

## FIVE OPTIONS

Stow Town Hall Renovation  
375 Great Road / Stow MA



MILLS WHITAKER ARCHITECTS LLC

01 August 2022

## STOW TOWN HALL RENOVATION

In the fall of 2020, Mills Whitaker Architects was selected to develop a comprehensive rehabilitation project for the former Town Hall in Stow. The Town Hall is in a prominent site at the conflux of Great Road and Crescent Street in the center of town. The facility was constructed in 1848 and an ell was added to the south side in 1895. Since 1989 when the Town Building was constructed across the street, the historic Town Hall has served as a community center in myriad ways. It is a unique structure in Stow, and one of the few historic buildings in town that is eligible for listing in the Register of Historic Places.



*Photo of 1848 Building with 1895 Addition to Right; Fairbanks Hay Scale in Foreground at Left*

The building retains much of its original historic integrity, but with time and neglect its effectiveness for community use has suffered somewhat. Drafty and worn down from a lack of maintenance and neglect, coupled with complications from the global pandemic commencing in the spring of 2020, the facility is in urgent need of funding to preserve its iconic character-defining historic presence in Stow. Given its unique attributes, it is due for a careful and thoughtful restoration for continuing service to the community.

Upon completion of the renovation recommendations and budgeting, funding was not initially secured for the project. As a result, the Select Board requested other renovation options to inform alternative next steps for this historic resource. This summary report outlines five incremental options and describes the scope of each along with anticipated approximate project budgets and considerations moving forward. These options outline project scope that ranges from minimal work (Option One - \$250k) to the recommended scope that was determined by the design process (Option Five - \$4.8m), all in current dollars that will need further escalation when project timing has been determined.

In addition to the five options, seven appendices memorialize various aspects of the background information used for the project, including cost estimates. Separately from this report, a final check set of construction documents (drawings and specifications) representing the project as designed have been provided. The construction documents were nearing completion when the Select Board requested options, so final completion was deferred pending further direction on the future of the building.

## **OPTION ONE / OVERVIEW**

**\$250,000**

Option One will maintain the existing building and provide a few essential repairs for a safe but essentially unimproved facility. The approximate project budget for Option One is \$250,000 in current dollars. This budget assumes that the work will be specified and managed by town staff with assistance from outside vendors to the extent needed. Routine maintenance costs are not included in this Option One budget since it is assumed that those will be ongoing and are not extraordinary.

### **Option One: Building Systems**

The existing mechanical and electrical systems will not be upgraded. The current oil-fired hot air furnace heating system will remain, and no air conditioning will be provided. The existing 100-amp single-phase electrical service will not be upgraded. It is assumed that the work will be classified as “ordinary repairs” and will therefore not require issuance of building permits.

### **Option One: Accessibility Features**

Existing accessibility features will remain as-is since no new work will be performed. Existing deficiencies will not be addressed since there are no known complaints against the building. For work consisting of “ordinary repairs,” permits will not be required and the 30% threshold of expenditure for triggering full compliance with current accessibility requirements (based on cost of permitted work over a three-year period per 521 CMR 3.3.2) will not be reached. The current threshold of expenditure is only \$158,250 based on the assessed building value (exclusive of land) of \$506,400 adjusted by the 96% equalization ratio for commercial properties in Stow per the Massachusetts Department of Revenue.

### **Option One: Support Facilities**

The ground floor kitchen will remain inoperable due to its existing conditions, and the ground floor will remain unoccupied. An interim dehumidification system is recommended for the lower level to control moisture accumulation and reduce mold growth. The fire escape stair will be inspected, repairs will be made, and this egress will be certified for life safety since that is required by law every five years. The fire escape door will be repaired so that it can be safely opened from the interior as an emergency exit.

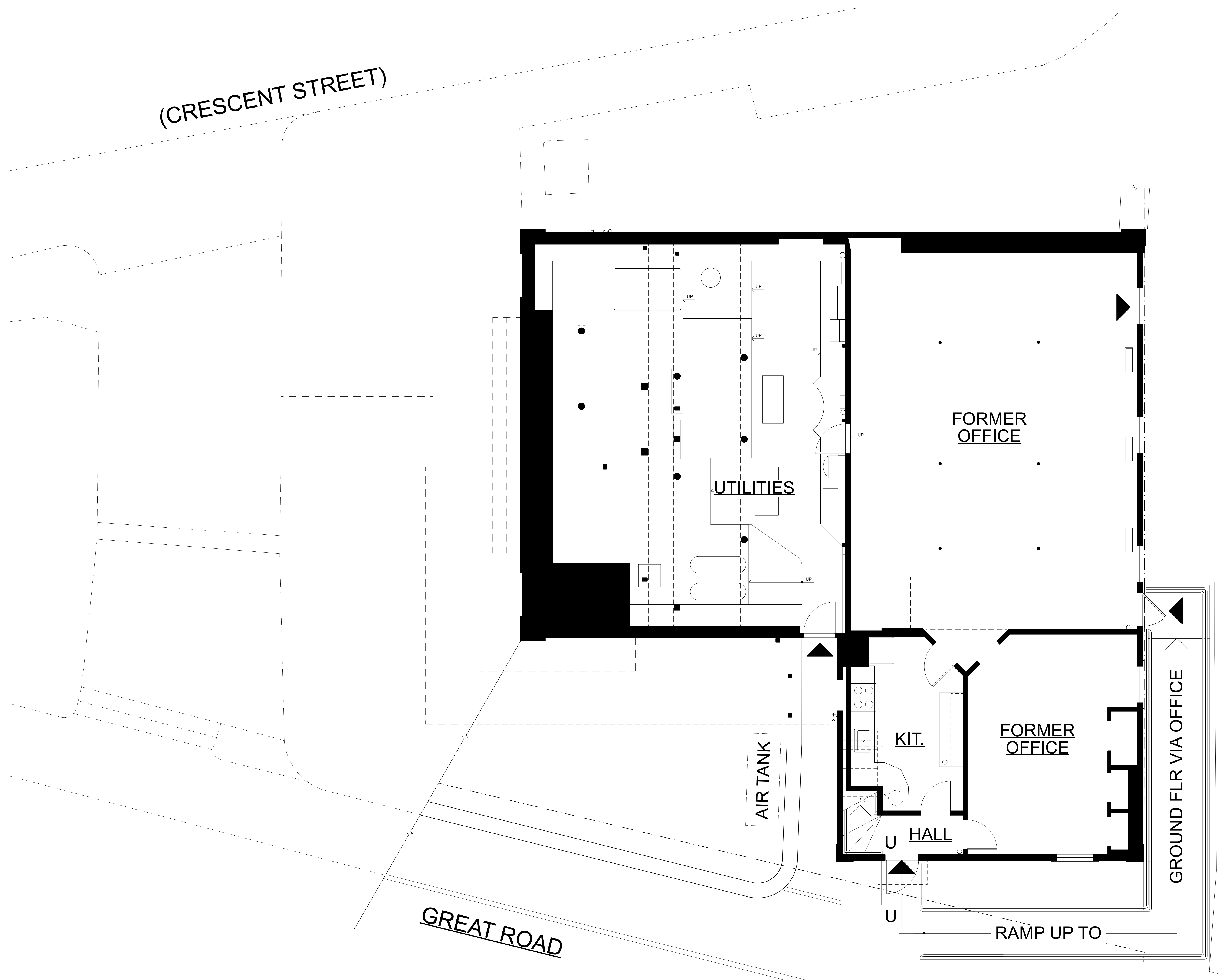
### **Option One: Site & Building Restoration Components**

Selective interior plaster walls and ceilings will be repaired where severely deteriorated, and repaired surfaces will be painted. The north and south walls of Great Hall will be insulated since the extent of recommended interior finish repairs involves exposing the stud cavities during the replacement of wall finishes. As noted, the ground floor level will remain unimproved and unoccupied. The exterior of the site will not be repaired or restored in this option.

### **Option One: Considerations**

This option puts any future work on hold and does not prevent the implementation of any of the other options noted. The improvements will allow for a safer building by implementing some essential repairs at the first floor, but no other changes will be provided, and the lower level will continue to be unused.

*Refer to the floor plans and building sections of Option One, which illustrate the existing facility.*

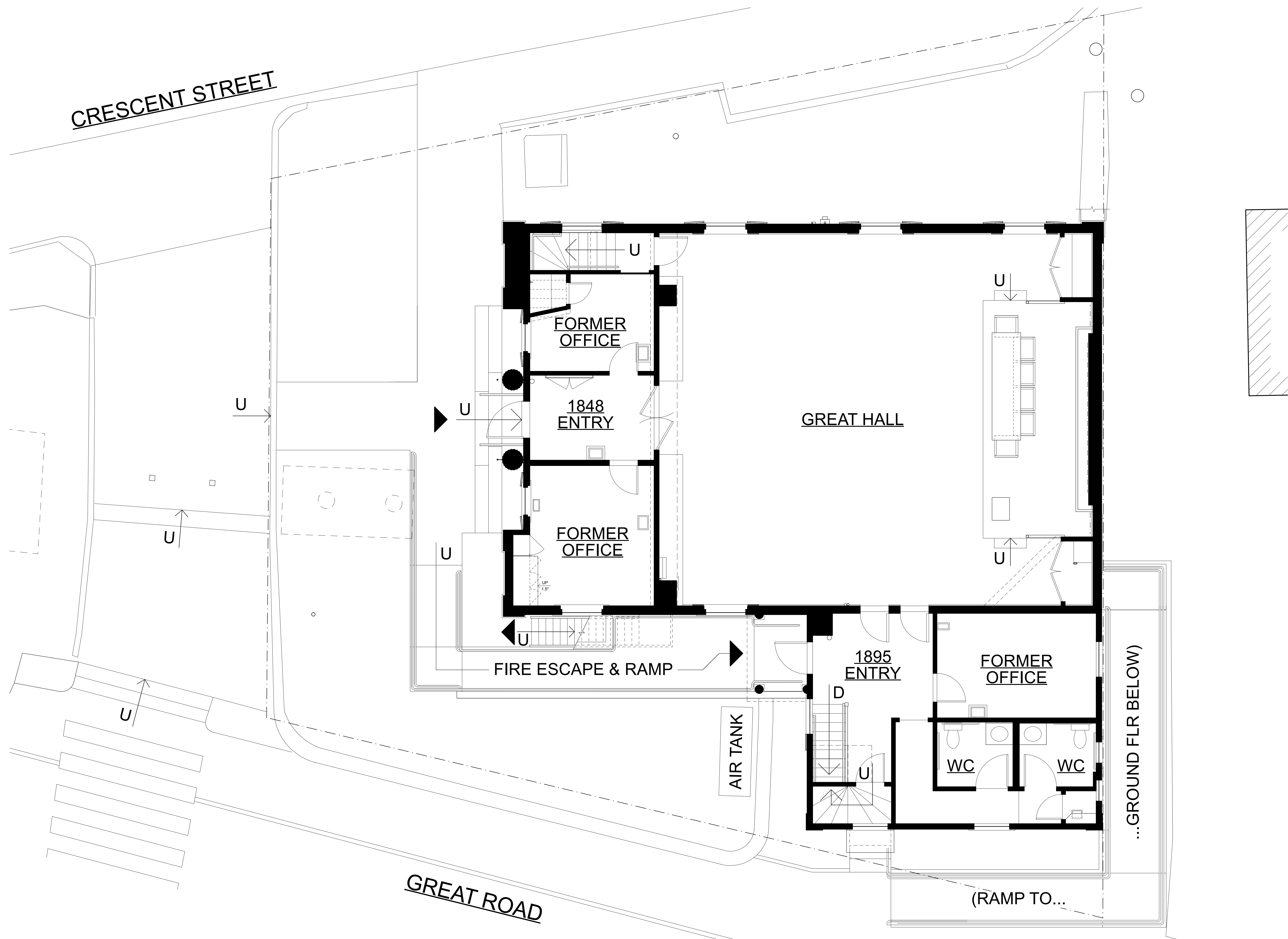


# OPTION ONE: GROUND FLOOR PLAN

NO RENOVATION WORK - ROUTINE MAINTENANCE ONLY



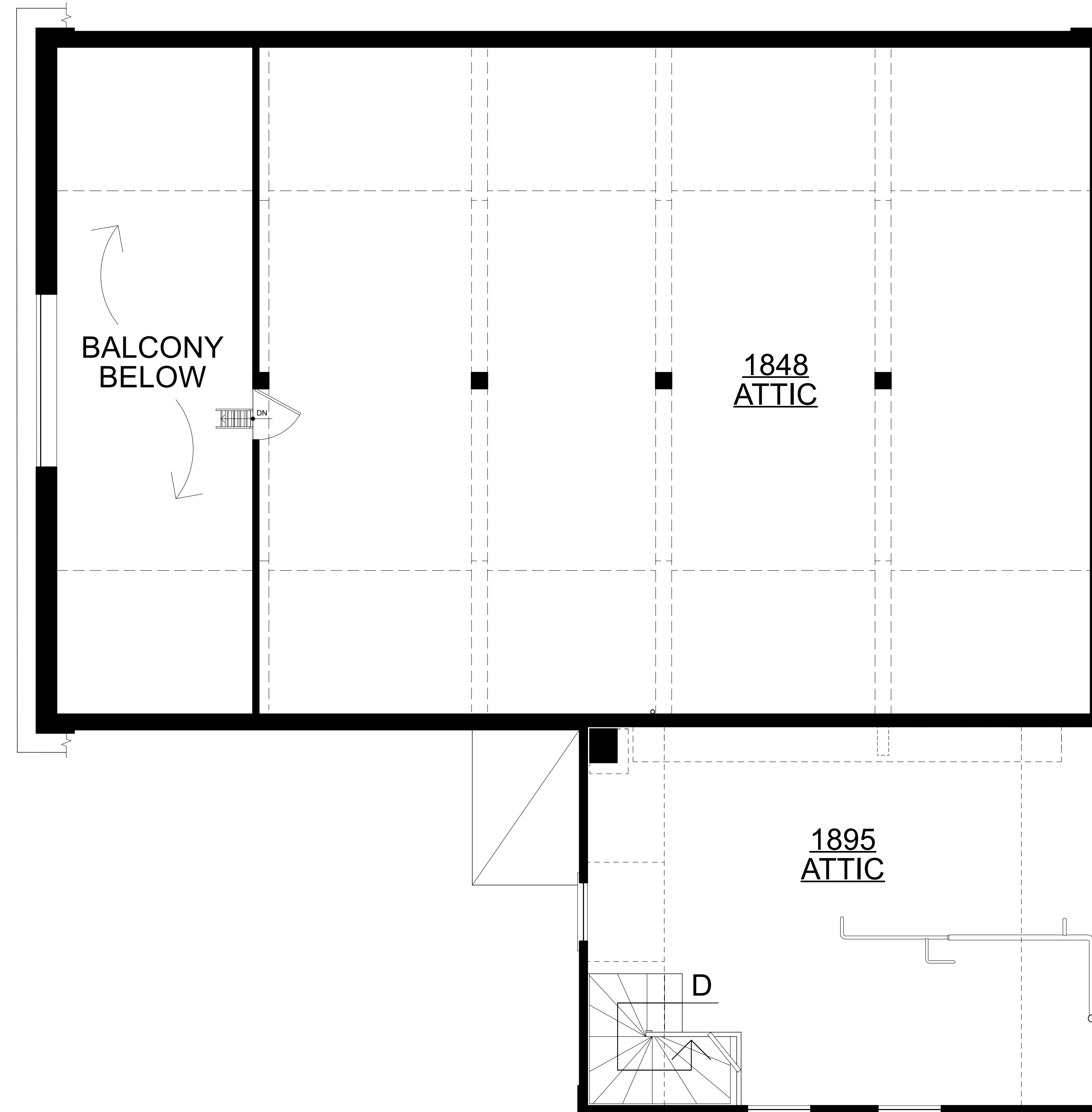
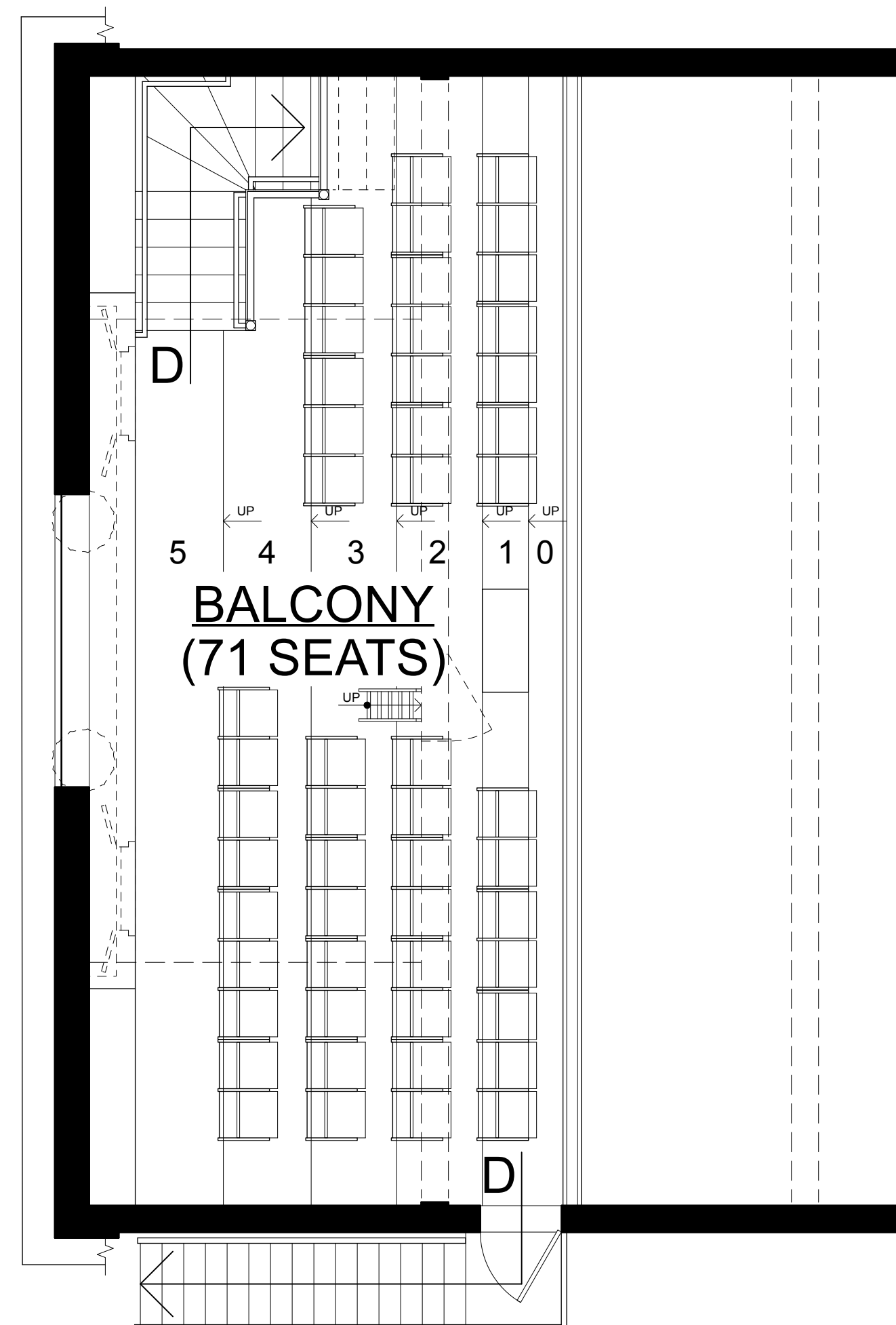




# OPTION ONE: FIRST FLOOR PLAN

NO RENOVATION WORK - ROUTINE MAINTENANCE ONLY

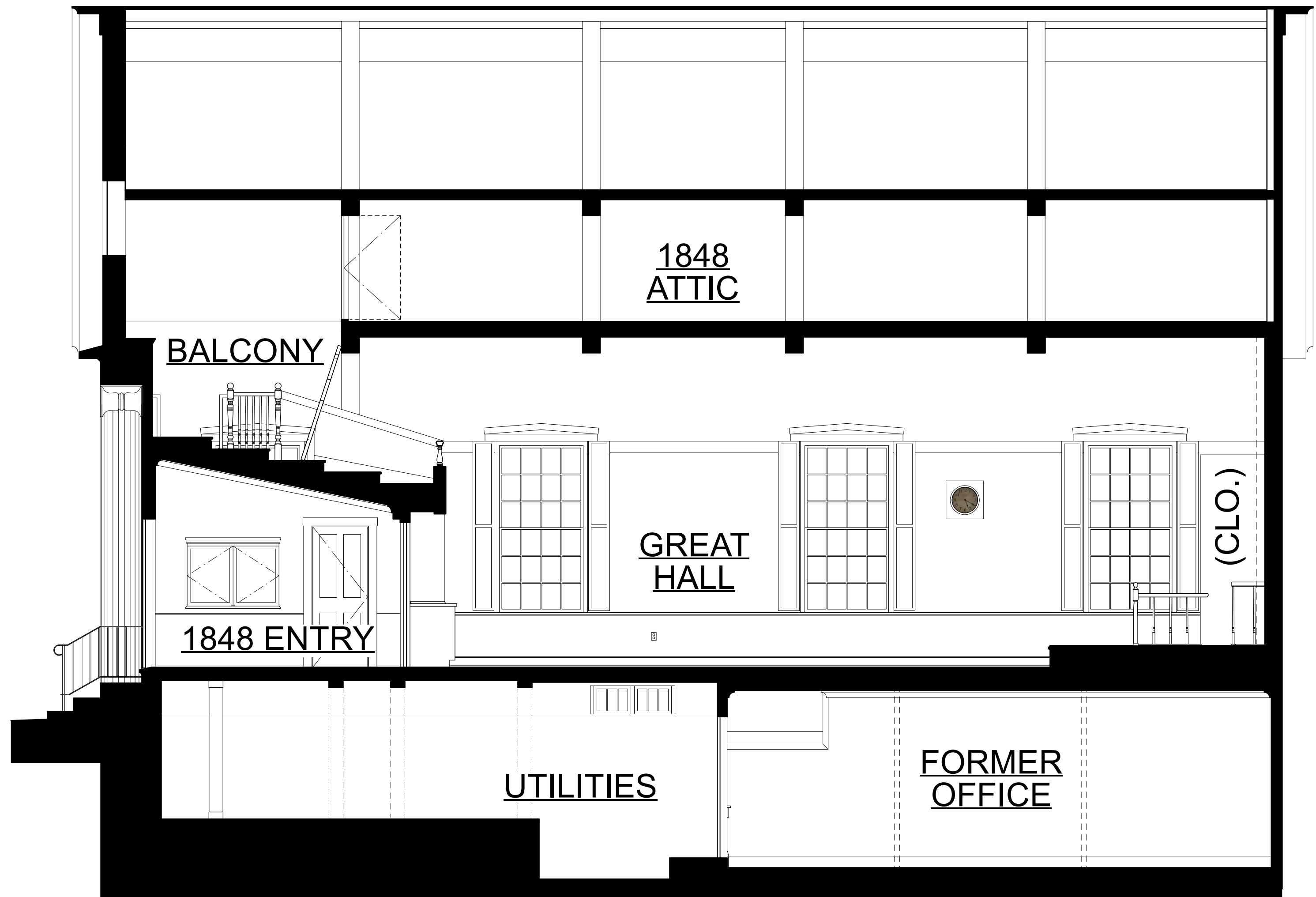




# OPTION ONE: BALCONY & ATTIC PLANS

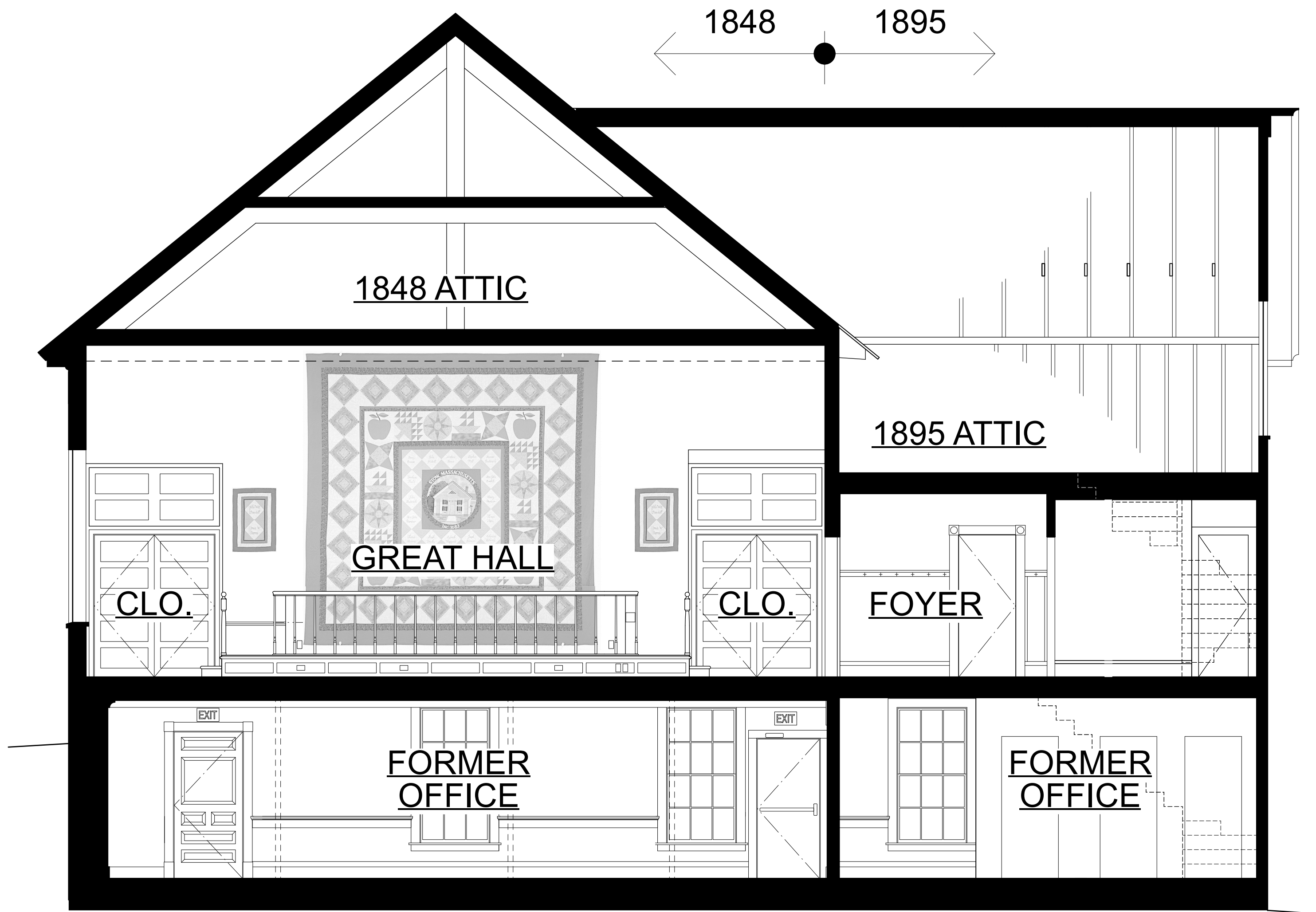
NO RENOVATION WORK - ROUTINE MAINTENANCE ONLY





# OPTION ONE: LONGITUDINAL SECTION LOOKING NORTH

NO RENOVATION WORK - ROUTINE MAINTENANCE ONLY



# OPTION ONE: CROSS SECTION LOOKING EAST

NO RENOVATION WORK - ROUTINE MAINTENANCE ONLY



## **OPTION TWO / OVERVIEW**

**\$1,800,000**

Option Two will renovate the first floor for improved functionality and will leave the ground floor level unimproved and unoccupied. The approximate project budget for Option Two is \$1.8 million in current dollars. This option and its associated budget will require selective revisions to the accessibility variance that was secured for the project based on the scope of Option Five.

### **Option Two: Building Systems**

The current heating system will remain, and air conditioning will be added to Great Hall with a mini-split system consisting of four indoor wall-mounted fan-coil units and an outdoor unit in the north yard area adjacent to the building visible from Crescent Street. Roof framing of the Great Hall will be reinforced to carry anticipated additional snow loads due to insulation. Ventilation will rely on operable windows and other parts of the building will not receive air conditioning. The electrical service will be upgraded for air conditioning loads. No acoustical improvements will be made to Great Hall as part of this option.

### **Option Two: Accessibility Features**

Existing accessibility features will remain as-is subject to approval of a significantly modified variance request to the Massachusetts Architectural Access Board. It is probable that the MAAB will make the building subject to a time variance of relatively short duration (3 years) to provide temporary relief from meeting current accessibility regulations. In lieu of issuing a time variance, they may require making the stage wheelchair accessible, adding an assistive listening system, upgrading the fire alarm system, and providing ADA signage, ... none of which is in the currently estimated budget for this option.

### **Option Two: Support Facilities**

As in Option One, the fire escape will be repaired, the ground floor level and kitchen will remain unused, and an interim dehumidification system will be added to the basement. On the first floor of the ell, the former office will be removed to provide a lobby and display area adjacent to the accessible entrance. The existing restrooms will remain in place, and the occupancy load of the facility will be reduced to a maximum of 100 persons to conform with plumbing code fixture limitations for an assembly occupancy.

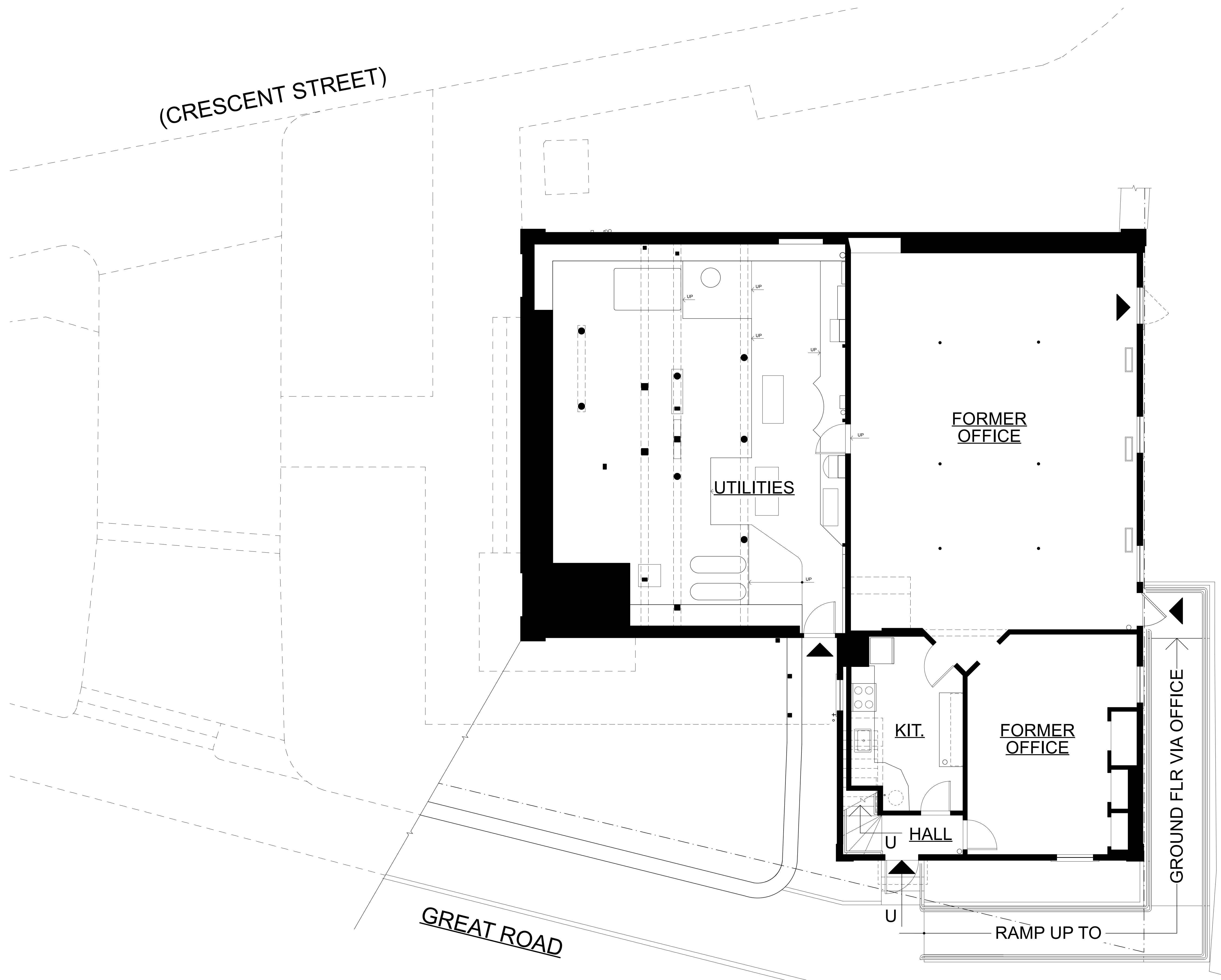
### **Option Two: Site & Building Restoration Components**

As in Option One, selective interior plaster walls and ceilings will be repaired and painted. The exterior walls and ceiling of Great Hall will be insulated, and Great Hall windows will be restored and fitted with exterior storm units. The ground floor level will remain unimproved and unoccupied. The exterior of the site will not be repaired or restored in this option.

### **Option Two: Considerations**

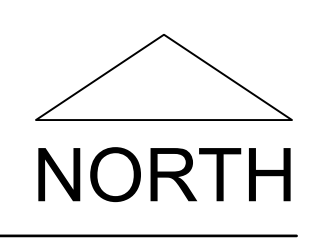
This option makes the Great Hall more useful for year-round activities due to adding air conditioning. The improvements will allow for a safer building and the lobby at the first floor of the ell will make the area more welcoming and useful for events. The lower level will not be occupiable. While this option does not prevent the implementation of other options noted, it will require modifications to the ell for changes that may be incorporated from any of the subsequent options.

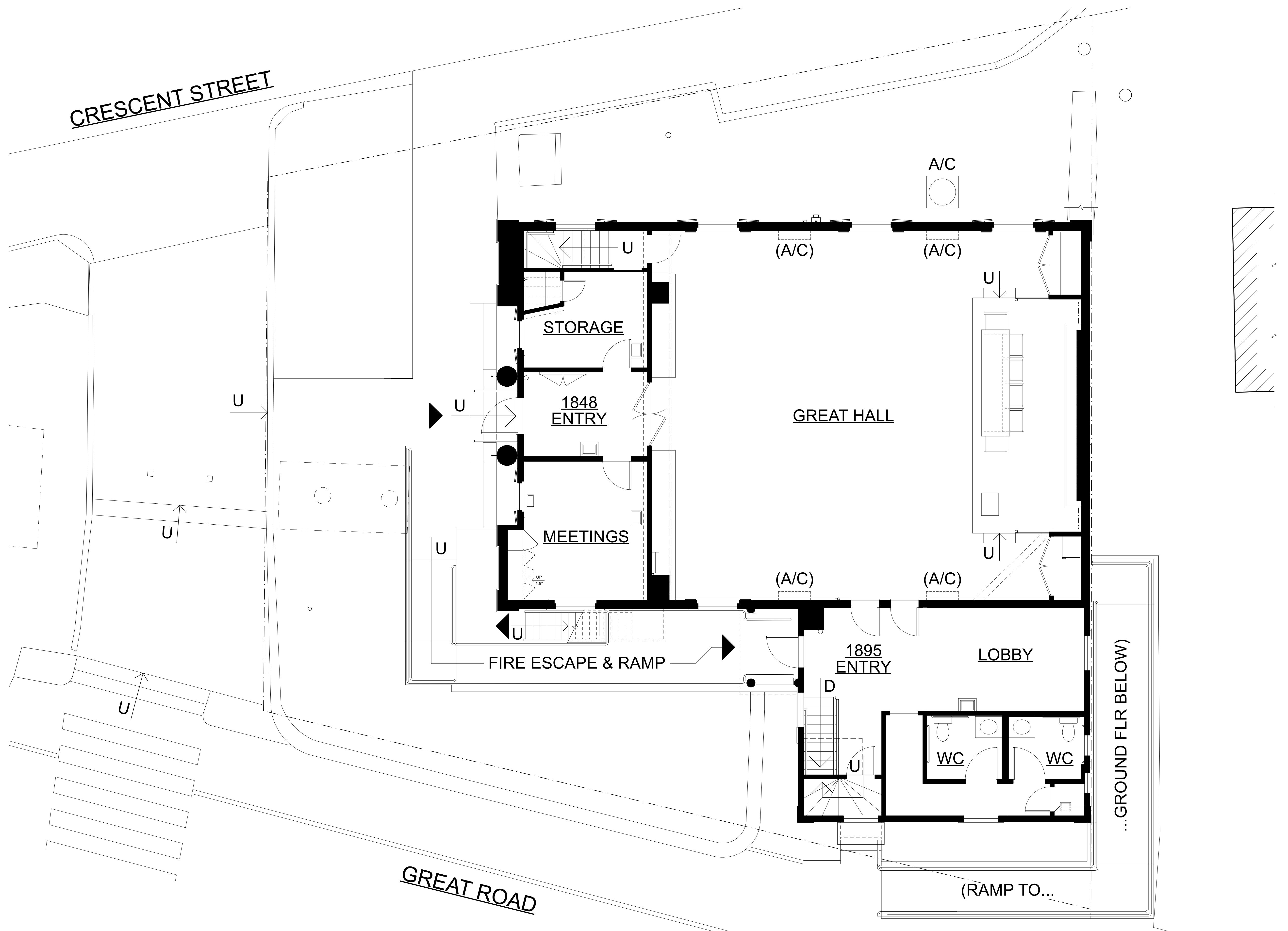
*Refer to the floor plans and building sections of Option Two, showing a lobby on the first floor of the ell and provision of air conditioning in the Great Hall.*



# OPTION TWO: GROUND FLOOR PLAN

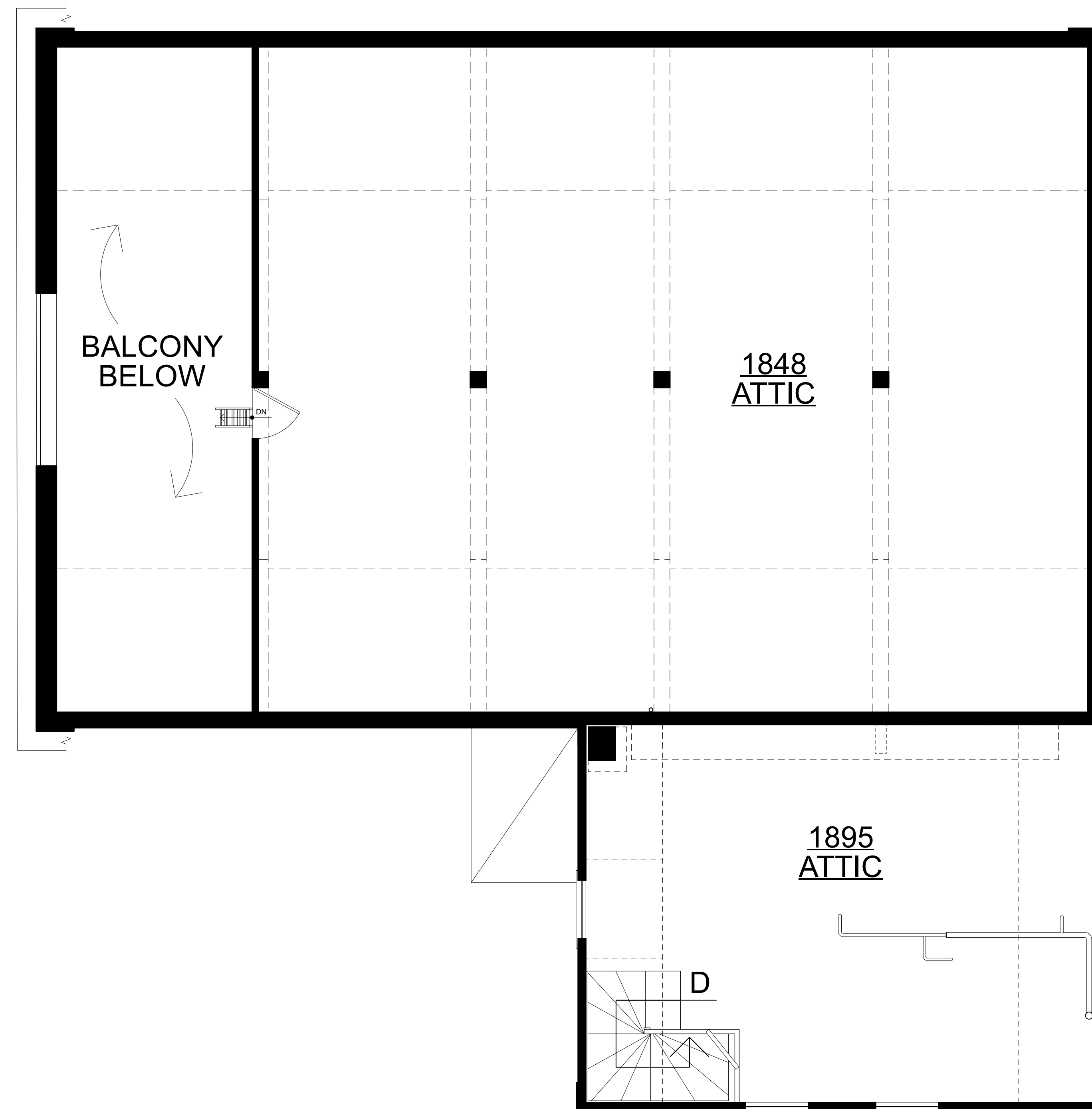
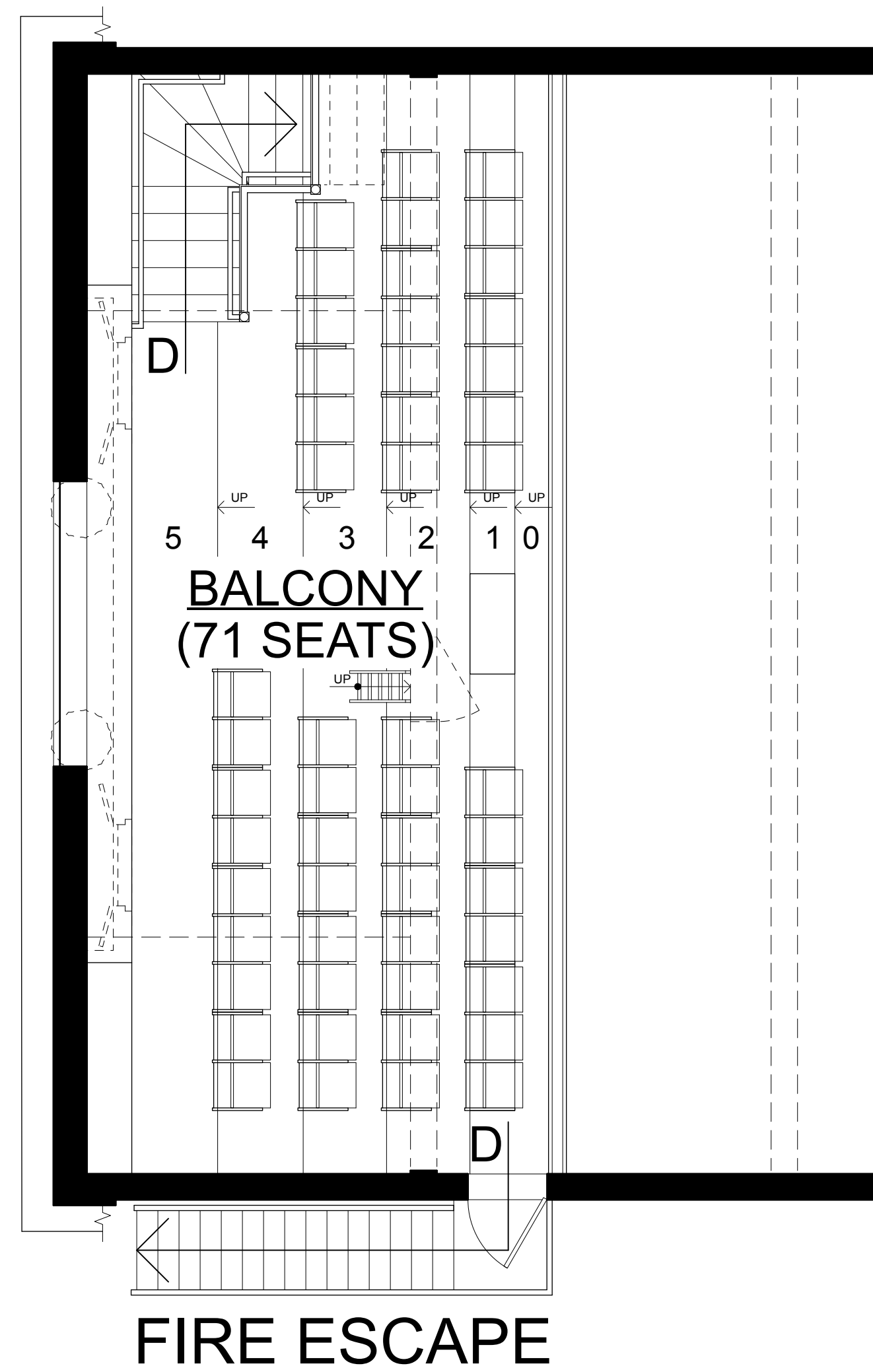
NO RENOVATION WORK AT THIS LEVEL - NO OCCUPANCY THIS FLOOR





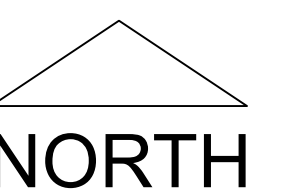
# OPTION TWO: FIRST FLOOR PLAN

LIMITED RENOVATIONS THIS FLOOR - NO ACCESSIBILITY IMPROVEMENTS

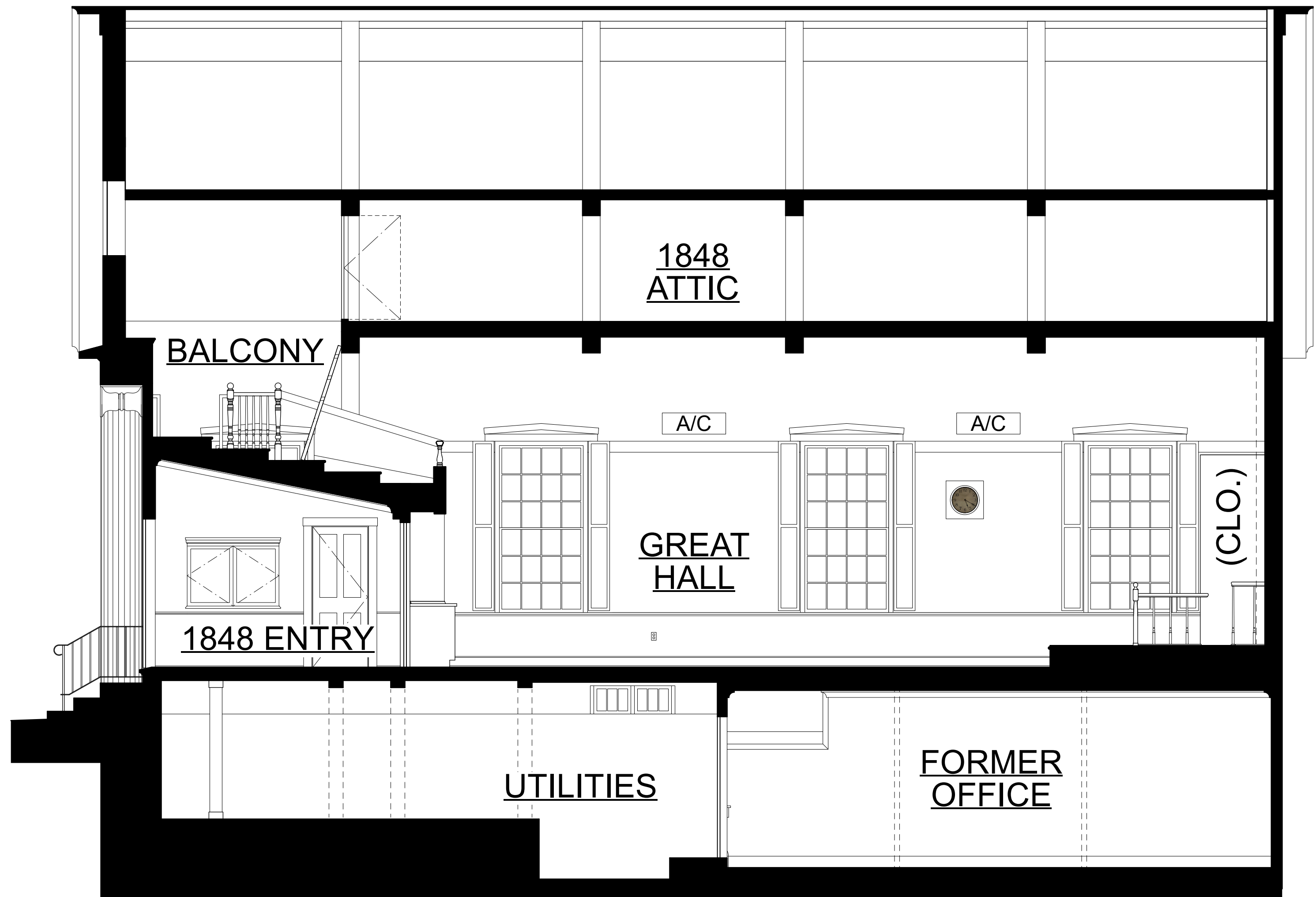


## OPTION TWO: BALCONY & ATTIC PLANS

INSULATE 1848 ATTIC FLOOR & BALCONY CEILING ABOVE GREAT HALL - NO OTHER WORK THIS LEVEL

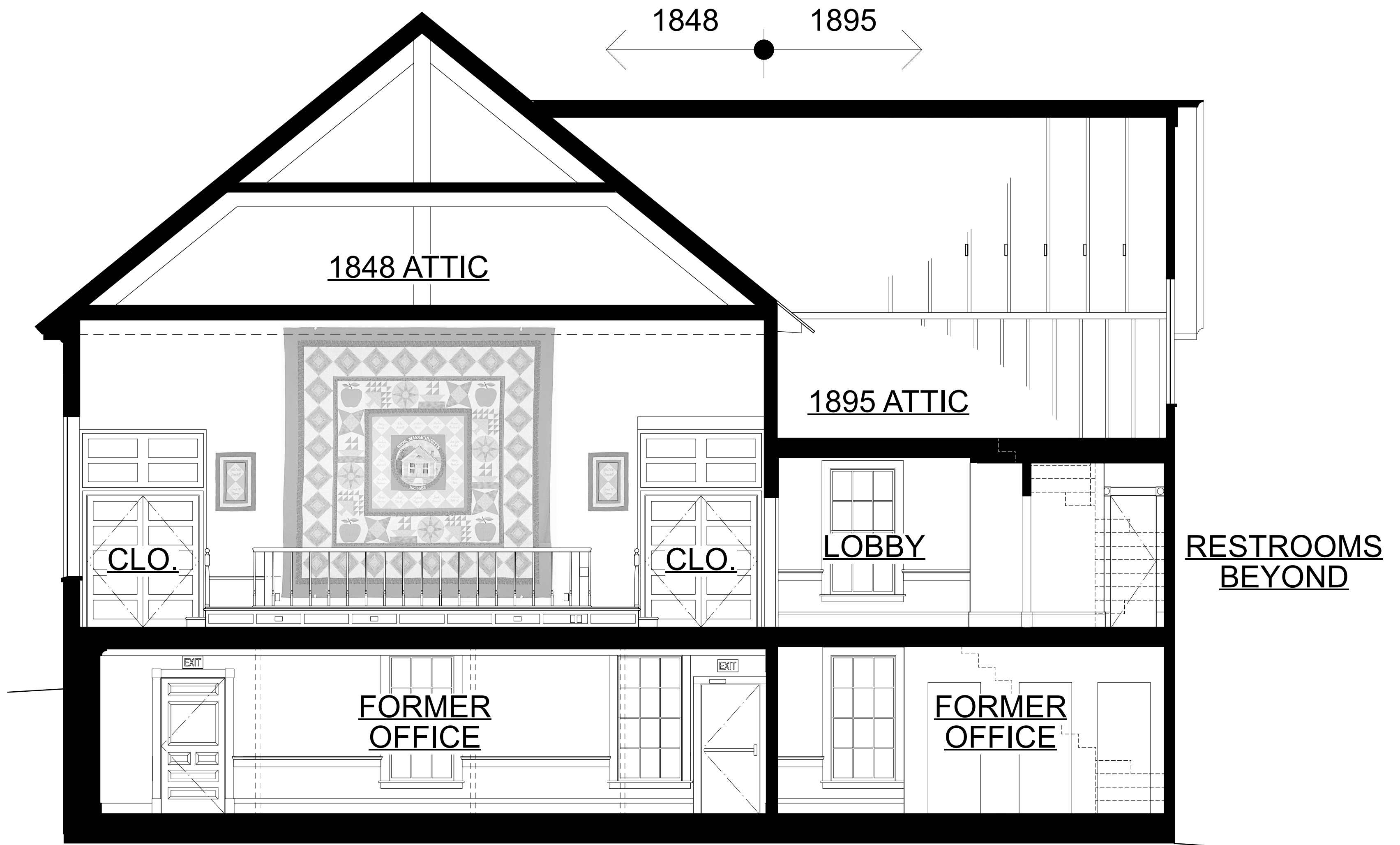






## OPTION TWO: LONGITUDINAL SECTION LOOKING NORTH

LIMITED RENOVATIONS - NO ACCESSIBILITY IMPROVEMENTS - NO BASEMENT OCCUPANCY



## OPTION TWO: CROSS SECTION LOOKING EAST

LIMITED RENOVATIONS - NO ACCESSIBILITY IMPROVEMENTS - NO BASEMENT OCCUPANCY

## OPTION THREE / OVERVIEW

**\$3,000,000**

Option Three will renovate both floor levels for separate uses. The first floor will be for community use related to the Great Hall, while the ground floor will be a municipal function use (offices or meetings) unrelated to events on the first floor. Keeping the two floors separate required each floor to maintain its own exterior accessible entrance and does not require any internal accessible vertical access via stairs and an elevator. The approximate project budget for Option Three is \$3.0 million in current dollars. This option and its associated budget will require revisions to the accessibility variance that was secured for the project based on the scope that was submitted and approved for Option Five.

### **Option Three: Building Systems**

The current heating system will remain, and air conditioning will be added to Great Hall and to the downstairs municipal function meeting room or open office area consisting of indoor wall-mounted fan-coil units and outdoor units in the north yard visible from Crescent Street. Roof framing of the Great Hall will be reinforced to carry anticipated additional snow loads due to insulation. Ventilation will rely on restored operable windows. The electrical service will be upgraded for air conditioning and no acoustical improvements will be made in the facility.

### **Option Three: Accessibility Features**

Each floor will operate independently and access between floors will not be allowed. The existing exterior accessible entrances will be retained in this option, and certain improvements and variances will be required since they do not meet current regulations. The Great Hall stage will be modified for wheelchair access. A few modifications to the prior variance application that was secured for Option Five will need to be submitted for consideration by the Massachusetts Architectural Access Board.

### **Option Three: Support Facilities**

As in Option One and Two, the fire escape will be repaired, existing restrooms on the first floor will remain, and the first floor occupancy load will be limited to 100 persons maximum. The lobby on the first floor of the ell as introduced in Option Two will be provided. A pair of accessible restrooms will be provided on the ground floor level to serve that separate use. The kitchenette will be removed from the ground floor and a foyer with storage closets to support the municipal function room will be provided.

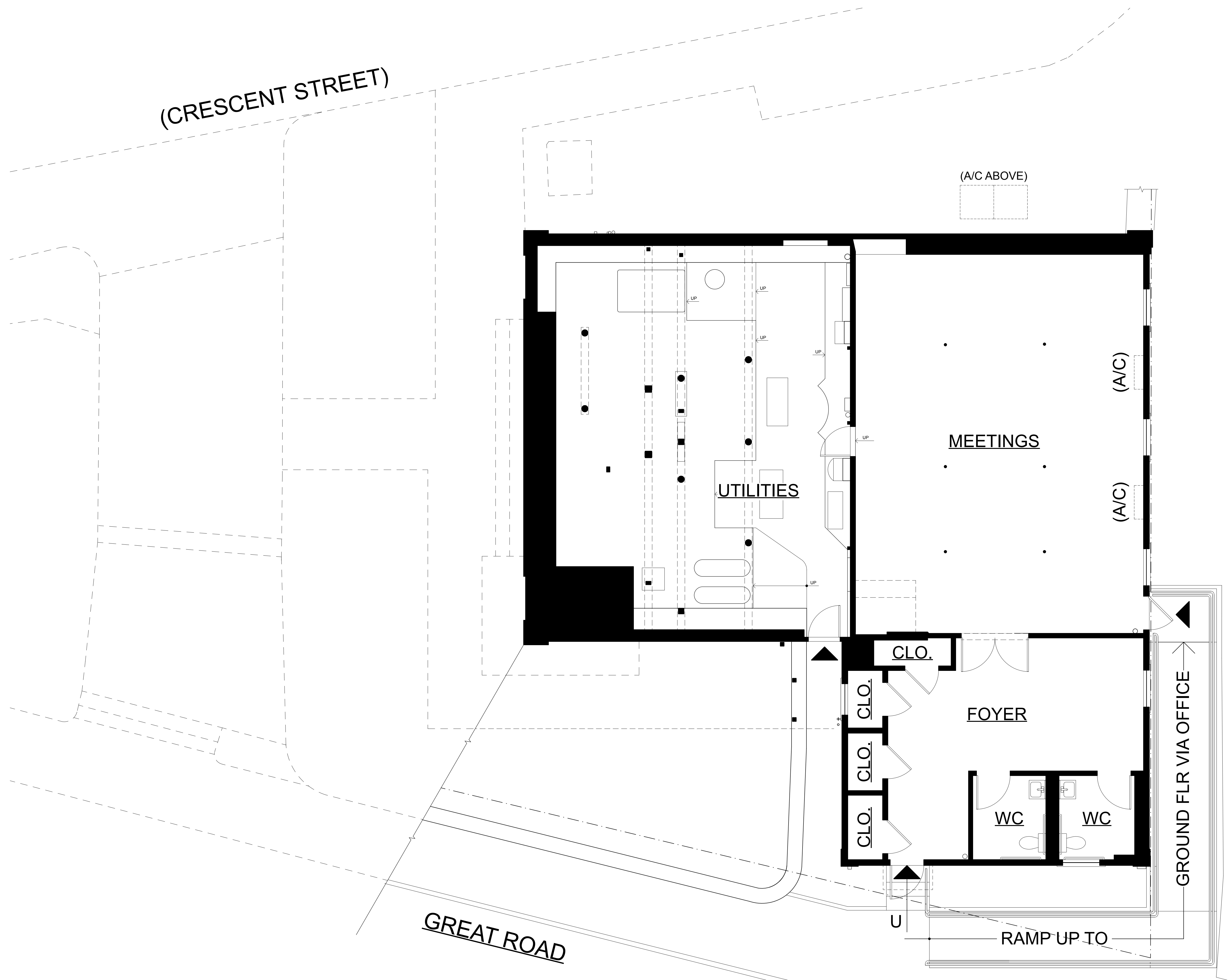
### **Option Three: Site & Building Restoration Components**

Interior walls and ceilings will be repaired and painted, and the building envelope will be insulated. Windows will be restored and fitted with exterior storm units. The existing wood flooring at the ground floor will remain in place, and water infiltration at the north stone wall will be addressed. Existing entrances will be retained, and the exterior of the site will not be repaired or restored.

### **Option Three: Considerations**

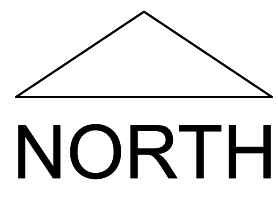
This option renovates the ground floor level and keeps that use separate from a renovated first floor to avoid the need for vertical accessibility between floors. This option would discourage implementation of either subsequent option without extensive modifications to the Ell and exterior entrances. The facility would lose some inherent flexibility since it would not be able to host events that might need to use both floors collectively since doing so would violate accessibility regulations.

*Refer to the floor plans and building sections of Option Three, showing modifications to the ground floor for a separate use and the absence of stairs from that level up to the first floor. Stairs from the first floor to the attic of the ell would remain in place for this option.*



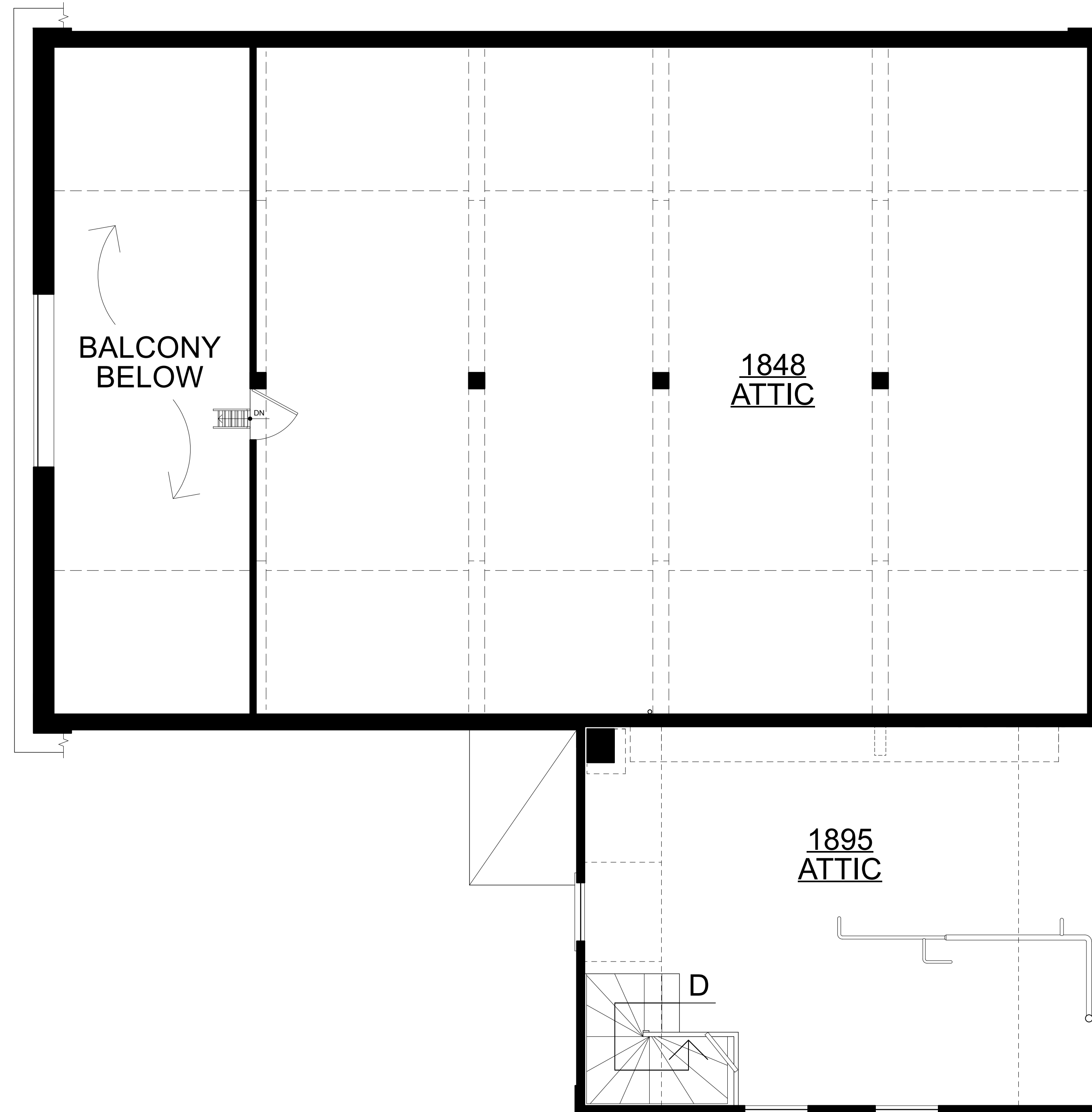
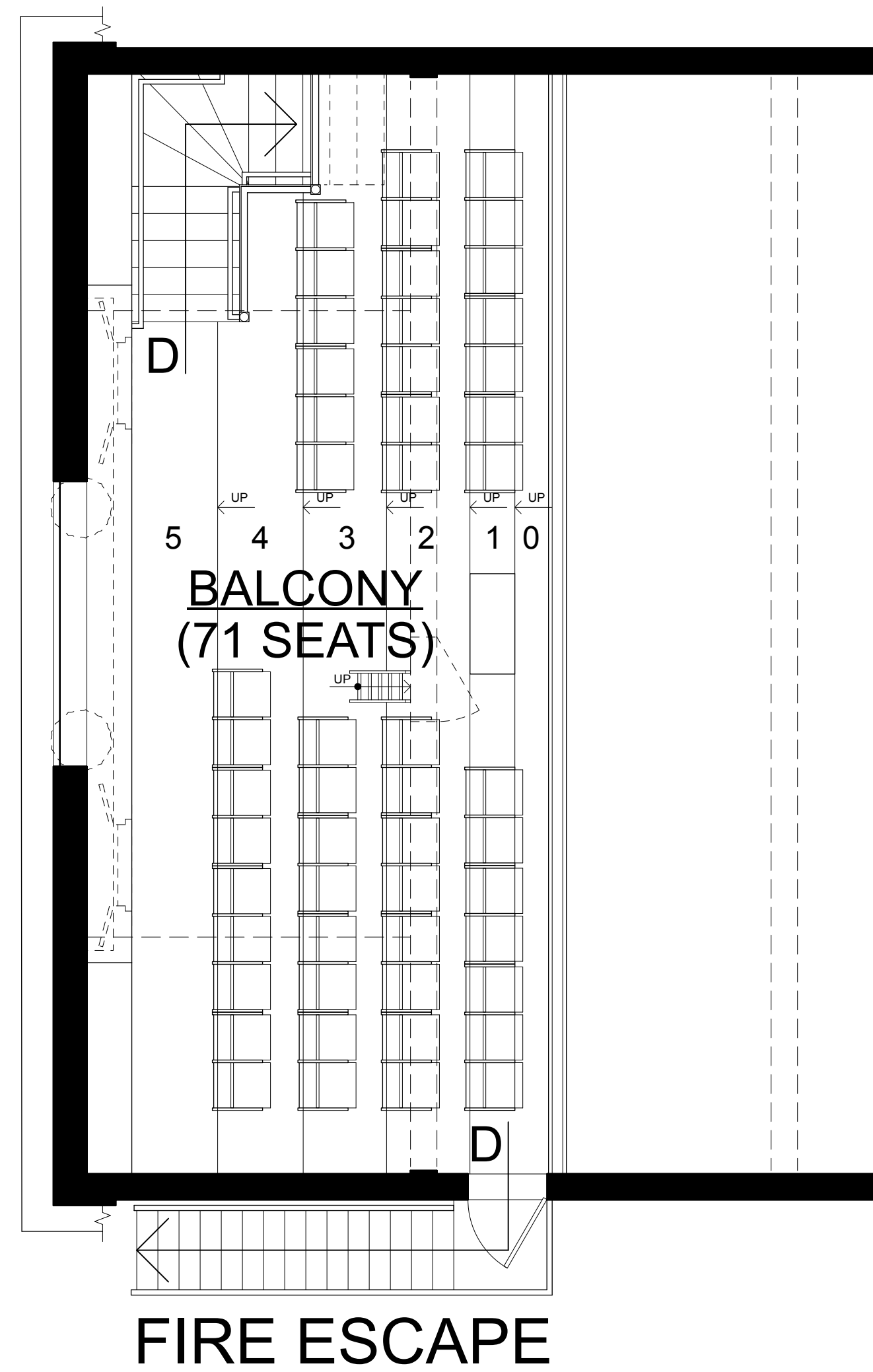
# OPTION THREE: GROUND FLOOR PLAN

NO INTERIOR ACCESS TO FIRST FLOOR - MEETING ROOM AS TOWN OFFICE ANNEX UNRELATED TO GREAT HALL USE





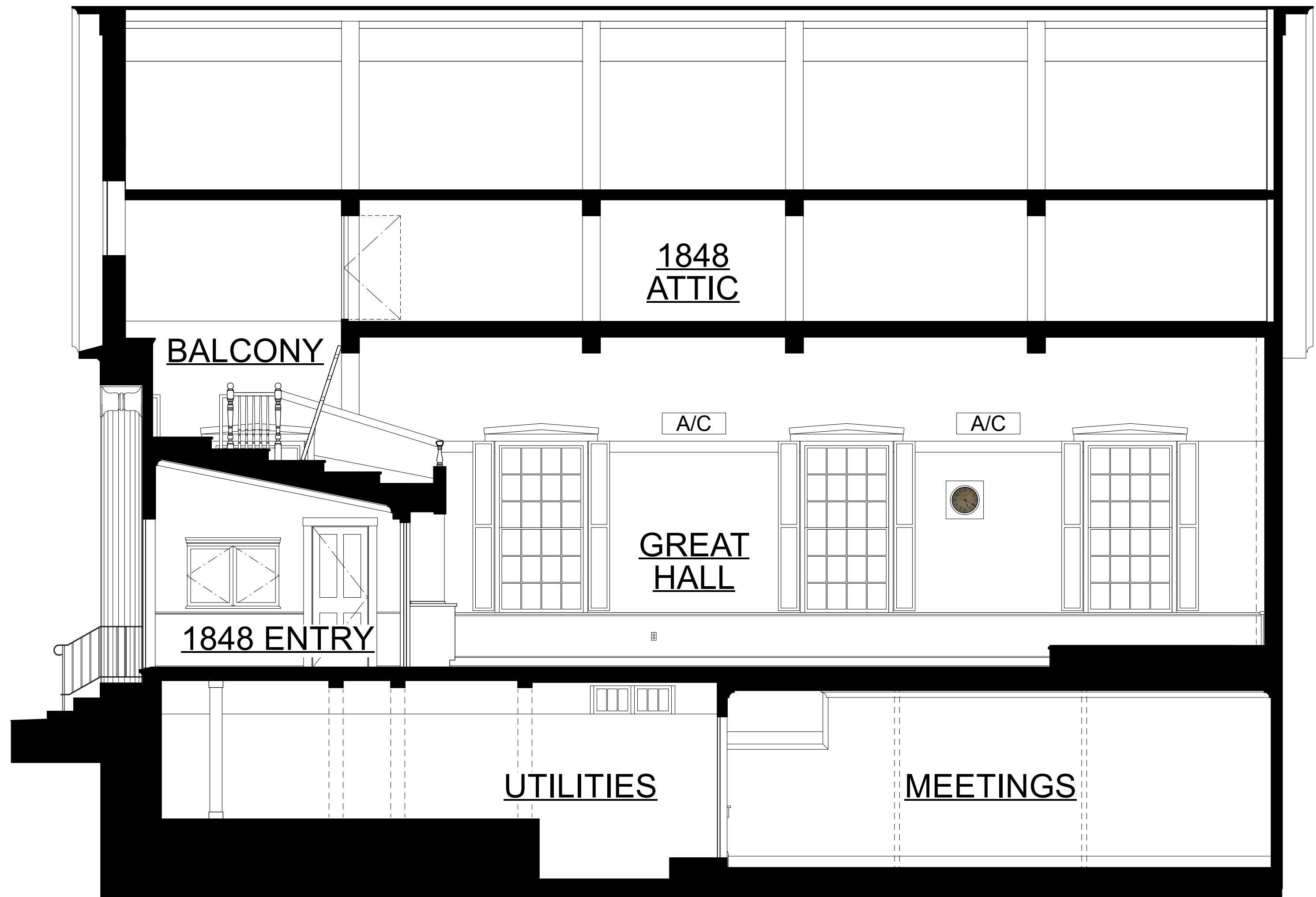




# OPTION THREE: BALCONY & ATTIC PLANS

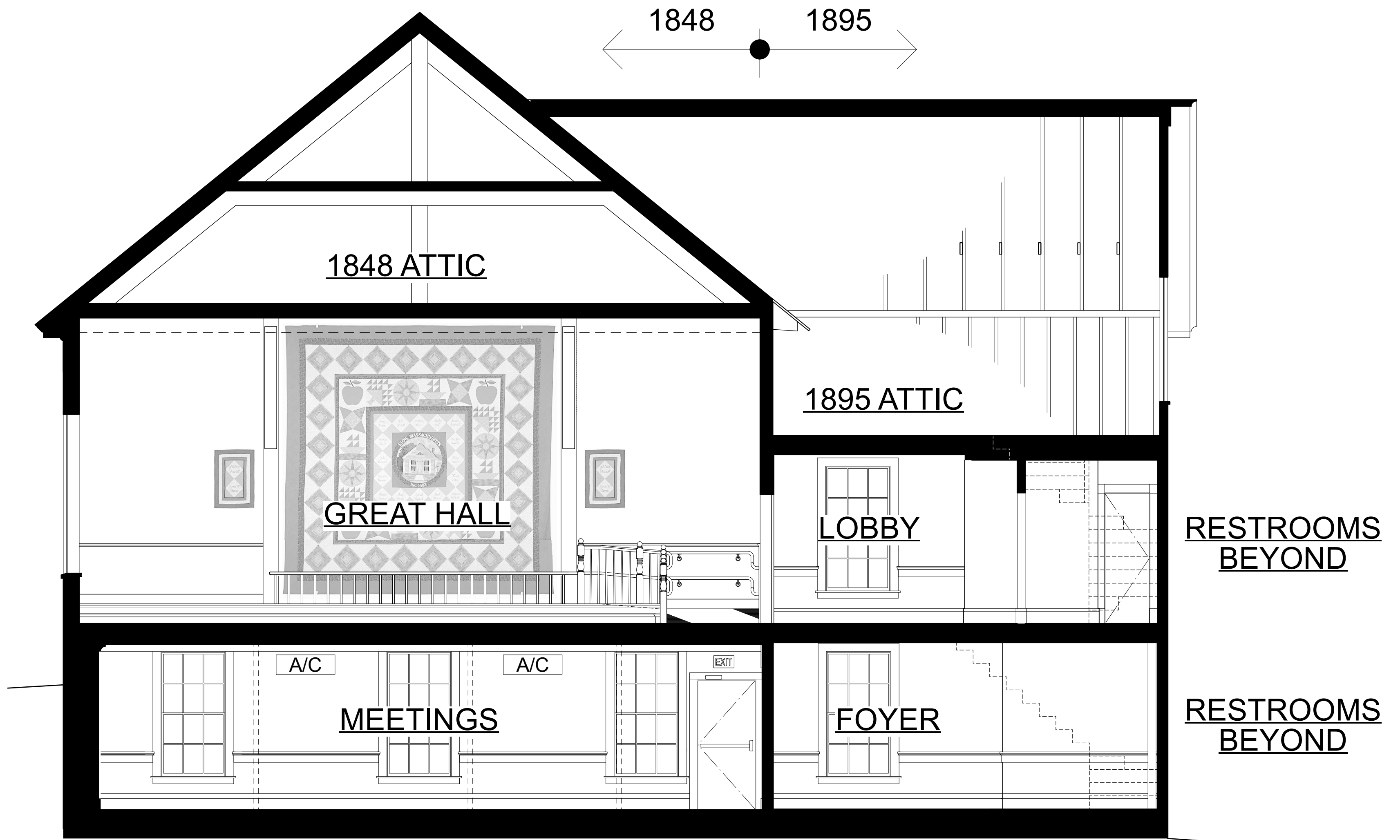
INSULATE 1848 ATTIC FLOOR & BALCONY CEILING ABOVE GREAT HALL - NO OTHER WORK THIS LEVEL





## OPTION THREE: LONGITUDINAL SECTION LOOKING NORTH

LIMITED RENOVATION OF EACH FLOOR - NO ACCESS BETWEEN FLOORS (SEPARATE USES)



## OPTION THREE: CROSS SECTION LOOKING EAST

LIMITED RENOVATION OF EACH FLOOR - NO ACCESS BETWEEN FLOORS (SEPARATE USES)



## **OPTION FOUR / OVERVIEW**

**\$3,800,000**

Option Four will renovate both floors, reconstruct the interior stair and provide a vertical wheelchair lift between the ground floor and first floor. The ground floor will be renovated to include a meeting room, historical commission office, display area and catering pantry. The ground floor's contemporary exterior ramp and awkward south entrance into the stair will both be removed, and a new ground floor entrance will be located directly below the existing first floor ell entrance into a lobby area. Existing entrances into the first floor will remain as-is and the first floor of the ell will include restrooms to support the full occupant load. The approximate project budget for Option Four is \$3.8 million in current dollars.

### **Option Four: Building Systems**

The HVAC system improvements will be of the same magnitude as Option Three plus added ventilation for the expanded restrooms. The building will be insulated, and roof framing will be reinforced to carry additional snow loads. Ventilation will rely on restored operable windows. The electrical system will be upgraded to provide power for air conditioning and the vertical wheelchair lift. No acoustical improvements will be made in the facility.

### **Option Four: Accessibility Features**

A vertical wheelchair lift will be provided between the ground floor and first floor levels. The first floor existing accessible entrance ramp will remain as-is while the revised ground floor entrance will not be accessible. The Great Hall stage will be made wheelchair accessible and other essential accessibility improvements will be provided. Adjustments to the previously issued accessibility variances based on Option Five will need to be submitted for approval.

### **Option Four: Support Facilities**

As in the previous options, the fire escape will be repaired and certified. Restrooms to support the full occupant load of the facility will be provided on the first floor, and a catering pantry for event support will be provided on the ground floor.

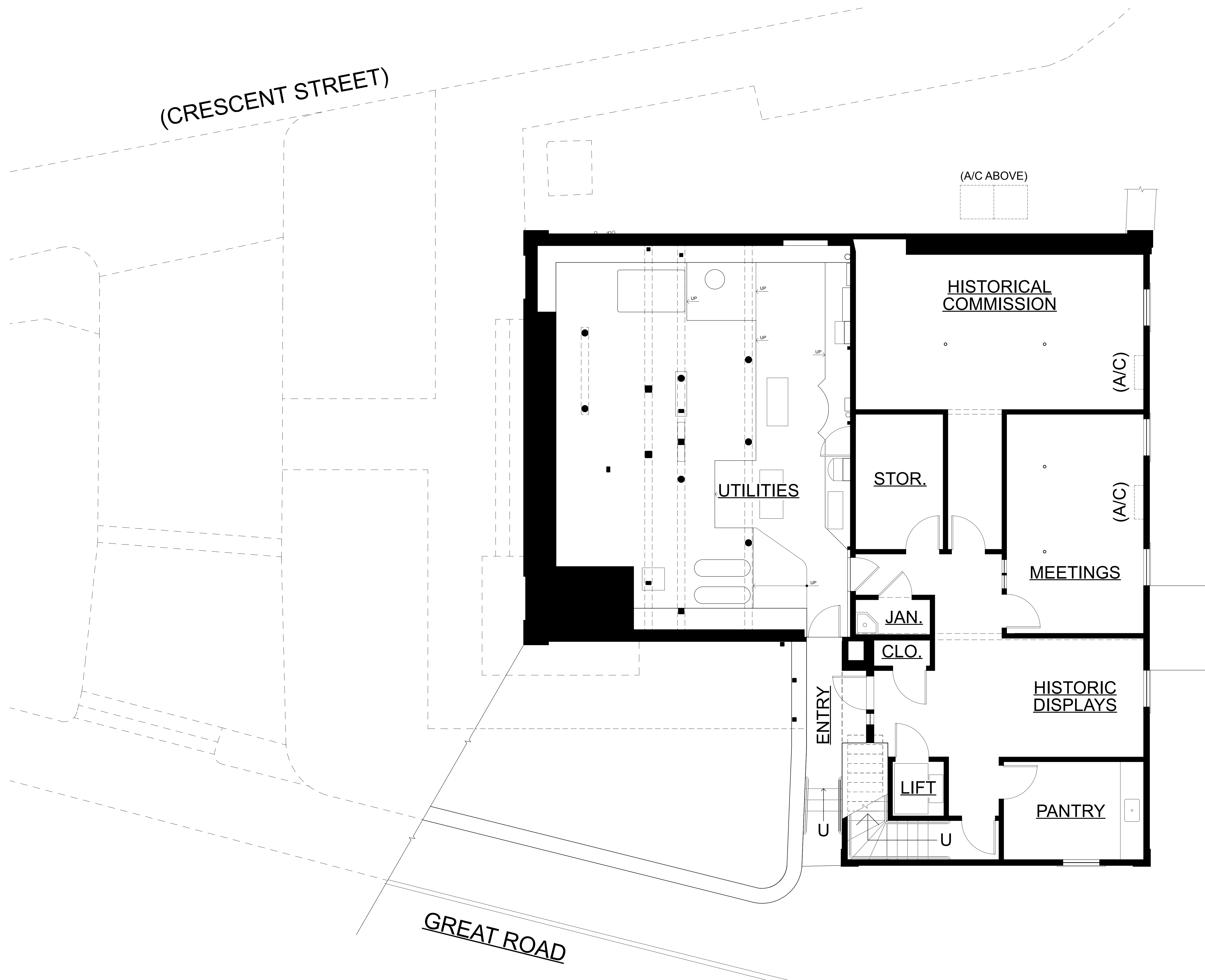
### **Option Four: Site & Building Restoration Components**

Interior walls and ceilings will be repaired and painted, and the building envelope will be insulated. Windows will be restored and fitted with exterior storm units. The basement will receive a new floor consisting of wood flooring over a waterproofed concrete slab with an underground drainage system. The free-standing columns in the lower level will be replaced and new footings provided. The site at the ground floor entrance areas will be reconfigured and the stone retaining wall at the service alley will be rebuilt for the new lower entrance. The existing site configuration at the first floor and forecourt area will remain as-is, including the existing first floor entrance, accessible ramp, and balcony fire escape.

### **Option Four: Considerations**

A vertical wheelchair lift is less expensive than an elevator but is also less user-friendly since it requires a "constant pressure" switch to call and operate the lift (button must be pressed continuously). Placing the expanded restrooms on the first floor, while convenient to occupants using the adjacent Great Hall, prevents the provision of a welcoming lobby and catering pantry on this main level for event support.

*Refer to the floor plans and building sections of Option Four, showing modifications to the ground floor and first floor including vertical access between floors.*

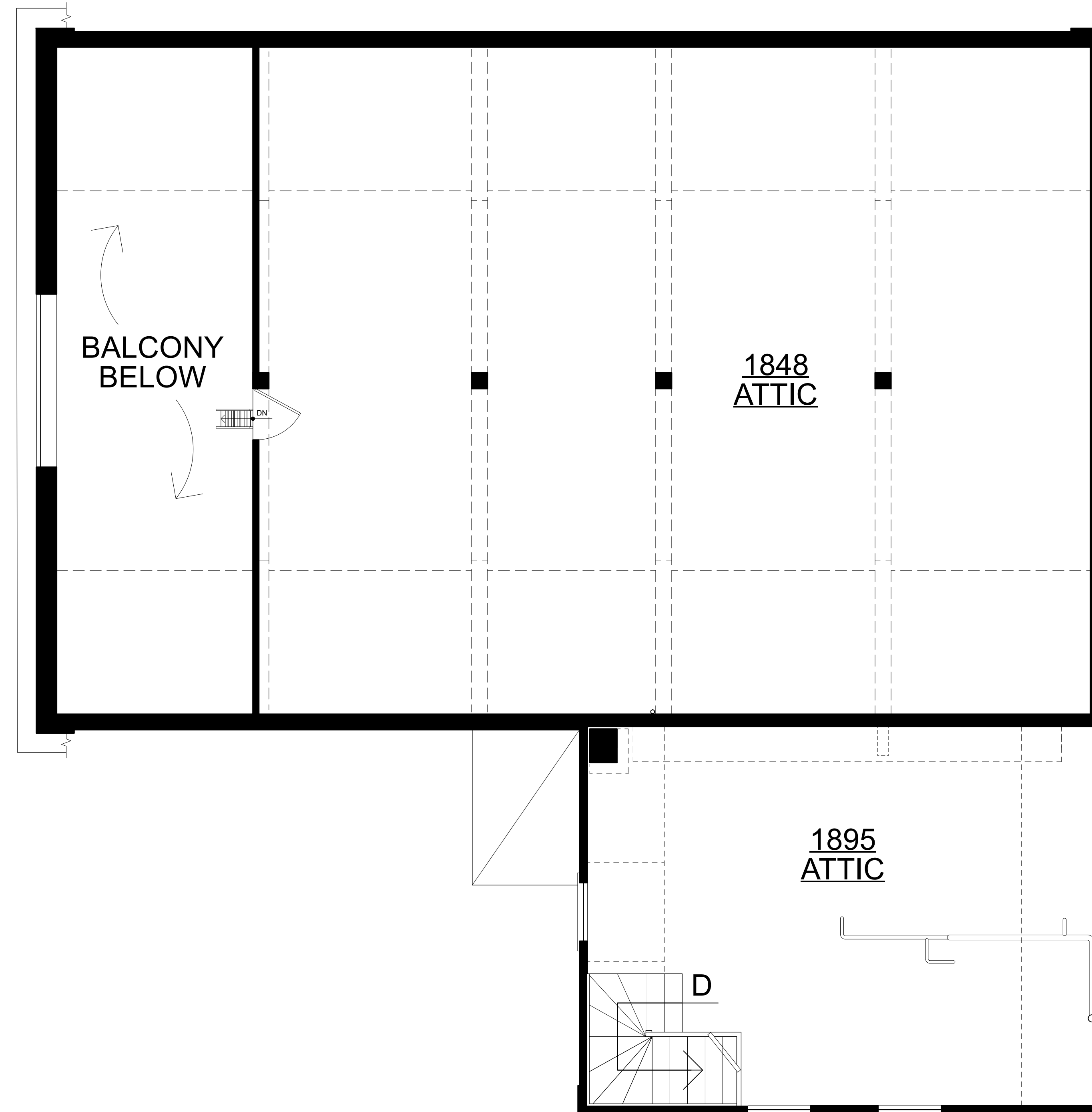
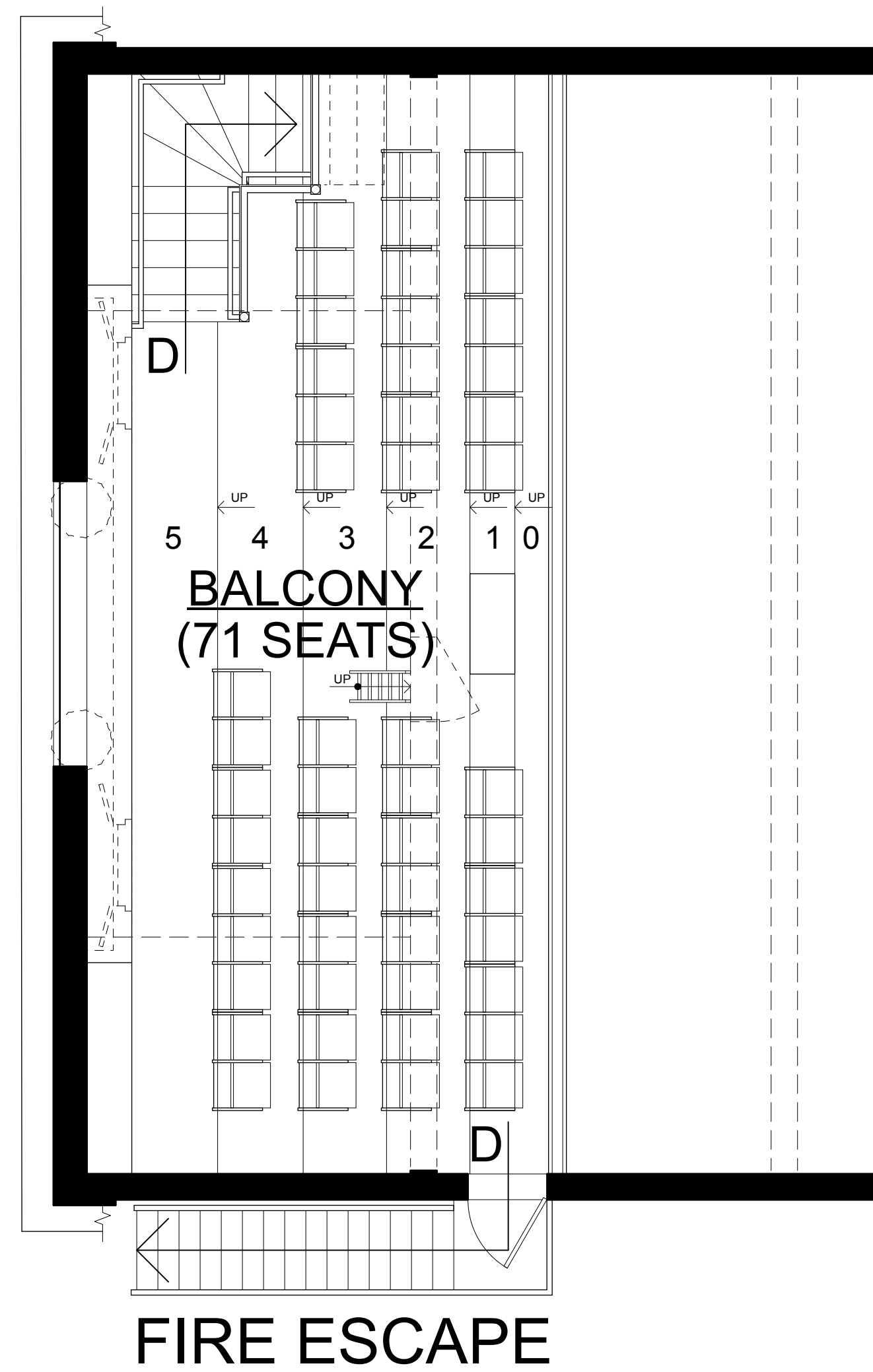


# OPTION FOUR: GROUND FLOOR PLAN

MODIFIED RENOVATION SCOPE - VERTICAL WHEELCHAIR LIFT BETWEEN FLOORS - RESTROOMS ON FLOOR ABOVE

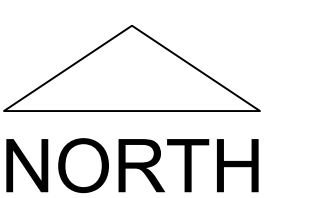


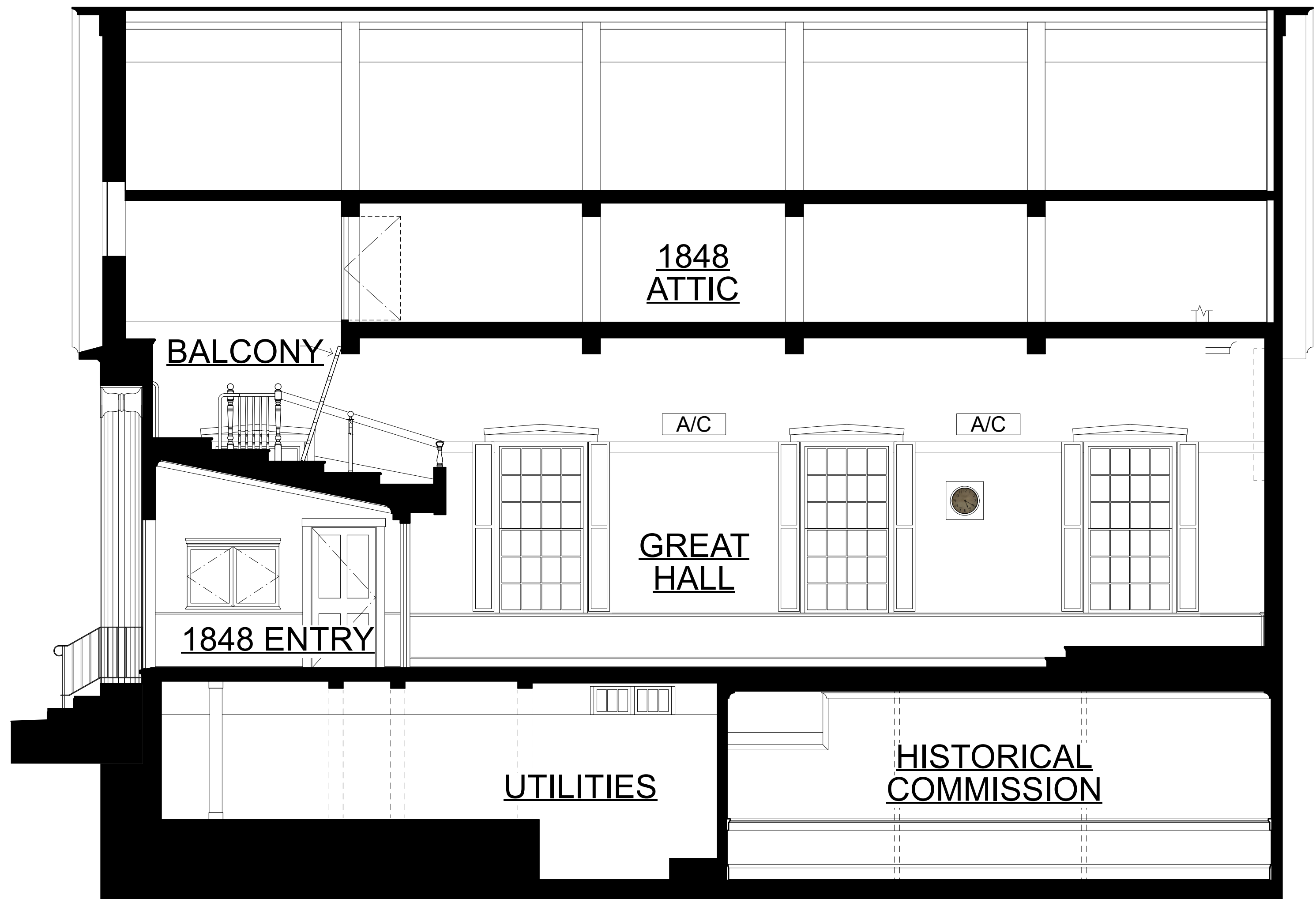




## OPTION FOUR: BALCONY & ATTIC PLANS

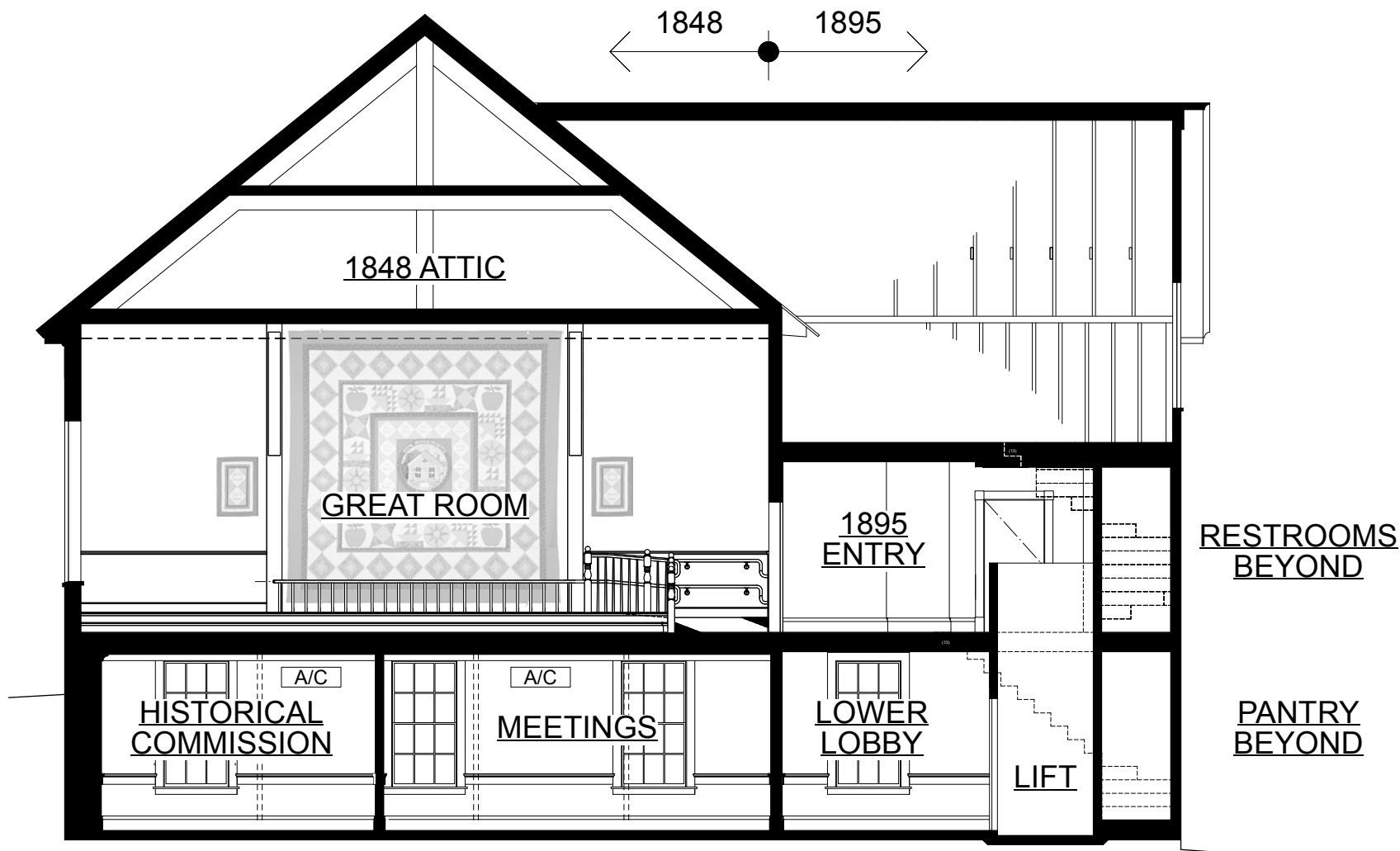
INSULATE 1848 ATTIC FLOOR & BALCONY CEILING ABOVE GREAT HALL - NO OTHER WORK THIS LEVEL





# OPTION FOUR: LONGITUDINAL SECTION LOOKING NORTH

MODIFIED RENOVATION SCOPE



## OPTION FOUR: CROSS SECTION LOOKING EAST

MODIFIED RENOVATION SCOPE



## **OPTION FIVE / OVERVIEW**

**\$4,800,000**

Option Five will rehabilitate the historic building per the scope of work as recommended by the Town Hall Renovation Committee. This option expands upon the features of Option Four by renovating the first floor entrances and forecourt, providing an elevator instead of a vertical wheelchair lift, providing a comprehensive energy efficient HVAC system, providing audiovisual and lighting upgrades, and other upgrades as noted. The approximate project budget for Option Five is \$4.8 million in current dollars.

### **Option Five: Building Systems**

This option will replace the existing heating system with an all-electric air-source heat pump system for heating, cooling, and ventilation. Energy recovery ventilating units will provide efficient air changes for a healthy indoor environment. The system will conform to the town's green building initiatives, reduce reliance upon fossil fuels, and benefit from the low rates provided by the municipal electric company. Outdoor equipment will be acoustically and visually shielded by a sound-isolating wood fence placed between the east wall and the neighbor's garden shed, subject to an easement agreement. Fan coil units serving the Great Hall will be sound-isolated with resilient hangers and attenuation ductwork.

The building will be fully insulated, and roof framing will be reinforced to carry additional snow loads. Windows will be restored, and exterior storm windows added for energy efficiency. The electrical system will be upgraded to provide power for the HVAC system, elevator, and other improvements. Great Hall will be acoustically improved with a sound attenuating ceiling that will have the appearance of smooth plaster. Integrated audiovisual systems and event lighting will be provided.

### **Option Five: Accessibility Features**

A small elevator will be provided between the ground floor and first floor levels with a machine room above the hoistway in the attic. The accessible entrance ramps at both floor levels will be removed from the south side of the building and the site will be restored in keeping with its original appearance. An accessible walkway (not a ramp, no handrails) will be provided to the first floor ell entrance. The ground floor entrance will be directly below this entrance as described in Option Four. The Great Hall stage will be made wheelchair accessible and other essential accessibility improvements (door widths, hardware, fire alarms, listening systems, signage) will be provided. The accessible parking and route from Crescent Street will be improved for safety and clarity. The previously issued accessibility variances were based on this Option Five and they have already received full approval for code compliance.

### **Option Five: Support Facilities**

An accessible catering pantry will be provided at the first floor adjacent to a lobby and display area in the ell. New restrooms to support the full occupant load of the facility will be provided on the ground floor next to reconstructed stairs, the elevator and lower lobby area. Small meeting rooms and storage areas will be provided on each floor, along with an office for the Historical Commission on the lower level. The fire escape and balcony exit door will be removed and the south façade restored. An audiovisual desk with space for lighting and sound board controls will be provided in the balcony.

### **Option Five: Site & Building Restoration Components**

Interior walls and ceilings will be repaired and painted, and the building envelope will be insulated. Windows will be restored and fitted with exterior storms. Painted tin ceilings will be preserved at the first floor (under the balcony) and a remnant on the ground floor will be restored and installed in the lower lobby ceiling. The basement will receive a new floor system consisting of wood flooring over a waterproofed concrete slab with an underground drainage system. The free-standing columns in the lower level will be replaced and new footings provided. The site at the ground floor entrance areas will

be reconfigured and the stone retaining wall at the service alley will be rebuilt for the new lower entrance. The site configuration at the first floor and forecourt area will be modified to be pedestrian friendly and will eliminate the remnant of former cross-over driveway and parking area between Great Road and Crescent Street. A bench and plaque will be provided to commemorate the former hay scale at the site. Front façade lighting will be upgraded by removing the pole-mounted flood light across Crescent Street and providing more effective and appropriate lighting to complement the unique exterior character of this signature historic building.

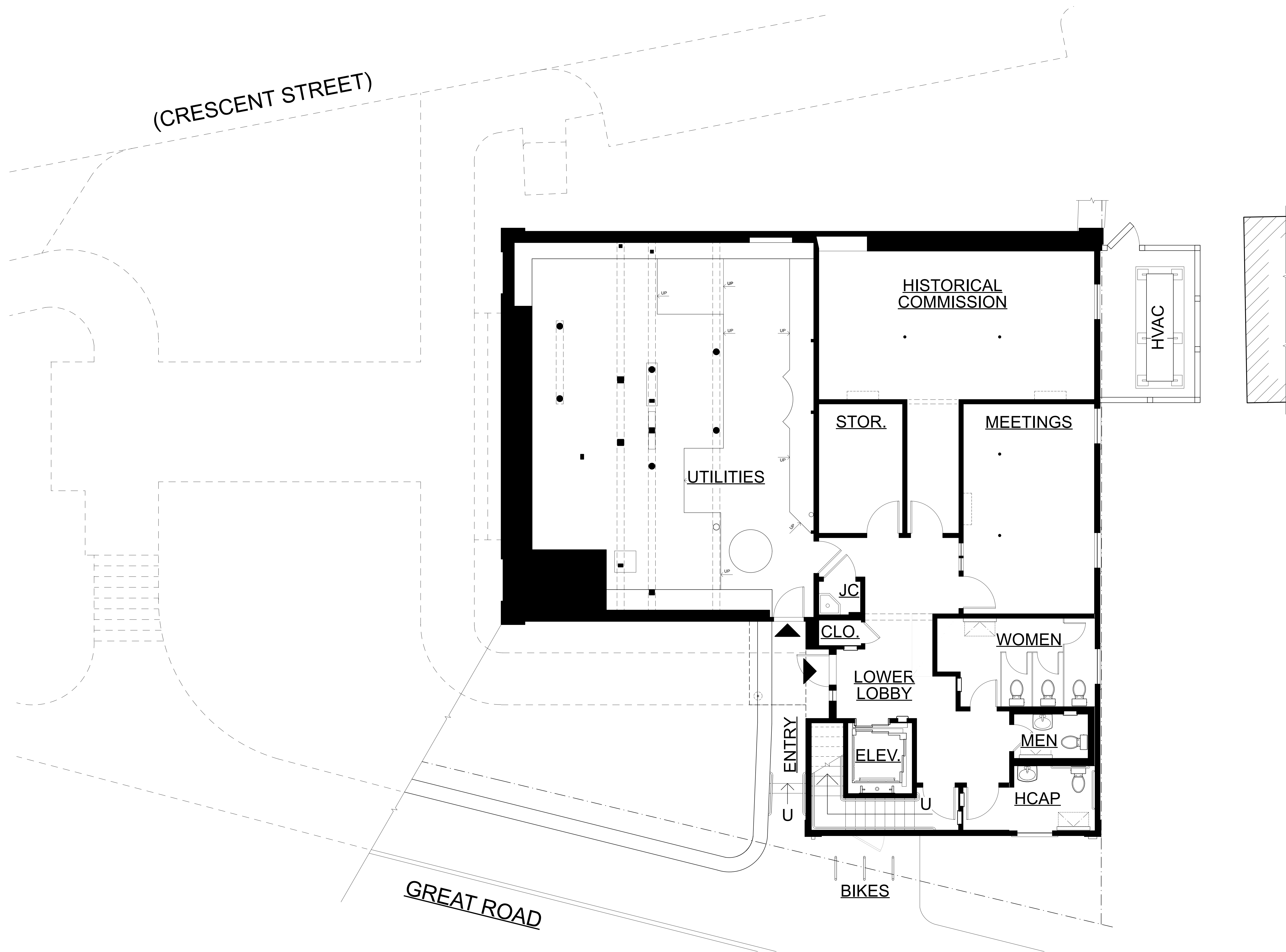
### **Option Five: Considerations**

This option incorporates all recommended elements of rehabilitation to prepare this iconic historic facility for its continuing service to the community for the next generation. It should be noted that many elements of the preceding four options were considered during the design process but were not incorporated into the design documents. Examples of options that were reviewed included:

- Use of a vertical wheelchair lift instead of an elevator per Option 4, ... but dissatisfaction with the operation of comparable vertical wheelchair lifts in town facilities was noted as a deterrent to using that type of interior vertical access solution for this building since a small elevator is feasible and results in a much higher level of building user satisfaction than a wheelchair lift.
- Placement of public restrooms on the first floor per Option 4, ... but providing a small lobby display area and catering pantry in the ell adjacent to Great Hall was determined to be a much more useful amenity at that level since the trip downstairs to the restrooms is a very short distance and the ground floor is less suitable for a lobby display area and pantry use.
- Retaining the existing oil-fired furnace heating system (Options 1 thru 4) while adding air conditioning in lieu of full replacement of the HVAC system (Options 2 thru 4), ... but the existing system is antiquated, not compatible with the ongoing effort in Stow to support and encourage green initiatives, and would not take advantage of current HVAC technologies that can be well integrated into the building during a renovation.
- Providing a minimal renovation to upgrade the building to code without incurring any more expense than is necessary, ... but minor expenditures on permitted construction work triggers the need for full compliance with current accessibility regulations. Even with the renovation of Option 5 as proposed, multiple variances were required due and those were granted by the Massachusetts Architectural Access Board after multiple reviews.
- Retaining existing exterior accessible ramps at both floor levels, omitting renovation of the site's forecourt, omitting upgrading of exterior lighting, all per Options 1 thru 4, ... but restoration of the site's cluttered appearance and removal of contemporary entrance elements was seen as important character-defining upgrades for this visually prominent site.

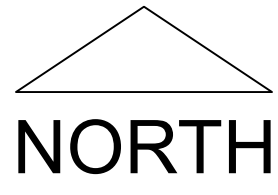
*Refer to the floor plans and building sections of Option Five, showing modifications to the ground floor and first floor including an elevator between floors, restrooms downstairs, and an ell lobby and catering pantry on the first floor. Also note renovations to the forecourt and entrance areas at both levels.*

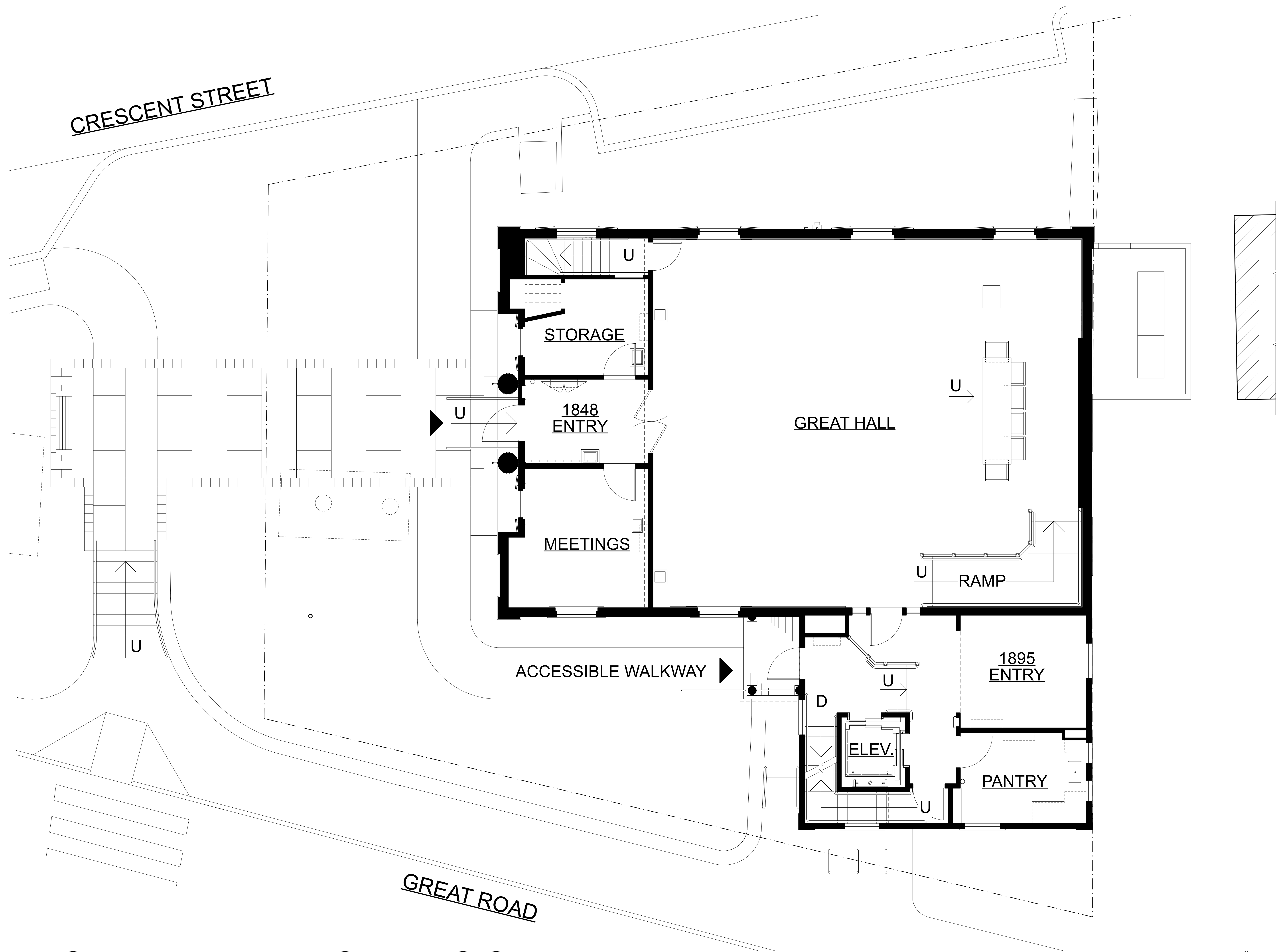
*Refer also to Appendices A thru G for cost details and design information.*



# OPTION FIVE: GROUND FLOOR PLAN

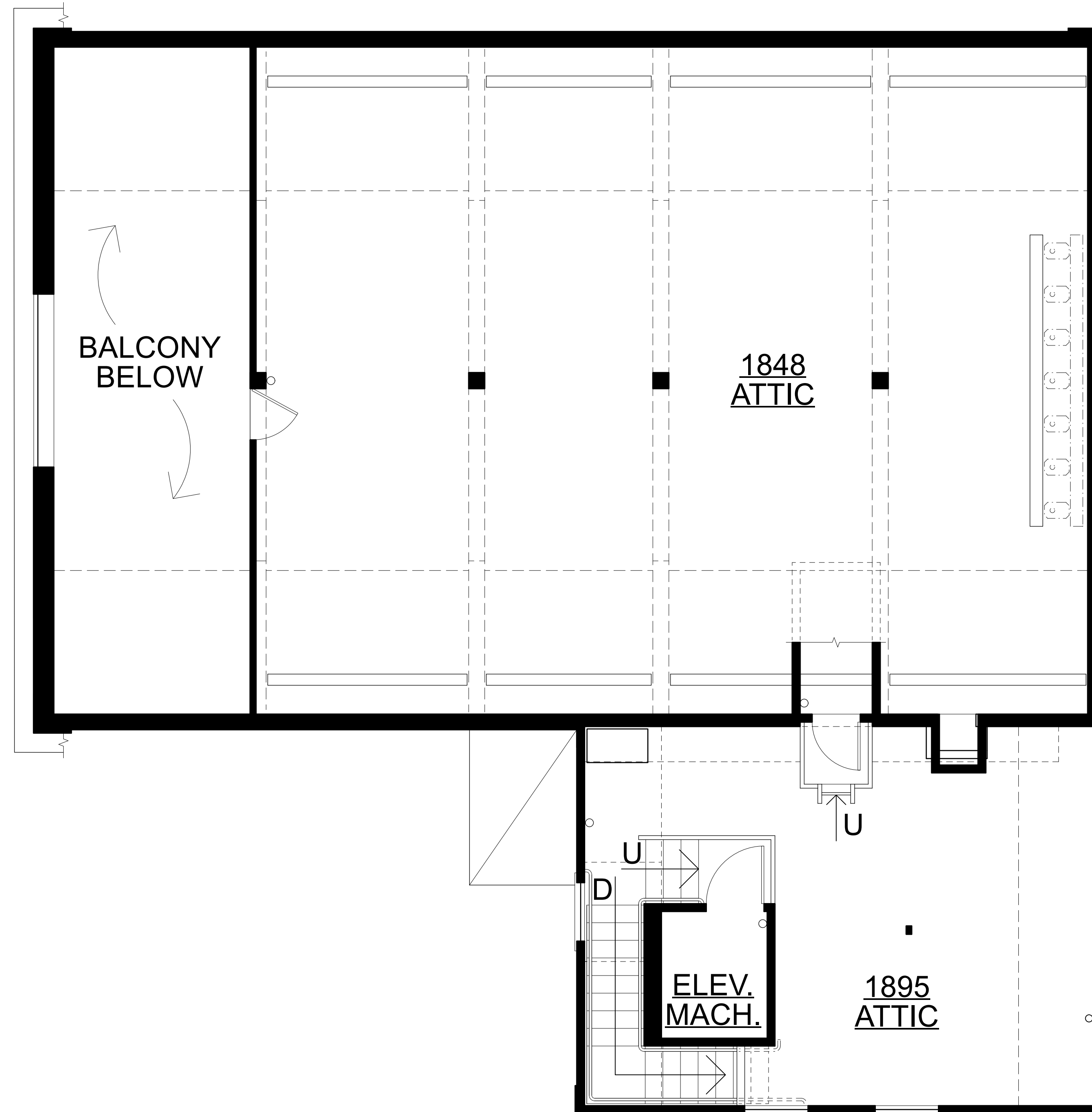
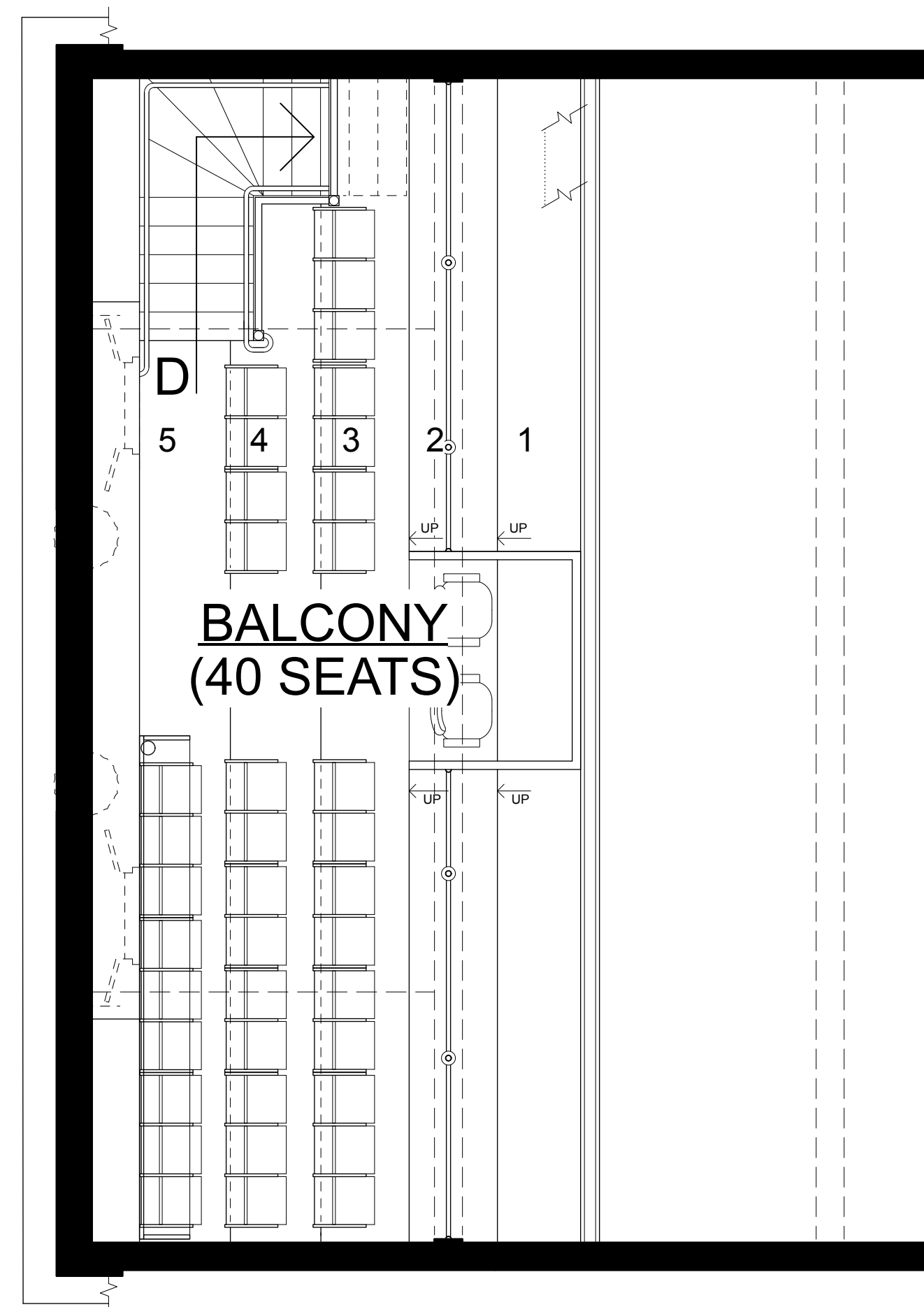
RENOVATION SCOPE AS PROPOSED BY TOWN HALL RESTORATION COMMITTEE





# OPTION FIVE: FIRST FLOOR PLAN

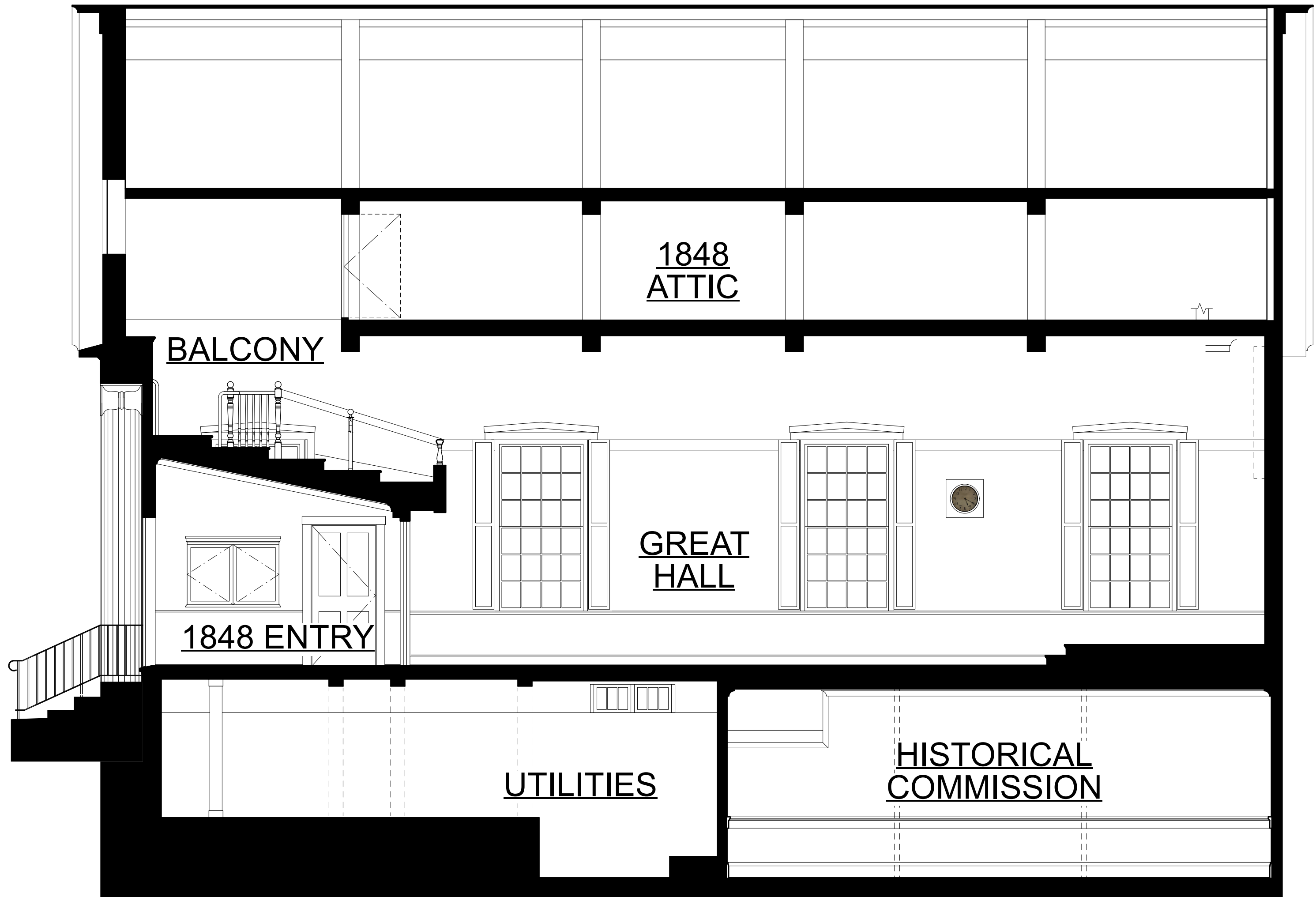
RENOVATION SCOPE AS PROPOSED BY TOWN HALL RESTORATION COMMITTEE



# OPTION FIVE: BALCONY & ATTIC PLANS

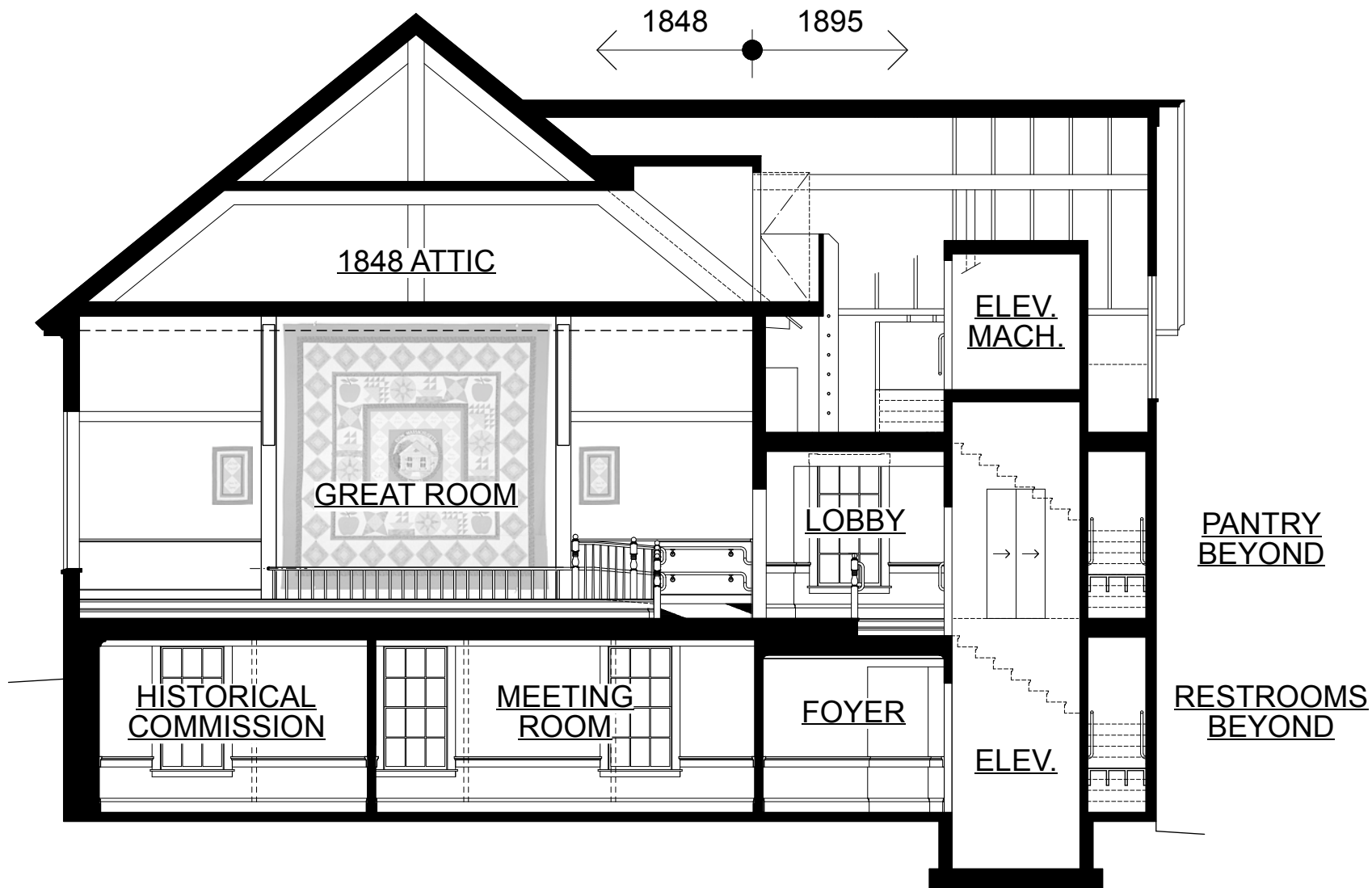
RENOVATION SCOPE AS PROPOSED BY TOWN HALL RESTORATION COMMITTEE





# OPTION FIVE: LONGITUDINAL SECTION LOOKING NORTH

RENOVATION SCOPE AS PROPOSED BY TOWN HALL RESTORATION COMMITTEE



## OPTION FIVE: CROSS SECTION LOOKING EAST

MAJOR RENOVATIONS AS PROPOSED BY TOWN HALL RESTORATION COMMITTEE



## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **APPENDICES**

**APPENDIX A** PRELIMINARY COST ESTIMATE

Pages A.01 thru A.35

**APPENDIX B** PHOTOGRAPHS OF EXISTING CONDITIONS

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### **APPENDICES**

Mills Whitaker Architects LLC

## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **PRELIMINARY COST ESTIMATE**

- A.01** BUDGETS FOR FIVE OPTIONS
- A.02** CHA Construction Document Estimate / Cover Page / August 23, 2021
- A.03** Project Description & Project Particulars
- A.04** Cost Center Summary
- A.05** Project Assumptions & Construction Cost Estimate Exclusions
- A.06** Main Summary
- A.07** Direct Trade Cost Summary
- A.10** Direct Trade Cost Details
- A.34** Alternates

**STOW TOWN HALL - BUDGETS FOR FIVE OPTIONS**

CSI Divisions of Work	Option 1	Option 2	Option 3	Option 4	Option 5
02 Existing Conditions	\$7,500	\$100,000	\$175,000	\$233,000	\$265,871
03 Concrete	\$0	\$0	\$35,000	\$59,165	\$59,165
04 Stone Masonry	\$0	\$0	\$50,000	\$67,000	\$87,930
05 Metals	\$5,000	\$75,000	\$75,000	\$101,775	\$101,775
06 Carpentry	\$20,000	\$133,000	\$198,000	\$263,000	\$289,184
07 Thermal & Moisture	\$25,000	\$65,000	\$95,000	\$102,522	\$102,522
08 Openings	\$5,000	\$75,000	\$125,000	\$133,065	\$133,065
09 Finishes	\$80,000	\$225,000	\$339,560	\$339,560	\$442,197
10 Specialties	\$0	\$0	\$5,750	\$12,607	\$12,607
11 Equipment	\$0	\$0	\$0	\$9,000	\$9,000
14 Conveying Equipment	\$0	\$0	\$0	\$45,000	\$65,000
22 Plumbing	\$6,000	\$12,000	\$55,000	\$75,375	\$75,375
23 HVAC Systems	\$6,000	\$120,500	\$217,000	\$245,000	\$360,610
26 Electrical	\$6,000	\$172,500	\$248,000	\$275,000	\$298,109
31 Earthwork	\$0	\$0	\$0	\$125,000	\$185,253
32 Site Improvements	\$0	\$0	\$0	\$50,000	\$143,472
33 Site Utilities	\$0	\$0	\$37,500	\$37,500	\$41,630
<b>Direct Trades Subtotal</b>	<b>\$160,500</b>	<b>\$978,000</b>	<b>\$1,655,810</b>	<b>\$2,173,568</b>	<b>\$2,672,764</b>
Design/Pricing Conting ~ 5%	\$7,500	\$48,900	\$82,791	\$108,678	\$134,000
Construction Cost Subtotal	\$168,000	\$1,026,900	\$1,738,601	\$2,282,246	\$2,806,764
Gen. Cond., Burdens, Markups ~ 18%	\$0	\$184,842	\$312,948	\$410,804	\$507,000
Estimate Prior to Escalation	\$168,000	\$1,211,742	\$2,051,549	\$2,693,051	\$3,313,764
Escalate to July 2022 ~ 10%	\$17,000	\$121,174	\$205,155	\$269,305	\$336,000
<b>Estimated Base Bid Cost</b>	<b>\$185,000</b>	<b>\$1,332,916</b>	<b>\$2,256,703</b>	<b>\$2,962,356</b>	<b>\$3,649,764</b>
ALT 1: Great Hall Audiovisual	\$0	\$0	\$0	\$0	\$365,000
ALT 2: Great Hall Event Lighting	\$0	\$0	\$0	\$0	\$49,400
ALT 3: Exterior Facade Lighting	\$0	\$0	\$0	\$0	\$23,900
ALT 4: Improve HCAP Parking	\$0	\$0	\$0	\$0	\$95,900
<b>Estimated Bid Cost for July 2022</b>	<b>\$185,000</b>	<b>\$1,332,916</b>	<b>\$2,256,703</b>	<b>\$2,962,356</b>	<b>\$4,183,964</b>
Contingency, A/E Fees, Misc. Exp.	\$65,000	\$467,084	\$743,297	\$837,644	\$616,036
<b>Estimated Project Cost for July 2022</b>	<b>\$250,000</b>	<b>\$1,800,000</b>	<b>\$3,000,000</b>	<b>\$3,800,000</b>	<b>\$4,800,000</b>

Further Escalation post July 2022	TBD	TBD	TBD	TBD	TBD
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**NOTES:**

- 1) Option Five represents the project as estimated by CHA Consulting on 8/23/2021 per design documents.
- 2) Costs for Options One thru Four conceptually determined by Architect from CHA Consulting's information.
- 3) Option One excludes General Contractor's associated costs (Gen Cond, Burdens, Markups).
- 4) Alternates 1 through 4 assigned only to Option Five but could be applied to any except Option One.
- 5) Further escalation beyond July 2022 reserved for when decisions are made about project timing.

*Preliminary Project Budget - Five Options  
Mills Whitaker Architects - 1 August 2022*

**CHA**  
**Stow Town Hall Restoration**  
**375 Great Road**  
**Stow, MA**

**August 23, 2021**

**Construction Document Estimate**



**Architect:**  
Mills Whitaker Architects LLC  
P O Box 750089  
Arlington, MA 02475  
(617) 876 7611

**Cost Consultant:**  
CHA Consulting, Inc.  
1 Faneuil Hall Marketplace  
South Market Bldg, 3rd Floor  
Boston, MA 02109  
(617) 451 2717

*Construction Cost Estimate*  
*CHA Consulting - 23 August 2021*



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Stow Town Hall Restoration  
Stow, MA

**Project Description:**

Rehabilitation of the historic Stow Town Hall includes making building handicap accessible, replacement of electrical and mechanical systems, improve life safety and enhance facility usability

Stow Town Hall is a wood framed 2-story 5,833gsf building

Scope of work has been allocated to four cost centers;

- Building System Upgrades

- Accessibility Requirements

- Improve Support Facilities

- Site and Building Restoration and Repairs

**Project Particulars:**

Pricing Set Drawings and Project Manual dated July 1, 2021 prepared by Mills Whitaker Architects

Design Team clarifications and supplemental information during estimating production period

Detailed quantity takeoffs where possible from design package documents

CHA Consulting experience with similar projects of this nature

Design intent and scope review discussions with Mills Whitaker, and their Consultant Design Team

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Stow Town Hall Restoration CD Aug 23  
Printed 8/23/2021

Project Scope  
Page 2 of 34 Pages

*Construction Cost Estimate  
CHA Consulting - 23 August 2021*



Stow Town Hall Restoration  
Stow, MA

**COST CENTER SUMMARY**

ELEMENT	BUILDING SYSTEMS	ACCESSIBILITY	SUPPORT FACILITIES	RESTORATION
1.a. Insulate Building Envelope	\$312,625			
1.b. Roof Structure Reinforcement	\$438,668			
1.c. Replace HVAC System	\$425,980			
1.d. Exterior VRF Equipment	\$58,820			
1.e. Upgrade Electrical Systems	\$335,786			
1.f. Window Restoration	\$128,974			
2.a. New LULA		\$204,960		
2.b. Reconstruct Ell Stairs		\$42,341		
2.c. New Accessible Ramp to Stage		\$32,054		
2.d. Replace Interior Doors		\$136,998		
2.e. Replace Fire Alarm		\$77,772		
2.f. Expand Restrooms		\$122,713		
2.g. Repair Front Entrance		\$80,373		
2.h. Upgrade Accessible Parking Space		\$95,900		
3.a. Upgrade Entrance to Ground Floor			\$12,921	
3.b. Accessible Kitchenette			\$14,599	
3.c. Audiovisual System in Great Hall			\$365,000	
3.d. Event Performance Lighting in Great Hall			\$49,400	
3.e. Storage Room in Great Hall			\$4,018	
3.f. Two New Meeting Rooms			\$10,454	
3.g. Larger Office for Historical Commission			\$21,005	
3.h. Large Storage Room in Ground Floor			\$6,077	
3.i. Two New Custodial Closets			\$5,050	
3.j. Reconfigure Balcony Level Seating			\$10,465	
3.k. AV Equipment Control Area in Balcony			\$4,500	
4.a. Replace Ramp At 1895 With Accessible Walkway				\$28,358
4.b. Remove Exterior Fire Escape				\$13,600
4.c. Remove Ramp to Lower Level				\$15,565
4.d. Reconstruct Stone Retaining Wall				\$38,335
4.e. Address Ongoing Water Infiltration				\$255,319
4.f. Reconfigure Front Entrance Site Area				\$381,392
4.g. Enhanced Exterior Lighting				\$23,900
4.h. Restoration Embossed Tin Ceiling				\$26,865
4.i. Restoration other than Cost Centers listed above				\$403,177
<b>Estimated Construction Cost Total</b>	<b>\$1,700,853</b>	<b>\$793,111</b>	<b>\$503,488</b>	<b>\$1,186,511</b>
<b>MASTER PLAN TOTAL</b>	<b>\$4,183,963</b>			

Stow Town Hall Restoration CD Aug 23  
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Cost Center Analysis  
Page 3 of 34 Pages

*Construction Cost Estimate  
CHA Consulting - 23 August 2021*





Stow Town Hall Restoration  
Stow, MA

**Project Assumptions:**

Conventional Design/Bid/Build process  
Bidding procedures and award of the trade contracts shall be in accordance with the provisions of Commonwealth of Massachusetts General Laws Chapter 149, including Filed Sub-Bids  
The project will be built by a General Contractor under a single prime contract  
The Total Estimated Construction Cost reflects the fair construction value of this project in a competitive bidding market and includes cost escalation to cover the construction duration  
Our costs assume that there will be at least three subcontractors submitting unrestricted bids in each trade bid category  
Direct trade unit rates include escalation to mid-point of construction duration and prevailing wage labor rates. These unit rates continue to be updated during the design period  
Entire building will be vacant during construction  
Lay-down/storage area, jobsite shed and trailers, and construction entrance will be located adjacent to Project area  
Operation during normal working hours  
Noise and vibration disturbances are anticipated and will be minimized or avoided during normal business hours  
Subcontractor's markups are included in each unit rate. These markups cover field and home office overhead and subcontractor's profit  
Design and Pricing Contingency markup is an allowance for unforeseen design issues, design detail development and specification clarifications during the design period. This allowance typically reduces during the design period, to more accurately reflect the designed scope of work progress  
General Conditions covers supervision, general facilities to support this project, and site office overhead that is not attributable to the direct trade costs  
Project Requirements covers scaffolding, staging and access, temporary protection, temporary egress, noise and dust control, and cleaning  
Anticipated start of construction is July 1, 2022 for 11½ months duration and completion June 15, 2023  
Escalation allowance from now to anticipated start of construction has been carried at a rate of 5% per year in the Main Summary

**Construction Cost Estimate Exclusions:**

Unforeseen Conditions Contingency  
Work beyond the boundary of the site  
Site or existing condition surveys and investigations  
Architectural/Engineering; Designer and other Professional fees, testing, printing, surveys and investigations  
Owner's administration, legal fees, advertising, permitting, Owner's insurance, interest expense, site representation, project administration  
Project costs; utility company back charges prior to construction, construction of swing space and temporary facilities, program related phasing, relocation  
Owner furnished and installed products; computer networking, desks, chairs, furnishings, equipment, artwork, loose case goods and other similar items  
Third Party testing and commissioning  
Building permit fees

*Construction Cost Estimate  
CHA Consulting - 23 August 2021*



Stow Town Hall Restoration  
Stow, MA  
5,833 GSF

MAIN SUMMARY

ELEMENT		BUILDING SYSTEMS	ACCESSIBILITY	SUPPORT FACILITIES	RESTORATION	TOTAL	COST/SF
Direct Trade Details		\$1,246,853	\$473,811	\$99,488	\$852,611	\$2,672,764	\$458.21
Design and Pricing Contingency	5.00%	\$62,000	\$24,000	\$5,000	\$43,000	\$134,000	\$22.97
<b>Direct Trade Cost Total</b>		<b>\$1,308,853</b>	<b>\$497,811</b>	<b>\$104,488</b>	<b>\$895,611</b>	<b>\$2,806,764</b>	<b>\$481.19</b>
Burdens and Markups							
General Conditions, Project Requirements, Overhead	12 MTH	\$151,000	\$57,000	\$12,000	\$103,000	\$323,000	\$55.37
Performance and Payment Bonds	0.70%	\$9,000	\$3,000	\$1,000	\$6,000	\$19,000	\$3.26
Insurance	1.25%	\$22,000	\$9,000	\$2,000	\$15,000	\$48,000	\$8.23
Police Details, Street/Sidewalk Permits	0.50%	\$9,000	\$4,000	\$1,000	\$6,000	\$20,000	\$3.43
Profit	3.00%	\$45,000	\$17,000	\$4,000	\$31,000	\$97,000	\$16.63
<b>Estimated Construction Cost Total</b>		<b>\$1,544,853</b>	<b>\$587,811</b>	<b>\$124,488</b>	<b>\$1,056,611</b>	<b>\$3,313,764</b>	<b>\$568.11</b>
Escalation Allowance to Start of Construction	4.58%	\$71,000	\$27,000	\$6,000	\$48,000	\$152,000	\$26.06
<b>Estimated Construction Cost Total</b>		<b>\$1,700,853</b>	<b>\$647,811</b>	<b>\$138,488</b>	<b>\$1,162,611</b>	<b>\$3,649,764</b>	<b>\$625.71</b>
Alternates							
Audiovisual System in Great Hall		\$0	\$0	\$365,000	\$0	\$365,000	\$62.58
Great Hall Event Lighting and Controls		\$0	\$49,400	\$0	\$0	\$49,400	\$8.47
Upgrade Illumination of Exterior Façade		\$0	\$0	\$0	\$23,900	\$23,900	\$4.10
Improve Crescent Street Accessible Parking and Route		\$0	\$95,900	\$0	\$0	\$95,900	\$16.44
<b>Estimated Construction Cost at Bid Opening</b>		<b>\$1,700,853</b>	<b>\$793,111</b>	<b>\$503,488</b>	<b>\$1,186,511</b>	<b>\$4,183,964</b>	<b>\$717.29</b>

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Main Summary  
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Construction Cost Estimate  
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Stow Town Hall Restoration  
Stow, MA  
5,833 GSF

STH COSTS\_Page\_07.jpg

**DIRECT TRADE COST SUMMARY**

ELEMENT	Filed Sub-Bid	BUILDING SYSTEMS	ACCESSIBILITY	SUPPORT FACILITIES	RESTORATION	TOTAL	COST/SF
02 41 00 Demolition		\$108,899	\$18,054	\$10,511	\$88,407	\$225,871	\$38.72
02 82 00 Asbestos Remediation					\$40,000	\$40,000	\$6.86
<b>02 EXISTING CONDITIONS</b>		<b>\$108,899</b>	<b>\$18,054</b>	<b>\$10,511</b>	<b>\$128,407</b>	<b>\$265,871</b>	<b>\$45.58</b>
03 30 00 Cast-In-Place Concrete		\$28,125	\$7,625		\$23,415	\$59,165	\$10.14
<b>03 CONCRETE</b>		<b>\$28,125</b>	<b>\$7,625</b>		<b>\$23,415</b>	<b>\$59,165</b>	<b>\$10.14</b>
04 43 00 Stone Masonry		\$6,000	\$8,755		\$73,175	\$87,930	\$15.07
<b>04 43 00 Stone Masonry Total</b>		<b>\$6,000</b>	<b>\$8,755</b>		<b>\$73,175</b>	<b>\$87,930</b>	<b>\$15.07</b>
05 12 23 Structural Steel for Buildings		\$53,375	\$19,400		\$21,000	\$74,375	\$12.75
05 50 00 ***Metal Fabrications	\$27,400	\$53,375	\$19,400		\$8,000	\$27,400	\$4.70
<b>05 METALS</b>					<b>\$29,000</b>	<b>\$101,775</b>	<b>\$17.45</b>
06 00 00 Carpentry		\$112,023	\$131,603	\$25,501	\$20,056	\$289,184	\$49.58
<b>06 WOODS, PLASTICS, &amp; COMPOSITES</b>		<b>\$112,023</b>	<b>\$131,603</b>	<b>\$25,501</b>	<b>\$20,056</b>	<b>\$289,184</b>	<b>\$49.58</b>
07 00 00 Waterproofing and Sealants		\$46,273	\$2,805		\$42,683	\$45,488	\$7.80
07 21 19 Foam-in-Place Insulation		\$1,630		\$1,630	\$2,500	\$48,773	\$8.36
07 46 23 Wood Siding		\$47,904	\$2,805	\$1,630	\$50,183	\$8,260	\$1.42
<b>07 THERMAL &amp; MOISTURE PROTECTION</b>						<b>\$102,522</b>	<b>\$17.58</b>
08 10 00 Doors, Frames and Hardware			\$54,930	\$4,031	\$1,921	\$60,882	\$10.44
08 50 00 Windows		\$68,184		\$3,000		\$72,184	\$12.38
<b>08 OPENINGS</b>		<b>\$68,184</b>	<b>\$54,930</b>	<b>\$7,031</b>	<b>\$1,921</b>	<b>\$133,065</b>	<b>\$22.81</b>
09 21 16 Gypsum Board Assemblies		\$61,421	\$25,244	\$12,161	\$34,724	\$133,550	\$22.90
09 30 00 Tiling			\$7,040			\$7,040	\$1.21
09 51 13 Acoustical Panel Ceilings			\$1,656	\$775	\$405	\$2,836	\$0.49
09 50 00 Specialty Ceilings					\$102,637	\$102,637	\$17.60
09 64 00 Wood Flooring			\$3,284	\$11,645	\$27,679	\$42,608	\$7.30
<b>09 65 00 Flooring</b>			<b>\$568</b>		<b>\$1,079</b>	<b>\$1,647</b>	<b>\$0.28</b>

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Direct Trade Cost Summary  
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Construction Cost Estimate  
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Stow Town Hall Restoration  
Stow, MA  
5,833 GSF

STH COSTS\_Page\_08.jpg

**DIRECT TRADE COST SUMMARY**

ELEMENT	Filed Sub-Bid	BUILDING SYSTEMS	ACCESSIBILITY	SUPPORT FACILITIES	RESTORATION	TOTAL	COST/SF
09 00 00 ***Painting and Coating							
09 FINISHES	\$151,880	\$90,713 \$152,134	\$18,784 \$56,575	\$5,581 \$30,162	\$36,803 \$203,327	\$151,880 \$442,197	\$26.04 \$75.81
10 00 00 Specialties		\$2,100	\$6,440	\$350	\$3,717	\$12,607	\$2.16
10 SPECIAL TIES		\$2,100	\$6,440	\$350	\$3,717	\$12,607	\$2.16
11 00 00 Equipment				\$5,000	\$4,000	\$9,000	\$1.54
11 EQUIPMENT				\$5,000	\$4,000	\$9,000	\$1.54
14 26 00 ***LU/LA Elevator			\$65,000			\$65,000	\$11.14
14 CONVEYING EQUIPMENT			\$65,000			\$65,000	\$11.14
22 00 00 ***Plumbing		\$29,850	\$38,360	\$6,310	\$855	\$75,375	\$12.92
22 PLUMBING		\$29,850	\$38,360	\$6,310	\$855	\$75,375	\$12.92
23 00 00 ***HVAC		\$360,610				\$360,610	\$61.82
23 HEATING, VENTILATING & AIR CONDITIONING		\$360,610				\$360,610	\$61.82
26 00 00 ***Electrical		\$215,475	\$59,447	\$12,873		\$287,795	\$49.34
27-Communications & Low Voltage		\$10,194		\$120		\$10,314	\$1.77
28 Security & CCTV							
26 ELECTRICAL	\$298,109	\$225,669	\$59,447	\$12,993		\$298,109	\$51.11
31 20 00 Earthwork		\$28,356	\$3,617		\$153,279	\$185,253	\$31.76
31 EARTHWORK		\$28,356	\$3,617		\$153,279	\$185,253	\$31.76
32 10 00 Paving and Surfacing					\$58,714	\$58,714	\$10.07
32 30 00 Site Improvements		\$18,125			\$46,333	\$64,458	\$11.05
32 90 00 Planting					\$20,300	\$20,300	\$3.48
32 EXTERIOR IMPROVEMENTS		\$18,125			\$125,347	\$143,472	\$24.60
33 30 00 Sanitary Sewerage			\$1,200			\$1,200	\$0.21

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Direct Trade Cost Summary  
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Construction Cost Estimate  
CHA Consulting - 23 August 2021



Stow Town Hall Restoration  
Stow, MA  
5,833 GSF

**DIRECT TRADE COST SUMMARY**

ELEMENT	Filed Sub-Btd	BUILDING SYSTEMS	ACCESSIBILITY	SUPPORT FACILITIES	RESTORATION	TOTAL	COST/SF
33 40 00 Storm Drainage					\$35,930	\$35,930	\$6.16
36 00 00 Site Electrical Support		\$4,500				\$4,500	\$0.77
33 UTILITIES		\$4,500	\$1,200		\$35,930	\$41,630	\$7.14
Direct Trade Cost Summary	\$978,374	\$1,246,853	\$473,811	\$99,488	\$852,611	\$2,672,764	\$458.21

Construction Cost Estimate  
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STH COSTS\_Page\_09.jpg

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Direct Trade Cost Summary  
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Stow Town Hall Restoration  
Stow, MA  
\$,833 GSF

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION QUANTITY	COST	COST CODES
10	02 EXISTING CONDITIONS											
11	02 41 00 Demolition											
12	General Demolition											
14	G05 - remove steps to stair door, roof canopy	LOC	\$3,500.00					1	\$3,500			3.a
15	G06 - Remove appliances	MHR	\$95.00					1	\$95			3.b
16	G07 - Remove counters and cabinets	MHR	\$95.00					8	\$760			3.b
17	G08 - Remove fire escape stairs, brackets, foundations, exit door, frame and hardware	LS	\$10,000.00							1	\$10,000	4.b
18	G09 - Remove coat hooks and wood trim to which hooks are attached	MHR	\$95.00							1	\$95	4.i
19	G10 - Remove stair handrails and guards either side of stage	MHR	\$95.00			10	\$950					2.c
20	G11 - Salvage for reinstall boot scrapers at each side of historic entrance	MHR	\$95.00			2	\$190					2.g
21	Remove Guard Rail at Quilt (A-14)	MHR	\$95.00			3	\$285					2.c
22	Associated Works with Removal of Restrooms on 1st Floor	RMS	\$1,500.00			2	\$3,000					2.f
23	Remove Angled Projection Screen (A-14)	MHR	\$95.00					1	\$95			3.c
24	Remove Aluminum Ladder & Assoc. clips at floor & wall (1/A-12.1)	MHR	\$95.00							1	\$95	4.i
26	Remove Chimney (1/A-12.0)	LS	\$10,000.00	1	\$10,000							1.c
26	Remove 2x WD Blocks at chair leg supports (2/A-12.0)	MHR	\$95.00					1	\$95			3.i
27	Remove AV Cabinet & Equipment not claimed by owner (2/A12.0)	MHR	\$95.00					4	\$380			3.c
28												
29	Door Demolition											
30	D01 - Remove door, frame & hardware for enlarged opening	LEAF	\$125.00			4	\$500					2.d
31	D02 - Remove door, frame & hardware for infill opening	LEAF	\$100.00			4	\$400					2.d
32	D03 - Remove door, frame & hardware	LEAF	\$100.00			8	\$800					2.d
33	D04 - Remove door opening and assoc. frame (note - door is missing)	OPEN	\$65.00			4	\$260					2.d
34	D05 - Remove door, hardware and interior casings; retain frame and exterior casings for clapboard exterior wall infill	OPEN	\$600.00					1	\$600			3.a
35	D06 - Remove door, frame & hardware to be reframed for new window opening	LEAF	\$100.00			1	\$100					2.d
36	D07 - Remove door, frame & hardware for reframe opening for as new accessibility entrance	LEAF	\$100.00							1	\$100	4.a
37												
38	Partition Demolition											
39	P01 - Temp shoring, remove N/S Wall at mid point of 1895 addition; assume wall is providing intermediate support for continuous E/W 2x8 joist framing at 1st floor / attic	SF	\$13.36			228	\$3,046					2.a
40	P01 - Temp shoring, remove N/S Wall at mid point of 1895 addition; assume wall is providing intermediate support for continuous E/W 2x8 joist framing at 1st floor / attic	SF	\$13.36					60	\$802			3.b

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ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	ACCESSIBILITY QUANTITY	SUPPORT FACILITIES QUANTITY	RESTORATION		COST CODES
							QUANTITY	COST	
								\$,833 GSF	
41	P02 - Temp shoring, remove E/W wall between steel beam and foundation at demising of 1848 / 1895 addition, assume wall is providing supplemental support of original exterior	SF	\$13.36				108	\$1,443	4.e
42	P02 - Temp shoring, remove E/W wall between steel beam and foundation at demising of 1848 / 1895 addition, assume wall is providing supplemental support of original exterior	SF	\$13.36				48	\$641	4.i
43	P03 - Remove interior partitions where indicated. Retain any support posts within walls	SF	\$6.08		40			\$243	2.f
44	P03 - Remove interior partitions where indicated. Retain any support posts within walls	SF	\$6.08			315		\$1,915	3.b
45	P03 - Remove interior partitions where indicated. Retain any support posts within walls	SF	\$6.08				120	\$730	4.i
46	P04 - Remove storage closets and turning to expose studs at exterior wall of addition	SF	\$5.00	40					1.a
47	P05 - Remove plaster and wood lath to expose stud wall framing, salvage trim for reuse	SF	\$7.50	1,058					1.a
48	P05 - Remove plaster and wood lath to expose stud wall framing, salvage trim for reuse	SF	\$7.50	306					1.a
49	P06 - Remove bearing walls adjacent to stairs	SF	\$16.70		96			\$1,603	2.a
50	P06 - Remove bearing walls adjacent to stairs	SF	\$16.70		72			\$1,202	2.a
51	P07 - Remove plaster, lath and wood studs to expose North stone foundation wall	SF	\$12.11				168	\$2,034	4.c
52	P08 - Remove plaster and lath, salvage wainscoting (base, boards, chair rail) expose wood studs	SF	\$13.36	1,064					1.a
53	P08 - Remove plaster and lath, salvage wainscoting (base, boards, chair rail) expose wood studs	SF	\$13.36	27					1.a
54	P09 - Remove portion of wall and lower floor curb for flush floor at passage doorway	SF	\$8.00				112	\$896	4.c
55	P09 - Remove portion of wall and lower floor curb for flush floor at passage doorway	SF	\$8.00				27	\$216	4.c
56	P10 - Remove partial height storage closets, shelves, wall cleats, doors, frames and hardware, remove projection screen and associated supports	MHR	\$95.00			5		\$475	3.e
57	P11 - Remove paneling and furred wall to expose original concealed wall; remove concealed wall finishes to expose wood studs	SF	\$5.00	352					1.a
59	Ceiling Demolition								
60	C01 - Remove plaster, wood lath, strapping and MEP components	SF	\$13.32	1,710					1.a
61	C02 - Remove acoustical ceiling components and MEP components	SF	\$2.50				297	\$743	4.i
62	C03 - Remove plaster, wood lath, strapping and MEP components	SF	\$13.32	2,554					1.b
63	C03 - Remove plaster, wood lath, strapping and MEP components	SF	\$13.32				463	\$6,187	4.i
64	C04 - Salvage tin ceiling to extent required for re-use	SF	\$7.48				82	\$613	4.h
65	C04 - Salvage tin ceiling to extent required for re-use	SF	\$6.50				386	\$2,507	4.h

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ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS		ACCESSIBILITY		SUPPORT FACILITIES		RESTORATION		COST CODES
				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
66	C05 - Remove gypsum wallboard, soffit trim, strapping, framing & MEP components	SF	\$10.00		\$220	22	\$220					2.f
67	C06 - Remove strapping from floor joists in area where ceiling was previously removed	SF	\$5.00		\$1,395	279	\$1,395					2.f
68	C06 - Remove strapping from floor joists in area where ceiling was previously removed	SF	\$5.00							164	\$820	4.i
69	C07 - Remove ceiling joists to provide access to roof framing for reinforcement	SF	\$5.00	2,030	\$10,150							1.b
70												
71	Flooring Demolition											
72	F01 - remove wood framed flooring assembly, det 2.0VA-10.0	SF	\$6.50							1,384	\$8,986	4.e
73	S02 - remove "rat" slab	SF	\$5.00							326	\$1,630	4.e
74	F02 - Remove wood stairs, framing and handrails	FLT	\$1,500.00		\$3,000	2	\$3,000					2.a
75	F03 - Remove ceramic tile and substrate materials to original subfloor below	SF	\$7.50					85	\$638			3.b
76	F04 - Remove carpet, pad, staples and tack strips to expose wood flooring below	SF	\$3.00							218	\$654	4.i
77	F04 - Remove carpet, pad, staples and tack strips to expose wood flooring below (110)	SF	\$3.00					91	\$273			3.e
78	F04 - Remove carpet, pad, staples and tack strips to expose wood flooring below (112)	SF	\$3.00					181	\$543			3.f
79	F05 - Remove maple flooring overlay and maple below to original subfloor	SF	\$10.00							71	\$710	4.i
80	Selective demolition, generally	GSF	\$1.00							5,833	\$5,833	4.i
81												
82	Cart, haul out, and disposal of demo debris	CY	\$50.00	104	\$5,186							1.a
83	Cart, haul out, and disposal of demo debris	CY	\$50.00		\$980	17	\$980					2.d
84	Cart, haul out, and disposal of demo debris	CY	\$50.00									3.e
85	Cart, haul out, and disposal of demo debris	CY	\$50.00					10	\$501	45	\$2,247	4.i
86												
87	Exterior Demolition, L-01											
88	Replace Ramp At 1895											
89	R&D concrete ramp	SF	\$20.00							343	\$6,860	4.a
90	R&D wood ramp	SF	\$25.00							205	\$5,125	4.a
91	R&D concrete ramp at E1	SF	\$20.00							266	\$5,320	4.c
92	Reconfigure front entrance											
93	R&D tree, grind stump	EA	\$1,800.00							3	\$5,400	4.f
94	R&D vegetation, clear and grub	SF	\$5.00							857	\$4,285	4.f
95	Salvage existing pavement	LF	\$12.00							66	\$792	4.f
96	R&S granite steps	LF	\$25.00							43	\$1,075	4.f
97	R&D asphalt pavement	SF	\$1.50							802	\$903	4.f
98	R&S stone wall where salvageable	LF	\$250.00							22	\$5,500	4.f
99	R&S granite curbing	LF	\$20.00							134	\$2,680	4.f
100	R&S granite pods	EA	\$175.00							2	\$350	4.f
101	R&D ramp handrails	LF	\$10.00							41	\$410	4.f

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102	R&D fencing	LF	\$10.00							44	\$440	4.f
103	R&S site signage	LS	\$1,000.00							1	\$1,000	4.f
104	R&S light post	EA	\$525.00							1	\$525	4.f
105	R&S cobbles	SF	\$1.50							205	\$308	4.f
106	R&D air tank	EA	\$350.00							1	\$350	4.f
107	02 41 00 Demolition Total				\$108,899		\$18,054		\$10,511		\$98,407	
108												
109	02 82 00 Asbestos Remediation											
110	Asbestos Abatement, Budget provided	AL	\$20,000.00							1	\$20,000	4.i
111	Lead Paint Removal	AL	\$20,000.00							1	\$20,000	4.i
112	02 82 00 Asbestos Remediation Total				\$0		\$0		\$0		\$0	
113												
114												
115	03 CONCRETE											
116												
117	03 30 00 Cast-In-Place Concrete											
118	Foundation work for reinforcing roof structure											
119	Slab thickening, 3' 0" - 7' 9" long, 3-#5 1-b	EA	\$2,625.00	5	\$13,125							1.b
120	Underpinning at existing column footing, 4' 0" sq. Note "A" - remove and replace footing similar cost to underpinning	EA	\$5,000.00	3	\$15,000							1.b
121	New LULA elevator											
122	Mat slab 15" thick, #5@8"oc 1-b, ew, x100sf	CY	\$475.00	5	\$2,375							2.a
123	Pt wall 10" thick x2' 11" high, #4@12"oc dowels, #4@12"oc h ef, x60sf	CY	\$1,750.00	3	\$5,250							2.a
124	Slab on grade - included in 4.e.											2.a
125	Address Ongoing Water Infiltration, det 2.1(A-10.0											
126	Slab on grade, 4" thick, reinf., 2" rigid insulation, vapor barrier at Utility Area	SF	\$7.50							1,384	\$10,380	4.e
127	Pre-molded expansion joint filler at perimeter of new slab	SF	\$7.50							326	\$2,445	4.e
128	F3.0 column spread footing, 36x36x15, #4@5"oc ew b	LF	\$10.00							159	\$1,590	4.e
129	03 30 00 Cast-In-Place Concrete Total	EA	\$1,500.00							6	\$9,000	4.e
130					\$28,125		\$7,625		\$0		\$23,415	
131												
132												
133	04 MASONRY											
134												
135	04 43 00 Stone Masonry											
136	Improve retaining wall at neighbors shed	LF	\$500.00	12	\$6,000							1.d
137	New retaining wall @ front entrance	LF	\$500.00							90	\$15,000	4.f
138	Reset existing granite steps at front entrance	SF	\$95.00			103	\$8,755					2.g
139	Rebuild site stone retaining wall at H/Cap Entry +234.75 det 4.S-2.2											
140	Deeply cut and re-point existing retaining wall prior to rebuilding the retaining wall portion	SF	\$30.00							102	\$3,063	4.d
141	Carefully remove stone retaining wall, salvage stone for reuse	CFT	\$20.00							238	\$4,763	4.d

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				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
142	Carefully excavate soil by hand, stockpile for re-use	CY	\$43.75							27	\$1,179	4.d
143	Compacted base material as wall platform, 6" thick	CY	\$75.00							3	\$214	4.d
144	Geogrid soil reinforcement at every stone course, assume 15% laps	SF	\$7.50							1,032	\$7,737	4.d
145	Filter fabric strip at every stone course	LF	\$5.00							207	\$1,035	4.d
146	Salvage stone from stockpile, re-set stone wall, fully-mortared	CFT	\$25.00							238	\$5,950	4.d
147	Excavate soil stockpile, backfill behind new stone wall, compacted in 6" lifts	CY	\$65.63							27	\$1,768	4.d
148	Crushed stone surround behind stone wall, 12" thick, compacted in 6" lifts	CY	\$75.00							7	\$492	4.d
149	Concrete curb/cap, #5 rebar, stainless steel pins, drill stone unit and adhesive-set pins	LF	\$200.00							10	\$2,000	4.d
150	Address Ongoing Water Infiltration, det 2.1/A-10.0											
151	Exterior repointing of granite wall base at entire perimeter of building	SF	\$30.00							580	\$18,600	4.e
152	Repoint interior of North rubble wall at Ground Floor	SF	\$25.00							258	\$6,438	4.e
153	at Utility Area	SF	\$25.00							150	\$3,750	4.e
154	04 43 00 Stone Masonry Total				\$6,000				\$8,755		\$0	
155												
156												
157	05 METALS											
158												
159												
160	05 12 23 Structural Steel for Buildings											
161	Reinforce roof structure	EA	\$750.00	24	\$18,000							1.b
162	Set of (5) 1/2" steel plates as custom-made face-mount hanger screwed to purlin, det 7/IS-3.2	EA	\$6,700.00	2	\$13,400							1.b
163	TS4; HSSS4x4x5/16 column, base plate, (4) adhesive anchors, leveling nuts, non-shrink grout, epoxy coating	EA	\$6,700.00	3	\$20,100							1.b
164	TS4 at Node "A"	LOC	\$625.00	3	\$1,875							1.b
165	3/8" stiffener plate to steel beam both sides											
166	Address Ongoing Water Infiltration, det 2.1/A-10.0											
167	Remove column, replace with 3" dia X-Strong pipe column	EA	\$3,900.00							6	\$21,000	4.e
168	05 12 23 Structural Steel for Buildings Total				\$53,375				\$0		\$21,000	
169	05 50 00 ***Metal Fabrications											
170	Elevator pit ladder, sill angles, hoist beam	SET	\$6,500.00	1	\$6,500							2.a
171	Guard wall @42" at Attic landing for EII stair	LOC	\$1,500.00	1	\$1,500							2.b
172	New ramp guard, newels, handrail, wall mounted handrail at Stage; assume metal	LF	\$225.00	48	\$10,800							2.c
173	Repair and reinstall boot scrapers at each side of historic entrance	MHR	\$150.00	4	\$600							2.g
174	Guardrail at EII entrance	LS	\$8,000.00							1	\$8,000	4.a
175	05 50 00 ***Metal Fabrications Total				\$0				\$19,400		\$0	
176												
177												

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5,833 GSF												
100 WOODS, PLASTICS, & COMPOSITES												
177												
178												
179	06 00 00 Carpentry											
180	06 10 00 Rough Carpentry											
181	Reinforce roof structure											
182	2-1 3/4x7 1/2 LVL x11' 6" long sistered to purlin both sides	EA	\$733.70	20	\$14,674							1.b.
183	1 3/4x4 1/2 LVL x5' 6" long sistered to rafters@2' 6" oc	EA	\$61.15	120	\$7,338							1.b.
184	(2) LVL cleat and 2x8 blocking at eave, det 8/5-3.2	LF	\$92.52	115	\$10,640							1.b.
185	1/2" plywood subfloor at Attic	SF	\$5.00	371	\$1,855							1.b.
186	Remove board sheathing, replace whine (2) 3/4" plywood sheathing	SF	\$12.50	2,030	\$25,380							1.c.
187	P1, 3/8x5 1/2 PSL post, corner post	EA	\$801.15	15	\$9,017							1.b.
188	P2, 3/8x9 1/2 PSL post, corner post	EA	\$675.95	1	\$676							1.b.
189	2-2x4 post	EA	\$175.18	1	\$175							1.b.
190	4-2x4 post at H1 opening	EA	\$205.88	4	\$824							1.b.
191	2x4 strongback	EA	\$750.00	1	\$750							1.b.
192	2-2x4 king stud	EA	\$175.18	1	\$175							1.b.
193	2-2x4 jack stud	EA	\$87.59	2	\$175							1.b.
194	BWAP 13, 2x6 stud bearing wall, assume sheathing both sides	SF	\$13.00	196	\$2,548							1.b.
195	2-1 3/4x7 1/2 LVL header x5' 6" long	EA	\$683.10	1	\$683							1.b.
196	3/8x8 1/2 LVL lintel x4' 6" long	EA	\$738.10	1	\$738							1.b.
197	5/8x9 1/2 PSL lintel x7' 9" long	EA	\$913.89	1	\$914							1.b.
198	5/8x8 1/2 PSL lintel x11' 4" long	EA	\$2,025.38	1	\$2,025							1.b.
199	5/8x8 1/2 PSL lintel x25' 6" long	EA	\$2,886.88	2	\$5,734							1.b.
200	B1-2, B1-3, assume 3/8x9 1/2 LVL	EA	\$738.10	2	\$1,476							1.b.
201	H1, 2-2x10 header x4' 8" long	EA	\$688.09	2	\$1,386							1.b.
202	2x6@24" oc rafter ties	SF	\$11.49	147	\$1,689							1.b.
203	New LULA elevator											
204	P1, 3/8x5 1/2 PSL post, corner post	EA	\$801.15			2	\$1,202					2.a.
205	P2, 3/8x9 1/2 PSL post, corner post	EA	\$675.95			8	\$5,408					2.a.
206	4-2x4 post at header opening	EA	\$205.88			1	\$206					2.a.
207	1 3/4x7 1/2 LVL ledger x7' long	EA	\$930.30			6	\$3,782					2.a.
208	1 3/4x9 1/2 LVL ledger x7' long	EA	\$857.80			2	\$1,316					2.a.
209	2-1 3/4x7 1/2 LVL x3' 6" long	EA	\$774.88			1	\$775					2.a.
210	2-1 3/4x9 1/2 LVL x10' long	EA	\$882.48			1	\$882					2.a.
211	3/8x11 1/2 LVL x8' 4" long	EA	\$922.08			1	\$922					2.a.
212	1 3/4x9 1/2 LVL@12" oc floor framing	SF	\$18.43			98	\$1,806					2.a.
213	New floor framing east of LULA, assume 1 3/4x9 1/2 LVL@12" oc	SF	\$18.43			91	\$1,677					2.a.
214	2x8@12" oc floor framing at Machine Room	SF	\$14.62			50	\$731					2.a.
215	Over framing to match adjacent floor elevation	SF	\$21.19			11	\$233					2.a.
216	New accessible ramp and extension to Stage											
217	Temp shoring at timber beam	LOC	\$1,100.00			1	\$1,100					2.c.

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				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
5,833 GSF												
218	Sister timber beam where 2-1 3/4x7 1/2 LVL x10' long per location both sides	LOC	\$1,239.01			1	\$1,239					2.c
219	J1, 1 3/4x5 1/2 LVL @20' oc added within air first floor framing	SF	\$26.37			207	\$5,459					2.c
220	Over-frame stage extension where LVLs, rip-to-fit	SF	\$17.14			161	\$2,760					2.c
221	3/4" plywood subfloor sheathing, det 4 1/A-14	SF	\$5.00			161	\$805					2.c
222	Modify Ell entry at 1895 porch, dwg A-17	LOC	\$1,500.00							1	\$1,500	4.a
223	Temp shoring of porch pilaster	LOC	\$650.00							3	\$1,950	4.a
224	New 11 1/2" sq. base extension	SF	\$50.00							42	\$2,109	4.a
225	New wood framed entry deck											
226												
227	Wood Stud/Partition Framing											
228	Reinstall salvaged trim	MHR	\$125.00	16	\$2,000							1.a
229	Lower floor curb reframe for flush floor at passage doorway	SF	\$15.00							64	\$960	4.e
230	Enlarge and reframe existing door opening	OPEN	\$1,100.00			4	\$4,400					2.d
231	Infill former door opening to match adjacent surfaces	OPEN	\$500.00			4	\$2,000					2.d
232	Reframe former door opening for new window to match adjacent	OPEN	\$750.00			1	\$750					2.d
233	Reframe opening for accessible entrance door, lower stoop, modify former door opening	EA	\$500.00							1	\$500	4.a
234	Reinstall exterior casings for clapboard exterior wall infill as detailed	OPEN	\$500.00									3.a
235	P.04 - 2x4 wood stud exterior return walls to ground floor entrance	SF	\$10.00					1	\$500			3.a
236	P.05 - 2x6 wood stud exterior wall infill	SF	\$12.00					42	\$420			3.a
237	P.07 - Infill existing doorway to match adjacent. Patch wall	SF	\$10.00							42	\$504	4.i
238	P.07 - Infill existing doorway to match adjacent. Patch wall	SF	\$10.00					112	\$1,120			3.i
239	Fire rated plywood wall sheathing at Utilities	SF	\$7.50	160	\$1,200					258	\$2,580	4.i
240	Wood blocking for finishes fit-out	LS	\$7,500.00	40%	\$3,011							1.e
241	Wood blocking for finishes fit-out	LS	\$7,500.00			24%	\$1,778					2.f
242	Wood blocking for finishes fit-out	LS	\$7,500.00					12%	\$878			3.g
243	Wood blocking for finishes fit-out	LS	\$7,500.00							24%	\$1,833	4.i
244												
245	06 20 13 Exterior Finish Carpentry											
246	06 20 23 Interior Finish Carpentry											
247	06 61 19 Quartz Surfacing Fabrications											
248	ELL stair and railings	FLT	\$8,000.00									2.b
249	Attic Ladder from 1895 to 1848	FLT	\$2,000.00	1	\$2,000	3	\$24,000					1.c
250	Reconfigure balcony level seating with infill lowest tiered level	GSF	\$20.00					71	\$1,417			3.j
251	1.5" velvet Control Ropes with 2 fixed posts & two wall plated @ 30" AFF (2/A12.1)	LF	\$250.00					28	\$7,085			3.j
252	AV equipment control area in balcony	LOC	\$4,500.00							1	\$4,500	3.k
253	Pantry cabinetry, quartz countertop	LF	\$325.00					16	\$5,200			3.b
254	Provide Step at front of Stage (A-14)	LF	\$50.00									4.i
255	Wainscoting PTD REP 1895; 2 10 1/2" high, det 3/A-07	SF	\$92.81			96	\$7,925			30	\$1,500	2.c

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5,833 GSF												
266	Wainscoting REF EX, repair and refinish, det 5/A-07	SF	\$10.00					85	\$852			3.e
267	Wainscoting REF EX, repair and refinish, det 5/A-07	SF	\$10.00					119	\$1,188			3.f
268	Wainscoting REF EX, repair and refinish, det 5/A-07	SF	\$10.00							173	\$1,731	4.i
269	Wainscoting at Restroom, 'Vertical' beadboard and trims, 60" high, det 4/A-16	SF	\$30.00			387	\$11,610					2.f
270	Wainscoting at Stage, MDO and trims, 3' 1" high, det 4B/A-07	SF	\$39.48			200	\$7,904					2.c
271	Door frame casing, flat, 1x4 sq stock, 1x6 sq stock	SIDE	\$400.00			3	\$1,200					2.d
272	Door frame casing, flat, 1x6 sq stock, scarf 1895 jambs	OPEN	\$640.00			1	\$640					2.d
273	Door frame casing, rosettes, E1 det 2/A-07	SIDE	\$1,000.00			23	\$23,000					2.d
274	Door frame casing, 1895 det 1/A-07	SIDE	\$1,250.00			5	\$6,250					2.d
275	Door frame casing, rosettes, plinths, E1 to Great Hall Door det 7/A-05	SIDE	\$1,714.38			1	\$1,714					2.d
276	Mullion 4-sided det 7/A-05	EA	\$1,170.00			2	\$2,340					2.d
277	Salvage interior casings, rosettes, stool and aprons for re-use at window unit W05 (W-Y)	SET	\$1,500.00	2	\$3,000							1.f
278	Install Salvaged Painted Wood Head Casing (Window W14, W15, W16) (A-13)	EA	\$500.00	3	\$1,500							1.f
279	Install Salvaged Fixed Interior 2 panel Faux Shutter (W14, W15, W16) (A-13)	EA	\$400.00	6	\$2,400							1.a
280	Wood frame to restroom mirror	EA	\$350.00			3	\$1,050					2.f
281	Finish carpentry, finishing trims, casework	LS	\$20,000.00									1.a
282	Finish carpentry, finishing trims, casework	LS	\$20,000.00	40%	\$8,030	24%	\$4,741					2.f
283	Finish carpentry, finishing trims, casework	LS	\$20,000.00					12%	\$2,341			3.g
284	Finish carpentry, finishing trims, casework	LS	\$20,000.00							24%	\$4,880	4.i
285	06 00 00 Carpentry Total				\$112,023		\$131,603		\$25,501		\$20,056	
07 THERMAL & MOISTURE PROTECTION												
07 00 00 Waterproofing and Sealants												
07 14 00 Fluid-Applied Waterproofing												
07 16 00 Crystalline Waterproofing												
07 26 16 Below-Grade Vapor Barriers												
07 92 00 Joint Sealants												
286	Waterproofing to LULA pit slab and walls	SF	\$10.00			281	\$2,805					2.a
287	Waterproofing to new basement slab and walls	SF	\$7.50							4,330	\$32,475	4.e
288	Joint sealants	GSF	\$1.75							5,833	\$10,208	4.i
289	07 00 00 Waterproofing and Sealants Total				\$0		\$2,805		\$0		\$42,683	
07 21 19 Foam-in-Place Insulation												
290	P.00 - Clean Interior Surface of existing exposed masonry wall and install spray closed cell foam insulation	SF	\$9.00	755	\$6,795							1.a

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\$,833 GSF

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ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION QUANTITY	COST	COST CODES
292	P.01 - Clean exposed surface of wood stud cavities and spray closed cell foam insulation in existing exterior stud wall cavity	SF	\$4.00	484	\$1,936							1.a.
293	P.02 - Provide closed cell foam insulation in stud cavity of exterior wall	SF	\$6.50	2,313	\$15,035							1.a.
294	P.03 - provide closed cell foam insulation at masonry wall	SF	\$7.15	189	\$1,351							1.a.
295	P.04 - Provide specified thickness of closed cell insulation at exterior wall infill	SF	\$7.48	42	\$314							1.a.
296	P.05 - Insulate stud cavity per project standards	SF	\$7.15	18	\$129							1.a.
297	P.05 - Provide specified thickness of closed cell insulation at exterior wall infill	SF	\$7.48	42	\$314							1.a.
298	Spray foam seal at window door/door perimeter	OPEN	\$350.00	30	\$10,500							1.a.
299	CD2 - provide closed cell spray foam within wood framed ceiling at Ell Attic	SF	\$10.00	490	\$4,900							1.a.
300	Miscellaneous exterior envelop infills, repairs and build-outs	SF	\$10.00	500	\$5,000							1.a.
301	Miscellaneous infills, repairs and build-outs at interiors	SF	\$10.00									4.i.
302	07 21 19 Foam-in-Place Insulation Total				\$48,273				\$0	250	\$2,500	
303											\$2,500	
304	07 46 23 Wood Siding											
305	07 27 00 Air Barriers											
306	07 60 00 Flashings and Sheet Metal											
307	P04 - clapboards over air barrier over 3/4" exterior grade plywood. Install 1x6 exterior wood outside corner boards at each face of recess	SF	\$38.81					42	\$1,630			3.a.
308	P06 - clapboards over air barrier over 3/4" exterior grade plywood	SF	\$38.81	42	\$1,630							1.a.
309	Misc. patch and repairs on wood siding	SF	\$5,000.00									4.i.
310	07 46 23 Wood Siding Total	AL			\$1,630				\$0	1	\$5,000	
311												
312												
313	08 OPENINGS											
314												
315	08 10 00 Doors, Frames and Hardware											
316	08 11 00 Metal Doors and Frames											
317	08 14 00 Wood Doors											
318	Door Type A (24x80) Solid Wood, flush	EA	\$900.00	1	\$900							2.d.
319	Door Type A (30x80) Solid Wood, flush	EA	\$900.00	7	\$6,300							2.d.
320	Door Type A (36x80) Solid Wood, flush	EA	\$900.00	1	\$900							2.d.
321	Door Type B (36x80) Solid Wood, 4-panel	EA	\$1,300.00	8	\$10,400							2.d.
322	Door Type C (36x80) Solid Wood, 1-panel, 1-glazed panel	EA	\$1,050.00					1	\$1,050			3.a.
323	Door Type C (36x80) Solid Wood, 1-panel, 1-glazed panel (Ell to Great Hall Door)	EA	\$1,050.00	1	\$1,050							2.d.
324	Door Type D (36x80) Solid Wood, 2-panel, 1-glazed panel	EA	\$1,150.00							1	\$1,150	4.a.
325	Door Frame F-A (24x80) HM	EA	\$185.00	1	\$185							2.d.
326	Door Frame F-A (30x80) HM	EA	\$165.00	1	\$165							2.d.

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							QUANTITY	COST	
327	Door Frame F-A (36x80) HM	EA	\$165.00		13				2.d
328	Door Frame F-B (36x80) WD	EA	\$330.00		3				2.d
329	Door Frame F-C (36x80) HM Galv, transom light, 8' 1" OA frame height	EA	\$454.40				1	\$454	4.a
330	Door Frame F-D (36x80) HM Galv, 2' 1 1/2" x 4' 1 1/2" sidelight	EA	\$748.80						3.a
331	Door Frame F-E HM 2' 11" x 3' 1 1/2" borrowed light	EA	\$630.00		1				2.d
332	Fire Rating	EA	\$50.00		3				2.d
333	Install Doors and Frames	LEAF	\$175.00		18				2.d
334	Install Doors and Frames	LEAF	\$175.00		1				2.d
335	08 31 00 Access Doors and Panels								
336	Access door/panel	EA	\$375.00		8				2.f
337	08 71 00 Door Hardware								
338	Hardware to new and existing doors	SET	\$650.00		23				2.d
339	Hardware to new and existing doors	SET	\$950.00			1		\$950	3.a
340	Replace front door hardware with accessible exterior lever and interior exit devices	SET	\$1,600.00		1				2.g
341	08 80 00 Glazing								
342	Door Type C 1-glazed panel	EA	\$280.00			1		\$280	3.a
343	Door Type C 1-glazed panel, 1/4 safety glass (Ell to Great Hall Door)	EA	\$440.00		1				2.d
344	Door Type D 1-glazed panel	EA	\$182.50				1	\$183	4.a
345	Door Frame F-C transom light	EA	\$123.60				1	\$124	4.a
346	Door Frame F-D 2-sidelight, 1/4 safety glass (Ell to Great Hall Door)	EA	\$1,002.36			1		\$1,002	3.a
347	Door Frame F-E borrowed light	EA	\$420.00		1				2.d
348	08 90 00 Louvers and Vents								
349	Door Type B louver panel	EA	\$500.00		1				2.d
350	08 10 00 Doors, Frames and Hardware Total							\$4,031	
351								\$1,921	
352	08 50 00 Windows								
353	08 51 69 Metal Storm Windows								
354	0852 00 Wood Windows								
355	Remove window and reframe exterior wall for entrance to Ground Floor (W-X)	LOC	\$3,000.00						3.a
356	Window W05 - New 39.5x77x1.5, 6-over-6 SH	OPEN	\$4,710.34	1					1.f
357	Window W06 - Block at Interior & Exterior	OPEN	\$1,000.00	1					1.f
358	Window W07 - Block at Exterior	OPEN	\$500.00	1					1.f
359	Window W12 - Replace Upper Sash whew 23.5x44.5x1.5, 1-over-1 SH	OPEN	\$2,306.25	1					1.f
360	Window repair and restoration; assume 5 manhour per opening	M-HR	\$105.00	125					1.f
361	New exterior storm window to 44.5x66 window, triple track	OPEN	\$2,543.75	6					1.f
362	New exterior storm window to 39.5x77 window, triple track	OPEN	\$1,850.14	11					1.f
363	New exterior storm window to 38.5x52.5 window, triple track	OPEN	\$1,298.09	1					1.f
364	New exterior storm window pair to 30.75x53 window, triple track	PR	\$2,181.81	2					1.f

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365	New exterior storm window to 39.5x27 window, fixed	OPEN	\$381.33	1				1.f
366	New exterior storm window pair to 30.75x53 window, fixed	PR	\$1,112.73	2				1.f
367	New exterior storm window to 23.5x44.5 window, triple track	OPEN	\$735.94	2				1.f
368	New interior storm window to 113.5x46 window, fixed	OPEN	\$1,327.46	1				1.f
369	New interior storm window to 39.5x27 window, fixed	OPEN	\$860.06	1				1.f
370	08 50 00 Windows Total				\$0	\$3,000		
371								
372								
373								
374								
375	09 21 16 Gypsum Board Assemblies							
376	07 21 13 Board Insulation							
377	07 21 16 Blanket Insulation							
378	P.01 - new drywall after spray-foam insulation install	SF	\$3.25	484				1.a
379	P.02 - 5/8" drywall on 1/2" resilient furring	SF	\$5.75	2,313				1.a
380	P.03 - Provide replacement furring over existing masonry, add new drywall after spray-foam insul install	SF	\$6.33	189				1.a
381	P.04 - new drywall at exterior return walls to ground floor entrance	SF	\$3.25			42	\$137	3.a
382	P.05 - new drywall after spray-foam insulation install	SF	\$3.74	18				1.a
383	P.06 - new drywall after spray-foam insulation install	SF	\$3.74				42	4.i
384	P.07 - Infill existing doorway to match adjacent. Patch wall	SF	\$7.48			112	\$837	3.i
385	P.07 - Infill existing doorway to match adjacent. Patch wall	SF	\$7.48				258	4.i
386	P.08 - 1 hour fire rated system with 1 layer 5/8" gypsum wallboard on each side of 3 5/8" metal stud framing with 2.5" thick 25PCF mineral wool sound attenuation	SF	\$222.00		750			2.a
387	P.09 - non rated fire shaft wall for ductwork and piping with 2 1/2" thick 20 gauge metal studs	SF	\$15.00	54				1.c
388	P.10 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs	SF	\$11.00			112	\$1,232	3.b
389	P.10 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs	SF	\$11.00			40	\$440	3.g
390	P.10 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs	SF	\$11.00			200	\$2,200	3.h
391	P.10 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs	SF	\$11.00			112	\$1,232	3.i
392	P.10 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs	SF	\$11.00				124	4.i
393	P.11 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs, insulate with 2.5" 25PCF mineral wool sound attenuation. 2nd layer of drywall on Meetings side of partition	SF	\$15.25			219	\$3,340	3.f

\$,833 GSF

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ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	BUILDING SYSTEMS COST	ACCESSIBILITY QUANTITY	ACCESSIBILITY COST	SUPPORT FACILITIES QUANTITY	SUPPORT FACILITIES COST	RESTORATION		COST CODES
										QUANTITY	COST	
											\$5,833 GSF	
384	P.11 - one layer 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs. Insulate with 2.5" 25PCF mineral wool sound attenuation. 2nd layer of drywall on Meeting's side of partition	SF	\$15.25					80	\$1,220			3 h
385	P.12 - one layer 5/8" drywall on each side of studs with 2nd layer on north side. Insulate stud cavity with 2.5" PCF wool sound attenuation	SF	\$12.00			128	\$1,536					2 f
386	P.13 - one layer of 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs. Insulate cavity with 2.5" thick 25 PCF mineral wool sound attenuation	SF	\$12.00			160	\$1,920					2 f
387	P.13 - one layer of 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs. Insulate cavity with 2.5" thick 25 PCF mineral wool sound attenuation	SF	\$12.00							80	\$720	4 i
388	P.14 - one layer of 5/8" drywall on each side of 3 5/8" thick 20 gauge metal studs. Insulate cavity with 2.5" thick 25 PCF mineral wool sound attenuation. Additional thickness to accommodate plumbing clearances	SF	\$16.50			120	\$1,980					2 f
389	P.15 - Repair existing west wall of Great Hall and restore	SF	\$10.00					72	\$720			3 a
400	P.15 - Repair existing west wall of Great Hall and restore	SF	\$10.00	240	\$2,400							1 a
401	P.15 - Repair existing west wall of Great Hall and restore	SF	\$10.00			137	\$1,370					2 c
402	P.16 - 5/8" gypsum wallboard on south surface of studs and 5/8" drywall on 1/2" resilient furring	SF	\$9.00							10	\$90	4 i
403	P.17 - 1 hour fire rated system with 1 layer of gypsum wallboard on each side of 3 5/8" 20 gauge metal studs	SF	\$11.75			32	\$376					2 f
404	P.17 - 1 hour fire rated system with 1 layer of gypsum wallboard on each side of 3 5/8" 20 gauge metal studs	SF	\$11.75					48	\$564			3 b
405	P.18 - Attic enclosure separation partial partition walls with 2.5" metal studs, 2 layers of 5/8" drywall each side and 2.5" thick 25PCF mineral wool sound attenuation in studs cavity	SF	\$19.84	48	\$972							1 b
406	P.19 - Separation wall between attic; add 6" thick 25 per mineral drywall over 1/2" resilient furring	SF	\$11.21	154	\$1,727							1 b
407	Miscellaneous infills, repairs and build-outs	GSF	\$1.75							5,833	\$10,208	4 i
408	Drywall Ceilings											
410	Ceiling Finishes quantified from Reflected Ceiling Plan series											
411	C08 at LULA machine room; gypsum board, furring on wood framing	SF	\$8.22			36	\$296					2 a
412	C08 at ELI stair; gypsum board, furring on wood framing	SF	\$10.73			118	\$1,266					2 b
413	C08 at storage First Floor; gypsum board, furring on wood framing	SF	\$20.00					12	\$240			3 h
414	C08 at ELI First Floor; gypsum board, furring on wood framing	SF	\$7.15							418	\$2,988	4 i
416	C07 at attic over Great Hall; gypsum board ceiling and framing	SF	\$10.00	1,057	\$10,570							1 a
416	C07 meeting First Floor; gypsum board ceiling and framing	SF	\$11.50							29	\$334	4 h
417	C08 at Great Hall; SAB, fire-taped gypsum board, furring on wood framing, 6" thick 25PCF mineral fiber insuln ceiling joist cavity	SF	\$15.75	1,829	\$28,807							1 c

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				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
418	C09 at balcony; gypsum board, turning on wood framing	SF	\$7.15							368	\$2,690	4.i.
419	Miscellaneous soffits, bulkheads and trim	SF	\$20.00							500	\$10,000	4.i.
420	Firestopping and fire safing	GSF	\$0.75							5,833	\$4,375	4.i.
421	09 21 16 Gypsum Board Assemblies Total				\$61,421		\$25,244		\$12,161		\$34,724	
422												
423	09 30 00 Tiling											
424	Ceramic Tile Flooring; 2x2 hexagonal mosaic	SF	\$27.50			216	\$5,940					2.f.
425	Honed slate threshold	EA	\$275.00			4	\$1,100					2.f.
426	09 30 00 Tiling Total				\$0		\$7,040		\$0		\$0	
427												
428	09 51 13 Acoustical Panel Ceilings											
429	C05; 2x2 tile, exposed grid at restrooms	SF	\$5.50			301	\$1,656					2.f.
430	C05; storage First Floor	SF	\$5.00					155	\$775			3.h.
431	C05; foyer	SF	\$5.00							81	\$405	4.i.
432	09 51 13 Acoustical Panel Ceilings Total				\$0		\$1,656		\$775		\$405	
433												
434	09 50 00 Specialty Ceilings											
435	09 54 43 Stretched Fabric Ceiling Panels	AL	\$50.00							1,829	\$91,450	4.i.
436	Stretched Fabric Ceiling system at Great Hall; allow											
437	09 56 16 Metal Textured Ceilings											
438	C03; repair Tin and strip for refinishing	SF	\$11.00							937	\$10,307	4.h.
439	C04; re-use salvaged tin ceiling for patching and selective replacement	SF	\$16.00							55	\$880	4.h.
440	09 50 00 Specialty Ceilings Total				\$0		\$0		\$0		\$102,637	
441												
442	09 64 00 Wood Flooring											
443	Finished Wood Flooring (004)	SF	\$15.00			75	\$1,125					2.a.
444	Wood Wall Base (004, 005, 006, 007)	LF	\$2.00			127	\$254					2.f.
445	Finished Wood Flooring (104)	SF	\$15.00					103	\$1,545			3.b.
446	Wood Wall Base (104)	LF	\$2.00					38	\$78			3.b.
447	Repair & Refinish Wood (110)	SF	\$8.00					91	\$728			3.e.
448	Finished Wood Flooring (112)	SF	\$15.00					242	\$3,630			3.f.
449	Repair & Refinish Wood (112)	SF	\$8.00					161	\$1,288			3.f.
450	Wood Wall Base (010)	LF	\$2.00					64	\$128			3.f.
451	Wood Wall Base (012)	LF	\$2.00					80	\$160			3.g.
452	Repair & Refinish Wood (207)	SF	\$8.00					511	\$4,088			3.j.
453	Finished Wood Flooring (003, 008, 103, 106, 107, 114, 204)	SF	\$15.00							877	\$13,155	4.e.
454	Finished Wood Flooring @ Stair (001, 101, 201)	SF	\$15.00			127	\$1,905					2.b.
455	Repair & Refinish Wood (103, 108, 111, 113)	SF	\$8.00							1,630	\$13,040	4.i.
456	Repair & Refinish Wood @ Stair (109, 208)	SF	\$10.00							72	\$720	4.i.
457	Wood Wall Base (001, 003, 009, 101, 103, 105, 106, 107, 113, 114, 201, 204)	LF	\$2.00							328	\$656	4.i.
458												

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460	Reinstall & Refinish Existing Wood Base (108, 109)	LF	\$1.00		\$0							
461	09 04 00 Wood Flooring Total						\$3,284		\$11,645	106	\$106	4.i.
462	09 05 00 Flooring										\$27,679	
463	09 05 19 Resilient Tile Flooring											
464	Resilient Flooring: 2x2x1/8 tile (011)	SF	\$7.75							95	\$736	4.e.
465	Resilient Base: Vinyl (011)	LF	\$2.65							40	\$106	4.e.
466	Resilient Flooring (008, 015)	SF	\$7.75							24	\$186	4.e.
467	Resilient Base (008, 015)	LF	\$2.65							19	\$50	4.e.
468	Resilient Flooring (202)	SF	\$7.75			38	\$295					2.e.
469	Resilient Base (202)	LF	\$2.65			24	\$64					2.e.
470	Carpet to elevator cab	SF	\$6.00			35	\$210					2.a.
471	09 05 00 Flooring Total				\$0		\$568		\$0		\$1,079	
472	09 90 00 ***Painting and Coating											
473	P00 - intumescent coating to closed cell foam insulation	SF	\$25.00	755	\$18,875							1.a.
474	P02 - intumescent coating to closed cell foam insulation at wood	SF	\$20.00	490	\$9,800							1.a.
475	Framed ceiling at Eli Attic	SF	\$0.50	3,004	\$1,502							1.a.
476	Paint new wallboard	SF	\$11.21			880	\$9,857		\$21			2.f.
477	Paint new wallboard	SF	\$0.50					42	\$160			3.a.
478	Paint new wallboard	SF	\$0.50					320	\$219			3.b.
479	Paint new wallboard	SF	\$0.50					438	\$280			3.f.
480	Paint new wallboard	SF	\$0.50					560	\$224			3.h.
481	Paint new wallboard	SF	\$0.50					448	\$40			3.i.
482	Paint new wallboard	SF	\$0.50					80	\$280			3.g.
483	Paint new wallboard	SF	\$0.50					560	\$473			3.h.
484	Paint new wallboard	SF	\$0.50							946		4.i.
485	Paint new wallboard	SF	\$2.25			744	\$1,674					2.f.
486	Paint Partition Walls (004, 005, 007)	SF	\$1.25					20	\$25			3.b.
487	Prep and paint Partition Walls (104)	SF	\$1.25					300	\$450			3.e.
488	Paint Partition Walls (110)	SF	\$1.25					780	\$975			3.g.
489	Paint Partition Walls (012)	SF	\$1.25					700	\$875			3.j.
490	Paint Partition Walls (207)	SF	\$1.25									
491	Paint Partition Walls (001, 002, 003, 009, 013, 014, 101, 102, 103, 208)	SF	\$1.25							5,976	\$7,473	4.i.
492	Paint door and frame	EA	\$125.00			23	\$2,875					2.b.
493												
494	C06 at LULA machine room; gypsum board ceiling paint	SF	\$8.22			36	\$296					2.a.
495	C06 at Eli stair; gypsum board ceiling paint	SF	\$10.73			118	\$1,266					2.b.
496	C06 at storage First Floor; gypsum board ceiling paint	SF	\$20.00					12	\$240			3.h.
497	C06 at Eli First Floor; gypsum board ceiling paint	SF	\$7.15							418	\$2,989	4.i.
498	C07 at attic over Great Hall; gypsum board ceiling paint	SF	\$10.00	1,057	\$10,570							1.a.

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Stow Town Hall Restoration  
Stow, MA

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS		ACCESSIBILITY		SUPPORT FACILITIES		RESTORATION		COST CODES
				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
499	C07 meeting First Floor, gypsum board ceiling paint	SF	\$11.50							29	\$334	4.h.
500	C08 at Great Hall, gypsum board ceiling paint	SF	\$15.75							1.a.	\$2,590	1.a.
501	C09 at balcony, gypsum board ceiling paint	SF	\$7.15							500	\$10,000	4.i.
502	Miscellaneous soffits, bulkheads and trim	SF	\$20.00									4.i.
503												
504	Prep and paint Existing Tin Ceiling	SF	\$5.00							992	\$4,960	4.h.
505												
506	Paint Wood Wall Base (004, 005, 006, 007)	LF	\$2.00			127	\$254					2.f.
507	Paint Wood Wall Base (104)	LF	\$2.00					39	\$78			3.b.
508	Paint Wood Wall Base (110)	LF	\$2.00					37	\$74			3.e.
509	Paint Wood Wall Base (010)	LF	\$2.00					64	\$128			3.f.
510	Paint Wood Wall Base (112)	LF	\$2.00					47	\$94			3.f.
511	Paint Wood Wall Base (012)	LF	\$2.00					80	\$160			3.g.
512	Paint Wood Wall Base (207)	LF	\$2.00					89	\$178			3.g.
513	Paint Wood Wall Base (001, 003, 009, 101, 103, 105, 106, 107, 111, 113, 114, 201, 204, 208)	LF	\$2.00							384	\$768	4.i.
514	Paint - Reinstall & Refinish Existing Wood Base (108, 109)	LF	\$2.00							106	\$212	4.i.
515	Prep and paint ETR wainscoting	SF	\$1.85					85	\$157			3.e.
516	Prep and paint ETR wainscoting	SF	\$1.85					119	\$220			3.f.
517	Prep and paint ETR wainscoting	SF	\$1.85							173	\$320	4.i.
518	Paint wainscoting	SF	\$1.10			200	\$220					2.d.
519	Paint wainscoting	SF	\$1.10			387	\$428					2.e.
520	Paint beadboard wainscoting	SF	\$1.10			440	\$484					2.f.
521	Paint wainscoting	SF	\$1.10							86	\$106	4.i.
522												
523	Concrete Flooring (013), assume seal	SF	\$3.00							305	\$915	4.i.
524												
525	Prep and paint exterior clapboards	SF	\$0.75									4.i.
526	Prep and paint wood window, assume inside and out	OPEN	\$750.00	25	\$18,750					5,612	\$4,209	1.f.
527												
528	General touch-up and miscellaneous painting	LS	\$6,000.00									1.b.
529	General touch-up and miscellaneous painting	LS	\$6,000.00	40%	\$2,400							2.f.
530	General touch-up and miscellaneous painting	LS	\$6,000.00			24%	\$1,422					3.g.
531	General touch-up and miscellaneous painting	LS	\$6,000.00									4.i.
532	09 90 00 ***Painting and Coating Total						\$18,784			24%	\$1,457	
533					\$80,713						\$18,803	
534												
535												
536												
537												
538												
539												

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Stow Town Hall Restoration  
Stow, MA  
\$833 GSF

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION QUANTITY	COST	COST CODES
540	10 SPECIALTIES											
541	10 00 00 Specialties											
542	10 14 00 Signage											
543	Room identification, wayfinding	GSF	\$0.50									
544	10 21 13 Toilet Compartments											
545	10 28 13 Toilet Accessories											
546	Toilet Partitions	EA	\$1,000.00									
547	Paper Towel Dispenser	EA	\$65.00									
548	Toilet Paper Dispenser	EA	\$35.00									
549	Soap Dispenser	EA	\$45.00									
550	Sanitary Towel Dispenser	EA	\$175.00									
551	Grab Rails	EA	\$150.00									
552	Changing Table	EA	\$300.00									
553	Mirror @ restroom's	EA	\$350.00									
554	Janitors mop rack and shelf	EA	\$400.00									
555	10 44 00 Fire Protection Specialties											
556	Assume 1 ea per 4,500sf	EA	\$400.00									
557	10 80 00 Other Specialties											
558	Remove/ Reinstall Small and Main Quilts (A11.1)	AL	\$2,000.00	1	\$2,000							
559	Install Salvaged Clock (A-13)	EA	\$100.00	1	\$100							
560	10 00 00 Specialties Total				\$2,100		\$6,440		\$350		\$3,717	1 a 1 a
561												
562												
563												
564	11 EQUIPMENT											
565	11 00 00 Equipment											
566	Kitchenette/Pantry appliances	RMS	\$5,000.00									
567	Markerboard, tackboards	AL	\$4,000.00									
568	11 52 13 Projection Screens											
569	Assume 1 ea per meeting room	EA	\$2,500.00									
570	11 00 00 Equipment Total				\$0		\$0		\$5,000		\$4,000	3 b 4 i 4 i
571												
572												
573	14 CONVEYING EQUIPMENT											
574	14 26 00 ***L/U/LA Elevator											
575	Passenger Elevator, 1,400 lbs, 30fpm, 3 stops	LS	\$65,000.00									
576	14 26 00 ***L/U/LA Elevator Total				\$0		\$65,000		\$0		\$0	2 a
577												
578												
579												
580												
581												

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Stow Town Hall Restoration  
Stow, MA

DIRECT TRADE COST DETAILS

\$,833 GSF

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION QUANTITY	COST	COST CODES
682	22 PLUMBING											
683	22 00 00 ***Plumbing											
684	Water meter	EA	\$1,500.00	1	\$1,500							1.e
685	Electric hot water heater 30 gallon	EA	\$7,500.00	1	\$7,500							1.e
686	Hot water circulation pump 3 gpm	EA	\$750.00	1	\$750							1.e
687	Duplex set submersible ejector pump system	EA	\$10,000.00	1	\$10,000							1.e
688	Water closet	EA	\$1,600.00			4	\$1,850					2.f
689	Lavatory	EA	\$1,150.00			3	\$1,200					2.f
690	Water closet ADA	EA	\$1,000.00			1	\$1,850					2.f
691	Lavatory ADA	EA	\$1,000.00			1	\$1,200					2.f
692	Sink	EA	\$1,050.00					1	\$1,000			3.b
693	Janitors sink	EA	\$250.00					1	\$1,050	2	\$500	4.i
694	Hose bibb	EA	\$950.00			2	\$1,200					2.f
695	Floor drain	EA	\$450.00			1	\$1,200					2.f
696	Trap primer	EA	\$355.00							1	\$355	4.i
697	Wall hydrant	LF	\$38.00			350	\$13,300					2.f
698	Domestic water pipe with fittings & hangers	LF	\$38.00					50	\$1,900			3.b
699	Sanitary waste and vent pipe with fittings and hangers	LF	\$44.00			290	\$12,760					2.f
700	Sanitary waste and vent pipe with fittings and hangers	LF	\$44.00					40	\$1,760			3.b
701	Pipe insulation	EA	\$12.00			350	\$4,200					2.f
702	Pipe insulation	EA	\$12.00					50	\$600			3.g
703	Demolition	LS	\$3,000.00	1	\$3,000							1.e
704	Coordination & management	LS	\$2,500.00	1	\$2,500							1.e
705	Coring and patching	LS	\$2,000.00	1	\$2,000							1.e
706	Flushing & sanitizing	LS	\$1,800.00	1	\$1,800							1.e
707	Fees & permits	LS	\$1,000.00	1	\$1,000							1.e
708	22 00 00 ***Plumbing Total				\$28,850		\$38,360		\$6,310		\$855	
709	23 HEATING, VENTILATING & AIR CONDITIONING											
710	23 00 00 ***HVAC											
711	Temporary heating system during construction	MTH	\$5,000.00	3	\$15,000							1.e
712	ERV with electric heat	CFM	\$12.00	1,650	\$19,800							1.e
713	Air source heat pump	TONS	\$885.00	26	\$25,610							1.e
714	Branch controller	EA	\$4,500.00	1	\$4,500							1.e
715	Fan coil with DX coil	EA	\$3,200.00	10	\$32,000							1.e
716	Electric heater	EA	\$650.00	9	\$5,850							1.e
717	Galvanized ductwork with fittings & hangers	LBS	\$13.00	6,200	\$80,600							1.e
718	Duct insulation	SF	\$4.00	3,700	\$14,800							1.e

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### DIRECT TRADE COST DETAILS

row	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	BUILDING SYSTEMS COST	ACCESSIBILITY QUANTITY	ACCESSIBILITY COST	SUPPORT FACILITIES QUANTITY	SUPPORT FACILITIES COST	RESTORATION QUANTITY	RESTORATION COST	COST CODES
624	Registers, grilles & diffusers	EA	\$125.00	32	\$4,000							1.e
625	Miscellaneous duct accessories	LS	\$3,000.00	1	\$3,000							1.e
626	Sound attenuators	LS	\$6,000.00	1	\$6,000							1.e
627	Refrigerant pipe with fittings & hangers	LF	\$40.00	1,500	\$60,000							1.e
628	Condensate drain pipe with fittings & hangers	LF	\$22.00	300	\$6,600							1.e
629	Pipe insulation	LF	\$12.00	1,800	\$21,600							1.e
630	Valves and accessories	LS	\$9,000.00	1	\$9,000							1.e
631	Automatic temperature control (Thermostats)	EA	\$1,225.00	14	\$17,150							1.e
632	Testing & balancing	LS	\$4,500.00	1	\$4,500							1.e
633	Demolition	LS	\$5,500.00	1	\$5,500							1.e
634	Premium to remove oil tank, fill/vent system, oil fired furnaces	ADJ	\$5,000.00	1	\$5,000							1.e
635	Coordination & management	LS	\$5,000.00	1	\$5,600							1.e
636	Coring and patching	LS	\$3,500.00	1	\$3,500							1.e
637	Rigging & equipment rental	LS	\$10,000.00	1	\$10,000							1.e
638	Equipment startup	LS	\$1,000.00	1	\$1,000							1.e
639	23 00 00 ***HVAC Total				\$306,610							
640												
641												
642	<b>26 ELECTRICAL</b>											
643												
644	26 00 00 ***Electrical											
645	<i>Gear and Distribution</i>											
646	Normal Power/Emergency Power	EA	\$350.00	1	\$350							1.e
647	Meter provision	EA	\$2,350.00	1	\$2,350							1.e
648	200A panelboard	EA	\$1,850.00	1	\$1,850							1.e
649	100A panelboard	EA	\$2,150.00	1	\$2,150							1.e
650	100A MTS	LF	\$66.00	70	\$3,920							1.e
651	200A feed (to overhead connection at mast)	LF	\$30.00	20	\$600							1.e
652	100A feed	EA	\$3,500.00	1	\$3,500							1.e
653	Portable generator connection cabinet	EA	\$300.00	50	\$1,500							1.e
654	100A feed	LF										1.e
655												
656	c. Branch Power											
657	<i>Branch Power</i>											
658	Duplex receptacle	EA	\$24.00	24	\$576							1.e
659	Duplex receptacle at Support Facilities program	EA	\$24.00					17	\$408			3.g
660	Double Duplex receptacle	EA	\$48.00	3	\$144							1.e
661	Double Duplex receptacle in floor box	EA	\$48.00	1	\$48							1.e
662	GFI receptacle	EA	\$39.50	14	\$553							1.e
663	GFI receptacle WIP	EA	\$49.50	1	\$50							1.e
664	2-Channel wire/did	LF	\$85.00	4	\$280							1.e
665	Floor box/poke thru	EA	\$650.00	3	\$1,950							1.e

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Stow Town Hall Restoration  
Stow, MA

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS		ACCESSIBILITY		SUPPORT FACILITIES		RESTORATION		COST CODES
				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
666	Device box	EA	\$25.00	44	\$1,100			17	\$425			1e
667	Device box at Support Facilities program	EA	\$25.00									3g
668	34" EMT	EA	\$7.00	500	\$3,500							1e
669	#12 THHN	EA	\$1.00	2,500	\$2,500							1e
670	MC cable	LF	\$4.50	850	\$3,825			400	\$1,800			1e
671	MC cable at Support Facilities program	LF	\$4.50									3g
672												
673	d. Lighting Fixtures											
674	Lighting Allowance per narrative	LS	\$57,400.00	1	\$57,400							1e
675	Lighting Installation	LS	\$23,000.00	1	\$23,000							1e
676	Type C1	EA		4	Incl. Above							1e
677	Type C2	EA		1	Incl. Above							1e
678	Type C3	EA		1	Incl. Above							1e
679	Type C4	EA		8	Incl. Above							1e
680	Type C5	EA		16	Incl. Above							1e
681	Type R1	EA		1	Incl. Above							1e
682	Type R2	EA		63	Incl. Above							1e
683	Type R3	EA										3g
684	Type R4	EA										1e
685	Type S1	EA		16	Incl. Above							1e
686	Type S2	EA		70	Incl. Above							3g
687	Type S4	EA		2	Incl. Above							1e
688	Type S5	EA		8	Incl. Above							1e
689	Type S6	EA										1e
690	Type W1	EA		1	Incl. Above							1e
691	Type W2	EA		3	Incl. Above							1e
692	Type W3	EA		10	Incl. Above							1e
693	Type W4	EA		4	Incl. Above							1e
694	Type W6 (Track)	EA										2f
695	Type W6 (Track heads)	EA										2f
696	EBU	EA	\$180.00	32	Incl. Above							2f
697	Re-lamp LED existing fixture	EA	\$100.00	3	Incl. Above							2f
698	Exit lighting	EA		9	Incl. Above							2f
699	Site Lighting	EA	\$15,000.00	1	\$15,000							2f
700	Great Hall Event Room lighting and controls (see Alternate	LS	See Alternate									1e
701	Device box	EA	\$25.00	195	\$4,875							1e
702	Device box	EA	\$25.00									3g
703	34" EMT	EA	\$7.00	500	\$3,500							1e
704	#12 THHN	EA	\$1.00	2,500	\$2,500							1e
705	MC cable	LF	\$4.50	3,300	\$14,850							1e
706	MC cable	LF	\$4.50									3g
707												

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Stow Town Hall Restoration  
Stow, MA  
5,833 GSF

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION		COST CODES
										QUANTITY	COST	
709	a. Lighting Control Lighting controls, switches and sensors (not depicted at this scope level)	SF	\$1.35	5,833	\$7,875							1.e
710												1.e
711	f. Power Transmission Equipment											1.e
712	Equipment Wiring											1.e
713	Elevator feed and connections	EA	\$3,000.00	1	\$3,000							1.e
714	Elevator sump pump feed and connections	EA	\$1,500.00	1	\$1,500							1.e
715	ERV feed and connection	EA	\$1,600.00	2	\$3,200							1.e
716	Wall Heater feed and connection	EA	\$850.00	9	\$7,650							1.e
717	Pump feed and connection	EA	\$850.00	1	\$850							1.e
718	Heat pump feed and connection	EA	\$850.00	26	\$18,900							1.e
719	WH feed and connection	EA	\$850.00	1	\$850							1.e
720	UH feed and connection	EA	\$650.00	2	\$1,300							1.e
721	FCU feed and connection	EA	\$650.00	10	\$6,500							1.e
722	BC feed and connection	EA	\$450.00	1	\$450							1.e
723	Damper feed and connection	EA	\$450.00	5	\$2,250							1.e
724												1.e
725	g. Lightning Protection											1.e
726	Lightning Protection system	LS	\$4,500.00	1	\$4,500							1.e
727	Building grounding											1.e
728												1.e
729	h. Fire Alarm											2.e
730	Control panel	LS	\$7,500.00			1	\$7,500					2.e
731	LCD Annunciator	EA	\$1,500.00			1	\$1,500					2.e
732	Knox box	EA	\$850.00			1	\$850					2.e
733	Digital dialer	EA	\$850.00			1	\$850					2.e
734	Beacon	EA	\$225.00			1	\$225					2.e
735	Initiating device	EA	\$140.00			52	\$7,280					2.e
736	Audio visual device	EA	\$120.00			10	\$1,200					2.e
737	Visual device	EA	\$105.00			11	\$1,155					2.e
738	RAI	EA	\$150.00			1	\$150					2.e
739	Modules	EA	\$220.00			6	\$1,320					2.e
740	Device box	EA	\$25.00			80	\$2,000					2.e
741	34" EMT	LF	\$7.00			300	\$2,100					2.e
742	FA cable	LF	\$1.30			500	\$650					2.e
743	FA MC cable	LF	\$5.50			2,100	\$11,550					2.e
744	Testing and programming	LS	\$2,000.00			1	\$2,000					2.e
745	Bi-Directional Amplification System, assume NIC											2.e
746												2.e
747	i. Other											1.e
748	Utility charges	LS	\$5,000.00	1	\$5,000							1.e

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Stow Town Hall Restoration  
Stow, MA  
\$,833 GSF

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION QUANTITY	COST	COST CODES
749	Temp lighting and power	LS	\$3,500.00	1	\$3,500							1.e
750	Keep fire alarm operational during construction	LS	\$0.50			5,833	\$2,917					2.e
751	Demolition work	LS	\$3,500.00	1	\$3,500							1.e
752	Coordination, BIM & management	LS	\$5,000.00	1	\$5,000							1.e
753	Fees and permits	LS	\$5,000.00	1	\$5,000							1.e
754	26 00 00 ***Electrical Total				\$215,475		\$59,447		\$12,873		\$0	
755												
756												
757	<b>27-COMMUNICATIONS &amp; LOW VOLTAGE</b>											
758												
759	a. Cable Distribution and Devices (DataComm)											
760	Telecommunications System	LOC	4,500.00	1	\$4,500							1.e
761	MDF closet	EA	\$484	11	\$4,884							1.e
762	2-port device	LF	1.30	2,500	\$3,250							1.e
763	Cat. 6A cable	EA	\$960	8	\$7,680							1.e
764	Device box with 1" conduit stub to ceiling	LS	\$1,000.00	1	\$1,000							1.e
765	Grounding											
766												
767	27 41 00 Audio Visual Systems											
768	Audio Visual System	LS	See Alternate					1	See Alternate			3.c
769	Great Hall Event Sound system (see Alternate)	EA	\$120.00					1	\$120			3.c
770	Device box with conduit stub to ceiling											
771	27-Communications & Low Voltage Total				\$10,194		\$0		\$120		\$0	
772												
773												
774	<b>28-SECURITY &amp; CCTV</b>											
775												
776	d. Intrusion Detection											1.e
777	Security System (not depicted at this scope level)	SF	\$2.00	5,833	\$11,666							1.e
778	Head end, cameras, access devices and cabling											1.e
779	28-Security & Cctv Total						\$0		\$0		\$0	1.e
780												
781												
782	<b>31-EARTHWORK</b>											
783												
784	31 20 00 Earthwork	LS	\$5,000.00							1	\$5,000	4.f
785	02 41 13 Site Preparation	LF	\$15.00							51B	\$7,770	4.f
786	Mobilization	EA	\$2,500.00							2	\$5,000	4.f
787	Construction fence installation and maintenance	LS	\$5,500.00							1	\$5,500	4.f
788	Double construction gate	LS	\$2,250.00							1	\$2,250	4.f
789	Temporary construction entrance											
790	Temporary signs											

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Stow, MA

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	BUILDING SYSTEMS COST	ACCESSIBILITY QUANTITY	ACCESSIBILITY COST	SUPPORT FACILITIES QUANTITY	SUPPORT FACILITIES COST	RESTORATION QUANTITY	RESTORATION COST	COST CODES
791	Protection of elements to remain	AL	\$10,000.00							1	\$10,000	4.f
792	Temporary utility	AL	\$15,000.00							1	\$15,000	4.f
793	Erosion control barrier install and maintenance	LF	\$12.00							518	\$6,216	4.f
794	Silt sacks in all ex. drainage structures	LS	\$1,000.00							1	\$1,000	4.f
795												
796	Excavation & grading at VRF new equipment	DAY	\$3,500.00	5	\$17,500							1.d
797	Structural fill	CY	\$65.00	25	\$1,625							1.d
798	Excavate for earth-form slab thickening, 6" compacted gravel bed, vapor barrier wrap, 6" compacted gravel topping	LOC	\$1,846.25	5	\$9,231							1.d
799	New LULA elevator											
800	Hand excavate soil substrate for new pit	CY	\$96.25			37	\$3,163					2.a
801	Compacted structural fill 6" thick, crushed stone base 4" thick	CY	\$74.75			6	\$455					2.a
802	Address Ongoing Water Infiltration, det 2 1/A-10.0	CY	\$75.00							189	\$12,887	4.e
803	Hand excavate soil substrate for new slab, assume 38" deep	CY	\$112.50							3	\$374	4.e
804	at Utility Area	CY	\$112.50							80	\$5,247	4.e
805	Trenching, 4" foundation drain, filter fabric, crushed stone surround, North and East walls	LF	\$96.00							52	\$3,389	4.e
806	at Utility Area	LF	\$96.00							1	\$1,700	4.e
807	Foundation wall sleeve, drill penetration, +10' drain exterior extension beyond wall	LOC	\$1,700.00							6	\$8,330	4.e
808	Excavate for earth-form column footing, 6" compacted gravel bed, vapor barrier wrap, 6" compacted gravel topping	LOC	\$1,065.00							93	\$8,920	4.e
809	Compacted structural fill	CY	\$74.75									
810	Reconfigure front entrance	DAY	\$3,500.00							1	\$3,500	4.f
811	Strip topsoil	LS	\$1,850.00							1	\$1,850	4.f
812	Remove & disposal of topsoil	DAY	\$3,500.00							10	\$35,000	4.f
813	Excavation & grading	CY	\$65.00							285	\$18,537	4.f
814	Structural fill											
815	31 20 00 Earthwork Total				\$28,356		-\$3,617		\$0		\$153,279	
816												
817												
818												
819												
820	32 10 00 Paving and Surfacing											
821	32 12 00 Asphalt Paving											
822	32 13 13 Exterior Concrete											
823	32 16 00 Curbing											
824	Replace Ramp At 1895 With Accessible Walkway	SF	\$11.50							216	\$2,484	4.a
825	Concrete paving, exposed aggregate, 4" thick	CY	\$38.00							6	\$228	4.a
826	Gravel base, 8" thick											
827	Reconfigure front entrance	SF	\$5.50							1,278	\$7,029	4.f
828	Asphalt vehicular paving, 2.5" base, 1.5" top	CY	\$38.00							52	\$1,976	4.f
829	Gravel base, 12" thick											

Stow Town Hall Restoration CO Aug 28  
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Direct Trade Details  
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Construction Cost Estimate  
CHA Consulting - 23 August 2021





Stow Town Hall Restoration  
Stow, MA

DIRECT TRADE COST DETAILS

\$,833 GSF

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS QUANTITY	COST	ACCESSIBILITY QUANTITY	COST	SUPPORT FACILITIES QUANTITY	COST	RESTORATION QUANTITY	COST	COST CODES
830	Cape cod berm	LF	\$18.00							25	\$450	4.f
831	Pavement markings	LS	\$3,500.00							1	\$3,500	4.f
832	Asphalt walkway paving, 2" base, 1" top	SF	\$4.75							284	\$1,349	4.f
833	Gravel base, 6" thick	CY	\$38.00							8	\$293	4.f
834	Concrete paving, seeded exposed aggregate, sawcut, 4" thick	SF	\$16.50							469	\$7,739	4.f
835	Gravel base, 8" thick	CY	\$38.00							13	\$484	4.f
836	Concrete paving, seeded exposed aggregate, 4" thick	SF	\$14.50							804	\$11,658	4.f
837	Gravel base, 8" thick	CY	\$38.00							22	\$830	4.f
838	Curb cuts	EA	\$850.00							2	\$1,700	4.f
839	Detachable warning strips	SF	\$95.00							30	\$2,850	4.f
840	2" rigid insulation for frost protection	SF	\$5.00							54	\$270	4.f
841	Cobblestone banding, reclaimed, 5.5" thick	SF	\$8.50							94	\$799	4.f
842	Concrete base, 5" thick	SF	\$8.00							103	\$827	4.f
843	Gravel base, 8" thick	CY	\$38.00							3	\$107	4.f
844	Granite curbing	LF	\$42.00							172	\$7,224	4.f
845	Concrete stairs	SF	\$95.00							76	\$7,220	4.f
846	32 10 00 Paving and Surfacing Total				\$0		\$0				\$58,714	
847												
848	32 30 00 Site Improvements											
849	VRF Pads	EA	\$7,500.00	1	\$7,500							1.d
850	12 93 00 Site Furnishings											
851	Hay scale historical marker	AL	\$5,000.00							1	\$5,000	4.f
852	Granite bench x6' long, wood top	AL	\$8,500.00							1	\$8,500	4.f
853	Metal handrails at stairs and ramp	LF	\$245.00							48	\$11,856	4.f
854	Misc. metal handrails (shown as TBD)	LF	\$245.00							30	\$7,350	4.f
855	Misc. site signage	LS	\$2,500.00							1	\$2,500	4.f
856	Bike rack	LS	\$5,000.00							1	\$5,000	4.f
857	32 31 00 Fencing											
858	Rebuild stone retaining wall at lower entry - Div 04 Masonry											
859	Wood fencing, 8" height to match existing	LF	\$175.00							35	\$6,125	4.d
860	Wood fencing, 10" height double layer sound attenuating	LF	\$225.00									4.c
861	Wood gate, 10" height double layer sound attenuating	EA	\$2,750.00	1	\$2,750							1.d
862	32 30 00 Site Improvements Total				\$18,125		\$0				\$46,333	
863												
864	32 90 00 Planting											
865	32 91 00 Loam and Planting Preparation											
866	32 92 00 Turf and Grasses											
867	Loam and seed, 6" thick topsoil	SF	\$3.50							3,750	\$13,125	4.f
868	Planting bed, 12" thick planting soil	SF	\$25.00							45	\$1,125	4.f
869	Crushed stone strip, 12" thick planting soil	SF	\$20.00							132	\$2,640	4.f
870	CC - Carpinus caroliniana 2.5-3.0" cal.	EA	\$975.00							2	\$1,950	4.f
871	TMD - Taxus x media 'Densaformis', 24" height	EA	\$185.00							4	\$740	4.f

Direct Trade Detailing  
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Stow Town Hall Restoration  
Stow, MA

DIRECT TRADE COST DETAILS

ROW	ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS		ACCESSIBILITY		SUPPORT FACILITIES		RESTORATION		COST CODES
				QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	
872	PV - Panicum virgatum 'Cape Breeze'; 2 gal.	EA	\$45.00							8	\$360	4.f
873	NT - Nardissus 'Tele-a-Tele'; 2 gal.	EA	\$45.00							8	\$360	4.f
874	32.00.00 Planting Total				\$0				\$0		\$20,300	
875												
876												
877	33 UTILITIES											
878												
879	33.30.00 Sanitary Sewerage											
880	Reset vent pipe, new decorative cover											
881	33.30.00 Sanitary Sewerage Total	LOC	\$1,200.00	1	\$1,200				\$0			2.f
882					\$0						\$0	
883	33.40.00 Storm Drainage											
884	DWH	EA	\$7,500.00							1	\$7,500	4.e
885	Clean out	EA	\$850.00							1	\$850	4.e
886	6" Sch40 PVC pipe	LF	\$125.00							70	\$8,750	4.e
887	Connect to existing; core & boot	EA	\$4,500.00							1	\$4,500	4.e
888	Clean out	EA	\$950.00							1	\$950	4.e
889	Slot Drain	LF	\$395.00							8	\$3,160	4.e
890	6" HDPE pipe	LF	\$135.00							42	\$5,670	4.e
891	Connect to existing; core & boot	EA	\$4,500.00							1	\$4,500	4.e
892	33.40.00 Storm Drainage Total				\$0				\$0		\$35,930	
893												
894	36.00.00 Site Electrical Support											
895	Earthwork, etc.	LF	\$45.00	100	\$4,500							1.e
896	36.00.00 Site Electrical Support Total				\$4,500				\$0		\$0	
897												
898												
899												

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Construction Cost Estimate  
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Stow Town Hall Restoration  
5,833 GSF  
Stow, MA

ALTERNATES

ELEMENT			BUILDING SYSTEMS		ACCESSIBILITY		SUPPORT FACILITIES		RESTORATION	
	UNIT	UNIT RATE	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST
ALTERNATE NO. 1										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
ALTERNATE NO. 2										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
ALTERNATE NO. 3										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
ALTERNATE NO. 4										
41										
42										
43										
44										
45										
46										

Alternates  
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CHA Consulting - 23 August 2021





Stow Town Hall Restoration  
5,833 GSF  
Stow, MA

ALTERNATES

ELEMENT	UNIT	UNIT RATE	BUILDING SYSTEMS		ACCESSIBILITY		SUPPORT FACILITIES		RESTORATION	
			QUANTITY	COST	QUANTITY	COST	QUANTITY	COST	QUANTITY	COST
47 R&D asphalt pavement	SF	\$1.50			852	\$1,278				
48 R&S granite curbing	LF	\$20.00			140	\$2,800				
49 R&D concrete walkway	SF	\$20.00			214	\$4,280				
50 Asphalt vehicular paving, 2.5" base, 1.5" top	SF	\$5.50			852	\$4,686				
51 Gravel base, 12" thick	CY	\$38.00			35	\$1,319				
52 Cape cod berm	LF	\$18.00			23	\$414				
53 Concrete paving, exposed aggregate, 4" thick	SF	\$11.50			435	\$5,003				
54 Gravel base, 3" thick	CY	\$38.00			12	\$449				
55 Curb cuts	EA	\$850.00			2	\$1,700				
56 Detectable warning strips	SF	\$85.00			59	\$5,015				
57 Granite curbing	LF	\$42.00			140	\$5,880				
58 Pavement markings	LS	\$1,500.00			1	\$1,500				
59 Loam and seed, 6" thick topsoil	SF	\$3.00			641	\$1,923				
60 Area drain	EA	\$2,500.00			1	\$2,500				
61 6" HDPE pipe	LF	\$135.00			42	\$5,670				
62 Bioretention Basin	SF	\$20.00			310	\$6,200				
63 ALT 2 per Site Drawings										
64 Stormwater CB: lower rim elevation	EA	\$7,500.00			1	\$7,500				
65 Patch asphalt paving	LS	\$5,000.00			1	\$5,000				
66 Burdens, Markups and Escalation			36%	\$0	37%	\$25,749	39%	\$0	36%	\$0
67 Alternate No. 4 Total				\$0		\$95,900		\$0		\$0
68										
69										
70										

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Alternates  
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## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **PHOTOGRAPHS OF EXISTING CONDITIONS**

- B.01** EXTERIOR
- B.10** BASEMENT LEVEL
- B.17** 1895 ELL / FIRST FLOOR
- B.19** 1895 ELL / ATTIC LEVEL
- B.22** 1848 FIRST FLOOR
- B.26** 1848 BALCONY & ATTIC

EXTERIOR

200421-IMG\_6472.JPG



*Stow Town Hall on Triangular Lot Formed by  
Confluence of Great Road and Crescent Street;  
Prominent Character-Defining Facade*

EXTERIOR

200421-IMG\_6473.JPG



*View of Town Hall from Southwest at Great Road;  
Pedestrian Crossing from Town Offices Building*

EXTERIOR

200421-IMG\_6476.JPG



*South Facade of 1848 Portion with 1895 Addition at Right;  
Low Clapboard Wall is Guardrail for Accessible Ramp;  
Fire Escape Stair Exit from Great Hall Balcony*

EXTERIOR

200421-IMG\_6475.JPG



*1895 Ell Addition at South Side of 1848 Building;  
Accessible Ramp to Ground Floor Wraps SE Corner*



EXTERIOR

200421-IMG\_6471.JPG



*West Facade and Historic 1848 Entrance;  
1895 Ell Addition at Right Adjacent to Great Road via  
Accessible Ramp; Crescent Street at Left*

EXTERIOR

200421-IMG\_6488.JPG



*Foreground of Main Facade with Cobbles, Lawn & Flagpole;  
Railing at Accessible Ramp Leads to Ell Entrance at Right*

EXTERIOR

200421-IMG\_6489.JPG



*Former Parking Area in Front of Town Hall Now  
Paved with Cobbles, Granite Steps and Bollards*

EXTERIOR

200421-IMG\_6486.JPG



*No Parking Sign at South Side on Great Road plus Cones  
Reinforce that Former Front Parking Area is Gone*

EXTERIOR

200421-IMG\_6490.JPG



*Pilasters & Clapboards at NW Corner of Primary Facade*

EXTERIOR

200421-IMG\_6494.JPG



*Ionic Volute Capitals on Fluted Columns of Pediment;  
Sign Band on Added Wood Board Across Pediment*

EXTERIOR

200421-IMG\_6492.JPG



*One of Two Lanterns at Corner Pilasters of West Facade*

EXTERIOR

200421-IMG\_6493.JPG



*Suspended Lantern Below Pediment Above Central Entrance*



EXTERIOR

200421-IMG\_6460.JPG



*Flanking Window to Left of Central Entrance;  
Two Granite Steps up to Granite Plinth*

EXTERIOR

200421-IMG\_6461.JPG



*1848 Granite Steps to Entrance Stoop with Pair of Railings;  
Each Riser Varies in Height to Granite Plinth and to  
Final Step at Wooden Door Threshold to Foyer*

EXTERIOR

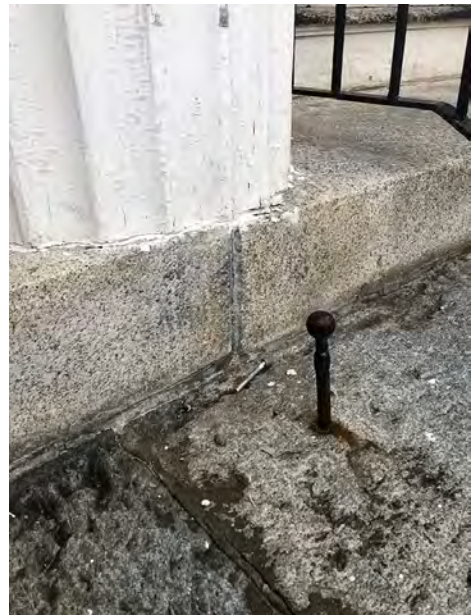
200421-IMG\_6469.JPG



*Intact Boot Scraper at South Side of 1848 Entrance;  
Base of Painted Fluted Column on Granite Plinth*

EXTERIOR

200421-IMG\_6470.JPG



*North Side Boot Scraper Missing Horizontal Component*

EXTERIOR

200421-IMG\_6459.JPG



*Carpenter Micah Smith Built Town Hall and Resided in Stow at 184 Gleasondale Road*

EXTERIOR

200421-IMG\_6464.JPG



*Side Door Canopy, Chimney and Dormer at 1895 Ell Addition Adjacent to South Facade at Left*

EXTERIOR

200421-IMG\_6462.JPG



*Accessible Ramp at Front Facade Heading South and East to Side Entrance at 1895 Ell Addition*

EXTERIOR

200421-IMG\_6463.JPG



*Accessible Ramp Heading East to Ell Entrance; Fire Escape Serving Balcony of Great Hall at Left; Dormer in 1895 Attic; Chimney Flue for Furnaces*



EXTERIOR

200421-IMG\_6466.JPG



*1895 Ell Entrance to Stair Hall at Accessible Ramp;  
Inadequate Strike Side Clearance at Pull (18" Required);  
Chimney at Interior Restricts Clearance on Hinge Side*

EXTERIOR

200421-IMG\_6467.JPG



*Looking West From Ell Entrance Down Ramp;  
Fire Escape Exit Stairs from Balcony of Great Hall*

EXTERIOR

200421-IMG\_6479.JPG



*South Door into 1895 Ell Addition Adjacent to  
Great Road Sidewalk Leads into Stair Hall;  
Accessible Ramp at Lower Left in Foreground;  
Service Alley Adjacent to Stone Retaining Wall Beyond*

EXTERIOR

200421-IMG\_6478.JPG



*Accessible Ramp at East Side of 1895 Ell to  
Ground Floor Enters at Former Office Area;  
Ramp is on Abutter's Property with Permission;  
Upper Landing Area & Door Clearances Inadequate*

EXTERIOR

200421-IMG\_6452.JPG



*View from Crescent Street at NE Corner of Building;  
East Facade with Cased Faux Windows  
at First Floor and Attic Levels*

EXTERIOR

200421-IMG\_6453.JPG



*Tooling Marks in Granite at Base of NE Cornerstone;  
Retaining Wall in Foreground Toward Crescent Street*

EXTERIOR

200421-IMG\_6454.JPG



*Inoperable Door from Ground Floor in East Facade  
Blocked by Elevated Height of Finished Grade*

EXTERIOR

200421-IMG\_6455.JPG



*6-over-6 Wood Window Sash in East Facade of Ground  
Floor at 1895 Ell Addition; Painted Wood Clapboards*



EXTERIOR

200421-IMG\_6457.JPG



*Custom Bicycle Rack on Concrete Pad at  
NW Corner of Building on Crescent Street*

EXTERIOR

200421-IMG\_6456.JPG



*Electrical Meter at North Facade Near NW Corner;  
Existing Service is 100-Amp, Single-Phase, 120/240-Volt*

EXTERIOR

200421-IMG\_6458.JPG



*Fuel Oil Fill & Vent at North Facade Adjacent to NW Corner*

EXTERIOR

200421-IMG\_6465.JPG



*Pneumatic Tank in South Yard for Former Fire Horn;  
Abandoned Horn Penetrated Roof for Town Notifications*

EXTERIOR

200421-IMG\_6480.JPG



*Service Alley to Cellar Entrance Adjacent to 1895 Addition;  
Bulging Rubble Stone Retaining Wall at Left Side of Alley;  
Knox Box for Fire Department Keys at SW Corner of Ell*

EXTERIOR

200421-IMG\_6482.JPG



*Insulation in Blocked Window Opening of Kitchen in  
West Wall of 1895 Ell Adjacent to Service Entrance;  
Window Not Visible from Interior of Kitchen*

EXTERIOR

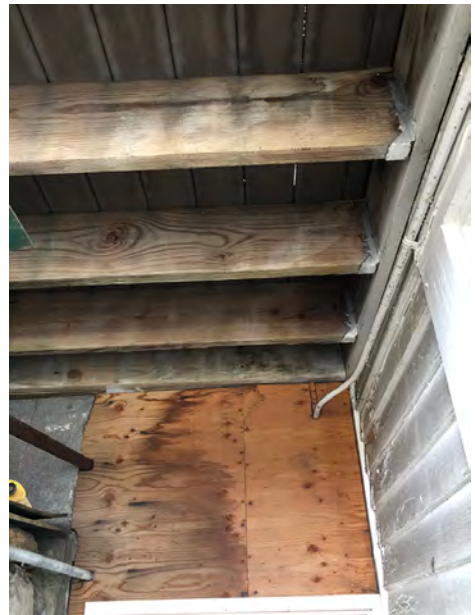
200421-IMG\_6481.JPG



*Wooden Post Bearing on Rubble Masonry at Ramp Structure  
to Side Entrance Adjacent to Abandoned Pneumatic Tank  
Serving Former Fire Alarm Notification System for Town*

EXTERIOR

200421-IMG\_6483.JPG



*Exposed Framing of Ell Entrance Landing;  
Plywood Sheathing at Wall Above Service Door*



**BASEMENT LEVEL**

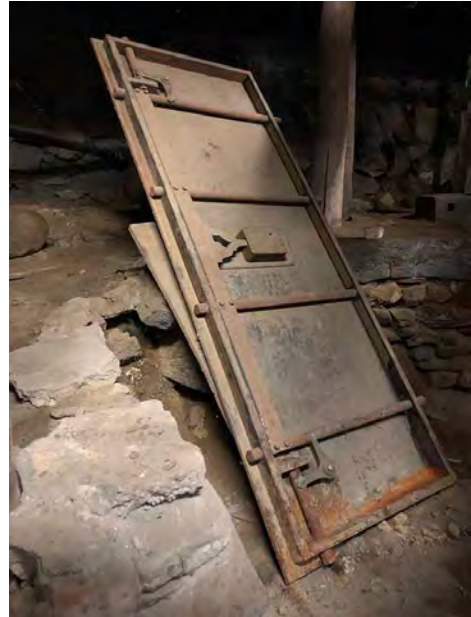
200505-IMG\_6764.JPG



*Looking South Thru Service Alley  
Toward Great Road from Cellar Door;  
Bulging Stone Retaining Wall at Right;  
Blocked Kitchen Window at Left*

**BASEMENT LEVEL**

200505-IMG\_6765.JPG



*Abandoned Steel Vault Door in Cellar*

**BASEMENT LEVEL**

200505-IMG\_6762.JPG



*Abandoned Interior Air Tanks for Former Fire Horn  
System Adjacent to South Foundation Wall;  
Concrete Buttress Added to South Stone Wall*

**BASEMENT LEVEL**

200505-IMG\_6753.JPG



*Active Fuel Oil Tank Adjacent to North Foundation Wall  
Serves Pair of Hot-Air Furnaces for Heating System*

BASEMENT LEVEL

200505-IMG\_6759.JPG



*One of Two Oil-Fired Hot-Air Furnaces in Cellar*

BASEMENT LEVEL

200505-IMG\_6756.JPG



*Pair of Oil-Fired Hot Air Furnaces in Cellar Mechanical Room; Existing Heating System*

BASEMENT LEVEL

200505-IMG\_6766.JPG



*Combustion Air Opening in Cellar Slab at Base of Duct Along East Wall Adjacent to Furnaces*

BASEMENT LEVEL

200505-IMG\_6763.JPG



*Hewn Timber Log Post Adjacent to Oil-Fired Hot Air Furnace*



BASEMENT LEVEL

200505-IMG\_6752.JPG



*Pressurized Well Tank Adjacent to Electrically Grounded Water Service at North Rubble Foundation Wall*

BASEMENT LEVEL

200505-IMG\_6760.JPG



*Abandoned Compressor in Mechanical Room for Former Air Horn Fire Alarm Notification System*

BASEMENT LEVEL

200505-IMG\_6754.JPG



*Fire Alarm Control Panel Components in East Wall of Mechanical Room*

BASEMENT LEVEL

200505-IMG\_6761.JPG



*Timber Post on Concrete Pad over Rubble Masonry*

BASEMENT LEVEL

200505-IMG\_6758.JPG



*Electrical Service Panel at East Wall of Mechanical Room in Cellar*

BASEMENT LEVEL

200505-IMG\_6757.JPG



*Patch Panel for Telephone and Cable Service at East Wall of Mechanical Room in Cellar*

BASEMENT LEVEL

200505-IMG\_6751.JPG



*Raised Threshold at Door from Ground Floor Former Office Area to Mechanical Room in Cellar*

BASEMENT LEVEL

200505-IMG\_6768.JPG

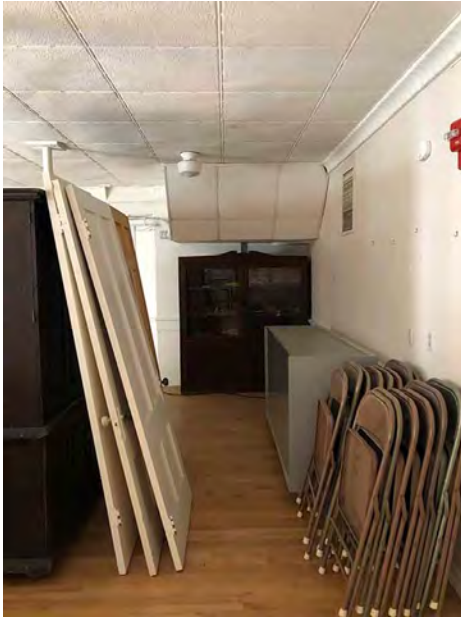


*Evidence of Water Infiltration at Blocked Cellar Sash in NW Corner of Former Ground Floor Office; Plaster Finishes Conceal Rubble Stone Foundation Wall at North Side*



**BASEMENT LEVEL**

200505-IMG\_6769.JPG



*Painted Tin Ceiling and Wood Flooring at Ground Floor;  
Soffits at Furnace Flues in SW Corner of Former Office;  
Mechanical Room at Right*

**BASEMENT LEVEL**

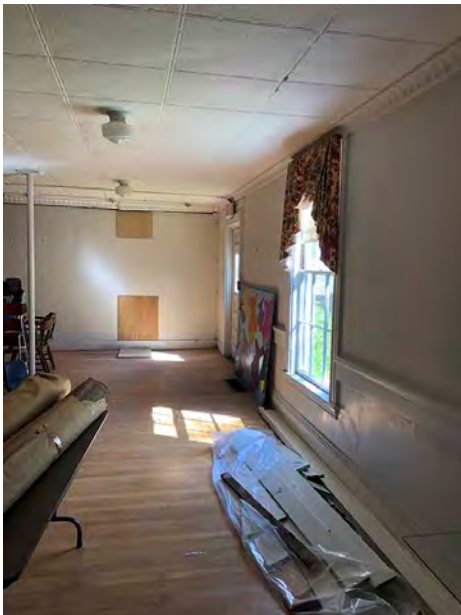
200505-IMG\_6770.JPG



*Exit Door to Exterior Ramp at SE Corner of Former  
Ground Floor Office Area; Strike Side Push Clearance at  
Door Inadequate on Interior Side of Exit;  
Pull Side Clearance at Exterior also Inadequate*

**BASEMENT LEVEL**

200505-IMG\_6750.JPG



*Looking North to NE Corner in Ground Floor;  
Painted Tin Ceiling, Wood Flooring, Plaster Walls;  
6-over-6 Window; Blocked Exit Door Beyond*

**BASEMENT LEVEL**

200505-IMG\_6749.JPG



*SW Corner of Former Office Area Adjacent to Kitchen;  
Acoustical Tile Ceiling Soffit Conceals Oil-Fired  
Furnace Flues to Brick Chimney at Left*

**BASEMENT LEVEL**

200505-IMG\_6771.JPG



*SW Corner of Ground Floor Kitchen with Ceiling Soffit Below Stairs to First Floor; Gas Range at Right (Gas Service Disconnected)*

**BASEMENT LEVEL**

200505-IMG\_6746.JPG



*Ground Floor Kitchen View to NW Corner; Brick Chimney Enclosure Behind Refrigerator; Gas Stove without Gas Service or Exhaust Hood; Water Heater & Drain Ejector Pump Under Counter*

**BASEMENT LEVEL**

200505-IMG\_6772.JPG



*East Side of Ground Floor Kitchen with Microwave*

**BASEMENT LEVEL**

200505-IMG\_6773.JPG



*Copper Piping Penetrating Tin Crown Above Kitchen Ceiling*



**BASEMENT LEVEL**

200505-IMG\_6748.JPG



*Painted Heating Ducts at Ceiling Serve Restrooms Above;  
Ceiling Removed Due to Recent Water Leak; Temporary  
Dehumidifiers (Blue) at Floor Level*

**BASEMENT LEVEL**

200505-IMG\_6747.JPG



*Dehumidifiers in Former Office Below Restrooms  
Following Recently Repaired Water Leak;  
Former Ceiling Removed to Expose Wood Framing*

**BASEMENT LEVEL**

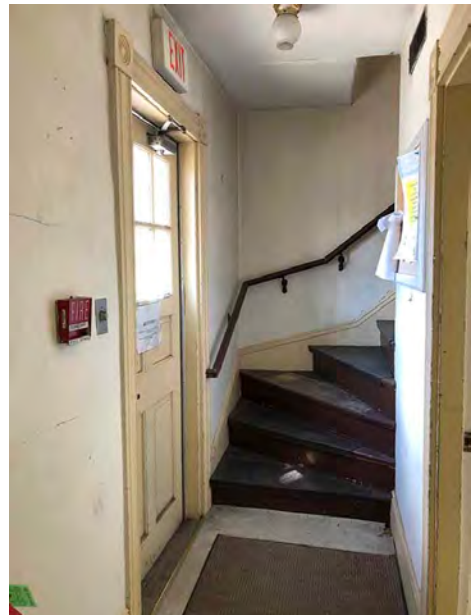
200505-IMG\_6774.JPG



*Copper Piping, Abandoned Light Fixture and  
Painted Tin Above Kitchen Acoustical Ceiling*

**BASEMENT LEVEL**

200505-IMG\_6775.JPG

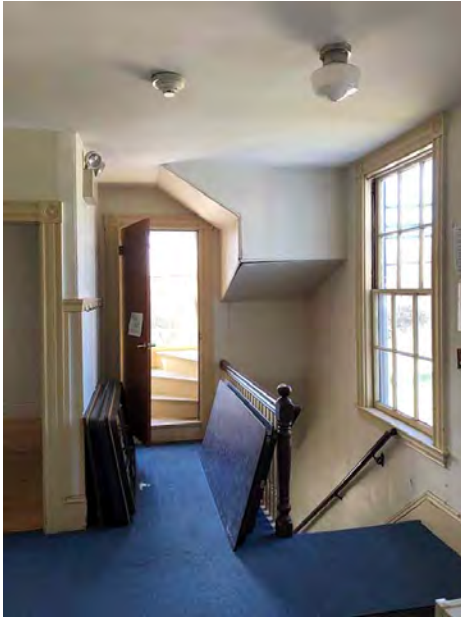


*Winder Stairs to First Floor in SW Corner of 1895 Addition;  
Exterior Door to Sidewalk in South Facade at Left*



1895 ELL / FIRST FLOOR

200505-IMG\_6724.JPG



*Looking South in 1895 Stair Hall at First Floor;  
Stairs Down to Ground Floor at Right;  
Stairs Up to Attic at Left*

1895 ELL / FIRST FLOOR

200505-IMG\_6744.JPG



*Looking Down Winder Stairs in 1895 Ell from  
First Floor to Ground Floor Level*

1895 ELL / FIRST FLOOR

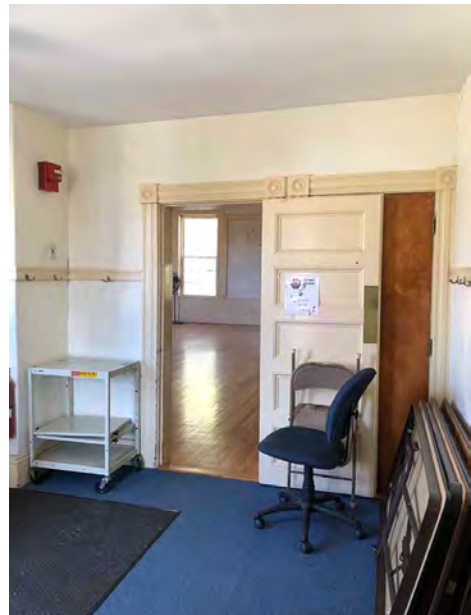
200505-IMG\_6730.JPG



*Side Entrance from Exterior Ramp into 1895 Addition at  
First Floor Stair Hall; Chimney Enclosure at Right;  
Stairs Down to Ground Floor at Left*

1895 ELL / FIRST FLOOR

200505-IMG\_6729.JPG



*One of Two Doors from Ell Addition into Great Hall;  
Each Door is 32" Wide and not Handicap Accessible*

1895 ELL / FIRST FLOOR

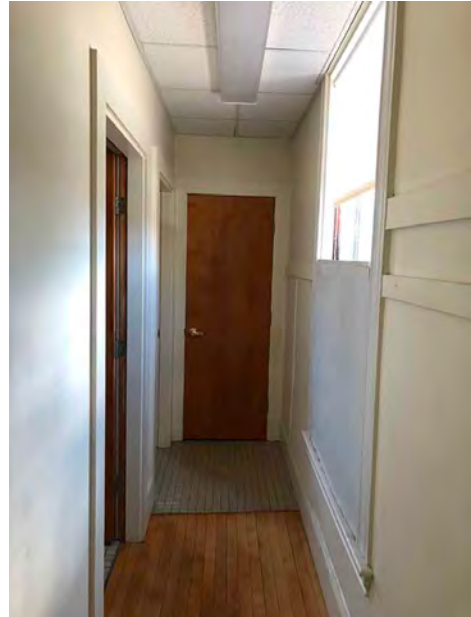
200505-IMG\_6725.JPG



*Former Office at First Floor of 1895 Ell  
Adjacent to Stair Hall; Window in East Wall;  
Louvered Strip Fluorescent Light Fixture;  
32" Wide Door not Handicap Accessible*

1895 ELL / FIRST FLOOR

200505-IMG\_6726.JPG



*Passage at South Side of Building to Public Restrooms;  
Wrap Around Acrylic Light Fixture & Acoustical Tile;  
Door to Custodial Closet at End of Hall*

1895 ELL / FIRST FLOOR

200505-IMG\_6728.JPG



*First of Two Public Accessible Restrooms at  
First Floor of 1895 Ell Addition*

1895 ELL / FIRST FLOOR

200505-IMG\_6727.JPG



*Second of Two Public Accessible Restrooms at  
First Floor in SE Corner of 1895 Ell*

1895 ELL / ATTIC LEVEL

200505-IMG\_6732.JPG



*Winder Stairs from First Floor of 1895 Ell to Attic;  
No Handrails at Stair*

1895 ELL / ATTIC LEVEL

200505-IMG\_6733.JPG



*Window in 1895 Attic Stairs with View of Parking Lot at  
1989 Stow Town Offices on South Side of Great Road*

1895 ELL / ATTIC LEVEL

200505-IMG\_6743.JPG



*Looking Down 1895 Ell Attic Winder Stairs;  
No Handrails; South Wall Window at Great Road*

1895 ELL / ATTIC LEVEL

200505-IMG\_6740.JPG



*Pair of Windows in South Wall of 1895 Ell Attic Addition*



1895 ELL / ATTIC LEVEL

200505-IMG\_6734.JPG



*Parged Brick Furnace Chimney in NW Corner of 1895 Attic  
Adjacent to Former Exterior Wall of 1848 Town Hall;  
Original Clapboards of South Wall Removed*

1895 ELL / ATTIC LEVEL

200505-IMG\_6735.JPG



*Siding Removed Revealing Lath & Plaster of 1848 Wall;  
Wood Shingles Remaining at South Slope of 1848 Roof*

1895 ELL / ATTIC LEVEL

200505-IMG\_6738.JPG



*Detail of Wood Shingles at 1848 Roof Surface;  
Wood Lath and Plaster Keys in Great Hall Wall Where  
Plaster was Replaced in 1895 when Ell was Added*

1895 ELL / ATTIC LEVEL

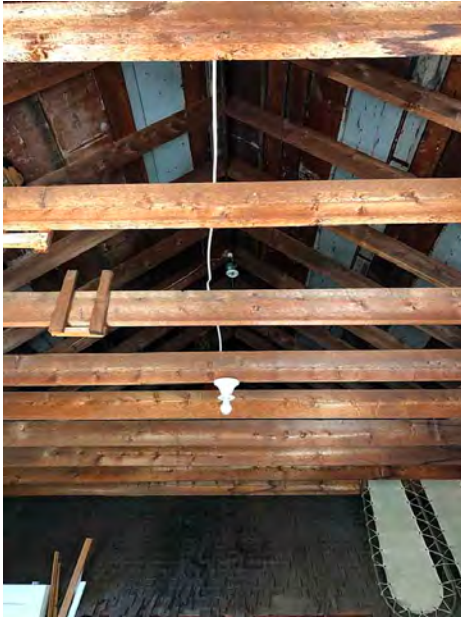
200505-IMG\_6737.JPG



*Exposed Timber Beam End at NE Corner of 1895 Attic  
Adjacent to SE Corner of Original 1848 Wall*

1895 ELL / ATTIC LEVEL

200505-IMG\_6741.JPG



*Collar Ties in Roof Framing of 1895 Ell Addition*

1895 ELL / ATTIC LEVEL

200505-IMG\_6739.JPG



*Looking West in Ell Attic at Dormer Above Side Entry;  
Transom Sash of Stair Hall Window Below at Floor Level*

1895 ELL / ATTIC LEVEL

200505-IMG\_6742.JPG



*Exposed Wood Stud and Board Sheathing at  
NW Corner of 1895 Ell Attic Stair;  
Plaster Finish Stops at Attic Floor Level*

1895 ELL / ATTIC LEVEL

200505-IMG\_6736.JPG



*Plumbing Vent from Restrooms at First Floor and  
Kitchen at Ground Floor Installed Exposed  
Above Floor Level of 1895 Ell Attic*



1848 FIRST FLOOR

200505-IMG\_6808.JPG



*Former Office Area in SW Corner of Building;  
Sloping Embossed Tin Ceiling Below Balcony Framing*

1848 FIRST FLOOR

200505-IMG\_6809.JPG



*Looking North in Former Office Adjacent to 1848 Entrance  
Foyer Beyond; Sloping Tin Ceiling of Balcony Above;  
32" Wide Door not Handicap Accessible*

1848 FIRST FLOOR

200505-IMG\_6810.JPG



*Detail of Painted Tin Crown Moulding at Ceiling of  
Former Office on South Side of 1848 Entrance Foyer*

1848 FIRST FLOOR

200505-IMG\_6812.JPG



*Four-Panel Door Leading from 1848 Entrance Foyer  
into Former Office at North Side of Foyer;  
32" Wide Door not Handicap Accessible*

## 1848 FIRST FLOOR

200505-IMG\_6807.JPG



*Great Hall and Balcony with Entrance Foyer Beyond;  
Built-in Cabinetry Added in 2000 Renovation;  
Duct Chases from Oil-Fired Furnaces Below;  
Attic Access Ladder Visible at Upper Left*

## 1848 FIRST FLOOR

200505-IMG\_6813.JPG



*Looking North in Great Hall Across Oak Flooring;  
Ceiling Fans and Floor Fan are Existing "Cooling" System*

## 1848 FIRST FLOOR

200505-IMG\_6777.JPG



*Stage of Great Hall with Podium and Town Quilt;  
Storage Closets on Each Side of Stage from 2000*

## 1848 FIRST FLOOR

200505-IMG\_6806.JPG



*Pair of Doors at Exit from Great Hall to 1895 Ell;  
Head Casing Detail Matches Windows of Town Hall;  
Doors 32" Wide not Handicap Accessible*



## 1848 FIRST FLOOR

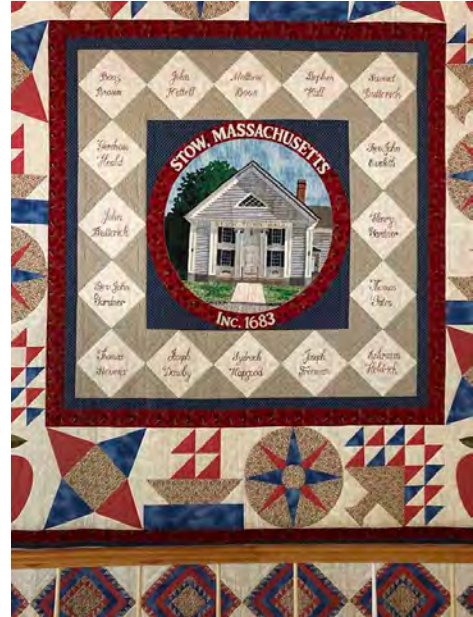
200505-IMG\_6817.JPG



*One Tread and Two Risers to Great Hall Stage at Each End of Stage; Stage not Wheelchair Accessible*

## 1848 FIRST FLOOR

200505-IMG\_6816.JPG



*Town Seal in the Quilt Referenced in Historical Society Newsletter of February 2000 (Headed by Clare Tozeski)*

## 1848 FIRST FLOOR

200505-IMG\_6776.JPG



*Chair Storage Dollies and Closet at SE Corner of Great Hall; Projection Screen Mounted at Angle Above Storage in Cased "Beam" is Manually Operated with Pull String; Video or Slide Projector is Setup on Stand When Used*

## 1848 FIRST FLOOR

200505-IMG\_6780.JPG



*Peeling Paint at Plaster of Great Hall; Painted Wainscoting Below Windows and Acoustical Finish Above Windows; Wall-Mounted Clock on North Wall of Great Hall; Exterior Walls are not Insulated*

1848 FIRST FLOOR

200505-IMG\_6814.JPG



*Textured Ceiling Finish Reduced Reverberation in Great Hall;  
Acoustical Finish and Light Fixtures Referenced in "Stow-Info"  
Historical Society Newsletter of February 2000*

1848 FIRST FLOOR

200505-IMG\_6782.JPG



*Great Hall Window Head Casing and  
Fixed Interior Shutters at Jamb;  
Former Drapery Hardware at Head*

1848 FIRST FLOOR

200505-IMG\_6783.JPG



*Greek Revival Muntin Profiles in Great Hall Window Sash;  
Half Screens Visible at Exterior of Lower Sash*

1848 FIRST FLOOR

200505-IMG\_6781.JPG



*Interior Shutter Fixed in Place at Great Hall Window  
Appears to be Solely Decorative - Not  
Wide Enough to Cover Half of the Window*



1848 BALCONY & ATTIC

200505-IMG\_6786.JPG



*Stair Leading from Main Hall to Balcony in NW Corner;  
Discontinuous Handrails on Both Sides of Stairs*

1848 BALCONY & ATTIC

200505-IMG\_6787.JPG



*Guard Rail Adjacent to Balcony Stair at Window Opening*

1848 BALCONY & ATTIC

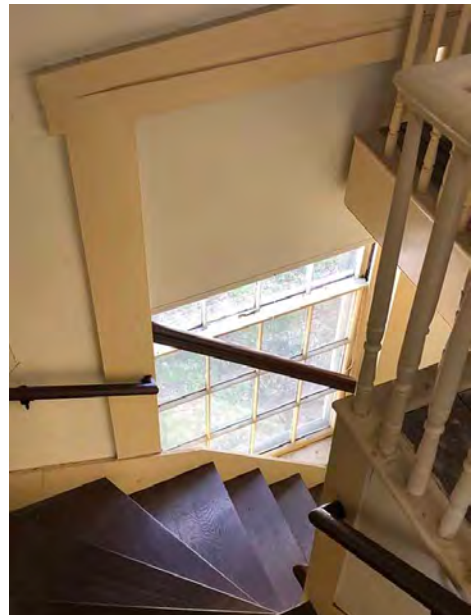
200505-IMG\_6803.JPG



*Northwest Corner of Balcony at Stair;  
Outdoor Type Fixture Mounted on Wall*

1848 BALCONY & ATTIC

200505-IMG\_6804.JPG



*Looking Down the Winder Stair from Balcony;  
Discontinuous Handrails at Each Side of Stair;  
Guardrail in Window*

### 1848 BALCONY & ATTIC

200505-IMG\_6800.JPG



*Front Rows of Balcony with South Exit to Fire Escape;  
Exit Door Operates with Extreme Difficulty;  
Second Exit Required if 50 or More Occupants in Balcony*

### 1848 BALCONY & ATTIC

200505-IMG\_6788.JPG



*Back Row of Balcony with "Deacon's Bench" Seating;  
Differs from Other Folding Seating Sections in Balcony*

### 1848 BALCONY & ATTIC

200505-IMG\_6790.JPG



*Looking North in Balcony Area Toward Stair;  
Attic Access Thru Hatch in Wall at Right via  
Aluminum Ladder Hitched in Place & Removable*

### 1848 BALCONY & ATTIC

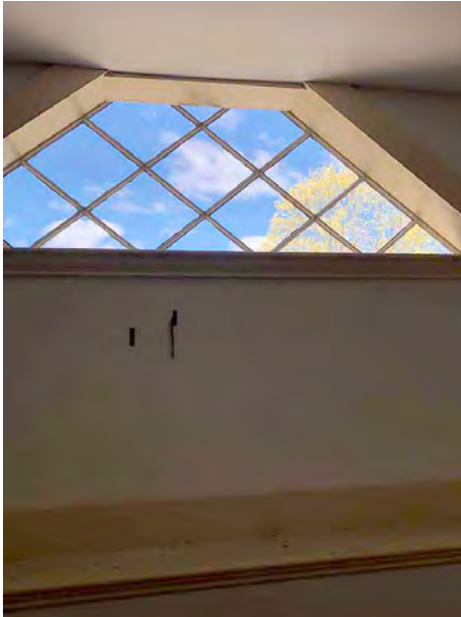
200505-IMG\_6789.JPG



*Looking South in Balcony Area;  
Total of Five Stepped Tiers in Balcony;  
Folding Chairs at Lower Four Tiers and  
Deacon's Bench at Upper Fifth Tier*

1848 BALCONY & ATTIC

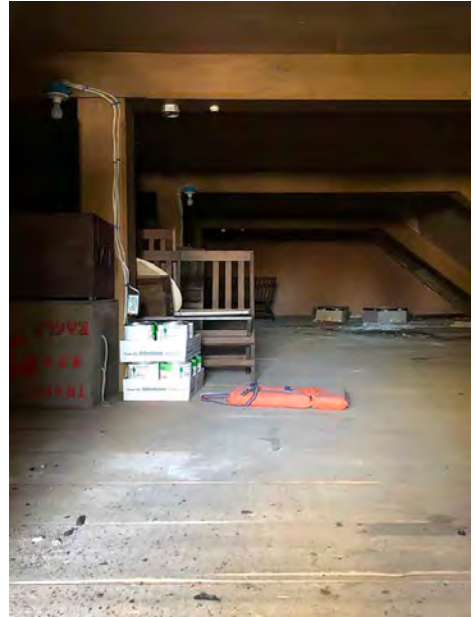
200505-IMG\_6792.JPG



*Iconic Window at Gable End of Entrance Facade  
Upper Portion Partially Concealed by Balcony Ceiling;  
Window Configuration Similar at Town Offices Building*

1848 BALCONY & ATTIC

200505-IMG\_6791.JPG



*Attic Area Above Main Hall with King Posts of Roof Trusses;  
Storage Area not Original from 1848 as Evidenced by  
Painted Casings on Timber Trusses and Plaster Ceiling*

1848 BALCONY & ATTIC

200505-IMG\_6793.JPG



*Projection Equipment at Front Row of Balcony;  
Storage Cabinet for Audiovisual Equipment;  
Local Access TV Channel 9 Identified on Cabinet*

1848 BALCONY & ATTIC

200505-IMG\_6794.JPG



*View of Great Hall Stage from Balcony Level;  
Storage Cabinets at Each Side of Stage Referenced as  
Part of Improvements in Feb 2000 "Stow-Info"*



1848 BALCONY & ATTIC

200505-IMG\_6801.JPG



*Painted Pilaster and Chamfered Beam at Intersection of Attic Framing to North Wall of Balcony at Main Hall; Low Headroom at Beam in Balcony (68" Above Tier 2); Pilaster Added as a Stop for Sprayed Acoustical Finish*

1848 BALCONY & ATTIC

200505-IMG\_6798.JPG



*Dual Head Battery Pack Emergency Light in Great Hall; Textured Finish at Upper Wall (and Ceiling) is Sprayed Acoustical Finish from 2000 Renovation*

1848 BALCONY & ATTIC

200505-IMG\_6796.JPG



*Pendant Ceiling Fixtures and Paddle Fans in Great Hall Referenced as Part of Renovations in 2000*

1848 BALCONY & ATTIC

200505-IMG\_6797.JPG



*Ribbed Glass Shade on Pendant Fixtures in Great Hall from 2000 Renovations*



## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **ACCESSIBILITY DOCUMENTATION**

- C.01** Accessibility Variance Process Summary
- C.02** Full Application for a Variance
- C.65** Letter of Support – Stow Historical Commission
- C.66** Notice of Determination – Massachusetts Historical Commission
- C.68** Initial “Notice of Action” on Incoming Case Application
- C.69** Submission for Continuation of Variance Application
- C.81** “Amended Notice of Action” on Continuation
- C.82** Request for Adjudicatory Hearing
- C.83** Adjudicatory Hearing Presentation to MAAB
- C.125** MAAB Decision / Procedural History

**Stow Town Hall**  
**Accessibility Variance Process Summary**  
**Massachusetts Architectural Access Board (MAAB)**

- 22 Jan 2021: Submitted Variance Application to Massachusetts Architectural Access Board  
 Submitted ADA Consultation Form to Massachusetts Historical Commission  
 Four variances requested as noted in the application:  
 14.1: Preservation of Tiered Balcony  
 25.1: Preservation of Historic Front Entrance  
 26.6: Strike Side Clearance at Stair Door  
 28.12.3a: Cab Size of Limited Use Limited Application Elevator
- 04 Feb 2021: Stow Historical Commission Letter of Support to Brona Simon, Executive Director of the Massachusetts Historical Commission (MHC)
- 05 Feb 2021: MHC Letter to MAAB supporting variance request for "no adverse effect"  
 Letter also notes building is "eligible for individual listing" in National Register
- 08 Feb 2021: MAAB reviewed variance application as an incoming case to review four requests  
 Accepted two variance requests; continued one and was silent on another  
 No representation by the Applicant per MAAB standards for incoming cases
- 11 Feb 2021: MAAB issued written decision of action on variance application requests  
 14.1: Continuation of request regarding who has access to the balcony  
 25.1: Granted variance subject to railing compliance at front steps with 521 CMR 27  
 26.6: No comment recorded on this request during incoming case review  
 28.12.3a: Granted variance as requested
- 12 Feb 2021: Submitted additional information on continuation of variance request 14.1  
 Also submitted an amended application requesting another variance  
 25.1: Requested relief from requiring ground floor accessible entrance
- 22 Feb 2021: MAAB reviewed continuation with no representation allowed by the Applicant
- 25 Feb 2021: MAAB issued amended decision of action on variance request and continuation:  
 14.1: Denied request for balcony accessibility relief; impracticability not shown  
 25.1: Denied request for ground floor entrance; impracticability not shown  
 26.6: Granted as requested
- 26 Feb 2021: Adjudicatory hearing requested for 14.1 and 25.1 as amended
- 05 Apr 2021: 26 Apr 2021: MAAB issued written decision of action on adjudicatory hearing requests:  
 14.1: Balcony access allowed for staff and AV personnel only; no public access  
 25.1: Ground floor accessible entrance relief granted as requested

*Accessibility Variance Process Summary*  
*Mills Whitaker Architects - January thru April 2021*

**CHARLES D. BAKER**  
GOVERNOR

**KARYN E. POLITO**  
LIEUTENANT GOVERNOR

**MIKE KENNEALY**  
SECRETARY OF HOUSING AND  
ECONOMIC DEVELOPMENT



**Commonwealth of Massachusetts  
Division of Professional Licensure  
Office of Public Safety and Inspections  
Architectural Access Board**

1000 Washington St., Suite 710 • Boston • MA • 02118  
V: 617-727-0660 • www.mass.gov/aab • Fax: 617-979-5459

**EDWARD A. PALLESCHI**  
UNDERSECRETARY OF  
CONSUMER AFFAIRS AND  
BUSINESS REGULATION

**DIANE M. SYMONDS**  
COMMISSIONER, DIVISION OF  
PROFESSIONAL LICENSURE

**APPLICATION FOR VARIANCE**

Docket: \_\_\_\_\_  
(Staff Only)

**INSTRUCTIONS:**

- 1) Answer all questions on this application to the best of your ability.
  - a. Information on the Variance Process can be found at: <https://www.mass.gov/guides/applying-for-an-aab-variance>.
- 2) Attach whatever documents you feel are necessary to meet the standard of impracticability laid out in 521 CMR 4.1. You must show that either:
  - a. Compliance is technologically infeasible, or
  - b. Compliance would result in an excessive and unreasonable cost without any substantial benefit for persons with disabilities.
- 3) Please ensure that attached documents are no larger than 11" x 17".
- 4) Sign the Application.
- 5) If the applicant is not the owner of the building or his or her agent, include a signed letter from the owner granting permission for you to apply for variance.
- 6) Burn copies of the application and all attached documents onto a Compact Disc (CD or DVD only, no flash drives will be accepted).
- 7) Provide full copies of the application and all attached documentation, on both Paper and CD/DVD to the:
  - a. Local Building Department,
  - b. Local Commission on Disability (if applicable in the town where the project is located) (A list of all active Disability Commissions can be found at: <https://www.mass.gov/commissions-on-disability>), and
  - c. The Independent Living Center (ILC) for your area.  
(Your ILC can be found at: <http://www.masilc.org/findacenter>.)
- 8) Provide to the Board:
  - a. A completed copy of the application and all attached documents,
  - b. A copy of the CD/DVD,
  - c. The completed, signed, and notarized Service Notice (included as Page 5 of this application).
  - d. A check or money order in the amount of \$50 dollars, made out to the Commonwealth of Massachusetts.

In accordance with M.G.L., c.22, § 13A, I hereby apply for modification of or substitution for the rules and regulations of the Architectural Access Board as they apply to the building/facility described below on the grounds that literal compliance with the Board's regulations is impracticable in my case.

1. State the name and address of the building/facility:

Stow Town Hall, 375 Great Road, Stow MA 01775

*Full Application for Accessibility Variance  
Mills Whitaker Architects - 18 January 2021*

2. State the name and address of the owner of the building/facility:

Town of Stow, 380 Great Road, Stow MA 01775

Attn: Denise Demboski, Town Administrator

E-mail: townadministrator@stow-ma.gov

Telephone: 978-897-2927

## 3. Describe the facility (i.e. number of floors, type of functions, use, etc.):

Two-story Greek Revival Town Hall building with ground floor, first floor and attic areas. Original portion constructed in 1848 and ell addition built in 1895. Used as a community center for public and private events since 1989 when a larger "Town Building" was provided across the street for the majority of municipal office functions. The building footprint is 2,562 SF.

4. Total square footage of the building: 5,833 SF Per floor: 2,562 SFa. total square footage of tenant space (if applicable): Not Applicable

## 5. Check the work performed or to be performed:

☐ New Construction ☐ Addition  
☒ Reconstruction/Remodeling/Alteration ☐ Change of Use

## 6. Briefly describe the extent and nature of the work performed or to be performed (use additional sheets if necessary):

Accessibility improvements to entrances at both levels, provision of an elevator between levels, and wheelchair access to the Great Hall stage. upgrading of HVAC systems and provision of building insulation for improved comfort and use. Restoration of historic character and enhancement of facility usability for the community. Refer to attachment for additional information.

7. Are you seeking temporary relief? Yes ☐ No ☒

a. If temporary relief is sought, what is the proposed deadline?

## 8. State each section of the Architectural Access Board's Regulations (521 CMR) for which a variance is being requested

**(Please note the Board will NOT consider requests for relief from Section 3, please list the specific items triggered by Section 3 where relief is being sought):**

## SECTION NUMBER

14.1  
 25.1  
 26.6  
 28.12.3a

## LOCATION OR DESCRIPTION

Preservation of Tiered Balcony  
 Preservation of Historic Front Entrance  
 Strike Side Clearances at Stair Door  
 Cab Size of Limited Use Elevator

*If requesting relief to 5 or more sections, use the Large Variance Tally Sheet available on the "Forms and Applications" page of the Board's website (<http://www.mass.gov/aab>)*



9. Is the building historically significant? ☒ yes ☐ no. If no, go to number 10.

9a. If yes, check one of the following and indicate date of listing:

\_\_\_\_ National Historic Landmark  
 \_\_\_\_ Listed individually on the National Register of Historic Places  
 \_\_\_\_ Located in registered historic district  
 \_\_\_\_ Listed in the State Register of Historic Places  
 \_\_\_\_ See MHC ADA Eligible for listing

9b. If you checked any of the above and your variance request is primarily based upon the historical significance of the building, you *must* complete the ADA Consultation Process of the Massachusetts Historical Commission, 220 Morrissey Boulevard, Boston, MA 02125.

10. For each variance requested, state in detail the reasons why compliance with the Board's regulations is impracticable (*use additional sheets if necessary*), including but not limited to: the necessary cost of the work required to achieve compliance with the regulations (i.e. written cost estimates); and plans justifying the cost of compliance.

See attachment for a detailed description of each request

11. Which section of the Board's Jurisdiction (*see Section 3 of the Board's Regulations*) has been triggered?

3.2 ☐ 3.3.1a ☐ 3.3.1b ☐ 3.3.2 ☒ 3.4 ☐ Other (List Section) \_\_\_\_\_

12. List all building permits that have been applied for within the past 36 months, include the issue date and the listed value of the work performed:

Permit #	Date of Issuance	Value of Work
2018-255	10/22/18	\$ 28,794.00

(Use additional sheets if necessary.)

13. List the anticipated construction cost for any work not yet permitted:

\$2,752,000

14. Has a certificate of occupancy been issued for the facility? Yes ☒ No ☐

If yes, state the date it was issued: 10/30/2018

15. To the best of your knowledge, has a complaint ever been filed on this building relative to accessibility? Yes ☐ No ☒

a. If so, list the AAB docket number of the complaint \_\_\_\_\_

16. For existing buildings, state the actual assessed valuation of the **BUILDING ONLY**, as recorded in the **Assessor's Office** of the municipality in which the building is located:


\$ 450,400.00

Is the assessment at 100%? No

If not, what is the town's current assessment ratio? 0.96 (FY 2020)

17. State the phase of design or construction of the facility as of the date of this application:  
Schematic Design
18. State the name and address of the architectural or engineering firm, including the name of the individual architect or engineer responsible for preparing drawings of the facility:  
Donald W. Mills, RA  
Mills Whitaker Architects LLC, PO Box 750089, Arlington MA 02475  
E-mail: donmills@millswhitaker.com  
Telephone: 617-876-7611, ext 2
19. State the name and address of the building inspector responsible for overseeing this project:  
Craig Martin, PE / Building Commissioner  
Stow Town Building, 380 Great Road, Stow MA 01775  
E-mail: building@stow-ma.gov  
Telephone: 978-897-2193

Date: 18 January 2021

  
**Signature of owner or authorized agent (required)**

**PLEASE PRINT:**

Donald W. Mills, RA

**Name**

Mills Whitaker Architects LLC

**Organization (if Applicable)**

PO Box 750089

**Address**

Address 2 (optional)

Arlington

MA

02475

**City/Town**

**State**

**Zip Code**

donmills@millswhitaker.com

**E-mail**

617-876-7611, ext 2

**Telephone**

## SERVICE NOTICE

I, Donald W. Mills, RA, as Agent (Architect)  
(name) (relationship to the applicant)  
 for the Petitioner Town of Stow (name of the applicant) submit a  
 variance application filed with the Massachusetts Architectural Access Board on 22 January 2021  
(date variance submitted)

HEREBY CERTIFY UNDER THE PAINS AND PENALTIES OF PERJURY THAT I SERVED OR CAUSED TO BE SERVED, A COPY OF THIS VARIANCE APPLICATION ON THE FOLLOWING PERSON(S) IN THE FOLLOWING MANNER:

	<u>NAME AND ADDRESS OF PERSON OR AGENCY SERVED</u>	<u>METHOD OF SERVICE</u>	<u>DATE OF SERVICE</u>
<b>1</b> Building Department	Craig Martin, PE Building Commissioner Stow Town Building 380 Great Road Stow MA 01775	Certified Mail	22 Jan 2021
<b>2</b> Local Commission on Disability (If Applicable)	Craig Martin, PE ADA Coordinator Stow Town Building 380 Great Road Stow MA 01775	Certified Mail	22 Jan 2021
<b>3</b> Independent Living Center	Paul Spooner, Executive Director MetroWest Center for Independent Living 280 Irving Street Framingham MA 01702	Certified Mail	22 Jan 2021

AND CERTIFY UNDER THE PAINS AND PENALTIES OF PERJURY THAT THE ABOVE STATEMENTS TO THE BEST OF MY KNOWLEDGE ARE TRUE AND ACCURATE.

Signature: Appellant or Petitioner *[Signature]*

On the 22<sup>nd</sup> Day of January 20 21  
 PERSONALLY APPEARED BEFORE ME THE ABOVE NAMED

Donald W. Mills, RA

(Type or Print the Name of the Appellant)

*[Signature]*  
 NOTARY PUBLIC





**The Commonwealth of Massachusetts**  
 William Francis Galvin, Secretary of the Commonwealth  
 Massachusetts Historical Commission - State Historic Preservation Office

**The Americans with Disabilities Act Consultation Process Form**

Name of Property: Stow Town Hall  
 Address of Property: Street: 375 Great Road  
 City: Stow County: Middlesex State: MA Zip: 01776

**Historic Designation/Status/Listing:**

- ☐ National Historic Landmark Date of Listing: \_\_\_\_\_
- ☐ Listed Individually in National Register of Historic Places Date of Listing: \_\_\_\_\_
- ☐ Located in registered historic district (specify 978-897-2927 ) Date of Listing: \_\_\_\_\_
- ☐ Listed in State Register of Historic Places Date of Listing: \_\_\_\_\_
- ☐ Eligible for listing (prepare and submit MHC inventory form, attach to application)

**Project Contact:**

Name: Donald W. Mills, RA  
 Street: PO Box 750089 City: Arlington  
 State: MA Zip: 02475 Daytime Telephone Number: 617-876-7611, ext 2

**Property Owner:**

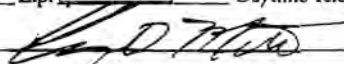
Name: Town of Stow / Attn: Denise Demboski, Town Administrator  
 Street: 380 Great Road City: Stow  
 State: MA Zip: 01775 Daytime Telephone Number: 978-897-2927  
 Signature: [Handwritten Signature]

(over) (R3)

*Full Application for Accessibility Variance  
 Mills Whitaker Architects - 18 January 2021*



**Consultation with individuals with disabilities and their organizations:**

Name: Craig Martin, PE / ADA Coordinator  
 Organization: Stow Building Department  
 Street: 380 Great Road City: Stow  
 State: MA Zip: 01775 Daytime Telephone Number: 978-897-2193  
 Signature:   
*Attach comments to form.*

**Consultation with local historical commission**

Name: Dorothy Spauding, Chair  
 Organization: Stow Historical Commission  
 Street: 380 Great Road City: Stow  
 State: MA Zip: 01775 Daytime Telephone Number: 978-562-6263  
*Attach comments to form.*

**Describe major significant architectural features of property. Include the overall shape of the building, its materials, craftsmanship, decorative details, interior space and features, as well as various aspects of its site and environment.**

Refer to the description of the building's historic character in the MHC Inventory Form B on file in the Massachusetts Cultural Resource Information System (MACRIS STW.57). Conditions have been consistent over the years, even after its primary municipal use converted to community use in 1989.

**Explain why applying the General Requirements for Barrier Free Access would threaten or destroy the historic significance of the property.**

Architectural feature(s): Original front central entrance on a raised granite plinth is characteristic of the Greek Revival style  
 Approximate date(s) of feature(s): Front entrance and balcony levels are original to 1848 construction; 1895 Ell more utilitarian  
 Describe existing condition(s): Minor interior alterations over time, most of which were in the Ell and basement level

**Describe the proposed alternative Barrier Free Access solution under the Special Rule [4.1.793]]. Include photographs, drawings, and all pertinent information to assist us in our review.**

Refer to the attached descriptions and details of the variance application to the Massachusetts Architectural Access Board in reference to a few requests for alternatives to full compliance with 521 CMR due to its resultant damage to historic materials, character and significant features of the original building and its integrity.

*Full Application for Accessibility Variance  
 Mills Whitaker Architects - 18 January 2021*

MILLS WHITAKER ARCHITECTS  
ARLINGTON, MA - [www.millswhitaker.com](http://www.millswhitaker.com) BOSTON, MA

22 January 2021

William Joyce, Executive Director  
Massachusetts Architectural Access Board  
1000 Washington Street, Suite 710  
Boston MA 02118

RE: Variance Application Payment Check  
Stow Town Hall / 375 Great Road / Stow MA 01775

Dear Mr. Joyce,

Enclosed please find our \$50 application fee for the variance application referenced above. We are submitting the application electronically in accordance with the online instructions that you forwarded.

It is our understanding that you do not require the CD noted on the checklist since there was no reference to this requirement in the instructions for the online submission. If we are mistaken, please let us know and I will send you a CD promptly.

If you have any questions regarding the application, please do not hesitate to contact me.

Sincerely,



Donald W. Mills, RA, NCARB, LEED AP  
Mills Whitaker Architects LLC

Enclosure

P.O. Box 750089  
Arlington MA 02475  
617.876.7611 voice  
617.876.6420 fax

*Full Application for Accessibility Variance  
Mills Whitaker Architects - 18 January 2021*



Denise M. Dembkoski  
Town Administrator  
[townadministrator@stow-ma.gov](mailto:townadministrator@stow-ma.gov)

***Town of Stow***  
***Office of the***  
***Town Administrator***

380 Great Road  
Stow, MA 01775  
Tel: 978-897-2927

January 21, 2021

Division of Professional Licensure  
Office of Public Safety and Inspections  
Architectural Access Board  
1000 Washington St, Suite 710  
Boston, MA 02118

To Whom it May Concern:

Please be advised that I give Donald Mills, of Mills Whitaker Architects LLC permission to seek variances through the AAB on behalf of the Town of Stow and our historic Town Hall located at 375 Great Road, Stow, MA.

Should you have any questions or need any information, please do not hesitate to contact me.

Very truly yours,

Denise M. Dembkoski  
Town Administrator

*Full Application for Accessibility Variance*  
*Mills Whitaker Architects - 18 January 2021*

**VARIANCE APPLICATION to the MASSACHUSETTS ARCHITECTURAL ACCESS BOARD**

**Stow Town Hall  
375 Great Road  
Stow MA 01775**

**Mills Whitaker Architects LLC  
18 January 2021**

**INTRODUCTION:**

Stow Town Hall is the most significant historic building in Stow Center, serving as the venue for town meetings and offices beginning in 1848, and for myriad community activities since 1989 after municipal office functions moved across the street to a newly constructed larger building. The restoration project will improve accessibility, upgrade building systems and enhance facility usability to better serve the community. Since the cost of the project triggers full compliance with current regulations for this historic building, a few variances from 521 CMR are requested as detailed herein.

**ITEM 6 / BRIEFLY DESCRIBE THE WORK:**

**Improve Accessibility:** Replace existing marginally accessible entrances to both levels of the building; provide a LULA elevator for vertical access between floor levels; provide wheelchair access to the stage via an accessible ramp, and; widen interior doorways to meet current regulations.

**Upgrade Building Systems:** Replace HVAC system for improved energy efficiency and reduced carbon footprint; insulate building envelope; provide updated electrical and fire alarm systems; increase restroom facilities to meet plumbing code minimum fixture requirements for building use.

**Enhance Facility Usability:** Improve features of the Great Hall and provide other small meeting rooms for various uses; provide support spaces for better use of Great Room (chair storage, pantry, lobby); improve building acoustics and audiovisual system, and; improve lighting for all community events.

**ITEM 10 / REASONS FOR VARIANCE REQUESTS:**

Given the historic significance of the building and the renovation emphasis that focuses on making extensive accessibility improvements, it is Applicant's belief that the cost of full compliance with 521 CMR is excessive without any substantial benefit to persons with disabilities. Full compliance would also result in disruption and loss of historic fabric. Refer to the descriptions that follow for each request.

- 14.1: Preservation of Tiered Balcony
- 25.1: Preservation of Front Entrance
- 26.6: Strike Side Clearances at Stair Door
- 28.12.3a: Cab Size of Limited Use Elevator

**SUPPLEMENTAL INFORMATION**

The following information is included in the variance application to illustrate the project issues:

- Captioned photographs of existing conditions describing the character of the building;
- Drawings with key notes of existing conditions and proposed accessibility improvements;
- Floor plan details to illustrate the variance requests: existing, proposed, variance implications;
- Massachusetts Historical Commission's *The Americans with Disabilities Act Consultation Process Form* is also attached, along with the MHC Inventory Form for the building, and;
- CD containing electronic versions of the application and all supplemental information.

STOW TOWN HALL / Stow MA  
MAAB Variance Application / January 2021

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IMG\_6471.JPG



*Front Facade of Existing Building;  
1848 Greek Revival Structure*

IMG\_6473.JPG



*View Across Great Road Showing  
1848 Original Building and 1895 Ell Addition*

IMG\_6476.JPG



*View Across Great Road Showing  
South Elevation Fire Escape & Access Ramp*

IMG\_6475.JPG



*South Facade of 1895 Ell with Multiple  
Entrances to Ground Floor Level*

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*Detail at Northwest Corner of Front Facade*



*Detail of Corner Pilaster, Frieze, Rake & Clapboards  
Typical of Greek Revival Style*



*North Facade of Building Facing Crescent Street;  
Continuous Granite Plinth Typical of Greek Revival*



*Detail of Granite at Northeast Cornerstone  
Showing Tooling Marks from Quarry*

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IMG\_8236.JPG



*One of Two Fluted Wooden Column with Ionic Capitals at Front Facade; Pair Frames Entry & Supports Pediment*

IMG\_8237.JPG



*Detail of Column and Capital*

IMG\_8186.JPG



*Window Sill Detail with Operable Shutter; Typical at North Facade*

IMG\_6459.JPG



*Wooden Plaque at Front Facade Commemorating Initial Construction*

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*South Stepped Entrance Leading from  
Great Road into Stair Hallway*

IMG\_6484.JPG



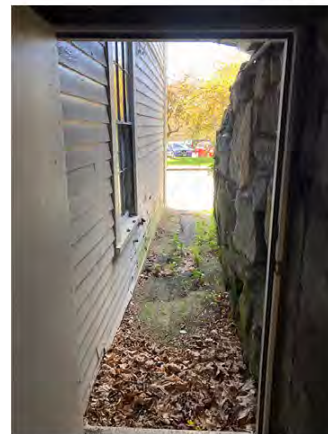
*Existing "Accessible" Ramp at East Side of Building;  
Insufficient Landing and Door Clearances*

IMG\_6480.JPG



*36" Wide Service Alley Between Stone Retaining Wall and  
Adjacent 1895 Ell; Entrance to First Floor Above;  
Walkway to be Widened for Accessible Entrance to Ell*

IMG\_6764.JPG



*View from Utility Room at Service Alley;  
Stone Wall is Bulging and Requires Repair;  
Area to be Reconfigured for Accessible Entrance*

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VIEW OF GREAT HALL FROM ENTRANCE FOYER



VIEW OF GREAT HALL & BALCONY FROM STAGE AREA

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IMG\_8211.JPG



Looking North from Ell Across Great Hall;  
Three Original Window Openings in Wall Beyond;  
Raised Wood Dais (Stage) at Right Along East Wall

IMG\_6817.JPG



12" Rise via Treads at Each End of Existing Stage;  
Circa 2000 Storage Closet at Left;  
Large Central Quilt and Two Flanking Quilts  
from 2000 Commemorate the Town

IMG\_8216.JPG



Circa 2000 Storage Unit at South End of Stage with  
Chair Storage Trolleys Blocking Doors; Projection  
Screen at Diagonal Brace Above; This Corner to be  
Location for an Accessible Ramp to Stage

IMG\_6816.JPG



Detail of Central Element of Main Quilt at Stage

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IMG\_6810.JPG



*Detail of Painted Tin Ceiling and Crown at First Floor Office Below Balcony of Great Hall Above*

IMG\_8457.JPG



*Original Window Sash with Typical Greek Revival Style Muntins*

IMG\_6806.JPG



*Pair of 32" Doors from Great Hall into 1895 Ell; Project to Retain Original Framed Opening and will Provide Accessible Door in Center with Equal Sidelights*

IMG\_6724.JPG



*Existing Entrance Area of 1895 Ell with Corner Stairs; Stairs to be Rebuilt and Vertical Access to be Provided via a Proposed Limited Use Elevator Adjacent to Stairs*

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IMG\_8212.JPG



*Typical Flat Interior Casings in 1848 Foyer;  
Rush Wood Wainscoting; Painted Tin Ceiling*

IMG\_8425.JPG



*Typical Belly Band Interior Casings with Rosettes in  
1895 Ell at Windows at Doors; No Wainscoting and  
Painted Plaster Ceilings; Maple Flooring Below Carpet*

IMG\_8202.JPG



*Interior View of "Accessible" Door at Ground Floor from  
Exterior Ramp will be Removed as part of the Project;  
Adjacent Window to Remain and be Restored*

IMG\_8361.JPG



*Textured Painted Tin Ceiling in Office Area of Ground Floor;  
Simple Clad Column Capital Typical Where in Finished Area*



IMG\_6775.JPG



*Winder Stairs in 1895 Ell at Ground Floor with Adjacent Exit Door Leading to Great Road*

IMG\_6731.JPG



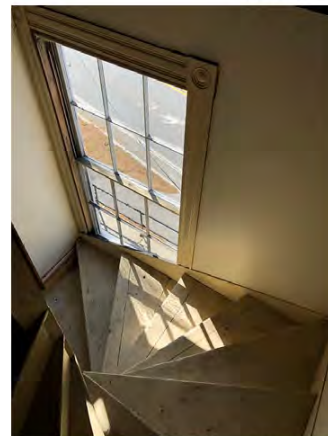
*View in 1895 Ell from First Floor Down Stairs to Ground Floor with Winders at Turn Below*

IMG\_6732.JPG



*Attic Stairs in Ell Originating at First Floor; Winders at Each of Two Turns in Stair Run*

IMG\_6743.JPG



*View from Attic of Ell Down Stairs; Original Window at South Facade to be Restored*

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IMG\_6733.JPG



*Attic Stair Adjacent to Window in South Facade of 1895 Ell with Original Sash to be Restored*

IMG\_8189.JPG



*Exposed Collar Ties and Rafters of 1895 Ell in Attic*

IMG\_6738.JPG



*Exposed Former Wood Shingles on South Slope of Original Roof Visible in 1895 Attic of Ell*

IMG\_8158.JPG

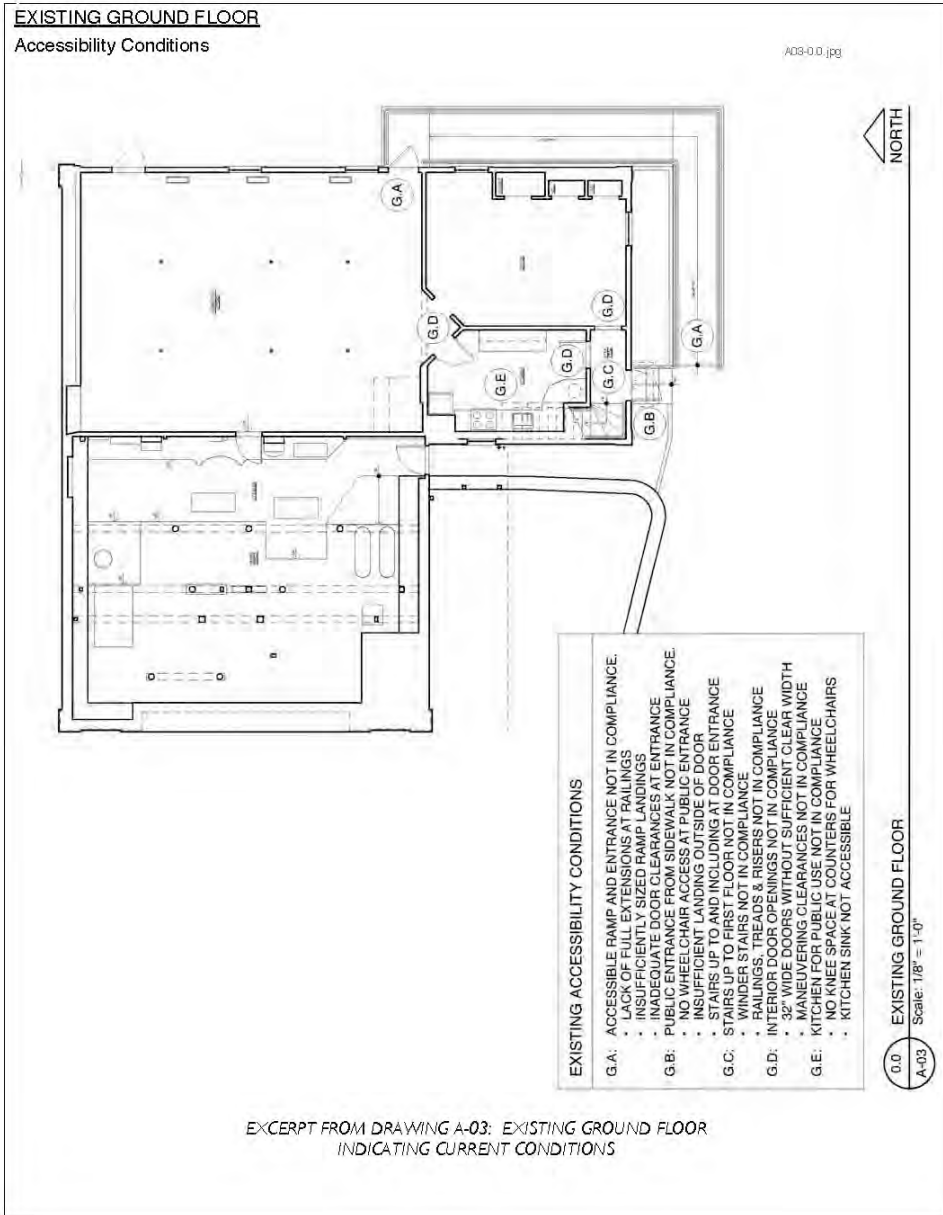


*Timber King Post in 1848 Concealed Upper Attic Area*

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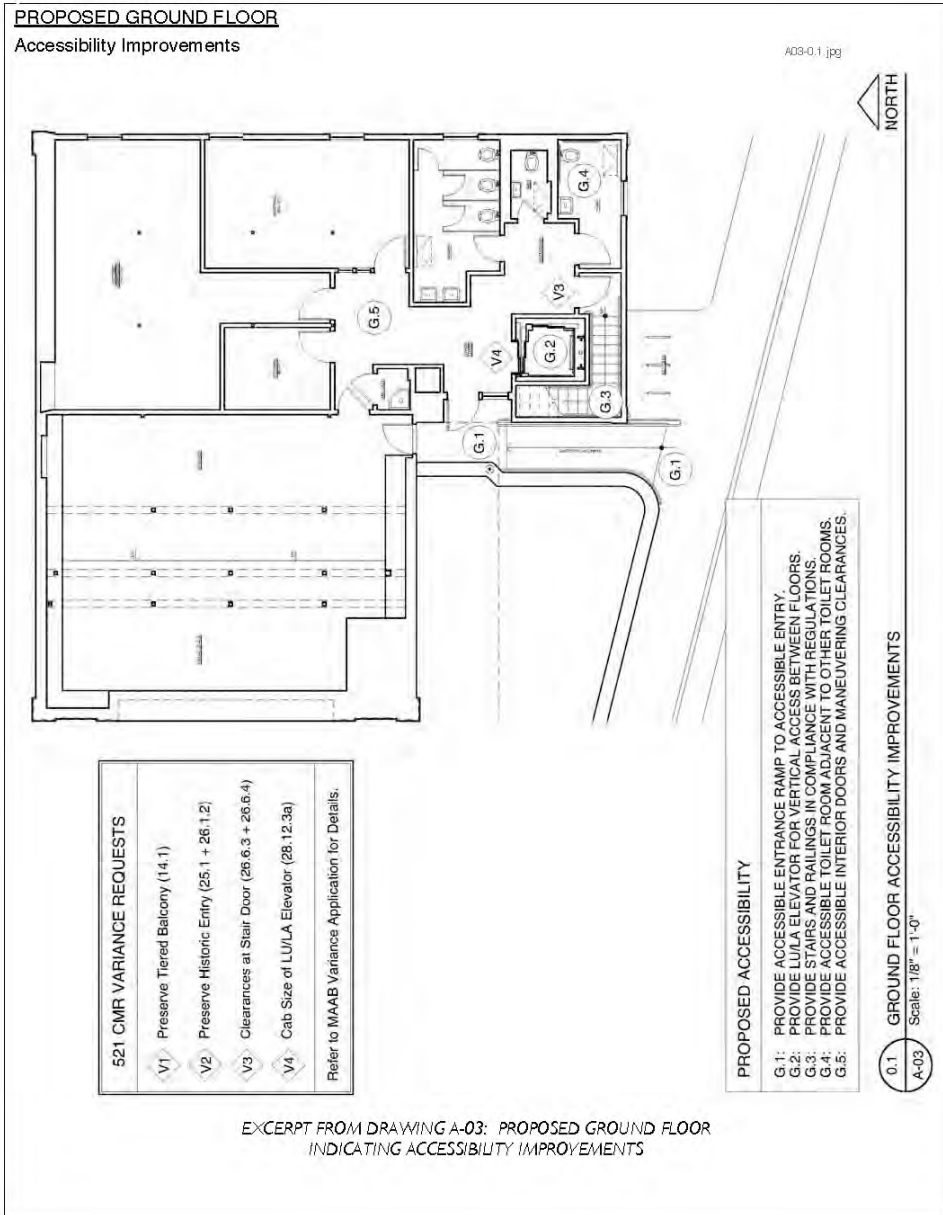
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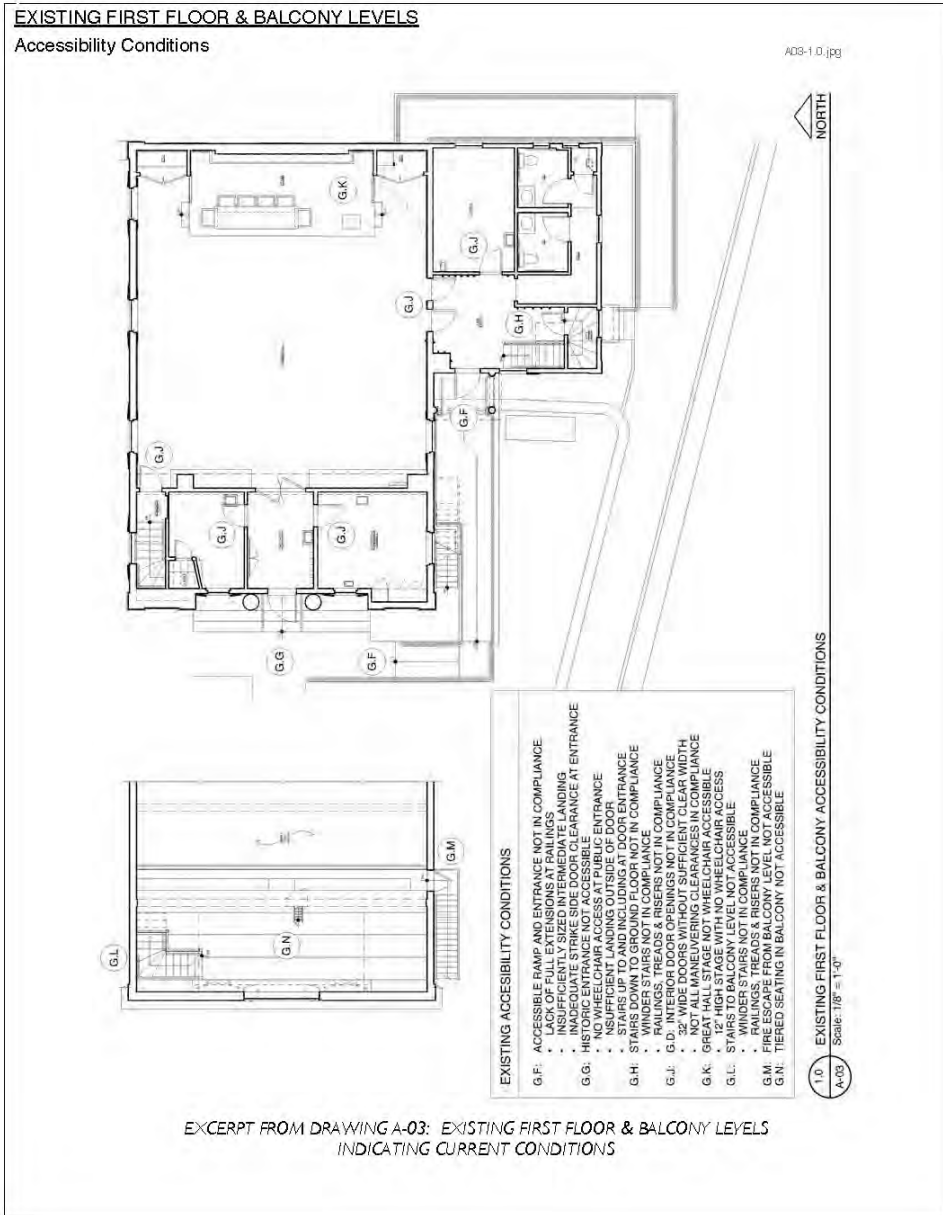


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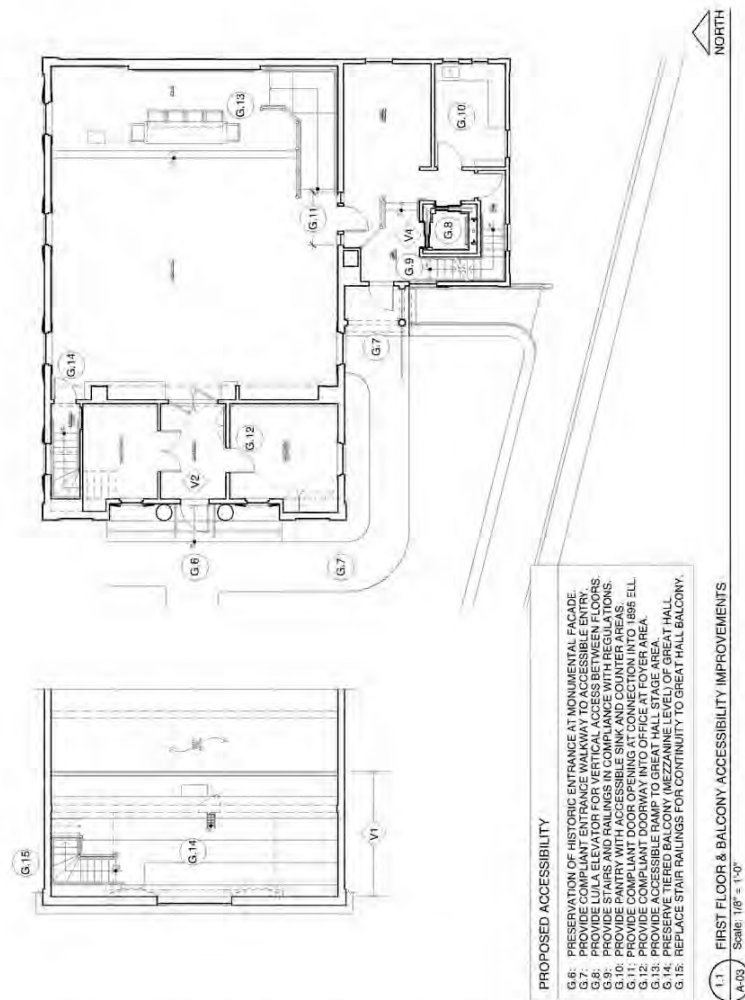
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# **PROPOSED FIRST FLOOR & BALCONY LEVELS**

Accessibility Improvements

AD3-1.1-01a1a.jpg



EXCERPT FROM DRAWING A-03: PROPOSED FIRST FLOOR & BALCONY LEVELS  
INDICATING ACCESSIBILITY IMPROVEMENTS

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Page 11-Images of America STOW-Halpin & Spler



**NEW ENGLAND AT ITS BEST.** In 1848 the Stow Town Hall on Great Road was built on land purchased from Francis Conant for \$125. Micah Smith was the builder; the cost of the building (and for equipping the original building) was \$2,514.91. This restored painting, made by Frank Augustus Curtis of Stow, c. 1882, hangs in Randall Library. For 141 years, the Stow Town Hall was the focal point of town life, until the new Town Building was built across the street in 1989.



**NEW ADDITION.** In 1895 an ell was added to the Stow Town Hall for \$2,904.17, and the furnishings cost \$383.94. The large Fairbanks hay scale shown in the foreground was installed in 1871 and removed in 1930. Selling hay was big business in this farm town, and local farmers shared the scale. [Warren]

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*DRAWING (ABOVE) OF 1848 STOW TOWN HALL AND  
PHOTOGRAPH (BELOW) WITH 1895 ELL ADDITION TO RIGHT;  
PROJECT PROPOSES TO RESTORE SIMPLICITY OF THE SITE PER THE 1895 APPEARANCE*

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EXISTING AERIAL VIEW SKETCH OF 1848 BUILDING AND 1895 ELL WITH BALCONY FIRE ESCAPE, ENTRY RAMP TO ELL, GROUND FLOOR ENTRY RAMP



PROPOSED AERIAL VIEW SKETCH OF 1848 BUILDING AND 1895 ELL WITH SITE SIMPLIFIED TO RESTORE 1895 APPEARANCE AFTER ADDITION

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EXISTING GRADE LEVEL SKETCH OF 1848 BUILDING AND 1895 ELL WITH  
BALCONY FIRE ESCAPE AND ENTRY RAMP TO ELL



PROPOSED GRADE LEVEL SKETCH OF 1848 BUILDING AND 1895 ELL WITH  
BALCONY FIRE ESCAPE REMOVED AND ENTRY RAMP TO ELL REPLACED WITH ACCESSIBLE WALKWAY

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**521 CMR 14.1: PRESERVATION OF TIERED BALCONY**

521 CMR 14 addresses regulatory requirements for "Places of Assembly" and the sole variance request from this Section is in relation to the original tiered balcony level serving the Great Hall. Other relevant aspects of Section 14 will be brought into compliance, including 14.5 for an assistive listening system (more than 49 occupants) and 14.6 for wheelchair access to the performance area of Great Hall (stage).

Great Hall is comprised of a flexible use first floor space with loose seating and a 12" high stage at the east end. A tiered balcony at the west end serves as a mezzanine level providing supplemental seating for when the building was used historically for town meetings. The five tiers of the balcony level incorporate loose wooden seating that is a mix of deacon's benches and folding chairs in groupings of two's and three's. A total of 71 persons could occupy the loose benches and chairs. The balcony is reached via a 32" door to a 41" wide winder stair in the northwest corner of the first floor. A second means of egress is provided on the south wall via an emergency exit door to an exterior fire escape.

A sign limiting balcony use to authorized persons is posted on the stair door to control access, and this exclusion is for reasons unrelated to universal accessibility. The balcony guardrail is low and an attic support beam above the second tier of the five tiered seating platforms does not provide adequate headroom clearance. Stow building officials restrict access to the balcony for these reasons, and yet the Town's affection for retaining the historic seating gallery has kept the space intact nonetheless.

Recommended work in the project includes replacement of the balcony stair handrails per 521 CMR 27.4, reduction of seating capacity (while retaining "authorized only" use limitations), and improvements to the historic guardrail. The Town will post a maximum occupancy load of 49 persons (down from the current 71) in order to remove the emergency exit and exterior fire escape stair since only one means of egress would then be required. The variance from 521 CMR 14.1 requests that the balcony tiered seating gallery remain as-is, along with the 32" door and the winder stairway. If full compliance with 521 CMR 14.1 were required, the following additional work would need to be performed:

- Provide a vertical wheelchair lift in compliance with 521 CMR 28.12 from the first floor to the balcony. Note the building size (2,562 SF per floor) and height (two stories) meet the criteria in 28.12.1d that allows provision of a wheelchair lift without requiring a variance.
- Modify the fourth seating tier at the balcony to allow for one wheelchair space on that platform. A companion seat would be a loose chair adjacent to the wheelchair since there are no fixed seats on the balcony level. Modify the third and fifth seating tiers to allow for maneuvering clearance for the wheelchair and provision of the accessible viewing area.
- Reconstruct the stairs to eliminate the winder treads and meet consistent tread depth as required by 521 CMR 27.2.
- Reconfigure the stair entry and replace the door leading from the first floor to the balcony stairs in order to comply with 521 CMR 26.5 and 26.6 for door width and maneuvering clearances.
- Reframe the first floor and balcony levels as needed, providing support foundations and posts in the crawl space area adjacent to the utility area in the ground floor below.
- Reconfigure and limit the intended first floor storage spaces for tables and chairs as indicated.

Refer to the following pages showing existing conditions and proposed first floor and balcony, along with revisions needed for full compliance. Also included is an itemized budget for the cost of compliance.

It is the Applicant's belief that the estimated cost of \$190,000 for full compliance with 521 CMR 14.1 and other noted compliance issues is excessive without any substantial benefit to persons with disabilities.

IMG\_6807.JPG



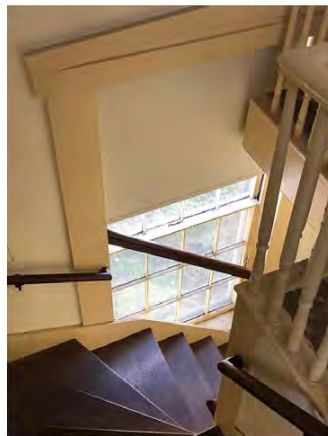
*View of Great Hall with Original Balcony Above;  
Stair to Balcony at Northwest Corner of Hall*

IMG\_6786.JPG



*Stair from Great Hall to Balcony;  
Winders at Turn and Discontinuous Railings;  
Proposed Project to Replace Railings for Continuity*

IMG\_6804.JPG



*Looking Down Balcony Stairs at the Turn;  
Continuity of Railings Included in Project Scope*

IMG\_8240.JPG



*Upper Landing at Tier 4 of Balcony with Stair Beyond*

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IMG\_6788.JPG



*Tier 5 of Balcony with Pair of Deacon's Benches*

IMG\_6789.JPG



*Looking South at Tiered Seating of Balcony;  
No Seats are Fixed in Place*

IMG\_8166.JPG



*Original Spandrel and Balustrade at Open Side of Balcony*

IMG\_6800.JPG



*Existing Exit Door to Exterior Fire Escape to be  
Removed in the Proposed Project Scope*

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IMG\_6818.JPG



*Exterior View of Fire Escape Serving the Balcony*

IMG\_7786.JPG



*Lower Run of Fire Escape Stairs Separated from Adjacent Ramp Leading to 1895 Entrance Beyond*

IMG\_8483.JPG



*Original 1848 Roof Overhang Detail at South Facade*

IMG\_8484.JPG

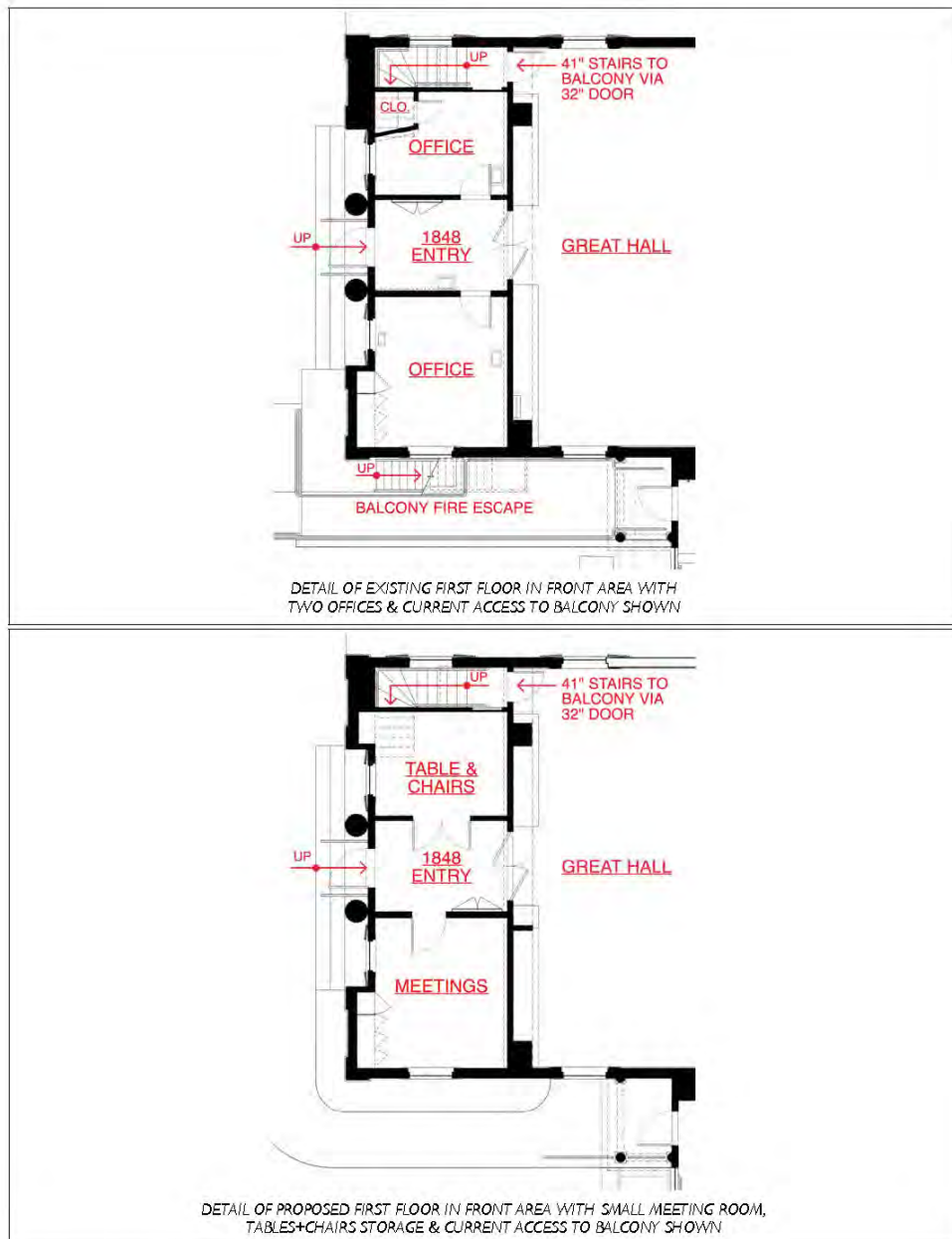


*Original Dual Board Frieze Interrupted by Fire Escape Exit Door Opening will be Restored*

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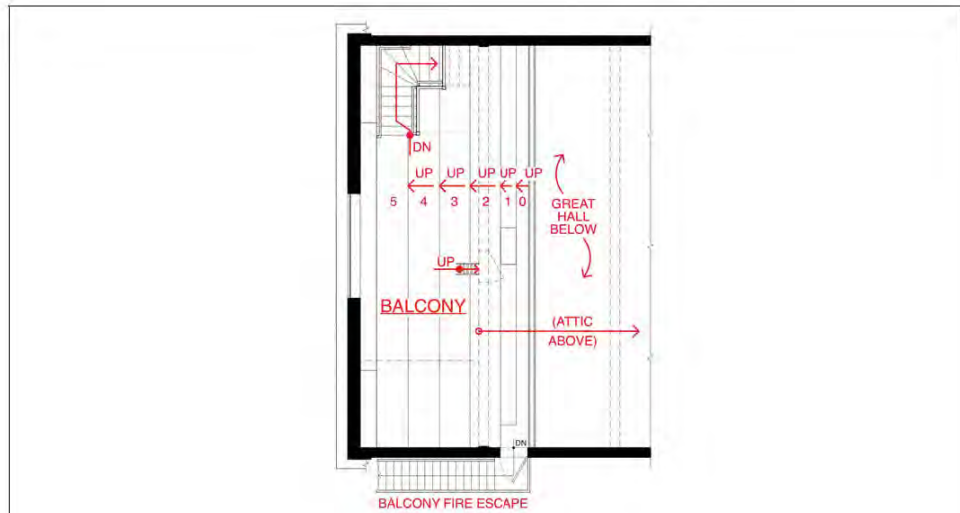
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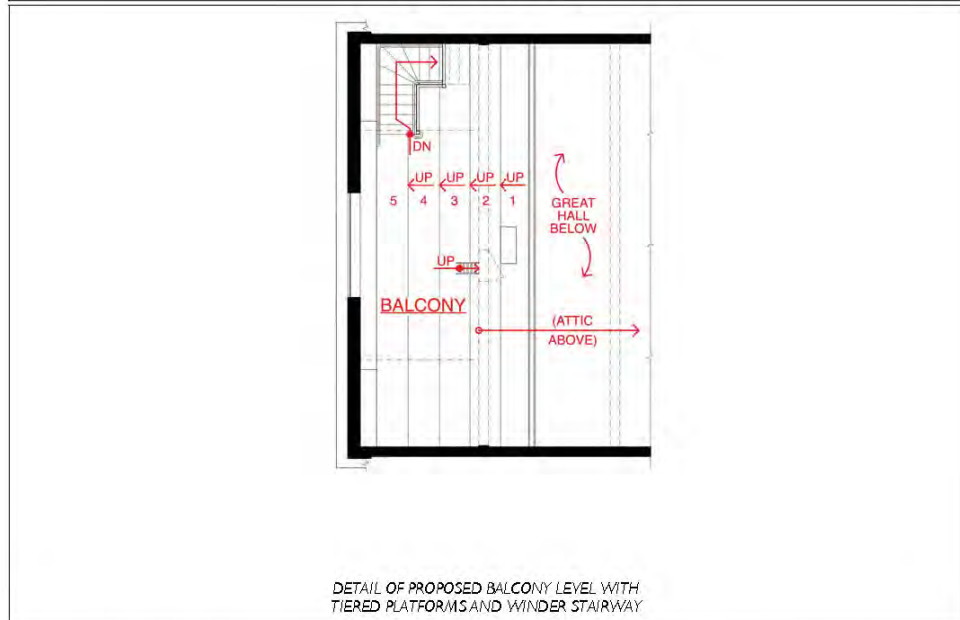
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DETAIL OF EXISTING BALCONY LEVEL WITH  
TIERED PLATFORMS AND WINDER STAIRWAY

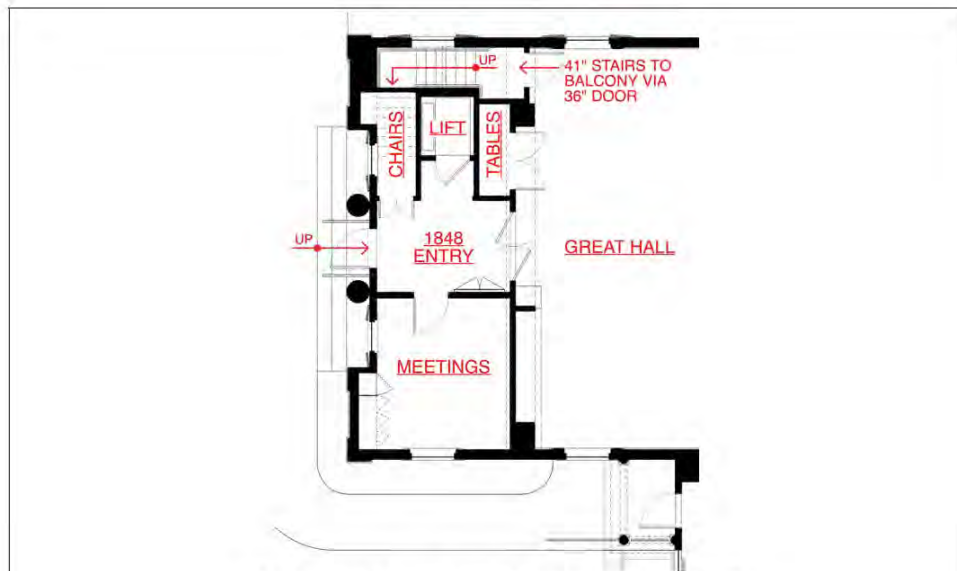


DETAIL OF PROPOSED BALCONY LEVEL WITH  
TIERED PLATFORMS AND WINDER STAIRWAY

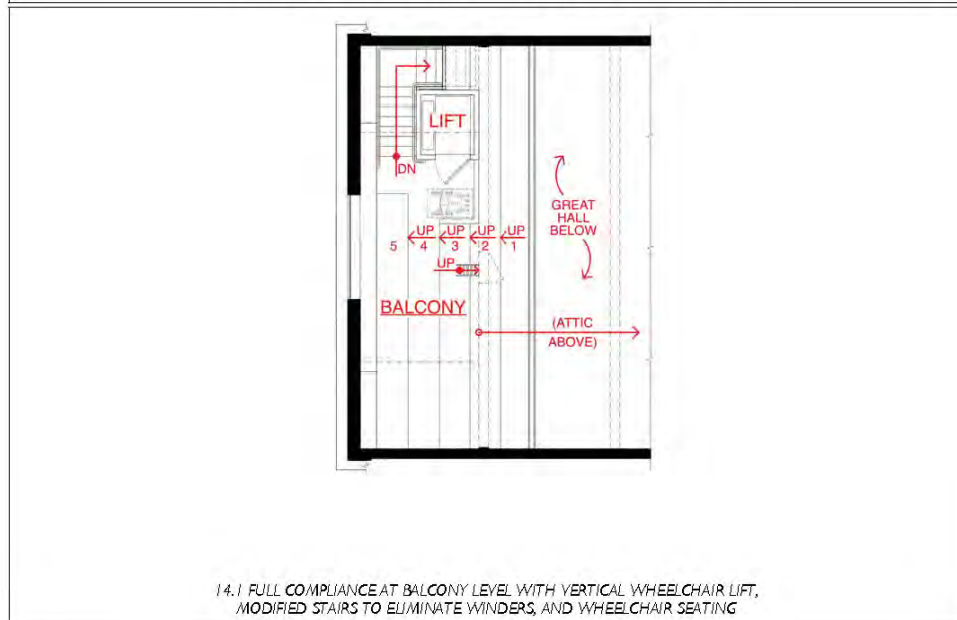
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14.1 FULL COMPLIANCE TO BALCONY AT FIRST FLOOR IN FRONT AREA WITH VERTICAL WHEELCHAIR LIFT & MODIFIED STAIRS+DOOR TO BALCONY



14.1 FULL COMPLIANCE AT BALCONY LEVEL WITH VERTICAL WHEELCHAIR LIFT, MODIFIED STAIRS TO ELIMINATE WINDERS, AND WHEELCHAIR SEATING

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STH\_MAAE\_Costs\_14 BALCONY.jpg

<b>COST of COMPLIANCE to 521 CMR 14.1</b>	
<b>14.1: PROVISION OF ACCESSIBILITY TO TIERED BALCONY</b>	
\$5,000	Selective Demolition in the Areas of Work
\$6,000	Foundations in Crawl Space for Lift & Framing Supports
\$12,000	Framing Reconfigurations at First Floor in Lift Area
\$16,000	Framing Reconfigurations at Balcony and Stairs
\$3,250	Framing at Enlarged Doorway Area to Stairs
\$7,750	Replacement Doors, Frames and Hardware in Area of Work
\$24,000	Finish Carpentry: Wainscoting, Trim, Casings, Stairs
\$16,500	Drywall, Taping, Painting
\$45,000	Provision of 2-Stop Vertical Wheelchair Lift
\$5,500	Miscellaneous Electrical in Area of Work
\$141,000	Subtotal
\$49,000	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>\$190,000</b>	<b>Estimated Cost for Full Compliance at Tiered Balcony</b>

*Cost of Full Compliance with 14.1 Showing Provision of Accessibility to Balcony Level of Great Hall*

*Full Application for Accessibility Variance  
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**521 CMR 25.1: PRESERVATION OF HISTORIC FRONT ENTRANCE**

521 CMR 25 addresses regulatory requirements for "Entrances" and the sole variance request from this Section is in relation to the original monumental front entrance into the building. Other public entrances to the building will be reconfigured for full compliance to this Section.

The existing building has four public entrances, two of which are not accessible (main front entrance; ground floor street entrance) and two of which are marginally accessible (first floor ramped entry to Ell; ground floor ramped entry to office area). The restoration project will reduce the number of public entrances from four to three, with two of the three meeting current regulations and the monumental front entry remaining as-is subject to approval of this variance request. The proposed project includes:

- Retain the 1848 original front entrance and add a directional sign to the improved first floor accessible entrance into the 1895 Ell. Reset the two granite steps leading up to the plinth to correct settling and restore even heights of risers. Repair and modify the iron rails for better compliance while retaining character. Retain and reset the historic boot scrapers.
- Replace the marginally compliant accessible entrance into the first floor of the Ell by removing the existing 1:12 ramp and its smaller-than-required landing at the 90-degree change in direction, along with removing the entrance door that does not provide adequate maneuvering clearance. The ramp will be replaced with an accessible walkway of maximum 1:20 running slope. The Ell entry will be replaced with a compliant door at grade that will lead to a lowered entry foyer.
- The two public entrances at the ground floor, neither of which complies with current code, will be removed and an accessible entrance provided by reconfiguration of the service entry alley.

The original monumental front entrance is a character-defining feature of the Greek Revival style, so its modification would permanently alter an important historic component. Greek Revival buildings were constructed atop a stone plinth with columns resting on the plinth, framing the entrance and supporting a pediment roof above. At the Stow Town Hall, a granite plinth is located 9" below the first floor level on all sides of the building, and fluted ionic wood columns rest directly on the granite outside the front door.

To create an accessible entrance would require cutting the bottom of the fluted columns, raising the plinth by 9" at the entrance and providing an extensive 1:12 ramp in the foreground of the building to rise up about 37" from grade to the first floor. Entrance stairs would need to be reconstructed in the foreground of a shared landing at the top of the accessible ramp. While this extent of modification would comply with current regulations, the result would conceal the characteristic granite plinth that encircles the historic building, and the primary façade of the iconic structure would be permanently disrupted.

A related compliance requirement for this historic entrance is noted in 524 CMR 26.1.2 stating that all exits leading to the exterior in Assembly buildings serving an occupant load over 150 must be accessible. In the base project, if the variance request is accepted, the accessible second means of egress from the Great Hall (occupancy load = 201, including stage and balcony) that leads to the exterior via the Ell will include illuminated exit signs with the universal symbol of accessibility incorporated into the signs.

Refer to the following pages showing existing conditions and proposed public entrances, along with the revisions needed for full compliance. Also included is an itemized budget for the cost of compliance.

It is the Applicant's belief that the estimated cost of \$446,00 for full compliance with 521 CMR 25.1 and a related compliance issue (26.1.2) is excessive without any substantial benefit to persons with disabilities.

IMG\_6488.JPG



*Front Facade and Foreground of 1848 Building;  
Project Proposes to Modify Foreground for Access,  
Remove Fire Escape & Ramp, Improve Approach to  
1895 Entrance & Retain Front Entrance*

IMG\_7783.JPG



*Historic Front Entrance on Granite Plinth;  
Project Proposes to Re-set Lower Two Steps to  
Re-establish Consistent Riser Heights to Plinth*

IMG\_6462.JPG



*Existing Confusing Duality of Accessible Ramp at  
Right Adjacent to Fire Escape Exit Route at Left*

IMG\_6463.JPG



*Existing Cluttered Side Elevation with  
Balcony Fire Escape and Accessible Ramp;  
Project Proposes to Remove Fire Escape and  
Replace Ramp with Accessible Walkway*

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IMG\_6819.JPG



Existing "Accessible" Entrance to 1895 Ell with Insufficient Maneuvering Clearance on Pull Side; Project Proposes to Make Door Fully Accessible and Lower Threshold for Replacement of Ramp with Walkway

IMG\_6461.JPG



Front Entrance with Two Granite Steps up to Plinth, Followed by Step up at Wood Threshold to Floor Level; Ruted Columns Rest on Granite Plinth 9" Below Floor

IMG\_6470.JPG



Iron Boot Scraper to Left of Entrance; Missing Horizontal Scraper Portion; Column Resting on Granite Plinth

IMG\_6469.JPG



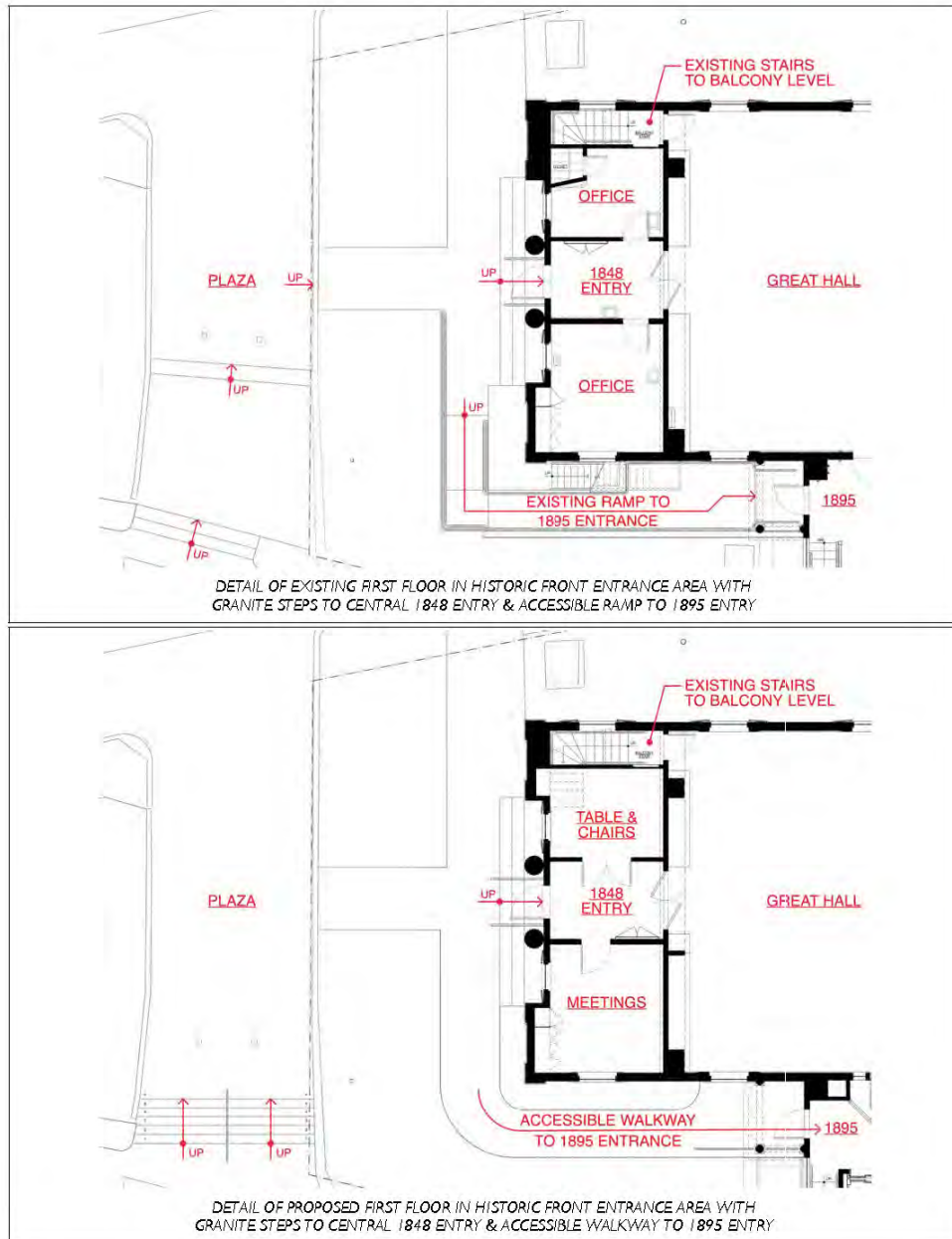
Iron Boot Scraper to Right of Entrance; Horizontal Scraper Portion Intact; Column Resting on Granite Plinth

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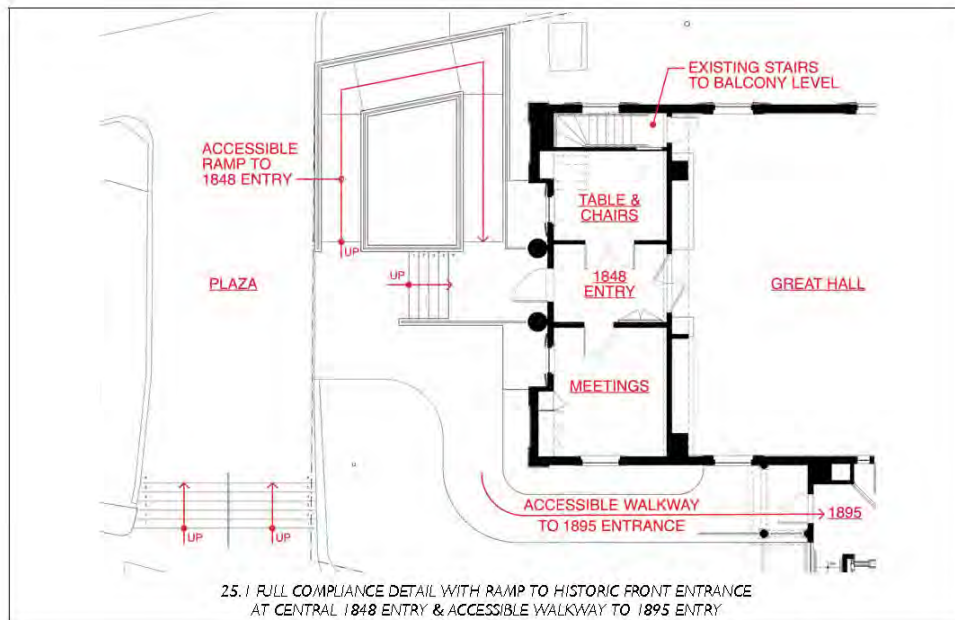




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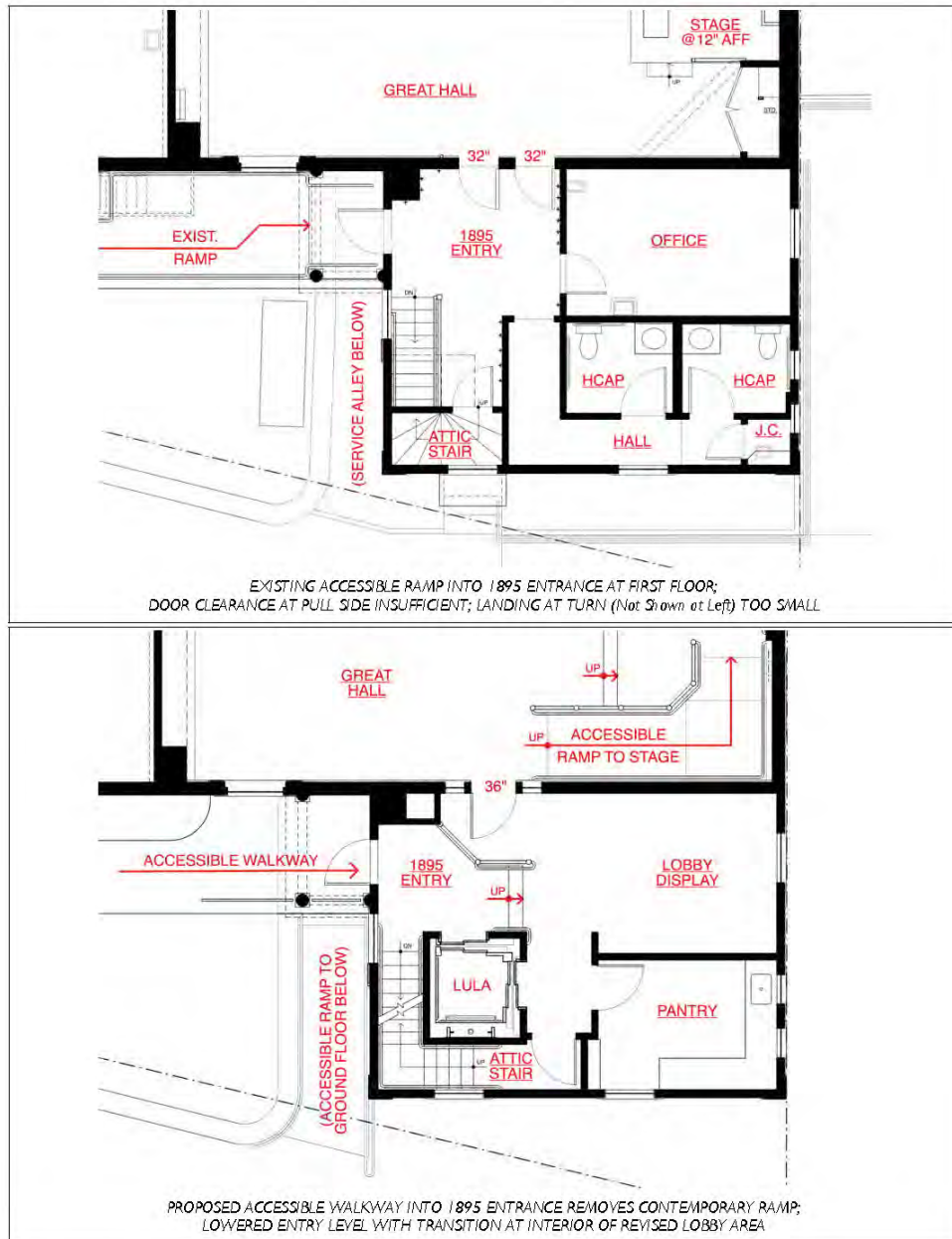


### **COST of COMPLIANCE to 521 CMR 25.1 HISTORIC FRONT ENTRANCE**

#### **25.1: PROVISION OF ACCESSIBLE ENTRANCE AT MAIN FAÇADE**

\$8,000	Selective Demolition and Excavations in the Areas of Work
\$7,000	Additional Sitework Required in the Area of Work
\$45,000	Concrete Foundations & Walls for Ramp, Stairs & Landing
\$195,750	Granite at Raised Plinth, Landing, Stairs, Ramp, Sidewalls
\$21,250	Shoring and Carpentry at Pair of Fluted Ionic Columns
\$35,425	Dual Height Continuous Railings at Ramp and Stairs
\$12,500	Replacement Hardware and Auto Door Operator at Entry
\$18,000	Lighting in Modified Area of Site, Ramp and Stairs
\$342,925	Subtotal
\$103,075	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>\$446,000</b>	<b>Estimated Cost for Full Compliance at Historic Front Entry</b>

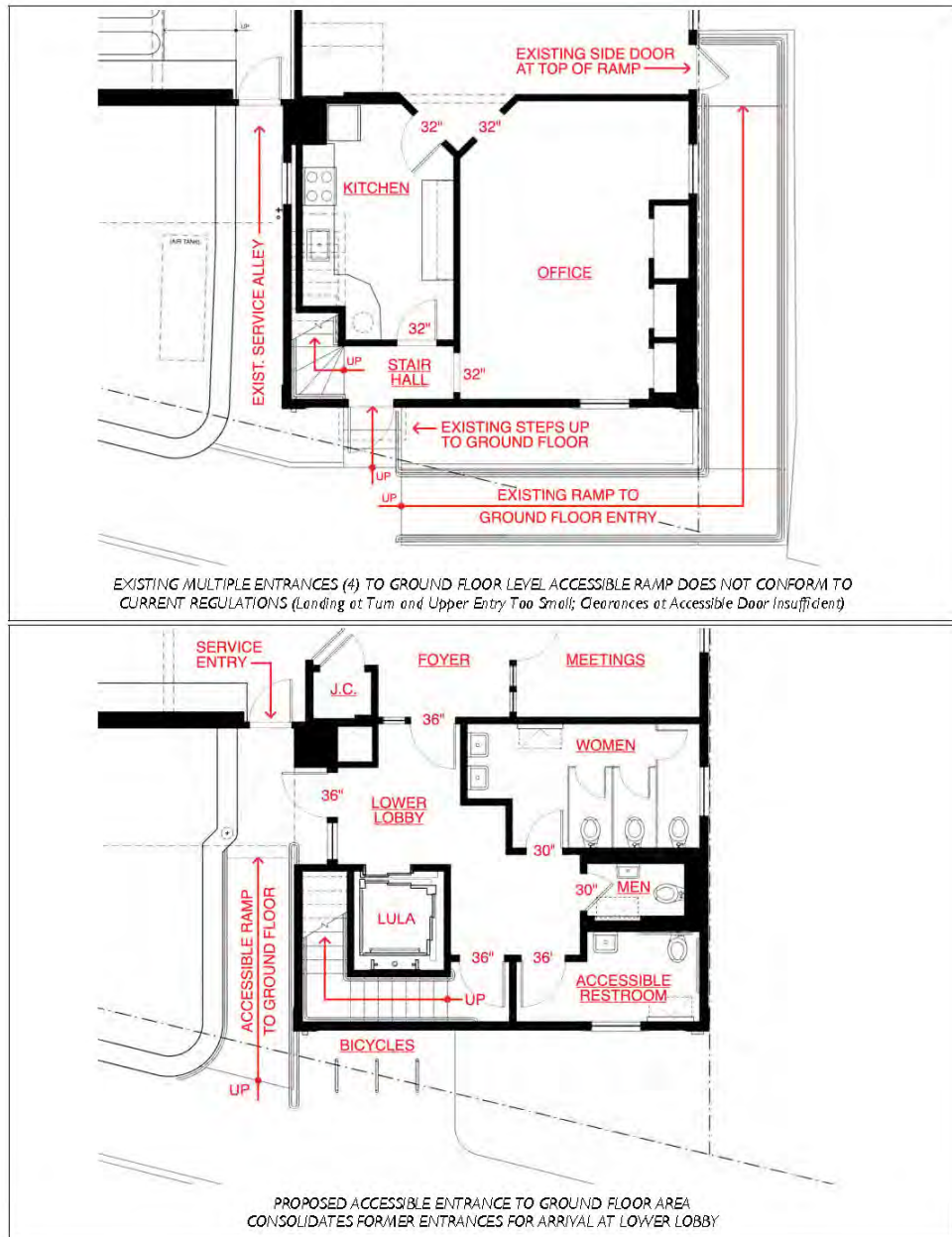
25.1 FULL COMPLIANCE ESTIMATED COSTS FOR RAMP TO HISTORIC FRONT ENTRANCE AT CENTRAL 1848 ENTRY



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**521 CMR 26.6: STRIKE SIDE CLEARANCES AT STAIR DOOR**

521 CMR 26 addresses regulatory requirements for "Doors & Doorways" and the sole variance request from this Section (except where noted in 14.1 and 25.1) is in relation to the door leading from the Lower Lobby of the Ell into the Stairway that provides ambulatory access to the First Floor.

The door in question is proposed to have 8" of clearance from the strike side of the door to the sidewall of the adjacent elevator. This dimension requires relief from 521 CMR 26.6.3 since it is less than the required minimum of 18" on the pull side of the door, and from 521 CMR 26.6.4 since it is less than the required minimum of 12" on the push side of the door.

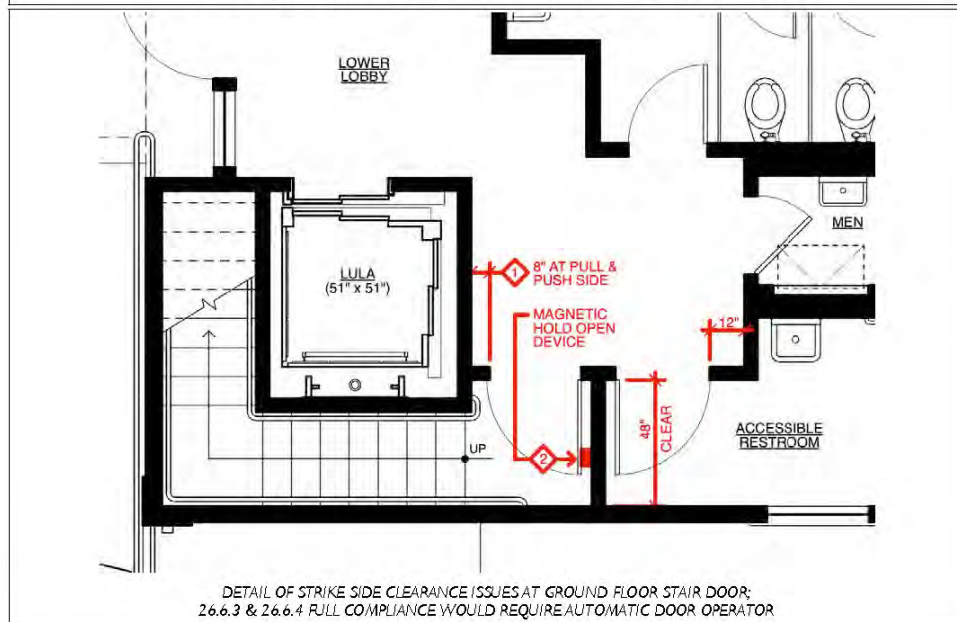
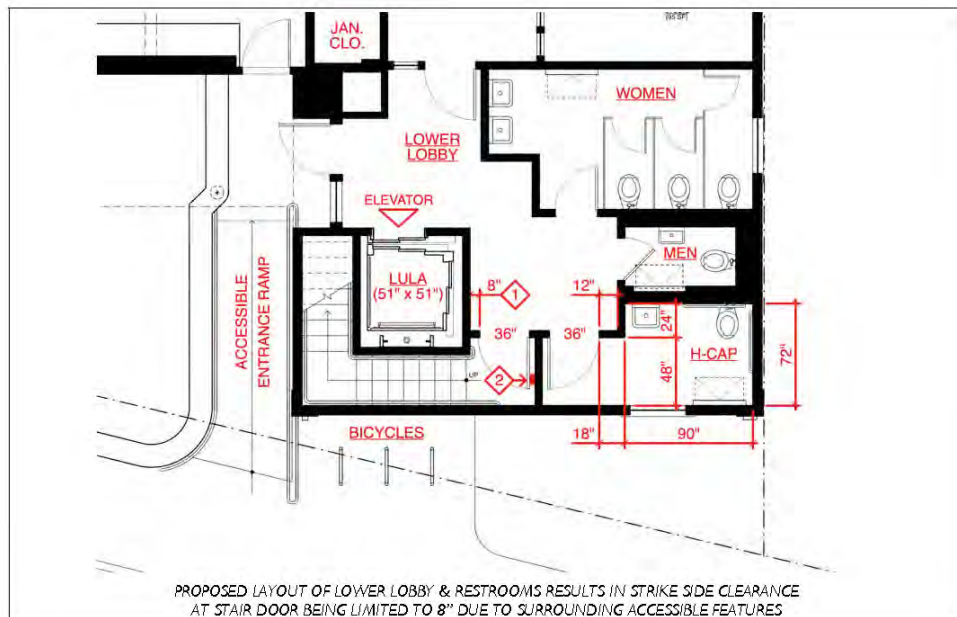
The project proposes to include a magnetic hold open device on this stairway door so that it may remain open at all times unless a fire alarm event releases the door allowing it to close and latch automatically.

Note the following regarding this particular door in its context:

- The ground floor level has its own accessible entrance in close proximity to this stairway.
- This door is not a required means of egress since only one exit is required from the ground floor per the building code, and that one exit is via the accessible entrance directly to the exterior.
- The stair door is adjacent to the elevator that provides accessible travel from the ground floor to the first floor at the same location as the stairs.
- It is technically infeasible to provide adequate clearance at this door without reconfiguration of the adjacent restrooms and lobby area that would encroach into adjacent spaces, and that intrusion would increase costs, decrease efficiency and be of no particular benefit to those with disabilities since this stair door will normally be held open and is adjacent to the elevator and accessible entrance at this level.
- Providing adequate strike side clearances at the stairway door could be achieved by adding a fire rated automatic door operator for this opening, which would bring the doorway into compliance as stated in the "Exception" at the end of 521 CMR 26.6.

Refer to the following pages showing proposed conditions and an itemized budget for the cost of compliance per the last bullet point above.

It is the Applicant's belief that the estimated cost of \$9,500 for full compliance with 521 CMR 26.6 for the stairway door is excessive without any substantial benefit to persons with disabilities.



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STH\_MAAB\_Costs\_26 STAIR DOOR.xlsx.jpg

<b>COST of COMPLIANCE to 521 CMR 26.6 at STAIR DOOR</b>	
<b>26.6.3 &amp; 26.6.4: PROVISION OF ACCESSIBILITY AT STAIR DOOR</b>	
\$3,500	Provide Automatic Door Operator at Restroom Door
\$1,500	Provide Electric Strike to Interface with Door & operator
\$2,500	Normal and Low Voltage Wiring and Controls for Devices
\$7,500	Subtotal
\$2,000	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>\$9,500</b>	<b>Estimated Cost for Full Compliance at Stair Door</b>

*Cost of Full Compliance with 26.6 Showing Provision of Automatic Door Operator to Stair Door at Ground Floor*

**521 CMR 28.12.3a: CAB SIZE OF LIMITED USE ELEVATOR**

521 CMR 28 addresses regulatory requirements for "Elevators" and includes descriptions for regular passenger elevators, wheelchair lifts and limited use elevators. Stow Town Hall falls into the category described in 521 CMR 28.12.1d allowing installation of a vertical wheelchair lift or limited use elevator in lieu of an elevator without a variance. The existing building is two stories (less than three) and has a footprint of 2,562 SF per floor (less than 3,000). While each level will have an accessible entrance after the restoration, vertical accessibility between floors is still required since there is an internal stair and the two floor levels are of related uses.

The project proposes to provide a three-stop limited use elevator (LULA) with a 51" x 51" cab size. There will be two 36" automatic sliding doors on the first floor at adjacent landings to navigate the lowered entry level to the Ell, and one 36" automatic sliding door at the ground floor. The minimum cab size allowed per 521 CMR 28.12.3a is 36" x 54" with a door opening on the 36" side. The 51" square cab size is the only size available with a front and side door for serving a floor with two adjacent landings. The size of a LULA cab is limited to no more than 18 SF due to its maximum weight capacity of 1,400 pounds. Note the following characteristics of the proposed cab in relation to other aspects of 521 CMR 28:

- The pair of 36" doors on the front and side, coupled with the first floor plan configuration, allows for compliance with the accessible route diagram as illustrated in Figure 20a in 521 CMR 20.4.
- The doors will be automatic sliding elevator doors and will comply with 521 CMR 26, as required by 521 CMR 28.12.3b and 3c.
- The proposed limited use elevator will comply with Sections 28.2 through 28.6, and 28.8 through 28.11, as required per 521 CMR 28.12.3d.
- The cab size of 51"x 51" is the clear dimension between walls. An existing buildings "Exception" allows a passenger elevator to have a cab size of 48" x 48" from wall-to-wall and wall-to-door per 521 CMR 28.7. The proposed LULA for this project is larger than that "Exception" without taking into account the added depth of having doors on adjacent sides that increases the clearance.

To meet compliance with 521 CMR without this variance request, there are two options:

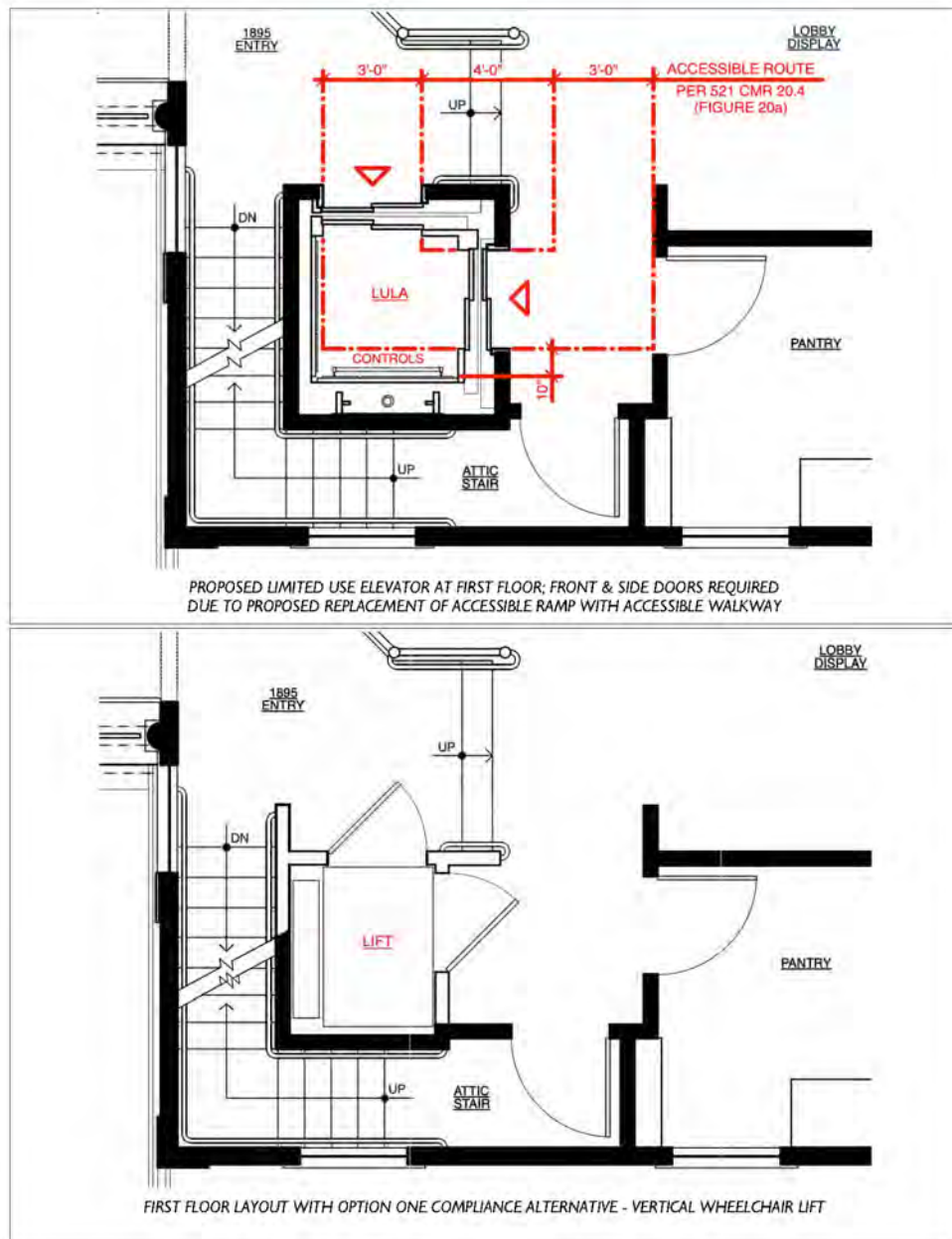
Option One would be to install a vertical wheelchair lift with minimum cab size of 36" x 54" per 521 CMR 28.12.2. The front door of the lift would be 36" wide and the side door 42". While a lift would cost significantly less than a LULA, it would be less desirable due to its constant pressure control switch. Also, the cab size of 10.5 SF would be more restrictive than the LULA at 18 SF. (Note: No LULA manufacturer produces a 36" x 54" cab with 36" front and 42" side doors.) The cost for compliance through use of vertical wheelchair lift is a credit of (\$113,000).

Option Two would be to install a passenger elevator, which is much larger and more expensive than a LULA and has a significant impact on the layout of adjacent spaces in the Ell. Elevators with adjacent landing doors are called "corner post" elevators and not all manufacturers build these due to inherent complexities. The added cost of an elevator over a LULA is \$300,000.

Refer to the following pages showing existing and proposed layouts, along with an itemized budget for the cost of full compliance using either a vertical wheelchair lift or a passenger elevator.

It is the Applicant's belief that the estimated credit of (\$113,000) for a 36" x 54" vertical wheelchair lift instead of a 51" x 51" LULA requiring a variance from 521 CMR 28.12.3a is an impracticable substitution without any substantial benefit to persons with disabilities. It is also the Applicant's belief that the added cost of \$300,000 for a passenger elevator instead of a LULA is without substantial benefit.

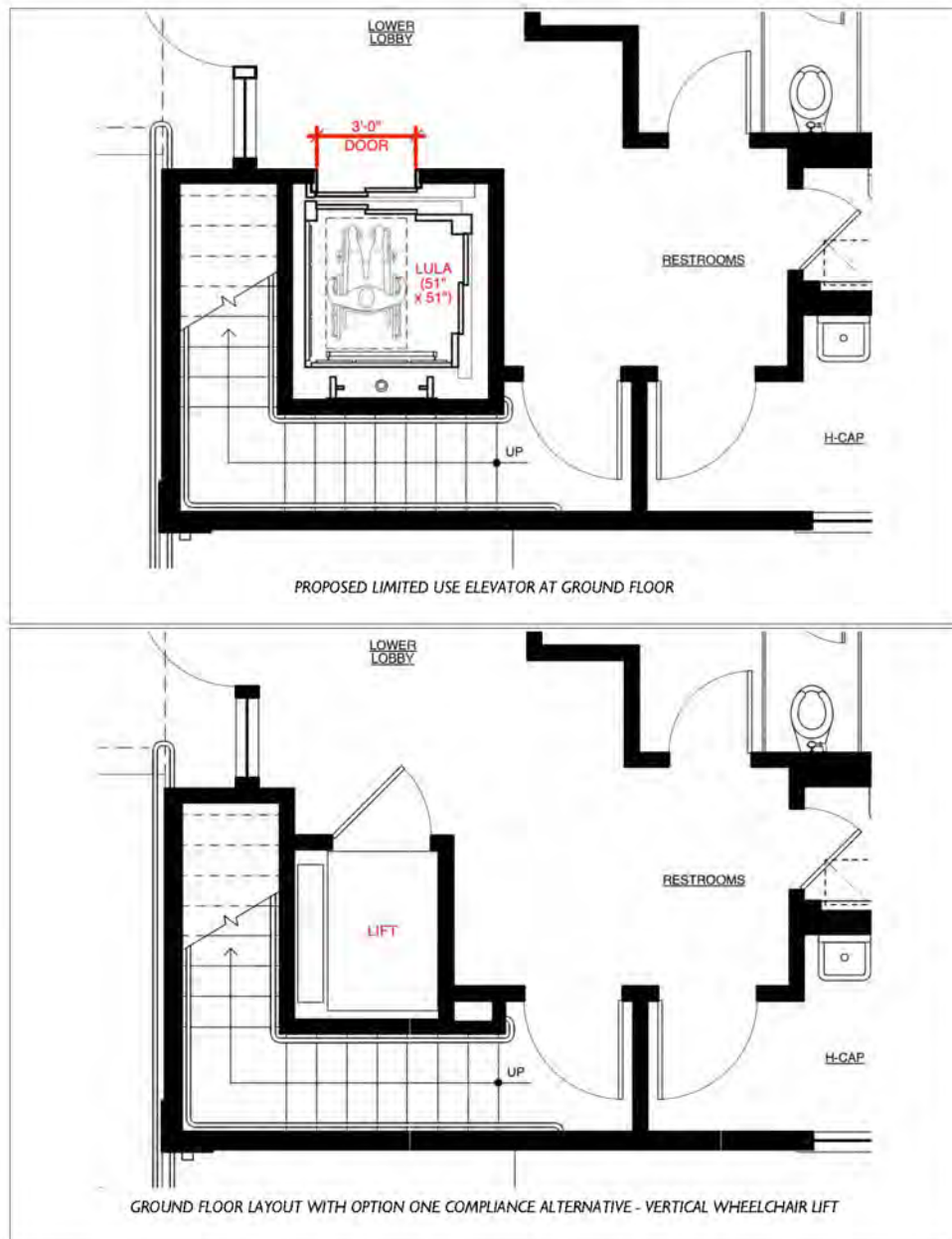




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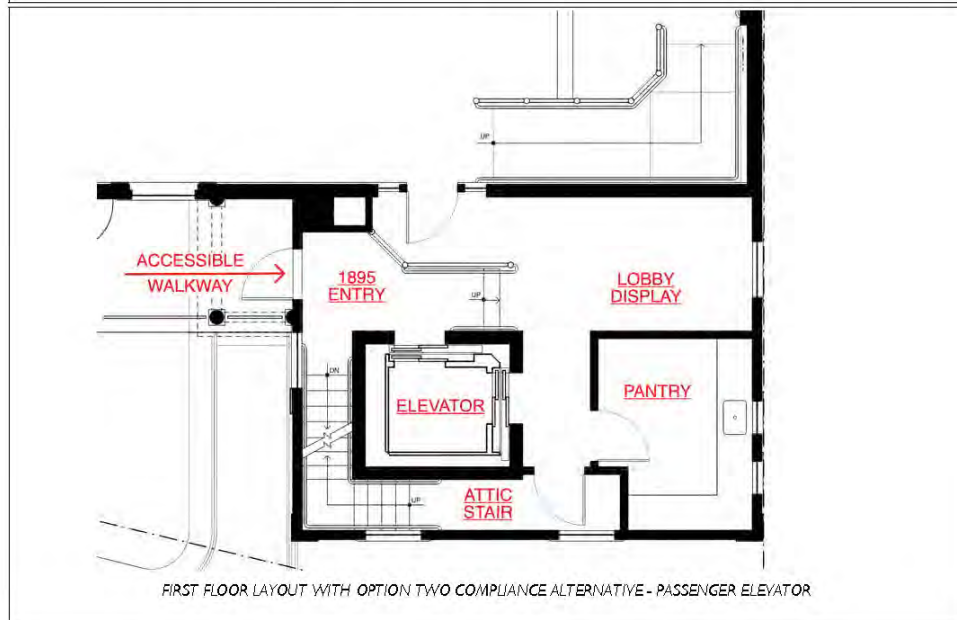
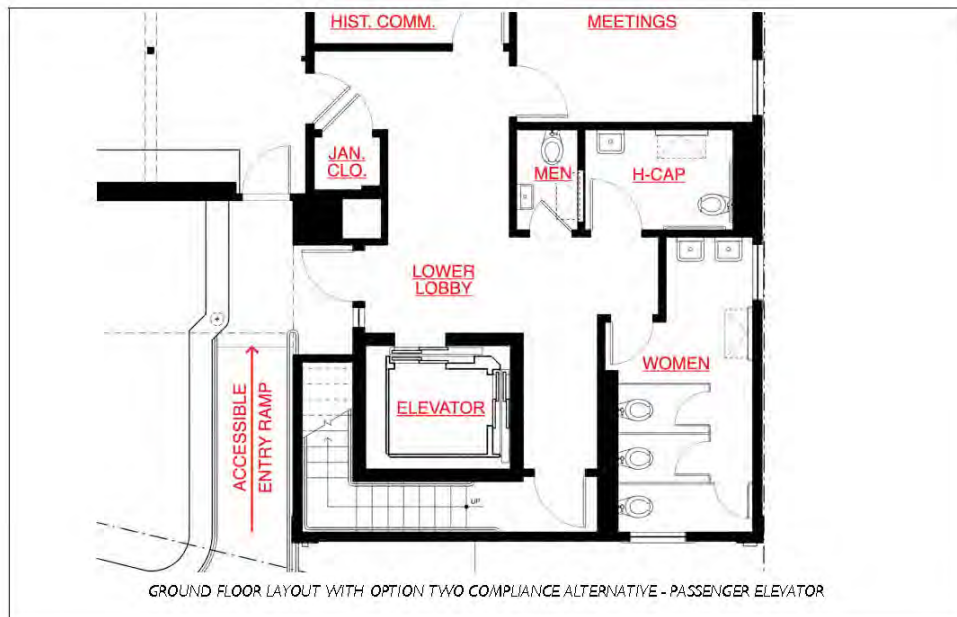
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**COST of COMPLIANCE to 521 CMR 28.12.3a (OPTION ONE)****28.12.3a: PROVISION OF VERTICAL WHEELCHAIR LIFT vs LULA**

(\$7,500)	Minimize Pit Depth (3" instead of 35")
(\$65,000)	Vertical Wheelchair Lift instead of LULA
(\$7,500)	Delete Upper Portion of Hoistway and Over-Run
(\$5,000)	Delete Machine Room in Attic Above Hoistway
(\$6,000)	Delete Venting and Controls into Existing Chimney
(\$91,000)	Subtotal
(\$22,000)	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>(\$113,000)</b>	<b>Estimated Credit for Full Compliance via Option One</b>

28.12.3a FULL COMPLIANCE - OPTION ONE - COST FOR VERTICAL WHEELCHAIR LIFT IN LIEU OF LULA

**COST of COMPLIANCE to 521 CMR 28.12.3a (OPTION TWO)****28.12.3a: PROVISION OF PASSENGER ELEVATOR vs LULA**

\$12,500	Increase Pit Depth; Add Sump + Ladder (48" instead of 35")
\$172,000	Corner Post 3-Stop Passenger Elevator instead of LULA
\$20,000	Increase Size of Hoistway; Add Steel Framing & Hoist Beam
\$8,000	Increase SF and Decrease Piping Efficiencies at Restrooms
\$10,470	Increase Size of Venting (3 SF vs 1 SF); Add Louver at Dormer
\$222,970	Subtotal
\$77,030	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>\$300,000</b>	<b>Estimated Cost for Full Compliance via Option Two</b>

28.12.3a FULL COMPLIANCE - OPTION TWO - COST FOR PASSENGER ELEVATOR IN LIEU OF LULA



**HISTORIC INFORMATION**

Massachusetts Historical Commission's Inventory Form MACRIS database record STW.57  
*Pages 43 through 54*

**APPLICATIONS SUBMITTED**

- 1) *Application for Variance – Massachusetts Architectural Access Board  
(\$50 Check Mailed Separately from Online Submission - Copy of Letter & Checked Attached)*
- 2) *The Americans with Disabilities Act Consultation Form / Massachusetts Historical Commission  
(Letter of Support from Stow Historical Commission to be Submitted Separately)*

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mab\_57\_page\_01.jpg

### Massachusetts Cultural Resource Information System Scanned Record Cover Page

Inventory No:	STW57
Historic Name:	Stow Town Hall
Common Name:	
Address:	375 Great Rd
City/Town:	Stow
Village/Neighborhood:	Stow
Local No:	
Year Constructed:	1848
Architect(s):	Forbush, L. W., Smith, Mican, Warren, J.
Architectural Style(s):	Greek Revival
Use(s):	Town Hall/Meeting Hall
Significance:	Architecture; Community Planning; Politics/Government
Area(s):	STW.B: Stow Center
Designation(s):	
Building Material(s):	Roof: Asphalt Shingle Wall: Glass; Wood; Wood Clapboard; Wood Flushboard Foundation: Granite; Stone; Cut



The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (<http://mhc-macris.net/macris/disclaimer.htm>)

Data available via the MACRIS web interface, and associated scanned files are for information purposes only. THE ACT OF CHECKING THIS DATABASE AND ASSOCIATED SCANNED FILES DOES NOT SUBSTITUTE FOR COMPLIANCE WITH APPLICABLE LOCAL, STATE OR FEDERAL LAWS AND REGULATIONS. IF YOU ARE REPRESENTING A DEVELOPER AND/OR A PROPOSED PROJECT THAT WILL REQUIRE A PERMIT, LICENSE OR FUNDING FROM ANY STATE OR FEDERAL AGENCY, YOU MUST SUBMIT A PROJECT NOTIFICATION FORM TO MHC FOR MHC'S REVIEW AND COMMENT. You can obtain a copy of a PDF through the MHC web site ([www.sos.state.ma.us/mhc](http://www.sos.state.ma.us/mhc)) under the subject heading "MHC Forms."

Commonwealth of Massachusetts  
Massachusetts Historical Commission  
220 Morrissey Boulevard, Boston, Massachusetts 02125  
[www.sos.state.ma.us/mhc](http://www.sos.state.ma.us/mhc)

This file was accessed on: Thursday, January 7, 2021 at 1:38: PM

MACRIS DATABASE COVER SHEET

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stw\_57\_Page\_02.jpg

**FORM B – BUILDING**

MASSACHUSETTS HISTORICAL COMMISSION  
MASSACHUSETTS ARCHIVES BUILDING  
220 MORRISSEY BOULEVARD  
BOSTON, MASSACHUSETTS 02125

**Locus Map**

4/11

Follow Massachusetts Historical Commission Survey Manual instructions for completing this form.

Assessor's Number USGS Quad Area(s) Form Number

00U-10 000004 Hudson B STW.57

Town/City: Stow

Place: (neighborhood or village):

Stow Center

Address: 375 Great Road

Historic Name: Stow Town Hall

Uses: Present: Community meeting space

Original: Town meetings

Date of Construction: 1848

Source: Halprin and Sipler (1999)

Style/Form: Greek Revival

Architect/Builder: Micah Smith

Exterior Material:

Foundation: Granite

Wall/Trim: Wood clapboard, wood flushboard

Roof: Asphalt shingle

Outbuildings/Secondary Structures:

Major Alterations (with dates):

Rear addition, 1895

Condition: Good

Moved: no ☒ yes ☐ Date:

Acreage: .1 acre

Setting:

Located at a prominent fork in the road in Stow Center, part of a dense concentration of 18<sup>th</sup> and 19<sup>th</sup>-century buildings of historic and architectural interest.

RECEIVED  
APR 19 2017

MASS. HIST. COMM.

Recorded by: Bruce Clouette, consultant

Organization: Stow Historical Commission

Date (month / year): October 2016

2017 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

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stew\_57\_Page\_03.jpg

**INVENTORY FORM B CONTINUATION SHEET**

STOW

375 Great Road

MASSACHUSETTS HISTORICAL COMMISSION  
220 MORRISSEY BOULEVARD, BOSTON, MASSACHUSETTS 02125

Area(s) Form No.

B STW.57

☒ Recommended for listing in the National Register of Historic Places.*If checked, you must attach a completed National Register Criteria Statement form.**Use as much space as necessary to complete the following entries, allowing text to flow onto additional continuation sheets.***ARCHITECTURAL DESCRIPTION:***Describe architectural features. Evaluate the characteristics of this building in terms of other buildings within the community.*

The building is 1 1/2 stories high, with the perpendicular rear ell (1895) 2 1/2 stories because of the slope of the lot. The front of the building, facing west, is dominated by two large fluted Ionic columns *in antis* that define a recessed area, finished with matched boards, between the corners of the building; the latter have paneled pilasters. Within the recess, the central entrance has a paneled door and a peaked pediment. There are two levels of 6-over-6 windows on either side of the entry, with similar pediments over the first-floor windows. The cornice moldings form a full return across the gable, within which is a triangular window with a grid of diagonal muntins. The north-side elevation has four 12-over-12 windows, and the south elevation has two similar windows. The 1895 rear addition features secondary entrances on the main and lower levels, a gabled dormer on the west slope of the roof, and windows with 6-over-6 sash. A small brick chimney rises at the intersection of the building's main block and rear ell.

The building is credited to Micah Smith (born 1807), who also was one of the three members of the committee chosen by the Town to plan the building, buy the land, and erect it. Smith was listed as a carpenter in several editions of the *Massachusetts Register* and the 1850 federal census, as "carpenter and farmer" in the 1860 census, and simply as "farmer" in the 1870 census. Because of the similarity in details, it can be surmised that he also designed and built the 1848 First Parish meetinghouse.

The Town Hall, originally referred to as the "Town House," stands as an excellent example of the Greek Revival in architecture; along with the meetinghouse, it ranks as the leading example of the style in Stow. Inspired by the ruined temples of ancient Greece, the style made use of such Classical elements as columns, pilasters, and pediments. In less fully realized examples, such elements were simply appended onto traditional building forms, but in more ambitious undertakings, such as this, the building could approximate the appearance of an actual Greek temple. The freestanding Ionic columns and the articulation of the façade with *antis* (projecting corners) and a recessed center portion are especially notable and show some sophistication, probably gained through Smith's perusal of one or more of the many handbooks of architecture published in the early 19<sup>th</sup> century and close inspection of contemporary buildings by his peers.

**HISTORICAL NARRATIVE***Discuss the history of the building. Explain its associations with local (or state) history. Include uses of the building, and the role(s) the owners/occupants played within the community.*

The Town Hall was built in 1848 for town meetings, which previously had been held in the First Parish meetinghouse. Although the proximate need for a town meeting space may have been the fire that destroyed the meetinghouse in 1847, the construction of the building also reflected the increasingly nonsectarian nature of society in New England in that period. By this time, Stow had not only the Unitarian First Parish, but also Universalists, Methodists, Evangelical Congregationalists, and a few Catholics, so the close identification of civil government and the dominant church no longer seemed appropriate.

In the early days, town officials—selectmen, the town clerk, the assessor—typically worked from their homes. The expansion of the Town Hall building in 1895 probably reflected the need to provide storage space for records and offices for a town government that had outgrown the earlier arrangement. The Town Building on the opposite side of Great Road was completed in 1989.

*Continuation sheet 1*

2017 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

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stew\_57\_Page\_04.jpg

<b>INVENTORY FORM B CONTINUATION SHEET</b>	STOW	375 Great Road
MASSACHUSETTS HISTORICAL COMMISSION 220 MORRISSEY BOULEVARD, BOSTON, MASSACHUSETTS 02125	Area(s)	Form No.
	B	STW.57

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**BIBLIOGRAPHY and/or REFERENCES**

Halprin, Lewis, and Barbara Sipler. *Stow, an Old New England Village*. Charleston, S.C.: Images of America Series, Arcadia, 1999.

*Massachusetts Register*, 1852, 1853.

U.S. Census, manuscript population schedules, 1850-1870.

Continuation sheet 2

2017 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

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**INVENTORY FORM B CONTINUATION SHEET**

STOW

375 Great Road

MASSACHUSETTS HISTORICAL COMMISSION  
220 MORRISSEY BOULEVARD, BOSTON, MASSACHUSETTS 02125

Area(s) Form No.

B STW.57

West and south elevations, camera facing northeast.



Continuation sheet 3

2017 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

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**INVENTORY FORM B CONTINUATION SHEET**

STOW

375 Great Road

MASSACHUSETTS HISTORICAL COMMISSION  
220 MORRISSEY BOULEVARD, BOSTON, MASSACHUSETTS 02125

Area(s) Form No.

B STW.57

Detail of columns, west elevation, camera facing east.



Continuation sheet 4

2017 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

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**INVENTORY FORM B CONTINUATION SHEET**

STOW

375 Great Road

MASSACHUSETTS HISTORICAL COMMISSION  
220 MORRISSEY BOULEVARD, BOSTON, MASSACHUSETTS 02125

Area(s) Town No.

B STW 57

**National Register of Historic Places Criteria Statement Form**

Check all that apply:

- ☒ Individually eligible ☐ Eligible only in a historic district  
☒ Contributing to a potential historic district ☐ Potential historic district

Criteria: ☒ A ☐ B ☒ C ☐ DCriteria Considerations: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ GStatement of Significance by Bruce Clouette, Consultant, Stow Historical Commission*The criteria that are checked in the above sections must be justified here.*

The Town Hall has local architectural significance as Stow's leading example of the Greek Revival style (Criterion C); its well-detailed Ionic columns, pilasters, and pediments illustrate the high regard for Classical Greek architecture that was at the heart of the style. The building also has historical significance as the long-time focus of the Town Meeting, the most important civic institution for all New England small towns from the Colonial period through the 20<sup>th</sup> century (Criterion A). By bringing citizens from all parts of town to the Upper Common several times a year, the Town House, as it was known, helped establish Stow Center as the principal focus of community life.

The Town Hall also makes an important contribution to the potential historic district at Stow Center. Its readily identifiable Greek Revival architecture helps establish the village's early 19<sup>th</sup>-century character (Criterion C), and the importance of the Town Meeting was part of what made the village a center for the entire town of Stow (Criterion A).

*Continuation sheet 5*

2017 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

STOW TOWN HALL / Stow MA  
MAAB Variance Application / January 2021Mills Whitaker Architects LLC  
Page 49

*Full Application for Accessibility Variance  
Mills Whitaker Architects - 18 January 2021*



stw\_57\_Page\_08.jpg

**FORM B - BUILDING**


MASSACHUSETTS HISTORICAL COMMISSION  
294 Washington Street, Boston, MA 02108

Area **B** Form no. **57**

*RV Simon*

Stow \_\_\_\_\_  
 375 Great Road \_\_\_\_\_  
 ic Name Stow Town Hall \_\_\_\_\_  
 Original Town Hall \_\_\_\_\_  
 Present Town Hall \_\_\_\_\_  
 ship: ☐ Private individual \_\_\_\_\_  
       ☐ Private organization \_\_\_\_\_  
 Public Town of Stow \_\_\_\_\_  
 Original owner Town of Stow \_\_\_\_\_

**SKETCH MAP**  
 Draw map showing property's location in relation to nearest cross streets and other buildings or geographical features. Indicate north.



**DESCRIPTION:**  
 Date 1847-49 \_\_\_\_\_  
 Source Town Records \_\_\_\_\_  
 Style Greek Revival \_\_\_\_\_  
 Architect Micah Smith \_\_\_\_\_  
 Exterior wall fabric clapboard \_\_\_\_\_  
 Outbuildings \_\_\_\_\_  
 Major alterations (with dates) south wing 2 1/2 stories (1895) fire escape \_\_\_\_\_  
 Moved \_\_\_\_\_ Date \_\_\_\_\_  
 Approx. acreage .10 acres \_\_\_\_\_  
 Setting At junction of two roads. Faces northwest. Built into hill, granite retaining wall. \_\_\_\_\_

Recorded by Architectural Preservation Assoc. \_\_\_\_\_  
 Organization Stow Historical Commission \_\_\_\_\_  
 Date January 30, 1982 \_\_\_\_\_

(Staple additional sheets here)

1982 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

stw\_57\_Page\_09.jpg

STW.57

**ARCHITECTURAL SIGNIFICANCE** (describe important architectural features and evaluate in terms of other buildings within community)

It is interesting to note that the Town Hall is built in very much the same pattern as the First Parish Church nearby, constructed at nearly the same time. Greek Revival was the obvious, and probably only choice of style suitable in 1847 when Town Hall was planned. The gable is presented as the main facade to represent a temple, with 2 Ionic columns, in antis flanked by paired panded pilasters. The door is recessed, the recess is flushboarded more nearly to imitate stone. The columns and pilasters support a full pediment, on which is inscribed in gold letters the name and function of the building. A large triangular window in the pediment has diamond panes. Granite stairs approach the door, which has a low pedimented lintel, of country Greek Revival structure, as do the 6/6 windows. The whole is made to look larger than it is by keeping the windows to the center.

The proportions here are shorter and wider than those of the church.

**HISTORICAL SIGNIFICANCE** (explain the role owners played in local or state history and how the building relates to the development of the community)

After sporadic attempts to settle the land now Stow, by 1672, a committee was formed to order and regulate the community. By 1683 the town was incorporated, selectmen were chosen. The incipient government probably met in private houses until the first meeting house was built, though not finished in 1685. The town appears to have continued using the meeting house, or church until the fourth church burned in 1847, although the town has ceased supporting a minister from Town funds in 1833.

After the church burned, a committee of six, one from each school district, was chosen to plan the Town Hall. A lot was purchased for \$125.00 from Francis Conant, and the Hall was built for \$2514.91. Micah Smith, a carpenter and millwright who lived at 184 Gleasondale Road built it, and was even paid extra for drawing up the plans; he was a member of the building committee. He was paid \$1863.89 for the job. The stoves, settles from J. Warren cost the town \$211.26.

J.W. Lawrence, who lived on Gleasondale Road, took care of the Hall for years. In 1874 the place was refurbished, and some remodeling may have occurred, as L.W. Forbush was the mason on the job.

In 1895 an addition was built on the south side.

The Hall is small but imposing by its solid dignity. It seems to objectify the increased awareness of separation of church and state.

**BIBLIOGRAPHY and/or REFERENCES**

Crowell, Rev. & Mrs. P.R., Stow Mass. 1683-1933, Stow  
Town Records  
Bicentennial Quilt, Stow, Mass.  
map 1856  
1875  
1889

204-2/80

1982 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

stw\_57\_Page\_10.jpg

**FORM B - BUILDING**  
 MASSACHUSETTS HISTORICAL COMMISSION  
 Office of the Secretary, State House, Boston

In Area no. \_\_\_\_\_ Form no. 57

wnStow  
 Address 375 Great Road  
 Name Town Hall  
 Present use " "  
 Present owner Town of Stow  
 Description:  
 Style Greek Revival  
 Architect \_\_\_\_\_  
 Exterior wall fabric clapboard  
 Outbuildings (describe) \_\_\_\_\_  
 Other features 2½-story, L-plan building. Granite foundation.  
Recessed entrance portico with  
 Altered \_\_\_\_\_ Date \_\_\_\_\_  
 Moved \_\_\_\_\_ Date \_\_\_\_\_

4. Map. Draw sketch of building location in relation to nearest cross streets and other buildings. Indicate north.

5. Lot size:  
 One acre or less ☒ Over one acre \_\_\_\_\_  
 Approximate frontage 45'  
 Approximate distance of building from street 5'

6. Recorded by Harriet White  
 Organization MAPC  
 Date 9/13/78

(over)

1982 VERSION OF FORM B INVENTORY SUBMITTED TO MHC

STW. 57

10. Bibliography and/or references (such as local histories, deeds, assessor's records, early maps, etc.)

1982 VERSION OF FORM B INYENTORY SUBMITTED TO MHC



stew\_57\_Page\_12.jpg

INVENTORY FORM CONTINUATION SHEET

MASSACHUSETTS HISTORICAL COMMISSION  
Office of the Secretary, Boston

Community: Stow	Form No: 57
Property Name: Town Hall	

Indicate each item on inventory form which is being continued below.

Other features:

fluted Ionic columns. Wide panelled corner boards and pilasters. Triangular fanlight with divided sash in facade gable. Gabled dormer in L roof. 6/6 divided sash with shaped lintels. Subsidiary entrance and brick chimney where main block joins "L".

Staple to Inventory form at bottom

1982 VERSION OF FORM B INVENTORY SUBMITTED TO MHC



**STOW HISTORICAL COMMISSION**  
Stow, Massachusetts 01775

Ms. Brona Simon  
Executive Director  
Massachusetts Historical Commission  
220 William T. Morrissey Boulevard  
Boston, Massachusetts 02118

Dear Ms. Simon,

At a duly posted meeting of the Stow Historical Commission, the commission voted to approve the four accessibility variance requests made by Donald W. Mills, RA of Mills Whitaker Architects LLC for the Stow Town Hall, located at 375 Great Road in Stow. These variance requests and the reasons for them are detailed in the application filed by Mr. Mills with the Massachusetts Architectural Access Board on January 22, 2021, with the permission of our town manager, Denise M. Dembkoski.

Please feel free to contact our Chair, Dot Spaulding, at 978-562-6263 with any questions.

Sincerely,

Barbara Clancy  
Secretary, Stow Historical Commission

cc: Donald W. Mills  
Denise M. Dembkoski  
Douglas Hyde, Town of Stow Building Department

*Letter of Support*  
Stow Historical Commission



**The Commonwealth of Massachusetts**  
William Francis Galvin, Secretary of the Commonwealth  
Massachusetts Historical Commission

February 5, 2021

William Joyce  
Executive Director  
Massachusetts Architectural Access Board  
1000 Washington Street, Suite 710  
Boston, MA 02118

RE: Stow Town Hall, 375 Great Road, Stow, MA; MHC# RC.69208

Dear Mr. Joyce:

The Massachusetts Historical Commission (MHC) is in receipt of information from Mills Whitaker Architects regarding the project referenced above, received on January 25, 2021, with additional information received on February 5, 2021. The staff of the MHC have reviewed the information submitted and have the following comments.

The Town of Stow proposes to improve accessibility, upgrade building systems, and enhance facility usability at the historic Stow Town Hall in Stow. This work includes the replacement of the two existing marginally accessible entrances with a fully accessible entrance, the installation of a LULA elevator to provide vertical access between floors, the construction of an interior ramp to provide access to the stage, and the widening of doors to meet code. This project will ensure the continued use of this important building.

Review of the MHC's *Inventory of Historic and Archaeological Assets of the Commonwealth* indicates that Stow Town Hall, located at 375 Great Road, is included in the Inventory (STW.57). It is the opinion of MHC staff that Stow Town Hall meets the criteria of eligibility for individual listing in the National Register of Historic Places under Criteria A and C at the local level of significance. Built in 1848, Stow Town Hall is an excellent and well-preserved example of Greek Revival architecture. The interior and exterior of the building are mostly unaltered in design and materiality, greatly enhancing the architectural and historical significance of this building.

The MHC supports the Town of Stow's proposed plan. If granted, MAAB variances would allow the project to reach a level of compliance without removal or alteration of historic features and significant changes to the historic interior and exterior. The MHC understands that the Town of Stow ADA Coordinator and the Stow Historical Commission also support this project.

The MHC believes that if MAAB variances are not granted, modifications to the historic front entrance and interior balcony and stairs would significantly compromise the integrity of the historic building. The exterior and interior of Stow Town Hall retain a significant amount of original materials and historic features.

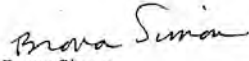
220 Morrissey Boulevard, Boston, Massachusetts 02125  
(617) 727-8470 • Fax: (617) 727-5128  
[www.sec.state.ma.us/mhc](http://www.sec.state.ma.us/mhc)

**Notice of Determination**  
**Massachusetts Historical Commission**

The proposed project will have "no adverse effect" (950 CMR 71.07(2)(b)(2)) on Stow Town Hall. The MHC respectfully requests that the Massachusetts Architectural Access Board grant the variance requests.

Your consideration of this matter is greatly appreciated. Please do not hesitate to contact Joshua Dorin of my staff if you have any questions.

Sincerely,



Brona Simon  
State Historic Preservation Officer  
Executive Director  
Massachusetts Historical Commission

cc: Denise Demboski, Stow Town Administrator  
Donald Mills, Mills Whitaker Architects

*Notice of Determination*  
*Massachusetts Historical Commission*



CHARLES D. BAKER  
GOVERNOR

KARYNE POLITO  
LIEUTENANT GOVERNOR

MIKE KENNEALLY  
SECRETARY OF HOUSING AND  
ECONOMIC DEVELOPMENT



Commonwealth of Massachusetts  
Division of Professional Licensure  
Office of Public Safety and Inspections  
Architectural Access Board

1000 Washington St., Suite 710 Boston, MA 02118  
Tel: 617-727-0660 www.mass.gov/aab Fax: 617-979-5469

EDWARD A. PALLESCI  
ATTORNEY GENERAL  
OFFICE OF CONSUMER  
AFFAIRS AND BUSINESS REGULATION

LAYLA R. D'EMILIA  
COMMISSIONER  
DIVISION OF PROFESSIONAL LICENSURE

Docket Number V-21-007

NOTICE OF ACTION

RE: Stow Town Hall, 375 Great Road

1. A request for a variance was filed with the Board by Donald W. Mills, RA.

Stow  
(Applicant) on January 22, 2021.  
Rules and Regulations of the Board:

The applicant has requested variances from the following sections of the

Section	Description
14.1	Accessible Seating Area
25.1	Accessible Entrances
26.6	Door Clearance
28.12.3	LULA Platform Size
(a)	

2. The application was heard by the Board as an incoming case on Monday, February 8, 2021.

3. After reviewing all materials submitted to the Board, the Board voted as follows:

CONTINUE the variance to 14.1 to request Petitioner provide additional information as to who will have access to the balcony level;

GRANT relief to 28.12.3 as proposed; and

GRANT relief to 25.1 as proposed on the condition that handrails which comply with 521-CMR 27 are provided at the stairs located so that they are adjacent to the door.

PLEASE NOTE: All documentation (written and visual) verifying that the conditions of the variance have been met must be submitted to the AAB Office as soon as the required work is completed.

Any person aggrieved by the above decision may request an adjudicatory hearing before the Board within 30 days of receipt of this decision by filing the attached request for an adjudicatory hearing. If after 30 days, a request for an adjudicatory hearing is not received, the above decision becomes a final decision and the appeal process is through Superior Court.

Date: February 11, 2021

cc: Local Disability Commission  
Local Building Inspector  
Independent Living Center

*Dawn Gummeller WT*  
Chairperson  
ARCHITECTURAL ACCESS BOARD

Initial Notice of Action on Incoming Case Review  
Massachusetts Architectural Access Board - 11 February 2021

**CONTINUATION of V21-007**

**VARIANCE APPLICATION to the MASSACHUSETTS ARCHITECTURAL ACCESS BOARD**

**Stow Town Hall  
375 Great Road  
Stow MA 01775**

**Mills Whitaker Architects LLC  
12 February 2021**

**INTRODUCTION:**

When this project was reviewed as an incoming case on Monday, February 8, 2021, the Board asked for more information regarding the potential use of the historic balcony of Great Hall since, in the variance application, it was noted that the balcony is posted for use by "Authorized Personnel Only" by the Town.

**SAFETY ISSUES RELATED TO BALCONY USE:**

The historic balcony consists of five tiers with loose seating accessed via a 32" wide door to a 41" wide stair with wider treads at its change in direction. The ceiling beams of the Great Hall provide a low headroom clearance of 58" above the second tier of seating. Also, the original balustrade at the balcony guardrail is lower than allowed by current code relative to the front seating tier and the bottom of aisles.

The Stow Building Commissioner determined that the balcony was not safe for public use due to the beam headroom clearance and the low guardrail, so the door leading to the balcony stairs is normally closed and locked to limit unauthorized access. Use of the balcony is restricted to Town Facilities Staff, audiovisual personnel associated with an event and the local cable television company, Stow TV.

**PROPOSED LIMITATIONS ON FUTURE USE OF THE BALCONY:**

The Town proposes to continue limitations on public use of the balcony with a policy as follows:

- Under normal circumstances, the balcony will be limited to use by Town Facilities Staff, AV personnel and Stow TV personnel.
- In the unlikely event that a function scheduled in Town Hall might exceed occupancy limits of the first floor of Great Hall, every effort will be made to reschedule the event to a different facility.
  - If an alternate venue is not possible, the Building Commissioner will allow limited and monitored occupancy of the balcony due to the special circumstances.
  - If monitored use of the balcony is allowed, priority seating for disabled persons will be provided in the loose seating configuration of the fully accessible first floor area.
- The Town's policy regarding provisions for seating of disabled persons for scheduled events in Town Hall will be posted in the building, on the Town's website, and be linked to other relevant online announcements.

**REQUEST FOR VARIANCE FOR BALCONY ACCESS:**

The original application request with narrative, photographs, drawings and cost estimate are included in the following pages for reference purposes.

STOW TOWN HALL / Stow MA  
MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
Page 1

*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*

**521 CMR 14.1: PRESERVATION OF TIERED BALCONY**

521 CMR 14 addresses regulatory requirements for "Places of Assembly" and the sole variance request from this Section is in relation to the original tiered balcony level serving the Great Hall. Other relevant aspects of Section 14 will be brought into compliance, including 14.5 for an assistive listening system (more than 49 occupants) and 14.6 for wheelchair access to the performance area of Great Hall (stage).

Great Hall is comprised of a flexible use first floor space with loose seating and a 12" high stage at the east end. A tiered balcony at the west end serves as a mezzanine level providing supplemental seating for when the building was used historically for town meetings. The five tiers of the balcony level incorporate loose wooden seating that is a mix of deacon's benches and folding chairs in groupings of two's and three's. A total of 71 persons could occupy the loose benches and chairs. The balcony is reached via a 32" door to a 41" wide winder stair in the northwest corner of the first floor. A second means of egress is provided on the south wall via an emergency exit door to an exterior fire escape.

A sign limiting balcony use to authorized persons is posted on the stair door to control access, and this exclusion is for reasons unrelated to universal accessibility. The balcony guardrail is low and an attic support beam above the second tier of the five-tiered seating platforms does not provide adequate headroom clearance. Stow building officials restrict access to the balcony for these reasons, and yet the Town's affection for retaining the historic seating gallery has kept the space intact nonetheless.

Recommended work in the project includes replacement of the balcony stair handrails per 521 CMR 27.4, reduction of seating capacity (while retaining "authorized only" use limitations), and improvements to the historic guardrail. The Town will post a maximum occupancy load of 49 persons (down from the current 71) in order to remove the emergency exit and exterior fire escape stair since only one means of egress would then be required. The variance from 521 CMR 14.1 requests that the balcony tiered seating gallery remain as-is, along with the 32" door and the winder stairway. If full compliance with 521 CMR 14.1 were required, the following additional work would need to be performed:

- Provide a vertical wheelchair lift in compliance with 521 CMR 28.12 from the first floor to the balcony. Note the building size (2,562 SF per floor) and height (two stories) meet the criteria in 28.12.1d that allows provision of a wheelchair lift without requiring a variance.
- Modify the fourth seating tier at the balcony to allow for one wheelchair space on that platform. A companion seat would be a loose chair adjacent to the wheelchair since there are no fixed seats on the balcony level. Modify the third and fifth seating tiers to allow for maneuvering clearance for the wheelchair and provision of the accessible viewing area.
- Reconstruct the stairs to eliminate the winder treads and meet consistent tread depth as required by 521 CMR 27.2.
- Reconfigure the stair entry and replace the door leading from the first floor to the balcony stairs in order to comply with 521 CMR 26.5 and 26.6 for door width and maneuvering clearances.
- Reframe the first floor and balcony levels as needed, providing support foundations and posts in the crawl space area adjacent to the utility area in the ground floor below.
- Reconfigure and limit the intended first floor storage spaces for tables and chairs as indicated.

Refer to the following pages showing existing conditions and proposed first floor and balcony, along with revisions needed for full compliance. Also included is an itemized budget for the cost of compliance.

It is the Applicant's belief that the estimated cost of \$190,000 for full compliance with 521 CMR 14.1 and other noted compliance issues is excessive without any substantial benefit to persons with disabilities.

*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*

IMG\_6807.JPG



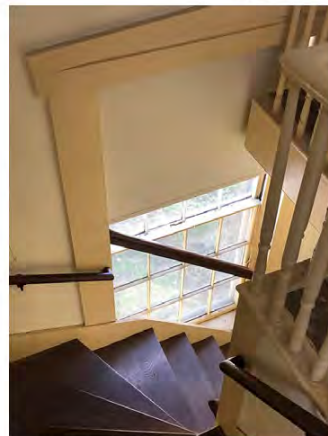
*View of Great Hall with Original Balcony Above;  
Stair to Balcony at Northwest Corner of Hall*

IMG\_6786.JPG



*Stair from Great Hall to Balcony;  
Winders at Turn and Discontinuous Railings;  
Proposed Project to Replace Railings for Continuity*

IMG\_6804.JPG



*Looking Down Balcony Stairs at the Turn;  
Continuity of Railings Included in Project Scope*

IMG\_8240.JPG



*Upper Landing at Tier 4 of Balcony with Stair Beyond*

STOW TOWN HALL / Stow MA  
MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
Page 3

*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*



IMG\_6788.JPG



*Tier 5 of Balcony with Pair of Deacon's Benches*

IMG\_6789.JPG



*Looking South at Tiered Seating of Balcony;  
No Seats are Fixed in Place*

IMG\_8166.JPG



*Original Spandrel and Balustrade at Open Side of Balcony*

IMG\_6800.JPG



*Existing Exit Door to Exterior Fire Escape to be  
Removed in the Proposed Project Scope*

STOW TOWN HALL / Stow MA  
MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
Page 4

*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*

IMG\_6818.JPG



*Exterior View of Fire Escape Serving the Balcony*

IMG\_7786.JPG



*Lower Run of Fire Escape Stairs Separated from Adjacent Ramp Leading to 1895 Entrance Beyond*

IMG\_8483.JPG



*Original 1848 Roof Overhang Detail at South Facade*

IMG\_8484.JPG

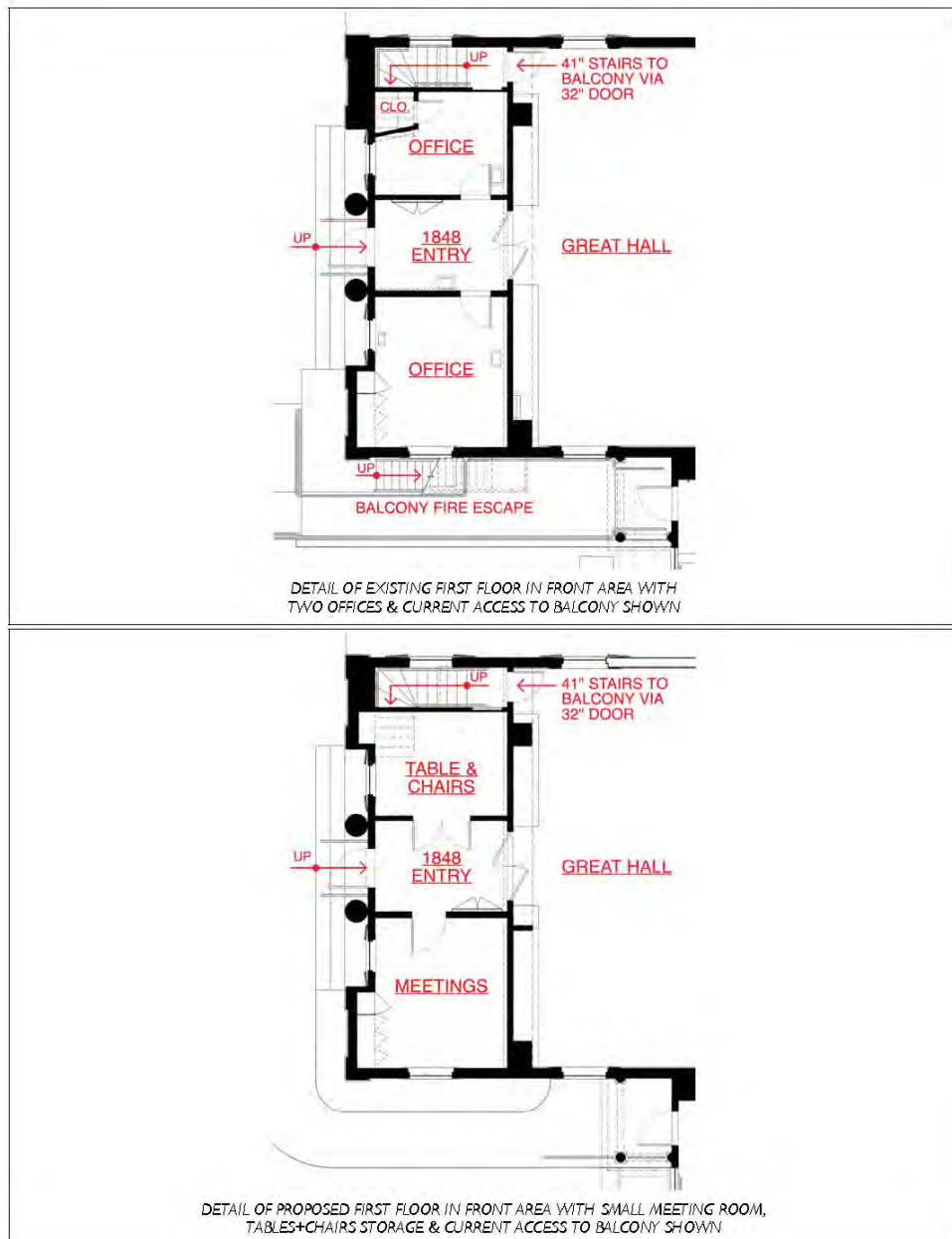


*Original Dual Board Frieze Interrupted by Fire Escape Exit Door Opening will be Restored*

STOW TOWN HALL / Stow MA  
MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
Page 5

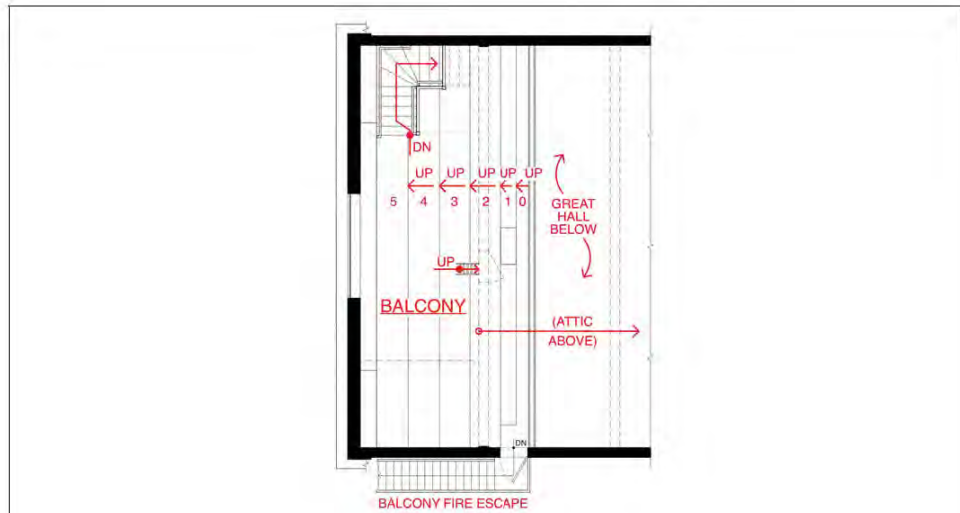
*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*



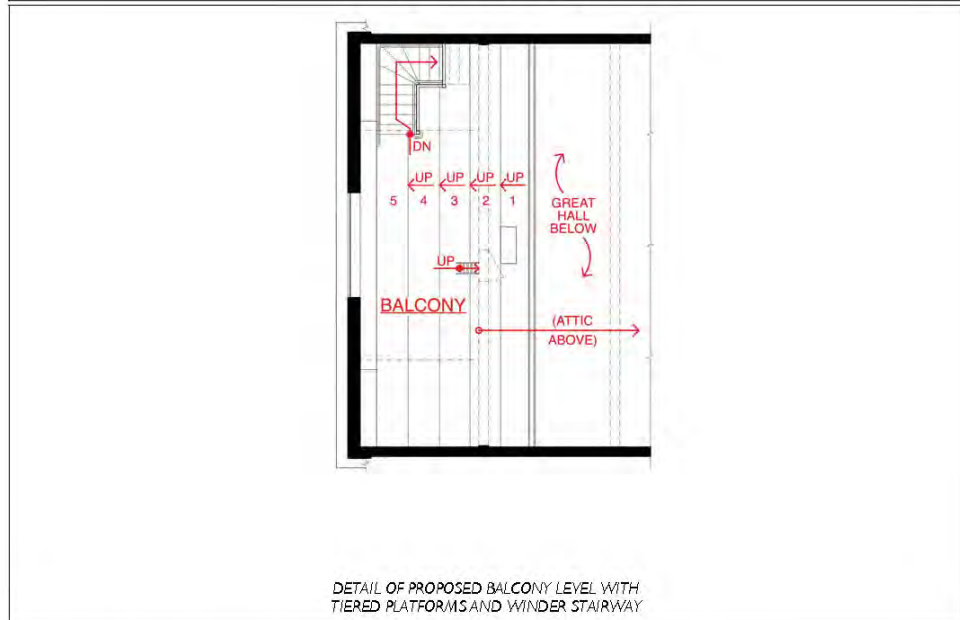
STOW TOWN HALL / Stow MA  
MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
Page 6

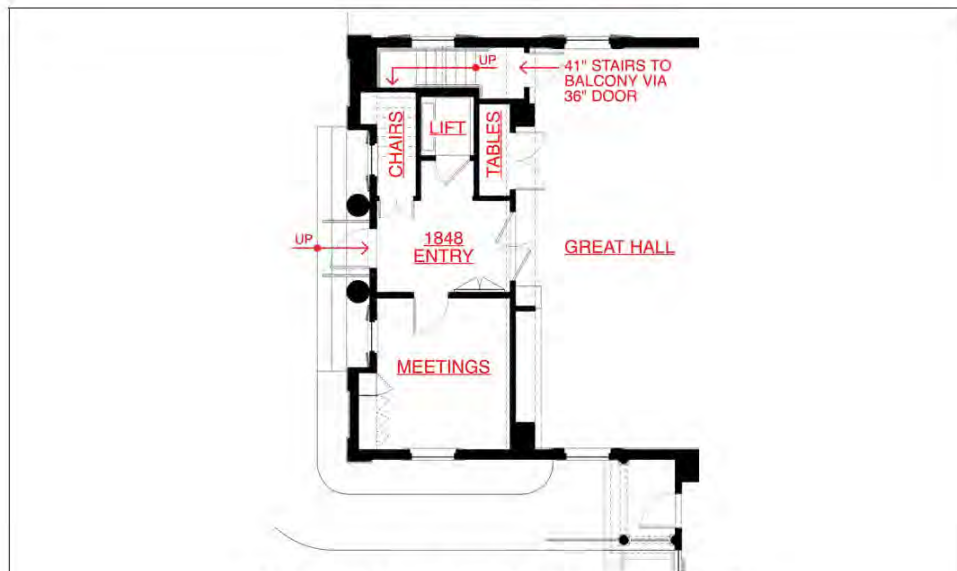
*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*



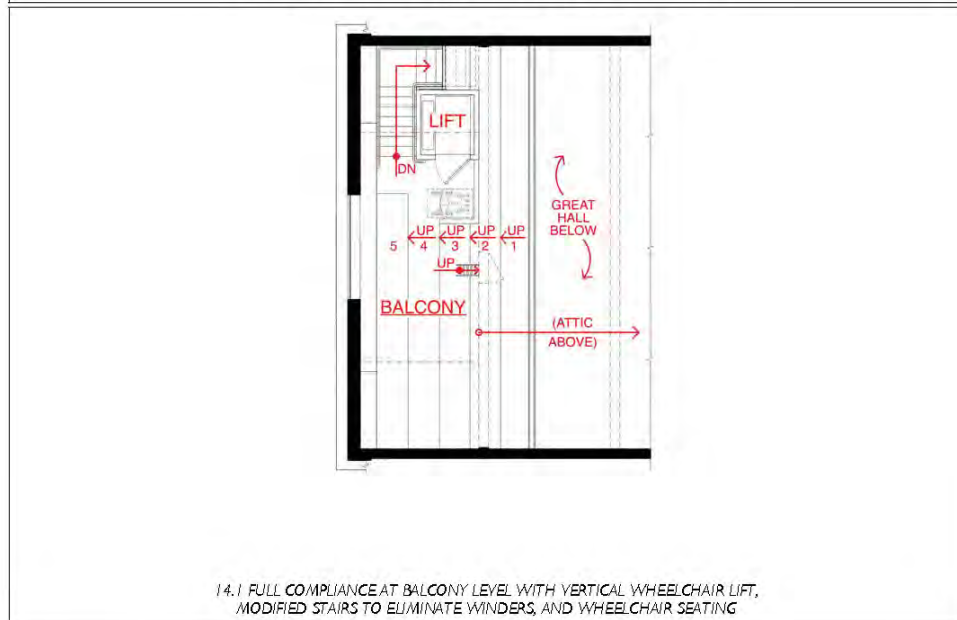
DETAIL OF EXISTING BALCONY LEVEL WITH  
TIERED PLATFORMS AND WINDER STAIRWAY



DETAIL OF PROPOSED BALCONY LEVEL WITH  
TIERED PLATFORMS AND WINDER STAIRWAY



14.1 FULL COMPLIANCE TO BALCONY AT FIRST FLOOR IN FRONT AREA WITH VERTICAL WHEELCHAIR LIFT & MODIFIED STAIRS+DOOR TO BALCONY



14.1 FULL COMPLIANCE AT BALCONY LEVEL WITH VERTICAL WHEELCHAIR LIFT, MODIFIED STAIRS TO ELIMINATE WINDERS, AND WHEELCHAIR SEATING



STH\_MAAE\_Costs\_14 BALCONY.jpg

<b>COST of COMPLIANCE to 521 CMR 14.1</b>	
<b>14.1: PROVISION OF ACCESSIBILITY TO TIERED BALCONY</b>	
\$5,000	Selective Demolition in the Areas of Work
\$6,000	Foundations in Crawl Space for Lift & Framing Supports
\$12,000	Framing Reconfigurations at First Floor in Lift Area
\$16,000	Framing Reconfigurations at Balcony and Stairs
\$3,250	Framing at Enlarged Doorway Area to Stairs
\$7,750	Replacement Doors, Frames and Hardware in Area of Work
\$24,000	Finish Carpentry: Wainscoting, Trim, Casings, Stairs
\$16,500	Drywall, Taping, Painting
\$45,000	Provision of 2-Stop Vertical Wheelchair Lift
\$5,500	Miscellaneous Electrical in Area of Work
\$141,000	Subtotal
\$49,000	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>\$190,000</b>	<b>Estimated Cost for Full Compliance at Tiered Balcony</b>

*Cost of Full Compliance with 14.1 Showing Provision of Accessibility to Balcony Level of Great Hall*

*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*

The following letter of support from the Massachusetts Historical Commission was sent to the Massachusetts Architectural Access Board separately from the original variance application. Note the following statements as quoted from the MHC letter of determination:

*The MHC believes that if MAAB variances are not granted, modifications to the historic front entrance and interior balcony and stairs would significantly compromise the integrity of the historic building. The exterior and interior of Stow Town Hall retains a significant amount of original materials and historic features.*

*The proposed project will have "no adverse effect" (950 CMR 71.07(2)(b)(2)) on Stow Town Hall. The MHC respectfully requests that the Massachusetts Architectural Access Board grant the variance requests.*

STOW TOWN HALL / Stow, MA  
MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
Page 10

*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*

MHC Letter page 1.pdf



**The Commonwealth of Massachusetts**  
 William Francis Galvin, Secretary of the Commonwealth  
 Massachusetts Historical Commission

February 5, 2021

William Joyce  
 Executive Director  
 Massachusetts Architectural Access Board  
 1000 Washington Street, Suite 710  
 Boston, MA 02118

RE: Stow Town Hall, 375 Great Road, Stow, MA; MHC# RC.69208

Dear Mr. Joyce:

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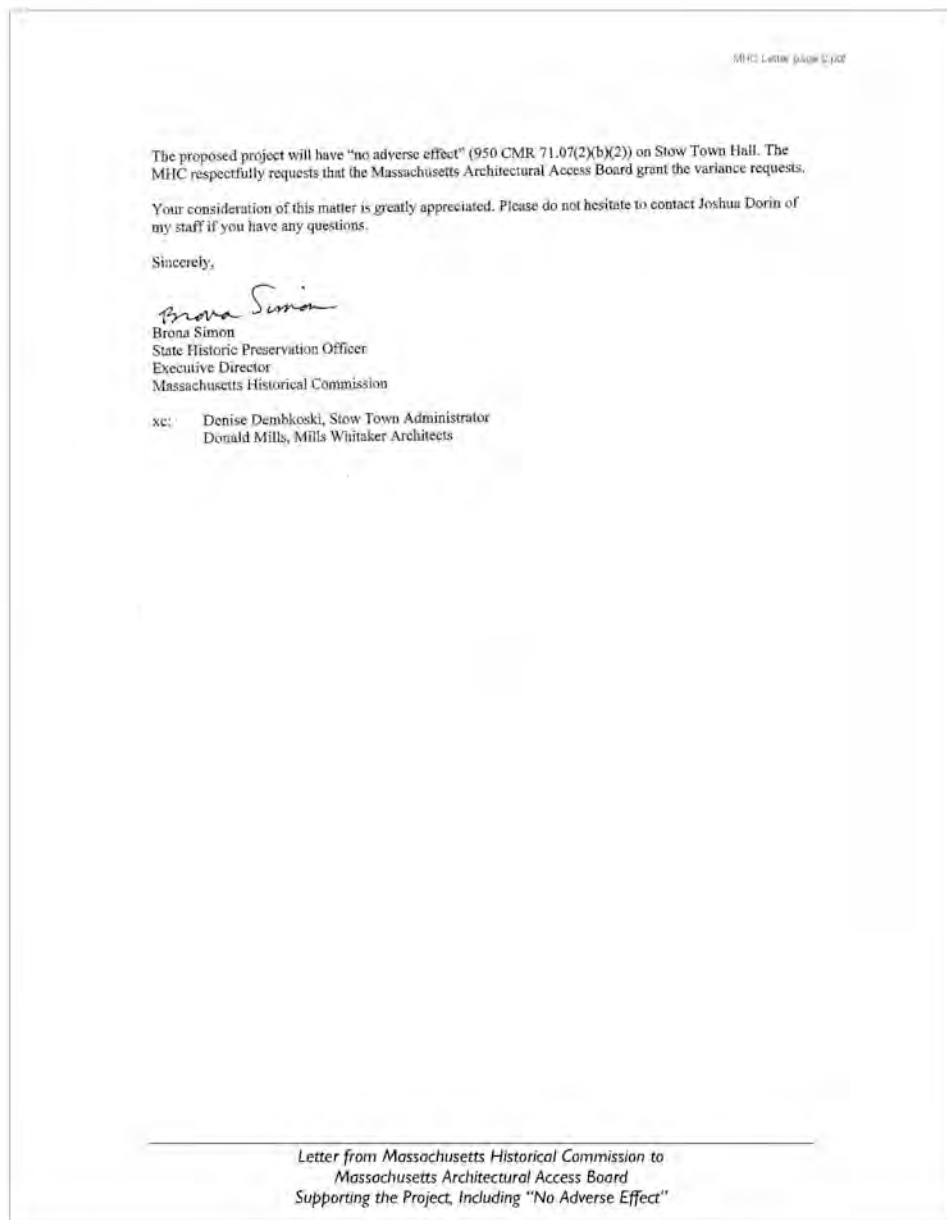
220 Morrissey Boulevard, Boston, Massachusetts 02125  
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[www.sec.state.ma.us/mhc](http://www.sec.state.ma.us/mhc)

*Letter from Massachusetts Historical Commission to  
 Massachusetts Architectural Access Board  
 Supporting the Project, Including Presentation of the "Interior Balcony and Stairs"*

STOW TOWN HALL / Stow MA  
 MAAB Variance Application Continuation / February 2021

Mills Whitaker Architects LLC  
 Page 11

*Submission for Continuation of Variance Application  
 Mills Whitaker Architects - 12 February 2021*



*Submission for Continuation of Variance Application  
Mills Whitaker Architects - 12 February 2021*



CHARLES D. BAKER  
GOVERNOR

KARYN E. POLITO  
LIEUTENANT GOVERNOR

MIKE KENNEALLY  
SECRETARY OF HOUSING AND  
ECONOMIC DEVELOPMENT

**Commonwealth of Massachusetts  
Division of Professional Licensure  
Office of Public Safety and Inspections  
Architectural Access Board**

1000 Washington St., Suite 710 Boston, MA 02118  
W: 617-727-0660 www.mass.gov/aab Fax: 617-979-5469

EDWARD A. PALLESCHI  
UNDER SECRETARY OF COMMERCE,  
AFFAIRS AND BUSINESS REGULATION

LAYLA R. D'EMILIA  
COMMISSIONER, DIVISION OF  
PROFESSIONAL LICENSURE

AMENDED NOTICE OF ACTION

Docket Number V21 007

RE: Stow Town Hall

375 Great Road

Stow

An application for variance was filed with the Board by Donald W. Mills, RA (Applicant) on January 22, 2021. On February 12, 2021, the Board received an additional submission regarding the following sections:

Section	Description
14.1	Accessible Seating Area
25.1	Accessible Entrances
26.6	Door Clearance
28.12.3	LULA Platform Size
(a)	

2. The submittal was reviewed by the Board on Monday, February 22, 2021.
3. After reviewing all materials submitted to the Board, the Board voted as follows:

GRANT relief to 25.6 as proposed;

DENY relief to 14.6 as impracticability (as defined in 821 CMR 5) has not been proven for this request; and

DENY the request for relief to 25.1 as amended as impracticability (as defined in 821 CMR 5) has not been proven for this request.

Any person aggrieved by the above decision may request an adjudicatory hearing before the Board within 30 days of receipt of this decision by filing the attached request for an adjudicatory hearing. If after 30 days, a request for an adjudicatory hearing is not received, the above decision becomes a final decision and the appeal process is through Superior Court.

cc: Local Building Inspector, Local Disability Commission,  
Independent Living Center

*Dawn Guarnello WT*

Chairperson, Architectural Access Board

Date: February 25, 2021

*Amended Notice of Action on Continuation  
Massachusetts Architectural Access Board - 25 February 2021*



**CHARLES D. BAKER**  
GOVERNOR

**KARYN E. POLITO**  
LIEUTENANT GOVERNOR

**MIKE KENNEALY**  
SECRETARY OF HOUSING AND  
ECONOMIC DEVELOPMENT



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V: 617-727-0660 • www.mass.gov/aab • Fax: 617-979-5459

**EDWARD A. PALLESCHI**  
UNDERSECRETARY OF  
CONSUMER AFFAIRS AND  
BUSINESS REGULATION

**DIANE M. SYMONDS**  
COMMISSIONER, DIVISION OF  
PROFESSIONAL LICENSURE

Docket Number: \_\_\_\_\_  
(Staff Use Only)

**REQUEST FOR ADJUDICATORY HEARING**

RE: **Stow Town Hall / 375 Great Road / Stow MA 01775**

(Name and address of building as appearing on application for variance)

I, Don Mills / Mills Whitaker Architects LLC, do hereby request that the Architectural Access Board conduct an informal Adjudicatory Hearing in accordance with the provisions of 801 CMR Rule 1.02 et seq. as I am aggrieved by the decision of the Board with respect to Section(s) 14.1 (Balcony); 25.1 (Lower Entry) of the Rules and Regulations of the Architectural Access Board, 521 CMR.

I understand that I may request such a hearing within **thirty (30) days** of receipt of the Notice of Action.

Date: 26 Feb 2021

Signature

**PLEASE PRINT:**

Don Mills / Mills Whitaker Architects

Name

PO Box 750089

Address

Arlington MA 02475

City/Town

State

Zip Code

donmills@millswhitaker.com

E-mail

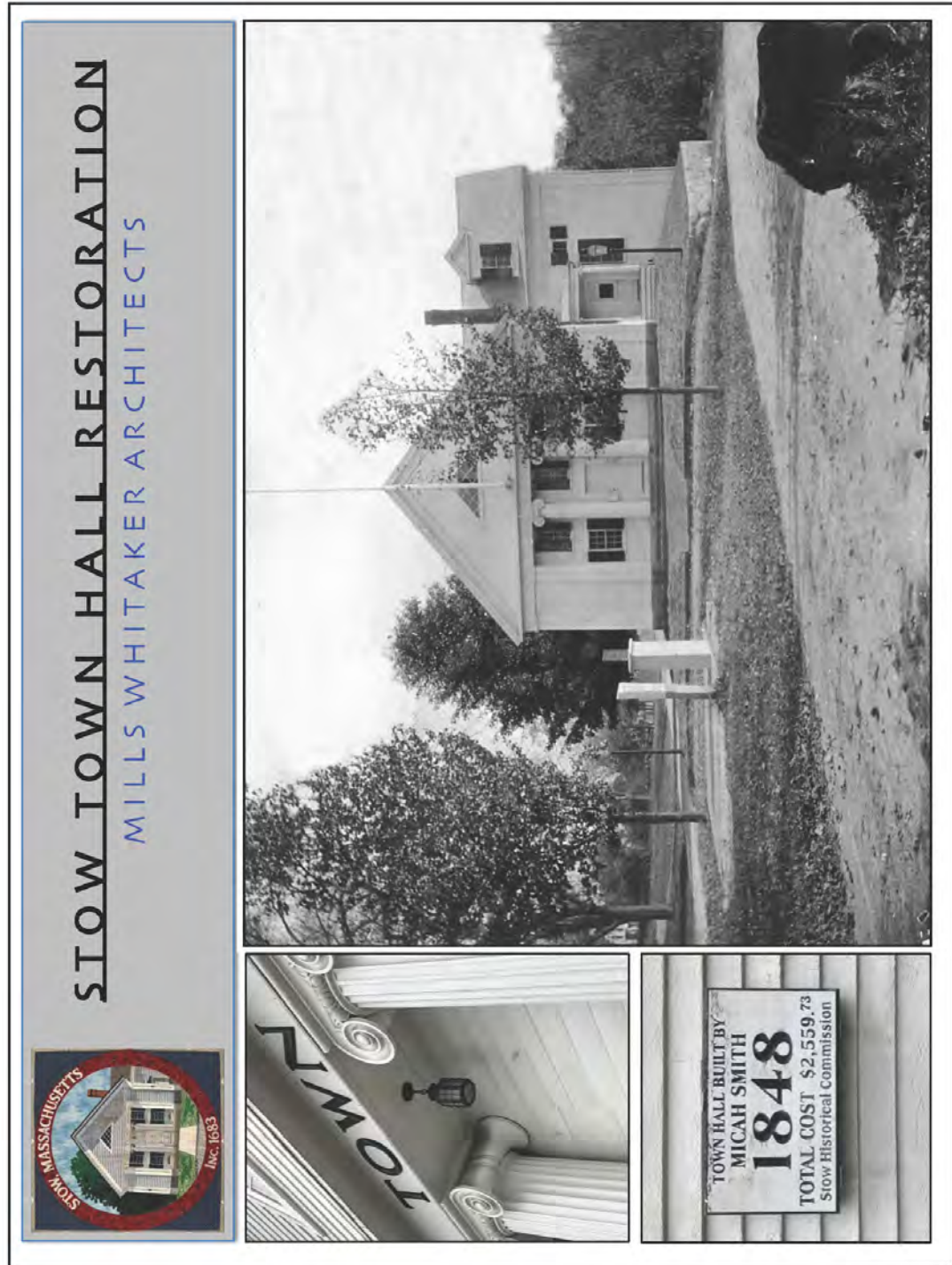
617-876-7611 ext 2

Telephone

**PLEASE NOTE:**

**This form must be received by the Board within thirty (30) days after receipt of the Notice of Action.**

*Request for Adjudicatory Hearing  
Mills Whitaker Architects - 26 February 2021*



Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



# STOW TOWN HALL RESTORATION

MILLS WHITAKER ARCHITECTS




## MAAB ADJUDICATORY HEARING ON TWO ITEMS:

- ✧ 521 CMR 14.1:  
Accessibility to Great Hall Balcony
- ✧ 521 CMR 25.1:  
Accessible Entrance to Ground Floor




Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





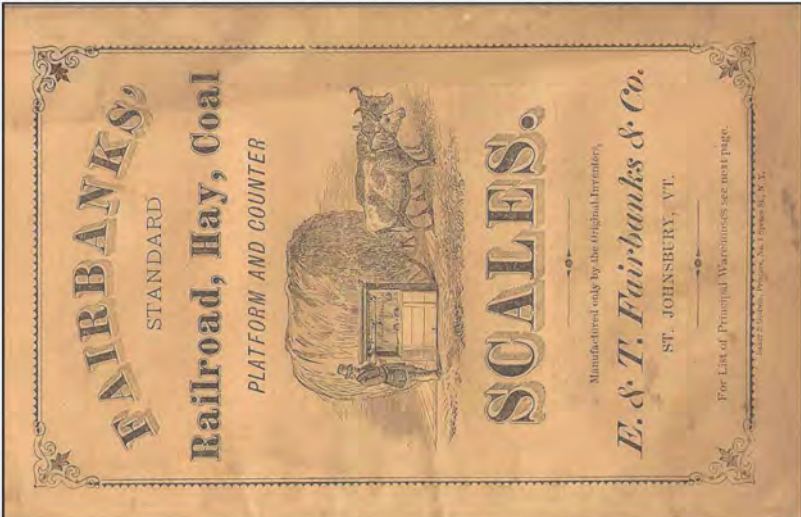
# STOW TOWN HALL RESTORATION

MILLS WHITAKER ARCHITECTS



**TOWN HALL RESTORATION PROJECT SUMMARY:**

- ✧ Restore Historic Character of Building & Site
- ✧ Improve Building Systems and Accessibility



Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



**EXISTING CONDITIONS**

MAAB Adjudicatory Hearing – 5 April 2021 4

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

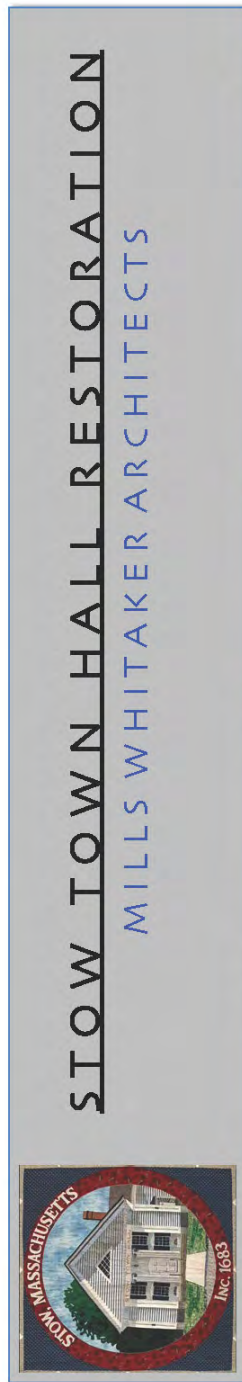




**PROPOSED RESTORATION**

MAAB Adjudicatory Hearing – 5 April 2021 5

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

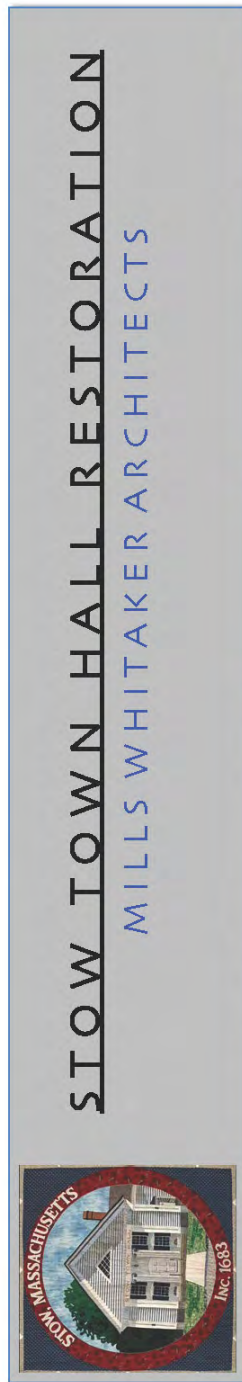


MAAB Adjudicatory Hearing – 5 April 2021 6

**EXISTING CONDITIONS**

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

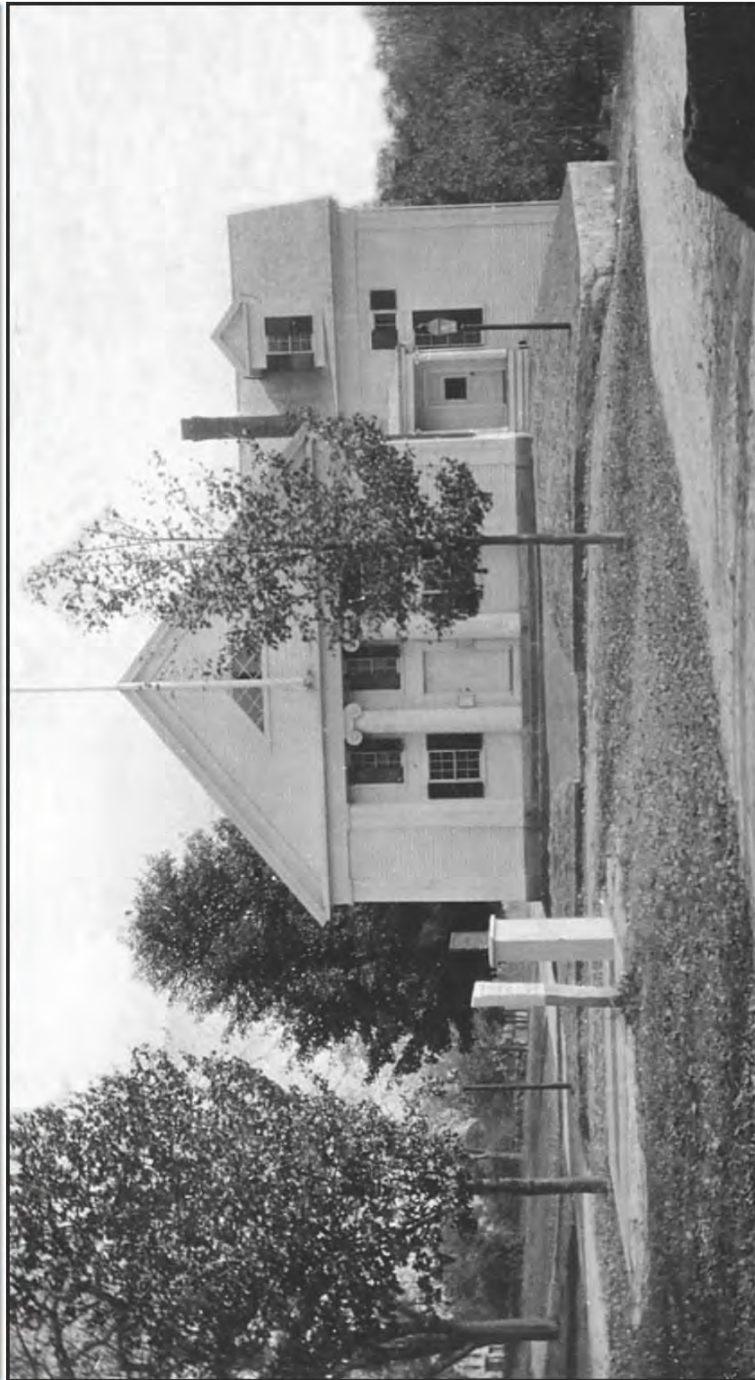




MAAB Adjudicatory Hearing – 5 April 2021 7

**PROPOSED RESTORATION**

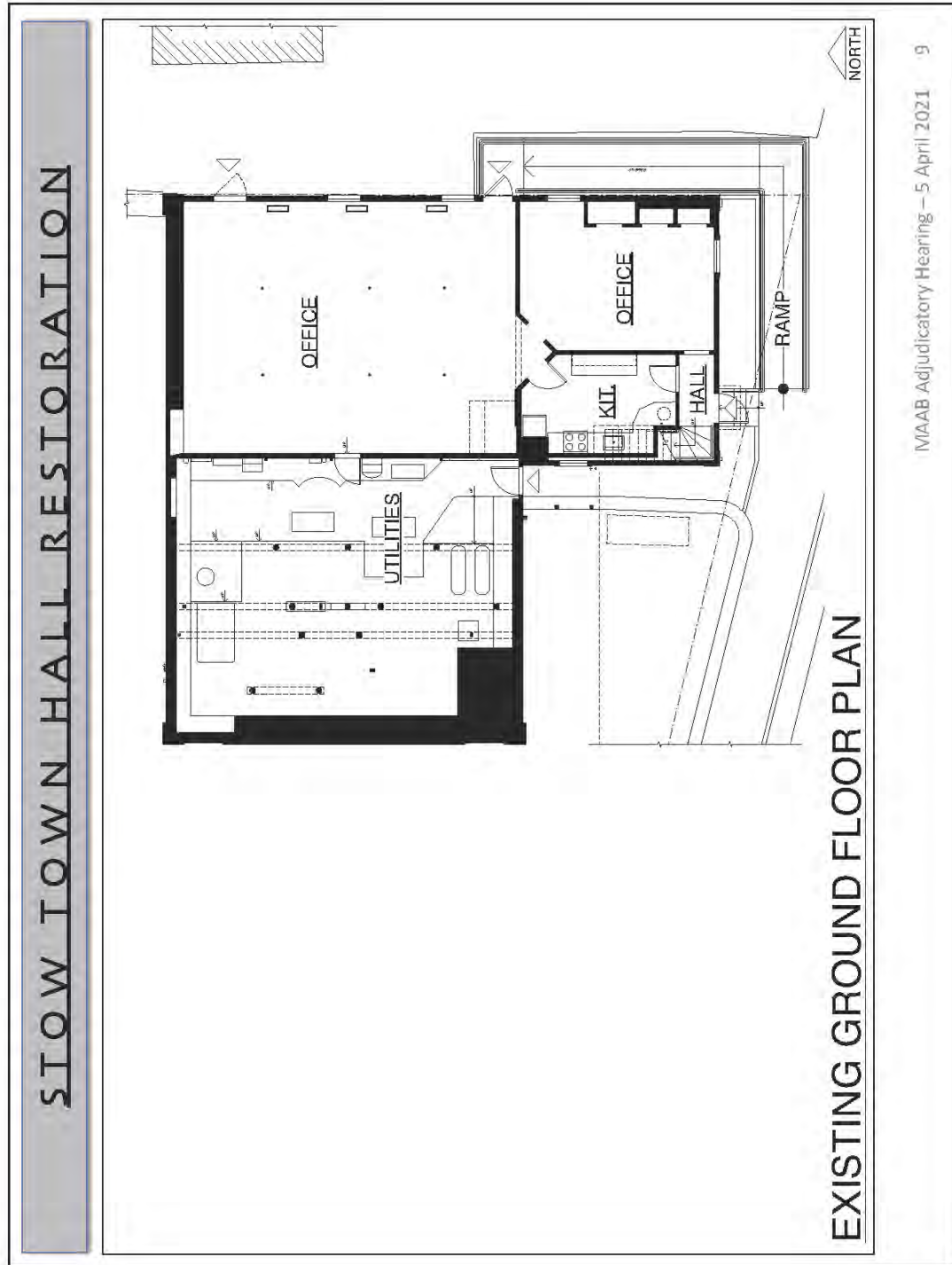
Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



**RESTORATION of 1895 SITE APPEARANCE**

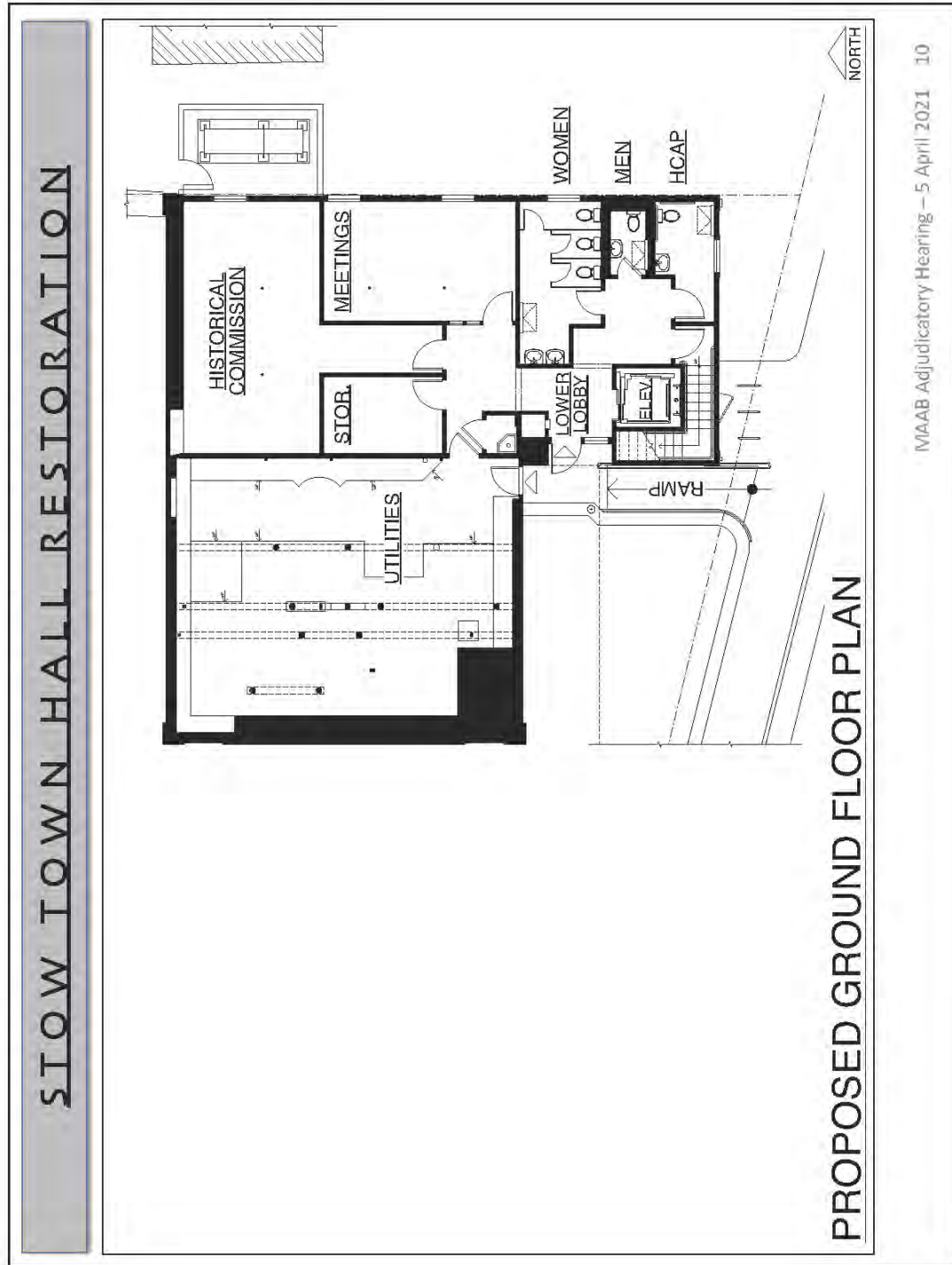
MAAB Adjudicatory Hearing – 5 April 2021 8

*Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021*

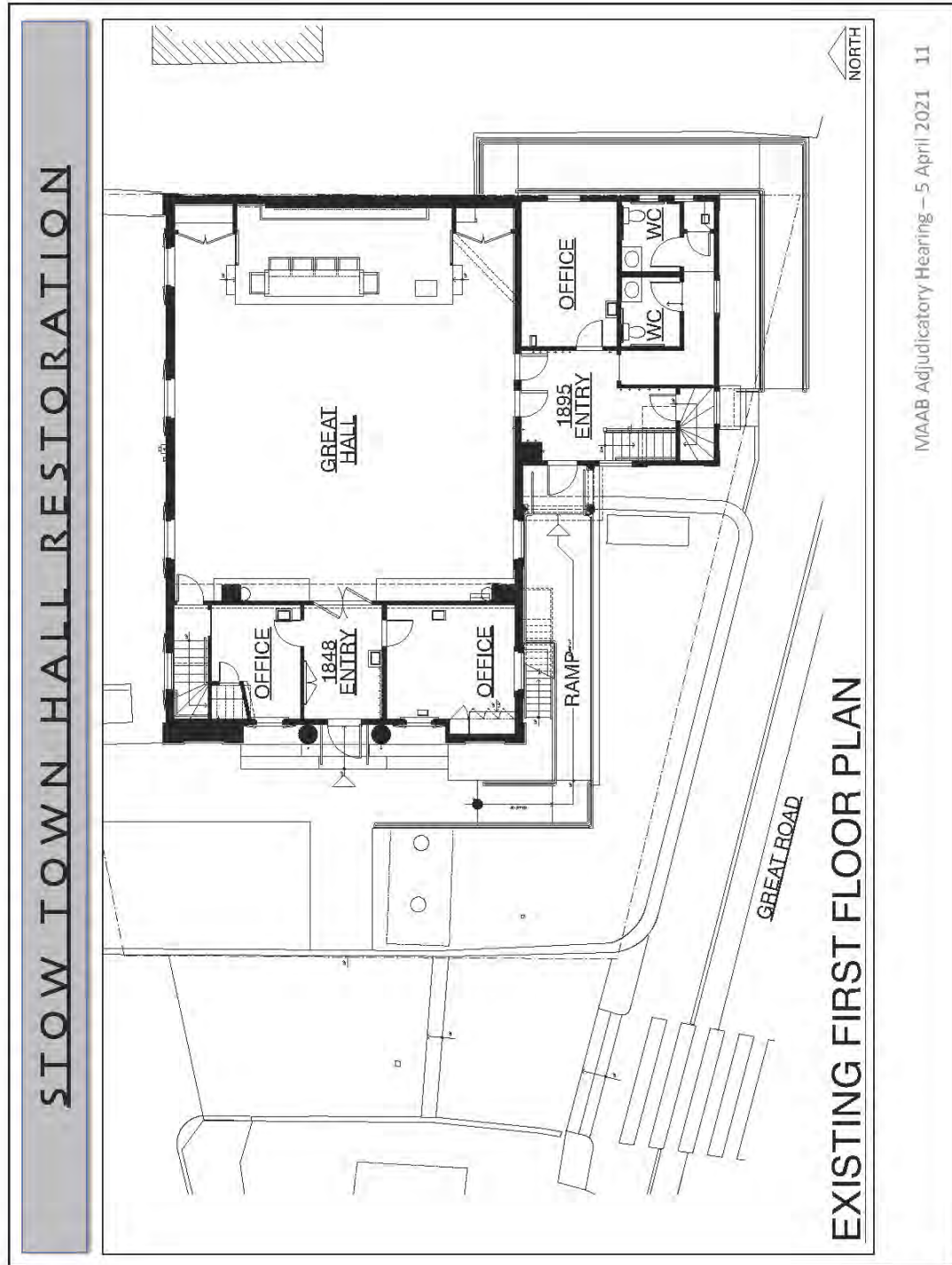


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Mills Whitaker Architects - 5 April 2021

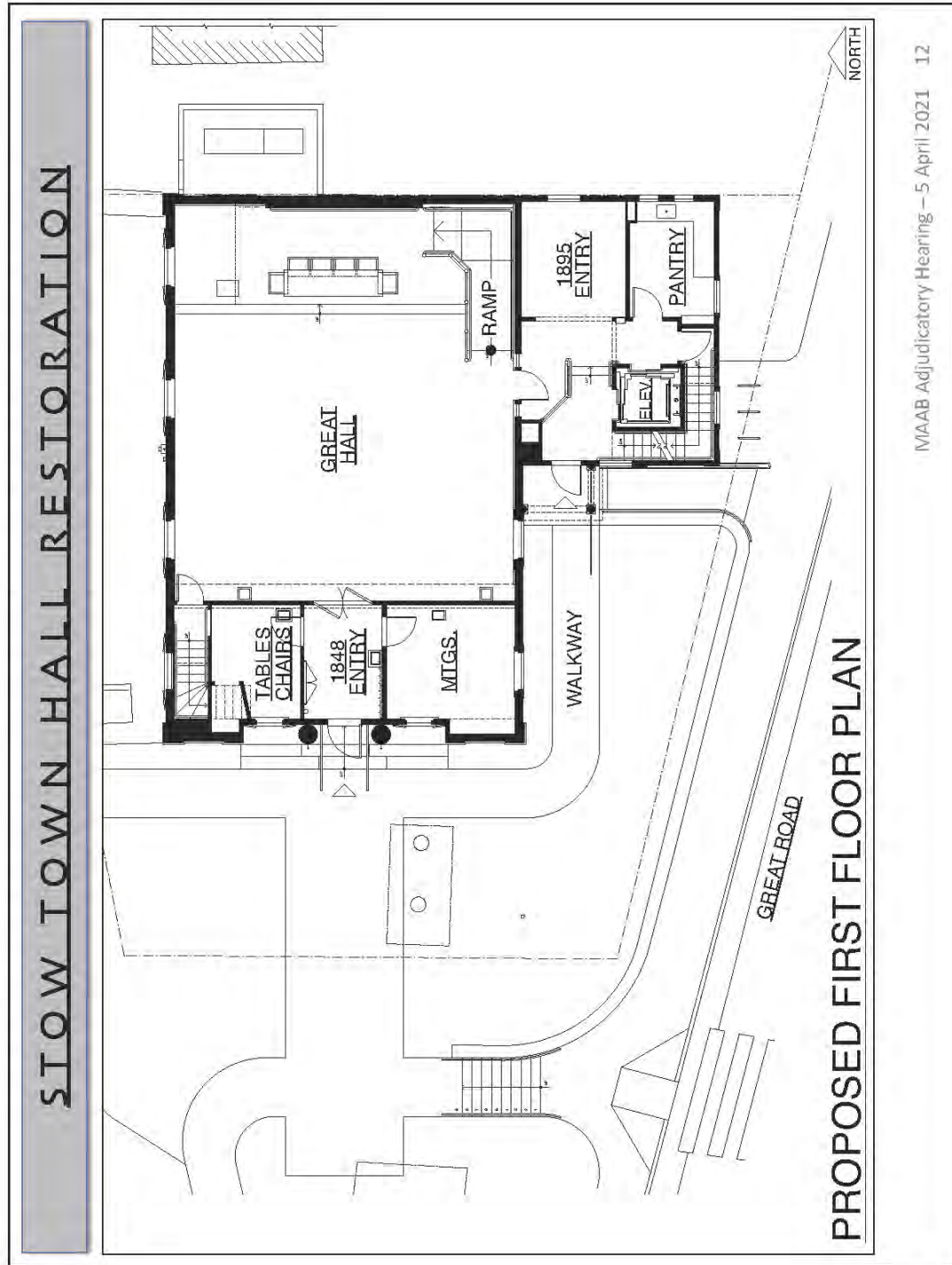




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Mills Whitaker Architects - 5 April 2021



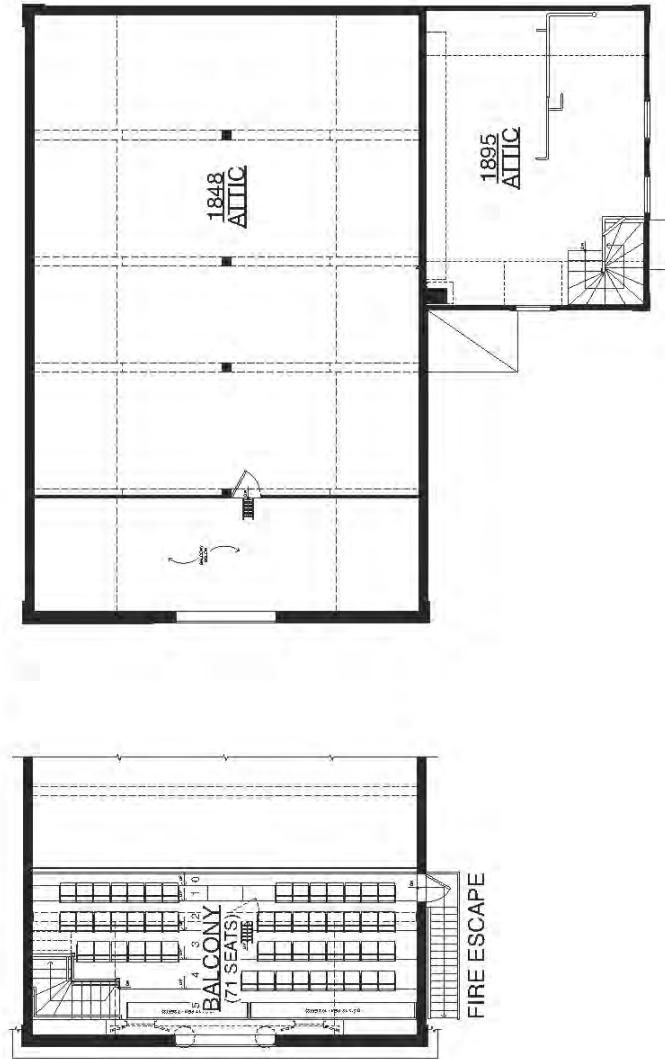
Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



MAAB Adjudicatory Hearing – 5 April 2021 12

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

# STOW TOWN HALL RESTORATION

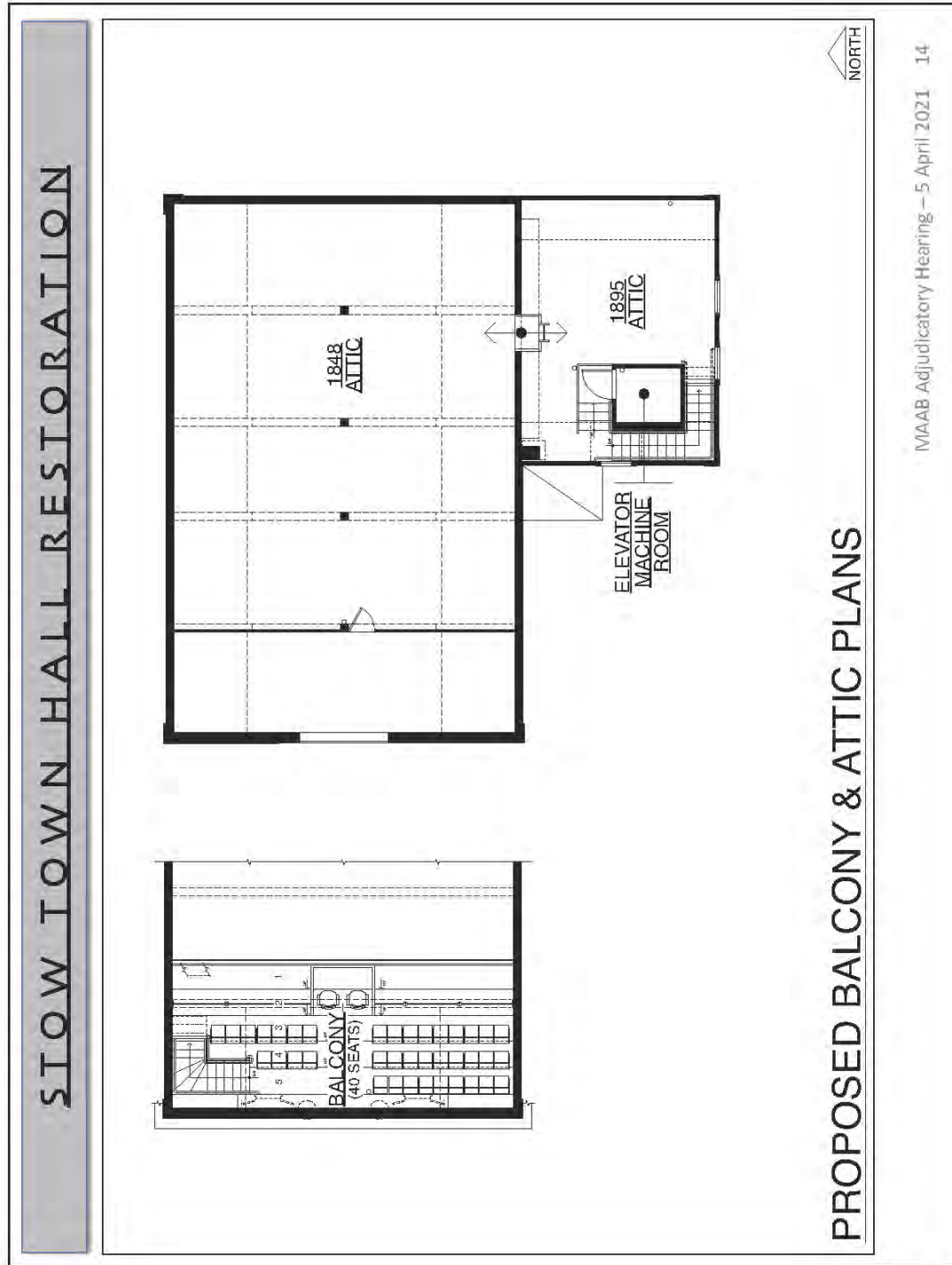


## EXISTING BALCONY & ATTIC PLANS

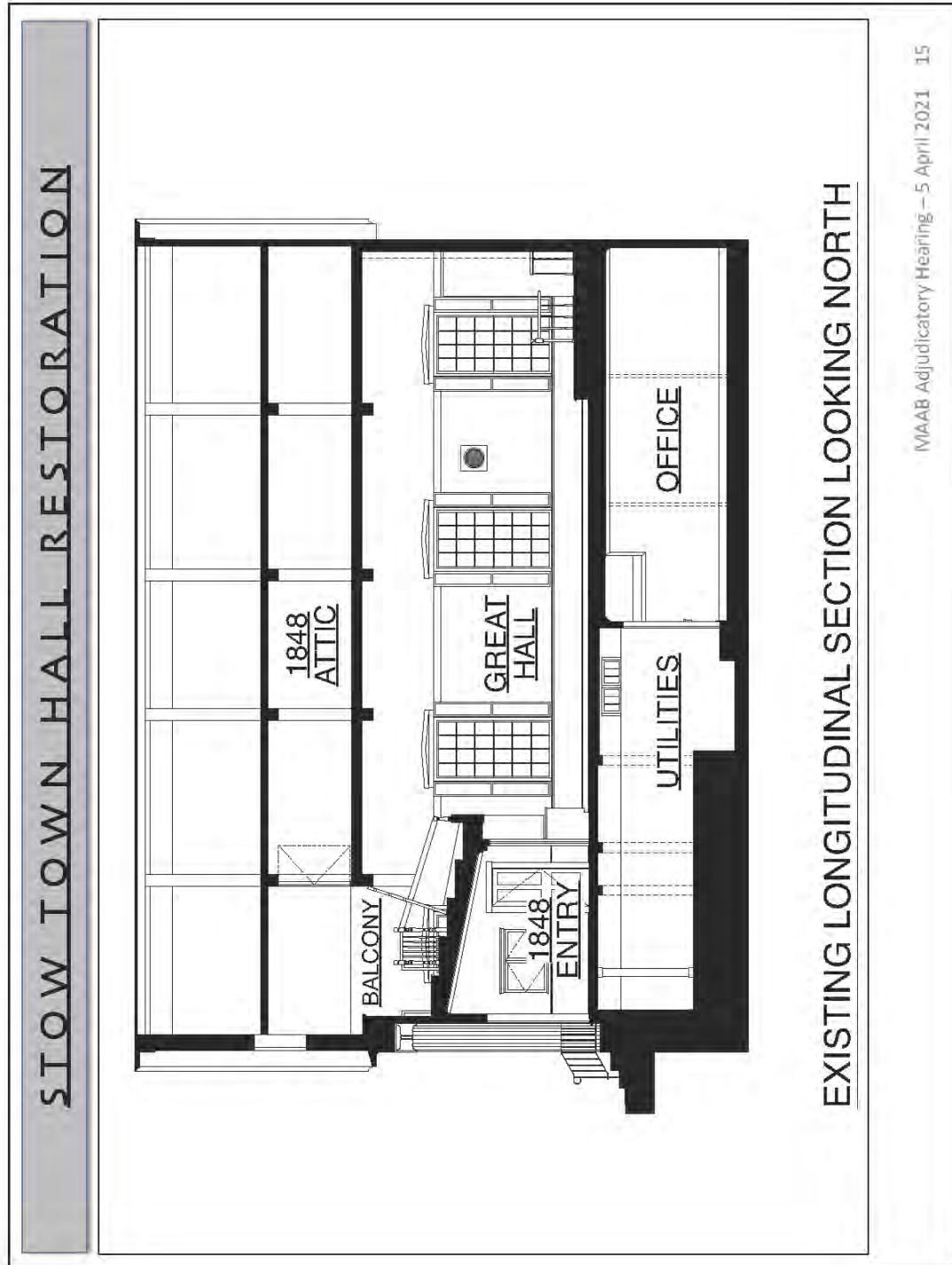
MAAB Adjudicatory Hearing – 5 April 2021 13

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

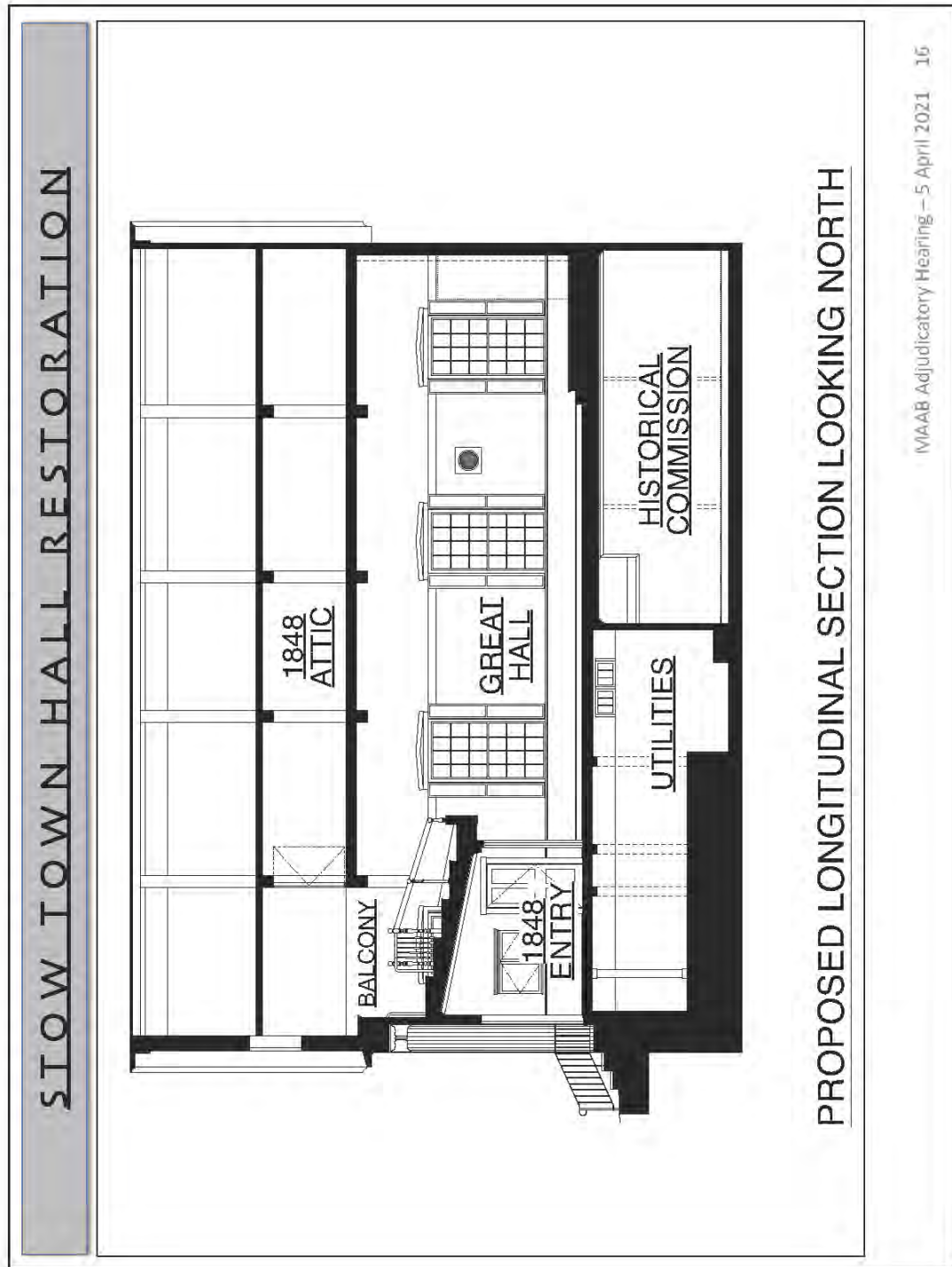




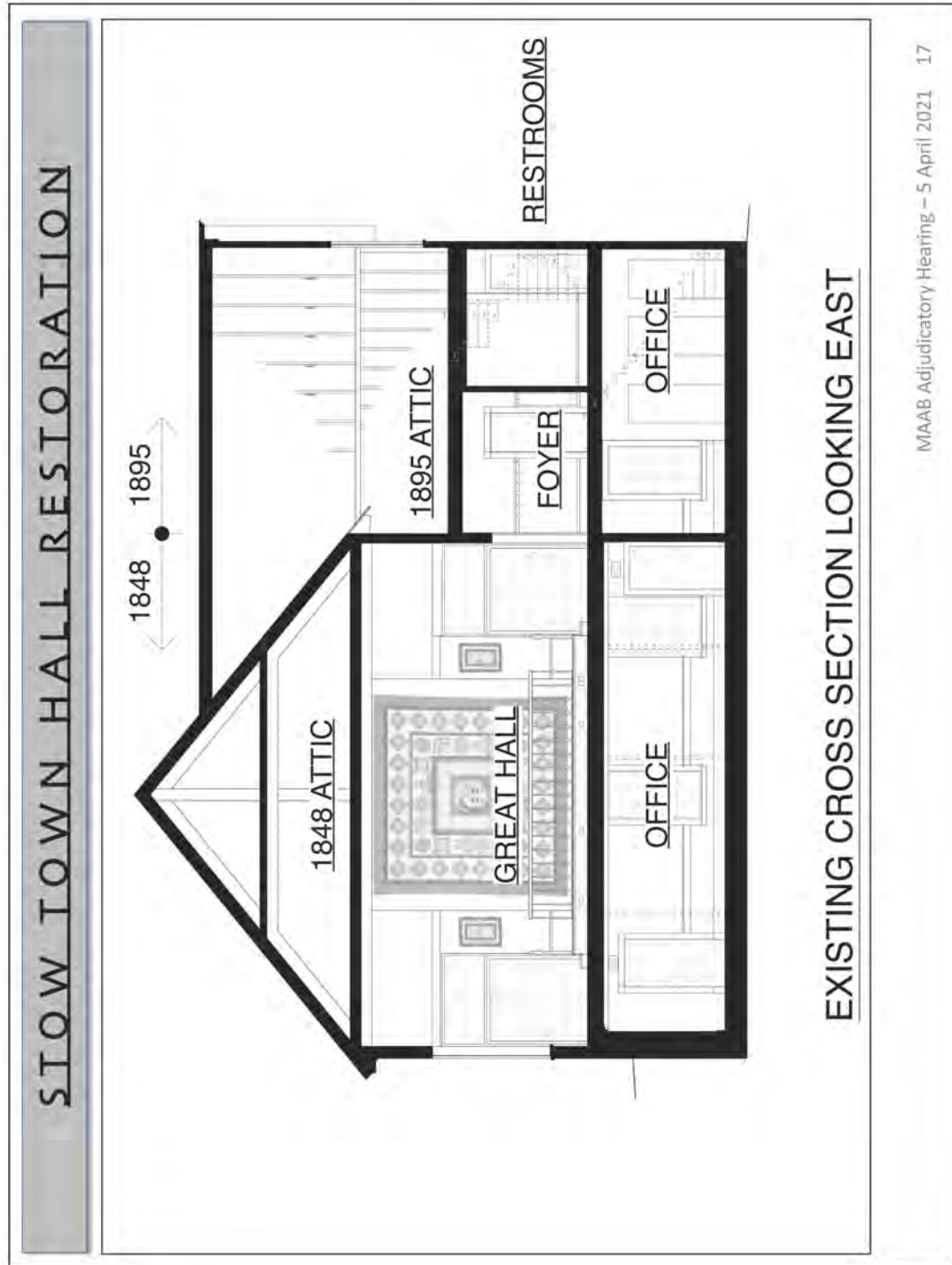
Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

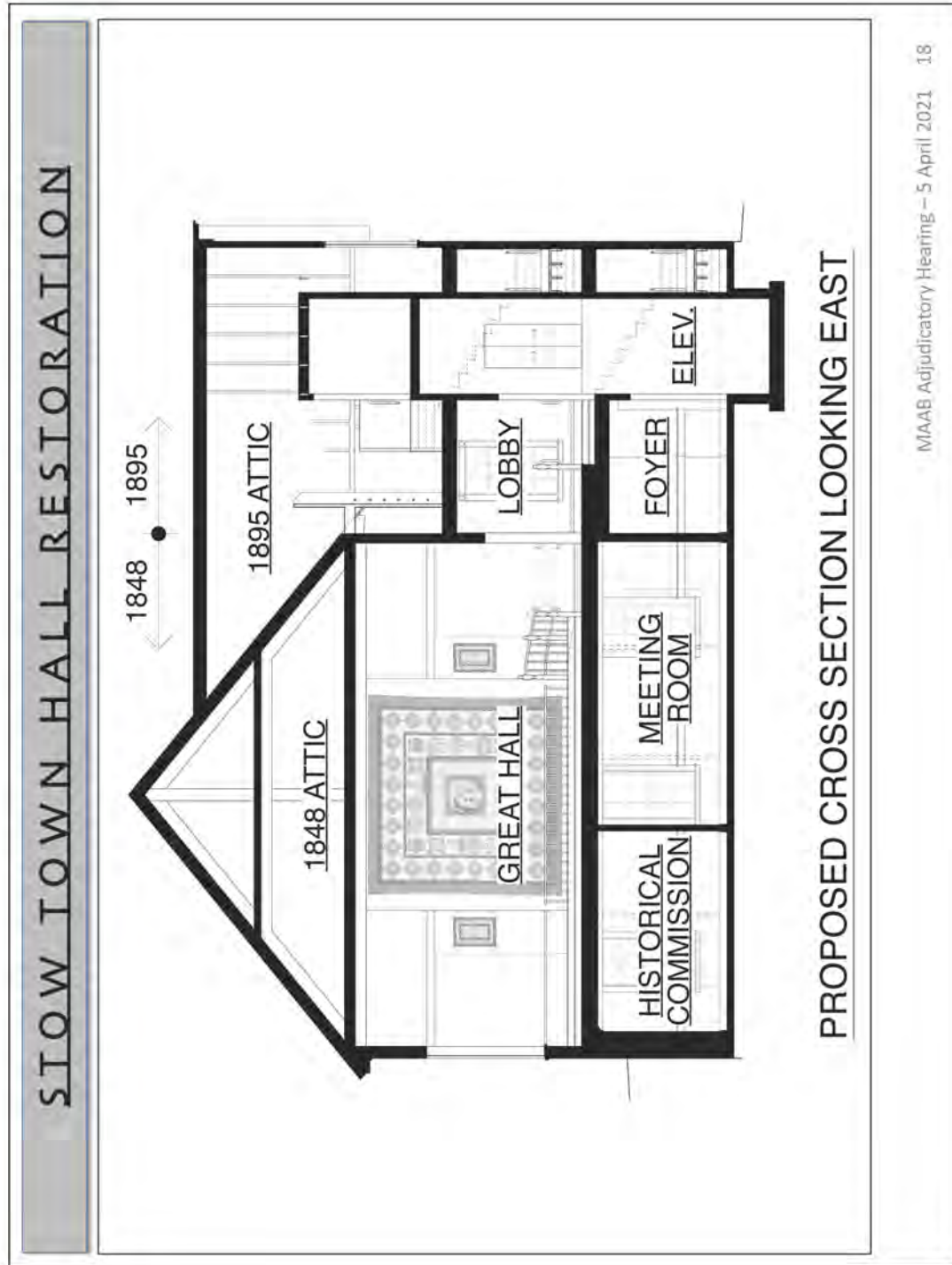


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Mills Whitaker Architects - 5 April 2021




Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



# STOW TOWN HALL RESTORATION

MILLS WHITAKER ARCHITECTS




## 521 CMR 14.1: ACCESSIBILITY TO BALCONY LEVEL

- ✧ Tiered Mezzanine Loose Seating for Great Hall
- ✧ Current Use Limited to Authorized Persons Only
- ✧ \$190,000 Cost for Full Accessibility Compliance

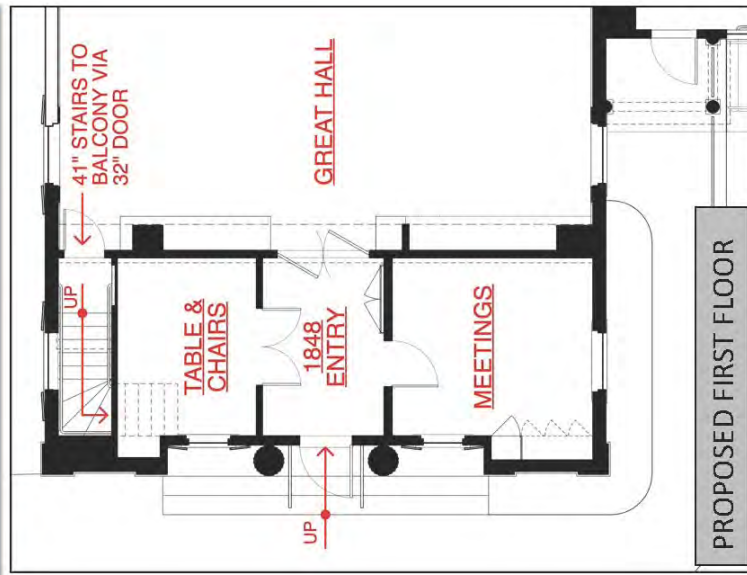
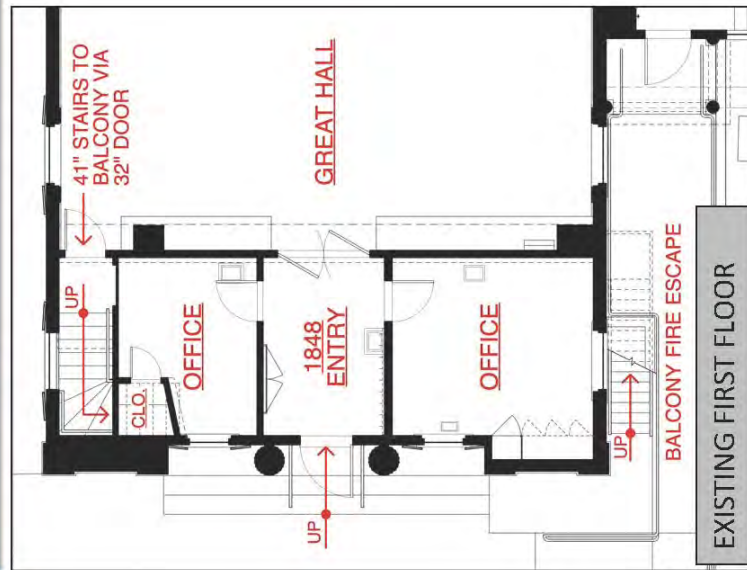
MAAB Adjudicatory Hearing – 5 April 2021 19

*Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021*



# STOW TOWN HALL RESTORATION

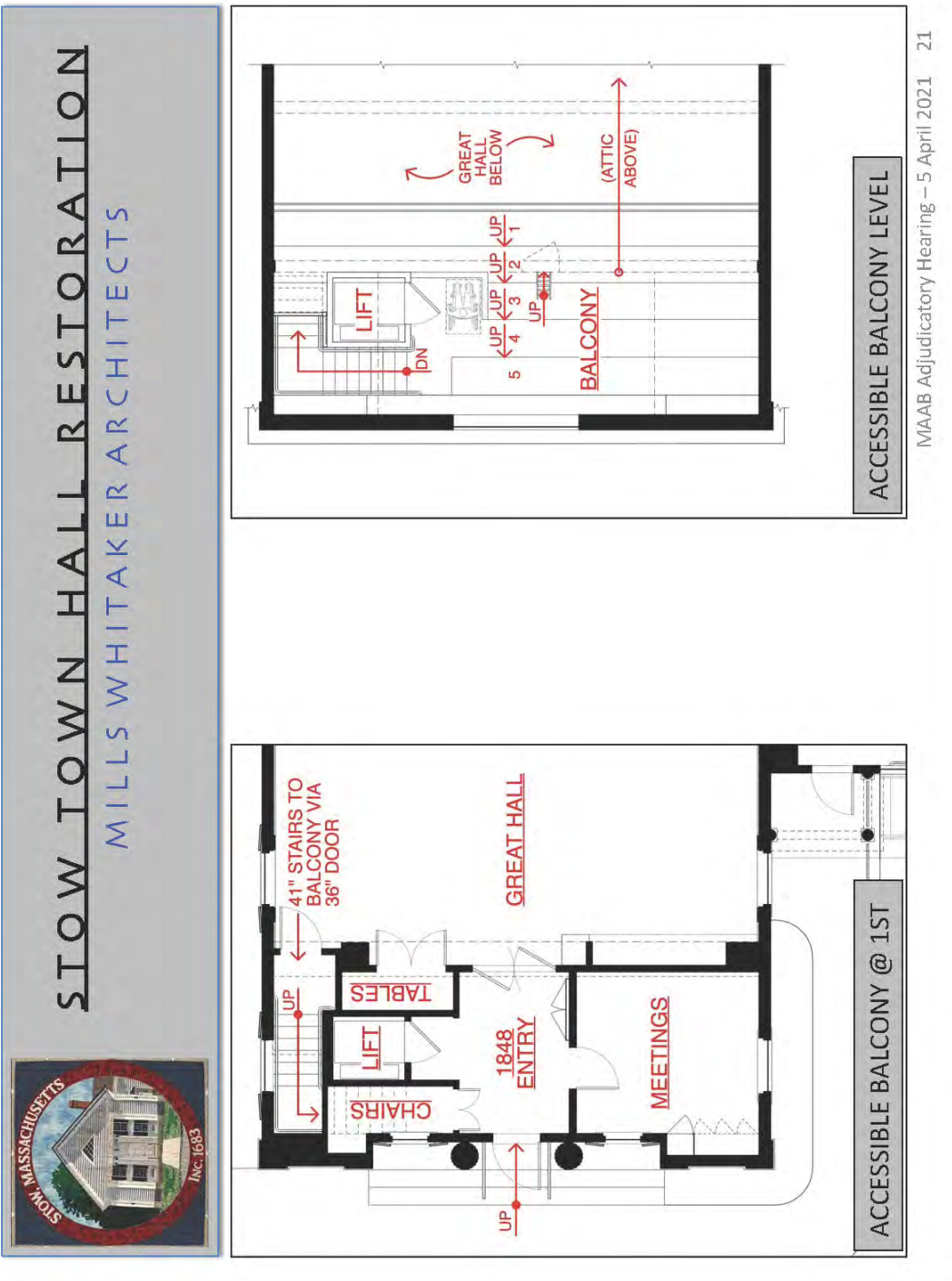
MILLS WHITAKER ARCHITECTS



MAAB Adjudicatory Hearing – 5 April 2021 20

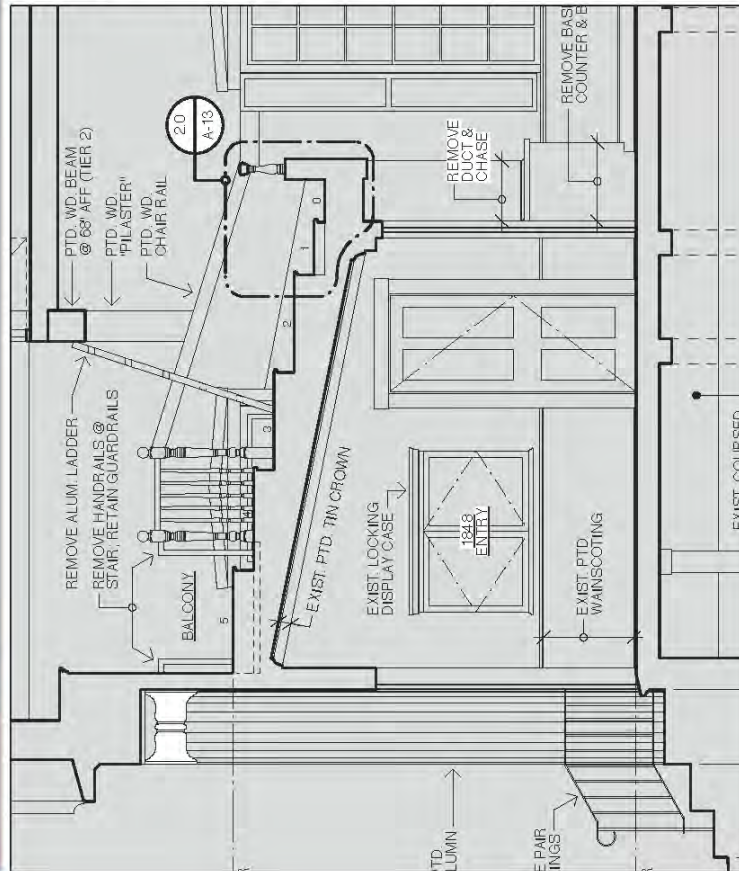
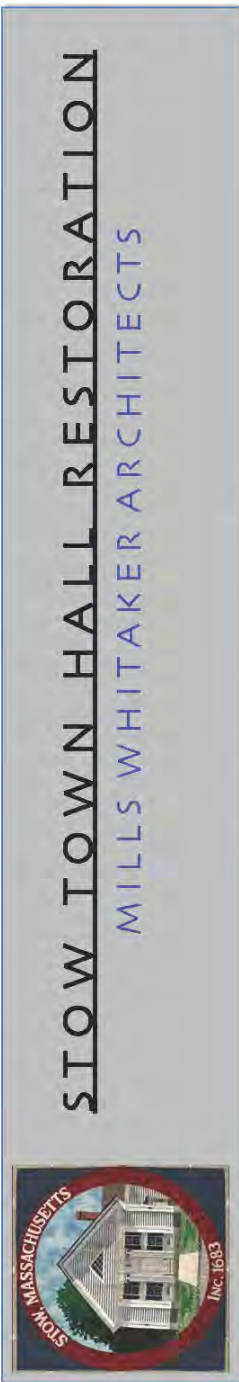
Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





**EXISTING BALCONY SECTION**

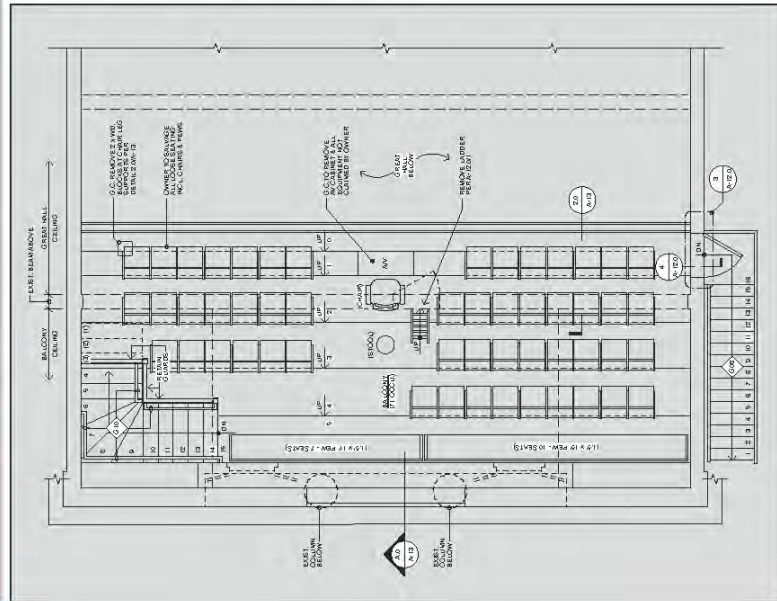
- ✧ Terraced Loose Seating (71)
- ✧ Low Headroom at Beam
- ✧ Historic Guardrail at Edge
- ✧ Fixed Ladder Access to Attic
- ✧ Non-Continuous Handrails

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS



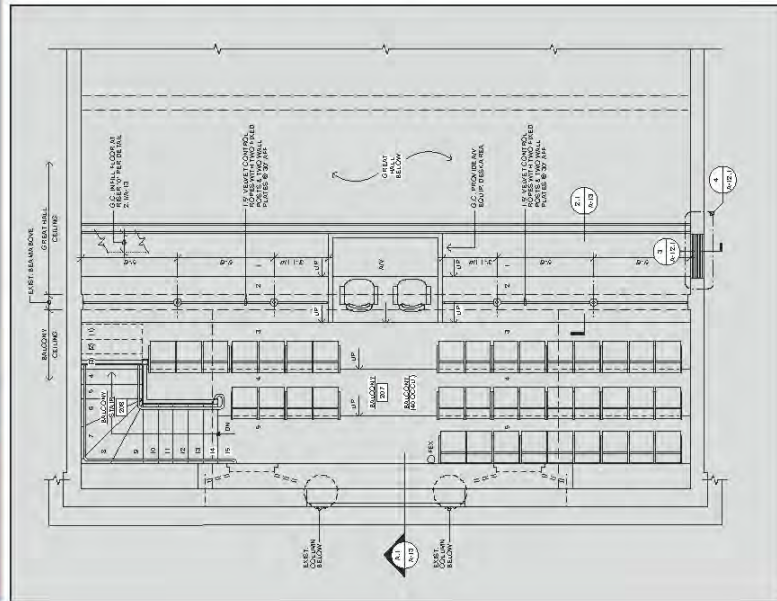
### EXISTING BALCONY FLOOR PLAN LAYOUT

- ❖ Loose Seating at All 5 Tiers
- ❖ Long Pews at Tier 5 Obstructs the Stairs
- ❖ Discontinuous Handrails at Winder Stairs
- ❖ Insufficient Height at Historic Guard Rail
- ❖ Fire Escape Exit Due to Occupant Load of 71
- ❖ Fixed Ladder Access to Attic



## PROPOSED BALCONY FLOOR PLAN LAYOUT

- ✧ Terraced Loose Seating at Tiers 3, 4 & 5
- ✧ Remove Pews at Stairs for Improved Access
- ✧ Provide Continuous Handrails at Stairs
- ✧ Restrict Access to Historic Guard Rail
- ✧ Remove Fire Escape Due to 40 Occupants
- ✧ Remove Ladder Access to Attic



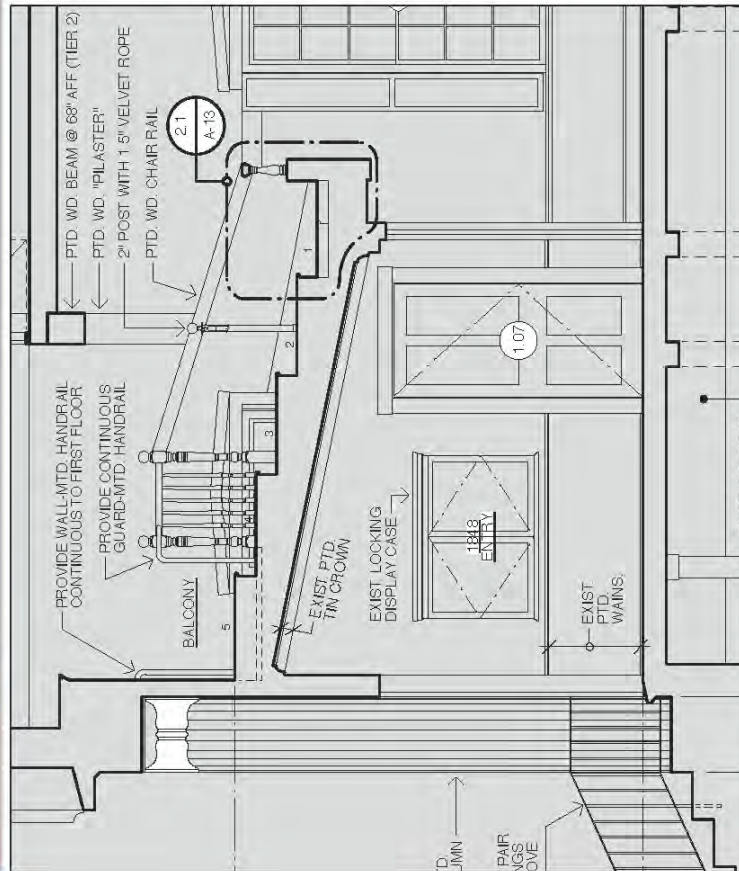
Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS



### PROPOSED BALCONY SECTION

- ✧ Seating at Tiers 3, 4, 5 Only
- ✧ Control Rope & Stanchions at Tier Level 2
- ✧ Avoid Headroom at Beam
- ✧ Avoid Guardrail at Edge
- ✧ No Fixed Ladder to Attic
- ✧ Continuous Stair Handrails





# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS

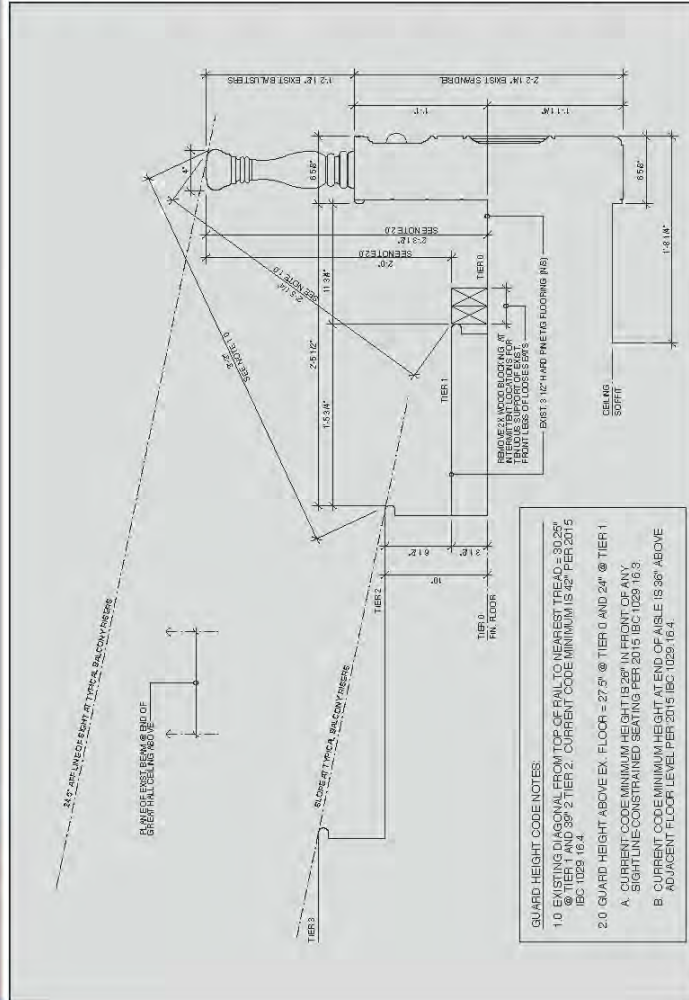
### HISTORIC RAILING PER CURRENT CODE:

#### AT SEATING ...

- ✧ Guard = 24" AFF;
- Code = 26" (2" shy)
- ✧ Diagonal = 39",
- Code = 42" (3" shy)

#### AT AISLES ...

- ✧ Guard = 27.5" AFF;
- Code = 36" (8.5" shy at aisles)



### EXISTING SECTION AT HISTORIC GUARD RAIL

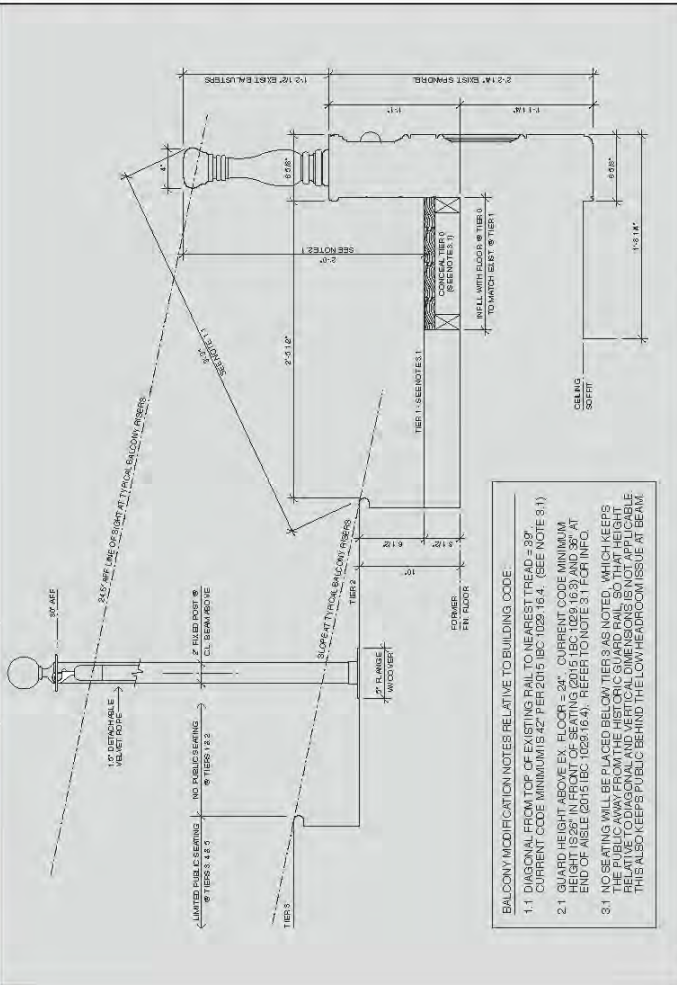
STOW TOWN HALL RESTORATION  
MILLS WHITAKER ARCHITECTS



**PRESERVATION OF  
HISTORIC RAILING &  
REDUCTION OF  
OCCUPANT LOAD:**


- ❖ Infill Narrow & Awkward Floor Level at Tier 0
- ❖ No Public Seating at Tiers 1 and 2
- ❖ Fixed Stanchions and Control Rope Below Beam at Tier Level 2

MAAB Adjudicatory Hearing – 5 April 2021 27



# PROPOSED SECTION AT HISTORIC GUARD RAIL

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



# STOW TOWN HALL RESTORATION

MILLS WHITAKER ARCHITECTS



**PRESERVATION OF HISTORIC BALCONY FEATURES:**

- ✧ 173 Year History of Great Hall Balcony Seating
- ✧ Original Balcony Guard Railing and Balusters
- ✧ Embossed Painted Tin Ceilings Below Balcony

*Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021*





# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS

The MHC supports the Town of Stow's proposed plan. If granted, MAAB variances would allow the project to reach a level of compliance without removal or alteration of historic features and significant changes to the historic interior and exterior. The MHC understands that the Town of Stow ADA Coordinator and the Stow Historical Commission also support this project.

The MHC believes that if MAAB variances are not granted, modifications to the historic front entrance and interior balcony and stairs would significantly compromise the integrity of the historic building. The exterior and interior of Stow Town Hall retain a significant amount of original materials and historic features.

### **TOWN POLICY FOR LIMITED USE OF BALCONY:**

- ❖ Normally Locked and Restricted to Use by Town Facilities Staff, AV Personnel and Stow TV.
- ❖ If an Event Anticipates More Than the 152 Maximum Occupant Load of the Great Hall and Stage, Seek an Alternative Venue with Greater Capacity.
- ❖ If an Alternative Venue is not Available, Building Commissioner can Choose to Allow Monitored Access for up to 40 Persons in the Balcony.
- ❖ Provide Priority Loose Seating for Wheelchairs in Great Hall and Post Policy on Town's Website and in Event Information.





# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS

### COST of COMPLIANCE to 521 CMR 14.1

#### 14.1: PROVISION OF ACCESSIBILITY TO TIERED BALCONY

\$5,000	Selective Demolition in the Areas of Work
\$6,000	Foundations in Crawl Space for Lift & Framing Supports
\$12,000	Framing Reconfigurations at First Floor in Lift Area
\$16,000	Framing Reconfigurations at Balcony and Stairs
\$3,250	Framing at Enlarged Doorway Area to Stairs
\$7,750	Replacement Doors, Frames and Hardware in Area of Work
\$24,000	Finish Carpentry: Wainscoting, Trim, Casings, Stairs
\$16,500	Drywall, Taping, Painting
\$45,000	Provision of 2-Stop Vertical Wheelchair Lift
\$5,500	Miscellaneous Electrical in Area of Work
\$141,000	Subtotal
\$49,000	Gen'l Conditions, G.C.'s OH+P, Contin. + A/E Fees
<b>\$190,000</b>	<b>Estimated Cost for Full Compliance at Tiered Balcony</b>



# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS


### SUMMARY OF BALCONY LEVEL IMPROVEMENTS

- ✧ Reduce Occupant Load from 71 to 40
- ✧ Remove Fire Escape Exit and Stairs
- ✧ Restrict Public Seating to Tiers 3, 4 and 5 to Avoid Low Headroom and Balcony Guard
- ✧ Provide Fixed Post Stanchions and Control Ropes at Tier 2 Below the Great Hall Beam
- ✧ Infill Floor at Tier 0 to Match Tier 1
- ✧ Replace Handrails with Continuous Railings at Both Sides of Stairs
- ✧ Restrict Use in Accordance with Town Policy




It is the Applicant's belief that the estimated cost of \$190,000 for full compliance with 521 CMR 14.1 is excessive without any substantial benefits to persons with disabilities.





# STOW TOWN HALL RESTORATION


MILLS WHITAKER ARCHITECTS



**521 CMR 25.1: ENTRANCE TO GROUND FLOOR**


- ✧ Remove Multiple Existing Awkward Entrances
- ✧ Relocate Lower Entry to be Below Upper Entry
- ✧ \$160,000 Cost for Full Accessibility Compliance

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021



# STOW TOWN HALL RESTORATION

MILLS WHITAKER ARCHITECTS



**EXISTING ENTRANCES TO GROUND FLOOR:**

- ✧ Abrupt Steps + Stoop at Door to Stair Hall
- ✧ Non-Compliant Contemporary Ramp to Side
- ✧ Service Entrance to Utility Area via Alley





# STOW TOWN HALL RESTORATION

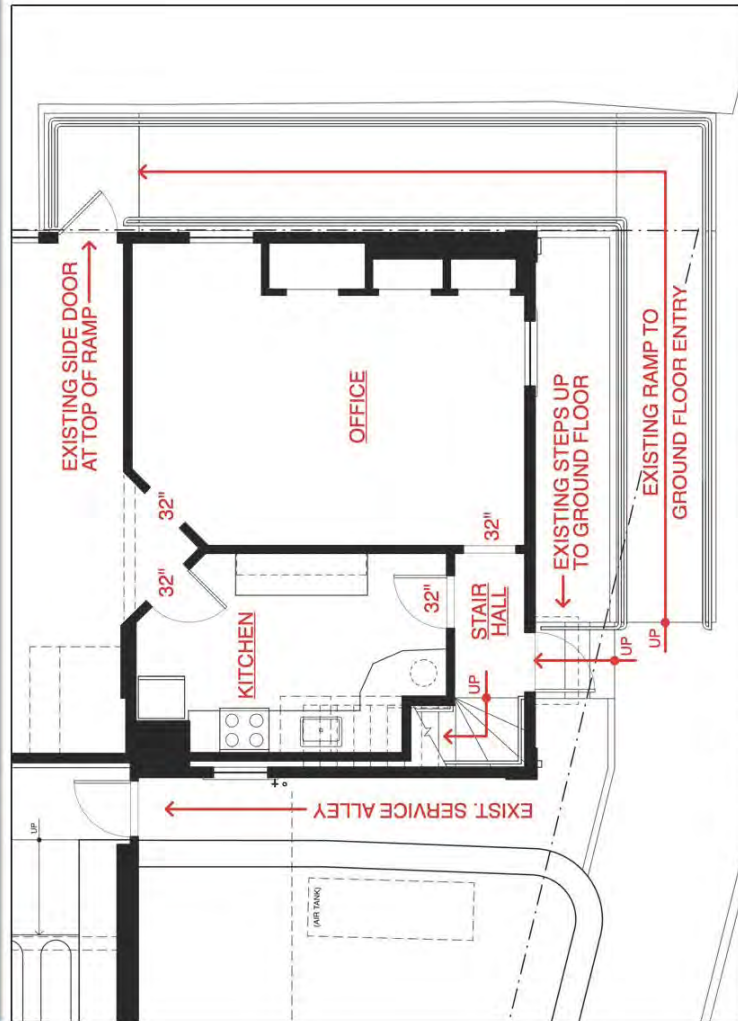
MILLS WHITAKER ARCHITECTS



**EXISTING ENTRANCES TO GROUND FLOOR:**

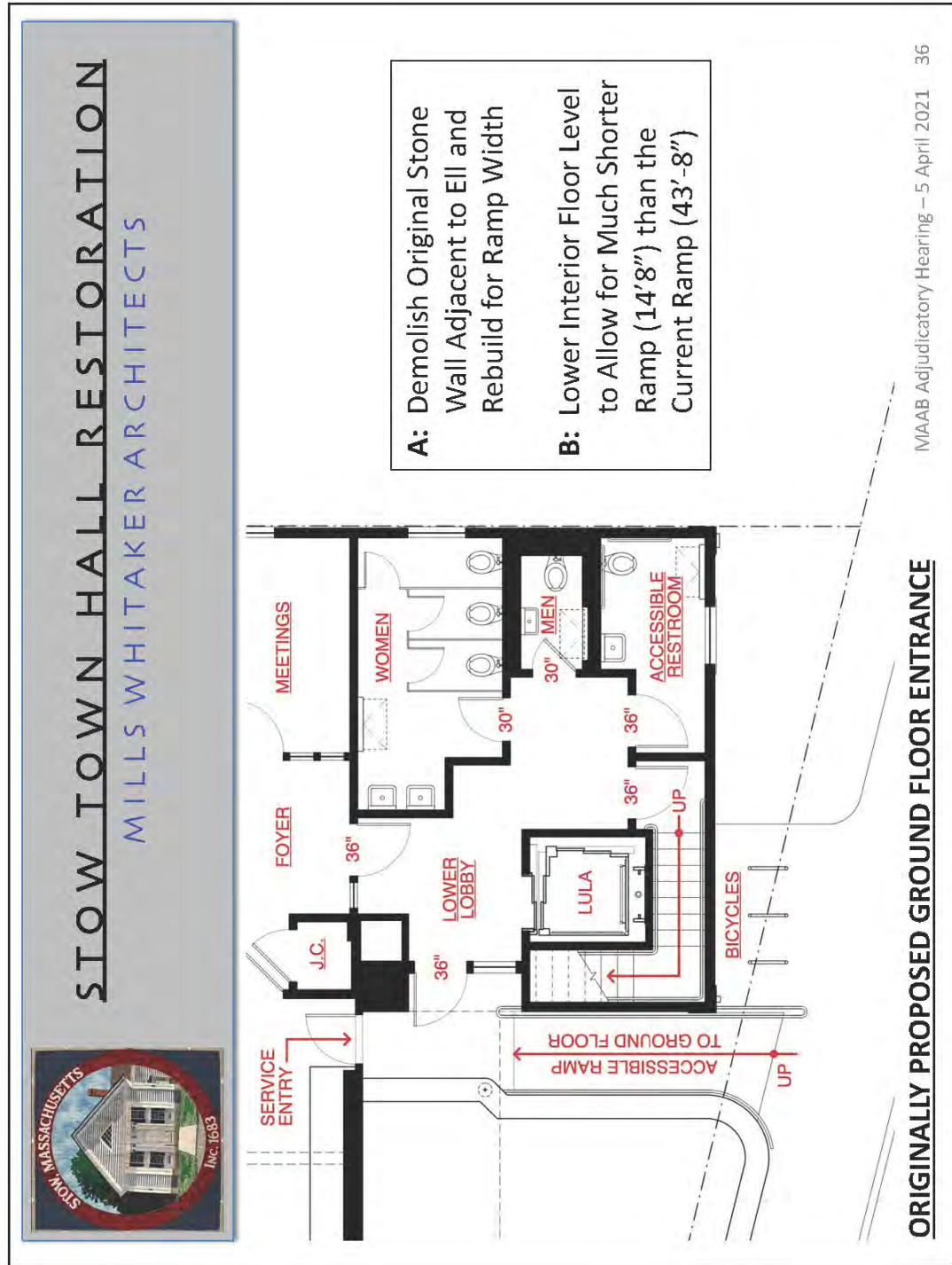
- ✧ Lower Level Entrances Adjacent to Great Road
- ✧ No Parking or Drop Off Area on the Street
- ✧ 6% + Grade at Sidewalk Adjacent to Great Road

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

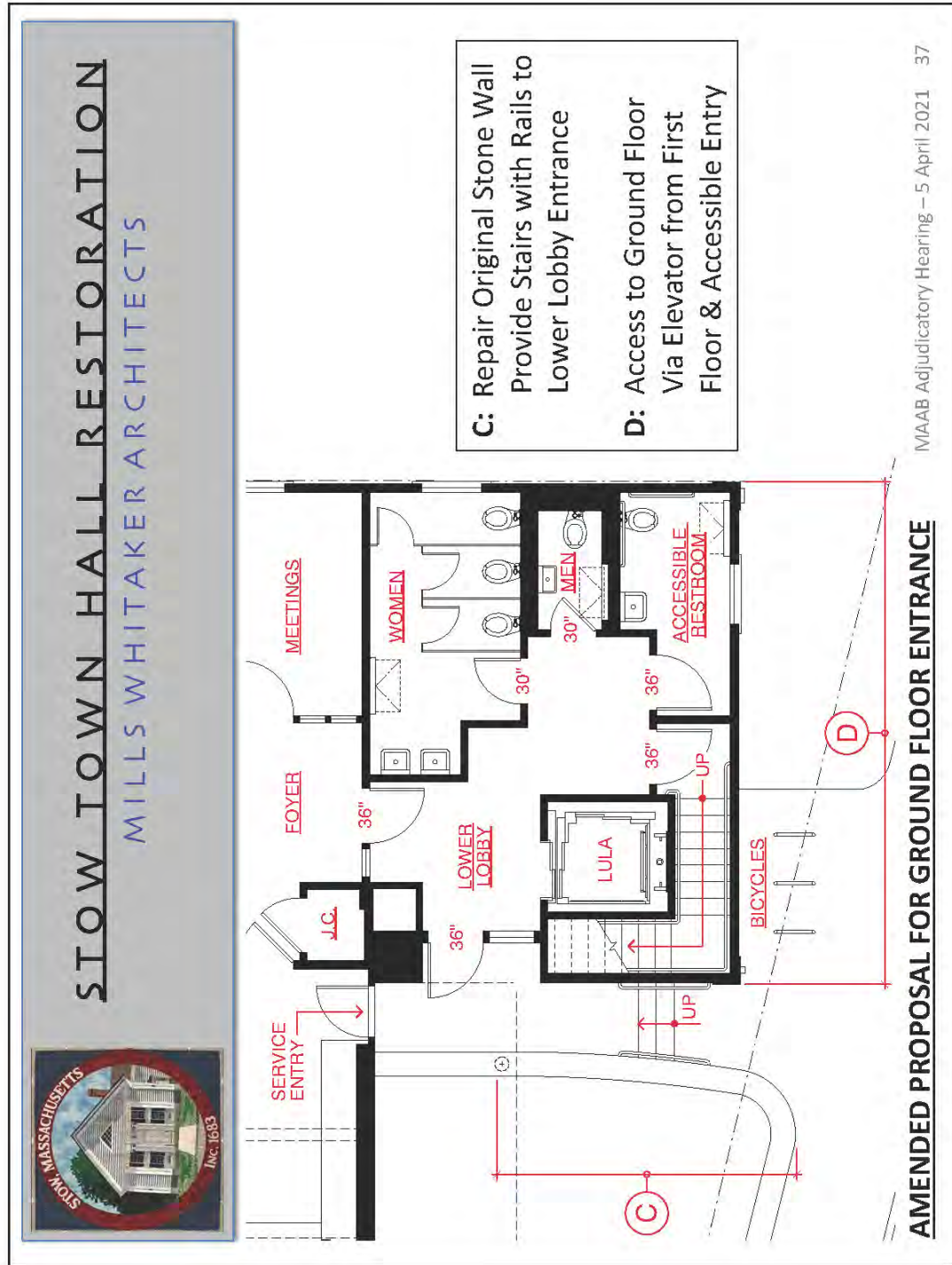


## EXISTING ENTRANCES TO GROUND FLOOR

STOW TOWN HALL  
APPENDIX







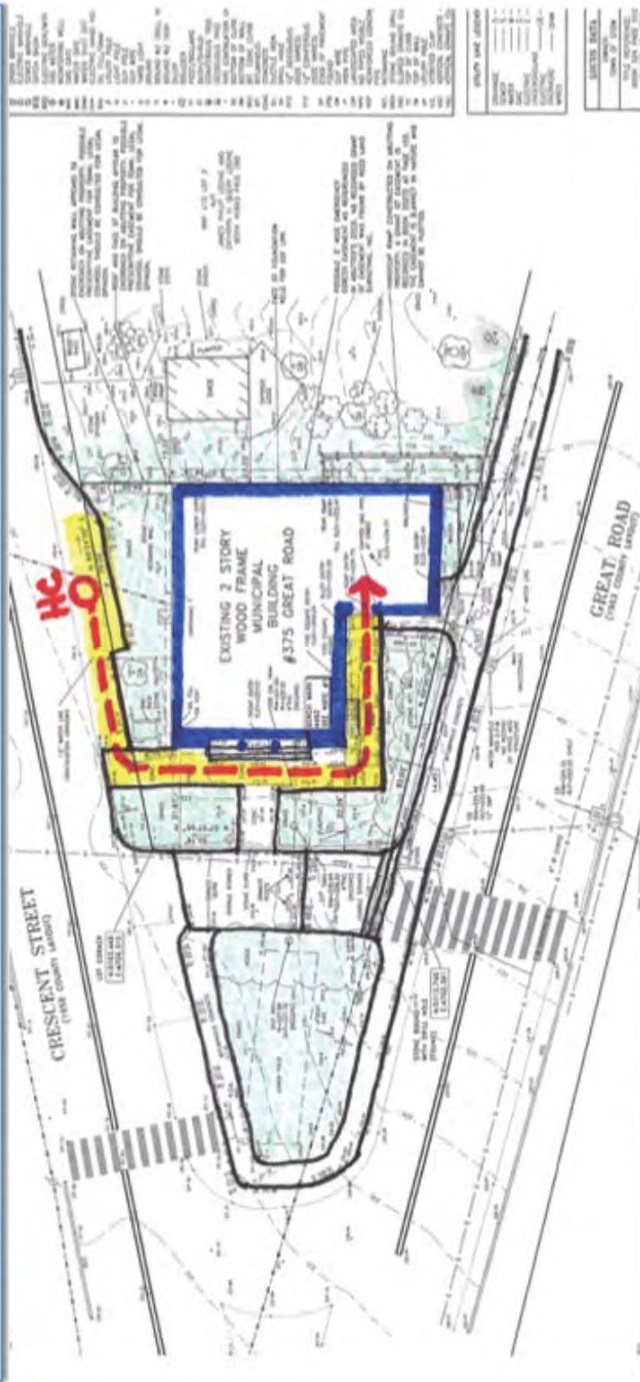
Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





# STOW TOWN HALL RESTORATION

MILLS WHITAKER ARCHITECTS



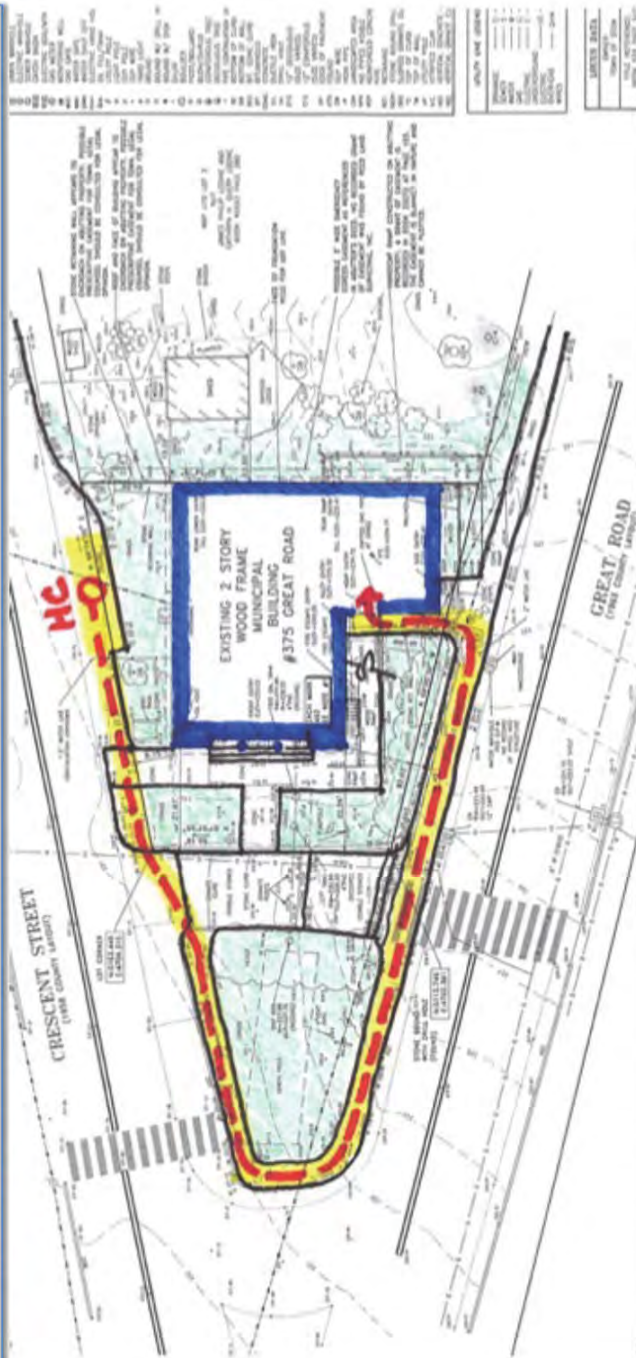
126 Feet of Travel from HC Parking Space on Crescent Street to First Floor Lobby Entry.  
Overall Grade Differential for this Route = 3.75 Feet

**ACCESSIBLE ROUTE FROM HC PARKING TO FIRST FLOOR**



# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS



266 Feet of Travel from HC Parking Space on Crescent Street to Ground Floor Lobby.  
Overall Grade Differential for this Route = 12.5 Feet with Portions > 6% at Great Road.

**ROUTE FROM HC PARKING TO GROUND FLOOR ENTRY**

MAAB Adjudicatory Hearing – 5 April 2021 39

Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021





# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS

### COST of COMPLIANCE to 521 CMR 25.1 GROUND FLOOR ENTRY

#### 25.1: PROVISION OF ACCESSIBLE ENTRANCE TO GROUND FLOOR

\$7,500	Selective Demolition of Original Stone Retaining Wall
\$38,250	Concrete Footings and Replacement Retaining Wall
\$18,750	Stone Veneer and Cap to Replicate Original Wall
\$15,000	Additional Excavation for Lowering of Interior Floor Elev.
\$6,250	Trimming Below-Slab Foundation Wall at 1848-1895
\$12,750	Shoring for Removal of Interior Columns & Footings
\$21,000	Replacement Footings and Columns for Lower Fin. Floor
\$5,500	Dual Railings at Ramp (less stair railings per amendment)
\$125,000	Subtotal of Net Construction Cost Estimate
\$35,000	Gen'l Conditions, G.C.'s OH+P, Contingencies + A/E Fees
<b>\$160,000</b>	<b>Est. Cost for Full Compliance at Ground Floor Entry</b>



# STOW TOWN HALL RESTORATION

## MILLS WHITAKER ARCHITECTS

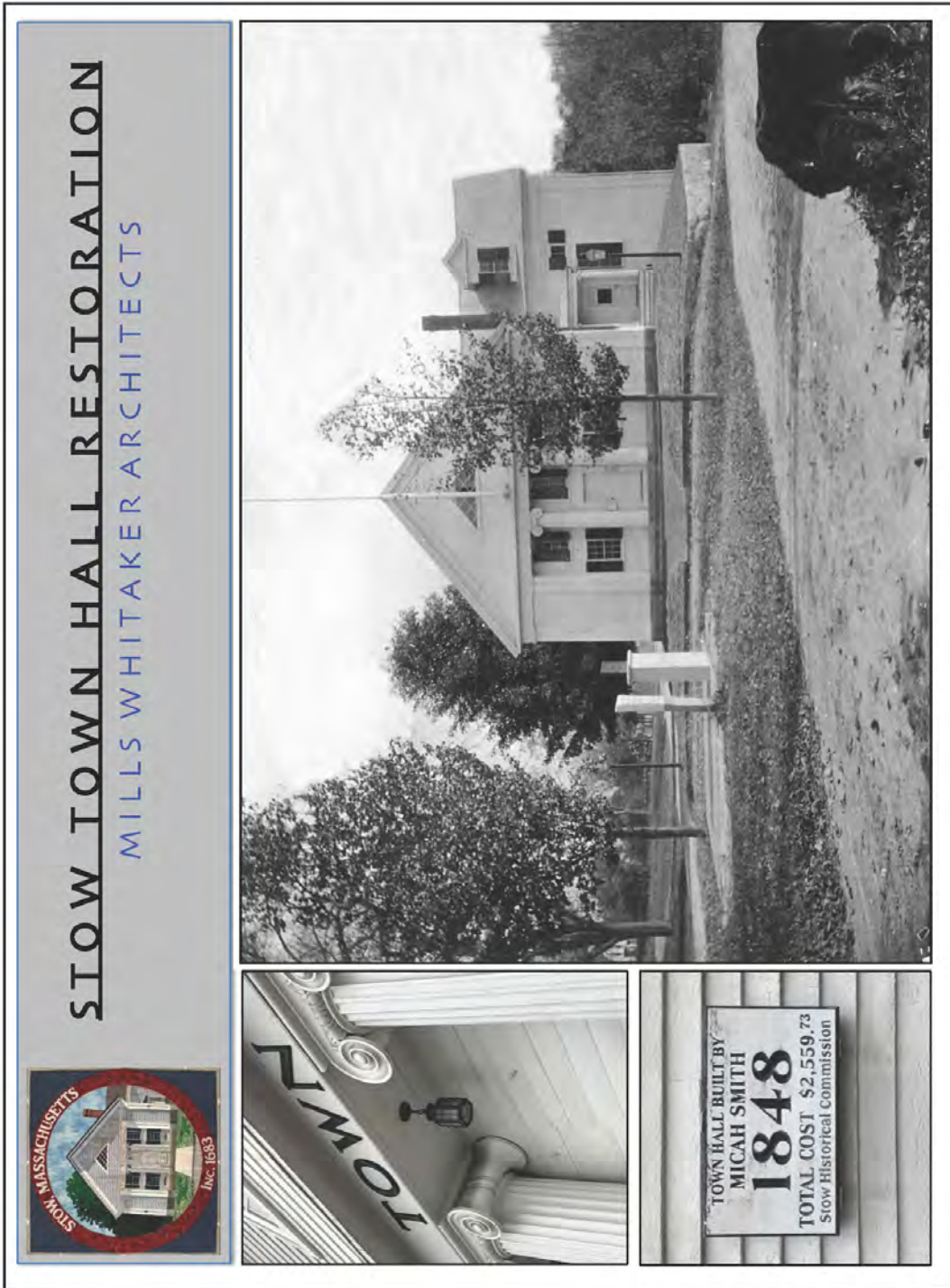
### SUMMARY OF GROUND FLOOR ENTRY PROPOSAL

- ✧ Retain and Repair Original Stone Wall in Lieu of Relocation for Ramp Clearance Width.
- ✧ Reduce Amount of Excavation for Lowering of the Ground Floor as Required for a 1:12 Ramp at 14'-8" Long (existing ramp is 43'-8" long).
- ✧ Remove Existing Disjointed Entrances including Contemporary Ramp and Stair Hall Doorway.
- ✧ Integrate Relocated Entrance at Ground Floor with Improved Entrance at First Floor, Aligning Them Vertically and Adjacent to New Elevator.



It is the Applicant's belief that the estimated cost of \$160,000 for full compliance with 521 CMR 25.1 is excessive without any substantial benefits to persons with disabilities.





Adjudicatory Hearing Presentation to MAAB  
Mills Whitaker Architects - 5 April 2021

## COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, ss.

ARCHITECTURAL ACCESS BOARD  
Docket No. V21-007

*In re* )  
 )  
 Stow Town Hall )  
 375 Great Road )  
 Stow )

**BOARD DECISION****Procedural History**

This matter is before the Architectural Access Board ("AAB" or "Board") based on an Application for Variance, dated December 29, 2021, and submitted on or about January 22, 2021, pursuant to 521 CMR 4.00, by Donald W. Mills, RA, for the Town of Stow (the "Petitioner"). The application sought variances from the requirements of the following sections of 521 CMR: (1) 14.1 (places of assembly in general); (2) 25.1 (entrances); (3) 26.6 (maneuvering clearance); and (4) 28.12.3a (limited use elevator cab size).

The Board initially reviewed the matter at its regularly scheduled meeting on February 8, 2021 at which time it voted as follows: (1) to continue the application regarding a variance from 521 CMR 14.1 and to request that the Petitioner provide additional information as to who will have access to the balcony level; (2) to grant relief from the requirements of 521 CMR 28.12.3; and (3) to grant relief from the requirements of 521 CMR 25.1 on the condition that handrails which comply with 521 CMR 27 are provided so as to be adjacent to the door. The written Notice of Action was issued on February 11, 2021. The Petitioner submitted additional information on February 12, 2021, including an Amended Application for Variance which sought an additional variance from the requirements of 521 CMR 25.1.

The Board reviewed the new submittals on February 22, 2021 at which time it voted as follows: (1) to grant relief from the requirements of 521 CMR 26.6, as proposed; (2) to deny relief from 521 CMR 14.1 because impracticability was not established; and (3) to deny a variance from 521 CMR 25.1 finding that the Petitioner had not demonstrated impracticability. The written Amended Notice of Action was issued on February 25, 2021. The Petitioner then submitted a request for adjudicatory hearing on February 26, 2021. The Board granted that request with written notice thereof issued on March 24, 2021.

The hearing was held on April 5, 2021 in accordance with G.L. c. 30A, §§ 10 and 11; 801 CMR 1.02 *et seq.*; and 521 CMR 4.00.<sup>1</sup> All interested parties were provided with an opportunity to testify and present evidence to the Board. Mr. Mills appeared on the Petitioner's behalf as did

<sup>1</sup> Due to the ongoing COVID-19 state of emergency, the hearing was held remotely on the Microsoft Teams platform.

*Massachusetts Architectural Access Board Decision  
Procedural History - 26 April 2021*

Douglas Hyde, the municipal building inspector. The witnesses were sworn in by the Board Chair. The instant decision now memorializes the determinations made at that time.

#### Applicable Laws & Regulations

Pursuant to 521 CMR 3.3.2, "[i]f the work performed, including the exempted work, amounts to 30% or more of the *full and fair cash value* (see 521 CMR 5[I]) of the *building* the entire *building* is required to comply with 521 CMR."

Per 521 CMR 3.9, "[a]n historic *building* or *facility* that is listed or is eligible for listing in the National or State Register of Historic Places or is designated as historic under appropriate state or local laws may be granted a *variance* by the *Board* to allow alternate accessibility. If a variance is requested on the basis of historical significance, then consultation with the Massachusetts Historical Commission is required in order to determine whether a building or facility is eligible for listing or listed in the National or State Register of Historic Places. The Massachusetts Historical Commission may request a copy of the proposed variance request and supporting documentation to substantiate the variance request and its effect on historic resources. A written statement from the Massachusetts Historical Commission is required with the application for variance."

521 CMR 14.1 states that "[p]laces of assembly shall comply with all parts of 521 CMR, except as specified or modified in 521 CMR 14.00. Places of assembly shall include but not be limited to theaters, auditoriums, armories, lecture halls, arenas, stadiums, banquet rooms and conference rooms. Associated, support, or related areas, including but not limited to press boxes, lobbies, ticket offices, seating, stages, backstage areas, dressing rooms, toilet rooms, showers and green rooms, shall also be *accessible*."

Per 521 CMR 14.6 [Access to Performing Areas], "[w]here access is provided to the stage from within the place of assembly, an *accessible route*, within the place of assembly, from the wheelchair seating locations, to the stage/performing must be provided. ... In addition, an *accessible route* that coincides with the route for performers must be provided to the backstage area."

Per 521 CMR 25.1, "[a]ll public *entrance(s)* of a *building* or tenancy in a *building* shall be *accessible*. Public *entrances* are any *entrances* that are not solely service *entrances*, loading *entrances*, or *entrances* restricted to employee use only."

#### Exhibits

The following documentation was entered into evidence:

- Exhibit 1: Board Packet AAB 1-105, including the Application for Variance, all correspondence, photographs and plans submitted.
- Exhibit 2: Power Point presentation (42 pages) offered at the hearing by Mr. Mills.

### Factual Findings

The following findings of fact and conclusions of law are supported by substantial evidence, based on the credited testimony of the witnesses, documents admitted into evidence and AAB records. G.L. c. 30A, § 11(2), § 14(7).

- 1) The building is a two-story Greek revival town hall, including a ground floor, first floor and attic, originally constructed in 1848. An addition (the "ell") was constructed in 1895. Exhibit #1, AAB 42.
- 2) The building's footprint is 2,562 ft<sup>2</sup>. The building has a total area of 5,833 ft<sup>2</sup> with 2,562 ft<sup>2</sup> per floor. AAB 42.
- 3) The great hall of the building includes a tiered balcony that is reached by a 32" door to a 41" wide winder stair. AAB 24.
- 4) The building has four public entrances. Two of them, including the main entrance and ground floor street entrance, are not accessible. AAB 78.
- 5) The building is eligible for listing as a historic facility. AAB 43.
- 6) The total anticipated construction costs are \$2,752,000. AAB 43.
- 7) The building's assessed value is \$450,400. AAB 43.

### Discussion

The Board's jurisdiction is established pursuant to 521 CMR 3.3.2 which requires that, "[i]f the work performed, including the exempted work, amounts to 30% or more of the *full and fair cash value* (see 521 CMR 5[]) of the *building* the entire *building* is required to comply with 521 CMR." The proposed project is estimated to cost a total of \$2,752,000. The full and fair cash value of the building is \$450,400. Based on these factors, the total amount proposed to be spent is more than 30% ( $\$450,400 \times 0.3 = \$135,120$ ) of the full and fair cash value of the building; therefore, full compliance with all applicable sections of 521 CMR is required. The Petitioner concedes the Board's jurisdiction.

However, pursuant to 521 CMR 4.1, an "owner or an owner's representative or tenant who thinks that full compliance with 521 CMR is *impracticable* may apply to the *Board* for a *variance* from 521 CMR." Impracticability is defined to mean either that compliance with 521 CMR "would be technologically unfeasible" or that it would "result in excessive and unreasonable costs without any substantial benefit to persons with disabilities." 521 CMR 5.00.

As noted above, the building was constructed in 1848 with an addition built in 1895. It has been used as a community center for public and private events since 1989 when a larger "Town Building" was constructed across the street to provide the majority of municipal office functions. The current project will include upgrading HVAC systems and adding insulation. It will also restore and improve the facility's historic character. The Petitioner intends to make accessibility improvements to entrances at both levels, install an elevator between levels, and include wheelchair access to the stage in the great hall.

The great hall is comprised of a flexible use first floor space with loose seating and a 12" high stage at the east end. A tiered balcony at the west end serves as a mezzanine level that historically provided supplemental seating for when the building was used for town meetings. The five tiers of the balcony level incorporate loose wooden seating; it is reached via a 32" door to a



41" wide winder stair in the northwest corner of the first floor. A sign limiting balcony use to authorized persons is posted on the stair door to control access. The balcony guardrail is low and an attic support beam above the second tier of the five-tiered seating platforms does not provide adequate headroom clearance. Stow building officials restrict access to the balcony for these reasons and yet, the Petitioner maintains, the Town's affection for retaining the historic seating gallery has kept the space intact nonetheless.

The project includes replacing of the balcony stair handrails, reduction of seating capacity (while retaining 'authorized only' use limitations), and improving the historic guardrail. The Town will post a maximum occupancy load of 49 persons (down from the current 71) so it can then remove the emergency exit and exterior fire escape stair (since only one means of egress would then be required). The Petitioner seeks the variance from 521 CMR 14.1 so that the balcony tiered seating gallery may remain as-is, along with the 32" door and the winder stairway. If full compliance with 521 CMR 14.1 were required, the following additional work would be required: (1) installation of a vertical wheelchair lift in compliance with 521 CMR 28.12 from the first floor to the balcony; (2) modification of the fourth seating tier at the balcony to allow for one wheelchair space on that platform; (3) reconstruction of the stairs to eliminate the winder treads and meet consistent tread depth as required by 521 CMR 27.2; (4) reconfiguration of the stair entry and replacing the door in order to comply with 521 CMR 26.5 and 26.6; (5) reframing the first floor and balcony levels, providing support foundations and posts in the crawl space area adjacent to the utility area in the ground floor below; and (6) reconfiguring first floor storage spaces.

The Petitioner also seeks a variance from the requirements of 521 CMR 25.1. The building currently has four public entrances. Of those, the main front entrance and ground floor street entrance are not accessible. The project will reduce the number of public entrances from four to three, with two of those three meeting current regulations. The Petitioner seeks to retain the 1848 original front entrance and proposes to add directional signage to the improved first floor accessible entrance into the 1895 ell section. It will also replace the entrance into the first floor of the ell by removing the existing 1:12 ramp and landing along with removing the entrance door that does not provide adequate maneuvering clearance. The ramp will be replaced with an accessible walkway of maximum 1:20 running slope. The ell entry will be replaced with a compliant door at grade that will lead to a lowered entry foyer. The two public entrances at the ground floor, neither of which is compliant, will be removed and an accessible entrance provided by reconfiguration of the service entry alley.

The Petitioner argues that the original monumental front entrance is a character-defining feature of the Greek Revival style, so its modification would negatively impact an important historic component. To create an accessible entrance would require cutting the bottom of the columns, raising the plinth by 9" at the entrance and providing an extensive 1:12 ramp in the foreground of the building to rise up about 37" from grade to the first floor. Entrance stairs would need to be reconstructed in the foreground of a shared landing at the top of the accessible ramp. While this extent of modification would comply with current regulations, the result would conceal the characteristic granite plinth that encircles the historic building, and the primary façade of the iconic structure would be permanently disrupted.

The Board has now reviewed the documentation, including narratives and plans, as well as the Mr. Mills' detailed testimony. With respect to the Petitioner's request for a variance from the requirements of 521 CMR 25.1, it now finds that the evidence is sufficiently substantial to warrant the variance with the conditions that the Petitioner has proposed. The Board notes that the Massachusetts Historical Commission supports the proposal and finds the Petitioner's many remediations and improvements to the facility commendable.

However, with regard to the application for a variance from the requirements of 521 CMR 14.1, the Board finds that such variance is not appropriate or necessary in the particular circumstances described. Given that the mezzanine balcony is neither currently nor prospectively intended for public use, a variance is not required. Indeed, both the documentary evidence and Mr. Mills' testimony establish that the balcony is and will only be used by Stow employees, not by the public.

#### Conclusion and Order

In light of all of the foregoing, the Board votes as follows:

- to **GRANT** a variance from the requirements of 521 CMR 25.1 on the **CONDITIONS** that the Petitioner: (1) post conspicuous directional signage for patrons at the property; and (2) post information regarding accessibility on its website. The Petitioner shall, as soon as practicable, submit evidence (e.g., photographs) of the signage and website information for the Board's review and approval.
- to **DENY** a variance from the requirements of 521 CMR 14.1 with respect to the balcony, meaning it may not be utilized by the public (it may only be used by staff).

A true copy attest, dated: April 26, 2021

#### **ARCHITECTURAL ACCESS BOARD**

By:



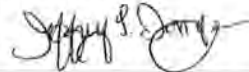
Dawn Guarriello, Chair



Patricia Mendez, Vice Chair

Not Present

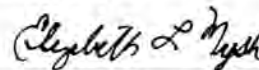
Raymond Glazier, Executive Office of Elder Affairs Designee



Jeffrey Dougan, Massachusetts Office on Disability Designee



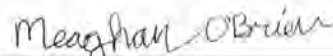
Andrew Bedar, Member



Elizabeth Myska, Member



David Johnson, Member



Meaghan O'Brien, Member

  
\_\_\_\_\_  
Ana Julian, Member

A complete administrative record is on file at the office of the Architectural Access Board.

This constitutes an order of the Architectural Access Board. In accordance with G.L. c. 30A, §14 and G.L. c. 22, §13A, any person aggrieved by this decision may appeal to the Superior Court of the Commonwealth of Massachusetts within thirty (30) days of receipt of it.

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*Massachusetts Architectural Access Board Decision  
Procedural History - 26 April 2021*

## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **ENERGY & LIFE CYCLE COST ANALYSIS**

- D.01** Summary Cover Letter
- D.02** System Cost Matrices
- D.03** Energy and Life Cycle Cost Analysis – Cover Page
- D.04** Energy and Life Cycle Cost Analysis – Contents
- D.05** Executive Summary
- D.06** I. Modeling Description
- D.07** II. Description of Alternatives Modeled
- D.09** III. Life Cycle Costing Methodology
- D.10** IV. Simulation Results
- D.15** V. Life Cycle Costing Analysis
- D.16** VI. Model Input Summary



MILLS WHITAKER ARCHITECTS  
9 MILL STREET, MA 01775 (www.millswhitaker.com) (617) 876-6420

December 8, 2020

Doug Hyde, Assistant Facilities Manager  
Town Hall Restoration Committee  
380 Great Road  
Stow MA 01775

Re: Stow Town Hall Restoration  
Preliminary HVAC Study (*Revised*)

Dear Mr. Hyde,

As a follow up to the information that we sent last week, we now have the results of The Green Engineer's "Energy and Life Cycle Cost Analysis" study of HVAC and insulation options (see attached). This study evaluates three mechanical systems and building envelope options in light of the following key cost categories:

- Net Installed Cost: conceptual construction cost for each system
- Annual Operating Cost: including energy cost and maintenance
- Annual Energy Use: including heating, cooling, equipment and lighting
- Greenhouse Gas Emissions: represents impacts toward global warming
- Life Cycle Cost: total equivalent annualized cost of all factors

In the attached study, the options include seven variations identified as follows:

- A1: Gas-fired DX split system; no insulation (for comparison purposes only)
- A2: Gas-fired DX split system; mineral wool batt insulation
- A3: Gas-fired DX split system; closed cell spray foam insulation
- B2: Air Source Variable Refrigerant Flow System; mineral wool batt insulation
- B3: Air Source Variable Refrigerant Flow System; closed cell spray foam insulation
- C2: Water source Geothermal VRF System; mineral wool batt insulation
- C3: Water source Geothermal VRF System; closed cell spray foam insulation

... And the winner is ... well, that depends on which of the cost parameters are most important to the Town. In my assessment, if an appropriate location for outdoor units can be arranged, Option B3 is the most sensible since it has the lowest life cycle cost. If site area cannot be arranged, then Option C3 should be considered (even though it is the most expensive to install) due to its lack of outdoor equipment, lowest energy use, lowest greenhouse emissions and second lowest annual operating costs. Please review the attached and let me know your thoughts on your preferred HVAC system.

Sincerely,



Donald W. Mills, RA, LEED AP  
Mills Whitaker Architects LLC

Attachments:

- 8 Dec 2020: *Revised* Comparative Matrix Based on Cost Parameters (1 page)
- 8 Dec 2020: *Revised* TGE's "Energy and Life Cycle Cost Analysis" study (15 pages)

P.O. Box 750089  
Arlington MA 02475  
617.876.7611 voice  
617.876.6420 fax

*Energy & Life Cycle Cost Analysis  
The Green Engineer - 8 December 2020*

8 Dec 2020:

Revised Comparative Matrices of HVAC Options Based on TGE "Energy &amp; Life Cycle Analysis"

**Lowest Installed Cost: B2** Air Source VRF system with closed cell spray foam insulation.  
Lowest Net Installed Cost; 2nd Lowest Life Cycle Cost.

HVAC OPTIONS MATRIX	Ranking of System Categories from Best (1ST) to Worst (7TH)						
System Cost Categories	1ST	2ND	3RD	4TH	5TH	6TH	7TH
Net Installed Cost	B2	A1	B3	A2	A3	C2	C3
Annual Operating Cost	A3	C3	B3	C2	A2	B2	A1
Annual Energy Use	C3	A3	B3	C2	A2	B2	A1
Greenhouse Gas Emissions	C3	B3	C2	B2	A3	A2	A1
Life Cycle Cost (TEAC)	B3	B2	A1	A3	A2	C2	C3
<b>Score = 19 / Rank = 4th</b>	<b>1</b>	<b>2</b>		<b>4</b>		<b>12</b>	

**Lowest Operating Cost: A3** Gas-Fired DX Split system with closed cell spray foam insulation.  
Lowest Operating Cost; 2nd Lowest Energy Use (NOTE: limited temperature control due to zoning).

HVAC OPTIONS MATRIX	Ranking of System Categories from Best (1ST) to Worst (7TH)						
System Cost Categories	1ST	2ND	3RD	4TH	5TH	6TH	7TH
Net Installed Cost	B2	A1	B3	A2	A3	C2	C3
Annual Operating Cost	A3	C3	B3	C2	A2	B2	A1
Annual Energy Use	C3	A3	B3	C2	A2	B2	A1
Greenhouse Gas Emissions	C3	B3	C2	B2	A3	A2	A1
Life Cycle Cost (TEAC)	B3	B2	A1	A3	A2	C2	C3
<b>Score = 17 / Rank = 2nd</b>	<b>1</b>	<b>2</b>		<b>4</b>	<b>10</b>		

**Lowest Energy Use & Emissions: C3** Water Source Geothermal VRF system with spray foam.  
... and 2nd Lowest Operating Costs; Highest Initial Cost; Highest Life Cycle Cost (due to boreholes).

HVAC OPTIONS MATRIX	Ranking of System Categories from Best (1ST) to Worst (7TH)						
System Cost Categories	1ST	2ND	3RD	4TH	5TH	6TH	7TH
Net Installed Cost	B2	A1	B3	A2	A3	C2	C3
Annual Operating Cost	A3	C3	B3	C2	A2	B2	A1
Annual Energy Use	C3	A3	B3	C2	A2	B2	A1
Greenhouse Gas Emissions	C3	B3	C2	B2	A3	A2	A1
Life Cycle Cost (TEAC)	B3	B2	A1	A3	A2	C2	C3
<b>Score = 18 / Rank = 3rd</b>	<b>2</b>	<b>2</b>					<b>14</b>

**Lowest Life Cycle Cost: B3** Air Source VRF system with closed cell spray foam insulation.  
... and 2nd Lowest Emissions; 3rd Lowest Costs for Installation, Annual Operating and Energy Use.

HVAC OPTIONS MATRIX	Ranking of System Categories from Best (1ST) to Worst (7TH)						
System Cost Categories	1ST	2ND	3RD	4TH	5TH	6TH	7TH
Net Installed Cost	B2	A1	B3	A2	A3	C2	C3
Annual Operating Cost	A3	C3	B3	C2	A2	B2	A1
Annual Energy Use	C3	A3	B3	C2	A2	B2	A1
Greenhouse Gas Emissions	C3	B3	C2	B2	A3	A2	A1
Life Cycle Cost (TEAC)	B3	B2	A1	A3	A2	C2	C3
<b>Score = 12 / Rank = 1st</b>	<b>1</b>	<b>2</b>	<b>9</b>				

Energy & Life Cycle Cost Analysis  
The Green Engineer - 8 December 2020



[www.greenengineer.com](http://www.greenengineer.com)

## Energy and Life Cycle Cost Analysis

Stow Town Hall

Stow, MA

Dec 08, 2020

Prepared By:

The Green Engineer, Inc.  
23 Bradford Street, 1st Floor, Concord, MA 01742

*Energy & Life Cycle Cost Analysis  
The Green Engineer - 8 December 2020*



**The Green Engineer**  
Sustainable Design Consulting

[www.greenengineer.com](http://www.greenengineer.com)

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Energy & LCCA: Stow Town Hall

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*Energy & Life Cycle Cost Analysis*  
*The Green Engineer - 8 December 2020*





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#### Executive Summary

The project is a renovation of about 7,600 gsf of town hall building. The scope of the work includes building envelope (wall and roof insulation), and mechanical systems improvements. The project will be identifying energy use targets relative to the existing conditions with a new DX cooling and gas heating system. All other options have been evaluated relative to the energy cost and energy consumption of option A1.

The analysis considers the lowest Total Equivalent Annual Costs (TEAC) of each option to compare which one would be a better fit for the project. TEAC amortizes the initial capital cost over the equipment's lifespan. (Please refer to Section III for more information).

Options A2 and A3 (Base HVAC system with envelope improvements) show a TEAC of \$5.46/SF and \$5.44/SF, respectively.

They have the lowest energy costs as well as the highest greenhouse gas emissions. The energy analysis showed more zone by zone temperature disparities for the base HVAC option compared to the alternatives. This condition is inherent to the system selection. The base option is a "single zone" system type that typically uses a single thermostat to dictate the mode of HVAC operation (i.e. heating or cooling). The zone containing the thermostat will maintain specified temperature setpoints, however, additional zones grouped with that HVAC system will not experience the same temperature profile on an hourly basis under certain conditions. These temperature disparities reached several degrees under simulated conditions, which may be noticeable to occupants and illicit thermal comfort complaints. The lack of finely tuned temperature control also has the effect of artificially reducing energy consumption as the HVAC system lets some zones drift beyond temperature setpoints. This contrasts the "B" and "C" options which include a terminal heating and cooling coil, and associated controls, within every thermal zone.

Using single zone systems to temper multiple zones will yield more temperature disparity, as our models show.

Options B2 and B3 (air-source VRF systems with envelope improvements) have TEAC costs of \$5.06/SF and \$4.86/SF. A total yearly savings in energy use of 25% and 30% respectively is observed in the analysis, with respect to option A1. As previously described, zone by zone temperature disparities are reduced when compared to the Option A series.

Options C2 and C3 (geothermal system with envelope improvements) show about 10% cooling savings and 15% heating savings over the Option B series (the VRF system). The TEAC costs are \$5.56/SF and \$5.6/SF.

The option C series geothermal borewells (i.e. the ground heat exchangers) have been amortized to 50 years of service life, reflecting the simple, robust nature of the design (and lack of moving parts) when properly installed. The remaining equipment assumes a 20 year service life, which is identical to the other options studied.

See Section IV for a more detailed discussion covering additional performance metrics for each option, including Greenhouse Gas Emissions, Site Energy and Source Energy use.

HVAC and envelope improvement cost estimates were provided by CHA Consulting, Inc. for each alternative.

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Energy & LCCA: Stow Town Hall

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## I. Modeling Description

The annual energy cost estimates are projected based on energy modeling results, using Design Builder modeling software. The software uses the EnergyPlus calculation engine to estimate annual energy consumption by simulating a year of building operations based on a typical weather year and user inputs. The geometry of the building is based on existing floor plans, with simplified window configurations.

The analysis assumes a 7-day week, plus evening occupancy use profile. A reduced occupancy profile will reduce total energy use but the relative savings between options should scale proportionally.

It is important to keep in mind the limitations of energy models when reviewing this information. Energy consumption is highly dependent on a number of variables, including weather conditions, installation quality and the actual operating schedule of the building. The numbers generated will not necessarily be an accurate projection of actual energy costs but should serve as an accurate comparison between alternatives.

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## II. Description Of Alternatives Modeled:

The purpose of this analysis is to compare the three mechanically ventilated HVAC options under consideration, with three different insulation levels. Non-HVAC design variables like internal loads, lighting, etc. are modeled identically for each option and are based on anticipated existing conditions. A split DX cooling with gas heat system providing primary cooling and heating energy is considered for the base building model with existing envelope conditions. Improvements in envelope as well as alternate mechanical systems of air source heat pumps (VRF) and geothermal heat pumps (GSHP) have been evaluated against this base model. Full cooling capacity is defined as the ability to maintain a 75° F cooling (thermostat) setpoint under peak cooling conditions.

System Type	Existing Envelope	Minor Envelope Improvements (Batt insulation)	Major Envelope Improvements (Spray foam insulation)
DX + Gas heat	A1	A2	A3
VRF		B2	B3
GSHP		C2	C3

Table 1 Matrix of options evaluated

### Option A1: Constant volume RTUs

Great Hall, offices, rec room: Four (4) split system with air-cooled condensing units with DX cooling and gas heat will be utilized to provide cooling and heating to the spaces. Each furnace will distribute conditioned air to spaces served via supply air ductwork, terminating in wall mounted registers or ceiling mounted diffusers. Indoor air will be drawn to the furnaces through ceiling or wall mounted registers and return air ductwork. Ventilation air for each system will be ducted to the furnace air inlet connection and drawn through a common intake louver with motorized damper.

IT, TV Studio Rooms: Ductless split DX systems with outdoor condensing units will serve spaces with high equipment loads.

Other parameters in the building will be held at existing or code compliant levels.

### Option A2: Constant volume RTUs + Batt insulation

This option is identical to option A1, with mineral wool insulation being added onto the different walls. The rubble stone foundation walls will have a whole assembly R-value of R-15 via spray foam. The above-grade 4" and 7" wood stud walls will have a whole assembly R-value of R-14 and R-22 respectively, while the 4" furred wall over stone will have an R-value of R-14. The model uses an aggregate R-value for the above grade walls for this analysis. The roof whole assembly insulation would be R-32.

### Option A3: Constant volume RTUs + Spray foam insulation

This option is identical to option A1, with spray foam insulation being added onto the different walls. The rubble stone foundation walls will have a whole assembly R-value of R-15. The above-grade 4" and 7" wood stud walls will have a whole assembly R-value of R-26 and R-49 respectively, while the 4" furred wall over stone will have an R-value of R-26. The model uses an aggregate R-value for the above grade walls for this analysis. The roof whole assembly insulation would be R-49.

The Green Engineer, Inc.  
Energy & LCCA: Stow Town Hall

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*Energy & Life Cycle Cost Analysis  
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**Option B2: Air-source VRF + Batt insulation**

Great Hall, offices, rec room: Heating, cooling and ventilation air will be provided through a multi-zone heat pump system consisting of an energy recovery ventilation unit, air-source heat pump modules and a combination of ducted and ductless indoor FCU's of approximately 275 MBH heating and 220 MBH cooling capacities in total. Ventilation air shall be distributed through supply ductwork from this unit to the inlet connection of the ducted FCUs serving each space.

IT, TV Studio Rooms: Ductless split DX systems with outdoor condensing units will serve spaces with high equipment loads

This option will also evaluate the effect of mineral wool insulation being added onto the different walls. The rubble stone foundation walls will have a whole assembly R-value of R-15 via spray foam. The above-grade 4" and 7" wood stud walls will have a whole assembly R-value of R-14 and R-22 respectively, while the 4" furred wall over stone will have an R-value of R-14. The model uses an aggregate R-value for the above grade walls for this analysis. The roof whole assembly insulation would be R-32.

**Option B3: Air-source VRF + Spray foam insulation**

This option is identical to option B2, but with spray wool insulation being added onto the different walls, instead of mineral wool. The rubble stone foundation walls will have a whole assembly R-value of R-15. The above-grade 4" and 7" wood stud walls will have a whole assembly R-value of R-26 and R-49 respectively, while the 4" furred wall over stone will have an R-value of R-26. The model uses an aggregate R-value for the above grade walls for this analysis. The roof whole assembly insulation would be R-49.

**Option C2: Ground water source VRF + Batt insulation**

Great Hall, offices, rec room: Heating, cooling and ventilation air will be provided through a multi-zone heat pump system consisting of an energy recovery ventilation unit, ground water source heat pump modules and a combination of ducted and ductless indoor FCU's of approximately 275 MBH heating and 220 MBH cooling capacities in total. Ventilation air shall be distributed through supply ductwork from this unit to the inlet connection of the ducted FCUs serving each space.

IT, TV Studio Rooms: Ductless split DX systems with outdoor condensing units will serve spaces with high equipment loads

This option will also evaluate the effect of mineral wool insulation being added onto the different walls. The rubble stone foundation walls will have a whole assembly R-value of R-15 via spray foam. The above-grade 4" and 7" wood stud walls will have a whole assembly R-value of R-14 and R-22 respectively, while the 4" furred wall over stone will have an R-value of R-14. The model uses an aggregate R-value for the above grade walls for this analysis. The roof whole assembly insulation would be R-32.

**Option C3: Ground water source VRF + Spray foam insulation**

This option is identical to option C2, but with spray wool insulation being added onto the different walls, instead of mineral wool. The rubble stone foundation walls will have a whole assembly R-value of R-15. The above-grade 4" and 7" wood stud walls will have a whole assembly R-value of R-26 and R-49 respectively, while the 4" furred wall over stone will have an R-value of R-26. The model uses an aggregate R-value for the above grade walls for this analysis. The roof whole assembly insulation would be R-49.

Additional details for these systems are provided in *Section VI - Model Input Summary*.

The Green Engineer, Inc.  
Energy & LCCA: Stow Town Hall

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The Green Engineer - 8 December 2020*





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Sustainable Design Consulting

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### III. Life Cycle Costing Methodology

The method used for life cycle costing is called Total Equivalent Annual Cost (TEAC). It amortizes the upfront cost over the life span of the equipment, and adds that to the operating cost. Another way to think of it is the operating cost + the bond payment on the capital cost. The IESNA recommends this specifically for comparisons of lighting options since it works well for comparing alternatives with different life spans.

Basic Formula is:

$$TEAC = \text{Annual Operating Cost} + \text{Initial Costs} \times \left[ \frac{i(1+i)^n}{(1+i)^n - 1} \right]$$

Where:

$i$  = Discount rate (2.5%)

$n$  = Expected service life  
Assumes 50 years for the ground heat exchanger, 20 years for all other items

#### Equipment Service Life

The service life of each option included in this study is assumed to be 20 years except for the ground heat exchanger in options C2 and C3, which is amortized over 50 years as mentioned in the executive summary. Although there is some evidence to suggest that DX heat pump technology may reach the end of its useful life sooner than a conventional system, there has been no peer reviewed publication that confirms a statistically significant conclusion. The oldest commercial VRF applications in the U.S. are still less than twenty years old, which yields a dearth of replacement and service life data.

#### HVAC Maintenance Costs

HVAC maintenance costs included in this study are reflective of a third party service contracted rate. Maintenance costs for Option A series are the lowest due to smaller RTUs and related items. Options B and C series have a highest maintenance cost, mostly due to an increased quantity of terminal units and associated air filters.

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Energy & LCCA: Stow Town Hall

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#### IV. Simulation Results

Additional performance metrics assessed for this study on an annual basis include Site Energy use, Source Energy use, Greenhouse Gas emissions and Energy Cost. Greenhouse gasses (GHG) are reported in terms of equivalent CO<sub>2</sub>, commonly abbreviated as "CO<sub>2</sub>e." GHG data is included to help inform decisions that relate to the Global Warming Solutions Act of 2008, which set greenhouse gas emissions tracking and reduction goals. While metrics such as site energy, source energy and energy cost are more readily understood, GHG emissions are often harder to quantify as they rely on a number of inputs to calculate that are both fuel type and regionally dependent.

The following tables contain the simulation results for each design alternative. Table 2 shows gross site energy consumption by enduse. The color coding in the total column reflects a **green to white to red** gradient from "best" to "worst," with green being the best and red being the worst. Option C3 has the lowest simulated site energy usage as well as greenhouse gas emissions, followed by B3 and C2. Option A3 has the lowest simulated energy costs, followed by options C3 and B3.

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Site Energy Use By Enduse (MMBtu/Yr)								
Description	Lights	Misc Equip	Heating	Cooling	Pumps & Aux	Vent Fans	Total	% Savings
A1: DX + Gas Heat (Existing envelope)	90	125	241	58	0	131	645	-
A2: DX + Gas Heat (Mineral wool Insulation)	88	123	130	61	0	66	469	27.4%
A3: DX + Gas Heat (Spray foam Insulation)	86	120	69	58	0	59	392	39.2%
B2: VRF (Batt Insulation)	88	123	147	46	0	22	426	33.9%
B3: VRF (Spray foam Insulation)	86	120	76	52	0	14	348	46.1%
C2: GSHP (Batt Insulation)	88	123	125	41	8	9	395	38.8%
C3: GSHP (Spray foam Insulation)	86	120	65	46	6	8	331	48.7%

Table 2: Energy by end use

Note: The color coding shown in the table for the total consumption is on a gradient going from red (worst case option) to white (medium option) to green (best case option). The differences in shades of each color depict where each option stands relative to others. A dark red color depicts a worse performing option than a light red color, which is worse than white colored cell. A dark green color is better performing option than a light green color.



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Table 3 combines site energy use, source energy use, greenhouse gas emissions and energy cost into a single comparison table. Similar to table 2, the color coding in each row reflects a gradient from "best" to "worst," with green being the best and red being the worst. In this table, options A3, B3, C2, and C3 have low energy costs while option C3 is the best performer on a site energy, source energy and greenhouse gas emissions basis.

Energy Use and Cost Summary								
Description		A1: DX + Gas Heat (Existing envelope)	A2: DX + Gas Heat (Mineral wool Insulation)	A3: DX + Gas Heat (Spray foam Insulation)	B2: VRF (Batt Insulation)	B3: VRF (Spray foam Insulation)	C2: GSHP (Batt Insulation)	C3: GSHP (Spray foam Insulation)
<b>Annual Energy Consumption</b>								
Electricity	kWh	118,439	99,069	94,648	124,423	101,982	106,682	99,648
Natural Gas	Therm	2,408	1,302	688	-	-	-	-
Total Site Energy use	MMBtu	645	469	392	426	348	395	331
Total Source Energy Use	MMBtu	1,384	1,083	976	1,189	974	1,019	952
Total GHG Emissions	kg CO2e	18,375	11,586	8,115	5,868	4,809	5,031	4,699
<b>Annual Energy Costs</b>								
Electricity	\$0.1100	\$13,028.3	\$10,897.6	\$10,411.3	\$13,686.6	\$11,218.0	\$11,735.1	\$10,961.3
Natural Gas	\$1.171	\$2,819.9	\$1,524.4	\$805.1	\$0.0	\$0.0	\$0.0	\$0.0
Total Energy Cost	\$	\$15,848	\$12,422	\$11,216	\$13,687	\$11,218	\$11,735	\$10,961
Energy Cost Savings Over Option 1			21.6%	29.2%	13.6%	29.2%	26.0%	30.8%

Table 3: Energy and cost by fuel type





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Figure 1 normalizes Table 2 data into the common site energy use index (EUI) metric. With the exception of options B3 and C3, heating energy is the dominant component of energy use. Accordingly, special care must be taken to optimize the envelope and ventilation system to ensure these loads are minimized. As described in the executive summary, energy use in the A options is artificially lower due to the lack of zone by zone temperature control and related temperature drifting in zones not served by a dedicated HVAC unit (Only four systems are proposed in the base HVAC option). Please refer to the executive summary for more details.

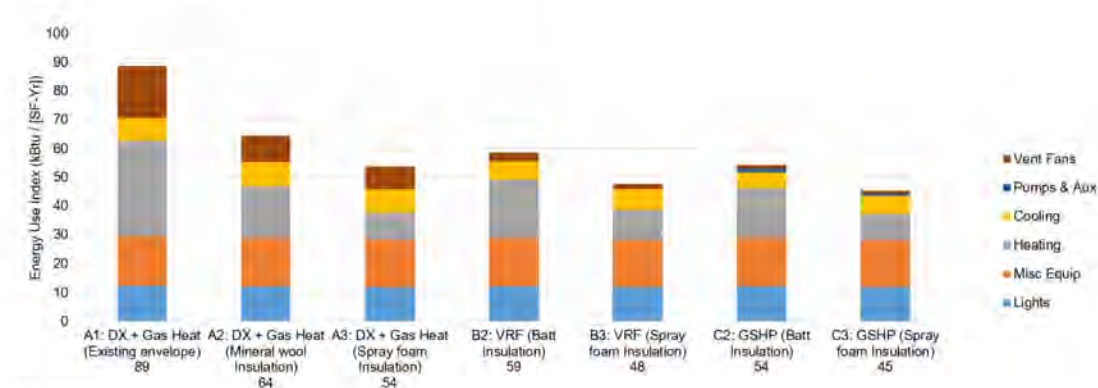


Figure 1: Energy Use Intensity



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Figure 2 provides a graphical comparison of the data contained in table two. The design option with the highest use of a particular metric (option A1) is normalized to 1.00 in the graph and the remaining options are seen as a percentage relative to the highest option. In other words, lower is better. For example, option C3 has the lowest site energy use relative to Option A1, followed by options B3, C2, and A3 respectively. Options C3 has the lowest energy cost, followed closely by option A3, B3 and C2, whereas option C3 has the lowest greenhouse gas emissions, followed by options B3 and C2.

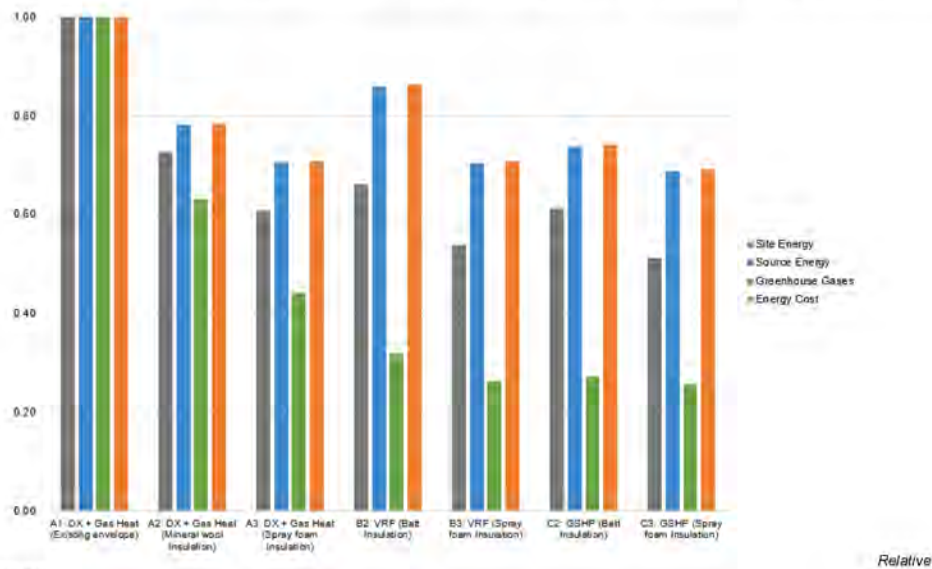


Figure 2  
Performance Comparison

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## V. Life Cycle Costing Analysis

The results of the TEAC analysis described in section III are shown below. Color coding is used to indicate the best and worst performers in select categories with green being the best performer and red being the worst.

Description	Option A1 DX + Gas Heat (Existing envelope)	Option A2 DX + Gas Heat (Mineral wool Insulation)	Option A3 DX + Gas Heat (Spray foam Insulation)	Option B2 VRF (Batt Insulation)	Option B3 VRF (Spray foam Insulation)	Option C2 GSHP (Batt Insulation)	Option C3 GSHP (Spray foam Insulation)
Discount Rate (i)	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Expected Service Life (n)	20	20	20	20	20	20	20
Annual Maintenance Costs (\$)	\$ 1,455	1,455	1,455	2,038	2,038	2,038	2,038
Annual Maintenance Costs (\$/SF)	\$0.20	\$0.20	\$0.20	\$0.28	\$0.28	\$0.28	\$0.28
Initial Cost (\$)	\$ 343,000	\$ 403,370	\$ 419,339	\$ 328,370	\$ 344,339	\$ 361,370	\$ 377,339
Net Installed Cost	\$ 343,000	\$ 403,370	\$ 419,339	\$ 328,370	\$ 344,339	\$ 461,370	\$ 477,339
Energy Cost (\$)	\$ 15,848	\$ 12,422	\$ 11,216	\$ 13,687	\$ 11,218	\$ 11,735	\$ 10,961
Annual Operating Cost (\$)	\$ 17,304	\$ 13,877.48	\$ 12,672	\$ 15,724	\$ 13,255.62	\$ 13,773	\$ 12,999
TEAC	\$ 17,304	\$ 13,877	\$ 12,672	\$ 15,724	\$ 13,256	\$ 13,773	\$ 12,999
	0.064	0.064	0.064	0.064	0.064	0.064	0.064
	\$ 22,002	\$ 25,875	\$ 26,899	\$ 21,064	\$ 22,088	\$ 23,181	\$ 24,205
	\$ 39,306	\$ 39,753	\$ 39,571	\$ 36,788	\$ 35,344	\$ 36,954	\$ 37,204
TEAC (Cost/SF)	\$ 5.40	\$ 5.48	\$ 5.44	\$ 5.06	\$ 4.86	\$ 5.56	\$ 5.60
NOTES: Net Installed Cost for Options C2 and C3 include the \$100,000 for the bore wells.							

Table 4: Total Equivalent Annual Cost Comparison

Note: The color coding shown in the table for the total consumption is on a gradient going from red (worst case option) to white (medium option) to green (best case option). The differences in shades of each color depict where each option stands relative to others. A dark red color depicts a worse performing option that a light red color, which is worse than white colored cell. A dark green color is better performing option that a light green color.



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## VI. Model Input Summary:

In table 5, greyed out cells are considered identical to the base option A1. Only design characteristics that differ from the base option are cited in the columns for options B and C series.

Building Component	Option A1: DX + Gas Heat (Existing envelope conditions)	Option A2: DX + Gas Heat (Mineral wool insulation)	Option A3: DX + Gas Heat (Spray foam insulation)	Option B2: VRF (Batt insulation)	Option B3: VRF (Spray foam insulation)	Option C2: GSHP (Batt insulation)	Option C3: GSHP (Spray foam insulation)
Building Type	Town Hall						
Utility Rates	EIA State Average Electricity \$0.17/kWh Gas \$1.17/therm						
Infiltration	Modeled for whole building Airtightness set to 'Poor' or 'Low'	Modeled for whole building Airtightness set to 'Medium'	Modeled for whole building Airtightness set to 'Good'	Modeled for whole building Airtightness set to 'Medium'	Modeled for whole building Airtightness set to 'Good'	Modeled for whole building Airtightness set to 'Medium'	Modeled for whole building Airtightness set to 'Good'
Roof Assembly	Assumed uninsulated U-0.613	U-0.031 (R-32)	U-0.020 (R-49)	U-0.031 (R-32)	U-0.020 (R-49)	U-0.031 (R-32)	U-0.020 (R-49)
Wall Assembly	Below-grade walls: R-15 Above-grade walls: U-0.292	Below-grade walls: R-15 Above-grade walls aggregated: U-0.056 (R-17.97)	Below-grade walls: R-15 Above-grade walls aggregated: U-0.027 (R-37.41)	Below-grade walls: R-15 Above-grade walls aggregated: U-0.056 (R-17.97)	Below-grade walls: R-15 Above-grade walls aggregated: U-0.027 (R-37.41)	Below-grade walls: R-15 Above-grade walls aggregated: U-0.056 (R-17.97)	Below-grade walls: R-15 Above-grade walls aggregated: U-0.027 (R-37.41)
Windows & Glazing	Operable clear single glazed windows: U - 1.25 SHGC - 0.82 VT - 0.76						
Window to Wall Ratio	7%						
Hours of Operation	Assumed extended office hours for the week						

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Energy & LCCA: Stow Town Hall

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The Green Engineer - 8 December 2020



Building Component	Option A1: DX + Gas Heat (Existing envelope conditions)	Option A2: DX + Gas Heat (Mineral wool insulation)	Option A3: DX + Gas Heat (Spray foam insulation)	Option B2: VRF (Batt insulation)	Option B3: VRF (Spray foam insulation)	Option C2: GSHP (Batt insulation)	Option C3: GSHP (Spray foam insulation)
HVAC System	<p>Thermostat 75F Cooling 70F Heating</p> <p>Building: (4) DX condensing units with furnaces, of approx 80 MBH heating and 54 MBH cooling capacity each. Ventilation air to be ducted to furnace air inlet connection and drawn through a common intake louver.</p> <p>IT, TV Studio rooms: Ductless split DX systems with outdoor air-cooled condensing units</p>			<p>Thermostat 75F Cooling 70F Heating</p> <p>Building: Multi-zone heat pump system with an ERV, air-source HP modules, and combination of ducted and ductless indoor FCU's (approx 275 MBH heating and 220 MBH cooling capacities). Ventilation air to be distributed through supply ducts from ERV to inlet connection of ducted FCU's.</p> <p>IT, TV Studio rooms: Ductless FCUs with ECM motors. Ventilation air via a direct duct connection to cabinet.</p>		<p>Thermostat 75F Cooling 70F Heating</p> <p>Building: Multi-zone heat pump system with an ERV, ground water sourced HP modules, and combination of ducted and ductless indoor FCU's (approx 275 MBH heating and 220 MBH cooling capacities). Ventilation air to be distributed through supply ducts from ERV to inlet connection of ducted FCU's.</p> <p>IT, TV Studio rooms: Ductless FCUs with ECM motors. Ventilation air via a direct duct connection to cabinet.</p>	
Cooling Efficiency	16 SEER/15.06 EER			11.4/11.1 (ducted/inducted)		11.4 EER/18.5 IEER	
Heating Efficiency	95% AFUE			3.41 COP		4.9 COP	
Supply Air (CFM)	Autosized						
Ventilation Air (CFM)	Autosized						
Fan Power	SZ-AC: Total 28 kW			VRF+ERV Total 3.6 kW ERV for ventilation air		GSHP+ERV Total 2 kW ERV for ventilation air	
Ventilation Energy Recovery	Not included						
Demand Control Ventilation	Not included						
Lighting LPO	1.1 w/sf						
Lighting Controls	Daylighting per code						
Process Loads	Corridors: 0.5 w/sf Remaining Spaces: 1 w/sf						

Table 5: Supplemental Model Inputs

## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **ACOUSTICAL ANALYSIS & RECOMMENDATIONG**

- E.01** Environment Noise Report
- E.08** Outdoor VRF Noise Mitigation Recommendations
- E.14** Architectural Acoustics Recommendations (Revised)



33 Midway Street  
Cambridge MA 02138  
617-499-8000  
acentech.com

February 19, 2021

Mr. Donald W. Mills, RA  
Mills Whitaker Architects  
P.O. Box 750089  
Arlington, MA 02475

Via email: [donmills@millswhitaker.com](mailto:donmills@millswhitaker.com)

**Subject**      **Environmental Noise Report**  
Stow Town Hall  
375 Great Road, Stow, MA  
Acentech Project No. 633808

Dear Don,

This report presents the results from an environmental noise survey we conducted at Stow Town Hall. These measurements will inform the placement of the building's new mechanical equipment in order to comply with the Town's Zoning Bylaw and the Massachusetts Department of Environmental Protection (DEP) noise pollution policy. A follow-up report will include our noise control recommendations for these units.

#### BACKGROUND

##### Stow Noise Regulations

The basis of our analysis is Article 3.8.1.3 of the Town of Stow Zoning Bylaw, which states:

*"The noise generated on any LOT, measured at any point beyond the property lines of the LOT on which the noise source is located, shall not cause the total sound level to be more than three (3) decibels above the natural ambient sound level except as provided below:*

- 1. For not more than five (5) minutes in any one (1) hour the noise generated shall not cause the total sound level to be more than ten (10) decibels above the natural ambient sound level.*
- 2. For not more than sixty (60) minutes in any seven (7) day period the noise generated shall not cause the total sound level to be more than thirty (30) decibels above the natural ambient sound level.*
- 3. Noise making devices which are maintained and are utilized strictly to serve as safety warning devices are excluded from these regulations."*

*Measurements shall be conducted by personnel approved by the BUILDING INSPECTOR using the "A" weighting on a standard commercial total sound level instrument approved by the BUILDING INSPECTOR. For the purpose of this Bylaw the natural sound level shall be assumed to be forty (40) decibels above 0.0002 microbar during hours of daylight, and thirty (30) decibels above 0.0002 microbar at all other times."*

Since the VRF units you are installing will be operating continuously, the project will have to meet the primary regulation of the Bylaw – the equipment must not exceed 3 dB over ambient noise levels.

The last sentence describes "assumed" natural sound levels of 40 dBA and 30 dBA during daytime and nighttime hours, respectively. Since our measured levels were often much lower than 30 dBA at night, the assumed levels can be used to gauge compliance with Stow's Bylaw. This will allow for less stringent

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**Acoustics Report - Environmental Noise**  
**Acentech - 19 February 2021**

requirements for noise mitigation.

#### MassDEP Noise Regulations

In setting these goals, we have also considered the Massachusetts Department of Environmental Protection (MassDEP) Noise Regulation:

*"A Noise source will be considered to be violating the Department's noise regulation (310 CMR 7.10) if the source:*

- 1. Increases the broadband sound level by more than 10 dB(A) above ambient, or*
- 2. Produces a "pure tone" condition – when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.*

*These criteria are measured both at the property line and at the nearest inhabited residence. "Ambient" is defined as the background A-weighted sound level that is exceeded 90% of the time, measured during equipment operating hours. "Ambient" may also be established by other means with consent of the Department."*

Their definition of "ambient" describes an industry standard practice known as an L90 measurement. L90 is a metric that refers to the level being exceeded for 90% of the measurement period—in other words, the background noise. It captures the contribution of continuous sound sources (like mechanical equipment) and ignores transient sources like occasional passing cars.

Unlike the Stow Bylaw, the MassDEP Noise Regulation does not include "assumed" ambient levels. Therefore, to comply with the State's guidelines we will need to use our measured levels as the basis for determining the allowable noise emission for the project's mechanical equipment.

In order to comply with Item 2 of the MA DEP Noise Regulation, the project will need to avoid a "pure tone" condition in the equipment selected.

#### METHODOLOGY

To perform our measurements, we placed a combination of Rion NL-52 & NL-62 sound meters (seen below in Figure 1) around the perimeter of the site. The locations (shown in Figure 2 on the following page) were selected to represent the preliminary and alternate locations for the VRF units, as indicated in the project documentation you recently sent to us. The measurement period for Location 1 was Wednesday, February 3<sup>rd</sup> through Wednesday, February 10<sup>th</sup>. The measurement period for Locations 2 & 3 was Thursday, February 11<sup>th</sup> through Tuesday, February 16<sup>th</sup>. We set the meters to record the hourly sound levels and let them run continuously throughout the measurement period.





Figure 1: Example of Sound Level Meter Set-Up (Location 1)



Figure 2: Sound Level Meter Locations



Acoustics Report - Environmental Noise  
Acentech - 19 February 2021

RESULTS & ANALYSIS

Figure 3 depicts the time history of Location 3, which we understand to be the preferred location at this point. The time histories of Locations 1 & 2 can be found in the appendix. Sound levels shown in orange represent the hourly L90, which is the "background noise" metric described above. For reference, these graphs also show the hourly Leq (in black), which is defined as the equivalent continuous sound level.

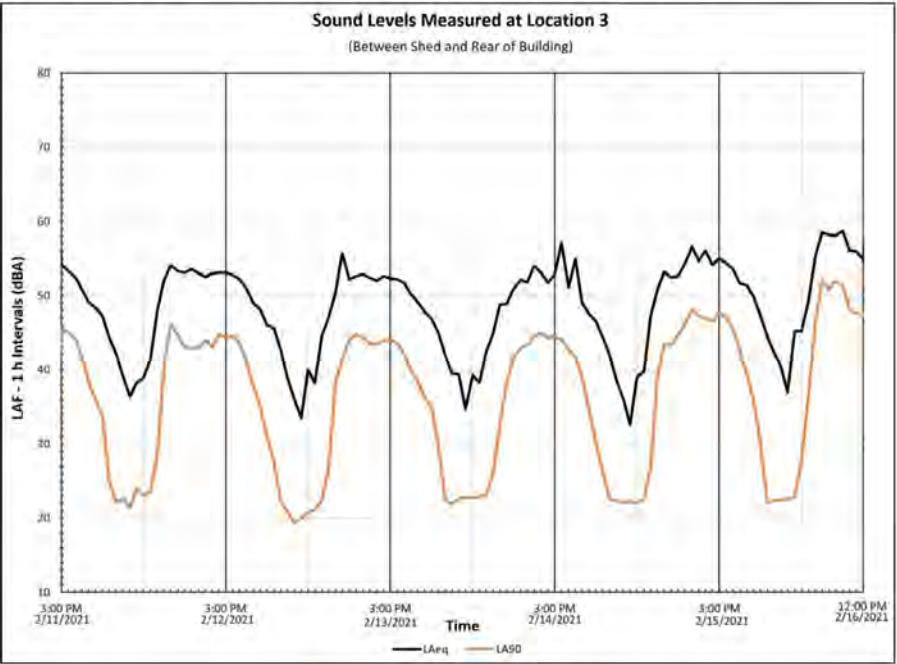


Figure 3. Time History of Location 3

As expected, levels peaked during the day and were quieter at night. Locations 1 & 2 had higher levels on average than Location 3, due to proximity to traffic noise. We examined the data on an hourly basis to capture the level of the quietest hour at each location.

Our measurements captured the winter storm and its aftermath, which has implications for our analysis. Over a foot of snow had accumulated, and fresh snow is particularly effective at absorbing the sound that would otherwise be reflected by the ground. Significant amounts of snow remained on the ground for the duration of the survey. As a result, these measurements have produced a low threshold for environmental noise at the site.

Table 1 below contains a summary of the quietest hour L90 noise measurements and the resulting project environmental noise criteria as required by the applicable state and local regulations. These limits will comply with the MassDEP requirements (will not increase ambient levels by 10 dB) and Stow requirements (will not exceed 33 dBA at night (3 dB above the ordinance's "assumed" nighttime level of 30 dBA)).

Mr. Donald W. Mills, ISA  
February 19, 2021  
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Table 1: Quietest Hour Measurements and the Resulting Noise Criteria Required by Applicable Regulations

	Quietest Measured 1-Hour Ambient (L90)	Statutorily Required Maximum Property Line Noise From Mechanical Equipment
Location 1	23 dBA	32 dBA
Location 2	23 dBA	32 dBA
Location 3	19 dBA	28 dBA

We note that these sound levels are quite low, and may be challenging to achieve; we look forward to working with you and your mechanical engineer as needed to develop noise control solutions that achieve these requirements.

This project is unique in that some of the proposed VRF locations (including Location 3) are actually on the adjacent property itself. If Location 3 remains the preferred location, we propose setting our noise criteria to apply to the residence side of the property owner's shed. In other words, the goal would be not to exceed the noise level limits in the neighbor's yard. The presence of the shed will help in achieving this goal, as it will serve as a natural sound barrier between the VRF units and the house.

#### SUMMARY

As the equipment selections are finalized, we will follow up by using mechanical noise data from the manufacturer to predict noise levels at the closest residence and other sensitive locations. We will then provide recommendations for enclosures or other mitigation strategies for the VRF units.

\* \* \* \* \*

We hope this report provides the information you need at this time. Please feel free to contact us if you have any questions.

Sincerely,



Josh Brophy  
Consultant

Cc: Ben Markham, Acentech  
Encl: Time history of measured sound levels



Acoustics Report - Environmental Noise  
Acentech - 19 February 2021

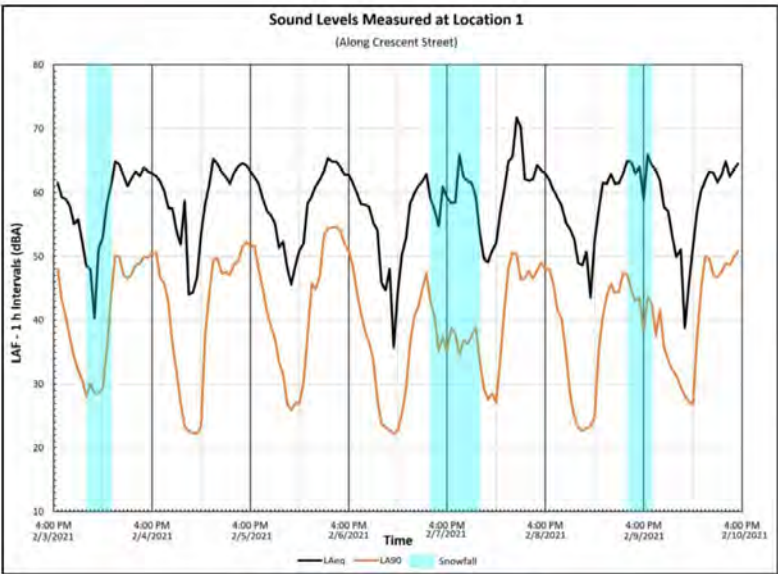


Figure 4: Time History of Location 1

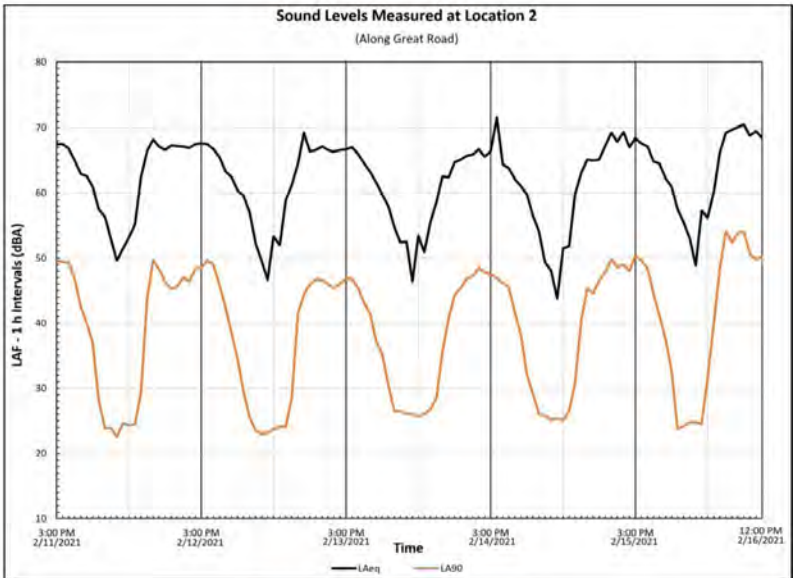


Figure 5: Time History of Location 2



Acoustics Report - Environmental Noise  
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Mr. Donald W. Mills, RA  
February 19, 2021  
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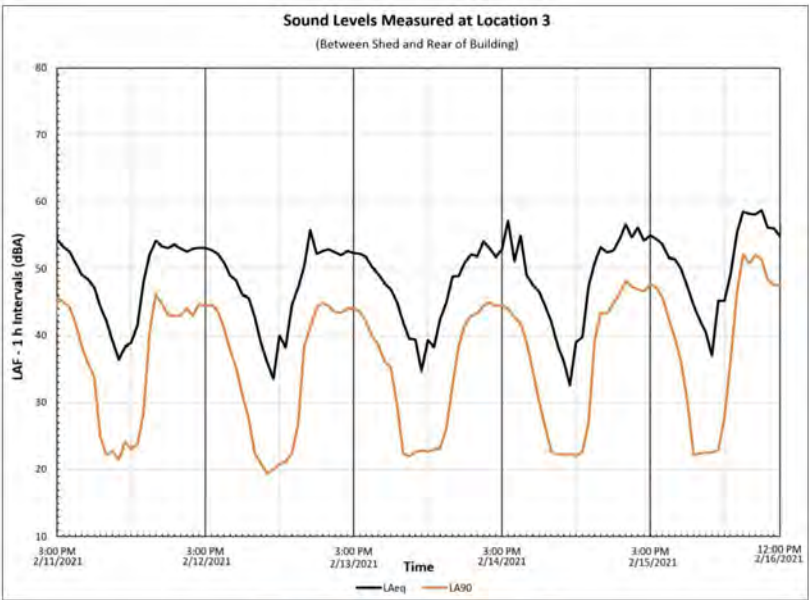


Figure 6: Time History of Location 3



Acoustics Report - Environmental Noise  
Acentech - 19 February 2021



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March 30, 2021

Mr. Donald W. Mills, RA  
Mills Whitaker Architects  
P.O. Box 750089  
Arlington, MA 02475

Via email: [donmills@millswhitaker.com](mailto:donmills@millswhitaker.com)

**Subject** **Outdoor VRF Noise Mitigation Recommendations**  
Stow Town Hall  
375 Great Road, Stow, MA  
Acentech Project No. 633808

Dear Don,

This report presents our noise mitigation recommendations for the new outdoor VRF units at Stow Town Hall. It follows an earlier report that contained the results of an environmental noise survey we conducted at the site. Those results have informed our recommendations, which are intended to assist the project in complying with the Massachusetts Department of Environmental Protection (DEP) noise pollution policy.

#### BACKGROUND & CRITERIA

In February 2021, we visited Stow Town Hall to install sound level meters at three locations around the building. We let the meters run for several days in order to establish time histories of the environmental noise levels at each location. Please refer to our "Environmental Noise Survey" report for more details about those measurement methods and results.

Since the time of our measurements, Location 3 has emerged as the preferred location for the VRF units. This is the location between the east facade of the building and the neighbor's shed. Recall from our previous report that our quietest hour  $L_{90}$  measurement at Location 3 was 19 dBA. Based on this benchmark, we determined that the VRF units must not exceed 28 dBA during these quietest hours (overnight) in order to comply with the MassDEP noise policy. The MassDEP regulation is more stringent than the Town's Zoning Bylaw, so designing for the former will also achieve compliance with the latter.

Typically, the reference point for meeting a noise goal is the property line of the nearest abutter. This project is unique in that source location is actually *on* the adjacent property itself. In our previous report, we proposed setting our noise criteria to apply to the residence side of the property owner's shed. At your suggestion, we have revised this to be the neighbor's outdoor terrace, based on the idea that this is the nearest location where they may be affected by the VRF noise for an extended period.

#### ANALYSIS

##### CadnaA Acoustical Model

To analyze noise emission of the VRF units, we used acoustical modeling software called CadnaA. This program allows us to simulate an acoustical environment and predict how a noise source will propagate among geographical features and existing buildings. In our base model, the main elements affecting VRF noise propagation were the Town Hall, the neighbor's house, the shed, and the natural absorption provided by the ground. Our model utilizes sound data for the VRF units as described in Appendix A.

acoustics | avir/securiv | vnf/mh/m

*Acoustics Report - Outdoor VRF Noise Mitigation Recommendations*  
*Acentech - 30 March 2021*

We then place receptors at various points of interest where we would like to determine expected sound levels. In this case, the primary receptor is the neighbor's terrace. For reference, we also included a receptor just on the other side of the shed. Without any noise mitigation measures added, our model predicted noise levels of **36 dBA** and 45 dBA at the terrace and shed locations, respectively, substantially exceeding our goals.



*Figure 1: Predicted Noise Levels (Before Mitigation)*

## RECOMMENDATIONS

### Acoustical Barrier

Typically the first strategy we consider is the implementation of an acoustical barrier around the equipment. The effectiveness of a barrier is related to its mass, location, and height. The barrier should weigh at least 4 psf continuously with no gaps (e.g. two layers of T&G wood planks with the seams staggered), and the interior of the barrier should be faced with a sound absorptive material that achieves at least NRC 0.90. We have determined that 3 meters (10 feet) is an appropriate height for this barrier, relative to the size of the VRF units. The barrier could either be stick-built or pre-fabricated. Stick-building would allow it to look consistent with the wood façade of the historic buildings. A pre-fab option could be [Koch Sons Acoustical Barriers](#), or similar.

In our recent correspondence, we discussed the idea of using the Town Hall itself as one of the "sides" of the barrier. This would entail the constructed barrier being three-sided, covering the north, east, and south of the VRF units, as shown in Figure 2 below. We expect that this is the ideal configuration both in terms of layout, as well as maintaining access to the back of the shed.



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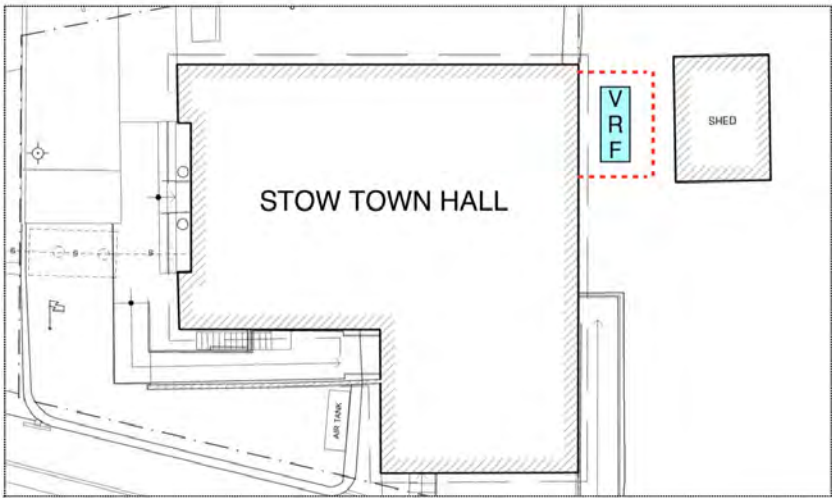


Figure 2: Recommended Location of Barrier Around VRF Units

We incorporated this barrier into our model, recalculated the results, and found **31 dBA** at the terrace and 35 dBA at the other side of the shed. For some additional context, see the plot of our measured environmental noise levels at Location 3 in Figure 4 on the following page. The noteworthy feature is the background noise history, shown in orange. Though our overall design goal for noise mitigation is based on the quietest hour measurement, note that the ambient noise only drops below 31 dBA (shown as the horizontal red line) between 9 PM and 10 PM most nights, and rises back above that level between 6 AM and 7 AM. This suggests that during the day, the contribution from the VRF units (within the barrier) to the background noise levels may be masked by other environmental noise sources.



Figure 3: Predicted Noise Levels (with Acoustical Barrier)



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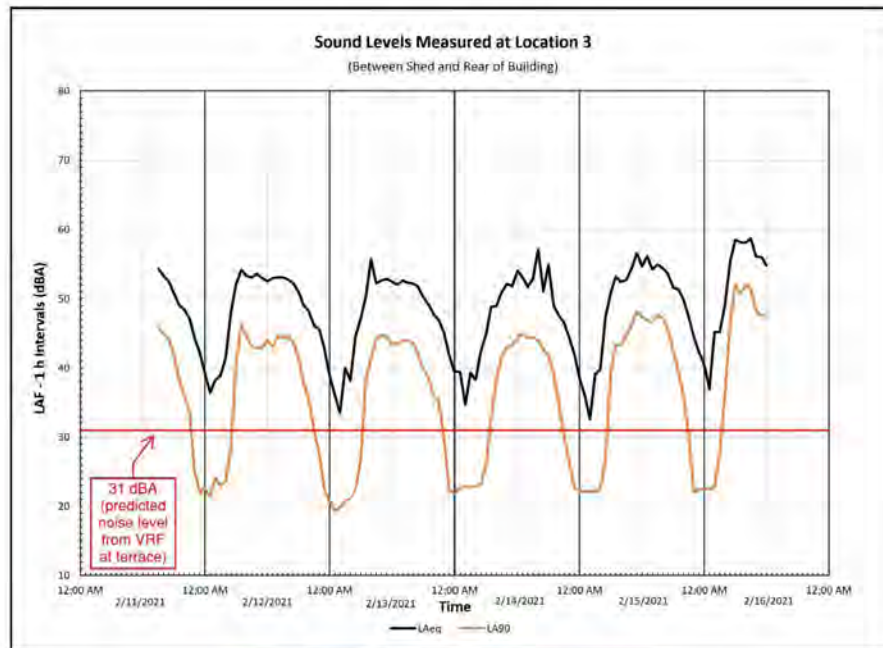


Figure 4: Ambient Sound Levels Measured at Location 3

In other words, while the barrier helps considerably, we will need to consider additional attenuation measures to achieve the goal of 28 dBA at the terrace *overnight*. Options A & B, described below, will need to be implemented in addition to the barrier to meet this goal.

#### Option A: Additional Source Attenuation

This method aims to achieve the additional 3 dB of attenuation by addressing the VRF noise at the source. Apart from the fans, the other noisy components are the internal compressors. Several manufacturers offer removable sound blankets that can be wrapped around the compressors to limit the noise emitted from the overall system. One example is [HushCore Standard by BRD](#), which provides 4 to 10 dBA of noise reduction according to the manufacturer. We expect that these or similar mass-loaded vinyl compressor wraps will provide enough additional attenuation to achieve our noise goal.

#### Option B: Reselecting Quieter VRF Units

In researching the Mitsubishi VRF units provided as the basis-of-design, we found a "Low Noise" setting which may be a useful feature to consider. With the sound power data for the current units, we determined that if the fans were to be running at 70% capacity at night, we would be able to meet the 28 dBA noise goal when required.

According to your mechanical engineer, however, the "Low Noise" setting would be overridden for outdoor temperatures above 95°F and below 32°F. Therefore, implementing a 70% capacity would necessitate selecting larger outdoor and indoor VRF units. This makes things more complicated. The calculations we used to determine that these units would meet the noise goal at 70% capacity are based on the sound power data for the current units, not hypothetical larger units. It's possible that a larger unit running at 70% capacity

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could be just about as noisy as the current unit running at 100% capacity, which would defeat the purpose of implementing the "Low Noise" reduced capacity setting.

Reselecting the units is still an option, but it would need to be carefully coordinated with this limitation in mind. You would need to choose a unit that achieves the building's heating / cooling requirements while staying below a sound power output of 72 dBA from 10 PM to 6 AM.

\* \* \* \* \*

We hope this report provides the information you need at this time. Please feel free to contact us via phone or email if you have any questions.

Sincerely,



Josh Brophy  
Consultant

Cc: Ben Markham, Acentech

Encl: Appendix A – VRF Sound Data



*Acoustics Report - Outdoor VRF Noise Mitigation Recommendations  
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#### APPENDIX A – VRF SOUND DATA

The first step in our analysis was to ensure that we had accurate noise data for the VRF units. We received a cut sheet for the Mitsubishi model (PURY-EP312TSNU-A), but the sound data on the sheet was rather limited, presented in the form of only a single-number sound power level and sound pressure level. For a more thorough evaluation, we require sound data for each octave band, rather than a single-number value. Furthermore, the difference between the sound pressure level and sound power level was wider than we typically see. This raised concerns about the accuracy of the data, especially because the cut sheet did not specify measurement distance or methods.

On the cut sheet that the mechanical engineer provided, we saw that the overall VRF system consisted of two modules (PURY-EP168 and PURY-EP144). We were able to find documentation published by Mitsubishi that includes more detailed sound data for these individual units. We used the combined sound power of the two units (shown in Table 1 below) as the source spectrum for the overall VRF system.

*Table 1: Sound Power Levels for Individual Modules and Combined VRF System*

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Overall dB(A)
<b>PURY-EP168</b>	80	78	74	69	65	61	58	49	72
<b>PURY-EP144</b>	76	77	75	69	65	60	60	53	72
<b>Overall Level</b>	82	81	78	72	69	64	62	55	75



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April 14, 2021

Mr. Donald W. Mills, RA  
Mills Whitaker Architects  
P.O. Box 750089  
Arlington, MA 02475

Via email: [donmills@millswhitaker.com](mailto:donmills@millswhitaker.com)

**Subject** **Architectural Acoustics Recommendations (Revised)**  
Stow Town Hall  
375 Great Road, Stow, MA  
Acentech Project No. 633808

Dear Don,

This report presents our recommendations related to sound isolation, room acoustics, and mechanical noise control for the renovation of Stow Town Hall.

#### OBSERVATIONS, MEASUREMENTS & CRITERIA

In February 2021, we visited Stow Town Hall to observe the existing architectural conditions. During the visit, we also took measurements of reverberation time (RT) and background sound levels in the Great Hall, which have informed our recommendations.

##### Reverberation Time

Due to the spray-applied acoustical treatment on the ceiling and upper walls (presumably K-13 or similar), the Great Hall is fairly absorptive. Its acoustical character favors speech but is still lively enough that performance events are likely reasonably well-supported.

The results of our RT measurements are shown in the Table 1 below. A single-number RT is typically reported as the average of the 500 Hz and 1000 Hz octave bands, which in this case is 0.77 seconds. This value aligns with our subjective observations of the room.

Table 1: Measured Reverberation Time (RT) in the Great Hall

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Measured RT	0.97 s	0.89 s	0.74 s	0.79 s	0.62 s	0.55 s

For speech events, we think it is appropriate to recreate this level of reverberation in the renovation, while maintaining sufficient liveliness to support occasional performances.

##### Background Sound Levels

With no centralized HVAC system affecting our measurements, the background sound levels in the Great Hall were quite low, as expected. We have attached a graph of these measurements to the end of this document. The results are presented in terms of two statistical levels:  $L_{90}$  and  $L_{10}$ .  $L_{90}$  refers to the level that is being exceeded for 90% of the measurement period, which is a good representation the background sound level.  $L_{10}$  refers to the level being exceeded for only 10% of the measurement period, which represents louder, transient events. In this case, it corresponds with the traffic noise, which was clearly audible through the existing windows.

acoustics | av/light/sound | vibration

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You will also see in the graph that we have compared our measurements to the standardized Noise Criteria (NC) rating system, which quantifies noise levels in relation to a group of weighted curves. We often use NC ratings in setting goals for background noise, e.g. from new HVAC systems. We recommend limiting noise to NC-25 in the Great Hall, given its function as a multi-use space for meetings, presentations, and more. For reference, the current background noise level in the Great Hall is NC-23. Because traffic noise (or other exterior noise) was the only noise source present during our measurements, that value would be lower when windows are upgraded.

We also recommend using NC-30 as the background noise goal for the smaller meeting rooms, and NC-40 to -45 in corridors, lobbies, and support spaces.

## GREAT HALL

### Room Acoustics & Ceiling Isolation

For the Great Hall, providing appropriate absorptive treatments and ensuring sufficient isolation from the mechanical attic are among project's critical acoustical objectives. There are several options for addressing each of these issues:

#### Option A (Lowest Cost):

This option assumes the current plaster substrate will remain at the ceiling, and in that case the K-13 acoustical treatment would remain on the ceiling as well. We understand that the walls will be refinished, which will entail removing the K-13 from the upper portions of the walls. To make up for the lost absorption and recreate the existing reverberation time, plan for fixed fabric-wrapped panels (1" thickness) at the upper walls, covering the area where the K-13 was removed. The panels should achieve at least NRC 0.80. In lieu of the wall panels, you could also reapply K-13 at 1" thickness.

If you decide to go with Option A, the additional required isolation could be provided at the attic level by adding two more layers of 3/4" plywood to the existing layer, for a total of three layers. Insulate the ceiling plenum by adding mineral fiber acoustical batts to the cavity. If there are inaccessible locations where it is not possible to add batts, then cellulose or an open-cell foam could be blown in instead (avoid closed-cell products).

#### Option B (Moderate Performance):

This option applies if the current plaster ceiling is removed, along with the K-13. This approach would entail installing a new double-layer GVB ceiling on spring hangers (similar to [Kinetics ICVV](#)), and adding mineral fiber acoustical batts to the ceiling cavity. The ceiling absorption could be implemented in the form of a surface-applied or suspended treatment that achieves at least NRC 0.80. A range of approaches may be workable here, including stretched fabric (as you have implemented elsewhere), acoustical "plaster" products, spray-applied finishes, panelized systems, and more. The wall absorption would be similar to Option A: fixed 1" fabric-wrapped panels or K-13 (1" thickness) at the upper walls.

For Option B, the spring hangers would provide substantial isolation, so we expect that just one additional layer of 3/4" plywood at the attic level would be required. We will confirm when we receive more information about the mechanical equipment planned for the attic and as the mechanical design evolves, please see MECHANICAL NOISE AND VIBRATION CONTROL, below, for more on this topic.

Option B recreates the current reverberation time and offers better sound isolation performance. The disadvantage is that absorptive treatments would be fixed, offering less flexibility of use.

#### Option C (Best Performance):

Option C uses the same ceiling strategy as Option B: GVB suspended on hangers with batts in the cavity, one layer of 3/4" plywood added to the attic floor (to be confirmed), and absorptive treatment applied to the underside of the ceiling.

For Option C, we propose adjustable wall absorption. You could achieve this by installing retractable banners at the side walls, with the banners retracting up into a ceiling soffit (similar to your work at Cary Hall in



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Lexington), or with horizontally tracking curtains that could retract to the balcony area. During meetings or other speech-critical events, the banners could be extended, making the room drier and enhancing speech clarity. During musical performances, the banners would be retracted, which would encourage more brightness from wall reflections. The mid-frequency reverberation time, unoccupied, would range from 0.8s to 1.2s.

#### Exterior Windows

We understand that the existing exterior windows will remain, and that you intend to add storm windows. These storm windows will reduce the transmission of traffic noise and other exterior noise sources. The new windows could be installed either at the exterior or interior. The key design parameter is to maximize the gap between the existing sash and the new windows. We recommend planning on a minimum  $\frac{1}{4}$ " glass thickness. For the window directly adjacent to the outdoor VRF units (W05), we recommend an airspace of at least 2".

#### Doors

For all doors leading into the Great Hall (1.04, 1.05, & 1.06), we recommend adding full-perimeter gaskets at the head and jamb, and a neoprene sweep paired with an ADA-compliant raised threshold at the door bottom. See the attached detail at the end of this document for a list of recommended products.

#### HISTORICAL COMMISSION & MEETING ROOMS

The ground floor of the building includes two acoustically sensitive spaces: Meetings 010 and Historical Commission 012. These meeting rooms are both directly beneath the Great Hall, but you told us that neither will be used simultaneously with events in the Great Hall on a regular basis. Therefore, designing for superior sound isolation performance may not be necessary for these spaces.

The 1<sup>st</sup> Floor also includes a meeting room: Meetings 112, which is located directly beneath the Great Hall's balcony.

#### Room Acoustics & Ceiling Isolation

There are also several options for absorptive treatment and ceiling construction for these spaces, based on the tradeoff between budget, performance, and aesthetic considerations:

##### Option A (Budget Solution):

This option calls for heavy mineral fiber ACT, either to replace or to be installed below the existing ceiling. Select an ACT product that achieves at least NRC 0.70 and CAC 35. Particularly if existing ceilings are replaced, users should not expect simultaneous use to be practical.

##### Option B (Moderate Performance):

Option B would include a single layer of GWB suspended from the existing ceiling on wire, with insulation in the cavity. Then, apply a sound-absorbing finish in the form of a surface-applied treatment that achieves at least NRC 0.70.

##### Option C (Best Performance):

Option C is similar to Option B, but the GWB would be a double-layer, suspended on spring hangers (similar to [Kinetics ICVV](#), as recommended above for the Great Hall ceiling) instead of wire. To the GWB, apply an absorptive treatment that achieves at least NRC 0.70.

##### Option D (Aesthetically Preferred):

We understand that some of these spaces have an existing tin ceiling, and that you may be interested in leaving the tin exposed for aesthetic purposes. This would result in the lower sound isolation performance compared to the options presented above, but if concurrent events are unlikely, this may not be a concern. (Or, to the extent that it is a concern, the tin ceilings could be removed and re-installed below a sound-barrier GWB ceiling as described above.) With a tin ceiling, you would still need to include absorptive treatments to promote speech clarity during meetings. With this option, the absorption could be provided at the walls. Select a product that achieves at least NRC 0.70, with wall coverage approximately equivalent to the surface area of the ceiling.



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#### Additional Consideration (Wood Flooring):

In recent correspondence, you mentioned that you are considering removing the carpet and pads to restore the underlying wood floors in Meetings 112. You are also considering adding carpet to Meetings 010. Exposed wood flooring would be acceptable acoustically if it can provide enough absorption at the walls and/or ceiling, which we understand might be a challenge if you want to retain the exposed tin ceilings.

If you can achieve at least 80% of the ceiling area in coverage at the walls and/or ceiling, the wood floors can be exposed. If that is not possible, adding carpet would be helpful to cover the remainder and improve reverberation control.

#### Wall Isolation

On the ground floor, there will be several new partitions built to divide the new meeting spaces. For the demising walls of Meetings 010 and Historical Commission 012, we recommend a single-stud wall with two (2) layers of GWB on each side, and insulation in the cavity.

#### Exterior Windows

The exterior windows at Meetings 112 face Great Road, and the exterior windows at Meetings 010 and Historical Commission 012 are right next to the planned location for the outdoor VRF unit. We recommend adding storm windows to these existing exterior windows in the same way as recommended above for the Great Hall.

We understand that you are considering a double-storm (one exterior storm and one interior storm, in addition to the existing sash) for the exterior window at Historical Commission 012, since this window will be inside the acoustical barrier that encloses the outdoor VRF unit. We think that this is a conservative approach. According to our calculations, a single storm window, 1/4" thick and at least 1" from the primary sash, will be enough to comply with typical meeting room noise standards (NC-30) in Historical Commission 012, provided that the existing window is solid and well-sealed. To the extent that is in doubt, or if the room is especially noise sensitive, a double-storm may be warranted.

Given that the exterior window at Meetings 010 is further from the outdoor VRF and is on the other side of the acoustical barrier, we do not anticipate the need for a more robust window assembly there.

#### Doors

For the doors leading into Meetings (010), Historical Commission (012), and Meetings (112), we recommend adding full-perimeter gaskets at the head and jamb, and a neoprene sweep paired with a raised threshold at the door bottom. See the attached detail at the end of this document for a list of recommended products.

#### MECHANICAL NOISE AND VIBRATION CONTROL

##### Equipment Layout

The attic includes two energy recovery units and four ducted fan coil units, all located directly above the Great Hall. The improvements to the floor/ceiling assembly recommended above are intended to reduce the transmission of radiated noise from units to the Great Hall below. The best way to assure an appropriately low background noise level in the Great Hall would be to relocate the loudest noise sources, e.g. by moving ERV-2 to the south attic, as shown in the figure on the following page.



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Mr. Donald W. Mills, RA  
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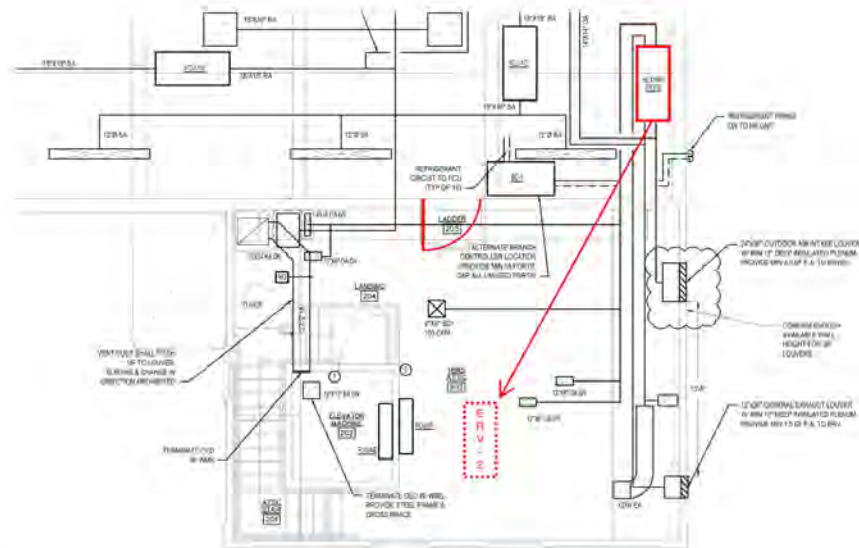


Figure 1: Recommended Location of ERV-2

This would also require adding a door at the top of the ladder between the two attics. The door should include gaskets similar to those recommended above. If these changes are feasible, it is possible that you could save money on the upgrades to the floor/ceiling assembly at the Great Hall and still achieve suitably low background noise. We will be able to make that determination later in the project when we have more detailed information about the ERVs.

#### Energy Recovery Ventilators

The cut sheets we received for the ERVs did not include sound data, so at this point our recommendations are conceptual in nature. We will refine these recommendations when we receive sound data for both units, preferably by octave band.

#### Noise Propagation to Interior Spaces

If the ERVs are noisy, it is likely that we will need attenuators in both the supply and return ducts that connect to the building's interior. Adding attenuators would help reduce the fan noise that breaks out from the sides of the ducts. This is especially critical since the portions of the ducts closest to the ERVs are directly above the Great Hall, meaning that this breakout noise could be audible below if it is not attenuated. At this point, we recommend you plan for attenuators between 3' and 5' in length for both ERVs.

#### Noise Propagation to the Community

Both ERVs are connected via ductwork to a single exhaust air louver and a single outside air louver located on the east side of the building. In our recent work on the project, we provided noise control mitigation recommendations to help ensure that the outdoor VRF units would comply with the MassDEP noise pollution policy. The ERV noise at these louvers will be obligated to meet those same requirements, and they directly face the same neighbor.

In our Environmental Noise Report, we presented our results from three measurement locations. The current orientation of the louvers places them nearest to Location 2, where our ambient noise measurements indicate that the required maximum noise level from mechanical equipment is 32 dBA. If we use the neighbor's outdoor terrace as the basis of our design goals (as we did for the outdoor VRF report), then the noise from



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Acentech - 14 April 2021



the louvers should be no greater than 32 dBA as measured at the terrace. This corresponds to a sound power level of 63 dBA or less at each louver, assuming a distance of approximately 70 feet from the louvers to the terrace.

When the ERV sound data is available, we will perform calculations to determine what mitigation strategies are necessary to meet this goal. Depending on how loud they are, this could entail duct lining, duct attenuators on the exterior side of the ERVs, or specialized acoustical louvers.

#### Fan Coil Units

The project includes two types of fan coil units. The ducted FCUs in the attic serve the Great Hall, while the ductless wall-mounted FCUs serve smaller meeting rooms and auxiliary spaces.

#### Ducted FCUs:

The ducted FCUs serve the Great Hall, and they receive outside air from the ERVs. To reduce the fan noise that propagates along the ducts, we recommend adding 15' of lined ductwork downstream of each FCU. Alternatively, the duct lining could be replaced by 3' sound attenuators installed downstream.

In addition to the fan noise, we are also concerned with airflow noise, which increases with velocity. In the appendix, we have included a table of recommended airflow velocities that correspond with NC goals. In the current design, the airflow velocity at the stretches of duct just before the supply and return openings in the Great Hall is approximately 600 fpm. This is about 100-200 fpm faster than recommended for our NC-25 goal. As the design develops, we recommend enlarging the ducts so that the airflow velocities stay below the values indicated in the table:

#### Wall-Mounted FCUs:

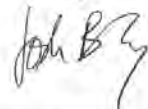
Ductless FCUs serve other spaces in the building. Among these, the only acoustically sensitive spaces are Meetings (010), Historical Commission (012), and Meetings (112), which are served by FCU-3, FCU-6, and FCU-5, respectively.

On the cut sheets provided for these units, sound data is reported in terms of sound pressure level at different operational speeds, though the measurement distance is not specified. Regardless, all of these units easily achieve our NC-30 goal for meeting rooms when running at lower fan speeds. With the larger units running on high, it is possible that they may slightly exceed NC-30. However, we expect that users of these spaces will be able to manually adjust the operation, and thus we do not anticipate noise from these units being a particular concern.

\* \* \* \*

We hope this report provides the information you need at this time. Please feel free to contact us via phone or email if you have any questions.

Sincerely,



Josh Brophy  
Consultant

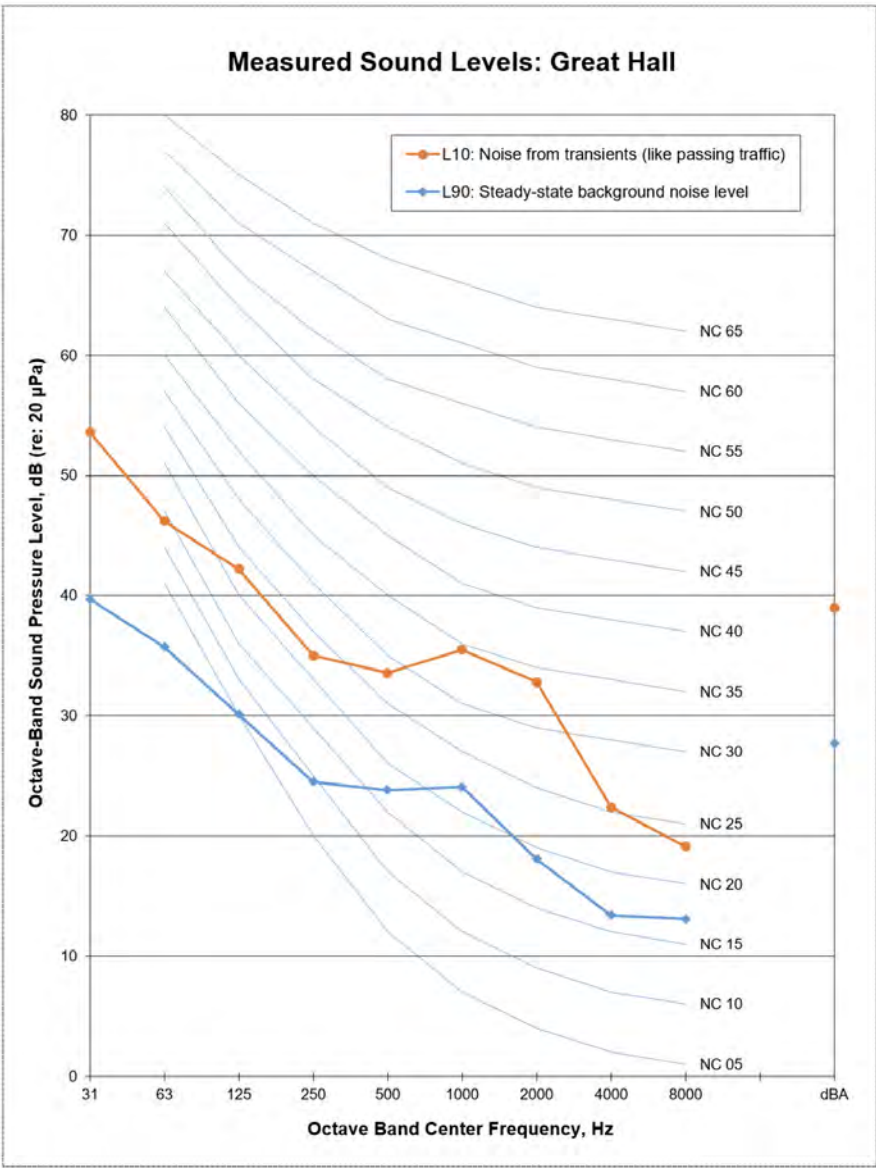
Cc: Ben Markham (Acentech)

Encl: Background Sound Measurement Graph  
Door Gasket Recommendations  
Recommended Duct Airflow Velocities

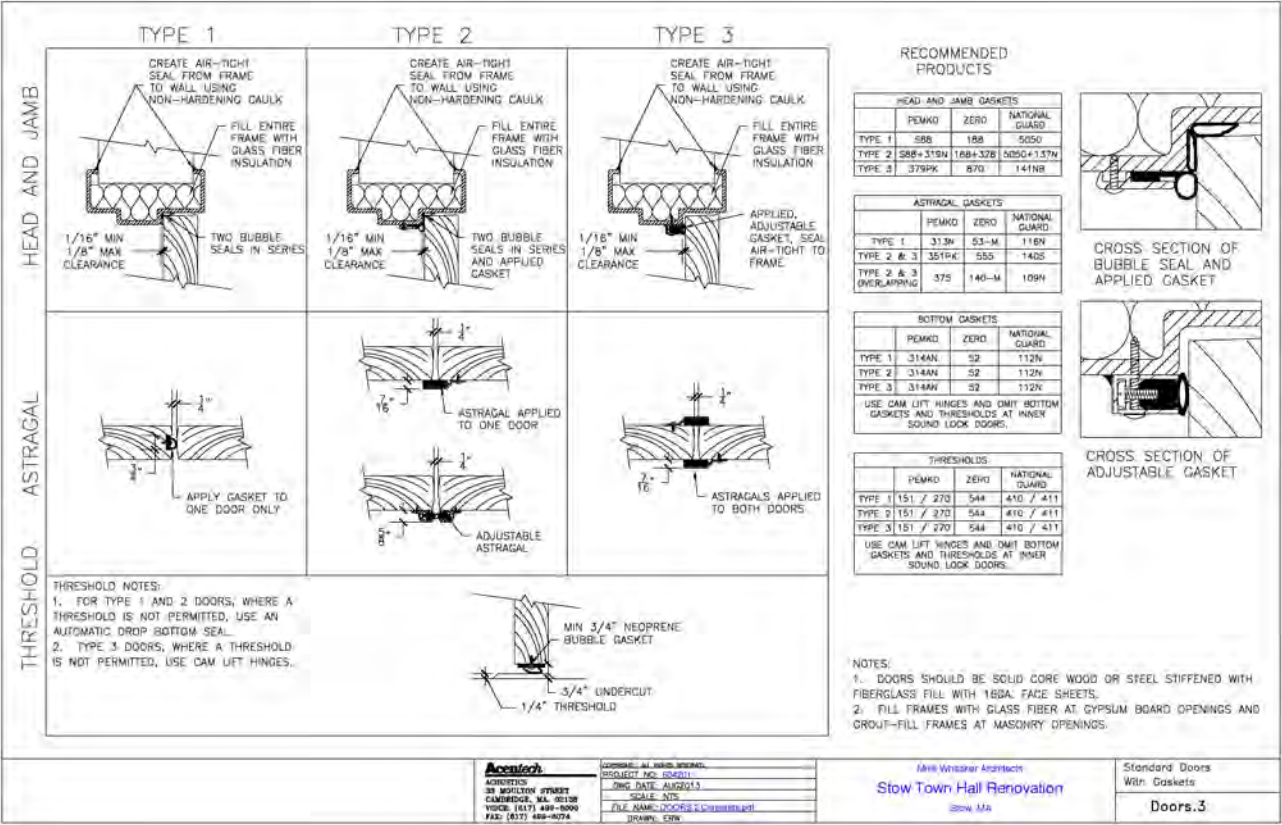


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**Recommended airflow velocities (fpm) consistent with indicated Noise Criterion (NC)  
(through net free area of duct section or device)**

		NC 15		NC 20		NC 25		NC 30		NC 35	
Duct element or device		Supply	Return	Supply	Return	Supply	Return	Supply	Return	Supply	Return
LINED DUCTWORK <sup>3</sup>	Terminal device <sup>1,2</sup>	250	300	300	360	350	420	425	510	500	600
	First 8-10 feet of duct	300	350	360	420	420	490	510	600	600	700
	Next 15-20 feet of duct	400	450	480	540	560	630	680	765	800	900
	Next 15-20 feet of duct	500	570	600	685	700	800	850	970	1000	1140
	Next 15-20 feet of duct	640	700	765	840	900	980	1080	1180	1280	1400
	Next 15-20 feet of duct	800	900	960	1080	1120	1260	1360	1540	1600	1800
	Maximum within space	1000	1100	1200	1320	1400	1540	1700	1870	2000	2200
UNLINED DUCTWORK	Terminal device <sup>1,2</sup>	Unlined ductwork not recommended for acoustically critical spaces		300	360	350	420	425	510	500	600
	First 8-10 feet of duct			325	375	375	450	450	550	550	650
	Next 15-20 feet of duct			400	450	480	540	560	630	680	765
	Next 15-20 feet of duct			500	570	600	685	700	800	850	970
	Next 15-20 feet of duct			640	700	765	840	900	980	1080	1180
	Next 15-20 feet of duct			800	900	960	1080	1120	1260	1360	1540
	Maximum within space			1000	1100	1200	1320	1400	1540	1700	1870

**Notes:**

1. ½" minimum slot width
2. No dampers, straighteners, deflectors, equalizing grids, etc. behind terminal devices.
3. All ducts with 1" thick internal sound absorptive lining.
4. Fan noise must be considered separately.





## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **AUDIOVISUAL PROGRAM ANALYSIS**

- F.01** Cover Letter for AV Programming
- F.02** Program Report - General
- F.03** Budget Estimate Summary / Great Hall Audiovisual System
- F.06** Meeting Rooms
- F.08** Architectural, Mechanical, and Electrical Considerations



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April 30, 2021

Don Mills  
Mills Whitaker Architects  
P.O. Box 750089  
Arlington, MA 02475

Via Email: donmills@millswhitaker.com

Subject: Audiovisual Systems Program Report, final  
Stow Town Hall Restoration  
Acentech Project Number: P633808

Dear Don:

Enclosed is our revised program document for the Stow Town Hall restoration project in Stow, MA. The enclosed document is the final deliverable for the Programming tasks as outlined in our proposal dated September 29, 2020. The document has been revised based on our follow-up meeting with you, Jonathan Daisy, and Doug Hyde on April 29, 2021.

This completes our programming tasks for the project. This document will serve as a basis of design for future design documentation (contract drawings and specifications).

Please contact me if you have any questions about the program. You can reach me at 617-499-8005 or at [bmasiello@acentech.com](mailto:bmasiello@acentech.com).

Sincerely,

A handwritten signature in black ink, appearing to read "Brian L. Masiello".

Brian L. Masiello, CTS  
Senior Consultant

Encl: Audiovisual System Program Report, final

acoustics | av/it/security | vibration

*Audiovisual Systems Program Report  
Acentech - 30 April 2021*



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## AUDIOVISUAL SYSTEM PROGRAM REPORT, FINAL

### Stow Town Hall Restoration

#### Submitted to:

Don Mills  
Mills Whitaker Architects

Acentech Project Number: P633808

Date: February 25, 2021

Revised: April 30, 2021

#### GENERAL

The purpose of this program report is to summarize the proposed audiovisual systems for the Stow Town Hall restoration project in Stow, MA. This document is expected to be reviewed by you and the stakeholders for conformity to project requirements and budget. Other related systems and budgets, such as network data distribution, furniture, millwork, and electrical and mechanical systems, may need to be reviewed in conjunction with this budget to provide a complete picture of the audiovisual system costs.

Acentech prepared the report and is an independent consulting firm specializing in architectural acoustics, the design of advanced audiovisual systems, the design of telecom infrastructure, and security system design. In order to provide unbiased consulting and design services, Acentech does not sell or install equipment and does not represent any dealer, distributor, or manufacturer.

The narrative below is based on our meeting with you, Doug Hyde (Assistant Building Commissioner), and Jonathan Daisy (Stow TV Director) on February 17, 2021, our review of the drawings, and our experience on prior similar projects. It has been revised based on our follow-up meeting with the same team on April 29, 2021.

acoustics | av/it/security | vibration

*Audiovisual Systems Program Report  
Acentech - 30 April 2021*

**BUDGET ESTIMATE SUMMARY**

The following summary outlines the estimated costs for the installed audiovisual systems described in this report. The estimate is based on the current level of design of the audiovisual systems at this time, and subject to change as designs are developed and refined. This budget provides a cost estimate for each system identified.

NO.	DESCRIPTION	ESTIMATED PRICE
1.	GREAT HALL – AUDIOVISUAL SYSTEM	\$201,200
2.	MEETING ROOM 010 – AUDIOVISUAL SYSTEM	\$9,600
3.	MEETING ROOM 112 – AUDIOVISUAL SYSTEM	\$9,500

**GREAT HALL – AUDIOVISUAL SYSTEM**

The Great Hall will be used for public hearings, town entertainment, panel discussions, lectures, group meetings, and unamplified and amplified musical performances. The room will include capacity of up to 192 people (134 in loose seats, 15 on stage, and 40 in the balcony).

The audiovisual system will comprise the following:

**1. Sound System****a. Microphones:**

- i. **Wired Microphones:** The system will include connections for up to twelve (12) wired microphones that are installed within three floor-boxes on the stage (four microphone inputs per floor-box). One (1) gooseneck microphone will be provided for connection to a lectern (lectern, by others). A stereo microphone will be hung in the room and used for simple audio recordings. Additionally, two ceiling-mounted microphones will be provided; one will be hung over the stage, and another will be hung over the audience area. The audio from these ceiling microphones will be sent to a receptacle panel in the back of the room for use by the local broadcaster. Finally, connections for wired microphones will be available along the side and rear walls of the seating area.
- ii. **Wireless Microphones:** The system will include a four (4) wireless microphones. It will include a 4-channel wireless microphone receiver (rack-mounted), four (4) lavalier ("clip-on") microphones and belt-pack transmitters, and four (4) handheld microphone transmitters. The four handheld microphone transmitters will interchangeable with four of the lavalier systems.

- b. **Audio Mixing:** The system will operate in an automatic mode. This will allow an end-user to connect a microphone to the system at one of multiple designated microphone receptacle locations (or use the wireless microphones). Master volume control will be accessible from the AV system control panels. A technician will not be required to operate the sound system. For events when more complex operation of the sound system is required, audio tie-lines will be provided between wall-mounted receptacle panels at the stage and a receptacle panel at the rear of the Great Hall (mix position). This will be used with portable Owner-furnished or rental audio equipment (mixing console, powered loudspeakers, etc.) and will allow the operator to connect the equipment without needing to run cables across the floor of the Great Hall.



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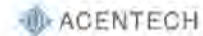
- c. Audio Recorder: An SD/USB recorder will be installed in the AV equipment rack and will be used for recording events from the stereo microphone. A USB connection will allow recordings to be transferred to a thumb-drive, or onto a computer on the local IT network. Controls for the audio recorder will be available from the AV system control panels.
- d. Audio Signal Processing: A digital audio signal processor will be used for automatic microphone mixing (as described above in paragraph 1.b.), and equalizing the loudspeakers. The signal processor will be expandable so that, if required, additional input and output capacity can be added to the system in the future.  
The system will include audio connectivity for use by the local broadcaster. This will include separate audio outputs for a mono mixed microphone audio feed, a stereo program audio feed, a feed from the ceiling-microphone above the stage, and a feed from the ceiling-microphone above the audience area. These audio outputs will be available on a wall-mounted receptacle panel at the broadcast operator position.
- e. Loudspeakers: Loudspeakers will be provided for speech reinforcement and program audio playback. These will consist of two self-powered digitally-steerable column loudspeakers that will be wall-mounted on the left and right sides of the stage. A subwoofer will be provided for low frequency enhancement. The loudspeaker system will provide uniform audio coverage through the audience area allowing the system to provide high levels of speech intelligibility and musical clarity.
- f. Amplifier: An amplifier will be used to power the subwoofer loudspeaker.
- g. Assistive Listening System: An FM-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by patrons with hearing impairments.

## 2. Display System

- a. Video Projector: The system will display computer and motion video using a three-chip 11,000 ANSI lumen high-definition video projector (4K resolution). The projector will be mounted near the front edge of the balcony.
- b. Projection Screen: In order to achieve a high level of legibility for all viewers, the recommended video projection screen image size for a room with this viewing distance (approximately 40' from furthest viewer to the projection screen) is 13'-4" wide x 7'-6" high. The projection screen will be motorized and will be ceiling-mounted close to the upstage wall. The screen will include tab-tensioning (a feature used to keep the image area flat) and black borders around the image area to better define the edges of the image.
- c. AV Sources: AV sources will include a Blu-ray player, a wireless AV presentation gateway (used for displaying content of network-connected sources, such as a laptop, smart phone, or tablet, to the AV system via the building's Wi-Fi network), a Bluetooth enabled audio input receptacle, and an Owner-furnished computer. HDMI inputs for portable AV devices, such as a laptop computer, will be available within two of the three floor-boxes (stage right, and stage center).
- d. Video Routing: Network-based AV transceivers will be used to route video and associated audio within the system. The system will support playback and distribution of digital video formats and the transport system will be compatible with newer generation 4K sources. One (1) portable transceiver will be provided to allow for connecting a portable AV source device (such as a laptop computer) to the AV system from a position away from the stage.  
The system will include video connectivity for use by the local broadcaster. This will include a program video output (HDMI) so that video content being displayed by the video projection system can be fed directly to the broadcaster's equipment. Additionally, cabling will be provided to support camera tie-lines (that supports HD-SDI camera signals) between wall-mounted receptacle panels in the Great Hall to the broadcast operator position.

## 3. System Control

The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interfaces will consist of one (1) wall-



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mounted 7" LCD touch screen control panel mounted at the stage wall (exact location, TBD), and one (1) wall-mounted 7" LCD touch screen control panel mounted at the rear of the Great Hall.

Although not included in the budget estimate below, as a future add-on to the AV system, the controls on the wall-mounted touch screen control panels could be made portable by installing a custom-programmed app onto a mobile tablet computer, such as an Apple iPad. The mobile tablet computer would connect to the building's IT network via WiFi, and communicate to the AV system through the building's wired IT network.

The control panels will be able to control all functions of the audiovisual system; including powering on/off the system, the projection screen (up/down/stop), source selection and media transport controls, and can interface with other operational functions including lighting (note that lighting presets will be in the scope of the lighting installer, and that coordination between the AV contractor and lighting system installer during installation will allow for some lighting system presets to be selectable via the AV control system).

This category also includes a Power-over-Ethernet (PoE) data switch that will be used by the AV control system for communication between AV devices, the video system for signal transport and distribution, and the audio system for Dante digital audio signal transport and distribution. AV data switches will connect to the building's data network for communication with the outside world, but the AV network will be independent and AV signals will not traverse outside of this network.

#### 4. Miscellaneous

Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, a UPS, custom connection panels, and all cable, connectors, and additional hardware and labeling required to install the system.

#### ***GREAT HALL- AUDIOVISUAL SYSTEM, BUDGET SUMMARY***

This budget provides a cost estimate for each of the sub-systems described above.

Item	Description	Cost
1.a.i.	Wired Microphones	\$2,200
1.a.ii.	Wireless Microphones	11,900
1.b.	Audio Mixing (included as part of Audio Signal Processing)	0
1.c.	Audio Recorder	700
1.d.	Audio Signal Processing	5,100
1.e.	Loudspeakers	27,900
1.f.	Amplifier	1,900
1.h.	Assistive Listening System	3,300
2.a.	Video Projector, Lens, & Accessories	29,000
2.b.	Projection Screen	8,100
2.c.	AV Sources (Blu-ray Player, Wireless Presentation Gateway, Bluetooth Audio)	3,600
2.d.	Video Routing and Distribution	19,100
3.	System Control, Touch Panels, & Accessories	10,700
<u>4.</u>	<u>Miscellaneous</u>	<u>20,200</u>
	<b>Equipment Total</b>	<b>\$143,700</b>
	Labor (35% Equip. Total)	50,300
	Contingency (5% Equip. Total)	7,200
	<b>Total</b>	<b>\$201,200</b>



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**MEETING ROOM 010**

Meeting Room 010 will include a wall-mounted video display panel that can be used for viewing local presentation content from portable AV sources. A wall-mounted button control panel will allow the user to operate the system by selecting sources, controlling volume, etc. Conduit (not included in the estimate below) will be included in the design and will allow the display to connect to the Great Hall's AV system for future overflow camera and program AV feeds.

The audiovisual system will comprise the following:

1. **Audiovisual Presentation System:**
  - a) **Video Display Panel:** The system will include one wall-mounted 65" video display panel with integrated loudspeakers. This size display will be appropriate for the room size and viewing distances.
  - b) **Video Routing:** A connection for a portable AV source, such as a laptop computer, will be provided as an HDMI input within a floor-box. Because of the cabling distance between the floor-box and the display, an active digital video transmitter and receiver pair will be provided to make a reliable connection. The digital video transmitter will be installed within the floor-box, and the digital video receiver will be mounted behind the video display panel.
  - c) **Portable Assistive Listening System:** An audio output will be provided on the wall-mounted receptacle panel and will be used to connect to a portable assistive listening system.
2. **System Control:** A wall-mounted button panel with an integrated control system will be used to control the functions of the audiovisual system.
3. **Miscellaneous:** Miscellaneous equipment includes all cables, connectors, and additional hardware and labeling that are required to install the system.

**MEETING ROOM 010, BUDGET SUMMARY**

The following budget provides a cost estimate for the system described above.

Item	Description	Cost
1. a.	Video Display Panel (65")	\$1,700
1. b.	Video Routing & Distribution	1,900
1. c.	Portable Assistive Listening System	1,200
2.	System Control	1,100
3.	Miscellaneous	1,000
	<b>Equipment Total</b>	<b>\$6,900</b>
	Labor (35% Equip. Total)	2,400
	Contingency (5% Equip. Total)	300
	<b>Total</b>	<b>\$9,600</b>

**MEETING ROOM 112**

Meeting Room 112 will include a wall-mounted video display panel that can be used for viewing local presentation content from portable AV sources. A wall-mounted button control panel will allow the user to operate the system by selecting sources, controlling volume, etc. Conduit (not included in the estimate below) will be included in the design and will allow the display to connect to the Great Hall's AV system for future overflow camera and program AV feeds.

The audiovisual system will comprise the following:

1. **Audiovisual Presentation System:**



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- a) Video Display Panel: The system will include one wall-mounted 55" video display panel with integrated loudspeakers. This size display will be appropriate for the room size and viewing distances.
  - b) Video Routing: A connection for a portable AV source, such as a laptop computer, will be provided as an HDMI input within a floor-box. Because of the cabling distance between the floor-box and the display, an active digital video transmitter and receiver pair will be provided to make a reliable connection. The digital video transmitter will be installed within the floor-box, and the digital video receiver will be mounted behind the video display panel.
  - c) Portable Assistive Listening System: An audio output will be provided on the wall-mounted receptacle panel and will be used to connect to a portable assistive listening system.
2. **System Control**: A wall-mounted button panel with an integrated control system will be used to control the functions of the audiovisual system.
  3. **Miscellaneous**: Miscellaneous equipment includes all cables, connectors, and additional hardware and labeling that are required to install the system.

#### MEETING ROOM 112, BUDGET SUMMARY

The following budget provides a cost estimate for the system described above.

Item	Description	Cost
1 a.	Video Display Panel (55")	\$1,600
1 b.	Video Routing & Distribution	1,900
1 c.	Portable Assistive Listening System	1,200
2.	System Control	1,100
3.	<u>Miscellaneous</u>	<u>1,000</u>
	<b>Equipment Total</b>	<b>\$6,800</b>
	Labor (35% Equip. Total)	2,400
	Contingency (5% Equip. Total)	<u>300</u>
	<b>Total</b>	<b>\$9,500</b>

#### INFRASTRUCTURE AND SUPPORT FOR FUTURE AV SYSTEM SUPPORT

Should budgetary restrictions or other reasons prevent all of the audiovisual systems described above from being implemented on day-one as part of the project, audiovisual infrastructure (cabling pathways including electrical boxes and conduit, AC power, data, etc.) can be included as part of the base project's contract drawings and will be included as scope for the electrical contractor. This will allow for the AV systems (or portions of the AV systems) to be provided as part of a future upgrade.

Further, if some features of the described audiovisual systems are deemed to be "optional", these items can be broken out in the contract documents (drawings and specifications) and defined as add-alternates. Add-alternates will require the bidding AV contractors to provide broken-out pricing for the base AV systems and each of the add-alternate sub-systems.

#### BUDGET NOTES

1. The budgets assume that the labor cost is 35% of the equipment cost (unless otherwise noted). A 5% contingency is also added to the cost.
2. The installed costs of the audiovisual systems are approximate. It assumes the use of new equipment professionally installed by a qualified audiovisual systems contractor, which are provided with as-built documentation and a one-year warranty covering parts and labor.
3. The estimate does not include costs for requirements such as electrical power, conduit, casework or



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any special architectural requirements. Technical administration and staffing, as well as vendor-supplied system service and maintenance beyond the initial one-year parts and installation warranty are not included in this estimate.

4. This budget incorporates the costs associated with travel, installation, documentation, training and on-site maintenance for one year. Installation cost is the greatest variable and is heavily dependent on factors such as site conditions, divisions of work between the audiovisual system contractor and other contractors, local market conditions and requirements for union labor.

## ARCHITECTURAL, MECHANICAL, AND ELECTRICAL CONSIDERATIONS

1. Architectural: The following items should be considered for proper coordination between audiovisual system components and other trades:
  - a. Loudspeaker coverage must not be obstructed.
  - b. Structure will be necessary to ensure that loudspeakers and the projection screen can be ceiling-mounted at recommended locations.
  - c. Blocking will be necessary for wall-mounted AV equipment such as loudspeakers and video display panels.
  - d. Antennas for the assistive listening system and wireless microphones will be mounted on the wall.
  - e. Wall-mounted connection panel locations will require coordination.
  - f. AV Equipment Racks:
    - i. A floor-standing AV equipment rack shall be fixed in position and will require front access for operational needs and will also require rear access for service. Clearances must be maintained around the AV equipment rack to comply with the requirements of the Americans with Disabilities Act, as well as for cooling/airflow requirements.
    - ii. It is estimated that one (1) floor-standing AV equipment rack will be required to support the audiovisual equipment in the Great Hall. It will be approximately 22" wide x 27" deep x 84" high.
    - iii. AV equipment rack rooms may require oversized doors.
  - g. Video Projectors:
    - i. Video projectors must be free from vibration.
    - ii. In order to optimize the viewing experience and achieve the minimum recommended video display contrast ratio, ambient lighting within the Theater should be no more than 4 foot-candles.
    - iii. Overhead lighting should be zoned so that lighting areas directly above the projection screen surfaces can be switched off during presentations.
    - iv. The video projector specification indicates that the projector's fan produces approximately 45 dBA of noise. In order to maintain a low level of background noise within the space, an acoustically-isolating enclosure or niche may be desirable to reduce the projector's impact on this. This can be achieved by using either an architecturally-designed niche/enclosure, or a stand-alone acoustically-isolating enclosure product (note that a stand-alone enclosure has not been included in the cost estimate above). In either case, sufficient cooling and air space must be provided around the projector within the enclosure. Coordination will be required with the mechanical engineer, electrical engineer, acoustical consultant, and the AV consultant.
  - h. If applicable, to avoid inducing electrical noise and interference into the audiovisual system, non-LED based theatrical lighting dimmer racks should be located in a separate room and located at least 15'-0" away from the audiovisual equipment racks. LED based dimmer racks can be located in close adjacency to AV equipment racks.



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- i. Storage area will be required for portable equipment, such as wireless microphones, cables, assistive listening receivers, and portable AV transceivers. Area should be provided for re-charging the assistive listening receivers.
- j. We recommend that the broadcast control position be located in either the rear of the balcony, or be provided in a separate room. If a separate room is used, additional loudspeakers and amplification equipment will be needed for audio monitoring purposes.
- 2. Mechanical/Electrical: The following items should be considered for proper coordination between the audiovisual system components and other trades:
  - a. The AC power system will be designed and specified by the electrical engineer and will include a dedicated power panel, transient voltage surge suppression, and AC outlets.
  - b. Electrical outlets will be required at the equipment racks, broadcast operator position, each stage floor-box, and at each wall-mounted receptacle panel. The video projector will require a dedicated 208 VAC circuit. The two wall-mounted powered loudspeakers will each require a dedicated 20 amp 120 VAC circuit.
  - c. IT data drops are strongly recommended at the equipment racks and all AV receptacle panels.
  - d. If lighting control is desired from the audiovisual system control touch panel, the lighting system will require an interface for communication with the control system.
  - e. It is estimated that the AV equipment rack used to support the Great Hall will require three (3) dedicated 20 amp VAC circuits.
  - f. Heat Loads:
    - i. The heat load for the AV equipment rack is estimated to produce approximately 5,500 BTU.
    - ii. It is estimated that the video projector will produce approximately 5,700 BTU.

\*\*\* End of Program \*\*\*



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## **STOW TOWN HALL RENOVATION**

375 Great Road / Stow MA

### **ARCHITECTURAL LIGHTING PROGRAM**

- G.01** Lighting Design Concept Presentation / Drawing L-01
- G.02** Great Hall Existing Photos / Drawing L-02
- G.03** Great Hall Architectural Lighting / Drawing L-03
- G.04** Great Hall Theatrical Lighting / Drawing L-04
- G.05** Balcony Plan / Drawing L-05
- G.06** Ground Floor Lighting / Drawing L-06
- G.07** Level 1 Entry / Meeting Room / Drawing L-07
- G.08** Exterior Lighting / Drawing L-08
- G.09** Exterior Lighting (Continued) / Drawing L-09
- G.10** Lighting Controls / Drawing L-10

## Lighting Design Concept Presentation



### Lighting, Style, Technology, and Functionality

In this presentation, the architectural team will discuss the current state of the lighting systems within the Stow Town Hall and propose new lighting concepts that highlight an updated stylistic approach while incorporating new LED technology into the building. LED technology offers many advantages over legacy lighting sources, most of which are becoming obsolete,

- Reduced energy consumption- typically on the order 60-80%.
- Long-life- typically between 35,000 and 50,000 hours.
- Flexibility- tunable "white" options from 2200-5000° Kelvin and multiple dimming schemes

In addition to proposing lighting fixture and technology options, dimming and control schemes will also be discussed to maximize the usage potential of the Stow Town Hall.

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**STOW TOWN HALL RESTORATION**  
MILLS WHITAKER ARCHITECTS

Date 18 March 2021  
Drawing # L-01

Lighting Design Concept Presentation  
Available Light - 18 March 2021



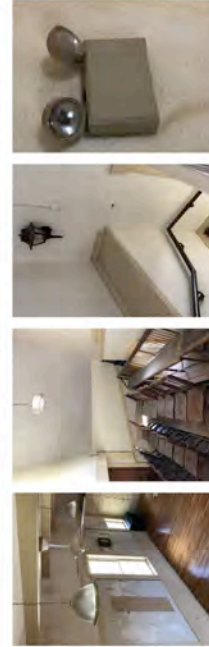
## Great Hall Existing Photos



### Existing Conditions- Great Hall:

In studying site photographs and meeting with the architectural team, we note the general illumination for the Great Hall comes from a series of pendant-mounted fixtures. At the stage front, there appears to be a small array of adjustable track sockets used for lighting of its particular area. Aside from the main pendant system, there are dedicated lighting fixtures in the balcony that are of a different style than the main pendant system. Lastly, there is a wall sconce at the top of the balcony stairs that appears to be a fixture intended exterior use but re-purposed for the interior. The emergency lighting system consist of battery back-up packs powering "bug eye" lamps. Though not particularly aesthetically pleasing, this is a typical scheme when retrofitting a building for emergency lighting.

The goal moving forward is to provide a lighting system in the Great Hall that is commensurate with the stature of Stow Town Hall while also enabling it to utilize it's full operational potential.



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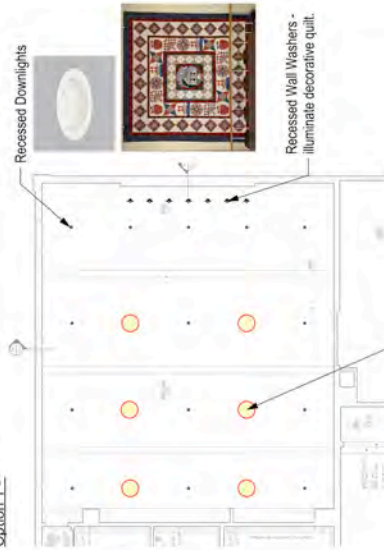
**STOW TOWN HALL RESTORATION**  
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Drawing #  
**L-02**  
Date  
18 March 2021

Lighting Design Concept Presentation  
Available Light - 18 March 2021

## Great Hall Architectural Lighting

### Option 1 -



Recessed Downlights

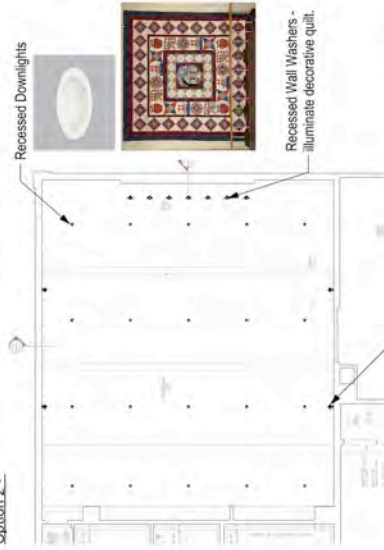
Recessed Wall Washers - illuminate decorative quilt.

Decorative Pendant

The proposed lighting design option #1 for the Great Hall consist of multiple layers of lighting elements, all purpose driven to serve a specific task.

- Decorative pendants
- Recessed downlight fixtures
- Recessed wall-wash fixtures

### Option 2 -



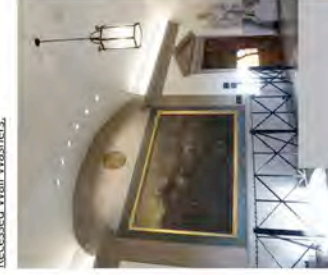
Recessed Downlights

Recessed Wall Washers - illuminate decorative quilt.

Decorative Sconce


As with Option #1, Option #2 has similar layers but substituting decorative wall sconces in place of pendants. All of the proposed fixture layers are interchangeable between both options.

- Decorative wall sconces
- Recessed downlight fixtures
- Recessed wall-wash fixtures




Recessed Wall Washers:


Recessed wall-wash fixture



Recessed Downlights



Decorative Sconce



Decorative Pendant

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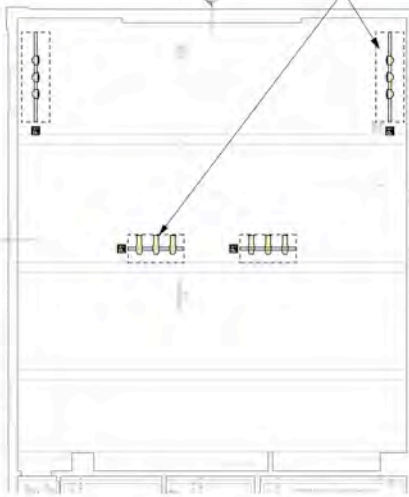
**STOW TOWN HALL RESTORATION**  
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Date: 18 March 2021  
 Drawing #: L-03

Lighting Design Concept Presentation  
Available Light - 18 March 2021

### Great Hall Theatrical Lighting

**Option 1 - Pipe and Pocket**




Lighting position recessed into pocket in ceiling.

2'-6"

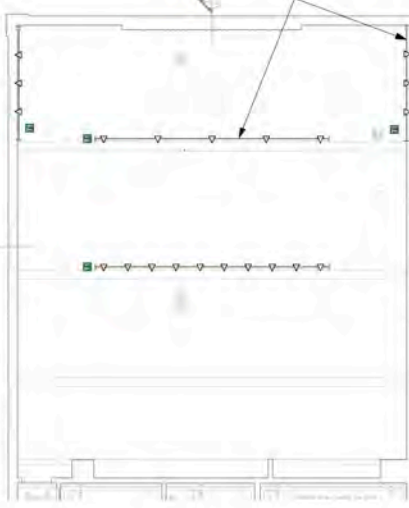
1'-6"

Section image of lighting pipe located in a ceiling pocket.

In an effort to maximize the potential uses and flexibility of the Great Hall, we are advocating for, in Option #1, a theatrical-based lighting system be integrated into the ceiling plane. Utilizing a recessed cavity in the ceiling structure helps to keep sightlines, particularly from the balcony, clear of lighting hardware. A pipe hosting DMX-controlled programmable framing projectors will allow for a wide variety of programs including drama, video broadcast, meetings (town or otherwise) and/or corporate events to name but a few. An investment of this order is designed to not just enhance the potential of the Great Hall at the building level, but also to make a statement of regarding what Stow Town Hall has to offer the community.




**Option 2 - Track**



Lighting track surface-mounted to beams

Keeping the goals in mind from the Option #1, Option #2 offers a trimmed-down, less intrusive approach to illuminating the presentation area. Surface-mounted single-circuit lighting tracks attached to the forward-facing vertical face of the exposed architectural beams will host DMX-programmable accent, wash and framing-projector fixtures. The depth of the beams will provide a sense visual obstruction of the lighting hardware from the balcony view. The fixture selections in Option #2 have a smaller footprint based on a reduced feature set, which is good for a reduced visual presence, however they will service most of the event types discussed in Option #1.



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**STOW TOWN HALL RESTORATION**  
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Drawing #  
L-04

Date  
18 March 2021

Lighting Design Concept Presentation  
Available Light - 18 March 2021



### Balcony Plan

### Balcony

As discussed earlier, there are two layers of lighting that occupy the balcony, A) two decorative pendants and B) a single exterior looking wall sconce providing illumination at the staircase.

Our proposed option in this area would be to incorporate recessed tunable-white downlight fixtures into the existing ceiling plane to provide the general ambient layer of lighting for the balcony. Matching the recessed tunable-white downlights in the Great Hall ceiling plane allows the color-temperature to optimally match to the event that visitors are attending, for example a cooler color (3500°K) for a lecture or meeting and a warmer color (2200°K) for a hospitality or performance event.

In keeping with the original design, two new decorative pendants will be installed in place of the existing fixtures. These might be part of the family of pendants in the Great Hall but on a smaller scale or a style that complements their pendant counterparts.

The staircase requires a lighting fixture(s) that can direct illumination the full length of the stair structure to ensure light levels meet code for vertical circulation. This is an instance where style meets safety!

Regarding safety and codes, building-wise, the emergency lighting system will use the newly proposed lighting fixtures to deliver the light levels required by code to ensure occupants can safely exit the building. This approach is standard to today's building practices and removes the need for unsightly "bug eye" emergency battery packs. This task falls to the MEP team to calculate and circuit the fixtures needed to satisfy the code.

### Wall Sconce Options

### Decorative Pendant Options

### Existing Fixtures

### Recessed Downlight Fixture

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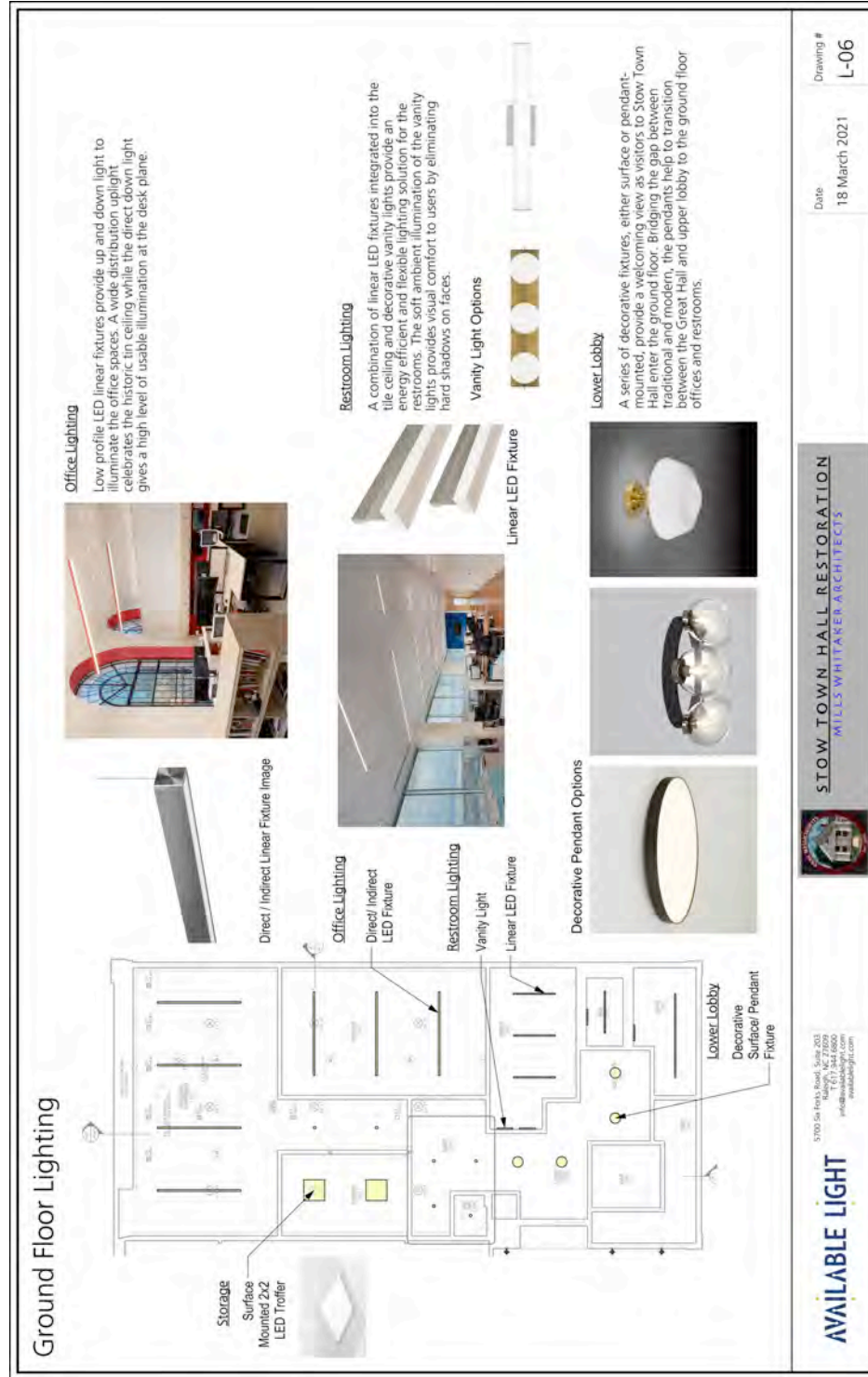
MILLS WHITAKER ARCHITECTS

Date: 18 March 2021

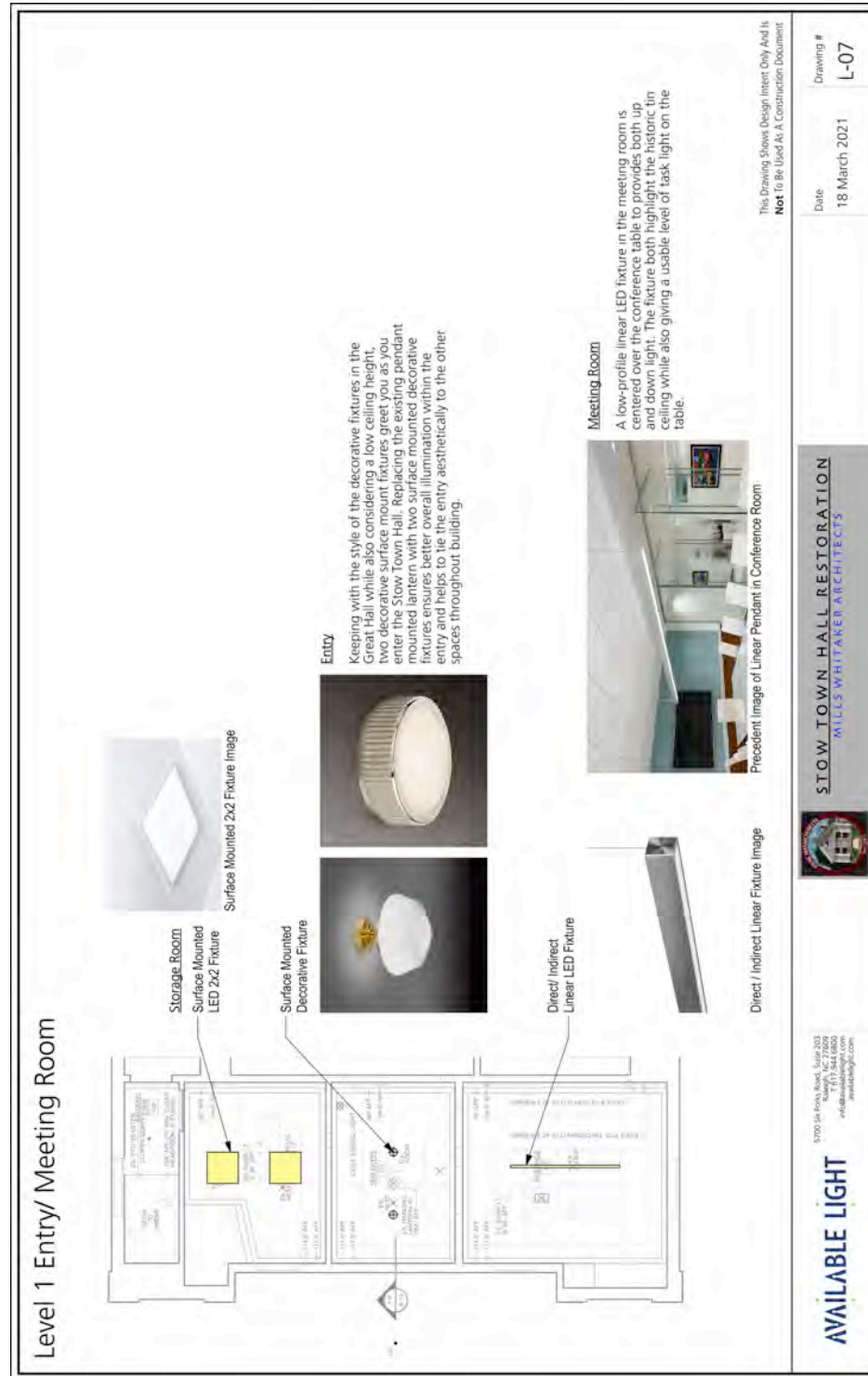
Drawing #: L-05

Lighting Design Concept Presentation  
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### Exterior Lighting

### Increasing The Presence

Typically in architectural applications, exterior lighting plays two roles; A) circulation illumination for safety and to meet code, and B) decorative elements that complement the building design. Currently there is one primary layer of exterior lighting at Stow Town Hall and it consists of three fixtures, two of which are sconces located at the building's front corners and one pendant located over the main entrance door. All three are of the same aesthetic and commensurate with the style of the building. We propose to keep the three current lighting elements with the only change being to lower the main entrance pendant to balance out the scale of the presentation as noted on the render.

We are proposing four additional layers of lighting to both brighten and accentuate the front facade of the building. Small form-factor surface-mounted LED strips, in outdoor-rated extrusions, are located just below the Stow Town Hall sign and cast a graze of light vertically across the field of letters. A second layer of surface-mounted LED strip will be located on the ledge above the signage letters to cast a sheet of grazing illumination across the slatted vertical wall. This approach exposes the rhythm of the horizontal construction as well as lighting the underside of the overhangs, which in turn helps to define the overall architecture.

### Plaque and Column Lighting

The third layer is a small arm-mounted LED accent fixture located just above the date plaque to allow visitors at night to see the historical information. Lastly, the same fixture is affixed just above each of the iconic columns providing accent lighting to the columns faces while simultaneously creating pools of illumination at the column bases and the entrance stairs, making for safer visitor ingress/egress.

**AVAILABLE LIGHT**

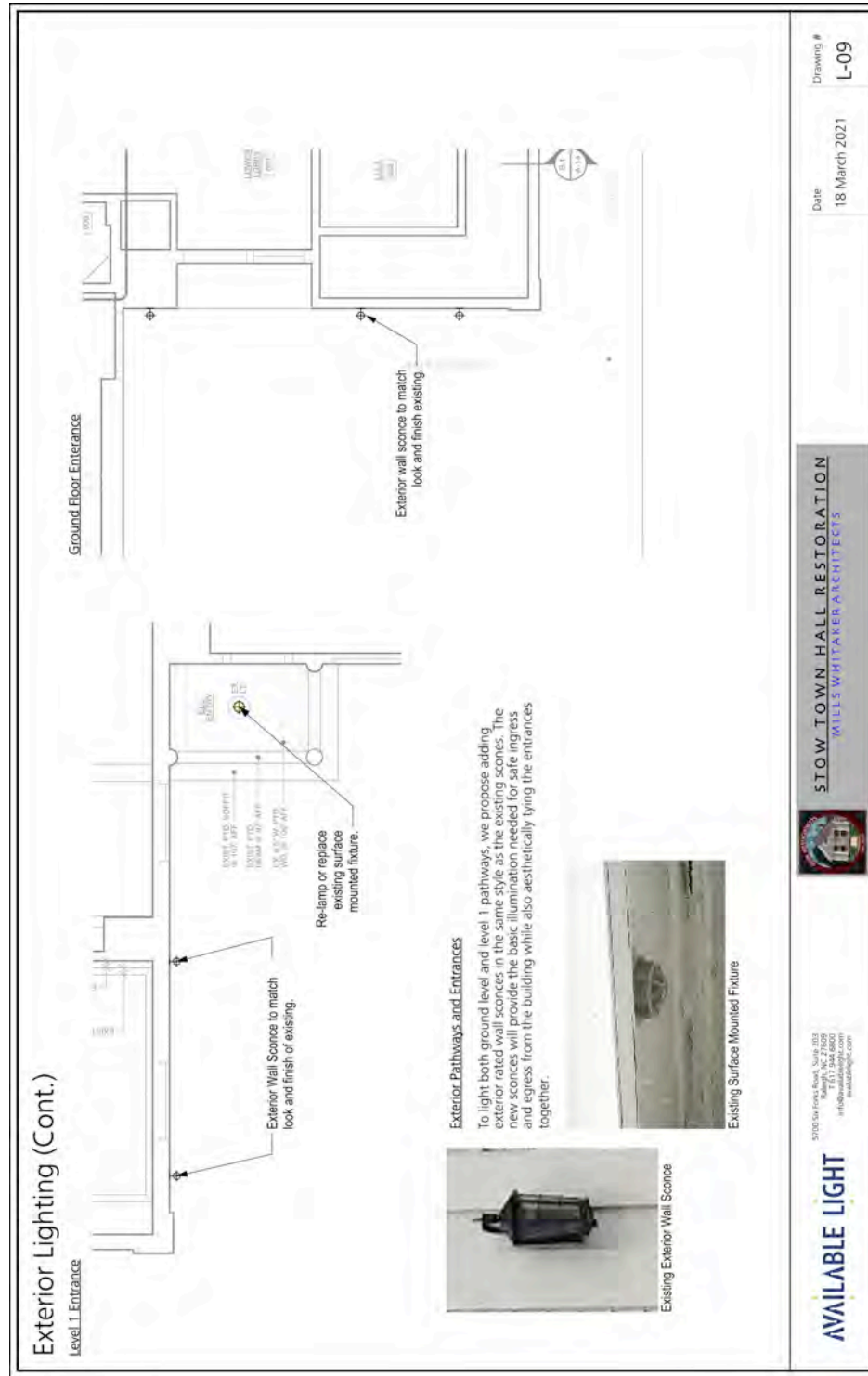
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**STOW TOWN HALL RESTORATION**  
 MILLS WHITAKER ARCHITECTS

Date: 18 March 2021

Drawing #: L-08

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## Lighting Controls

**Schematic Control Riser**

**Lighting console**  
dynamic control of stage light fixtures

**Run DMX to all Great Hall downlights and wall washers (typ)**

**DMX Lighting Control Console**

**Programmable Touchscreen and Button Station**

### Maximizing Potential Through Controls

Implementing a versatile, yet easy to use, control system is the key to unlocking the Great Hall's potential as a flexible and accommodating space. The control system would utilize DMX lighting protocol to speak to the dedicated stage lights, from either Options #1 or #2 from earlier in this report, as well as the recessed downlights, wall-washers, sconces and/or pendants. Capturing every lighting element in the Great Hall under one control interface will allow users the ability to organize the lighting to suit their event's needs, from a single, or multiple, access points.

A programmable preset wall station will reside on the first floor, likely in a location not easily accessible by the public. The unit will be the primary user interface for the control system, allowing for programming, live editing, and recall of lighting presets. Other system interfaces may be integrated into the system, for instance a simple button station located adjacent to the main entrance or stage area of the Great Hall. These devices will allow for quicker access to presets to accommodate changing conditions during an event.

For live performance, spoken word, or complex events, a programmable DMX lighting console would be located at the balcony level, allowing event personnel to operate the lighting system in traditional theater approach.

To reiterate the point noted earlier, an investment of this order is designed to not just enhance the potential of the Great Hall at the building level, but also to make a statement of regarding what Stow Town Hall has to offer the community.

### Architectural Controls

Lighting controls for the remainder of the facility will follow local codes regarding automated controls for energy management in commercial properties, such as occupancy sensors where required. Meeting rooms may employ programmable preset units to accommodate conference room type requirements.

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