



DATE: 30 April 2021

REVIEWER: Alison C. Brackett, PE

PROJECT: **Code Review for Banquet Event Use**
19 Putnam Road
Temple, NH

TO: Isabella Martin
Boo@steppingstoneeventcenter.com

Triangle Fire Consultants (TFC) has performed an evaluation of the change of use proposed for a portion of an existing barn building in Temple, NH. Our review is based on a discussion with Ms. Martin and a site visit on 4/9/2021. In question is a second-floor space that the owner wishes to use for gatherings of up to 99 people. Previous approved use of the barn has been as a dining hall for a camp, but we are unaware of whether there was a previous code study done for this use.

Summary

- Existing Occupancy Observations: currently mixed-use, unseparated with
 - Utility/Storage use on first level: used for agricultural purposes [IBC Section 312 / U] and moderate hazard storage. [IBC Section 311 / S-1]
 - Assembly use on the second level: used for assembly-type gatherings for the purposes of eating and meeting. [IBC Section 303 / classified as A-2 because of the presence of food and drink]
 - Storage on the third level: light storage [IBC Section 311 / S-2]
- Classification of Work: Level 2 alteration will be performed (a door will be added to comply with common path of travel rules in an assembly occupancy). The proposed use of the second floor as a banquet / event center does not constitute a change of use because both dining hall and banquet hall uses are classified by the IBC as A-2. Therefore, the Code review is subject to the requirements of Chapter 8 of the International Existing Building Code (IEBC) and Chapter 13 of the NFPA 101 Life Safety Code for existing assembly occupancies.
- Building characteristics: Three-story Type VB (unprotected wood frame) [V(000) per NFPA] building. Approx. 6,656-ft² per floor. No intentional fire rated separations observed.
- Fire protection systems present: No automatic sprinkler protection or fire alarm system.

Code Evaluation

The goal of the Life Safety Code is to provide an environment for occupants that is reasonable safe from fire, that provides occupants with protection and notification during initial fire development, and that provides reasonable safe crowd movement to safe areas in the event of an emergency. These objectives are met through available and obvious egress paths, good lighting, occupant notification either through automatic sprinklers or through smoke detection, and enclosure of vertical openings as necessary to afford occupants reasonable safety to egress.

Overall, the subject building is an existing mixed-use non-separated barn building that has historically housed horses and associated storage on the first level, assembly (meeting and dining) and associated uses (bathrooms, storage areas, no kitchen facilities) on the second level, and light storage on the third level. The plan to use the second level

of the barn for weddings and other gathering of up to 99 people does not represent a change of use for the building. The “work area” (IEBC) will be confined to a limited area of the barn where a new egress will be created and an existing unsafe opening will be closed off.

The focus then of this Code Analysis is to ensure that the building meets the requirements of existing assembly occupancies because of the increase in occupancy expected with larger events. While the previous assembly use was accepted, the Authority Having Jurisdiction (AHJ) has requested that the building be brought up to Code for banquet and wedding event use due to the higher life safety hazard. Per NFPA 101: 13.1.1.4 an existing building housing an assembly occupancy established prior to the effective date of this Code shall be permitted to be approved for continued use if it conforms to, or is made to conform to, the provisions of this Code to the extent, in the opinion of the AHJ, that reasonable life safety against the hazards of fire, explosion, or panic is provided and maintained. This Code language affords the AHJ with some flexibility in the acceptance of alternatives to full Code compliance.

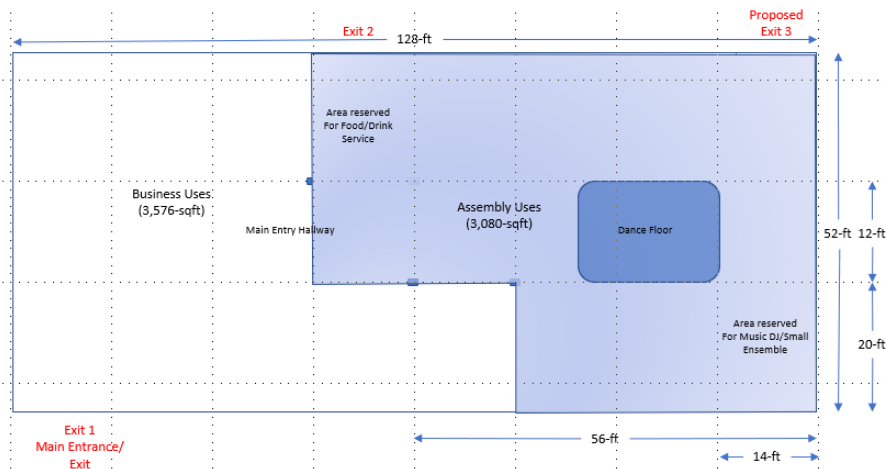


Figure 1: Second floor occupancy layout (mixed-use, unseparated)

Ms. Martin would like to hold two types of events:

- Meetings and catered dinners for less than 50 persons. This use would be classified as Business Use.
- Weddings and banquets for up to 99 people. This use would be classified as Assembly Use.

The design (or calculated) occupant load is the maximum number of people upon which egress and other life safety requirements (fire alarm, sprinkler systems) are applied. Design occupant load of the building is calculated based on the most onerous use of a space and the occupant load factor for that use. Assembly uses sometimes used fixed seating, seating at tables or in rows, or no seating at all. Each of these seating options result in different occupant loads as follows in Table 1 (see also Figure 1 for second floor areas / other areas to have negligible occupant loads).

[Note: when the occupant load of an assembly use space is less than 50 people, the area is classified as a Business occupancy, not an assembly occupancy.]

Ms. Martin has stated that the existing eight tables in the barn are to be used for seating at the proposed events. They are currently not fixed to the floor but will stay in the general arrangement that they are in currently due to building structural members (posts), planned areas for bar and food service and music, along with a dance floor that will remain in place.

Assembly Use	Occupant load factor (Table 7.3.1.2)	Design Occupant Load ²	Note
Fixed Seating	Use number of fixed seats	For the tables currently found in the barn, 10 chairs at each table, 8 tables, 80 people + 35 for the business use = 115 people .	Based on actual number of fixed seats, or number of chairs that can fit around a fixed table. ¹
Seating at Tables	15-sqft / person for assembly areas plus 100-sqft / person for business uses	1,736 / 15 = 116 plus 35 in the business use area = 151 people	Assuming different (round?) tables are brought in and are not fixed, the occupant load number could be higher.
Seating in Chair Rows	7-sqft / person for assembly areas plus 100-sqft / person for business uses	1,736 / 7 = 248 plus 35 in the business use area = 283 people	Example of this use is rows of chairs (as in a church service or theater event)

¹ The AHJ is permitted to accept various approved seating diagrams where it is impracticable to fasten the seats to the floor [NFPA 101 Sections 13.2.5.9 and 13.7.9.2]

² The AHJ is permitted also to establish the occupant load as the number of persons for which the existing means of egress is adequate, provided that measures are established to prevent occupancy of a greater number of persons. [NFPA 101: 13.1.7.1.3]

As a result of our Code Analysis, the following are required to utilize the building for weddings/events:

1. Per NFPA 101 Table 13.1.6, automatic sprinkler protection is required for assembly occupancies with up to 300 persons on the second floor of a V(000) building. *Note: For the limited number of times each year that these events are held, the AHJ may approve the use of a paid fire watch on-site for the duration of such events, as long as all other Code requirements and TFC recommendations are met.*
2. Doors in the means of egress (marked in Figure 1 as Exit 1, Exit 2, and Proposed Exit 3) shall:
 - a. Remain open / unlocked whenever occupied. Doors that can be locked closed shall be provided with panic hardware. *[Note: Exit 1 is a large sliding door and shall be locked/secured in the open position during events.]*



Exit 1 doors tied or secured open

- b. Swing in the direction of egress (out of the building). [NFPA 101: 7.2.1.4.2]
- c. Be a minimum of 32-inches wide. [NFPA 101: 7.2.1.2.3.2]

- d. The elevations of floor surfaces on each side of a door opening shall not vary by more than ½-inch, and the threshold at all door openings shall not exceed ½-inch. [NFPA 101: 7.2.1.3] An exception does exist for existing buildings in which the floor level outside the door opening is permitted to be one step lower (not more than 8-inches). [NFPA 101: 7.2.1.3.5] *Note: Exit 2 needs improvement to provide either a gradual slope down from the door opening OR a step not less than 8-inches down.*



Exit 2 door landing needs improvement

- e. Marked with exit signs that are readily visible from any direction of exit egress. [NFPA 101:7.10.1] Each of the required signs shall be located and of such size, distinctive color, and design that it is readily visible and shall provide contrast with decorations and interior finish. We recommend that you combine emergency lighting with the exit signage so that a backup power source will also serve the exit sign.
3. Add an additional means of egress (marked in Figure 1 as Proposed Exit 3) to meet the maximum common path of travel requirements of NFPA 101: Table A.7.6. All requirement for the new exit as outlined in Item 2 above apply, with the following requirements for the stairs required:
 - a. The width of the required stairs shall be not less than 44-inches.
 - b. Stair risers shall be not less than 4-inches and not more than 7-inches.
 - c. Tread depth shall be not less than 11 inches. [Note: for both items b and c, all stairs shall be uniform.]
 - d. The landing outside the door shall have a dimension of not less than 44-inches wide and not less than 44-inches deep.
 - e. The stairs shall be of permanent fixed construction and can be built of wood.
 - f. Stairs shall have handrails on both sides, shall continue for the full length of the flight (including the inside of a turn between flights at landings if provided), and between 30-inches and 38-inches above the surface of the tread. The cross-section of the rail shall be circular or another shape that is easily graspable.

4. When setting up the tables, aisles shall be not less than 44-inches wide. [NFPA 101: 13.2.5.8.2] When chairs are not fixed, Figure 2 illustrates the requirement that the measurement of clear width of the aisle shall made to a line 19-inches measured perpendicularly from the edge of the table.

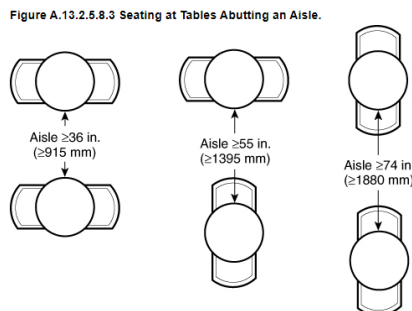


Figure 2

5. All means of egress shall discharge to a safe location outside and away from the building and fire department access locations. This includes lighting, safe walking surfaces, and obvious direction to the safe location.
6. All paths in the means of egress, both interior and exterior, shall be provided with both regular illumination and emergency lighting. [NFPA 101: 13.2.9.1] Emergency illumination is required to last for at least 1 ½-hours in the event of failure of normal lighting. [NFPA 101: 7.9.2.1] Lighting shall be arranged to provide not less than an average of 1-ft-candle and not less than 0.1-ft-candle at any point along the egress route. Testing of the emergency lighting is required before each event.
7. Provide a guard (railing) not less than 42-inches off this finished floor at the opening on the end of barn (see pic). If an open guard is provided (allowed), intermediate rails shall be provided such that a sphere 4-inches in diameter is not able to pass through any opening in the structure.



8. Any rooms storing in quantities deemed hazardous by the authority having jurisdiction shall be protected by 1-hour rated construction. Another option would be to remove the storage from the building. Laundry facilities, if provided, shall be separated by 1-hour rated construction, including a 45-minute fire rated, self-closing door.
9. No cooking equipment shall be utilized in the building unless first approved by the AHJ.
10. Interior finishes shall be classified as Class A, Class B, or Class C in all general assembly areas (therefore, at a minimum they must be Class C). These ratings refer to the flame spread and smoke development characteristics of a finish. The consequence of this requirements is that:
 - a. Hanging tapestries, foam, or plastic material on the walls or ceiling is prohibited.
 - b. If projection screens are used, they shall be Class A or Class B.
 - c. Exposed surfaces of wood structural members can be safely used. [NFPA 101: 10.2.3.1] Raw wood siding of almost all species of timber is also safe. [American Wood Council AWC-DCA1-FlameSpreadPerformance dated 2019] Care should be taken that any varnish or paint products used on the interior have an appropriate flame spread rating.
11. A fire alarm system is not required because the design occupant load of the proposed uses does not exceed 300 persons. We are not aware if the Town of Temple requires smoke detection in assembly occupancies, but we do recommend the following:
 - a. Install hard-wired smoke detectors (battery backup and interconnected) throughout the lower level of the building and connected to at least one smoke detector on the main floor in a constantly attended location. The intent of this is to provide early notification of an emergency in locations

where occupants may not be aware and know to egress. *While this is not a Code requirement, this goes toward providing substantially equivalent protection to occupants in a building that is required to be otherwise protected by automatic sprinkler protection.*

12. A full compliment of fire extinguishers are required throughout the building in accordance with NFPA 10:
 - a. Fire extinguishers shall be conspicuously located and readily accessible at all times.
 - b. For extinguishers that weigh less than 40-lbs, the top of the extinguisher shall be mounted no higher than 5-ft off the finished floor surface.
 - c. Travel between extinguishers shall be not more than 75-ft.
13. All electrical work in the building shall comply with the currently adopted version of NFPA 70.
14. Means of egress inspection shall be performed before every event:
 - a. Ensure all means of egress are free from obstructions and correct deficiencies if found.
 - b. Ensure lighting and exit signs are in working order.
 - c. Ensure that the floor / ground in the means of egress is clean, free of trip hazards, and in good repair.
15. No open flames devices are permitted in assembly occupancies unless approved by the AHJ. [NFPA 101: 13.7.3]
16. Since the building in un-separated mixed use, any storage areas in the barn are prohibited from storing compressed flammable gases, flammable or combustible liquids, or any other hazardous chemicals unless approved by the AHJ.
17. TFC recommends that smoking be prohibited both inside the barn and within 20-ft of the exterior. The AHJ may require this per NFPA 1: 10.10.
18. Combustible vegetation, including cut Christmas Trees, are not permitted in buildings used for assembly.

This concludes our Code review for the assembly uses proposed. Please let me know if you have any questions.

Kind regards,

Alison C. Brackett, PE | Fire protection
Triangle Fire Consultants, LLC – Licensed in MA, NH, VT, and ME
Alison.brackett@gmail.com

