



## **Senior Housing**

**Conceptual Design  
Whitney Hall  
5 School Street  
Royalston, Massachusetts**

Prepared by:

Haynes, Lieneck, and Smith, Inc.  
(Architects)

10 Common Road  
Post Office Box 128  
Ashby, Massachusetts  
01431-0128

(978) 386-2473

**Architect's Project 17040**

October 1, 2018



10 Common Road  
Post Office Box 128  
Ashby, Massachusetts 01431-0128  
(978) 386-2473  
(978) 386-2474 (facsimile)

## Table of Contents Senior Housing

### **Architect's Project 17040 Conceptual Design Whitney Hall 5 School Street Royalston, Massachusetts**

Cover Page

Table of Contents

Evaluation of Existing Building

Space Program for Dwelling Units

Design Concepts

Conceptual Construction Budget

Code Compliance Report

Drawings:

#### Existing Conditions

- EX1: FLOOR PLAN: BASEMENT
- EX2: FLOOR PLAN: FIRST FLOOR
- EX3: FLOOR PLAN: SECOND FLOOR
- EX4: FLOOR PLAN: THIRD FLOOR (ATTIC LEVEL)
- EX5: EXTERIOR ELEVATION: SCHOOL STREET SIDE (WEST)
- EX6: EXTERIOR ELEVATION: PARKING SIDE (EAST)
- EX7: EXTERIOR ELEVATION: DRIVE SIDE (NORTH)
- EX8: EXTERIOR ELEVATION: PLEASANT STREET SIDE (SOUTH)

#### Alterations

- A1: SITE PLAN
- A2: FLOOR PLAN: BASEMENT
- A3: FLOOR PLAN: FIRST FLOOR
- A4: FLOOR PLAN: SECOND FLOOR
- A5: FLOOR PLAN: THIRD FLOOR (ATTIC LEVEL)
- A6: EXTERIOR ELEVATION: SCHOOL STREET SIDE (WEST)
- A7: EXTERIOR ELEVATION: PARKING SIDE (EAST)
- A8: EXTERIOR ELEVATION: DRIVE SIDE (NORTH)
- A9: EXTERIOR ELEVATION: PLEASANT STREET SIDE (SOUTH)



10 Common Road  
Post Office Box 128  
Ashby, Massachusetts 01431-0128  
(978) 386-2473  
(978) 386-2474 (facsimile)

## **Evaluation of Existing Building Senior Housing**

**Architect's Project 17040  
Conceptual Design  
Whitney Hall  
5 School Street  
Royalston, Massachusetts**

### Site:

The front yard has the potential for development for limited accessible parking and an accessible entrance in the front tower where the existing entrance doors are located.

The rear yard has the potential for development for parking.

The basement level is directly accessible along the front for building services.

The second egress bridge to the side street (Pleasant Street) provides egress only for a limited part of the building and a better solution is needed long term.

There is additional site in the rear for development as a public play area or other community related gathering space that also affords the senior housing residents an outdoor space. Some of the additional site may be considered for sale to the adjacent church.

### Building:

The basement level is in fair condition and is not conducive to space accessible to the public. The basement space is better suited to building systems spaces and support spaces that are not accessed by the public.

The first floor and second floor are actively being used for municipal offices and are in good condition, although not configured for senior housing. Removal of existing partitions to the exterior walls is recommended.

The third floor (attic level) is not currently developed. There is potentially usable space on the third floor.

The building does not have an elevator.

The building envelope is in fair condition. The siding is anticipated to be salvageable and workable although the long term maintenance of the wood siding is not desirable. The recommendation is for a fly ash based composite siding. The recommendation is for replacement of the doors and windows with energy efficient metal clad wood windows and doors. For a long term solution the roofing is recommended to be replaced as part of total building upgrade.

### Building Systems:

The structural system includes the following components:

The first floor is construction of rough wood columns with natural wood beams (members that are not milled). There is not a method for calculating the load capacity of the first floor components which were constructed long before a state building code existed. The recommendation is to remove the first floor framing and reconstruct the first floor with structural steel columns, structural steel supplemental intermediate beams, wood floor joists of limited depth as feasible, and plywood floor sheathing and underlayment.

The columns in the basement continue through to support the second floor and the bearing points of the roof frames in the exterior walls appear to align with the column lines for the internal columns on the basement and first floor. Accordingly, there are anticipated to be a heavy timber frame in the exterior walls that aligns with the interior columns and with the roof beams.

The second floor framing is anticipated to be adequate for the intended uses because the building has functioned with an assembly space on the second floor. During structural evaluation, the floor structure will be evaluated to verify load capacity.

The third floor is probably not adequate to support the intended load without reinforcement. The third floor has wood transverse supporting girders that are suspended by tie rods from the roof beams. There are no web members between the floor beams and the roof beams so the roof structure is not a truss. The recommendation is to reinforce the floor framing and the roof framing to support the loading capacity required. One factor in the favor of the structure is that the roofing was probably slate tile and is now asphalt shingles which are much lighter.

There is not lateral load resisting structural that is required by current building codes. The recommendation is to remove the interior finish on the exterior walls and to provide plywood sheathing before gypsum board facings to provide lateral load resisting shear walls. Further, internal steel frames for lateral stability are recommended where the frames can be incorporated.

The framing for the third floor (attic floor) which is suspended from the roof girders is reinforced and upgraded with structural steel and wood framing to provide the code required live load capacity

There is no fire suppression system. The building code mandate is to provide an automatic fire suppression system throughout that reports through a fire alarm system. A dry system is recommended that provides full coverage including the attic above the third floor.

The plumbing system is not adequate. The recommendation is to provide a full plumbing system beginning at the water service entrance and the sanitary sewer service outlet. A hot water heater for each dwelling unit is recommended

The mechanical systems are nearing the end of the useful life and the systems do not provide fresh air. The recommendation is to provide a heat pump heating and air conditioning system for each dwelling unit in conjunction with an energy recovery ventilator for each dwelling unit that provide fresh air and ventilation.

The electrical system is not contemporary and is recommended to be replaced. With the incorporation of air conditioning and the elevator, an upgraded three phase electrical service is recommended with an underground service entrance with spare conduit for future services. Further, the following electrical systems are recommended:

- Emergency generator for life safety systems and for elevator
- Ambient lighting with LED fixtures throughout
- Cable television or other system for television, telephone, and internet to dwelling units
- Fire alarm system with coverage of the common areas and with residential coverage within the dwelling units.



10 Common Road  
Post Office Box 128  
Ashby, Massachusetts 01431-0128  
(978) 386-2473  
(978) 386-2474 (facsimile)

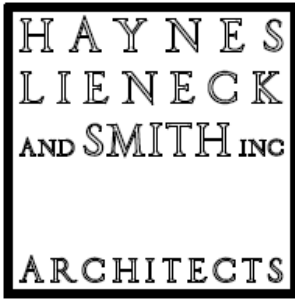
## **Space Program for Dwelling Units Senior Housing**

**Architect's Project 17040  
Conceptual Design  
Whitney Hall  
5 School Street  
Royalston, Massachusetts**

The dwelling units are between 700 square feet and 800 square feet in size with the following nominal net room sizes:

<b>Size</b> (Net square feet)	<b>Room</b>
50	Entry
80	Kitchen
80	Dining area
170	Living room
180	Bedroom
30	Bath
40	Laundry

In addition, each dwelling unit has a nominal 100 net square foot storage space in the basement



10 Common Road  
Post Office Box 128  
Ashby, Massachusetts 01431-0128  
(978) 386-2473  
(978) 386-2474 (facsimile)

## **Design Concepts Senior Housing**

**Architect's Project 17040  
Conceptual Design  
Whitney Hall  
5 School Street  
Royalston, Massachusetts**

### Site:

Accessible parking is provided at the beginning of the drive with a short accessible route to the main entrance at the current locations. The site around the parking is regraded to provide accessible parking space and a low slope walkway to the landing at the entrance. The low sloped walkway is extended to the sidewalk at the street.

Steps are provided from the sidewalk to the front entrance.

A parking lot is provided in the rear with a sloped walkway up to an accessible entrance from the parking area. The top of the walkway is covered. Steps are also provided from the parking to the rear entrance.

The dumpster is located off the rear parking lot and there is a truck turning area before entering the parking lot.

Additional parking that could be shared by the church is not included.

### Building:

The front tower will be the fire rated and smoke controlled stairway and elevator. The stairs will be on the north and south sides of the elevator, and there are elevator landings on the east and west sides of the elevator. The elevator has one stop on the west side at the grade of the exterior accessible entrance and then four stop son the east side; one stop for the basement and each of the three dwelling unit floors.

The basement level is planned for a storage unit for each dwelling unit and for utility spaces.

The first floor has three dwelling units with an accessible entrance from the front and an accessible entrance from the rear so there are two means of egress from the first floor.

The second floor has three dwelling units and the common path of travel from the most remote point to the point where two means of egress are present is within the code required distance for stories with one exit. Accordingly, the second floor is allowed to have one exit as long as the bedrooms have emergency rescue windows. Further, since the door to each dwelling unit is with 20 feet of the door to the fire rated and smoke controlled stairway, the second floor is allowed to be a story with one exit.

The third floor has two dwelling units and since the door to each dwelling unit is with 20 feet of the door to the fire rated and smoke controlled stairway, the second floor is allowed to be a story with one exit.

Code compliant natural light enters the dwelling units through emergency egress windows on the gable ends.

### Building Systems:

The structural system is upgraded as follows:

The first floor is reconstructed with conventional floor joists, supplemental steel beams, and plywood subfloor and underlayment to provide the code required live load capacity

The framing for the third floor (attic floor) which is suspended from the roof girders is reinforced and upgraded with structural steel and wood framing to provide the code required live load capacity

The interior finish from the exterior walls is removed for insulating the existing wall cavity and the interior surface is replaced with plywood sheathing and gypsum board to provide lateral load resistance in all four directions.

Interior steel bracing is provided to provide internal lateral load resistance.

An automatic fire suppression system is added, reporting through the fire alarm system. The system is a dry pipe system that provides full coverage including the attic above the third floor.

The plumbing system is replaced from the water service entrance and the sanitary waste outlet. A hot water heater is provided for each dwelling unit.

The mechanical systems are replaced. An energy recovery ventilator and a split system with heat pump and exterior condensing unit are provided for each dwelling unit. The ventilator provides fresh air to the dwelling unit and exhaust air from the dwelling unit. The split system provides heating and cooling to the dwelling units with piping to indoor delivery units.

The electrical system is replaced. An upgraded service is provided to a house main distribution panel in the basement. Each dwelling unit has subpanel within the dwelling unit and code required power distribution throughout.

The fire alarm system is replaced with coverage of the common areas and with residential coverage within the dwelling units.

### Dwelling Units:

The dwelling units are between 700 square feet and 800 square feet in size and are suitable for senior citizens that are a single person, a married couple, or two unrelated individuals that can share a bedroom space with individual beds.

Each dwelling unit has the following spaces:

Entry with coat closet

Kitchen with pass through to dining area

Dining area that is part of the living room and that doubles as an activity table

Living room with seating for residents and guests

Bedroom with closet and space for dresser

Bath room with vanity, water closet, and shower or combination tub and shower as space allows

Washer and dryer, floor mounted, not stacked

The kitchen is appointed with large single bowl sink, dishwasher, refrigerator and freezer, and range with oven, cooktop, and hood venting to the energy recovery ventilator. There is ample counter space.

Finishes include carpet in the bedrooms and living rooms, luxury vinyl tile in the dining area, kitchen, and entry, and ceramic tile in the bath rooms. The color and pattern of flooring is selected for the circulation path to be discernable by the visually less acute.

Wood trim includes the following:

- Door frames
- Wood casings at doors and windows
- Wood base



Architect's Project 17040  
 Conceptual Design  
 Whitney Hall  
 Royalston, Massachusetts

## Senior Housing

### Conceptual Budget Cost

COST	DESCRIPTION
270,000	GENERAL CONDITIONS
175,000	OVERHEAD AND PROFIT
110,000	SITE WORK
70,000	DEMOLITION
25,000	HAZARDOUS MATERIALS ABATEMENT
25,000	CONCRETE
70,000	MASONRY
50,000	STRUCTURAL STEEL
25,000	MISCELLANEOUS METALS
160,000	ROUGH CARPENTRY
95,000	FINISH CARPENTRY
20,000	MOISTURE PROTECTION
60,000	BUILDING INSULATION
20,000	ASPHALT SHINGLE ROOFING
25,000	SIDING
5,000	JOINT SEALING
15,000	PRESSED METAL FRAMES
35,000	FIBERBOARD DOORS
10,000	CLAD WOOD DOORS
75,000	CLAD WOOD WINDOWS
35,000	HARDWARE
5,000	GLAZING
125,000	GYPSON BOARD
35,000	CERAMIC TILE
70,000	ACOUSTICAL INSULATION
50,000	RESILIENT FLOORING
2,000	ENTRY MAT TILE
45,000	CARPET
70,000	PAINTING
10,000	SPECIALTIES
45,000	APPLIANCES
5,000	LOUVERS
3,000	SIGNAGE
5,000	TOILET ROOM ACCESSORIES
10,000	WINDOW TREATMENT
175,000	ELEVATOR
70,000	FIRE SUPPRESSION SYSTEM
125,000	PLUMBING
290,000	HEATING, VENTILATING, AND AIR CONDITIONING
180,000	ELECTRICAL

**2695000**

#### CONSTRUCTION COST

270000 DESIGN AND CONSTRUCTION CONTINGENCY  
 175000 PROFESSIONAL SERVICES FEE

**3140000**

#### PROJECT COST



10 Common Road  
Post Office Box 128  
Ashby, Massachusetts 01431-0128  
(978) 386-2473  
(978) 386-2474 (facsimile)

September, 2018

## **Code Compliance Report Investigation and Evaluation of Existing Building Senior Housing**

**Architect's Project 17040  
Alterations  
Whitney Building  
5 School Street  
South Royalston, Massachusetts**

**780 CMR The Massachusetts State Building Code, ninth edition, Chapter 34  
International Building Code (IBC) 2015 and Massachusetts Amendments  
Existing Building Code of Massachusetts (IEBC) 2015  
521 CMR Rules and Regulations of the Architectural Access Board 2006  
International Energy Conservation Code (IECC) 2015  
International Mechanical Code (IMC) 2015  
248 CMR Uniform State Plumbing Code 2017**

### **780 CMR The Massachusetts State Building Code, eighth edition, Chapter 34**

#### **General Information:**

The project is to renovate Whitney Hall for use as senior citizen housing. The Alterations involve using the basement level for tenant storage and spaces for building systems; and using the first floor, second floor and third floor attic level for dwelling units that are approximately 800 square feet in floor area. Each dwelling unit consists of an entry with closet, kitchen, bath room with tub or shower, laundry, bedroom, and living space with an eating area.

The following information is available from the Board of Assessors:

Whitney Hall was constructed in 1907

The building has an assessed value of \$398,300.

The building has a gross floor area of enclosed space of 11,384 square feet with 2,846 square feet on the basement, first floor, second floor, and attic.

The site is an irregular shape of 1.000 acres that surrounds the adjacent church building.

The building is in the R2 Zoning District

The roof framing in the attic rest on the exterior walls such that the usable area in the attic where the ceiling is at least 5 feet above the floor is less than the footprint area of the building. The usable area in the attic is approximately 2,295 square feet.

## Use and Occupancy Classification:

In accordance with IBC 302.1 General, in determining the Use Group for the area being altered, consideration is given to the Use Group which most nearly resembles the occupancy characteristics and relative hazards to life safety that occur in the portion of the building being altered.

The existing first floor is used for municipal offices. In accordance with IBC 304.1 Business Group B, offices for civic administration are in Business Group B.

The second floor of the building is used for meeting space with a capacity of more than 50 occupants. In accordance with IBC 303.1: Assembly Group A, meeting rooms with an occupant load of more than 50 persons are in Assembly Group A3.

In accordance with IBC 310.1: Residential Group R, apartment houses with more than two dwelling units where the occupants are primarily permanent in nature are included in Residential Group R2.

Accordingly, the existing building is a mixed use building without separations consisting of Business Group B throughout except for the second floor meeting room which is Assembly Group A3; and the Alterations involve a change in occupancy with a change in occupancy classification to Residential Group R2, apartments.

**Construction Classification:** Although some of the construction is concealed from view, in accordance with IBC Table 601 Fire Resistance Rating Requirements for Building Elements, the construction classification is determined to be Type VB with the following characteristics:

Wood frame supporting floors and roof with columns in exterior wall and with interior columns  
Wood framed floor construction  
Wood frame with tie rods supporting the attic floor and a steeply pitched roof  
Interior non-load bearing partitions of wood framing

## Existing Conditions:

**Eighth Edition, 780 CMR The Massachusetts State Building Code 34: Existing Buildings:** Evaluation of an existing building is according to 780 CMR 34, which is replaced by the IEBC with modifications according to the 780 CMR 34 amendments.

## IBC 102.6.4: Existing Means of Egress, Ventilation, and Lighting

Regardless if any work is planned and as a minimum requirement for occupancy; the building official may cite the following conditions and require abatement of cited conditions to make the building environment safe, healthy, or otherwise in compliance with 780 CMR:

### Means of Egress:

Less than the number of means of egress required

Any required component, which is of insufficient width to provide adequate exit capacity

Any means of egress that is not so arranged as to provide safe and adequate means of egress including, but not limited to, unimpeded access and required emergency lighting

The second egress from the basement level has a restricted door height and restricted interior stairs with restricted landing area. The second means of egress from the second floor is a sloped bridge to the public way at the side street. The existing means of egress will be improved to suit conditions involved with alterations.

Ventilation: In accordance with IBC 1203: Ventilation, building shall be provided with natural ventilation in compliance with IBC 1203.4: Natural Ventilation or mechanical ventilation in compliance with IMC 403: Mechanical Ventilation and IMC Table 403.3.1.1 Minimum Ventilation Rates.

In accordance with IMC 403, where natural ventilation is not provided, mechanical ventilation will be provided based on a default occupant density with assigned flow rate per person (people rate) plus a flow rate per square foot (area rate) as follows:

Occupancy	People rate Cubic feet/ person	Area rate Cubic feet/ square foot	Exhaust Rate cubic feet/ minute continuous or cubic feet/ square foot
Living areas	15	0	0
Kitchens	0	0	100
Bath rooms	0	0	50 cubic feet/fixture

The building was designed with natural ventilation. Natural ventilation will be maintained in the living areas and mechanical ventilation will be provided where specifically required for the kitchens and bath rooms. Accordingly, the existing ventilation does not present hazardous conditions.

Lighting: In accordance with IBC 1205: Lighting, every space intended for occupancy shall be provided with natural light by means of exterior glazed openings or with artificial light to an average illumination of 10 foot-candles over the area of the space at 30 inches above the floor level.

The existing natural lighting and artificial lighting systems provide adequate lighting and do not present a hazard.

**IEBC 101.2.3: Scope**: In accordance with IEBC 101.2.3, requirements in 780 CMR 34: Existing Structures for plumbing, fuel gas, electrical, elevators, fire, or accessibility shall be replaced with the requirements of the Massachusetts specialty codes as indicated in 780 CMR 1.00 Scope and Administration.

**IEBC 104.2.2.1: Building Investigation and Evaluation**: In accordance with IEBC 104.2.2.1, the Designer of Record is required to investigate, evaluate, and report to the building inspections authority on the effects of the Alterations on designated aspects of the existing building including Design Gravity Loads, Lateral Load Capacity, Egress Capacity, Fire Protection Systems, Fire Resistive Construction, Interior Environment, Hazardous Materials, and Energy Conservation. The report on the investigation and evaluation of the Alterations is as follows:

Design Gravity Loads: The Alterations do not affect the gravity load carrying capacity of the existing structure to the extent that compliance with IBC is required.

The building was originally designed for classroom occupancy. The building is currently used for office and assembly. In accordance with IBC Table 1607.1 minimum Uniformly Distributed Loads, minimum live load on floors for the various occupancies is as follows:

Live load	Occupancy
40 pounds per square foot	Classrooms
50 pounds per square foot	Offices
100 pounds per square foot	Assembly areas with movable seats

Accordingly, the gravity loads do not exceed the gravity load for any of the other occupancies which have occurred in the building. However, the actual live loads that were used when the building was constructed are not known and the loads in IBC Table 1607.1 cannot be assumed. Therefore, the existing floor structures will be structurally evaluated and reconstructed to meet the live load characteristics.

The existing first floor framing is very rough cut logs that are not likely to calculate so that the first floor framing will be replaced.

The floor framing for the attic will probably be close to providing the live load but the supporting beams with tie rods from the roof structure probably will not so that replacing the beams for the floor structure on the attic floor is anticipated.

Existing members on which an added load of less than 5 percent is placed may remain in accordance with 707.4, which requires compliance with the IBC where the Alterations reduce the capacity of existing gravity load carrying structural elements or where additional gravity loads exceeding 5 percent are added to the existing structural elements.

Lateral Load Capacity: The Alterations affect the lateral load carrying capacity of the existing structure because the level of work requires compliance with IBC 1609: Wind Loads and IBC 16010: Soil Lateral Loads. Bracing against lateral loads will be provided as required.

The interior facing of the exterior walls will be removed throughout for access to the exterior wall cavity for insulation. After insulation and a vapor barrier are provided, the interior surface facing will be plywood to provide lateral resistance. The plywood will be covered with 3/8 inch gypsum board veneer.

Where the interior columns occur, the columns will be replaced with steel columns with diagonal vertical steel bracing. Finished walls are located to conceal the bracing.

Other methods of bracing will be considered as the design is developed.

Egress Capacity:

Egress Capacity: The Alterations do not affect the egress capacity. The design occupant load for the residential use is less than the design occupant load for office space.

In accordance with IBC Table 1004.1.4: Maximum Floor Area Allowances per Occupant, the Design Occupant Load is based on 100 square feet gross per person for Business Group B occupancy and the Design Occupant Load is based on 200 square feet gross for Residential Group R.

Further, In accordance with IBC Table 1006.3.2(1) Stories with One Exit for R2 Occupancies, with the installation of a fire sprinkler system, which is required for Residential Group R uses, the floors can be considered for qualifying as a story with one exit if there are less than four dwelling units per floor; if the common path of travel distance from the most remote point to the point where the occupants have separate and distant access to two means of egress is less than 125 feet; and if there are emergency escape and rescue windows in each sleeping room. The first floor has two means of egress; the second floor qualifies as a story with one exit, and the third floor does not qualify because the path of common travel is greater than 125 feet. However, in accordance with IEBC 805.3.1.1.1: Single Exit Buildings and IEBC 805.3.1.1.9, only one exit is required from buildings and spaces in Residential Group R2 buildings of any height with not more than 4 dwelling units per floor; with a smoke-proof exit enclosure; and with doors to the exit enclosure located within 20 feet of travel to the entrance doors to dwelling units served by the exit enclosure. There are less than four dwelling per floor, the exit enclosure shall be smoke-proof, and the doors from the dwelling units shall be within 20 feet of the exit enclosure. Accordingly, the one stairway around the elevator is sufficient for egress from every floor.

Egress Lighting: In accordance with IBC 1008: Means of Egress Illumination, the egress paths will be illuminated by battery powered egress lights.

Exit Signs: In accordance with IBC 1013: Exit Signs: Lighted exit signs will be provided.

#### Fire Protection Systems:

Fire Suppression: The Alterations affect the fire suppression requirements. A fire suppression system is required. In accordance with IBC Table 903.2 Occupancy Automatic Sprinkler Requirements, an automatic fire sprinkler system is required throughout the building for any Residential Group R Alterations. The fire suppression system is allowed to meet the requirements in National Fire Protection Association NFPA 13R for a Residential system.

In accordance with IBC 905.3.1 Height, Standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet above the lowest level of fire department vehicle access.

Fire Alarm: The Alterations affect the fire alarm system. A fire alarm system shall be provided.

In accordance with IBC 420.6: Fire Alarm Systems and Smoke Alarms, fire alarm systems and smoke alarms shall be provided in Residential Group R2 occupancies in accordance with IBC 907.2.8. Single and multiple stations smoke alarms shall be provided in accordance with IBC 907.2.11.

In accordance with IBC 704.4.1.6: Residential Group R2, a fire alarm system shall be installed in accordance with IBC 9. In accordance with IBC 907.2 Where Required, a fire alarm system shall be provided for Residential R2 uses in accordance with IBC 907.2.1 through 907.2.23 and shall provide notification in accordance with IBC 907.5.

The fire alarm system shall be coordinated with the automatic fire sprinkler system to provide supervision and notification through the heat sensing devices of the fire sprinkler system.

The Alterations affect the requirements for fire extinguishers. In accordance with IBC 906.1: Where Required, fire extinguishers shall be provided in Residential Group R2 occupancies in compliance with NFPA 10: Standard for Portable Fire Extinguishers, which requires a Type 2ABC fire extinguisher for every 3,000 square feet and within a travel distance of 75 feet to an extinguisher. A fire extinguisher provided in the common area on each floor will provide the required coverage.

#### Fire Resistive Construction:

In accordance with IBC Table 601: Fire-Resistance Rating Requirements for Building Elements, there are no requirements greater than zero-hour fire ratings.

In accordance with IBC 602 Fire Resistance Rating for Exterior Walls Based on Fire Separation Distance, there is a requirement for a two-hour fire rating when an adjacent building is within 5 feet and a one-hour fire rating for the exterior wall when an adjacent building is within 30 feet. Measured perpendicular to the wall, there are no adjacent buildings within 30 feet of the existing exterior wall.

In accordance with IBC 708: Fire Partitions, wall assemblies for Residential Group R2 occupancies shall comply with IBC 420.2. In accordance with IBC 420.2: Separation Walls, wall separating dwelling units in the same building shall be constructed as fire partitions in accordance with IBC 708. In accordance with 708.3: Fire-Resistance Rating, Exception 2, dwelling unit separations in buildings of VB Construction Classification shall have a fire resistance rating of 1/2 hour in buildings equipped throughout with an automatic sprinkler system in accordance with IBC 903.3.1.1. Accordingly, walls around dwelling and the doors to dwelling units shall have a fire resistance rating of 1/2 hour.

In accordance with IBC 420.3: Horizontal Separation, floor assemblies separating sleeping areas in the same building shall be constructed according to IBC 711: Floor Assemblies. In accordance with IBC 711.2.4.3: Dwelling Units, Exception, horizontal assemblies serving as dwelling unit separations in accordance with IBC 420.3 shall not be less than 1/2 hour in buildings of Construction Classification VB

where the building is equipped throughout with an automatic sprinkler system in accordance with IBC 903.3.1.1. Accordingly, the floor-ceiling assemblies separating dwelling units shall have a fire resistance rating of 1/2 hour.

In accordance with IBC 1020 Corridors and IBC Table 1020.1 Corridor Fire Resistance Rating, in Residential Group R occupancies serving an occupant load greater than 10 persons, a sprinkler system and a 1/2 hour fire rating are required for corridor walls. Accordingly, the corridors shall have a fire resistance rating of 1/2 hour.

In accordance with IBC 713 Shaft Enclosures, shaft enclosures shall be provided around stairways. In accordance with IBC 713.4: Fire-resistance rating, shaft enclosures shall have a fire resistance rating of one-hour where connecting less than four stories. Accordingly, the shaft enclosures around the stairways shall be one-hour fire-rated.

#### Interior Environment:

Based on the components of the interior environment indicated in IBC 12, the following existing conditions of the interior environment are evaluated for effects resulting from the Alterations:

Ventilation: The Alterations affect the existing mechanical ventilation system. The natural ventilation shall be replaced with mechanical air handling systems, ducted supply air and ducted return air from each dwelling. The ventilation of spaces no longer involves natural ventilation to meet ventilation requirements.

Mechanical ventilation will also be provided in bath rooms and kitchen.

Temperature Control: The Alterations affect the existing temperature controls. The existing controls are being replaced with controls for each dwelling unit.

Lighting: The existing lighting system will be replaced throughout the building.

Yards or Courts: There are no existing yards or courts involved with the Alterations.

Sound Transmission: The Additions and Alterations affect sound transmission in the floor-ceilings assemblies, and between dwelling units.

In accordance with IBC 1207.2: Air-borne Sound, floor-ceiling assemblies separating dwelling units from each other or from public areas within the structure shall have a sound transmission class (STC) of not less than 50 for air-borne noise when tested according to ASTM E90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss.

In accordance with IBC 1207.3: Structure-borne Sound, floor-ceiling assemblies separating dwelling units from each other or from public areas within the structure shall have an impact insulation class (IIC) of not less than 50 when tested according to ASTM E492: Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-ceiling Assemblies.

Interior Space Dimensions: The Alterations maintain the requirements for the size of spaces in compliance with minimum space requirements for occupied spaces.

Access to Unoccupied Spaces: The involve access to unoccupied spaces.

Access is provided for the attic level via a stairway and then access panels to the attic areas.

The access to the existing basement level is maintained.

Hazardous Materials: The Owner shall be responsible for identifying hazardous materials that are not concealed within existing construction, and for reporting the presence of hazardous materials to the Contractor. The results of testing for hazardous materials in the area of Alterations shall be provided to the Contractor prior to the start of construction. Hazardous materials that are disturbed by the Additions and Alterations will be abated.

The contractor is being instructed to identify, report, and properly handle any concealed hazardous materials that may be uncovered during construction.

Energy Conservation: The Alterations affect energy conservation.

In accordance with IECC R503.1: General, Alterations to an existing building, building system, or portion thereof shall conform to the provisions of the IECC for new construction without requiring the unaltered portions of the existing building or building system to comply with the IECC.

In accordance with IECC R503.1.1: Building Envelope, Exception 2, provided the energy use of the building is not increased by the Alterations, Alterations are not required to comply with the IECC where existing cavities at the roof, ceilings, walls, or floors are not exposed by the Alterations.

Although not required by the codes, the Alterations provide for insulation in the exterior wall cavities and in accordance with R503.1.1: Building Envelope, the cavities will be filled with insulation, but meeting a prescribed value of insulation is not required.

In accordance with IECC Table R402.1.2: Insulation and Fenestration Requirements by Component, the following prescribed insulation requirements apply in Residential Occupancies in Zone 5:

Fenestration added in Climate Zone 5 including, windows and doors shall have a maximum heat loss resistance factor of U0.32

There is no Solar Heat Gain Coefficient requirement for fenestration.

Horizontal planes separating attic spaces from heated spaces shall be insulated with minimum R49 insulation.

Wood framed exterior walls shall be insulated with minimum R20 cavity insulation or with minimum R13 cavity insulation with minimum R5 continuous insulation; except that only the cavity is required to be filled in an existing wall.

Basement walls shall be insulated with minimum R15 continuous insulation on the interior or the exterior or with minimum R19 interior wall cavity insulation.

The Alterations affect the mechanical systems that are replaced and that are required for the interior environment. Mechanical equipment shall comply with IECC R403: Mechanical Systems, including, but not limited to, regulations affecting programmable thermostats and controls, hot water boilers, ducts, mechanical system piping, service hot water systems, mechanical ventilation, and equipment sizing and efficiency.

The Alterations affect the light fixtures that are replaced and that are required for the interior environment. Light fixtures shall comply with IECC R404.1: Lighting Equipment, which requires a minimum of 75 percent of the lamps in permanently installed lighting fixtures, shall be high-efficiency lamps or a minimum of 75 percent of light fixtures shall contain only high-efficiency lamps.

**IEBC 301.1: General:**

In accordance with IEBC 301.1 and IEBC 301.1.2 Work Area Compliance Method, Repairs, Alterations, Additions, and Changes in Occupancy complying with applicable requirements of IEBC 5 through IEBC 13 shall be considered compliance.

**IEBC 301.1.1: Prescriptive Compliance Method:** In accordance with IEBC 301.1.1, alterations and change of occupancy complying with IEBC 4; incorporating contemporary life safety design and construction; and providing the means of egress, fire protection, occupancy, and structural conditions that are required by recent editions of the building code. The building was constructed before the first edition of the building code and substantial alterations have not occurred to incorporate contemporary life safety systems and, therefore, the building does not incorporate contemporary life safety design and construction and the prescriptive method is not used.

**IEBC 301.1.2, the Work Area Compliance Method:** In accordance with IEBC 301.1.2, the Work Area Compliance Method is selected as the method for evaluation of the existing building. In accordance with IEBC Chapter 5: Classification of Work Method, the applicable Chapters of the IEBC are identified for the Work Area Compliance Method as follows:

In accordance with IEBC 503, Alterations involving removal, replacement, or covering existing materials, elements, equipment, or fixtures with new materials that serve the same purpose shall be evaluated in accordance with Chapter 7: Alterations, Level 1.

In accordance with IEBC 504, Alterations involving the reconfiguration of spaces, the addition or elimination of any door or window, and the reconfiguration or extension of any system shall be evaluated in accordance with Chapter 7 and Chapter 8: Alterations, Level 2.

In accordance with IEBC 505, Alterations involving the reconfiguration of spaces, the addition or elimination of any door or window, and the reconfiguration or extension of any system where the work areas exceed 50 percent of the building shall be evaluated in accordance with Chapter 7 and Chapter 8, and Chapter 9: Alterations, Level 3.

In accordance with IEBC 506, Change of Occupancy shall be evaluated in accordance with Chapter 10: Change of Occupancy.

**Work Area Method  
Chapter 7: Alterations, Level 1**

**IEBC 701.1 Scope:** Level 1 alterations shall comply with the requirements of Chapter 7.

**IEBC 701.2 Conformance:** In accordance with IEBC 701.2, the Alterations shall not make the building or portion less safe than the existing conditions.

**IEBC 701.3: Flood hazard areas:** In accordance with IEBC 701.3, 780 CMR Appendix G, 1612, and local flood hazard maps prepared for the Federal Emergency Management Agency (FEMA), the building is not in a flood hazard area.

**IEBC 702: BUILDING ELEMENTS AND MATERIALS:**

**IECC 702.1 Interior Finishes:** In accordance with IEBC 702.1, Alterations involving newly installed interior wall and ceiling finishes shall comply with IBC 8. In accordance with IBC 803 and IBC Table 803.11: Interior Wall and Ceiling Finish Requirements By Occupancy, when tested according to ASTM E84, interior finishes in Residential Group R2 occupancies with fire suppression shall meet the following requirements:

Exit enclosures Exit passageways	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
-------------------------------------	---

Corridors	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
Enclosed spaces	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450

**IEBC 702.2: Floor Finishes:** In accordance with IEBC 702.2, newly installed floor finishes shall comply with IBC 804: Interior Floor Finish, which exempts finishes not comprised of fibers and which exempts finishes comprised of fibers that are not in a means of egress. Floor finishes comprised of fibers that are part of the means of egress shall withstand a minimum radiant flux of not less than Class II for Residential Group R2 occupancies.

**IEBC 702.3: Interior Trim:** In accordance with IEBC 702.3, newly installed interior trim shall comply with IBC 806: Decorative Materials and Trim. In accordance with IBC 806: Decorative Trim and Materials, curtains, draperies, and similar decorative materials suspended from the walls or ceilings shall comply with IBC 806.3 and shall not exceed 10 percent of the surface to which the materials are attached.

**IEBC 702.4 Window Opening Control Devices:** In accordance with IEBC 702.4, in Residential Group R2 or R3 buildings containing dwelling units, window control devices shall meet the requirements of ASTM F2009.

**IEBC 702.5 Emergency Escape and Rescue Openings:** In accordance with IEBC 702.5, in Residential Group R2 or R3 buildings containing dwelling units, replacement windows where emergency escape and rescue openings are required are allowed to be the same size as existing window openings.

**IEBC 702.6 Materials and Methods:** In accordance with IEBC 702.6, Alterations shall comply with materials and method requirements in the IBC, IECC, IMC, and 248 CMR including material standards, detail of installation and connection, joints, penetrations, and continuity of any element, component, or system in the building.

**IEBC 703 FIRE PROTECTION:** In accordance with IEBC 703.1, Alterations shall maintain the level of fire protection. The Alterations enhance the level of fire protection by adding a fire suppression system, and updated fire alarm system, and by providing fire extinguishers

**IEBC 704: MEANS OF EGRESS:** In accordance with IEBC 704, Alterations shall be performed in a manner that preserves the level of protection provided for the existing means of egress. The Alterations enhance the level of protection provided for the existing means of egress.

**IEBC 705: ACCESSIBILITY:** Accessibility shall be in accordance with 521 CMR The Regulations of the Architectural Access Board. In accordance with 521 CMR 3.3.EXISTING BUILDINGS, the following conditions apply based on the value of work excluding exempted work over a three-year rolling period:

In accordance with 521 CMR 3.3.1, when the value of the Alterations is less than 30 percent of the assessed value of pro-rated value of the portion of the building being altered then

a: when the value of the Alterations is under \$100,000, then the work being performed shall comply with 521 CMR or.

b: when the value of the Alterations exceeds \$100,000, then the work being performed shall comply and the building shall have an accessible public entrance, toilet room, and drinking fountain.

In accordance with 521 CMR 3.3.2, when the value of the Alterations exceeds 30 percent of the value of the building, then the entire area being altered will be required to comply with 521 CMR.

The value of the Alterations and any other work performed within the last three-year period is more than 30 percent of the value of the building. Accordingly, the entire building shall comply with 521 CMR, specifically

## 521 CMR 9.00: Multiple Dwellings

In accordance with 521 CMR 9.1: General, a multiple dwelling is a residential facility for rent containing three or more dwelling units in a building.

In accordance with 521 CMR 9.1.2, a residential facility is a building consisting of dwelling units each of which provides complete independent living facilities for one or more persons including permanent provisions for living, sleeping, cooking, eating, and sanitation.

In accordance with 521 CMR 9.2.2, renovation of dwelling units is subject to 521 CMR 9.4: GROUP 2 DWELLING UNITS through 521 CMR 9.5: DWELLING UNIT INTERIORS provided the work being performed in a three-year period exceeds 30 percent of the value of the building.

In accordance with 521 CMR 9.4, in multiple dwellings for rent containing 20 or more units, at least 5 percent of the dwelling units must be Group 2A units. Group 2A units are not required because there are less than 20 dwelling units in the building.

### 521 CMR 9.5 Dwelling Unit Interiors:

In accordance with 521 CMR 9.5.1: Doorways, doorways and openings that allow passage in a Group 2 dwelling unit must comply with 521 CMR 26.4: Double Leaf Doorways through 521 CMR 26.11: Door Hardware.

In accordance with 521 CMR 26.5: Width, Doorways and openings that are required to be accessible shall have a clear opening of not less than 32 inches.

In accordance with 521 CMR 26.6: Maneuvering Clearance, a minimum prescribed clear floor area shall be provided on both sides of doors and gates.

In accordance with 521 CMR 26.7: Two Doors in Series, the minimum space between two doors in series shall be 48 inches plus the width of any door swinging into the space between doors.

In accordance with 521 CMR 26.8: Door Opening Force, the maximum force for opening doors shall be as follows:

Interior doors: 5 pounds  
Exterior doors: 15 pounds

In accordance with 521 CMR 26.9: if a door has a closer, then the sweep period shall be adjusted so that from an open position of 90 degrees the door will close in not less than six seconds.

In accordance with 521 CMR 26.10: Thresholds, Thresholds at doorways and at changes in floor materials shall not exceed 1/2 inch in height and shall be beveled on both sides with a slope no greater than one-in-two.

In accordance with 521 CMR 26.11.1: Operating Hardware, door operating hardware shall be easily operated with one hand with requiring tight grasping, tight pinching, or twisting of the wrist.

In accordance with 521 CMR 9.5.2: every entry door to each dwelling unit shall have a means by which a resident can identify a visitor before opening the door such as an additional peephole mounted at 42 inches above the floor.

In accordance with 521 CMR 9.5.3, buzzers, bells, and intercoms shall be within the reach zone.

In accordance with 521 CMR 9.5.4: Accessible Routes, an accessible route at least 36 inches wide shall be provided to rooms, spaces, and storage closets within the dwelling unit and to exterior decks, balconies, patios, attached garages and storage closets.

In accordance with 521 CMR 9.5.5: Landry Facilities, operating controls for washers and dryers must be within the reach zone

In accordance with 521 CMR 9.5.6: Outlets, electrical outlets, telephone outlets, television jacks, and other wall outlets shall be between 15 inches and 48 inches above the floor and at least 18 inches from interior corners. Outlets above counters shall be at 44 inches above the floor. Telephone outlets shall have an electrical outlet within 12 inches for installation of a text telephone.

In accordance with 521 CMR 9.5.7: controls and Alarms, controls and alarms shall be located between 36 inches and 48 inches above the floor and at least 24 inches from interior corners.

In accordance with 521 CMR 9.5.8: Closets, closets and pantries shall have shelves that area relocatable from 42 inches to 72 inches; and closets shall open to permit reach into all parts of the closet.

**IEBC 706: REROOFING:** In accordance with IEBC 706: Reroofing, materials and methods for recovering or replacing existing roof covering shall comply with IBC 15. The Alterations do not involve roofing and, therefore, the requirements of IEBC 706 do not apply.

**IEBC 707: STRUCTURAL:** In accordance with IEBC 707.1: General, where Alterations include replacing equipment that is supported by the building or where a reroofing permit is required, the provisions of IEBC 707 shall apply. The Alterations do not involve modifications to equipment mounted on the building or roofing replacement and, therefore, compliance with the provisions of IEBC 707 is not required.

**IEBC 708: ENERGY CONSERVATION:** In accordance with IEBC 708, the Alterations shall conform to the energy requirements of the IECC without requiring unaltered portions of the building to comply with the IECC.

In accordance with IECC R503.1: General, Alterations to an existing building, building system, or portion thereof shall conform to the provisions of the IECC for new construction without requiring the unaltered portions of the existing building or building system to comply with the IECC.

In accordance with IECC R503.1.1: Building Envelope, Exception 2, provided the energy use of the building is not increased by the Alterations, Alterations are not required to comply with the IECC where existing cavities at the roof, ceilings, walls, or floors are not exposed by the Alterations.

Although not required by the codes, the Alterations provide for insulation in the exterior wall cavities and in accordance with R503.1.1: Building Envelope, the cavities will be filled with insulation, but meeting a prescribed value of insulation is not required.

In accordance with IECC Table R402.1.2: Insulation and Fenestration Requirements by Component, the following prescribed insulation requirements apply in Residential Occupancies in Zone 5:

Fenestration added in Climate Zone 5 including, windows and doors shall have a maximum heat loss resistance factor of U0.32

There is no Solar Heat Gain Coefficient requirement for fenestration.

Horizontal planes separating attic spaces from heated spaces shall be insulated with minimum R49 insulation.

Wood framed exterior walls shall be insulated with minimum R20 cavity insulation or with minimum R13 cavity insulation with minimum R5 continuous insulation

Basement walls shall be insulated with minimum R15 continuous insulation on the interior or the exterior or with minimum R19 interior wall cavity insulation.

The Alterations affect the mechanical systems that are replaced and that are required for the interior environment. Mechanical equipment shall comply with IECC R403: Mechanical Systems, including, but not limited to, regulations affecting programmable thermostats and controls, hot water boilers, ducts, mechanical system piping, service hot water systems, mechanical ventilation, and equipment sizing and efficiency.

The Alterations affect the light fixtures that are replaced and that are required for the interior environment. Light fixtures shall comply with IECC R404.1: Lighting Equipment, which requires a minimum of 75 percent of the lamps in permanently installed lighting fixtures, shall be high-efficiency lamps or a minimum of 75 percent of light fixtures shall contain only high-efficiency lamps.

## **Chapter 8: Alterations, Level 2:**

**IEBC 801.3 Compliance:** In accordance with 801.3, new construction elements, components, systems, and spaces shall comply with the requirements of the International Building Code.

**IEBC 802: SPECIAL USE AND OCCUPANCY:** Alterations in buildings classified in IBC 4: Special Detailed Requirements Based on Occupancy or in IEBC 1002: Special Use and Occupancy shall comply with IEBC 8 and the applicable provisions of IEBC 1. In accordance with IBC 420.1: General, occupancies in Residential Group R2 shall comply with the requirements of IBC 420.1 through IBC 420.6 as follows:

IBC 420.2: Separation Walls: Walls separating dwelling units shall be fire partitions in accordance with IBC 708.

In accordance with IBC 708.3: Exception 1, corridor walls shall have a one half hour fire resistance rating in accordance with IBC Table 1020.1: corridor Fire Resistance Rating, corridor fire resistance rating in Residential Groups with fire suppression systems shall be one half hour fire rated.

In accordance with IBC 708.3: Exception 2, dwelling unit and sleeping unit separations in building in Construction Classification VB with fire suppression system shall be not less than one half hour fire rated.

IBC 420.3: Horizontal Separation: Floor assemblies between dwelling units and sleeping units shall be constructed in accordance with IBC 711. In accordance with IBC 711.2.4.3: Dwelling Units and Sleeping Units, Exception: in buildings in Construction Classification VB with fire suppression, horizontal assemblies separating dwelling units shall not be less than one half hour fire rated.

IBC 420.5: Automatic Sprinkler System: Group R occupancies shall be equipped with an automatic sprinkler system in accordance with IBC 903.3: Standards. In accordance with IBC 903.3.1.2: NFPA 13R Sprinkler Systems, automatic sprinkler systems in Group R occupancies up to four stories in height are allowed to be NFPA 13R systems.

IBC 420.6: Fire Alarm Systems and Smoke Alarms: fire alarm systems and smoke alarms shall be provided in Group R2 occupancies in accordance with IBC 907.2.9 and IBC 907.2.11. In accordance with IBC 907.2.11.2: Groups R2: single and multiple station smoke alarms shall be installed and maintained at the following locations:

- Outside each separate sleeping area in the immediate vicinity of bedrooms
- In each room used for sleeping purposes
- In every story

### **IEBC 803: BUILDING ELEMENTS AND MATERIALS:**

**IEBC 803.1:** The requirements of IEBC 803 shall be limited to the work area where Level 2 Alterations are performed and beyond the work area where specified.

**IEBC 803.2 Vertical Openings:** Existing vertical openings shall comply with IBC 803.2.1, 803.2.2, and 803.2.3.

In accordance with IEBC 803.2.1: Existing Vertical Openings, Exception 1, existing vertical openings connecting two or more floors shall be enclosed with assemblies of not less than one hour with approved opening protective unless the building has a fire suppression system and unless the vertical opening enclosures are not required by the building code. In accordance with IBC 808.2 Shaft Enclosure Required Exception 16, a shaft enclosure is not required where permitted without by the code. In accordance with IBC 1022.1: Enclosures Required, Exception 1, in occupancies other than Hazardous Group H and institutional Group I, a stairway is not required to be enclosed when the stairway serves an occupant load of less than ten persons and the stairway is not open to more than one story above the level of exit discharge. The stairway shall be enclosed by one-hour fire-rated construction.

In accordance with IEBC 803.2.2: Supplemental Shaft and Floor Opening Enclosure Requirements, where the work area on any floor exceeds 50 percent of the floor area, the enclosure requirements of IEBC 802 shall apply to vertical openings other than stairways throughout the floor. The requirements of IEBC 803.2.2 apply and the stairway shall be enclosed by one-hour fire-rated construction.

In accordance with IEBC 803.2.3: Supplemental Stairway Enclosure Requirements, where the work area on any floor exceeds 50 percent of that floor area, stairways that are part of a means of egress serving the work area shall, at a minimum, be enclosed with smoke-tight construction on the highest work area floor and all floors below except where the stairway enclosure is not required by the code. In accordance with IBC 1022.1: Enclosures Required, Exception 1, in occupancies other than Hazardous Group H and institutional Group I, a stairway is not required to be enclosed when the stairway serves an occupant load of less than ten persons and the stairway is not open to more than one story above the level of exit discharge. The stairways shall have smoke-tight construction.

**IEBC 803.3 Smoke Compartments:** In accordance with IEBC 803.3 smoke compartments shall be provided in Institutional Group I-2 occupancies where the work area is on a story used for sleeping rooms for more than 30 patients. The Alterations do not involve an Institutional Group I-2 occupancy and, therefore, smoke compartments barriers are not required.

**IEBC 803.4 Interior finish:** In accordance with 703.4, interior finish work on walls and ceilings within corridors and exits within any Work Area shall comply with the requirements of the IBC 8. In accordance with IBC 803.4 and IBC Table 803.11: Interior Wall and Ceiling Finish Requirements By Occupancy, when tested according to ASTM E84, interior finishes in Residential Group R2 occupancies with fire suppression shall meet the following requirements:

Exit enclosures Exit passageways	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
Corridors	Class C: Flame Spread Index 76-200

	Smoke Developed Index 0-450
Enclosed spaces	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450

**IEBC 803.5 Guards:** In accordance with IEBC 805.10, guard rails are required along edges of platforms with a change in elevation of more than 30 inches. Guards in accordance with the IBC shall be provided at changes in elevation.

**IEBC 803.6 Fire Resistance Ratings:** Where approved by the code official, where an automatic fire suppression system is added, the fire resistance ratings of building elements shall be permitted to meet the requirements for new construction.

## **IEBC 804 FIRE PROTECTION:**

**IEBC 804.1 Scope:** The requirements of IEBC 804 shall be limited to the work area where Level 2 Alterations are performed.

**IEBC 804.2.1: High Rise Buildings:** In accordance with IEBC 802.1, automatic fire protection is required where the work area is on a floor with sufficient water supply. The building is not a high rise building and, therefore, the requirements of IEBC 804.2.1 do not apply.

**IEBC 804.2.2: Groups A, B, E, F-1, H, I, M, R-1, R-2, R-4, S-1, and S-2:** In accordance with IEBC 804.2.2, Work Areas that have exits or corridors shared by more than one tenant and serving an occupant load greater than 30 shall be provided with automatic sprinkler protection where the following conditions occur:

The Work Area is required to be provided with an automatic fire suppression system by the IBC as applicable to new construction

The Work Area exceeds 50 percent of the floor area

The requirements of IEBC 804.2.2 do not apply because the occupant load is less than 30 persons.

**IEBC 804.2.2.1 Mixed Uses:** In accordance with IEBC 804.2.2.1, in Work Area containing mixed uses, one or more of which require automatic fire protection, protection shall not be required throughout the Work Area when the uses are separated by fire rated construction. Although the Work Area contains mixed uses, none of the mixed uses requires fire suppression. Therefore, the requirements of IEBC 804.2.2.1 do not apply.

**IEBC 804.2.3 Windowless stories:** In accordance with IEBC 804.2.3, work located in a windowless story, as determined by the IBC, shall be sprinklered where the Work Area is required to be sprinklered under the provisions of the IBC for newly constructed buildings and the building has a sufficient water supply. The Alterations do not involve space that is on a windowless story and, therefore, the requirements of IEBC 804.2.3 do not apply.

**IEBC 804.2.4 Other Required Suppression Systems:** The building does not contain uses listed in IBC Table 903.2.11.6: Additional Required Suppression Systems and, therefore, compliance with IEBC 804.2.4 is not required.

**IEBC 804.2.4 Other required suppression systems:** In buildings and areas listed in IBC Table 903.2.11.6: Additional Required Suppression Systems that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with sprinkler protection under the conditions indicated. The requirements of IEBC 804.2.4 do not apply because the occupant load is less than 30 persons.

IEBC 804.2.5 Supervision: Fire suppression systems required by IEBC 8 shall be supervised. Fire suppression is not required by IEBC 8 and, therefore, the requirements of IEBC 804.2.5 do not apply.

**IEBC 804.3 Standpipes:** In accordance with IEBC 804.3, standpipes shall be installed where the Work Area includes exits or corridors served by more than one tenant and where the work area is located more than fifty feet above or below the lowest level of fire department access. The Work Area does not involve stairways or corridors serving more than one tenant, and the Work Area is not located more than 50 feet above or below the lowest level of fire department access. Therefore, the requirements of IEBC 804.4 do not apply.

**IEBC 804.4 Fire Alarm and Detection:** In accordance with IEBC 804.4, an approved fire alarm system shall be installed in accordance with IEBC 804.4.1 through IEBC 804.4.3.

In accordance with IEBC 804.4.1: Occupancy Requirements, a fire alarm system shall be installed in accordance with IEBC 804.4.1.1 through IEBC 804.4.1.7; and where a building is not equipped with a fire alarm system, automatically activated alarm notification appliances shall be provided within the work areas.

In accordance with 804.4.1.6: Group R2, a fire alarm system shall be installed in work areas of Group R2 as required for existing R2 occupancies by 527 CMR 1.00 Massachusetts Comprehensive Fire Safety Code. In accordance with 527 CMR Table 13.7A Smoke Alarms-Detectors, photoelectric smoke alarm-detectors shall be provided on every habitable level, on the ceiling outside each separate sleeping area, and on ceilings in common areas.

In accordance with IEBC 804.4.2: Supplemental Fire Alarm System Requirements, where the Work Area exceeds 50 percent of the floor area on which the work area occurs, the provisions of IEBC 804.4.1 shall apply to the entire floor. The Work Area exceeds 50 percent of the floor area and, therefore, the fire alarm required by IEBC 804.4.1 shall be provided on the entire floor.

In accordance with IEBC 804.4.3: Smoke Alarms, individual sleeping units and individual dwelling units in any Work Area in Group R and Group I-1 shall be provided with smoke detectors in compliance with the 527 CMR 1.00 Massachusetts Comprehensive Fire Safety Code. In accordance with 527 CMR Table 13.7A Smoke Alarms-Detectors, photoelectric smoke alarm-detectors shall be provided on every habitable level, on the ceiling outside each separate sleeping area, and on ceilings in common areas.

**IEBC 805: MEANS OF EGRESS:** The requirements of IEBC 805 shall be limited to the work areas that include exits or corridors shared by more than one tenant within the work area where Level 2 Alterations are performed and beyond the work area where specified.

In accordance with IEBC 805.3: Number of Exits, the number of exits shall comply with IEBC 805.3.1 through IEBC 805.3.3.

In accordance with IEBC 805.3.1.1: Single Exit Buildings and IEBC 805.3.1.1.9, only one exit is required from buildings and spaces in buildings on Residential Group R2 buildings of any height with not more than 4 dwelling units per floor; with a smokeproof exit enclosure exit located within 20 feet of travel to the entrance doors to all dwelling units served thereby.

In accordance with IEBC 805.4: Egress Doorways, egress doorways shall comply with IEBC 805.4.1 through IEBC 805.4.5 as applicable.

In accordance with IEBC 805.4.3 Door Closing, doors opening into an exit stairway shall be automatic closing by listed closing devices.

In accordance with IEBC 805.5: Openings in Corridor Walls, openings in corridor walls shall comply with IEBC 805.5.1 through IEBC 805.5.4 as applicable.

In accordance with IEBC 805.5.1: Corridor Doors, corridor doors in Residential Group R2 occupancies shall be at least 1-3/8 inch thick solid core wood and shall not have any glass panels other than approved wire glass or glass panels in metal frames; and dwelling unit corridor doors shall be equipped with approved door closers.

In accordance with IEBC 805.6: Dead End Corridor, dead end corridors shall not exceed 35 feet.

In accordance with IEBC 805.7: Means of Egress Lighting, egress doorways shall comply IBC1008 Means of Egress Lighting

In accordance with IEBC 805.8: Lighted Exit Signs, lighted exit signs shall comply with IBC 1013: Exit Signs.

In accordance with IEBC 805.9: Handrails, handrails shall comply with IBC 1014: Handrails.

In accordance with IEBC 805.11: Guards, guards shall comply with IBC 1015: Guards.

**IEBC 806: ACCESSIBILITY:** Accessibility shall be in accordance with 521 CMR The Regulations of the Architectural Access Board. The value of the Alterations and any other work performed within the last three-year period is more than 30 percent of the value of the building. Accordingly, the entire building shall comply with 521 CMR, specifically 521 CMR 9: Multiple Dwelling Residential Facility and 521 CMR: Public Use and Common Areas in Residential Facilities.

#### 521 CMR 9.00: Multiple Dwellings

In accordance with 521 CMR 9.1: General, a multiple dwelling is a residential facility for rent containing three or more dwelling units in a building.

In accordance with 521 CMR 9.1.2, a residential facility is a building consisting of dwelling units each of which provides complete independent living facilities for one or more persons including permanent provisions for living, sleeping, cooking, eating, and sanitation.

In accordance with 521 CMR 9.2.2, renovation of dwelling units is subject to 521 CMR 9.4: GROUP 2 DWELLING UNITS through 521 CMR 9.5: DWELLING UNIT INTERIORS provided the work being performed in a three-year period exceeds 30 percent of the value of the building.

In accordance with 521 CMR 9.4, in multiple dwellings for rent containing 20 or more units, at least 5 percent of the dwelling units must be Group 2A units. Group 2A units are not required because there are less than 20 dwelling units in the building.

#### 521 CMR 9.5 Dwelling Unit Interiors:

In accordance with 521 CMR 9.5.1: Doorways, doorways and openings that allow passage in a Group 2 dwelling unit must comply with 521 CMR 26.4: Double Leaf Doorways through 521 CMR 26.11: Door Hardware.

In accordance with 521 CMR 26.5: Width, Doorways and openings that are required to be accessible shall have a clear opening of not less than 32 inches.

In accordance with 521 CMR 26.6: Maneuvering Clearance, a minimum prescribed clear floor area shall be provided on both sides of doors and gates.

In accordance with 521 CMR 26.7: Two Doors in Series, the minimum space between two doors in series shall be 48 inches plus the width of any door swinging into the space between doors.

In accordance with 521 CMR 26.8: Door Opening Force, the maximum force for opening doors shall be as follows:

Interior doors: 5 pounds  
Exterior doors: 15 pounds

In accordance with 521 CMR 26.9: if a door has a closer, then the sweep period shall be adjusted so that from an open position of 90 degrees the door will close in not less than six seconds.

In accordance with 521 CMR 26.10: Thresholds, Thresholds at doorways and at changes in floor materials shall not exceed 1/2 inch in height and shall be beveled on both sides with a slope no greater than one-in-two.

In accordance with 521 CMR 26.11.1: Operating Hardware, door operating hardware shall be easily operated with one hand with requiring tight grasping, tight pinching, or twisting of the wrist.

In accordance with 521 CMR 9.5.2: every entry door to each dwelling unit shall have a means by which a resident can identify a visitor before opening the door such as an additional peephole mounted at 42 inches above the floor.

In accordance with 521 CMR 9.5.3, buzzers, bells, and intercoms shall be within the reach zone.

In accordance with 521 CMR 9.5.4: Accessible Routes, an accessible route at least 36 inches wide shall be provided to rooms, spaces, and storage closets within the dwelling unit and to exterior decks, balconies, patios, attached garages and storage closets.

In accordance with 521 CMR 9.5.5: Laundry Facilities, operating controls for washers and dryers must be within the reach zone

In accordance with 521 CMR 9.5.6: Outlets, electrical outlets, telephone outlets, television jacks, and other wall outlets shall be between 15 inches and 48 inches above the floor and at least 18 inches from interior corners. Outlets above counters shall be at 44 inches above the floor. Telephone outlets shall have an electrical outlet within 12 inches for installation of a text telephone.

In accordance with 521 CMR 9.5.7: controls and Alarms, controls and alarms shall be located between 36 inches and 48 inches above the floor and at least 24 inches from interior corners.

In accordance with 521 CMR 9.5.8: Closets, closets and pantries shall have shelves that area relocatable from 42 inches to 72 inches; and closets shall open to permit reach into all parts of the closet.

## **IEBC 807: STRUCTURAL:**

**IEBC 807.1:** In accordance with IEBC 807.1, general structural elements and systems within buildings undergoing Alterations shall comply with IEBC 807. Alterations involving structural elements shall meet the requirements of IEBC 807 as follows:

**IEBC 807.2: New Structural Elements:** In accordance with IEBC 807.2, new structural elements in Work Areas shall comply with the IBC.

**IEBC 807.3: Minimum Design Loads:** In accordance with IEBC 807.3, the minimum design loads on existing structural elements that do not support additional loads shall be the loads applicable at the time the building was constructed.

**IEBC 807.4 Existing structural elements carrying gravity load:** In accordance with IEBC 807.4, compliance with the IBC is required where the Alterations reduce the capacity of existing gravity load carrying structural elements and where loads exceeding 5 percent are added to the existing structural elements.

**IEBC 807.5 Existing structural elements resisting lateral loads:** In accordance with IEBC 807.5, the Alterations can increase the demand capacity of lateral load carrying members of the existing structure by up to ten percent.

**IEBC 807.6 Voluntary seismic improvements:** The Alterations do not involve voluntary seismic improvements.

## **IEBC 809 MECHANICAL:**

**IEBC 809.1: Reconfigured or Converted Spaces:** In accordance with IEBC 809.1 and the International Mechanical Code IMC 4, natural or mechanical ventilation shall be provided in reconfigured spaces intended for occupancy and spaces converted to habitable space. Habitable spaces shall be provided with natural ventilation in compliance with IBC 1203.4: Natural Ventilation or mechanical ventilation in compliance with IMC 403: Mechanical Ventilation and IMC Table 403.3.1.1 Minimum Ventilation Rates.

In accordance with IMC Table 403.3.1.1 Minimum Ventilation Rates, where natural ventilation is not provided, mechanical ventilation will be provided based on a default occupant density with assigned flow rate per person (people rate) plus a flow rate per square foot (area rate) as follows:

Occupancy	People rate Cubic feet/person	Area rate Cubic feet/square foot	Default Density Occupant /1000 square feet	Exhaust Rate cubic feet/ minute continuous or cubic feet/ square foot
Bedrooms	5	0.06	10	
Living Rooms	5	0.06	10	
Residential Kitchens	0	0	0	100 cubic feet/ square foot
Toilets	0	0	0	50 cubic feet/fixture

The mechanical ventilation for kitchens and bathrooms is direct ventilation to the exterior and recirculation of air is prohibited. The natural ventilation of the original building design is being replaced with mechanical systems that provide mechanical ventilation to each occupiable space in accordance with IMC Table 403.3.1.1

**IEBC 809.2: Altered Existing Spaces:** In accordance with IEBC 809.2, in existing mechanically ventilated spaces in which the existing mechanical system is altered, reconfigured, or extended; mechanical ventilation shall be provided.

**IEBC 809.3: Local Exhaust:** In accordance with IEBC 809.3, local exhaust shall be provided at equipment producing contaminants that are introduced into the Work Area.

**IEBC 811 ENERGY CONSERVATION:** In accordance with IEBC 811, the Alterations shall conform to the energy requirements of the IECC.

In accordance with IECC R503.1: General, Alterations to an existing building, building system, or portion thereof shall conform to the provisions of the IECC for new construction without requiring the unaltered portions of the existing building or building system to comply with the IECC.

In accordance with IECC R503.1.1: Building Envelope, Exception 2, provided the energy use of the building is not increased by the Alterations, Alterations are not required to comply with the IECC where existing cavities at the roof, ceilings, walls, or floors are not exposed by the Alterations.

Although not required by the codes, the Alterations provide for insulation in the exterior wall cavities and in accordance with R503.1.1: Building Envelope, the cavities will be filled with insulation, but meeting a prescribed value of insulation is not required.

In accordance with IECC Table R402.1.2: Insulation and Fenestration Requirements by Component, the following prescribed insulation requirements apply in Residential Occupancies in Zone 5:

Fenestration added in Climate Zone 5 including, windows and doors shall have a maximum heat loss resistance factor of U0.32

There is no Solar Heat Gain Coefficient requirement for fenestration.

Horizontal planes separating attic spaces from heated spaces shall be insulated with minimum R49 insulation.

Wood framed exterior walls shall be insulated with minimum R20 cavity insulation or with minimum R13 cavity insulation with minimum R5 continuous insulation

Basement walls shall be insulated with minimum R15 continuous insulation on the interior or the exterior or with minimum R19 interior wall cavity insulation.

The Alterations affect the mechanical systems that are replaced and that are required for the interior environment. Mechanical equipment shall comply with IECC R403: Mechanical Systems, including, but not limited to, regulations affecting programmable thermostats and controls, hot water boilers, ducts, mechanical system piping, service hot water systems, mechanical ventilation, and equipment sizing and efficiency.

The Alterations affect the light fixtures that are replaced and that are required for the interior environment. Light fixtures shall comply with IECC R404.1: Lighting Equipment, which requires a minimum of 75 percent of the lamps in permanently installed lighting fixtures, shall be high-efficiency lamps or a minimum of 75 percent of light fixtures shall contain only high-efficiency lamps.

**IEBC 901.2 Compliance:** In accordance with IEBC 901.2, in addition to compliance with IEBC 9, work shall comply with the requirements of IEBC 7 and IEBC 8. Further, the requirements of IEBC 803, 804, and 805 shall apply in Work Areas regardless of whether or not Work Areas include exits and corridors shared by more than one tenant and regardless of occupant load.

## **IEBC 902: SPECIAL USE AND OCCUPANCY:**

**IEBC 902.1 High Rise Buildings:** In accordance with 802.1, any building with occupied floors more than 75 feet above the lowest level of fire department vehicle access shall comply with the requirements of IEBC 902.1.1 and 802.1.2. No occupied floor of the building is more than 75 feet above the lowest level of fire department vehicle access and, therefore, the requirements of IEBC 902.1 do not apply.

**IEBC 902.2 Boiler and Furnace Equipment Rooms:** In accordance with IEBC 902.2, equipment rooms for boilers and furnace equipment in Groups I-1, I-2, I-4, R-1, R-2, and R-4 shall be enclosed in one hour fire rated construction except as follows:

IEBC 902.2.1: Steam boiler equipment operating at pressures of 15 pounds per square inch or less

IEBC 902.2.2: Hot water boilers operating at pressures of 170 pounds per square inch gauged or less

IEBC 902.2.3: Furnace and boiler equipment with 400,000 British Thermal units per hour input rating or less

IEBC 902.2.4: Furnace rooms protected by an automatic fire suppression system

## **IEBC 903: BUILDING ELEMENTS AND MATERIALS:**

**IEBC 903.1: Existing Shafts and Vertical Openings:** In accordance with IEBC 903.1, existing stairways that are part of a means of egress shall be enclosed in accordance with IEBC 803.2.1 from the highest Work Area to, and including, the level of exit discharge and all floors below. In accordance with IEBC 803.2.1, the stairways shall be enclosed by one-hour fire-rated construction.

**IEBC 903.2 Fire Partitions in Group R3:** In accordance with IEBC 903.2, fire separation shall be provided in Residential Group R3 occupancies in accordance with IEBC 903.2.1 which requires continuous fire separation between dwelling units. The Alterations do not involve Residential Group R3 and, therefore, the requirements of IEBC 903.2 do not apply.

**IEBC 903.3 Interior finish:** In accordance with IEBC 903.3, interior finish work on walls and ceilings within corridors and exits within any Work Area shall comply with the requirements of the IEBC 803.4 between the highest floor on which work occurs and the floor of exit discharge. In accordance with IBC 803.4 and IBC Table 803.11: Interior Wall and Ceiling Finish Requirements By Occupancy, when tested according to ASTM E84, interior finishes in Residential Group R2 occupancies with fire suppression shall meet the following requirements:

Exit enclosures Exit passageways	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
Corridors	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
Enclosed spaces	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450

## **IEBC 904 FIRE PROTECTION:**

**IEBC 904.1 Automatic Sprinkler Systems:** In accordance with IEBC 904.1, automatic sprinkler systems shall be provided when required by IEBC 804.2: Automatic Sprinkler Systems or by IEBC 904.

A fire suppression system is not required by IEBC 804.2.

IEBC 904.1.1: High-rise Buildings: An automatic fire suppression system shall be provided in a high rise building where there is sufficient water supply. The building is not a high rise building.

IEBC 904.1.2: Rubbish and Linen Chutes: Rubbish and Linen chutes within the work area shall be provided with fire suppression. There are no rubbish chutes or linen chutes in the work area.

IEBC 904.1.3: Upholstered Furniture or Mattresses: Fire suppression shall be provided where upholstered furniture is manufactured, displayed, or stored. The work area does not involve manufacture, display, or storage of upholstered furniture or mattresses.

Accordingly, the requirements of IEBC 904.1 do not apply.

**IEBC 904.2 Fire Alarm and Detection Systems:** In accordance with IEBC 904.2, fire alarm and detection systems shall be provided in compliance with IBC 907 for new construction.

In accordance with IBC 907.2 Where Required, a fire alarm system shall be provided in accordance with IBC 907.2.1 through 907.2.23 and shall provide notification in accordance with IBC 907.5.

In accordance with IBC 907.2.9: Group R2, Fire alarm systems and smoke alarms shall be installed in Group R2 occupancies as required in IBC 907.2.9.1 and IBC 907.2.9.3.

In accordance with IBC 907.2.9.1 Manual Fire Alarm System, a manual fire alarm system that activates the occupant notification system in accordance with IBC 907.5 shall be provided in Group R2 occupancies where the building contains more than 16 sleeping units. The Work Areas do not contain more than 16 sleeping units and, therefore, a manual fire alarm system is not required by the Alterations.

In accordance with IBC 907.2.9.2: Single and multiple station smoke alarms shall be installed according to IEBC 907.2.11 which requires single and multiple smoke alarms complying with Underwriters' Laboratories, Inc. 217 installed according to National Fire Protection Association NFPA 72 and IBC 907.2.11.1 through 907.2.11.6.

In accordance with IBC 907.2.11.2: Groups R2, R3, R4, and I-1, single or multi-station smoke alarms shall be installed and maintained at the following locations:

Outside of each separate sleeping area in the immediate vicinity of bedrooms

In each room used for sleeping purposes

In each story within a dwelling unit, including basements but not including crawl spaces and uninhabited attics

In accordance with IBC 907.2.11.3: Installation Near Cooking Appliances, separation distances from smoke alarms and cooking appliances shall be maintained unless the separation would prevent placement of a smoke alarm required by IEBC 907.2.11.1 or IEBC 907.2.11.2.

In accordance with IBC 907.2.11.4: Installation Near Bathrooms, smoke alarms shall be placed not less than 3 feet from the door or opening to a bathroom containing a bath tub or shower.

In accordance with IBC 907.2.11.6: Power Source, required smoke alarms shall receive primary power from the building power service and shall be equipped with battery back-up.

In accordance with IBC 907.5: Occupant Notification Systems, the fire alarm system shall annunciate at the fire alarm control panel and shall initiate the occupant notification upon activation as required by IBC 907.5.1 through 907.5.2.3.3.

In accordance with 907.5.2 Alarm Notification Appliances, alarm notification appliances shall be provided and listed for the purpose as follows:

In accordance with IBC 907.5.2.1: Audible Alarms, audible alarm notification appliances shall be provided and emit a distinctive sound that is only used for fire alarm notification.

IBC 907.5.2.1.1: Average Sound Pressure, The audible alarm notification appliances shall provide a sound pressure level of 15 decibels above the ambient sound level.

IBC 907.5.2.1.2: Maximum Sound Pressure, The maximum sound pressure for audible alarm notification appliances shall be 110 decibels at the minimum hearing distance from the audible appliance.

In accordance with IBC 907.5.2.3: Visible Alarms, visible alarms shall be provided in accordance with IBC 907.5.2.3.1 through IBC 907.5.2.3.3.

IBC 907.5.2.3.1: Public Use and Common Areas, visible alarm notification appliances shall be provided in public areas and common use areas.

**IEBC 905: MEANS OF EGRESS:** In accordance with IEBC 905, the means of egress shall comply with IEBC 805, except as provided in IEBC 905.2, and 905.3. The provisions of IEBC 805 are limited to the work areas that include exits or corridors shared by more than one tenant within the work area where Level 2 Alterations are performed and beyond the work area where specified. The means of egress shall comply with IEBC 805.

**IEBC 906: ACCESSIBILITY:** Accessibility shall be in accordance with 521 CMR The Regulations of the Architectural Access Board. The value of the Alterations and any other work performed within the last three-year period is more than 30 percent of the value of the building. Accordingly, the entire building shall

comply with 521 CMR, specifically 521 CMR 9: Multiple Dwelling Residential Facility and 521 CMR: Public Use and Common Areas in Residential Facilities.

## **IEBC 907: STRUCTURAL:**

**IEBC 907.1:** In accordance with IEBC 907.1, general structural elements and systems within buildings undergoing Level 3 Alterations shall comply with IEBC 907.

**IEBC 907.2:** In accordance with IEBC 907.2, new structural elements in Alterations shall comply with the IBC.

**IEBC 907.3 Existing structural elements carrying gravity load:** In accordance with IEBC 907.3, existing structural elements shall comply with IEBC 707.4, which requires that compliance with the IBC is required where the Alterations reduce the capacity of existing gravity load carrying structural elements and where loads exceeding 5 percent are added to the existing structural elements. Modifications to existing structural elements carrying gravity load shall comply with the IBC.

**IEBC 907.4 Structural alterations:** In accordance with IEBC 907.4, structural elements of the lateral force resisting system in building undergoing Level 3 Alterations shall provide an engineering evaluation and analysis that establishes the structural adequacy of altered structural elements; and where more than 30 percent of the total floor areas and roof areas of the building are involved with structural alteration, the evaluation shall demonstrate that the altered structural elements comply with IBC wind loading and reduced level seismic forces. The Alterations shall comply with structural design evaluation for lateral load resisting forces in accordance with IBC 16.

**IEBC 908 ENERGY CONSERVATION:** In accordance with IEBC 908, the Alterations shall conform to the energy requirements of the IECC.

In accordance with IECC R503.1: General, Alterations to an existing building, building system, or portion thereof shall conform to the provisions of the IECC for new construction without requiring the unaltered portions of the existing building or building system to comply with the IECC.

In accordance with IECC R503.1.1: Building Envelope, Exception 2, provided the energy use of the building is not increased by the Alterations, Alterations are not required to comply with the IECC where existing cavities at the roof, ceilings, walls, or floors are not exposed by the Alterations.

Although not required by the codes, the Alterations provide for insulation in the exterior wall cavities and in accordance with R503.1.1: Building Envelope, the cavities will be filled with insulation, but meeting a prescribed value of insulation is not required.

In accordance with IECC Table R402.1.2: Insulation and Fenestration Requirements by Component, the following prescribed insulation requirements apply in Residential Occupancies in Zone 5:

Fenestration added in Climate Zone 5 including, windows and doors shall have a maximum heat loss resistance factor of U0.32

There is no Solar Heat Gain Coefficient requirement for fenestration.

Horizontal planes separating attic spaces from heated spaces shall be insulated with minimum R49 insulation.

Wood framed exterior walls shall be insulated with minimum R20 cavity insulation or with minimum R13 cavity insulation with minimum R5 continuous insulation

Basement walls shall be insulated with minimum R15 continuous insulation on the interior or the exterior or with minimum R19 interior wall cavity insulation.

The Alterations affect the mechanical systems that are replaced and that are required for the interior environment. Mechanical equipment shall comply with IECC R403: Mechanical Systems, including, but not limited to, regulations affecting programmable thermostats and controls, hot water boilers, ducts, mechanical system piping, service hot water systems, mechanical ventilation, and equipment sizing and efficiency.

The Alterations affect the light fixtures that are replaced and that are required for the interior environment. Light fixtures shall comply with IECC R404.1: Lighting Equipment, which requires a minimum of 75 percent of the lamps in permanently installed lighting fixtures, shall be high-efficiency lamps or a minimum of 75 percent of light fixtures shall contain only high-efficiency lamps.

## **IEBC 10: Change of Occupancy**

**IEBC 1001.1 Scope:** In accordance with IEBC 1001.1 and IEBC 202, a change in occupancy is the change in purpose or level of activity within a building where the change in occupancy requires a change in application of the code in accordance with the IBC.

**IEBC 1001.2 Certificate of Occupancy:** In accordance with IEBC 1001.2 a change in occupancy, or a change of occupancy within a space where there is different fire protection system threshold requirements in IBC 9, shall not be made to any structure without the approval of the code official. A certificate of occupancy shall be issued where it has been determined that the requirements for the change of occupancy have been met.

**IEBC 1001.2.1 Change of Use:** In accordance with IEBC 1001.2.1, any work in connection with a change of use that does not involve a change in occupancy classification or a change to another group within an occupancy classification shall conform to the applicable requirements for the work as classified in IBC 5 and IEBC 1002 through IEBC 1011.

**IEBC 1001.2.2 Change of Occupancy Classification:** In accordance with 1001.2.2, the provisions of IEBC 1002 through IEBC 1012 apply where there is a change in occupancy classification occurs including a change to another group within an occupancy classification.

The Alterations involve a change of occupancy classification from Business Group B and Assembly Group A3 to Residential Group R2. Accordingly, the requirements of IEBC 1002 through IEBC 1012 apply.

**IEBC 1001.3 Certificate of Occupancy:** A certificate of occupancy shall be issued where a change in occupancy occurs that results in a change of occupancy classification as determined by the IBC.

## **IEBC 1002: SPECIAL USE AND OCCUPANCY:**

**IEBC 1002.1 Compliance with the Building Code:** In accordance with IEBC 1002.1, where the character or use of an existing building is changed to a special use addressed in IBC 4: Special Detailed Requirements Based on Use and Occupancy, the special use or occupancy shall comply with IBC 4. The Alterations shall comply with IBC 420: Residential Group R2.

**IEBC 1002.2 Underground Buildings:** In accordance with IEBC 1002.2, the requirements of the IBC for underground structures shall apply to underground structures in which there is a change in use. The building is not an underground structure.

## **IEBC 1003: BUILDING ELEMENTS AND MATERIALS**

**IEBC 1003.1 General:** In accordance with IEBC 1003.1, building elements and materials in portions of buildings undergoing a change of occupancy classification shall comply with the requirements of IEBC 1012.

#### **IEBC 1004: FIRE PROTECTION:**

**IEBC 1004.1 General:** In accordance with IEBC 1004.1, the fire protection requirements of IEBC 1012 shall apply where a building undergoes a change of occupancy classification or where there is a change in occupancy in a space where there is a different fire protection system threshold in IBC 9. A fire suppression system shall be provided in accordance with IBC 9903: Automatic Fire Protection Systems. In accordance with IBC Table 903.2 Occupancy Automatic Sprinkler Requirements, an automatic fire sprinkler system is required throughout the building for any Residential Group R Alterations. The fire suppression system is allowed to meet the requirements in National Fire Protection Association NFPA 13R for a Residential system.

#### **IEBC 1005: MEANS OF EGRESS:**

**IEBC 1005.1 General:** In accordance with IEBC 1005.1, the means of egress in portions of a building undergoing a change of occupancy classification shall comply with the requirements of IEBC 1012.

**IEBC 1006: ACCESSIBILITY:** In accordance with IEBC 1006, accessibility in portions of building undergoing a change in occupancy classification shall comply with 521 CMR The Regulations of the Architectural Access Board. The value of the Alterations and any other work performed within the last three-year period is more than 30 percent of the value of the building. Accordingly, the entire building shall comply with 521 CMR, specifically 521 CMR 9: Multiple Dwelling Residential Facility and 521 CMR: Public Use and Common Areas in Residential Facilities.

#### **IEBC 1007: STRUCTURAL:**

**IEBC 1007.1 Gravity Loads:** In accordance with IEBC 1007.1, buildings or portions of buildings subject to change of occupancy resulting in higher uniform or concentrated loads based on IBC Tables 1607.1 Minimum Uniformly Distributed Live Loads shall comply with the gravity load provisions of the IBC.

**IEBC 1007.2 Snow and Wind Loads:** In accordance with IEBC 1007.2 where a change of occupancy results in a higher wind or snow risk category based on IBC Table 1604.5: Occupancy Categories of Buildings and Other Structures, then the building shall be analyzed and shall comply with wind and snow load provisions of the IBC. The change in occupancy does not involve a change in risk category for wind and snow and, therefore, the requirements of IEBC 1007.3 do not apply..

**IEBC 1007.3 Seismic loads:** In accordance with IEBC 1007.3, existing buildings with a change of occupancy shall comply with the seismic provisions of IEBC 1007.3.1 and IEBC 1007.3.2, which require buildings undergoing a change in occupancy resulting in a higher hazard category in IBC Table 1604.5 to comply with the requirement for seismic forces in IBC 301.1.4.2.

In accordance with IEBC 1007.3.1 and IBC Table 1604.5 Occupancy Categories of Buildings and Other Structures; the change of occupancy does not result in a higher occupancy category for seismic loads because the uses and occupancies resulting from the Change of Occupancy are in the same category, Occupancy Category II and, therefore, the requirements of IEBC 1007.3 do not apply..

In accordance with IEBC 1007.3.2, access through an adjacent structure is not allowed for occupancy category IV buildings. The space undergoing a Change in Occupancy being Altered is not accessed through an adjacent structure and the building is not an occupancy category IV building. Accordingly, the requirements of IEBC 1007.3 do not apply.

#### **IEBC 1008 ELECTRICAL:**

**IEBC 1008.1 Special Occupancies:** In accordance with IEBC 1008.1, where the occupancy of an existing building or part of an existing building is changed to one of the following special occupancies as described

in NFPA 70 National Electric Code, the electrical wiring and equipment in the building or portion thereof that contains the change of occupancy occurs shall comply with NFPA 70 whether or not a change of occupancy group is involved:

- Hazardous locations
- Commercial garages, repair, and storage
- Aircraft hangars
- Gasoline dispensing and service stations
- Bulk storage plants
- Spray application, dipping, and coating processes
- Health care facilities
- Places of assembly
- Theaters, audience areas of motion picture and television studios
- Motion picture and television studios
- Motion picture projectors
- Agricultural buildings

The change of occupancy does not involve a special occupancy as described by NFPA 70.

### **IEBC 1009 MECHANICAL:**

**IEBC 1009.1 Mechanical Requirements:** In accordance with IEBC 1009.1, where the occupancy of the existing building or part thereof is changed such that there are different kitchen ventilation requirements or increased mechanical ventilation requirements in accordance with the IMC the new occupancy shall comply with the respective provisions of the IMC. Habitable spaces shall be provided with natural ventilation in compliance with IBC 1203.4: Natural Ventilation or mechanical ventilation in compliance with IMC 403: Mechanical Ventilation and IMC Table 403.3.1.1 Minimum Ventilation Rates.

In accordance with IMC Table 403.3.1.1 Minimum Ventilation Rates, where natural ventilation is not provided, mechanical ventilation will be provided based on a default occupant density with assigned flow rate per person (people rate) plus a flow rate per square foot (area rate) as follows:

Occupancy	People rate Cubic feet/person	Area rate Cubic feet/square foot	Default Density Occupant /1000 square feet	Exhaust Rate cubic feet/ minute continuous or cubic feet/ square foot
Bedrooms	5	0.06	10	
Living Rooms	5	0.06	10	
Residential Kitchens	0	0	0	100 cubic feet/ square foot
Toilets	0	0	0	50 cubic feet/fixture

The mechanical ventilation for kitchens and bathrooms is direct ventilation to the exterior and recirculation of air is prohibited. The natural ventilation of the original building design is being replaced with mechanical systems that provide mechanical ventilation to each occupiable space in accordance with IMC Table 403.3.1.1

### **IEBC 1010 PLUMBING:**

**IEBC 1010.1 Increased Demand:** In accordance with IEBC 1010.1 where the occupancy of an existing building or part thereof is changed such that the new occupancy is subject to increased or different

plumbing fixture requirements in accordance with 248 CMR Uniform State Plumbing Code, then the new occupancy shall comply with the respective provisions of 248 CMR.

In accordance with 248 CMR Table 1: Minimum Facilities, 105 CMR 410.100: Kitchen Facilities and 105 CMR 410.150: Washbasins, Toilets, Tubs, and Showers; the following plumbing fixtures are required per dwelling unit:

- One Bathroom Group per unit including bath fixture, toilet, and lavatory
- One Kitchen per unit
- One laundry connection for every 10 dwelling units

## **IEBC 1011 OTHER REQUIREMENTS:**

**IEBC 1011.1 Light and Ventilation:** In accordance with IEBC 1011.1, light and ventilation shall comply with requirements of the IBC for the new occupancy.

Ventilation: In accordance with IMC Table 403.3.1.1 Minimum Ventilation Rates, where natural ventilation is not provided, mechanical ventilation will be provided based on a default occupant density with assigned flow rate per person (people rate) plus a flow rate per square foot (area rate) as follows:

Occupancy	People rate Cubic feet/person	Area rate Cubic feet/square foot	Default Density Occupant /1000 square feet	Exhaust Rate cubic feet/ minute continuous or cubic feet/ square foot
Bedrooms	5	0.06	10	
Living Rooms	5	0.06	10	
Residential Kitchens	0	0	0	100 cubic feet/ square foot
Toilets	0	0	0	50 cubic feet/fixture

The mechanical ventilation for kitchens and bathrooms is direct ventilation to the exterior and recirculation of air is prohibited. The natural ventilation of the original building design is being replaced with mechanical systems that provide mechanical ventilation to each occupiable space in accordance with IMC Table 403.3.1.1

Lighting: In accordance with IBC 1205: Lighting, every space intended for occupancy shall be provided with natural light by means of exterior glazed openings or with artificial light. Following Alterations, the area in which the change of occupancy occurs shall have adequate artificial lighting.

## **IEBC 1012: CHANGE OF OCCUPANCY CLASSIFICATION:**

**IEBC 1012.1: General:** In accordance with IEBC 1012.1, the provisions of IEBC 1012 shall apply to buildings undergoing a change of occupancy classification. The Alterations involve a change of occupancy classification from Business Group B and Assembly Group A3 to Residential Group R2.

**IEBC 1012.1.2 Fire Protection and Interior Finish:** In accordance with IEBC 1012.1.2, the provisions of 1012.2 Fire Protection Systems and 1012.3 Interior Finish shall apply to all buildings undergoing a change in occupancy classification.

**IEBC 1012.1.3: Change of Occupancy Classification Based on Hazard Category:** In accordance with IEBC 1012.1.3, the degree of hazard between different occupancy shall be determined by applying the following:

IEBC Table 1012.4 Means of Egress Hazard Categories

**IEBC 1012.1.4 Accessibility:** In accordance with IEBC 1012.1.4, all buildings undergoing a change in occupancy classification shall comply with 1012.8: Accessibility.

**IEBC 1012.1: General:** In accordance with IEBC 1012.1, fire protection systems shall be provided in accordance with IEBC 1012.2.1 and IEBC 1012.2.2.

**IEBC 1012.2.1 Fire sprinkler system:** In accordance with IEBC 1012.2.1, where a change in occupancy classification occurs that results in the requirement of an automatic fire suppression system, then the an automatic fire sprinkler system shall be provided throughout the area of the change in occupancy in accordance with IBC 9 based on the new occupancy. In accordance with IBC Table 903.2 Occupancy Automatic Sprinkler Requirements, an automatic fire sprinkler system is required throughout the building for any Residential Group R Alterations. The fire suppression system is allowed to meet the requirements in National Fire Protection Association NFPA 13R for a Residential system.

**IEBC 1012.2.2 Fire Alarm and Detection:** In accordance with IEBC 1012.2.2, where a change in occupancy classification occurs that results in the requirement of a fire alarm and detection system, then the an automatic fire sprinkler system shall be provided throughout the area of the change in occupancy in accordance with IBC 9 based on the new occupancy. A fire alarm system shall be provided. In accordance with IBC 420.6: Fire Alarm Systems and Smoke Alarms, fire alarm systems and smoke alarms shall be provided in Residential Group R2 occupancies in accordance with IBC 907.2.8. Single and multiple stations smoke alarms shall be provided in accordance with IBC 907.2.11. In accordance with IEBC 704.4.1.6: Residential Group R2, a fire alarm system shall be installed in accordance with IBC 9. In accordance with IBC 907.2 Where Required, a fire alarm system shall be provided for Residential R2 uses in accordance with IBC 907.2.1 through 907.2.23 and shall provide notification in accordance with IBC 907.5.

**IEBC 1012.3 Interior Finish:** In accordance with IEBC 1012.3, the interior finish of walls and ceilings in work areas undergoing a change of occupancy classification shall comply with the requirements of the IBC for the new occupancy classification. In accordance with IBC 803.4 and IBC Table 803.11: Interior Wall and Ceiling Finish Requirements By Occupancy, when tested according to ASTM E84, interior finishes in Residential Group R2 occupancies with fire suppression shall meet the following requirements:

Exit enclosures Exit passageways	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
Corridors	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450
Enclosed spaces	Class C: Flame Spread Index 76-200 Smoke Developed Index 0-450

**IEBC 1012.4 Means of Egress, general:** Hazard categories in regards to life safety and means of egress shall be in accordance with IEBC Table 1012.4 Means of Egress Hazard Categories.

**IEBC 1012.4.1 Means of Egress for change to a higher hazard category:** In accordance with IEBC Table 1012.4 Means of Egress Hazard Categories, when a change in occupancy classification occurs to a higher hazard category, then the means of egress shall comply with IBC 10. A portion of the Alterations involve a change in occupancy classification to a higher hazard category and therefore, the requirements of IBC 10 apply.

**IEBC 1012.4.2 Means of Egress for change to equal or lesser hazard category:** In accordance with IEBC Table 1012.4 Means of Egress Hazard Categories, when a change in occupancy classification occurs to an equal or lesser hazard category, then the existing elements of the means of egress shall comply with the requirements of IEBC 905 for the

new occupancy classification. In accordance with IEBC 905, the means of egress will comply with the requirements of IEBC 805. A portion of the Alterations involve a change in occupancy classification to an equal hazard category and therefore, the requirements of IBC 805 apply.

**IEBC 1012.4.3 Egress capacity:** In accordance with IEBC 1012.4.3, the egress capacity involving a change in occupancy classification shall meet or exceed the occupant load as specified in the IBC for the new occupancy.

**IEBC 1012.4.4 Handrails:** In accordance with IEBC 1012.4.4, existing stairways serving a work area involved with a change of occupancy classification shall comply with the handrail requirements of IEBC 705.9, which requires a minimum of one handrail from the work area to the level of exit discharge. In accordance with IEBC 1012.4.4, handrails shall be provided in accordance with IBC 1014: Handrails.

**IEBC 1012.4.5 Guards:** In accordance with IEBC 1012.4.5, existing guards in the area of the change of occupancy classification shall comply with the requirements of IECC 705.10, which requires guards on open portions of stairways that are more than 30 inches above the floor below. In accordance with IEBC 1012.4.5, guards shall be provide in accordance with IBC 1015: Guards.

**IEBC 1012.5 Heights and Areas:** Hazard categories in regards to heights and areas shall be in accordance with IEBC Table 1012.5 Heights and Areas Categories.

**IEBC 1012.5.1 Height and area for change to a higher hazard category:** In accordance with IEBC 1012.5.1, when a change of occupancy classification results in a higher hazard category per IEBC Table 1012.5, then the height and area of a building shall comply with IBC 5 for the new occupancy. In accordance with IEBC Table 1012.5 Heights and Areas Hazard Categories, a portion of the Alterations involve a change in occupancy to a higher hazard category for height and area and, therefore, the building shall comply with the requirements of IBC 5.

In accordance with IBC Table 504.3: Allowable Building Height in Feet above Grade Plane and with IBC Table 504.4 Allowable Number of Stories Above Grade Plane; for a Residential Group R2 occupancy in Type VB Construction Classification with NFPA 13R fire suppression, a building height of 60 feet above grade plane and three stories above grade plane are allowed. The building is less than 60 feet above grade plane and the building is two stories above the grade plan. Therefore, the building complies with height limitations.

In accordance with IBC Table 506.2: Allowable Area Factor in Square Feet; for a Residential Group R2 occupancy in Type VB Construction Classification with NFPA 13R fire suppression, a building area of 7,000 square feet is allowed. The building is less 7,000 square feet in projected area. Therefore, the building complies with area limitations.

**IEBC 1012.5.2 Height and area for change to an equal or lesser hazard category:** In accordance with IEBC 1012.5.2, when a change of occupancy classification is made to an equal of lesser hazard category per IEBC Table 1012.5, then the existing height and area of a building shall be deemed accepted. In accordance with IEBC Table 1012.5 Heights and Areas Hazard Categories, a portion of the Alterations involves a the changes of occupancy classification to an equal or lesser relative hazard category.

**IEBC 1012.6 Exterior Walls:** Hazard categories in regards to fire resistance of exterior walls shall be in accordance with IEBC 1012.6 Exposure of Exterior Walls Categories.

**IEBC 1012.6.1 Exterior wall rating for a change of occupancy classification to a higher hazard category:** In accordance with IEBC 1012.6.1, when a change of occupancy results

in change in occupancy classification with a higher exterior wall hazard category according to IEBC Table 1012.6, then the exterior walls shall have a fire resistance rating and exterior opening protectives as required by the IBC. The Alterations do not result in a change in occupancy classification to a higher exterior wall hazard category.

**IEBC 1012.6.2 Exterior wall rating for a change of occupancy classification to an equal or lower hazard category:** In accordance with IEBC 1012.6.1, when a change of occupancy results in a change of occupancy classification with an equal or lessor exterior wall hazard category according to IEBC Table 1012.6, then the existing exterior walls and opening protectives shall be deemed acceptable. The Alterations result in a change in occupancy classification to an equal or lessor exterior wall hazard category and, therefore, the existing exterior walls and opening protective are deemed acceptable.

**IEBC 1012.6.3: Opening protectives:** In accordance with IEBC 1012.6.3, opening protective shall be in accordance the IBC. In accordance with IEBC 1012.6.3 Exception 4, when the change of occupancy results in a change in occupancy classification to an equal or lessor higher exterior wall hazard category, then opening protectives are not required.

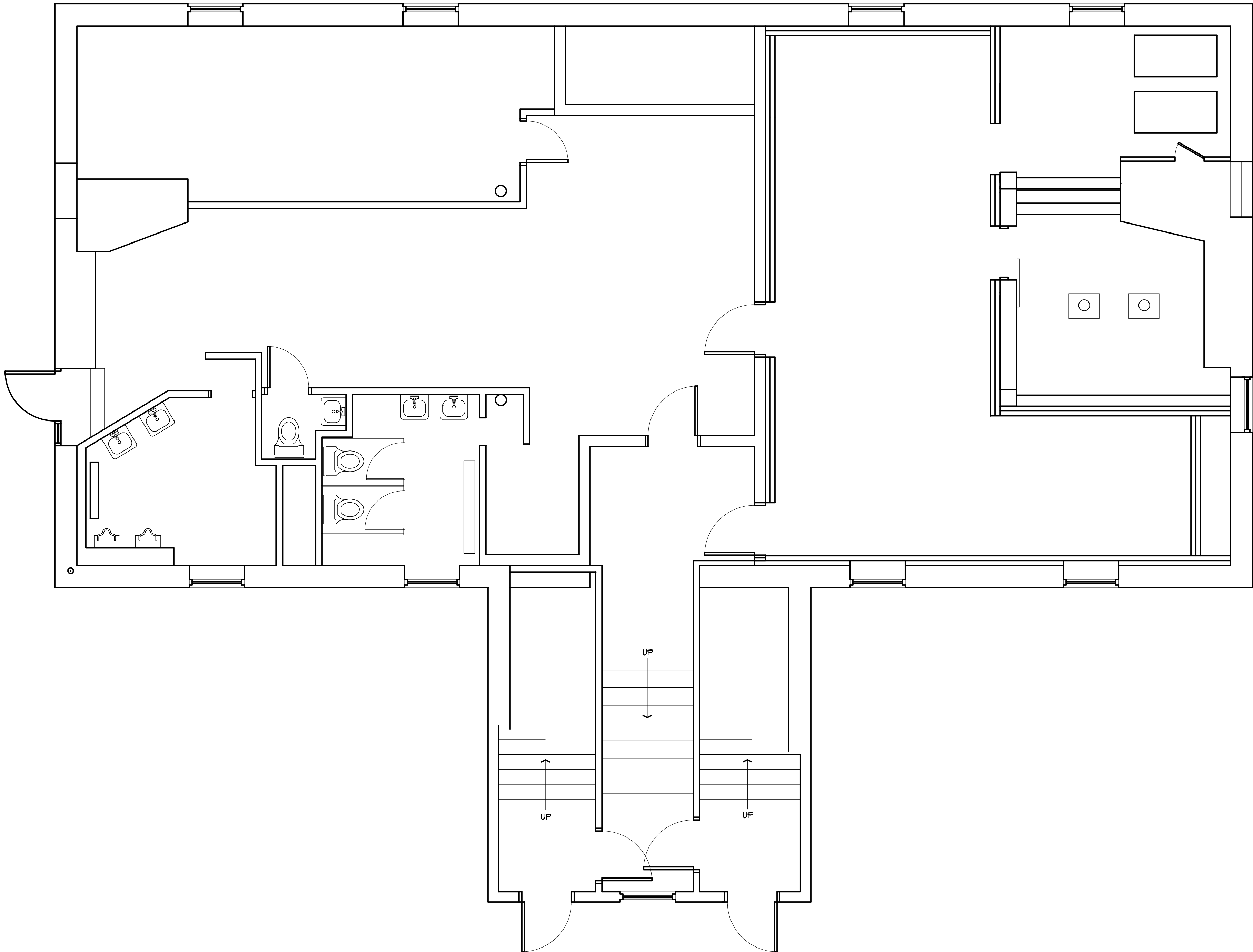
**IEBC 1012.7 Enclosure of vertical shafts:** In accordance with IEBC 1012.7, enclosure of interior vertical shafts shall be in accordance with IECC 1012.7.1 through 1012.7.4, which require compliance with the IBC where there is a change in occupancy classification to a higher means of egress category as determined by IEBC Table 1012.4.

In accordance with IEBC 1012.7.2: Stairways, stairways shall be enclosed in accordance with the IBC. In accordance with IBC 713.4: Fire-resistance rating, shaft enclosures shall have a fire resistance rating of one-hour where connecting less than four stories. Accordingly, the shaft enclosures around the stairways shall be one-hour fire-rated.

**IEBC 1012.8 Accessibility:** Accessibility shall be in accordance with 521 CMR The Regulations of the Architectural Access Board. The value of the Alterations and any other work performed within the last three-year period is more than 30 percent of the value of the building. Accordingly, the entire building shall comply with 521 CMR, specifically 521 CMR 9: Multiple Dwelling Residential Facility and 521 CMR: Public Use and Common Areas in Residential Facilities.

end

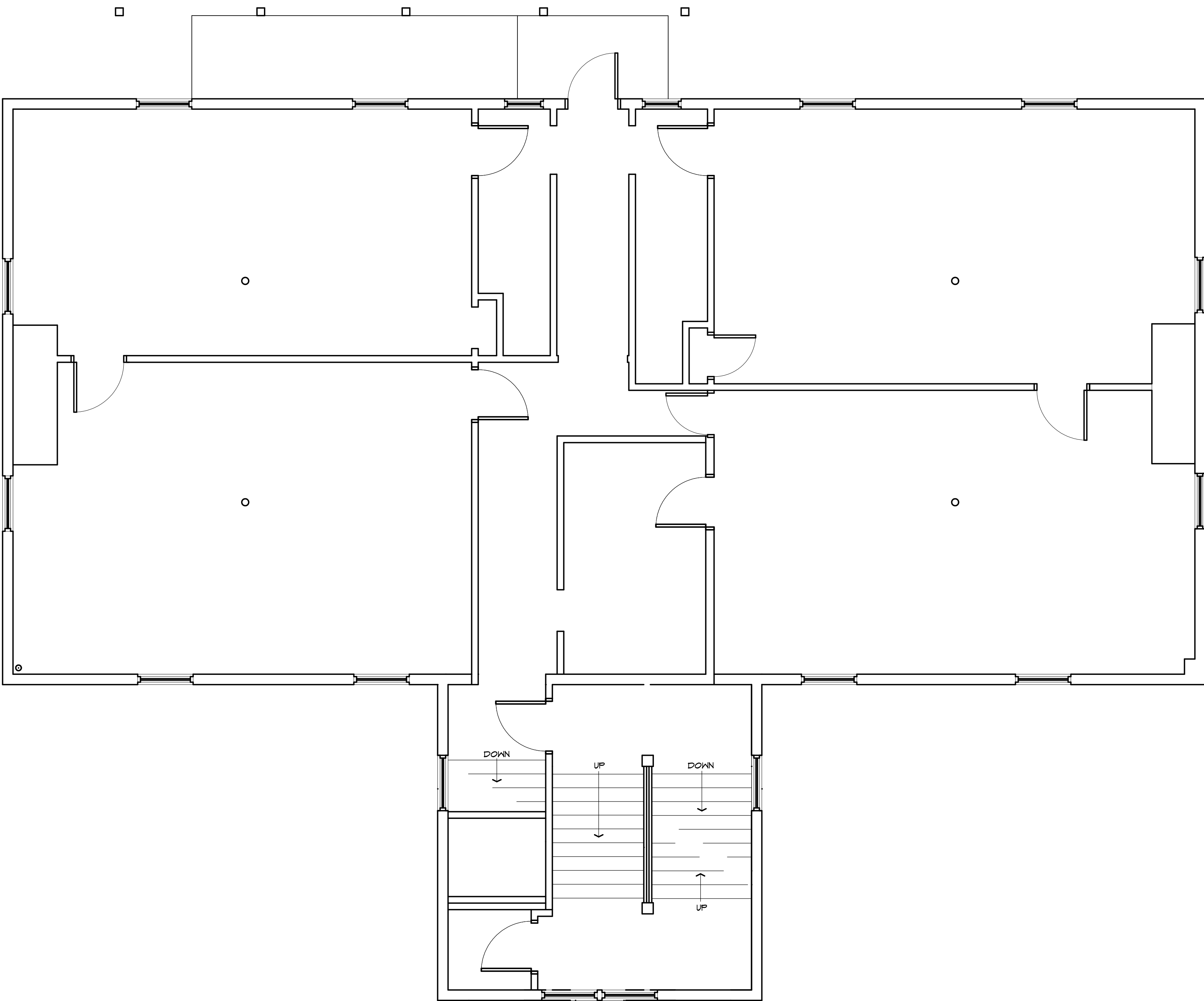
© Drawing 17040-17040 Existing Floor Plans



FLOOR PLAN: BASEMENT

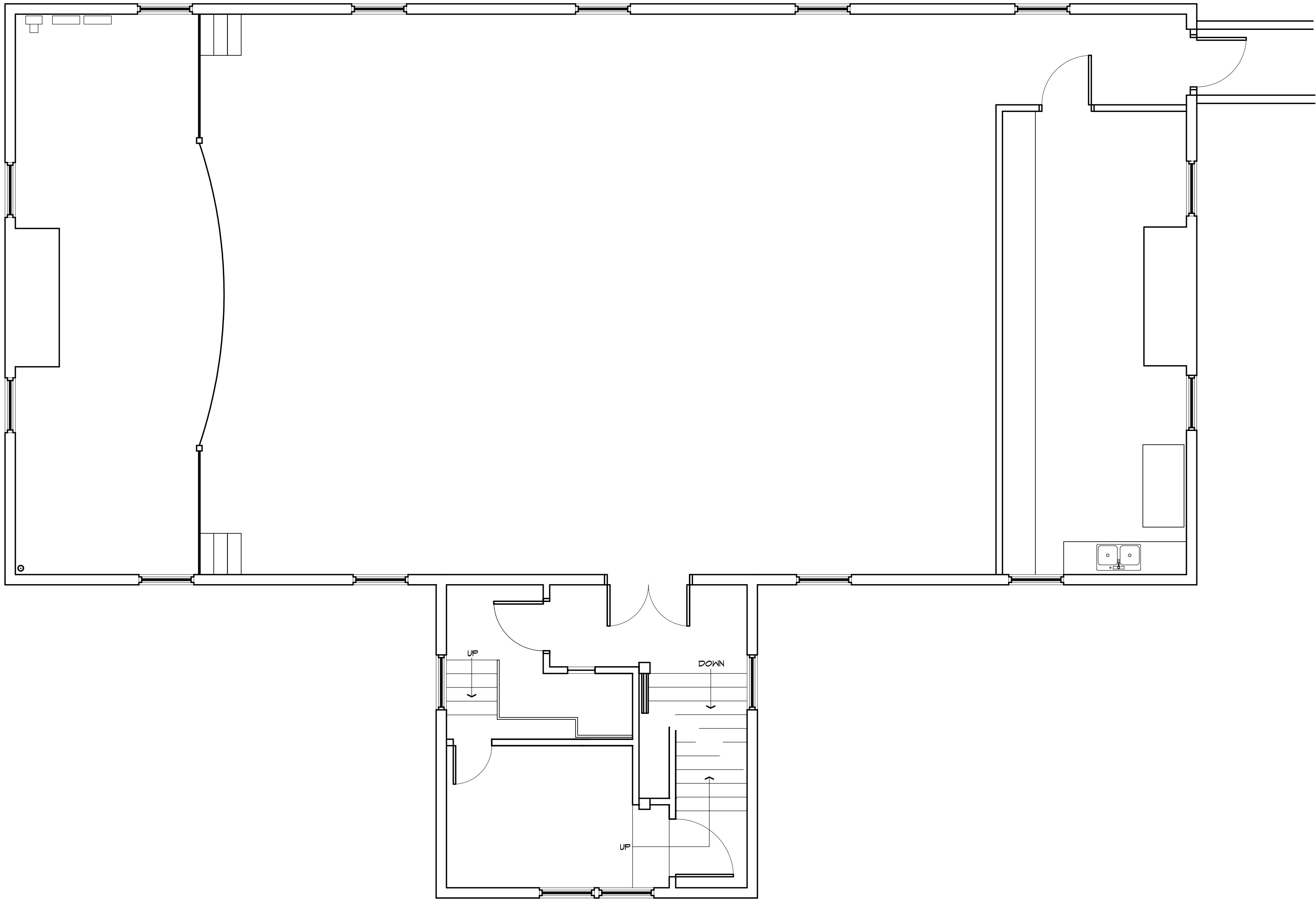
0 2 4 8 16

6' 0"

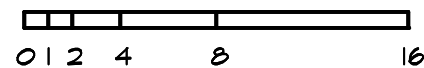
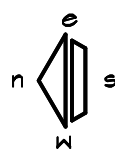


FLOOR PLAN: FIRST FLOOR

0 1 2 4 8 16



FLOOR PLAN: SECOND FLOOR



EXISTING CONDITIONS

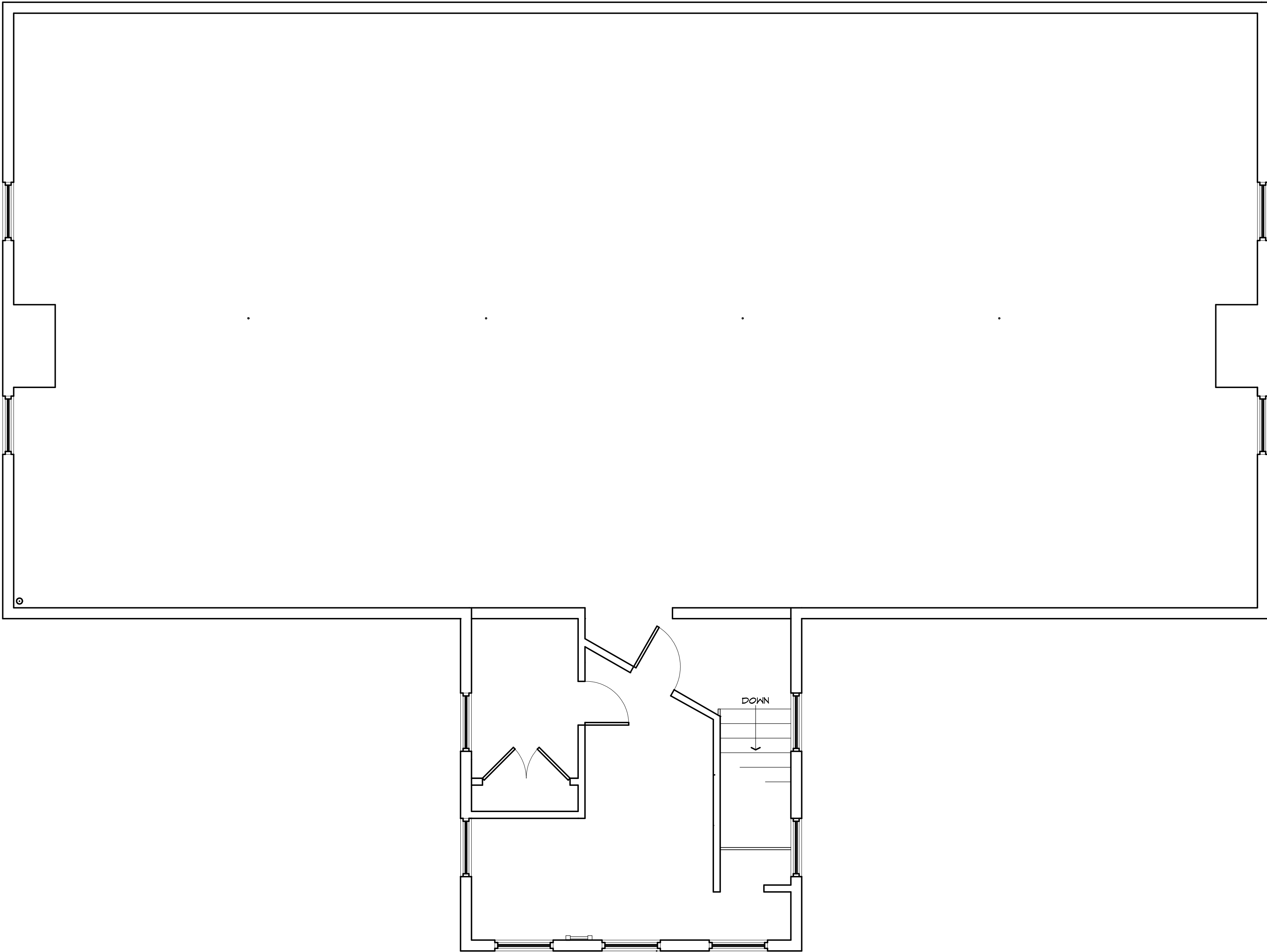
FLOOR PLAN: THIRD FLOOR (ATTIC LEVEL)

ALTERATIONS  
WHITNEY HALL  
SCHOOL STREET  
ROYALSTON, MASSACHUSETTS

HAYNES  
LIENCK  
AND SMITH INC  
ARCHITECTS

17040  
EX  
4

C:\Drawings\17000\17040 Existing Floor Plans.dwg



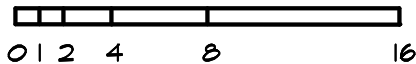
FLOOR PLAN: THIRD FLOOR (ATTIC LEVEL)

0 1 2 4 8 16





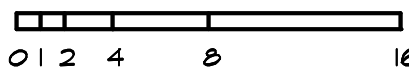
EXTERIOR ELEVATION: SCHOOL STREET SIDE (WEST)



© Drawing 11/2007/17040 Existing Floor Plans.doc

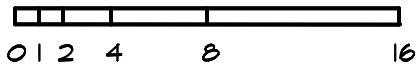


EXTERIOR ELEVATION : PARKING SIDE (EAST)



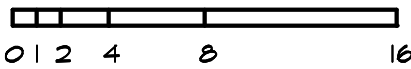


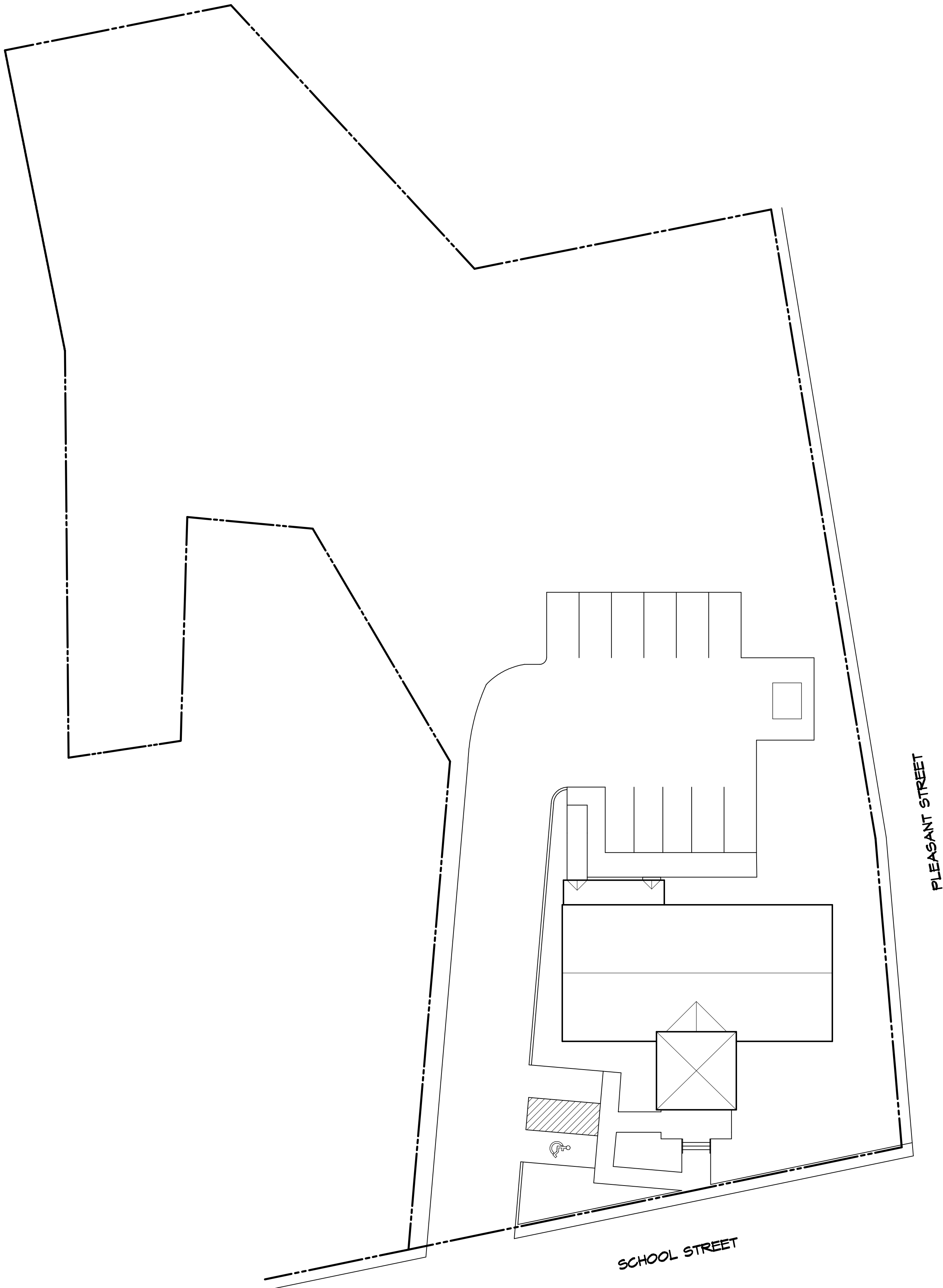
EXTERIOR ELEVATION: DRIVE SIDE (NORTH)



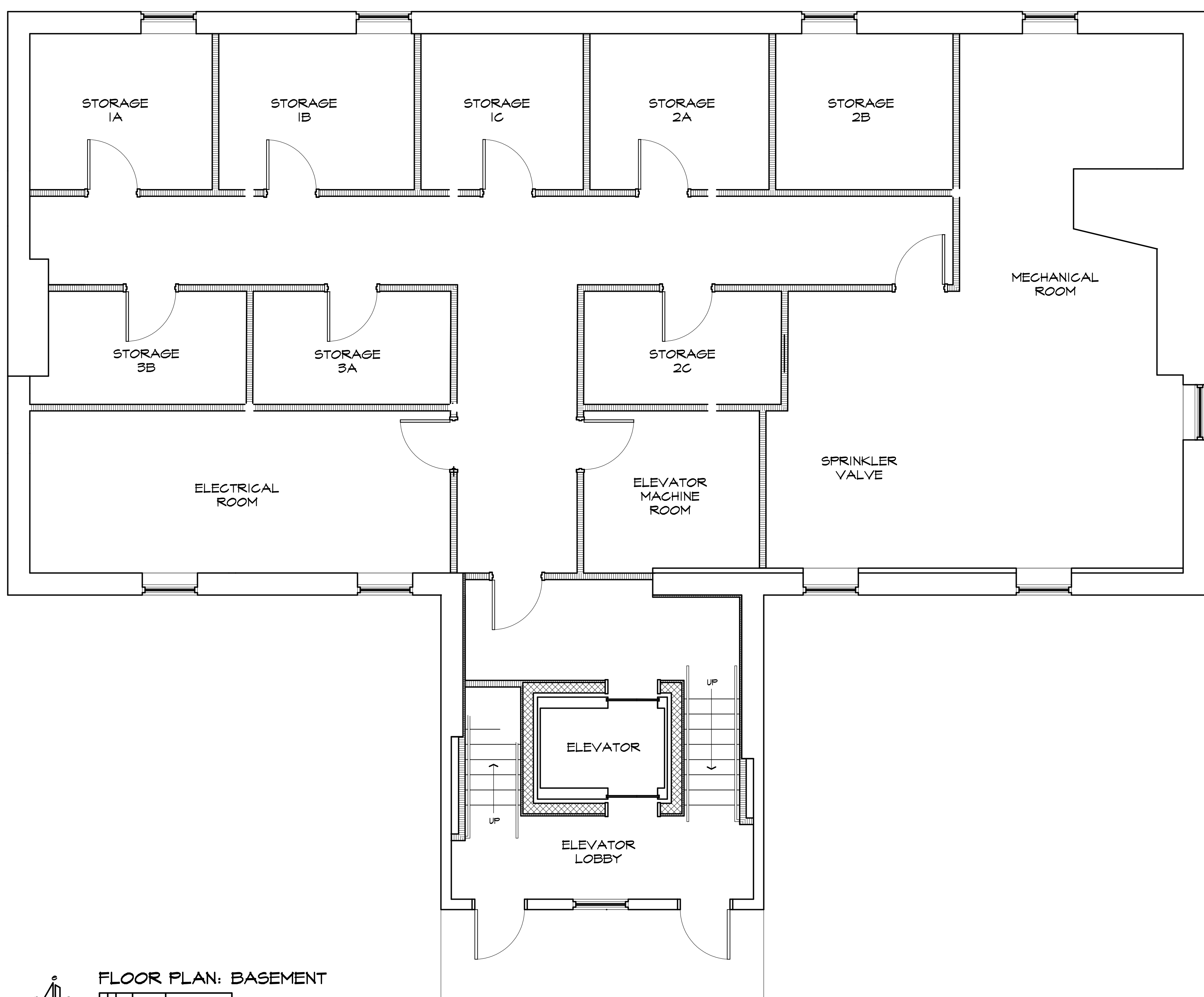


EXTERIOR ELEVATION: PLEASANT STREET SIDE (SOUTH)



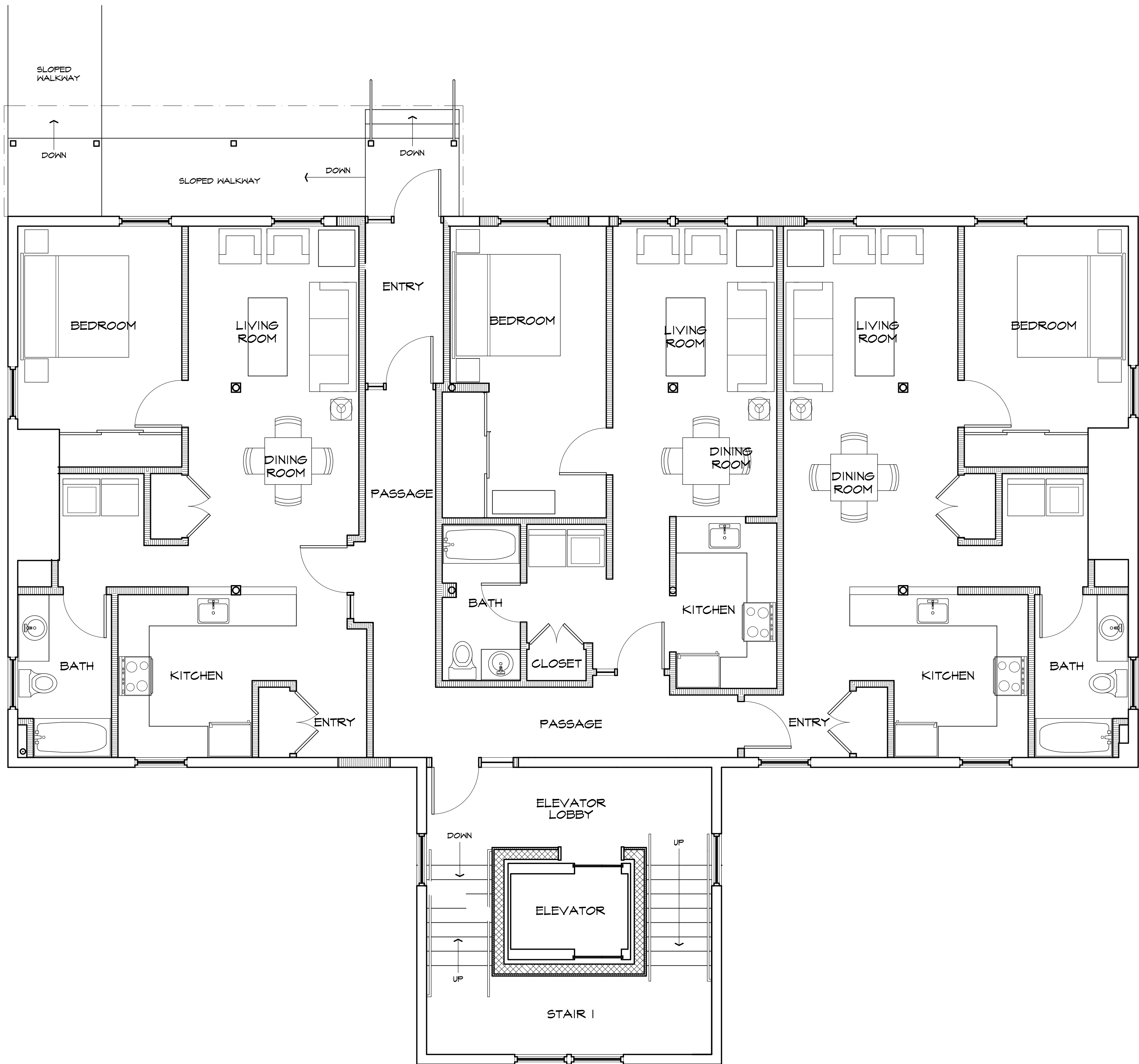


SITE PLAN  
1" = 20'



FLOOR PLAN: BASEMENT





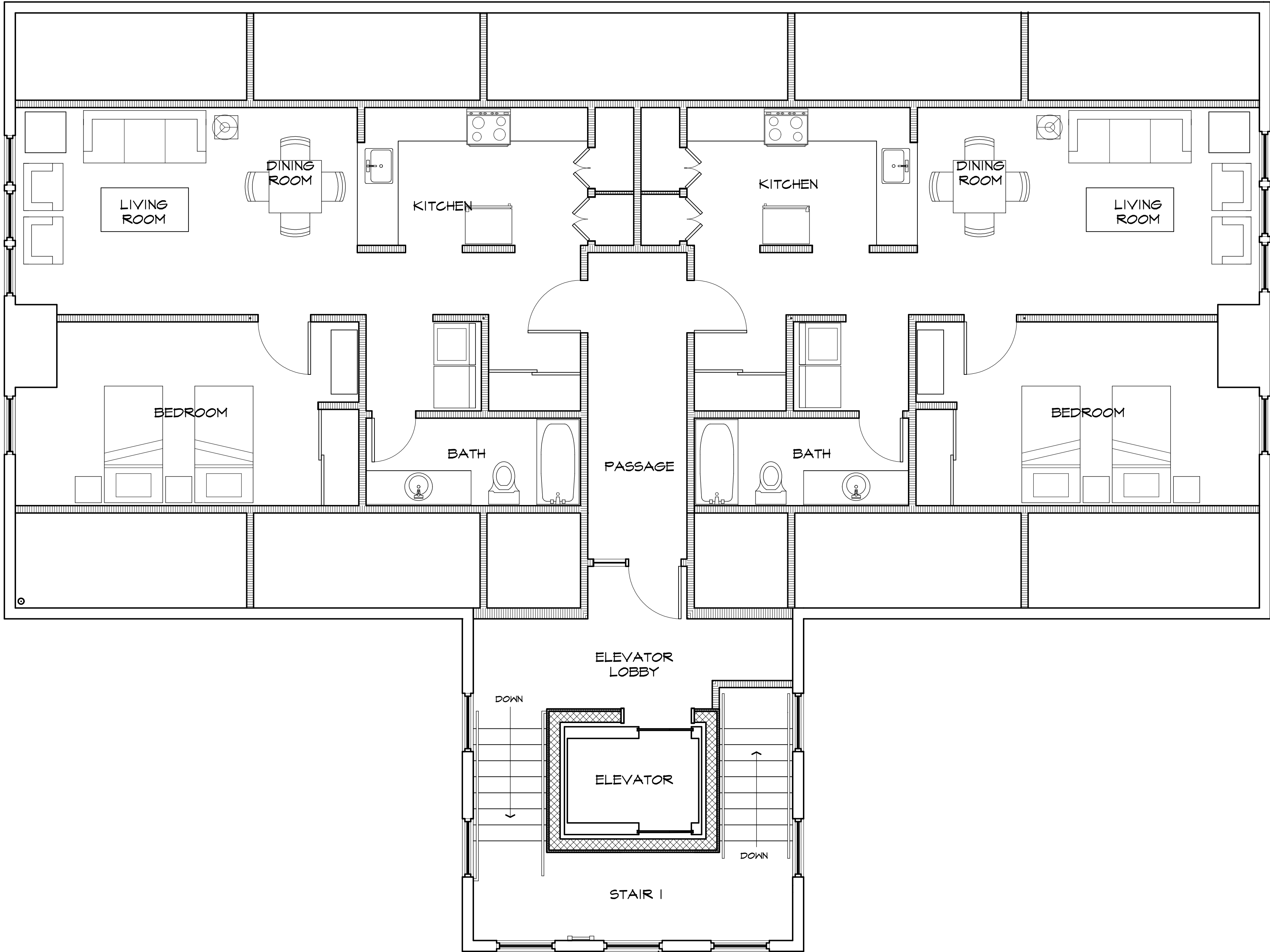
FLOOR PLAN: FIRST FLOOR





FLOOR PLAN: SECOND FLOOR

0 1 2 4 8 16



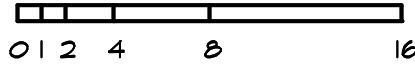
FLOOR PLAN: THIRD FLOOR (ATTIC LEVEL)

0 1 2 4 8 16

N



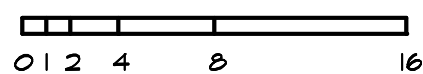
EXTERIOR ELEVATION: SCHOOL STREET SIDE (WEST)







EXTERIOR ELEVATION: DRIVE SIDE (NORTH)





EXTERIOR ELEVATION: PLEASANT STREET SIDE (SOUTH)

