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Building Code Analysis Report June 23, 2018
Dr. Edward L Trudeau Building

Overview

The Dr. Edward Livingston Trudeau Building, located at 118 Main Street in Saranac Lake NY, is a two-story, wood-framed structure of about 6,000 conditioned square feet, originally constructed in 1894, with several additions and modifications over time. The building is included in the Church Street Historic District of the National Register of Historic Places. Until January 2018, the building housed medical offices for the successor practice of Dr. Trudeau. Historic Saranac Lake (HSL) proposes to restore the historic fabric and renovate the building to include a museum of Dr. Trudeau's tuberculosis research and treatment, plus other functions. No additions to the building are proposed.

Applicable Building Codes

The proposed modifications, alterations, and restorations of the building will change the occupancy from medical offices to a mixture of museum, office, and residential uses. This work will be regulated by the 2015 International Existing Building Code (IEBC) as amended by the 2017 Uniform Code Supplement (UCS) of the NY State Department of State. Chapter 12 of the IEBC addresses Historic Buildings. Some additional definitions and requirements are contained in the International Building Code (IBC) and the International Energy Conservation Code (IECC).

Uses and Occupancy

The existing building was used for medical offices until January 2018. HSL proposes to develop a tuberculosis museum, HSL research offices, and rental offices on the first floor of the building. Three or more rental residential apartments are proposed for the second floor.

1. The offices will be Business Group B (IBC 304). The occupancy load factor will be 100 square feet (SF) per person.
2. The museum would typically be assembly group A, but a museum space with an occupant load of fewer than 50 people (using an occupancy load factor of 30 SF per person (IBC Table 1004.1.2) and less than 1,500 SF may be treated as Group B (IBC 303.1.1).
3. The residences on the second floor will be Residential Group R-2 (IBC 310.4). The occupancy load factor will be 200 SF per person.

Type of Construction

The building is a two-story wood frame building (type V-B) that does not include a fire sprinkler system. In this type of construction, Use Group B and R-2 are permitted to be not more than

two floors above grade. The maximum building height for B and R occupancies is 40 feet. (IBC Chapter 5). The allowable area for Group B is 9,000 SF. The allowable area for Group R-2 is 7,000 SF. (IBC Table 506.2). New residential Group R occupancies are required to be protected by an automatic sprinkler system (note h) – it must be determined if this provision will be applicable in this existing building – this will be partly determined by the design and also by the code official's interpretation in a historic building.

Classification of Work

IEBC Chapter 5 describes alternative Alteration Levels and the required code provisions. Depending on the design, the construction work will probably be either:

1. Section 504 – Alteration Level 2 – alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any new equipment. Requires compliance with Chapter 7 for Level 1 and Chapter 8.
2. Section 505 – Alternation Level 3 – applies where the work area exceeds 50 percent of the building area. Requires compliance with Chapters 7 and 8 for Level 1 and 2 respectively, as well as the provisions of Chapter 9.

Since the proposed work includes a change in occupancy, the provisions of IEBC Chapter 10, Section 1012 are applicable (IEBC Section 506).

Fire Protection

Automatic sprinkler systems will generally be required under Alteration Level 3, where the work area exceeds 50 percent of the building area. Additionally, under Alteration Level 2 (IEBC 804.2), an automatic sprinkler system is required in the entire work area for Groups B and R-2 if the work areas have exits or corridors shared by more than one tenant OR that have exits or corridors serving an occupant load greater than 30 and both of the following conditions apply:

1. The work area is required to have an automatic sprinkler system in accordance with the IBC for new construction, which is required for Group R (IBC 903.2.8); AND
2. The work area exceeds 50 percent of the floor area.

The specific design or the renovations will determine if this requirement is applicable. If the existing stairway and corridor to the exterior is shared by both the residential tenants on the second floor and business tenants on the first floor, this provision is applicable if the work area exceeds 50 percent of the floor area.

Egress Requirements

Means of Egress are specified in IBC Chapter 10. The minimum number of exits per story for this building is two, with some exceptions. A business (B) occupancy may have a single exit from the first story above the grade plane if the maximum occupancy load per story is 49 and the maximum travel distance is 75 feet. The business occupancy may have a single exit from the second story above the grade plane if the maximum occupancy load per story is 29 and the maximum travel distance is 75 feet. (IBC Table 1006.3.2(2)). The applicability of these

provisions will depend on the specific design that is developed, especially with respect to travel distance. Since the office (Group B) uses on the first floor will be separated into those used by HSL and those rented to tenants, one or two exits will be required from each.

Residential (R2) occupancy egress is regulated by the provisions of the NYS 2017 Uniform Code Supplement, which replaces provisions of the 2015 IEBC Section 805.3.1.1. A residential R-2 occupancy may have a single exit from the second story if the number of dwelling units is not more than 4, the maximum gross floor area per story is 3,500 SF, and the exit access travel distance does not exceed 50 feet. With a single exit from the Group R space, an electronically supervised quick response wet pipe sprinkler system is required in all non-residential occupancies located below Group R. (UCS Table 805.3.1.1(2) note "d")). Alternately, per IBC, a single exit is permitted if the maximum common path of egress travel distance is 125 feet, and the building is equipped throughout with an automatic sprinkler system and provided with emergency escape and rescue openings (IBC 1006.3.2.1, Table note "a"). Since the addition of an automatic sprinkler system throughout all or major parts of the building is likely to be impractical and/or prohibitive in cost in this existing historic building, it is assumed that two exits will be required from the second floor.

One of the required exits will be the existing historic stair (see provisions below). The second exit can be an internal or external stairway; a fire escape is not permitted because it is possible to construct a stairway (IEBC 805.3.2.1, note 3).

Stairways for egress are regulated by IBC Section 1011. The minimum stairway width for an occupancy not more than 50 persons is 36 inches (IBC 1011.2, exception 1). The maximum riser height is 7 inches and the minimum tread width is 11 inches. These provisions will apply to any new exit stairway from the second floor, if required. Other provisions of IEBC Chapter 8 are also applicable if the project will be governed under Alteration Level 2 or 3.

Historic Buildings

The code includes several provisions that make accommodation for the special characteristics of historic buildings and provide some flexibility in how compliance is accomplished.

The existing historic stair is an existing vertical opening regulated by the IEBC 803.2.1. In Group B, a minimum 30-minute enclosure is required at vertical openings not exceeding three stories. In a historic building, a stairway enclosure, if required, must limit the spread of smoke by tight-fitting doors and solid elements. Such elements are not required to have a fire-resistance rating (IEBC 1203.6). IEBC 803.2.1 Exception 11 does not require an enclosure for vertical openings in Group R-2 occupancies not exceeding two stories and with not more than four dwelling units per floor. These provisions will guide design revisions to the existing historic stair.

IEBC Chapter 12, Historic Buildings includes many specific provisions that are different from non-historic existing buildings. Some notable provisions for this analysis are:

1201.2 – A written report may be required by the code official identifying each required safety feature that is in compliance with the chapter and identifying where compliance with other provisions would be damaging to the contributing historic features.

1203.3 – The code official may approve existing openings, corridors and stairway widths that are less than required, provided that, in the opinion of the code official, the conditions are sufficient for required egress.

1203.7 – Existing wall and ceiling finishes composed of plaster over wood or metal lath are deemed to meet a 1-hour fire-resistance assembly, if required.

1203.9 – Existing handrails and guards at all stairways shall be permitted to remain unless they are structurally dangerous.

1204.1.4 – At least one family or assisted-use toilet room shall be provided.

1205.13 – Exit Stair Live Load – An existing historic stairway in an R-2 occupancy must be able to support a minimum 75-pounds-square-foot live load.

Energy Conservation

There is limited evidence of thermal insulation in the walls, floors, or ceilings of the existing building, with the possible exception of the most recent addition. All original windows have been replaced with high quality thermally-insulated window units. The building is heated using fuel oil and a relatively energy efficient heating system that was installed in 2006. Space cooling is provided with individual through-wall room air conditioning units; such units are generally not energy efficient. Wherever practical, additional energy conservation measures should be incorporated during the renovation of the building.

The International Energy Conservation Code (IECC) includes provisions for existing historic buildings. Energy conservation provisions are not mandatory for historic buildings provided that a report has been submitted to a code official demonstrating that compliance with that provision would threaten, degrade, or destroy the historic form, fabric, or function of the building (IECC C501.6). Alterations where the existing wall, roof, or floor cavity is not exposed are not required to be brought into compliance with the code (IECC 503.1).

Other Code Research

During the detailed design of the building restoration and rehabilitation, research will be required to ascertain the applicability of other codes to the project including:

1. 2015 International Fire Code, especially as it applies to Historic Buildings (IFC 1103.1.1).
2. 2015 International Mechanical Code provisions for ventilation and fire separation around combustion equipment
3. 2015 International Building Code provisions for fire protection systems
4. 2017 Uniform Code Supplement provisions regarding carbon monoxide detection systems (section 915.3).

Summary of Code Analysis

The specific application of the applicable code requirements to the renovation/restoration of the Trudeau building will be determined when a detailed architectural and engineering design is developed. Based on this building code analysis, the significant conclusions are:

1. The Trudeau building can be renovated to achieve the desired combination of office, museum, and residential apartment uses.
2. The project should strive to meet the provisions of Alteration Level 2 of the IEBC, where the work area does not exceed 50 percent of the building. Alteration Level 3 will significantly increase the applicable building code requirements.

3. Since retrofitting all or major parts of the building with an automatic fire sprinkler system would have a significant impact on the historic fabric and character of the building, and would be expensive, the project should attempt to achieve a design that will not require this type of system. The existing building has a sophisticated fire detection system that should be modified to meet the specific building code requirements of the new uses.

4. The residential occupancy proposed for the second floor will require the design of a second exit from that story in addition to the existing historic stair. The alternative using only the existing historic stair would require an automatic fire sprinkler system through all or a majority of the building.

5. In a historic building, the building code enforcement official (CEO) has a significant amount of discretion in the application of some code requirements. The CEO may require a written analysis of each safety feature and the impact on the historic features of the building.

6. While all practical means of improving the energy efficiency of the building should be incorporated in the design and construction of the renovation, the energy code requirements (IECC) will not have a significant impact on this historic building.

7. During the detailed design phase, additional code investigation will be required to assess the applicability of fire code and mechanical code provisions.