101-2015, the first-floor dwelling units (units two and four) will each be equipped with one required means of egress. These spaces are permitted to be served by one required means of egress as they will comply with the following criteria:
 - 7.6.1 The story will not contain more than four dwelling units.
 - 7.6.2 The occupant load will not exceed 20 people.
 - 7.6.3 The dwelling units will be equipped with an automatic sprinkler system.
 - 7.6.4 The common path of egress travel distance will not exceed 125 feet.
 - 7.6.5 The interior exit stairway will be enclosed in 1-hour fire rated construction.
 - 7.6.6 Horizontal and vertical separation between dwelling units will have a minimum ½-hour fire resistance rating (1-hour separation will be installed).
 - 7.6.7 The building will not contain access corridors. Otherwise, these would be enclosed in 1-hour fire rated construction. Travel distances within such corridors would be limited to 35 feet or less.
- 7.7 Per Section 1021.1, Exception 4, in IBC-2009 and Section 30.2.4.6 in NFPA 101-2015, the second story dwelling unit (unit three) will be equipped with one required means of egress – the interior exit stair. The second-story unit is permitted to be served by one required means of egress as it will comply with the following criteria:
 - 7.7.1 The story will not contain more than four dwelling units.
 - 7.7.2 The occupant load will not exceed 20 people.
 - 7.7.3 The dwelling units will be equipped with an automatic sprinkler system.
 - 7.7.4 The common path of egress will not exceed 125 feet.
 - 7.7.5 The interior exit stairway will be enclosed in 1-hour fire rated construction.
 - 7.7.6 Horizontal and vertical separation between dwelling units will have a minimum ½-hour fire resistance rating (1-hour separation will be installed).
 - 7.7.7 The building will not contain access corridors. Otherwise, these would be enclosed in 1-hour fire rated construction. Travel distances within such corridors would be limited to 35 feet or less.
- 7.8 The exterior stair will not be a required means of egress. For the purpose of the narrative, it will be considered a “convenience” stair. Thus, it will not be constructed to comply with the requirements for exterior exit stairs. All stairs will comply with applicable dimensional criteria (reference Section 1009 in IBC-2009 and Section 7.2.2.2 in NFPA 101-2015).

- 7.9 First floor living areas will be equipped with sliding glass doors for secondary means of escape. Escape windows will be installed in the second floor living area and all bedrooms. Escape windows will comply with Section 1029 in IBC-2009 and Section 24.2.2.3.3 in NFPA 101-2015, as amended by the New Hampshire State Fire Marshal's Office. Escape windows will comply with the following criteria:
 - 7.9.1 Sills will be no higher than 44 inches above the floor. They will be within 20 feet of grade.
 - 7.9.2 The clear width of escape windows (when open) will be at least 20 inches.
 - 7.9.3 The clear height of escape windows (when open) will be at least 24 inches.
 - 7.9.4 The net opening of double-hung style windows (when open) will be at least 4½ square feet.
- 7.10 The first floor will have a maximum occupant load of 15 people (2,934/200, rounded up). Each dwelling unit will be equipped with an exit door having a minimum egress capacity of 160 people. This exceeds the demand set forth by the occupant load.
- 7.11 The second floor will have an occupant load that is less than 15 people (2,934/200, rounded up). The dwelling unit will be equipped with an interior exit stair having a minimum egress capacity of 120 people. This exceeds the demand set forth by the occupant load.
- 7.12 Doors will comply with Section 1008 in IBC-2009 and Section 7.2.1 in NFPA 101-2015.
 - 7.12.1 Per Section 1008.1.2 in IBC-2009 and Section 7.2.1.4.1 in NFPA 101-2015, egress doors will be of the side-hinged swinging type.
 - 7.12.2 Per Section 1008.1.1 in IBC-2009 and Section 7.2.1.2.3.2 in NFPA 101-2015, doors will have a clear width of at least 32 inches.
 - 7.12.3 Egress doors will not be locked against egress. Locking devices will allow doors to be opened from within the building.
 - 7.12.3.1 Egress doors will not use ordinary double-cylinder locks or key-operated chain locks.
- 7.13 The building will not be equipped with aisles or corridors.
- 7.14 Stairs will comply with Section 1009 in IBC-2009 and Section 7.2.2 in NFPA 101-2015.
 - 7.14.1 Per Section 1009.1 in IBC-2009 and Section 7.2.2.2.1.2(A) in NFPA 101-2105, stairs will have a clear width of at least 36 inches since they will serve an occupant load that is less than 50 people.
 - 7.14.2 Per Section 7.2.2.6.5 in NFPA 101-2015, the outside stair will be constructed to minimize water accumulation.
 - 7.14.3 Landings will comply with Section 1009.5 in IBC-2009 and Section 7.2.2.3.2 in NFPA 101-2015.
 - 7.14.3.1 Every landing will have a dimension, measured in the direction of travel, that is not less than the width of the stair.
- 7.15 The building will not be equipped with ramps.
- 7.16 Handrails will comply with Section 1012 in IBC-2009 and Section 7.2.2.4 in NFPA 101-2015.
 - 7.16.1 Handrail height (measured above stair tread nosing or finish surface of ramp slope) will be uniform, not less than 34 inches and not more than 38 inches.

- 7.17 Guards will comply with Section 1013 in IBC-2009 and Section 7.2.2.4 in NFPA 101-2015.
- 7.17.1 Guards will be provided at the open sides of stairs that exceed 30 inches above the floor or finished ground level below.
- 7.18 IBC-2009 and NFPA 101-2015 regulate common paths of travel, dead-end corridors, and travel distances until one reaches an exit. The layout will not exceed the maximum paths of travel, as catalogued in Table 7.18.

Table 7.18: Maximum Paths of Travel in Sprinklered Buildings

Use of Space	Common Path (Feet)	Dead-End (Feet)	Travel Distance (Feet)
Residential (R-2)	50 (NFPA) ¹	50 (IBC/NFPA)	250 (IBC) ²
Storage/Utility (U)	100 (IBC/NFPA)	50 (IBC)	400 (IBC/NFPA)

¹ Travel within dwelling units is not included in common paths of travel.

² Travel distance is reduced to 125 feet for areas with one exit.

8 Fire Alarm and Detection

- 8.1 The building will be equipped with a fire alarm system. The system will comply with applicable codes, including the National Fire Alarm and Signaling Code (NFPA 72-2013).
 - 8.1.1 The system will include initiation by manual pull stations, sprinkler monitoring, carbon monoxide detection and automatic smoke detection.
 - 8.1.2 Occupant notification will include audio and visual signals from horns and strobes.
 - 8.1.2.1 Audible notification will be heard throughout the building.
 - 8.1.2.1.1 Sleeping spaces will be equipped with low frequency horns.
 - 8.1.2.2 Visual notification will be in all public spaces.
 - 8.1.2.2.1 Visual signals will be installed in units designed for the hearing impaired. The fire alarm system may not initially have visual notification in dwelling units but will be designed to support visual notification as needed.
 - 8.1.3 Secondary power will have enough capacity to operate the fire alarm system under quiescent load for a minimum of 24 hours and, at the end of that period, be capable of operating all alarm notification appliances for 5 minutes.
 - 8.1.4 Alarm, trouble, and supervisory signals will be automatically transmitted to an approved supervising system.
 - 8.1.5 Dwellings will be protected by interconnected smoke/CO alarms. Alarms will be provided in the following locations:
 - 8.1.5.1 In every sleeping area.
 - 8.1.5.2 Outside every sleeping area in the immediate vicinity of the bedrooms.
 - 8.1.5.2.1 Photoelectric devices will be installed at least 10 feet from fixed cooking appliances (unless otherwise listed).
 - 8.1.5.3 On all levels of the dwelling units.

9 Fire Sprinkler System

- 9.1 Per Section 903.2.8 in IBC-2009 and Section 30.3.5.1 in NFPA 101-2015, the building will be equipped with a sprinkler system. The system will comply with applicable codes, including the Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies (NFPA 13R-2013).
- 9.2 The building will not be equipped with a standpipe system.

10 Portable Fire Extinguishers

- 10.1 Per Table 13.6.2 in NFPA 1-2009, portable fire extinguishers will be provided throughout the building. They will be selected and maintained in accordance with the Standard for Portable Fire Extinguishers (NFPA 10-2013).
- 10.2 ABC-Type fire extinguishers will be installed per Chapter 6 of NFPA 10-2013. They will be readily accessible within 75 feet of all locations, hung, marked by signage, and possess a valid inspection sticker.
 - 10.2.1 An ABC-Type fire extinguisher will be located within 50 feet of any combustible or flammable liquid.
- 10.3 The distribution of fire extinguishers will also comply with Table E.3.5 in NFPA 10-2013, as catalogued in Table 10.3.

Table 10.3: Maximum Area (Square Feet) of Protection per Fire Extinguisher¹

Class A Rating on Extinguisher	Occupancy Type		
	Light Hazard	Ordinary Hazard	Extra Hazard
2A:10B:C (5 lbs.)	6,000	3,000	Not Allowed
3A:40B:C (5 lbs.)	9,000	4,500	Not Allowed
4A:80B:C (10 lbs.)	11,250	6,000	4,000
10A:120B:C (20 lbs.)	11,250	11,250	10,000

¹ Weights provided by ULINe for AMEREX ABC-Type fire extinguishers.

11 Lighting and Signage

- 11.1 Per Section 1006.2, Exception 3, in IBC-2009, under normal power, the means of egress serving a room or space outside of dwelling units will be illuminated whenever the room or space is occupied.
 - 11.1.1 The means of egress illumination level will be at least 1 foot-candle (10.8 lux) at the walking surface.
 - 11.1.2 For stair use, the minimum illumination level will be at least 10 foot-candles (108 lux) at the walking surface.
 - 11.1.3 Externally illuminated walking surfaces will be at least .2 foot-candle (2.15 lux) at the walking surface.
- 11.2 Per Sections 1006.3.1 through 1006.3.3 in IBC-2009, in the event of power failure, emergency lights will automatically illuminate the following areas:
 - 11.2.1 Interior areas outside of dwelling units.
 - 11.2.2 Exterior egress components until exit discharge is accomplished.
 - 11.2.3 Exterior convenience stair.
- 11.3 Per Section 1006.3.4 in IBC-2009, the emergency power system will provide power for a duration of not less than 90 minutes.
- 11.4 Per Section 1006.3.5 in IBC-2009, under emergency power, emergency lighting facilities will be arranged to provide initial illumination that is not less than an average of 1 foot-candle (10.8 lux) and a minimum at any point of .1 foot-candle (1 lux) at the walking surface.
 - 11.4.1 Under emergency power, illumination levels can decline to an average of 0.6 foot-candle (6 lux) with a minimum at any point of .06 foot-candle (.6 lux) at the walking surface.
 - 11.4.2 A maximum-to-minimum illumination uniformity ratio of 40 to 1 will not be exceeded.

11.5 Per Section 1011.1 in IBC-2009, the exterior door of the interior exit stair will be marked with an internally illuminated exit sign that is readily visible from any direction of egress travel.

11.5.1 Per Section 1011.1, Exception 3, exit signs will not be provided in dwelling units.

12 Interior Finish

12.1 Wall and ceiling finish materials will comply with Table 803.9 in IBC-2009 and Section 10.2 in NFPA 101-2015.

12.1.1 Finishes will be Class B or better in exits.

12.1.2 Finishes will be Class C or better in all other areas.

12.2 Combustible decorative materials will not cover more than 10% of the specific wall or ceiling area to which they are attached.

12.3 Floors will have at least a Class II rating.

13 Fire Rated Construction

13.1 The building will not contain, and thus not have to protect, the following hazardous areas (reference Table 508.2.5 in IBC-2009 and Table 30.3.2.1.1 in NFPA 101-2015):

13.1.1 Boiler and fuel-fired heater rooms serving more than a single dwelling.

13.1.2 Laundry rooms outside of dwelling units.

13.1.3 Trash collection rooms.

13.2 The building will not contain corridors.

13.3 Per Sections 420.2, 420.3, 709.3, and 712.3 in IBC-2009 and Section 30.3.7.2 in NFPA 101-2015, dwelling units will be separated from each other by walls and floors constructed as fire barriers having a minimum 1-hour fire resistance rating.

13.3.1 Per Sections 709.4 and 712.4, Exception 2, in IBC-2009, the construction supporting the fire rated assemblies will not be fire resistance rated.

13.3.2 Penetrants will be firestopped in accordance with UL listed assemblies.

13.3.3 Where necessary, joints will be sealed in accordance with UL listed assemblies.

13.3.4 Ductwork will be equipped with 90-minute fire rated dampers (if applicable).

13.4 Per Section 708.4 in IBC-2009 and Section 7.1.3.2.1(1) in NFPA 101-2015, the interior exit stair will be enclosed in 1-hour fire rated construction.

13.4.1 The interior of the exit enclosure (dwelling openings) will be equipped with 90-minute fire rated door-frame assemblies. Fire doors will be self-latching and equipped with closers.

13.4.2 Shaft penetrants will be firestopped in accordance with UL listed assemblies.

13.4.2.1 Exit enclosure penetrants will be limited to equipment and/or systems serving the enclosure.

13.4.3 Where necessary, joints will be sealed in accordance with UL listed assemblies.

13.4.4 Ductwork will be equipped with 90-minute fire rated dampers (if applicable).

13.5 The exterior stair will not be a required means of egress. For the purpose of the narrative, it will be considered a "convenience" stair. Thus, it will not be constructed to comply with the requirements for exterior exit stairs. All stairs will comply with applicable dimensional criteria (reference Section 1009 in IBC-2009 and Section 7.2.2.2 in NFPA 101-2015).

- 13.6 Per Section 406.1.4 in IBC-2009, the private garage will be separated from the adjacent dwelling unit by gypsum board, not less than ½-inch thick, applied to the garage side. The garage will not be underneath habitable rooms.
 - 13.6.1 The opening between the garage and the dwelling unit will be equipped with a 20-minute fire rated door-frame assembly. The fire door will be self-latching and equipped with a closer.
 - 13.6.2 Per Section 406.1.4 in IBC-2009, the 20-minute fire rated door-frame assembly can be replaced by a solid wood door or solid or honeycomb core steel door not less than 1 3/8 inches thick.
- 13.7 Fire separation distances are used to evaluate building construction and exterior wall openings. Per Chapter 2 in IBC-2009, a fire separation distance (FSD) is the distance measured from the building face to one of the following (the distances are measured at right angles):
 - 13.7.1 The closest interior lot line.
 - 13.7.2 The centerline of a street, an alley, or public way.
 - 13.7.3 An imaginary line between two buildings on the lot.
- 13.8 The fire separation distances between the apartment building and house will be greater than 10 feet. All other fire separation distances will be greater than 30 feet.
 - 13.8.1 The distance between the apartment building and house is approximately 24 feet.
- 13.9 The fire-resistance rating of exterior walls will comply with Table 602 in IBC-2009.
 - 13.9.1 Exterior walls will not be fire rated.
- 13.10 Exterior wall openings will comply with Table 705.8 in IBC-2009.
 - 13.10.1 House, side facing apartment – exterior wall openings will not exceed 15% of the area of the exterior wall, per story.
 - 13.10.2 Apartment building, side facing house – exterior wall openings will not exceed 45% of the area of the exterior wall, per story.
 - 13.10.3 The area of openings for all other sides of the buildings will not be limited (fire separation distances will be greater than 30 feet).

Respectfully Submitted,
Nortech Systems



Mark R. Richards, PE
Fire Protection Engineer