



## **Building Evaluation Report**

**Grange Hall  
31 New Ipswich Road  
Ashby, Massachusetts**

Prepared by:

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June 25, 2015

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## Executive Summary

The Town of Ashby requested that Haynes, Lieneck, and Smith, Inc., architects, provide design services to evaluate the Grange Hall at New Ipswich Road for repairs needed for the survival of the building and for alterations recommended or required for the use of the building as a public building or as a rented property for meeting space.

In response, Haynes, Lieneck, and Smith, Inc. prepared a Building Evaluation Report that includes the following information:

Drawings of existing conditions including the following drawings:

Floor plan: lower level  
Floor plan: main level  
Floor plan: upper level

Exterior elevations

Transverse building section

Written general information

Written identification of remedial repairs for survival of the building and recommendations for implementation of preservation

Written identification of issues involved with the alterations needed for provide for the health, safety, and welfare of building occupants during practical use of the building; and recommendations for implementation of rectifying work

Written identification of issues of non-compliance with building codes and recommendations for work for compliance

Written identification of issues of recommended alterations for energy efficiency

Conceptual budget costs for planning implementation of recommended work; and conclusion with recommendation for course of action

The evaluation of the existing building is based on the requirements of the following current standard building codes that are involved with repairs and alterations to an existing building in Massachusetts:

780 CMR The Massachusetts State Building Code, eighth edition  
International Building Code (IBC) 2009 and Massachusetts Amendments  
Existing Building Code of Massachusetts (IEBC) 2009  
521 CMR Rules and Regulations of the Architectural Access Board (AAB)  
International Energy Conservation Code (IECC) 2012  
International Mechanical Code (IMC) 2009  
248 CMR 10 Uniform State Plumbing Code

If no work is performed, the building code does not require retroactive alterations for compliance with current code requirements. The building code prescribes specific compliance requirements dependent upon the scope of work performed as repairs, alterations, or additions. However, where the building evaluation is intended to identify issues on non-compliance for continued use; the evaluation includes recommendations for resolution of issues; applicable code requirements for repairs, alterations, and additions; and code requirements that direct the safe use of the building whether or not required because of work performed. Accordingly, there are recommendations for work that would be expected for the safe use of the building regardless of whether or not there is a code based directive for performing the work.

The evaluation reviews the Grange Hall as if the building will remain in the current use as a meeting and public assembly building. Using the building for other purposes including, but not limited to, town administrative office, private rental office space, private rental housing, or other use requires compliance with code requirements for a building code Change of Occupancy Classification that may be more, or less, stringent than alterations within the current use depending on the proposed use. Evaluating the more stringent requirements is beyond the scope of the current building evaluation because of the potential variety of uses and associated requirements. However, most of the recommended work in general in nature and satisfies many, but not necessarily all, of the requirements imposed by a building code Change of Occupancy Classification.

Budget costs are conceptual estimates without knowing the actual scope of work. Budget costs are intended to indicate an order of magnitude for the purposes of planning. Amounts set aside for the recommended work will be determined by further design review, evaluation, and cost estimating before projects are included in annual working budgets.

A conclusion is offered on the efficacy of proceeding with the recommended work with respect to the size of the building and the potential for use.

## General Information

The Ashby Grange Hall is a three story wood framed building that was constructed circa 1820. The overall dimensions are 40 feet wide by 51 feet deep. The building consists of the following spaces:

Lower level floor with food preparation room, meeting room, mechanical room, and toilet

Main floor with entrance foyer, meeting room with platform, storage alcoves on platform, and office

Upper floor with meeting room with platform, and storage area

The building has access points at a door to the lower level on the north side; a pair of doors for the main entrance, which is on the west end; and doors from the platform on the main level and from the upper level to an exterior fire escape on the south end.

The lower level is entirely below grade at the front of the building and entirely above grade at the back of the building. The exit door to grade from the lower level occurs within the rear one quarter of the length. The foundation walls above the lower floor consist of large field stones along the front wall and returning approximately 10 feet on the sides; concrete masonry where the lower floor is below grade; and wood framing where the lower floor is above grade. The wood sill which is covered by wood siding consistently extends to the grade regardless of the type of foundation wall construction.

The superstructure is a wood post and beam frame with a heavy timber simple gable attic truss that includes metal cables that extend through the upper floor to heavy timber girders that support the framing for the upper floor.

The finishes on the upper level are close to what is probably the original construction in 1820; the horse hair plaster of exterior walls appears to be covered in places by the first coat of paint that was applied. The finishes on the main level are similar except for more contemporary finishes that are applied over the original finishes. The finishes on the lower level are more contemporary but are judged to be at least 50 years old. The original wide floor boards remain in service on the main floor and upper floor.

The Ashby Grange Hall is used for gatherings, meetings, workshops, and other similar functions that take advantage of the open spaces. Accordingly, the Use Group assigned to the Grange Hall in 780 CMR Massachusetts State Building Code is Assembly Group A3. The Use Group is one of the factors used to determine the parts of the building code, laws, and regulations that apply to the building.

The Construction Classification is another factor used to determine code applicability. The Construction Classification of the Grange Hall is VB with is Unprotected wood frame. The VB Construction Classification carries the least restrictive fire protection requirements.

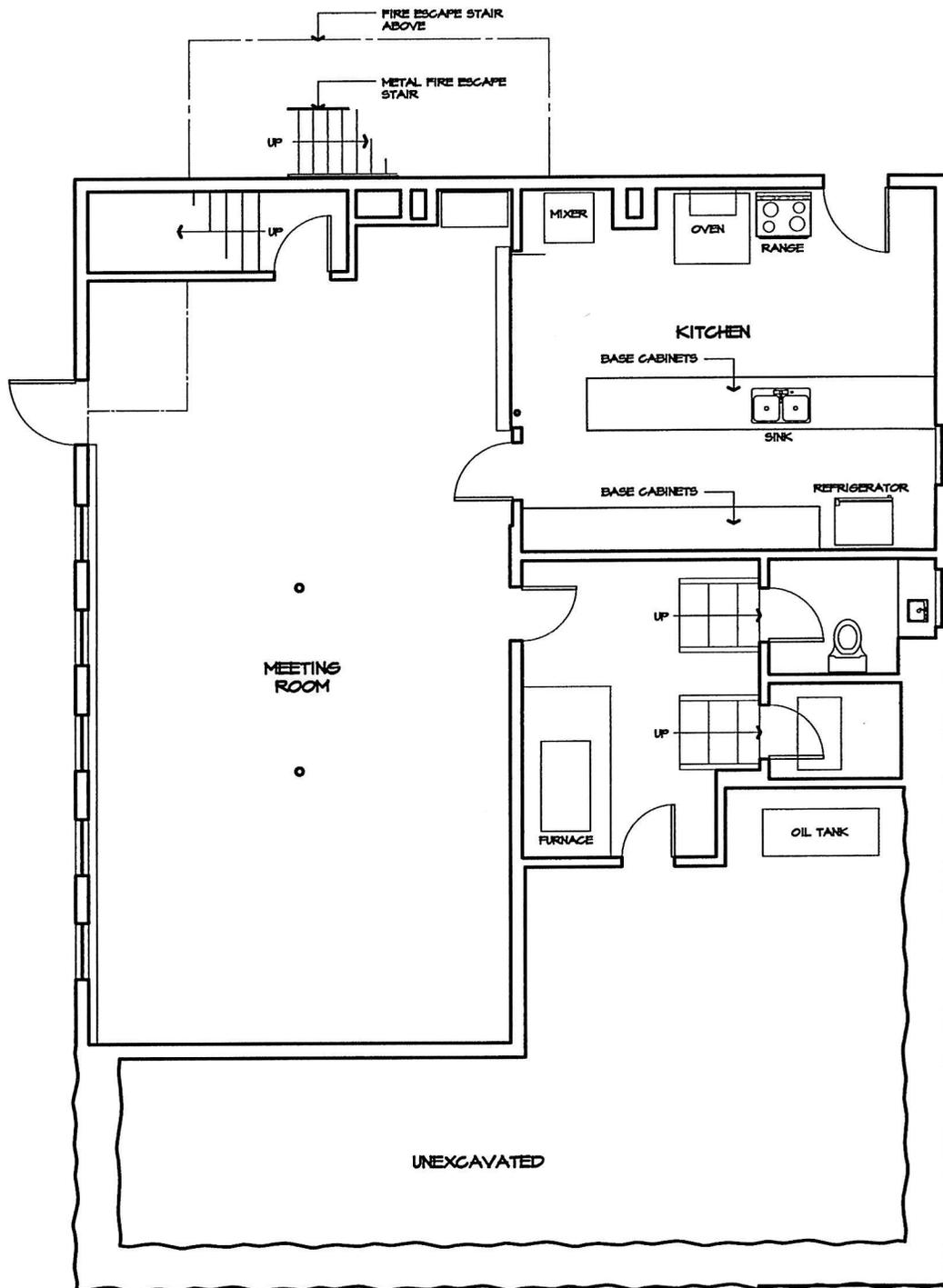
According to the Board of Assessors, the assessed value of the Grange Hall is \$34,600 based on one percent valuation last reviewed in 2014. The value is used in some codes to establish a threshold that triggers additional work; usually the threshold is thirty percent of the assessed value. The low assessed value causes the threshold to be reached by relatively small alterations.

## Drawings of existing conditions:

Floor plan: lower level  
Floor plan: main level  
Floor plan: upper level

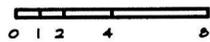
Exterior elevations

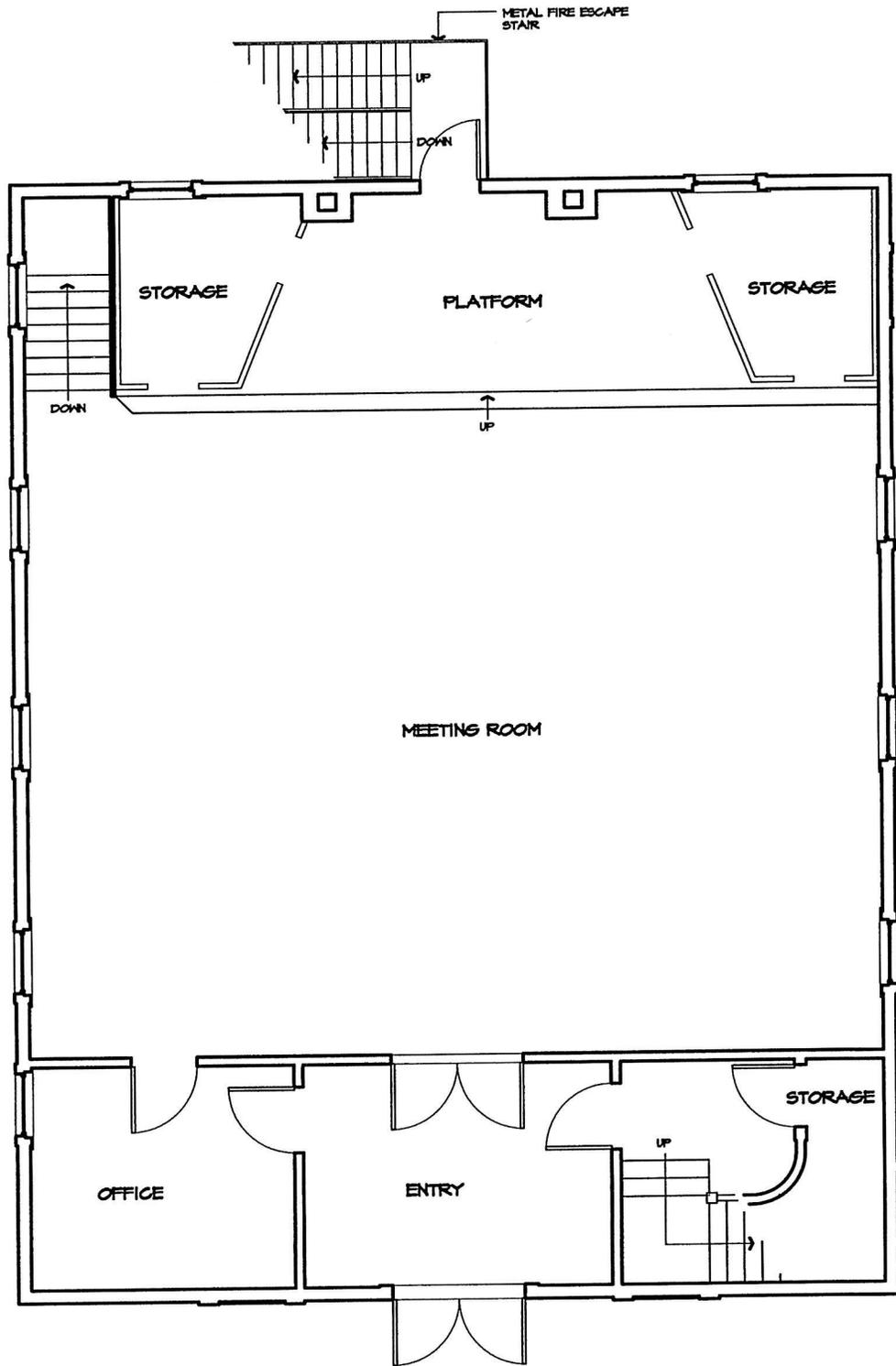
Transverse building section



**FLOOR PLAN: LOWER FLOOR: EXISTING CONDITIONS**

1/8" = 1'-0"

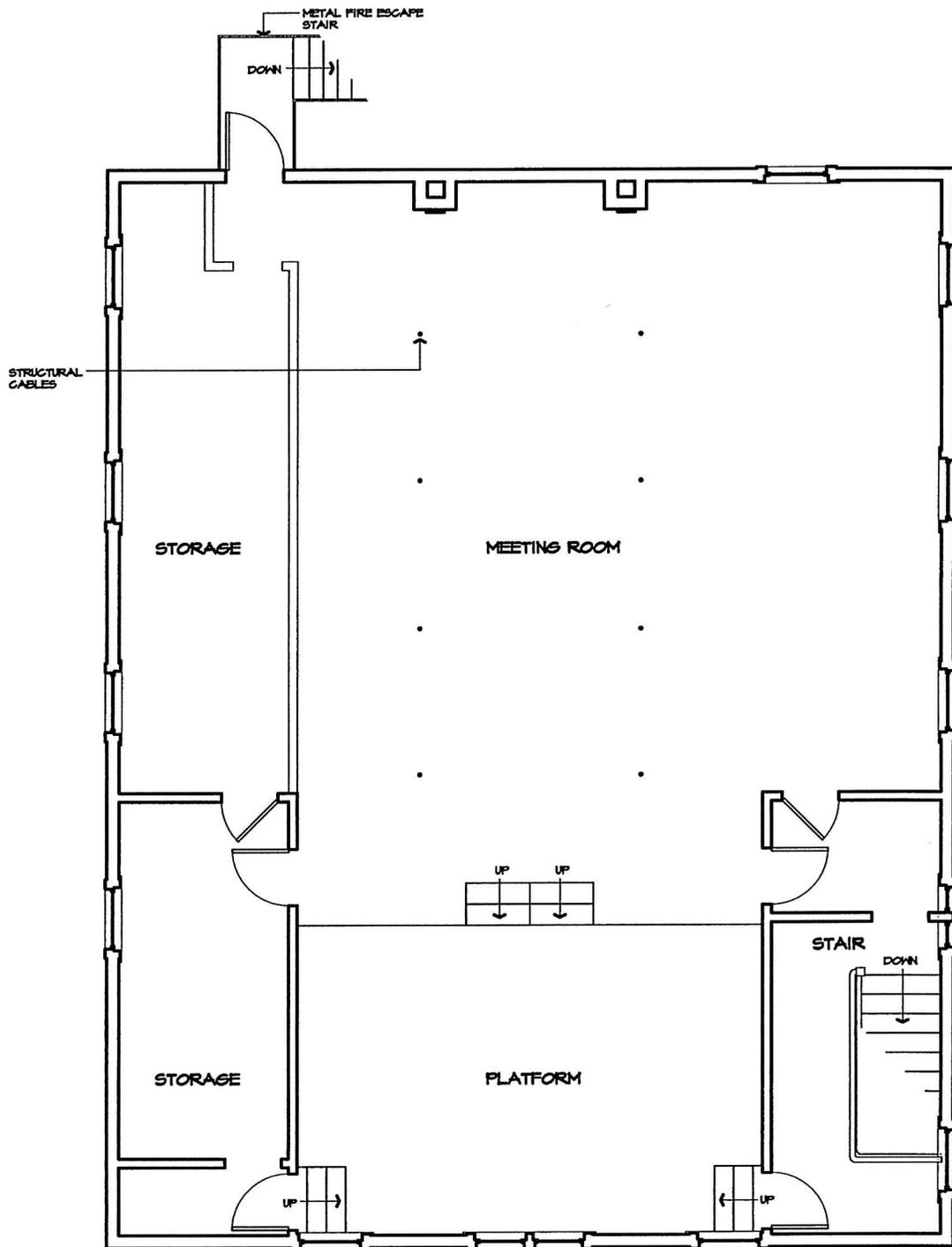




**FLOOR PLAN: MAIN FLOOR: EXISTING CONDITIONS**

1/8" = 1'-0"





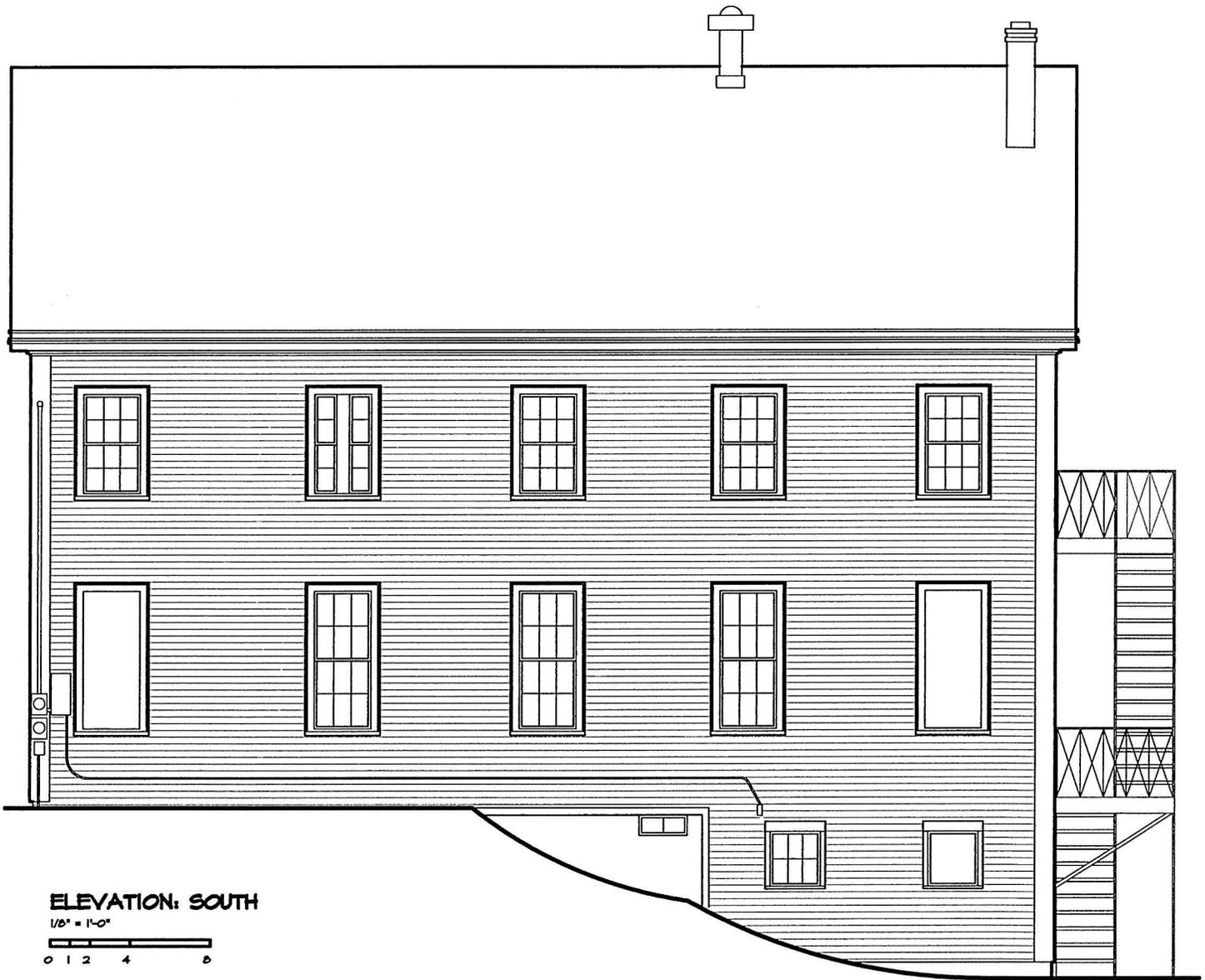
 **FLOOR PLAN: UPPER FLOOR: EXISTING CONDITIONS**  
 1/8" = 1'-0"  
 0 1 2 4 8

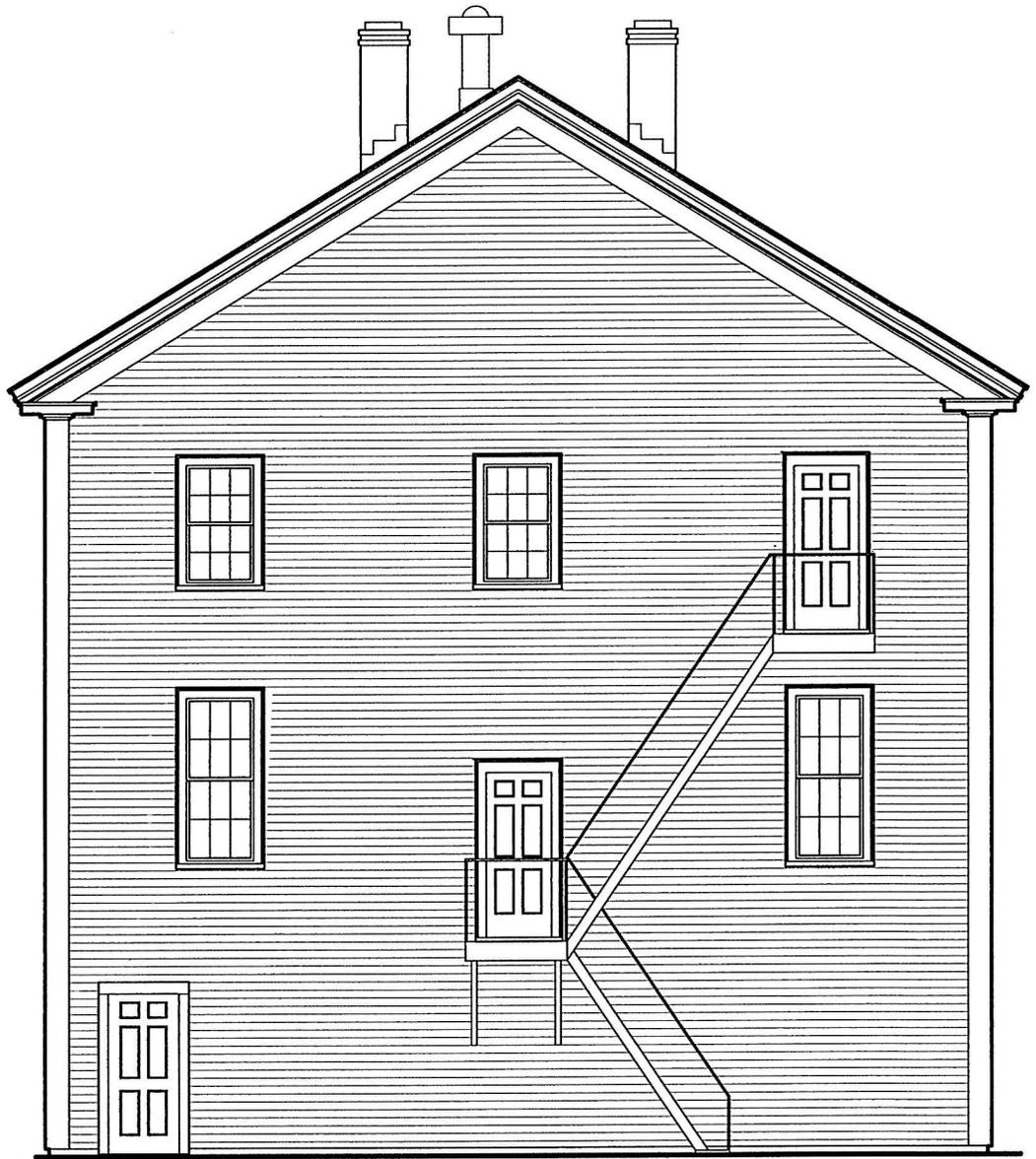


**ELEVATION: WEST**

1/8" = 1'-0"

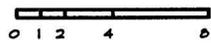


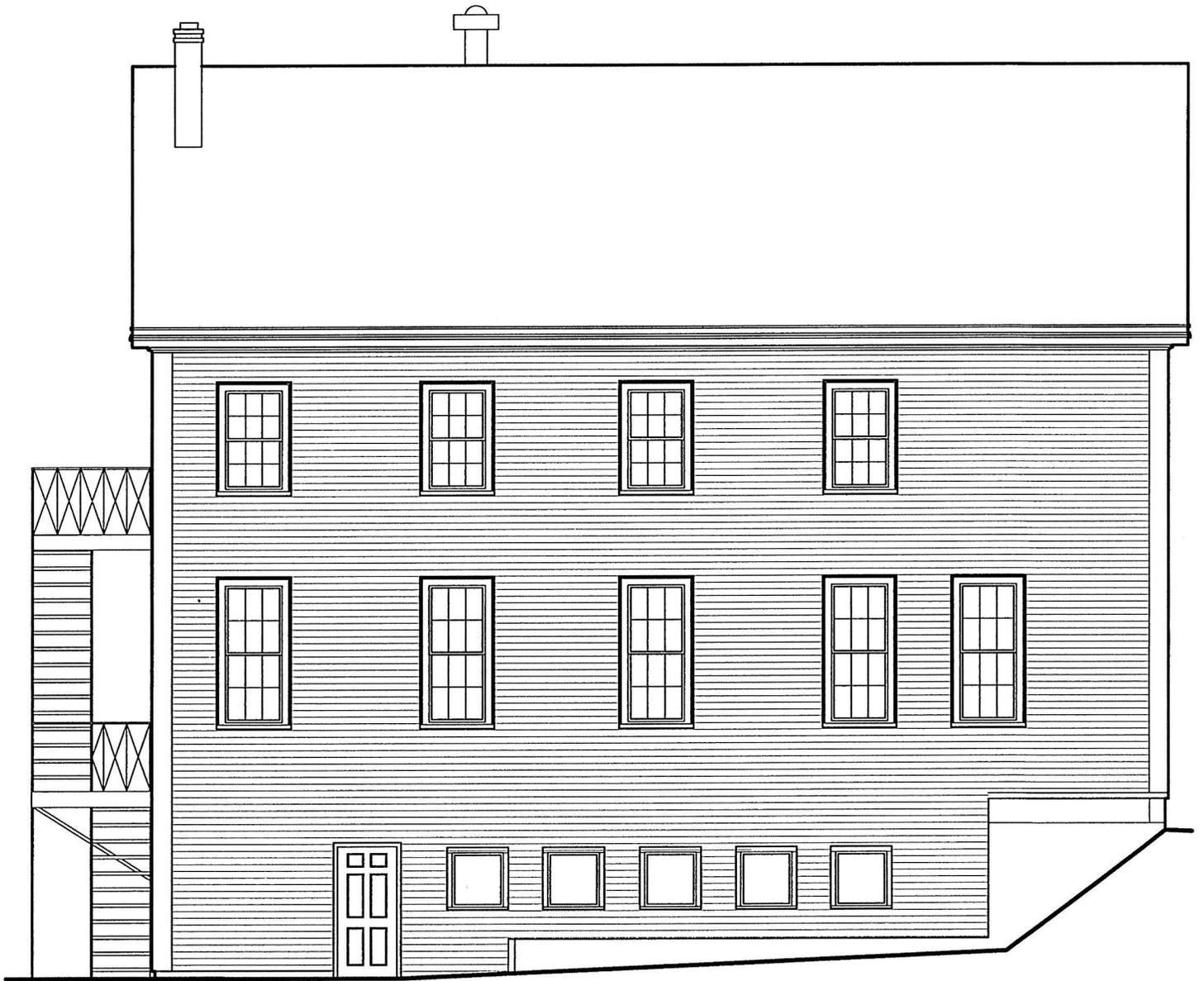




**ELEVATION: EAST**

1/8" = 1'-0"

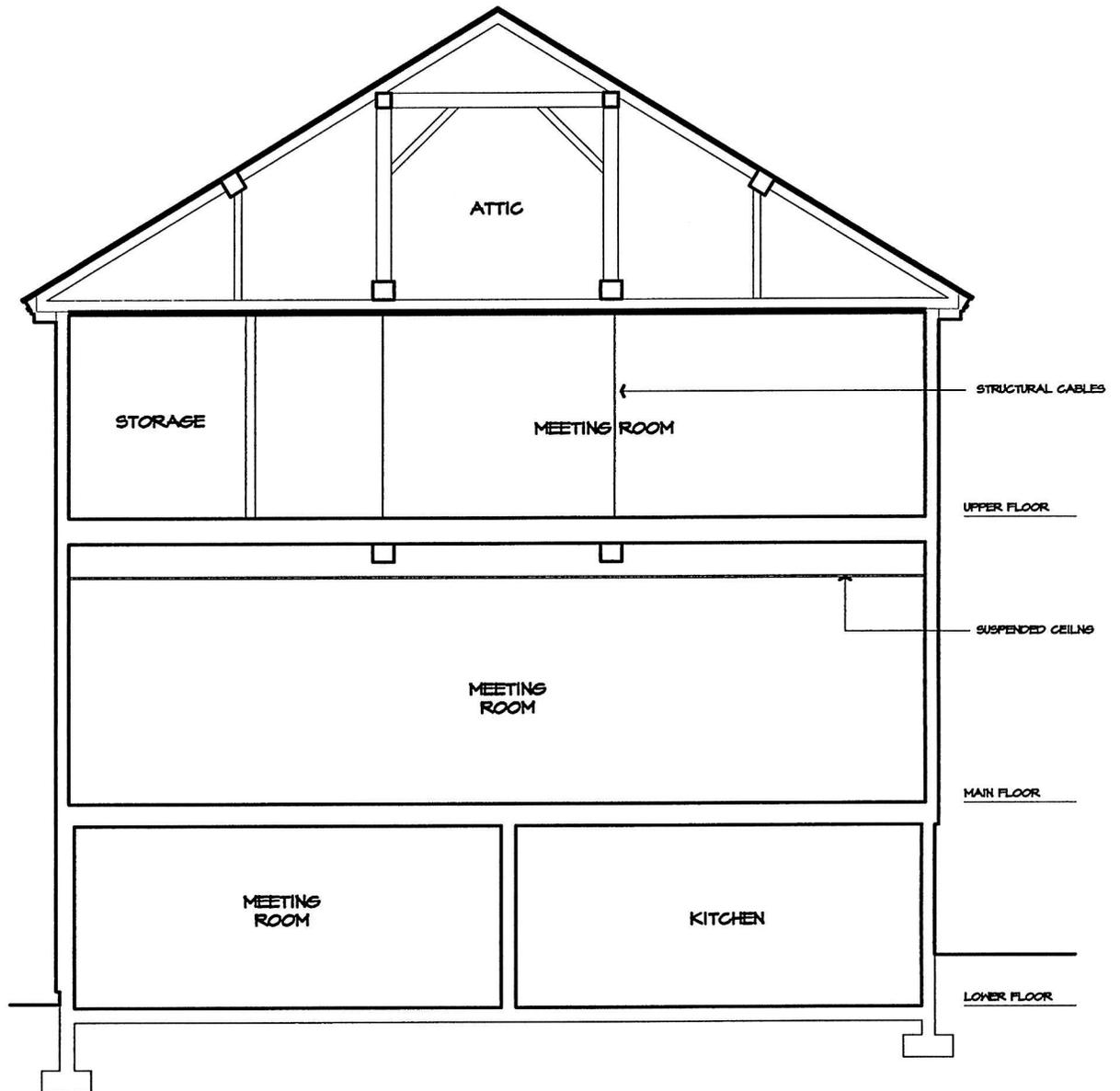




ELEVATION: NORTH

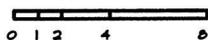
1/8" = 1'-0"





**BUILDING SECTION**

1/8" = 1'-0"



The building is in the Ashby Historical District. Any repair work on the exterior of the building is recommended to be restoration work in accordance with the Secretary of the Interiors Standards for the Treatment of Historical Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings and the Preservation Briefs of the Technical Preservation Services for Historical Buildings of the National Park Service. While strict adherence to the historical preservation guidelines is the goal, if strict adherence is impractical because of future inability to maintain the preserved materials, then use of contemporary weather durable materials that replicate exactly the historical character of the original features is recommended for the long term benefit of the building.

Consideration of preservation of a building usually focuses on building envelope and structural system failure. In the case of the Grange Hall, the most important issue of preservation is the replacement of parts of the electrical system that are a fire hazard that could result in devastating the building beyond restoration. The primary focus of survival of the building is, therefore, the replacement of the older parts of the electrical system.

### **Electrical System:**

The existing electrical system appears to be of three vintages, the original knob-and-tube wiring system with screw in fuses that remains on the upper level; an intermediate system of grounded outlets, conduit, and wiring that is evident on the main level; and a more contemporary system of conduits and wiring that existing on the lower level. There is a mix of wiring types including cloth covered wiring, plastic covered wiring, metal clad wiring, and wiring in conduit throughout the lower level. The recommendation is to replace the cloth covered cables and the devices and equipment that are not code allowed.

The existing electrical system includes, but is not limited to, the following items; any one of which could result is a fire:

Prevalent throughout the upper floor and attic is exposed and concealed, code violating, knob-and-tube wiring consisting of porcelain wire retainers and cloth covered copper wire. The cloth covering is susceptible to animals gnawing through exposing the metal cables within. The covering is also susceptible to brittleness through general deterioration that also results in exposed wiring. Any electrical work performed in the building will require removing knob-and-tube wiring. The knob-and-tube wiring is strongly recommended be replaced immediately regardless of any requirement to perform the replacement.

On the upper level stair landing as a wood board on which are mounted exposed sockets with screw in fuses. Some of the sockets are empty which could indicate a discontinued circuit or which could be an open live circuit. There are boxes of fuses near the panel board indicating frequent overloading. The screw in fuses are recommended to be replaced as soon as possible with circuits from the electrical panel on the lower level.

One the upper level and in some locations on the main floor are push button type and rotary type light switches which are no longer allowed by code. Also some of the light switch cover plates have openings that do not protect against arcing out through the plate. The archaic light switches and plates are strongly recommended be replaced immediately, regardless of any requirement to perform the replacement.

Throughout the building, but particularly in the main entrance and in stairwells, are incandescent light fixtures suspended by cloth covered cords. The cloth covering is susceptible to animals gnawing through and to brittleness through general deterioration resulting in exposing the wiring. Further, the condition of excess heat

on the cords is exacerbated by the heat producing incandescent lamps in antique lamp holders. The recommendation is to replace any light fixtures with cloth covered wiring.

Electrical outlets and distribution devices on the upper level are not grounded and distribution of power on the upper level is insufficient. Extension cords are used for power distribution often with a string of several cords combined and ended with a multiple outlet device. The extension cords are not rated for the use, are not properly secured, and are routed through doors and paths of egress. The recommendation is to replace the power distribution throughout the upper level.

### **Structural systems:**

The general building structure is post and post construction which is in relatively good condition. In general, adjusting an existing post and beam frame to eliminate deflection is not recommended because of potential damage to the system but also because the original state of plumb and level is not known. As long as the connections are intact and able to transfer load properly, adjusting the existing frame is not recommended. However, areas that are out of plane are prudent to investigate to ensure that structural failure at the connections or at a broken member has not occurred. Based on observations of current conditions, the recommendation is investigation to repair damaged connections and broken members at the following locations:

In general, the roof frame appears to be in acceptable condition. There are two higher points along the ridge and along the south facing roof plane that may indicate that the connections of the roof frame spanning between trusses is failing from fatigue. There is also an apparent small broken member on the south end of one of the trusses that does not appear to have had an effect yet on the plane of the roof.

The exterior wall on the north side is out of plane bulging toward the exterior on the lower level where the wood foundation wall is on the concrete masonry foundation wall. The repair probably will involve adjusting the existing framing and replacing intermediate studding. The connections at the main level floor framing should be verified.

Where the wood framing foundation wall extends to the stone foundation at the lower floor level, the existing sill is deteriorated in several locations. The sill is recommended to be with pressure treated wood materials wherever the wood foundation is within one foot of the ground. Also recommended is a moisture barrier between the pressure treated wood and the stone foundation. The sill can be replaced in sections with the existing wall framing shored in place.

There is bowing of the floor on the first floor appears to be the result of the floor joists bearing on the center longitudinal bearing wall on the lower level. There could also be settling of the exterior walls involved. However, the upper level floor appears to be higher along the exterior walls and lower in the center which would indicate that the exterior walls did not settle but that perhaps the center bearing has been forced upwards or that the condition is indigenous to the original construction. Recommended is investigation of the top of the lower level bearing wall and the condition of the foundation walls on the north and south sides.

The upper level floor framing is part of the roof truss system that is suspended by metal cables that are exposed and interrupt the free use of the upper level. The floor may have settled in the center due to long term fatigue and stretching of the metal cables. The connections at the cables is recommended to ensure that there is no damage.

## **Exterior envelope:**

### Unexcavated Foundation:

Water is entering at the bottom of the concrete masonry wall that is at the interior face of the unexcavated space at the large field stone foundation wall along the front of the building. The recommendation is to excavate to lower the grade on the unexcavated side of the masonry wall and to provide membrane waterproofing along the bottom of the concrete masonry wall in the unexcavated space.

### Windows:

The windows are original double hung wood windows with single pane true divided lites. The narrow muntins that yield maximum vision are an historical feature of the windows that is worth preserving. The narrow muntins has also resulted in deterioration, damage, and wear in use that requires more attention than would a wider muntin. The sash are poorly fitted and do not operate because of built up paint, poor fit, or missing balance hardware.

Some of the windows have exterior aluminum storm windows.

Recommended is restoration of the existing windows and fabrication of wood storm windows for the protection of the windows and for energy conservation. The following work is recommended for each window:

Remove sash, strip paint from sash and window frames, and clean hardware without removing patina

Repair damaged components by epoxy repair or replication with mahogany or other wood with the characteristics of the original old growth wood.

Repair glazing materials and replace severely deteriorated materials. Replace broken glass using reclaimed glass of the original period.

Paint the exterior of the sash and frames with marine grade sealer, primer, and paint

Reinstall the sash with copper weatherstripping, sash weights and sash cords, and original hardware

Provide wood framed storm windows with insulating glass.

Further reference to Preservation Brief 9;: The Repair of Historic Wooden Windows is recommended.

### Siding and trim:

In general siding and trim are in fair to good condition. There are areas of deterioration and damage that must be repaired to preserve the exterior envelope. Considering that the building is a public building that will experience periods when maintenance may not be available when needed, the recommendation is to restore existing materials where possible with epoxy restoration techniques and to replace materials damaged beyond restoration with historically exact composite polyvinylchloride materials.

The recommendation is to address specific places where the restoration and replacement with composite materials will offer most benefit in the areas regularly exposed to water including, but not limited to, the following locations:

Molded fascia at roof eaves

Molded pediment at gable ends

Window sills

Siding within two feet of the ground

Further, the recommendation is to provide zinc coated copper flashing on the flat tops of projecting trim over doors and windows, some of which project from the wall face as much as 12 inches.

## Means of Egress:

### Occupant Load:

The occupant load in a building is established by IBC 1004: Occupant Load. For assembly Group A3 spaces without fixed seats, the occupant load is one person per 5 square feet net for standing space; one person per 7 square feet net for chairs; and one person per 15 square feet net for tables and chairs. The net area is the area for occupants less space for egress. The chairs occupancy is the closest to what will be a typical maximum use of the spaces in the Grange Hall. Accordingly, the meeting room on the lower floor has a maximum occupancy of 35 persons, the meeting rooms on the main floor has a maximum occupancy load of 75 persons; and the meeting room on the upper level has a maximum occupancy load of 75 persons.

### Exits:

In accordance with IBC Table 1021.2: Stories with One Exit, in Assembly Group A, only one exit is required from the first story or basement with less than 50 people and a travel distance to an exit of 75 feet or less. The lower level qualifies as needing only one exit and the main floor would qualify if the occupant load were posted at less than 50 persons. The upper floor requires two means of egress regardless of occupant load and travel distance. Existing exits are as follows:

The lower level has two exit doors to the exterior and a stairway connecting to the main floor. One of the exit doors is sufficient as the single exit required from the lower floor.

The main floor has the main entrance door leading to the exterior, a stairway that exits the exterior on the lower level, and a door from the platform to a metal exterior fire escape. The metal exterior fire escape is not needed from the main level. The stairwell through the lower level to an exit and the main exit provide the two exits required from the main level.

The upper level as an exit to an exterior metal fire escape and a stairway in the front of the building. The building used to have a second stairway in the front of the building but the space is now used for an office and storage. Exterior metal stairs are impractical and unsafe because the snow and ice must be regularly removed to maintain the use of the stairs. The open grates allow snow to pass, but ice routinely builds up on the grates. Further, metal stairs must be recertified every five years by a professional structural engineer.

The recommendations include the following work:

Provide a concrete landing at the lower level exit door and provide concrete steps from the landing to the parking lot not only for safe egress by for accessing the food serving room.

For long term safety construction of a second interior stairway from the upper level to an exit by extending to the upper level the existing stairs that serve the lower level and main level. Alterations for an enclosed stair are recommended with landings on the upper level, main level, and lower level; and with the exit discharge on the lower level. The recommended stairs will also provide the only direct connection between all three floors. With the construction of the recommended interior stairs for second egress from the upper level, the exterior metal stair is recommended to be removed and the two doors leading to the stairs replaced with windows or solid wall.

The building code establishes capacity of exits based on unit widths per component of the means of egress. The existing means of egress is of sufficient width for the maximum occupant load.

### Existing Stairs:

For safety, the following remedial work is recommended on the existing front stairs:

Provide continuous handrails on both sides of stairs. There are currently no handrails.

The existing guard rails are very low and provide little fall protection. Many of the existing balusters are missing. Provide extended newel posts and guard rails with balusters with space between balusters of less than 4 inches.

Provide beveled riser filler to eliminate the abrupt transition from riser to tread.

For safety, the following remedial work is recommended for the back stairs as part of the reconstruction of the stairs to connect the lower level to the upper level:

Remove wood paneling and provide fire rated gypsum board wall surfaces.

Provide continuous handrails with extensions at landings

### Egress Lighting:

There are egress lights covering the main entrance vestibule, the meeting room on the main level, and the meeting room on the lower level. There are exit signs on some of the exits, but not every exit is marked and none of the signs are lighted. The recommendation is to provide a comprehensive system of battery packs with egress lights and lighted exit signs covering the entire interior and the exterior at exit doors.

### **Fire Protection:**

#### Fire suppression system:

Also there is inadequate water supply for a fire suppression system, there are ways to provide fire suppression with water storage and a pump if fire suppression is required.

A fire suppression system is not required by Massachusetts General Laws Chapter 146 Section 26g because the building is less than 7,500 square feet in the aggregate.

According to IBC Table 503: Allowable Heights and Areas, the Grange Building does not comply with the number of stories above grade. A building is Assembly Group A3 in the VB Type of Construction is limited to one story above the average grade plane. The average grade plane is below the main floor and, therefore, the main floor is one story above the grade plane and the upper level is two stories above the grade plane. An additional story above the grade plane is allowed if the building is equipped with an automatic fire suppression system. However, because the building is less than 7,500 square feet, the building may be fully renovated without requiring a fire suppression system as long as the Occupancy Classification remains the same. If the Occupancy Classification is changed, the building may, or may not, require a fire suppression system to meet the height and area requirements depending on the new occupancy classification and the Hazard Index Categories of the occupancy classifications involved.

Although IBC Table 903: Occupancy Automatic Sprinkler Requirements requires a new building over 5,000 square feet in aggregate area to be equipped with a sprinkler systems; the building can be fully renovated under the Work Classification of compliance without requiring a fire suppression system.

The conclusion is that a fire suppression system is not required for use of the building as a public assembly building.

### Fire alarm system:

In accordance with IBC 907: Fire Alarm and Detection Systems and specifically IBC 907.2.1: Group A as amended; a manual fire alarm system that activates the occupant notification system shall be installed in new construction of Assembly Group A buildings with an occupant load greater than 50 persons. However, in accordance with IEBC 704.4: Fire Alarm and Detection, a fire alarm system is not required for buildings in Assembly Group A being altered, including full renovation. So, a fire alarm system is not required in an existing building.

Although not required, recommended for the safety of occupants is a manual fire alarm that activates an occupant notification system in compliance with IBC 907.2.1: Group A building including, but not limited to, a fire alarm control panel, manual pull stations at every exit, and audio visual signaling devices throughout.

### Fire Extinguishers:

Existing fire extinguishers appear to be adequate. There are fire extinguishers strategically located on the lower level and on the upper level, coverage is good with the proper type of extinguishers in accordance with IBC 906: Portable Fire Extinguishers which requires a fire extinguisher located within 30 feet of cooking equipment and 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.

### **Fire Resistive Construction:**

#### Interior Finishes:

Although the original wood floor are intact throughout the main level and upper level; finish materials have been applied over wall surfaces and below ceiling surfaces.

In accordance with IBC 803 and IBC Table 803.9: Interior Wall and Ceiling Finish Requirements By Occupancy, when tested according to ASTM E84, buildings in Assembly Group A with floors less than three stories above the grade plane, the interior finishes Class B flame spread rating of 26 to 75 and smoke developed index of 0-450. The flame spread requirement affects the following materials:

The wood paneling that is prevalent of the main floor does not comply with the flame spread requirement. The recommendation is to remove wood paneling and provide a layer of gypsum board or skim coat plaster on the original plaster walls surfaces.

Although the suspended ceilings may meet flame spread requirements, the suspended ceiling do not protect the wood ceilings that exist above the suspended ceilings so that there remains finishes that do not comply. The wood ceilings may, or may not, meet the required flame spread. The recommendation is to remove the suspended ceilings and to treat the bead board wood ceilings with intumescent paint to preserve the historical character or to cover the wood ceilings with a fire rated gypsum board facing.

The fibrous board ceiling with thin wood battens that is prevalent on the lower level probably does not meet the flame spread requirement. The recommendation is to provide fire rated gypsum board on the ceiling of the lower level.

In accordance with IBC 804: Interior Floor Finish, specifically 804.1, Exception, traditional wood floor coverings are exempt from flame spread requirements. The floor finishes in the building are the original wide wood boards.

In summary for interior finishes, The recommendation is to return to the original finishes on the walls and ceilings and to repair and recondition the existing finishes to comply with the requirements for flame spread while providing a consistent appearance that is in the character of the original building. The wall surfaces on

the lower floor and on the upper floor and the ceiling surfaces on the upper floor still have exposed the original finishes and do not require removing applied finishes before the original finishes can be restored.

### **Hazardous Materials:**

The most likely hazardous materials that will be encountered are paint containing lead and materials containing asbestos.

Unless the building will be inhabited by children under 6 years old for more than 30 hours per weeks, the paint containing lead is an issue for workers during construction and there is no requirement for de-leading. Given the age of the building and the lack of painting history, the recommendation is to test for paint containing lead on interior and exterior surfaces in a variety of places that may have been painted in the past as a repair or as a limited scope painting project. Knowledge of paint containing lead is important from protection of workers.

Materials containing asbestos are usually abated by removing the materials and any contingent materials. In some circumstances materials containing asbestos can be encapsulated. The original materials are unlikely to contain asbestos. However, materials applied over the history of the building including, but not limited to, window glazing, sealants, adhesive for paneling, applied ceiling materials, and roofing materials can contain asbestos. The recommendation is a total building sampling and testing for materials containing asbestos and for abatement of the materials as far as is practical with encapsulation as a reluctant alternative to abatement.

### **Plumbing:**

In the entire building, there is only toilet room with one water closet and one lavatory located on the lower level with access through a mechanical room and up several steps. The toilet is not adequate for the building.

#### Minimum Plumbing Fixtures:

Table 1: Minimum Facilities for Building Occupancy in 248 CMR 10: Uniform State Plumbing Code establishes the plumbing fixtures required in a building based on the use of the building. For an Assembly Group A3 building classified as a Hall, Museum, or Library; one water closet is required for each 50 women, one water closet is required for each 100 men, and one lavatory is required for each 200 of each gender.

The plumbing code considers that every space in the building may be in use at any one time and that half the occupant load of the building is female and half the occupant load is male. Also, the toilet facilities must be within one floor of occupants so that, in a three story building, toilet on the middle level serve the entire building but toilets on the top or bottom level will require additional toilet rooms on another floor.

The occupant load of the building is 35 persons on the lower level, 75 persons on the main level, and 75 persons on the upper level. Accordingly, if toilets are placed on the main level, the following fixtures are required for the entire building:

	Water closet	Urinal	Lavatory	Accessible
Men	1	0	1	Yes
Women	2	0	1	Yes

A urinal is not required but is recommended for the men/s toilet. Although, urinals are allowed to count for 50 percent of the fixtures required for men, there being only one water closet required for men does not allow a urinal to be counted as part of the minimum required fixtures.

A custodian's sink is recommended on any floor level on which plumbing fixtures are located.

## Food Handling:

The space on the lower level that is involved with food handling includes, but is not limited to, a double bowl stainless steel sink, propane gas fired double oven, electric range, direct venting residential range hood over the flue from the gas fired oven, and residential refrigerator. If food will be cooked or otherwise prepared in the food handling space, then the space must be a commercial kitchen and appointed according to code requirements including, but not limited to, mechanical code, plumbing code, National Sanitation Foundation, and regulations of the local Board of Health. The required appointments for a typical commercial kitchen usually includes, but is not limited to, the following fixtures and equipment:

Hood over cooking equipment that can generate grease in any form with direct vent to the exterior above the roof line, with a dry chemical fire suppression system, and with a provision for makeup air without significantly removing the air from the kitchen space

Hand washing sink

Food preparation sink, usually two compartments

Three bin sink or two bin sink and a dishwasher with provisions for maintaining water temperature and chemical treatment levels for cleaning dishes, pots, serving vessels, and utensils that are not disposable

Grease trap for clean-up area

Floor drain

Commercial refrigerator capable of maintaining

Cooking equipment that, if gas fired, is capable of terminating gas supply in case of fire

Further, the finish surfaces in a commercial kitchen on floor, cove base, walls, and ceiling must be washable, scrubbable, and impervious to absorbing food products.

The recommendation is to eliminate preparation of food in the building because of the cost involved with appointing a commercial kitchen in such a small building unless there is an overriding reason why the building needs a kitchen.

Further, the recommendation is to fit up the existing kitchen space as a food serving space only, commonly referred to as a caterer's kitchen. Recommended alterations include, but are not limited to, providing impervious kitchen type finishes on the floor, cove base, walls, and ceiling and providing a sink for handwashing and a sink with light commercial dishwasher for clean-up of items that are not disposable. With the exception of hot beverages, only packaged food and food prepared elsewhere can be handled in the food serving space.

## Septic System:

Whatever septic system exists is not likely to pass the required inspection for 310 CMR 15: Title V of the State Environmental Code. A septic system is recommended. If land is available suitable for a leaching area, then a leaching septic system is the preference. If land is not available, a tight tank type of system is recommended as the first alternative. The small demand and the scarcity of land even for a tight tank may lead to the next alternative which is consideration of innovative alternative technology toilets which are allowed by and regulated by the plumbing code. An alternative technology waste disposal system includes, but is not limited to, recharging gray water from sinks, composting toilets, waterless urinals, and extremely low metered water usage.

## Public Water Supply:

A public water supply is required for any building with 15 or more plumbing fixtures connections or more than 24 building occupants per day for at least six months of the year. When used to the fullest extent, the Grange Hall will pass the threshold for a public water supply by virtue of the number of people. However, if lesser use is planned, then the requirement can be reviewed with the Department of Environmental Protection

A typical public water supply regulated by the Department of Environmental Protection involves a well surrounded by a safe zone which is owned and controlled to limit activities within the safe zone only to activities involving the well. The safe zone is usually 200 feet from the well so that a large area of land is needed that is owned and controlled. Periodic testing is required to certify that the water meets quality standards.

Waivers can be obtained for a public water supply well that cannot be protected with a safe zone. Usually, the waivers involve implementing protections from the effects of the environment around the well including parking lots, septic systems, and other uses of the surrounding land; and a more rigorous and stringent testing program such as quarterly testing and reporting to verify water quality.

The recommendation is to implement a program for establishing a public water supply well near the Grange Hall if the Grange Hall is going to be used to the fullest extent.

## **Mechanical Ventilation:**

A low level of alterations triggers the requirement for ventilation and air changes in occupied spaces. In accordance with IEBC 709.1 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. While the existing windows could provide adequate natural ventilation, natural ventilation is not recommended for the following reasons:

Use of preserved original wood windows is not recommended in favor of maintaining the preserved state of the windows

Natural ventilation during winter conditions is not energy efficient and is not likely to be employed

Air quality control is difficult with natural ventilation. Excess humidity, pollution, noise, insects, and anything detrimental condition in the outside air is allowed into the building.

Responsible use of windows cannot be controlled in a public building where the potential exists for windows to be left open unintentionally with the incumbent issues of security and weather entry.

The recommendation is to provide mechanical ventilation in occupied spaces using energy recovery ventilators that act independent of other mechanical system equipment or in conjunction with other equipment to provide ventilation and corresponding fresh air based on the occupants in the building. An energy recovery ventilator (ERV) has four ports: exhaust air to the exterior, fresh air from the exterior, supply air to interior, and return air from interior. The ERV mixes the temperature in the outgoing air with the temperature of the incoming air without mixing the air. A high efficiency ERV maintains the interior temperature while providing ventilation and fresh air with little energy use. The ERV equipment is recommended to be located in the attic and on the lower level. In accordance with IMC 401.2 Ventilation required, mechanical ventilation is required in accordance with IMC 402.1 Table 403.3 Minimum Ventilation Rates Air as follows:

Multiuse Assembly Spaces:

Outdoor air: 7.5 cubic feet per minute per person  
0.06 cubic feet per minute per square foot

The recommendation is to provide separate low volume mechanical ventilation for toilets that are controlled locally and operate only when the room is occupied. In accordance with IMC 402.1 Table 403.3 Minimum Ventilation Rates Air, ventilation is required in toilets as follows:

Toilets:

Exhaust air: 50 cubic feet per minute per waste fixture

**Electrical:**

Parts of the electrical system are dangerous and addressing the issues with the electrical system is recommended. Although also a safety concern, the replacement of the electrical system is addressed under Preservation because of the potential for destroying the building in a fire.

## Accessibility:

Accessibility shall be in accordance with 521 CMR The Regulations of the Architectural Access Board. In accordance with 3.3.EXISTING BUILDINGS, the following conditions apply:

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

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 and accessible toilet room.

When the value of the Alterations within a three year rolling period exceeds 30 percent of the assessed value of the building, then the entire building will be in compliance with 521 CMR.

According to the Board of Assessors, the assessed value of the Grange Hall is \$34,600 based on 100 percent valuation last reviewed in 2014.

In anticipation that the work within a three year rolling period will exceed 30 percent of the value of the building, the entire building must be in compliance with accessibility regulations. The following recommendations eliminate non-compliance with the Regulations of the Architectural Access Board:

Provide a van accessible designated parking space consisting of standard parking space, 8 foot wide safe zone landing and circulation area, signage, and painted markings. The surface shall be negotiable with a wheelchair and the slope of paving shall not exceed 2 percent in any direction.

Provide an accessible route the main entrance. Recommended is modifying the area in front of the building to incorporate a walkway with a running slope of less than 5 percent, one inch in twenty inches, from the accessible parking space to a landing at the main entrance at the elevation of the interior floor. The walkway does not require handrails and there is no limit on length with slope less than the prescribed maximum slope.

Modify the main entrance door to replace the 2-1/4 inch wood with a 1/4 inch metal saddle threshold, to replace the door operators with rim type exit devices with a removable center mullion and with lever operators on both doors, to provide delayed action adjustable closers on both doors, and to provide a sign indicating the accessible entrance..

Eliminate the platform on the main level and on the upper level to provide a flat floor for the entire floor. The window sills are at the same elevation at the platform and at the rest of the first floor. The alternate to eliminating the floor is to provide a lift, ramp with rails, or long sloped floor to the platform level which is costly and space consuming at best.

Provide accessible toilets with accessible fixtures, mixing valve single lever faucets, grab bars, and accessible toilet accessories.

Within the footprint of the existing building, provide a standard wheelchair size hole-less hydraulic elevator with stops at each floor including, but not limited to, waterproofed elevator pit to four feet below lower level, fire rated hoistway to twelve

feet above upper level, hoistway ventilation with motorized damper, fire alarm elevator recall system, standard control panel in cab, and fire rated elevator machine room. Suggested as the preferred location in the front corner of the building where the second egress stair was previously. An elevator requires that the electric service to the building be increased to 400 amperes, single phase.

Replace door hardware to spaces accessed by the public with latchsets lever operators. Remove thresholds, adjust door swings, adjust door widths, and maintain 18 inch clearance space on strike of doors.

Provide signage with raised letter and Braille for toilets, stairs, elevator, and spaces accessed by the public.

## **Insulation:**

There is no insulation in the building except for the minimally effective suspended ceiling the meeting room on the man floor. The insulated suspended ceiling is recommended to be removed to meet flame spread regulations. Accordingly, the building can be considered to have no insulation.

Insulation at the roof will yield the more benefit in energy saved per cost of insulation. The current code requirement for attic insulation in IECC Table C402.2 Opaque Thermal Envelope Requirements for an Assembly Group A building in Zone 5 is R38 which is equivalent to 2 inches of fiberglass. The recommendation is the attic at the floor.

Insulating the walls involves removing either exterior siding or interior wall surface finish to gain access to the wall cavity. Access can be small holes within each cavity space for blown in insulation. The recommendation is to provide as much blown in fiberglass insulation as will fit in the existing wall cavity while the interior wall surfaces are being repaired. Although the building code does not prescribe an insulation value when filling an existing wall cavity, the code does require that the cavity is filled.

Storm windows are recommended for the windows as part of preservation.

## **Mechanical Systems:**

The recommendation is for a combination of hydronic heating system, energy recovery ventilation system, point-of-use water heating, to efficiently operate the building.

### Heating System:

The existing mechanical system consists of an oil fired 145,000 British Thermal Unit (BTU) output furnace with exposed ductwork on the lower floor that serves the lower floor at the ceiling and the main floor through small outlets along the base of the walls. Ductwork is for supply and return air; there is no fresh air introduced into the system. None of the ductwork is insulated.

The furnace is located near the front of the building on the lower level and the flue gas ductwork exposed extends along the ceiling of the lower to the chimney at the back wall, a long run. The flue ductwork does not appear to be rated flue ductwork, the flue ductwork appears to come in contact with wood framing and the flue ductwork is not insulated.

The upper level is currently not heated, although there are non-code compliant flue access points into the chimneys that indicate wood stoves were used for heat formerly.

There is no air conditioning.

The recommendation is to construct a mechanical systems room on the lower floor and to provide a hydronic heating system for the entire building that includes, but is not limited to, the following components:

- High efficiency boiler with direct side wall venting

- Circulator pumps and thermostats for a heating zone for each floor

- Insulated supply and return heating water piping in three loops, one for each floor

- Base board radiation on each floor with cabinet unit heaters with fans at entrances, exits, toilet rooms, and other areas where baseboard is not effective

### Ventilation System:

Energy recovery ventilation is recommendation to meet the code requirement for air exchanges in occupied spaces. Control of the ventilators is recommended to be through a time clock that facilitates changing the air in the building for a nominal time each day whether or not the building is occupied and that can be programmed to change the air when the building is occupied as a more regular schedule of use of the building occurs. Where the use of the building may be sporadic, the regular changing of the air for some time period will be set to satisfy the requirements for air change when occupied.

#### Water Heating:

Electric point of use water heaters are recommended rather than a water heater and hot water circulation piping. Water and energy are often wasted when hot water is not readily available and the water is allowed to run under hot water is available. Further, with sporadic use of the building, energy is wasted maintaining water at temperature in a water heater or storage tank off a boiler. The point of use water heaters are located at each sink and provide continuous instant hot water through energy conservative low flow faucets. The initial cost of the point-of-use heaters is less than a water heater and hot water piping and the energy used is less than the energy used in maintaining hot water when demand is low.

#### **Lighting:**

##### Fixtures:

The lighting is archaic. Many fixtures are incandescent fixtures for which lamps are no longer available because of inefficiency. The fixtures with fluorescent tubes lamps are two generations of efficiency away from current fluorescent tube technology which has been replaced in general by Light Emitting Diode (LED) technology. The recommendation is to replace lighting throughout the building with LED technology light fixtures. In Massachusetts, local utility companies have programs that provide rebates and grants for lighting upgrades. Although the building is small, the inefficiencies of the existing light fixtures should result in recovery of some of the cost of the lighting replacement through UNITIL.

##### Controls:

Lighting controls are also archaic. As indicated in the evaluation of the electrical system, some of the light switches are the push button type or twist type that are not allowed because of fire hazards. The current energy code, IECC C405 Electrical and Lighting Systems, requires occupancy sensor controls on light fixtures in meeting rooms except for fixtures needed for the means of egress. Occupancy sensors turn on lights when motion is sensed, and Occupancy sensors turn off lights in rooms that are unoccupied after a pre-set, but adjustable, time. Recommended are occupancy sensors on the ceiling in meeting rooms that control a majority of the lights in the space.

#### **Power Generation:**

One entire side of the roof faces south with essentially no obstructions on the roof and with only the steeple of the adjacent church to block sunlight. Accordingly, with an anticipated small electrical energy use, the recommendation is to review placing a photovoltaic array on the south facing roof. Programs are available to tax exempt building owners for no money down systems that can offer a fixed low cost for electric energy.

## Summary of Recommendations Budget Costs

Following is a summary of the recommendations and associated conceptual budget costs for alterations required or recommended for making the Grange Hall acceptable for use as a public meeting building:

Budget	Recommended work
	<b>Preservation</b>
\$ 15,000	Modifying electrical system
\$ 20,000	Structural systems investigation and anticipated repairs
\$ 1,000	Waterproofing interior masonry wall
\$ 55,000	Window restoration
<u>\$ 25,000</u>	Restoring and replacing siding and trim; head flashing metal
<b>\$ 116,000</b>	
	<b>Health, Safety, and Welfare</b>
\$ 30,000	Improve exits by removing exterior metal fire escape; providing exterior walkway, steps, and landing to lower level; and constructing interior stairway from lower level to upper level
\$ 7,500	Retrofit existing stairs
\$ 5,000	Egress lighting, lighted exit signs
\$ 7,500	Fire alarm system
\$ 25,000	Interior finishes
\$ 20,000	Hazardous materials
\$ 30,000	Toilets, accessible for men and women
\$ 10,000	Caterer's Kitchen
\$ 5,000	Custodian's sinks
\$ 30,000	Septic system investigation and construction, tight tank system used as budget place holder
\$ 50,000	Public water supply with waivers for well near existing
<u>\$ 25,000</u>	Energy recovery ventilation systems
<b>\$ 245,000</b>	

Budget	Recommended work
	<b>Code Compliance</b>
\$ 15,000	Accessible parking space, accessible route to main entrance
\$ 5,000	Modify main entrance doors
\$ 25,000	Eliminate platforms on main level and on upper level; both floors without change in elevation
\$ 15,000	Accessible doorways and hardware
\$ 1,000	Signage
<u>\$ 185,000</u>	Elevator, elevator machine room
<b>\$ 246,000</b>	
	<b>Energy Efficiency</b>
\$ 10,000	Insulation in attic
\$ 20,000	Insulation in exterior walls
\$ 40,000	Hydronic heating system
\$ 5,000	Point of use water heaters
<u>\$ 25,000</u>	Light fixtures and controls
<b>\$ 100,000</b>	

Budget costs are conceptual estimates without knowing the actual scope of work. Budget costs are intended to indicate an order of magnitude for the purposes of planning. Amounts set aside for the recommended work will be determined by further design review, evaluation, and cost estimating before projects are included in annual working budgets.

## Conclusions

As requested, the evaluation focuses on using the building as a public building or as a rental property without changing the Occupancy Classification. Change of Occupancy Classification involves further code compliance depending on the Use Group of the proposed use, the variety of which is beyond the scope of the current study.

A phased program can be developed to preserve the building and then to plan providing building systems and infrastructure that supports the public use of the main level only at first and then to continue alterations for use of the rest of the building in steps.

Maintaining the use of the Grange Hall as meeting space for public use and for rental is expensive for the following reasons:

The age of the existing building resulting in preservation costs

The lack of contemporary building systems resulting in costs to support public meetings

The building is on three floors resulting in more work required for circulation, egress, and especially for accessibility

The size of the building in that the 2,040 gross square feet per floor and the aggregate floor area of the three floors is small resulting in high cost per square foot to implement the work

Using the Grange Hall as a public meeting space may not be the most cost effective or best use of the building, especially if the demand for meeting space is not high.

### Best Use

The best use of the building is a use that requires the least in the way of building systems and support infrastructure. For example, speculating, without recommending a best use, consider the following:

If the building were an office building, either public use or private use, that did not use the lower floor for public access and in which there are less than 25 people in the building, then the public water supply would not be needed, the elevator would not be needed where a wheelchair lift could serve the upper floor, and the ventilation requirements would be reduced. An office building would probably require air conditioning to be competitive with the local market for office space or for the comfort of municipal office workers during the summer.

If the building were senior housing, then the public water supply would not be needed, there would be no accessibility requirements, and the mechanical systems would be greatly reduced. The lower level would probably be used for support space alternative technology sewage disposal, mechanical systems, and tenant storage. The cost of an internal build out would be greater for residential units, but there is potential for grant funding for senior housing.

### Recommendation

In consideration of the recommendations and associated costs presented in the Grange Hall evaluation, the recommendation is to provide the Preservation work to protect the building as an asset and to review the best use of the building that results in the least amount of cost to achieve a usable building that may, or may not, be publically owned or operated. Accordingly, the Building Evaluation Report is a guideline for comparing continuing with the current use to other uses and the associated expenditures as other uses are explored.