

# Cambridge Historical Commission Review

February 2, 2023

## City Hall Façade Restoration Project

Anticipated Construction  
June 2023 through August 2024

Project Team

Arup

City of Cambridge DPW

Finegold Alexander Architects

Simpson Gumpertz & Heger

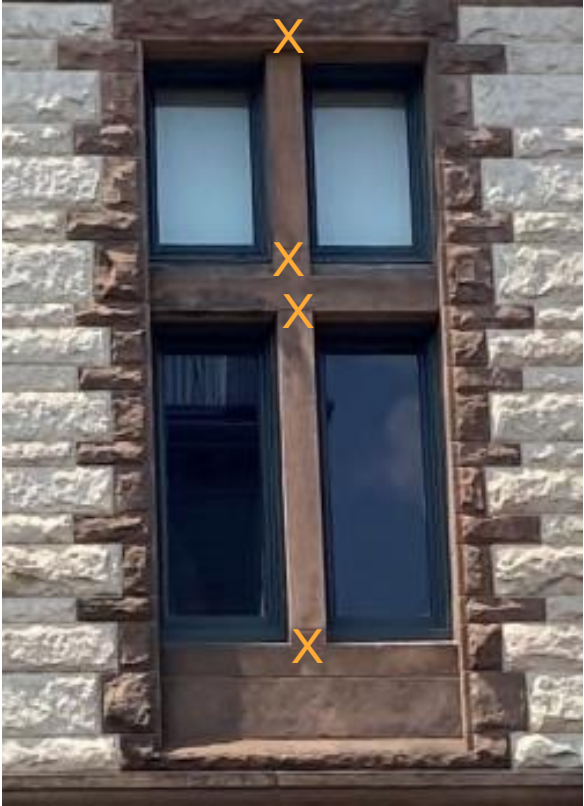
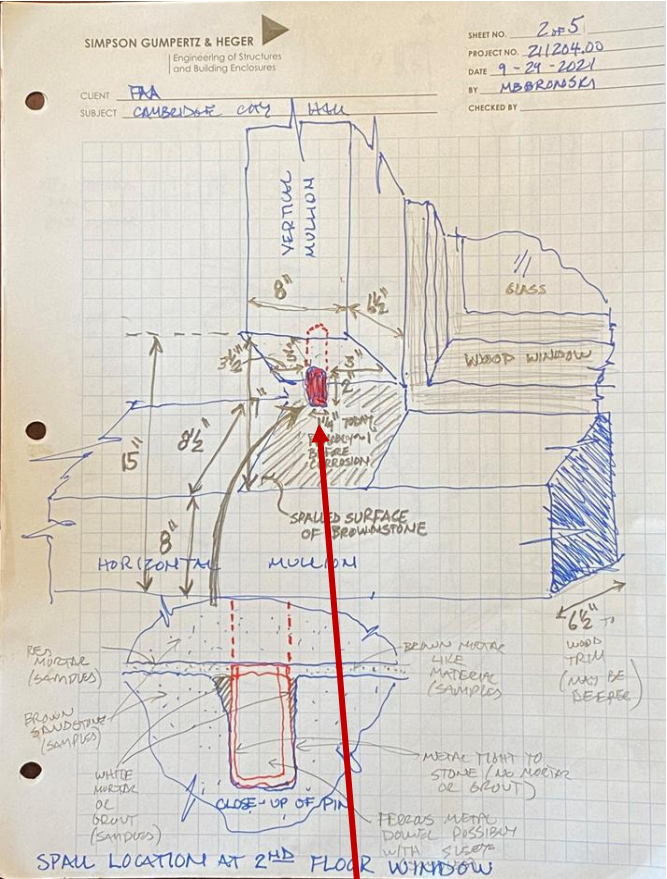


# Scope of Work

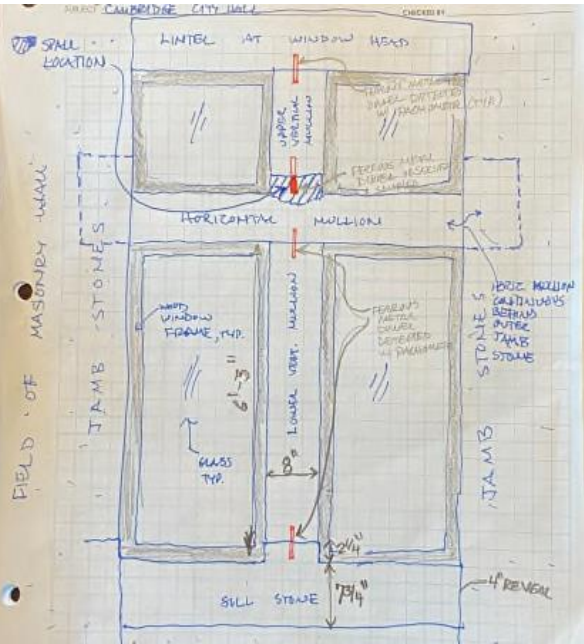
1. Masonry Repairs
2. Masonry Cleaning
3. Window Painting and Repairs
4. Gilding
5. Balcony Signage Relocation
6. Flagpole Replacement
7. Balcony Drainage/Roofing
8. Bird Deterrent Replacement
9. Lightning Protection
10. Tower Lighting Replacement

# Masonry Repair Scope Overview

# Critical Repairs – Masonry



The design team assessed the cause of the spall (detached chunk of stone) that fell from the second-floor window at the north end of the Inman Street in July 2021. The cause of the spall is corrosion-related expansion of the embedded ferrous metal (iron or steel) dowel that connects the sill stone to the vertical stone mullion. The ferrous dowel appear to be original to the 1889 construction.



The team concluded that the source of the moisture that caused the corrosion of the ferrous metal dowel was external rain saturating the mortar bed joint between the two stones.

# Critical Repairs – Masonry

The ferrous metal dowels are present only in specific stones, typically to connect slender, freestanding, or spanning stones:

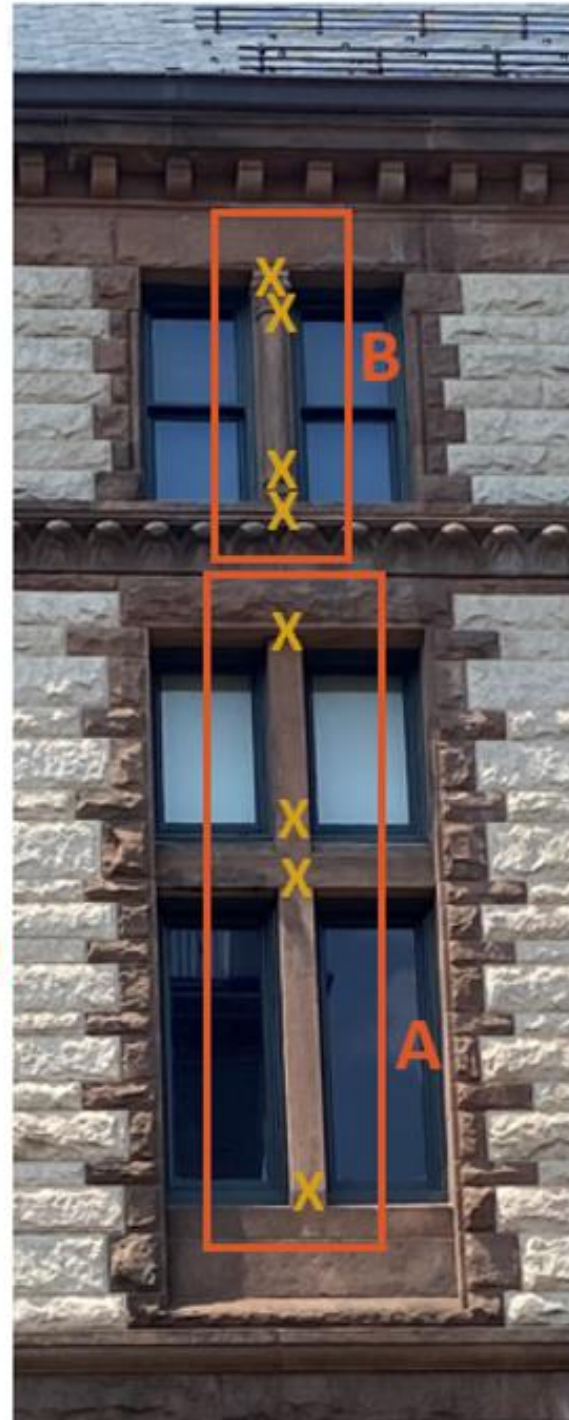
A. At cruciform mullions, four dowels (yellow X) each location (red box), confirmed via testing.

B. At column-like vertical mullions, four dowels (yellow X) each location (red box), confirmed via testing.

C. Likely at the stone finials atop dormers, likely one dowel (yellow X) at each finial.

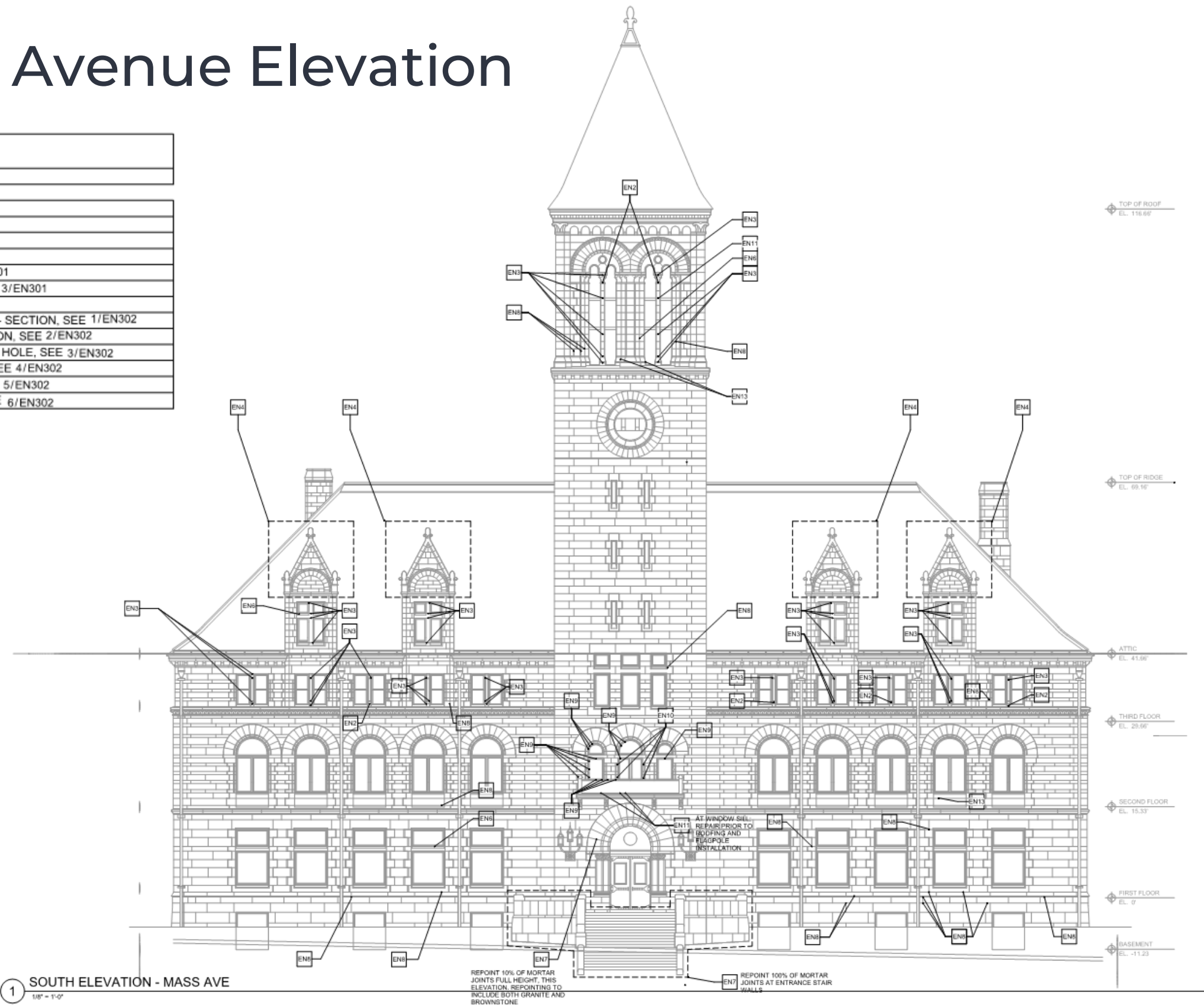
D. At column-like vertical mullions in the tower (from survey inside tower).

**The team developed the façade restoration project to replace the dowels, to repair visible spalls and cracks, to redress stone and to repoint in locations as outlined on the elevations next up.**



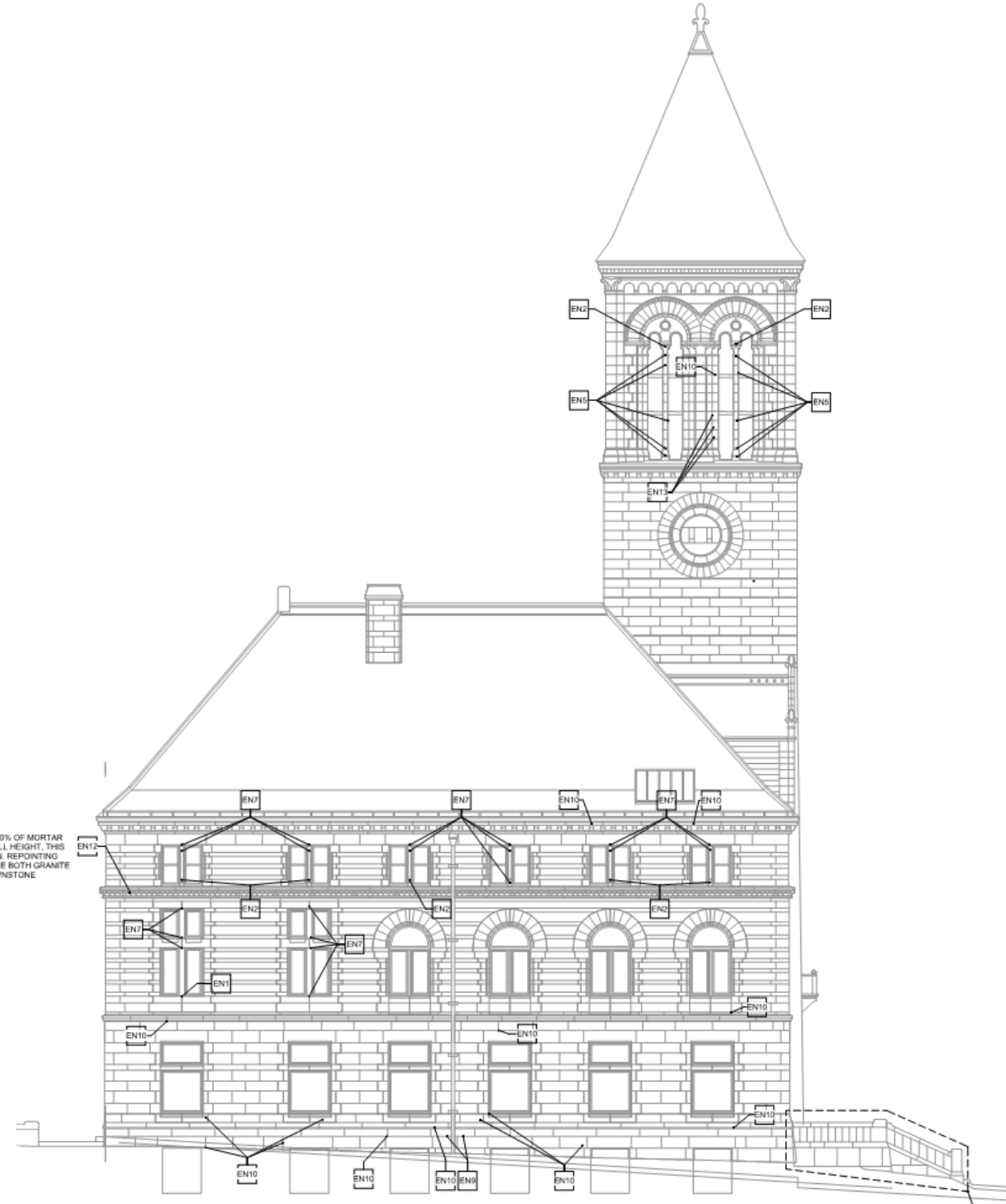
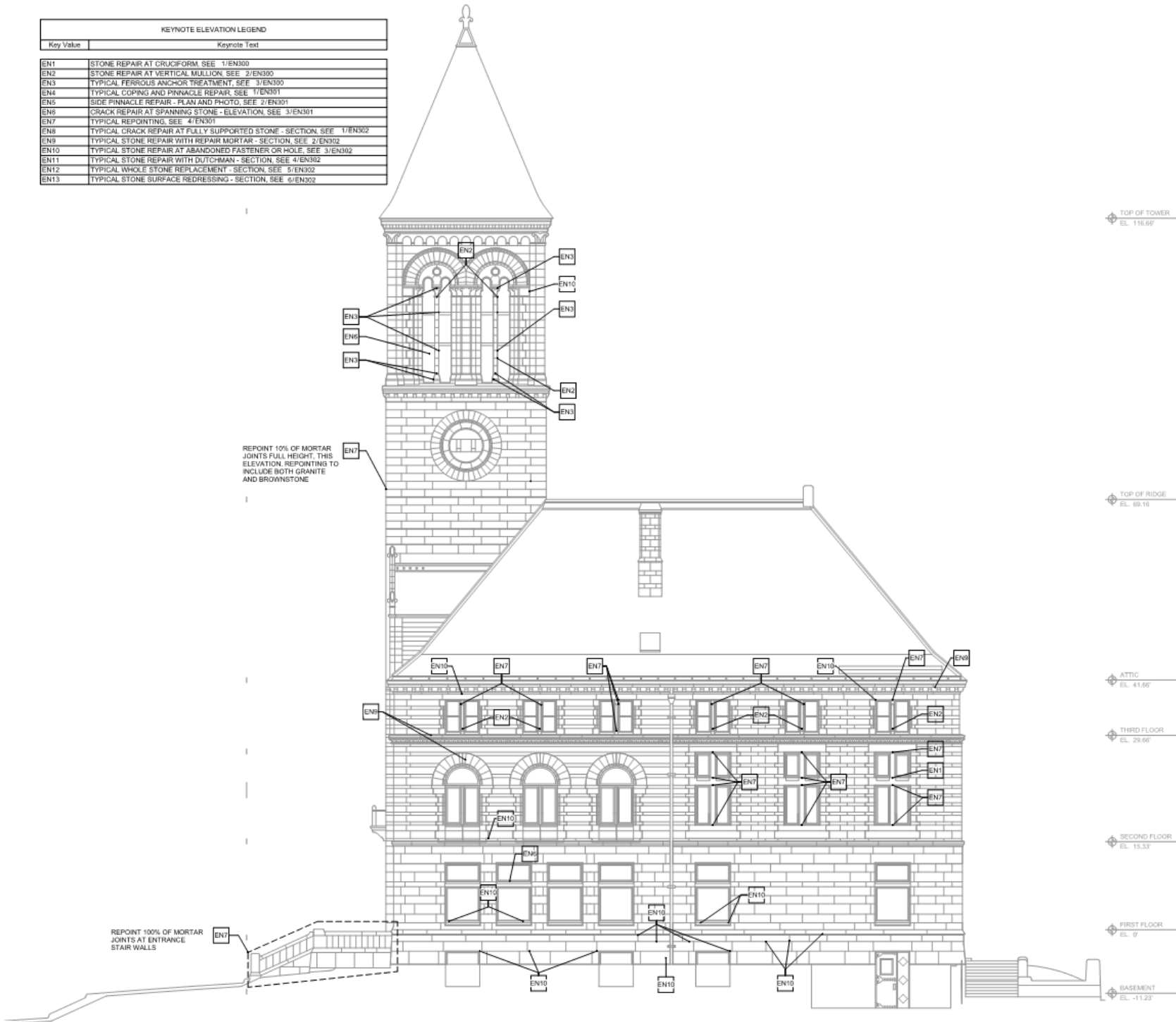
# Massachusetts Avenue Elevation

KEYNOTE ELEVATION LEGEND	
Key Value	Keynote Text
EN1	STONE REPAIR AT CRUCIFORM, SEE 1/EN300
EN2	STONE REPAIR AT VERTICAL MULLION, SEE 2/EN300
EN3	TYPICAL FERROUS ANCHOR TREATMENT, SEE 3/EN300
EN4	TYPICAL COPING AND PINNACLE REPAIR, SEE 1/EN301
EN5	SIDE PINNACLE REPAIR - PLAN AND PHOTO, SEE 2/EN301
EN6	CRACK REPAIR AT SPANNING STONE - ELEVATION, SEE 3/EN301
EN7	TYPICAL REPOINTING, SEE 4/EN301
EN8	TYPICAL CRACK REPAIR AT FULLY SUPPORTED STONE - SECTION, SEE 1/EN302
EN9	TYPICAL STONE REPAIR WITH REPAIR MORTAR - SECTION, SEE 2/EN302
EN10	TYPICAL STONE REPAIR AT ABANDONED FASTENER OR HOLE, SEE 3/EN302
EN11	TYPICAL STONE REPAIR WITH DUTCHMAN - SECTION, SEE 4/EN302
EN12	TYPICAL WHOLE STONE REPLACEMENT - SECTION, SEE 5/EN302
EN13	TYPICAL STONE SURFACE REDRESSING - SECTION, SEE 6/EN302



# Inman and Bigelow Street Elevations

KEYNOTE ELEVATION LEGEND	
Key Value	Keynote Text
EN1	STONE REPAIR AT CRUCIFORM. SEE 1/EN300
EN2	STONE REPAIR AT VERTICAL MULLION. SEE 2/EN302
EN3	TYPICAL FERROUS ANCHOR TREATMENT. SEE 3/EN300
EN4	TYPICAL COPING AND PINNACLE REPAIR. SEE 1/EN301
EN5	SIDE PINNACLE REPAIR - PLAN AND PHOTO. SEE 2/EN301
EN6	CRACK REPAIR AT SPANNING STONE - ELEVATION. SEE 3/EN301
EN7	TYPICAL REPOINTING. SEE 4/EN301
EN8	TYPICAL CRACK REPAIR AT FULLY SUPPORTED STONE - SECTION. SEE 1/EN302
EN9	TYPICAL STONE REPAIR WITH REPAIR MORTAR - SECTION. SEE 2/EN302
EN10	TYPICAL STONE REPAIR AT ABANDONED FASTENER OR HOLE. SEE 3/EN302
EN11	TYPICAL STONE REPAIR WITH DUTCHMAN - SECTION. SEE 4/EN302
EN12	TYPICAL WHOLE STONE REPLACEMENT - SECTION. SEE 5/EN302
EN13	TYPICAL STONE SURFACE REDRESSING - SECTION. SEE 6/EN302



# Rear Elevation

## GENERAL NOTES

1. Repair locations are approximate and quantities are estimated from limited survey and may not include all required repairs. Contractor to provide base bid from quantities shown in these drawings and unit price cost as outlined in the Project Specifications. Selected contractor to perform a repair quantity survey in advance of the work and provide quantities and shop drawings as submittal for Engineer's review.
2. Clean stone prior to submitting samples for color matching and performing mockups.
3. For window repairs, painting, glazing, and bird protection refer to Architectural Drawings.

KEYNOTE ELEVATION LEGEND	
Key Value	Keynote Text
EN1	STONE REPAIR AT CRUCIFORM, SEE 1/EN300
EN2	STONE REPAIR AT VERTICAL MULLION, SEE 2/EN300
EN3	TYPICAL FERROUS ANCHOR TREATMENT, SEE 3/EN300
EN4	TYPICAL COPING AND PINNACLE REPAIR, SEE 1/EN301
EN5	SIDE PINNACLE REPAIR - PLAN AND PHOTO, SEE 2/EN301
EN6	CRACK REPAIR AT SPANNING STONE - ELEVATION, SEE 3/EN301
EN7	TYPICAL REPOINTING, SEE 4/EN301
EN8	TYPICAL CRACK REPAIR AT FULLY SUPPORTED STONE - SECTION, SEE 1/EN302
EN9	TYPICAL STONE REPAIR WITH REPAIR MORTAR - SECTION, SEE 2/EN302
EN10	TYPICAL STONE REPAIR AT ABANDONED FASTENER OR HOLE, SEE 3/EN302
EN11	TYPICAL STONE REPAIR WITH DUTCHMAN - SECTION, SEE 4/EN302
EN12	TYPICAL WHOLE STONE REPLACEMENT - SECTION, SEE 5/EN302
EN13	TYPICAL STONE SURFACE REDRESSING - SECTION, SEE 6/EN302



1 NORTH ELEVATION - REAR

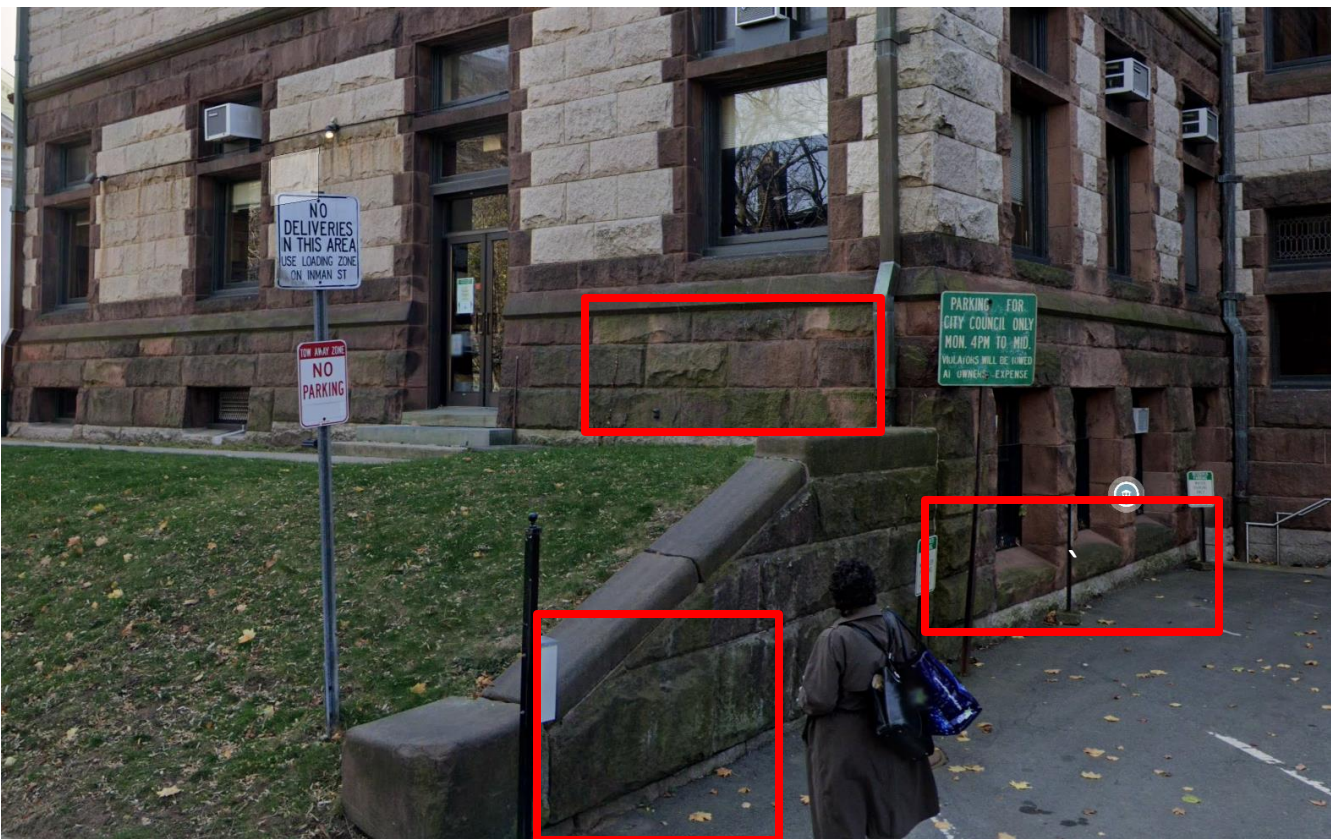
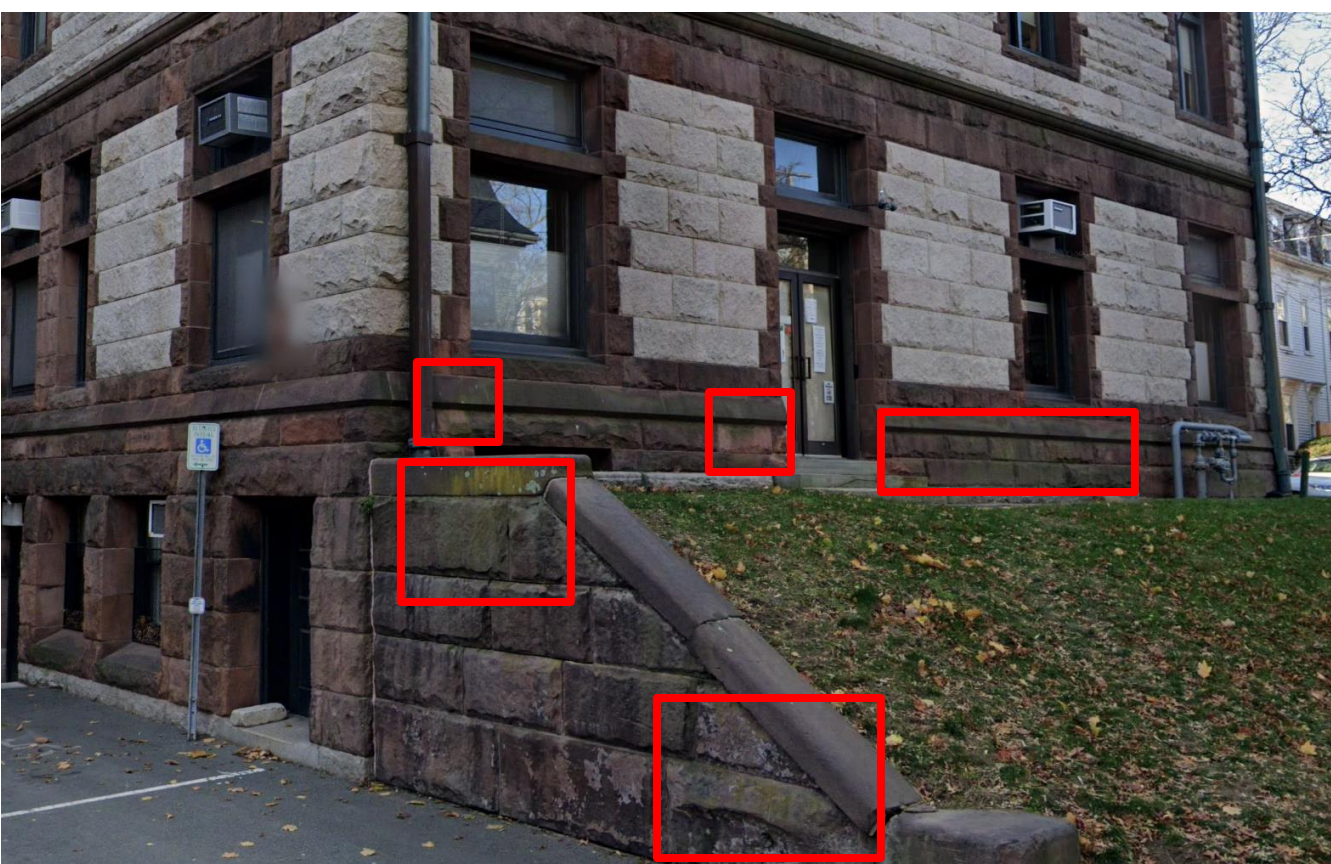
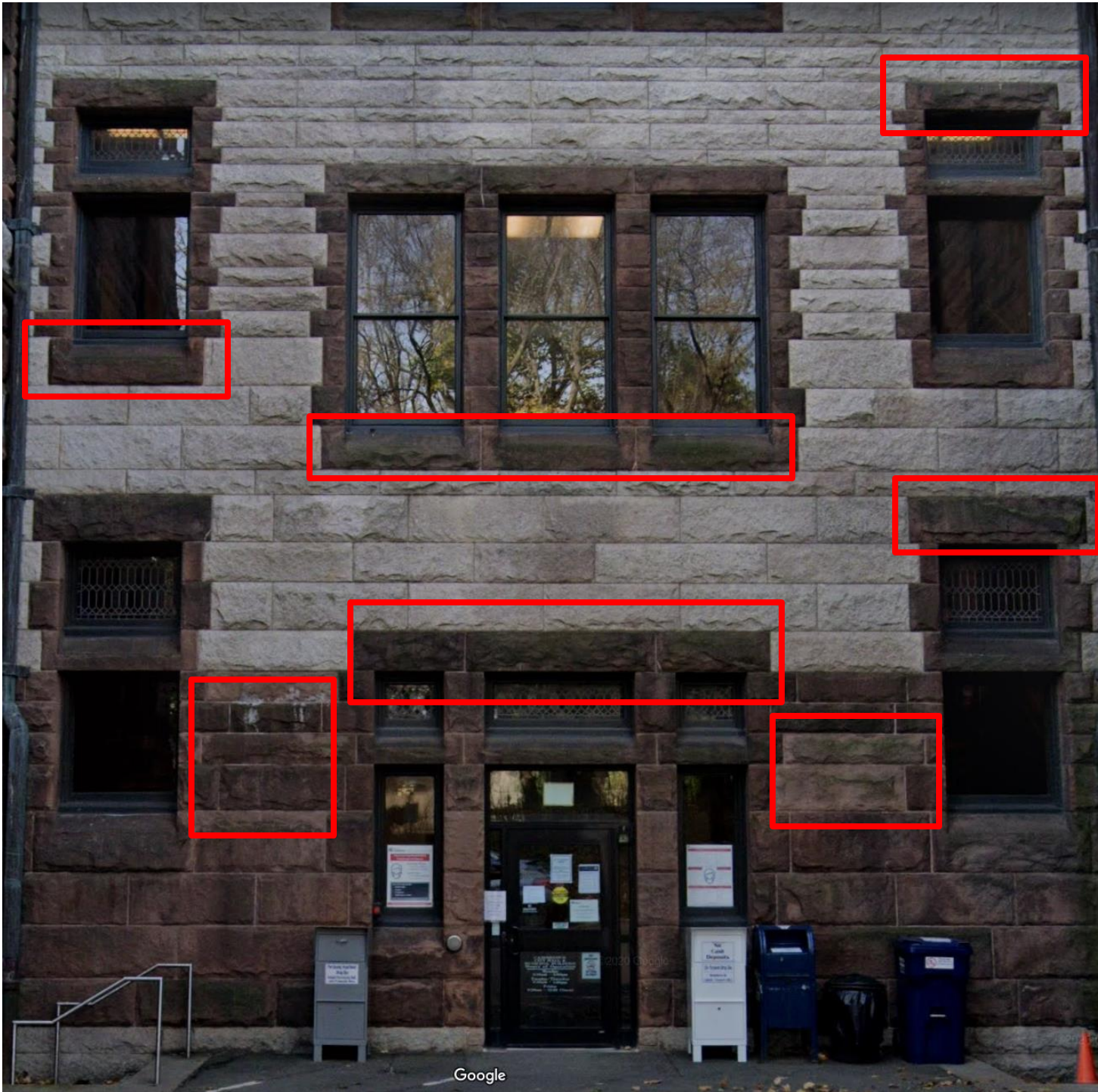
1/8" = 1'-0"



# Masonry Cleaning

# North/Rear Elevation

Select areas of cleaning were also identified.



# Window Painting and Repairs

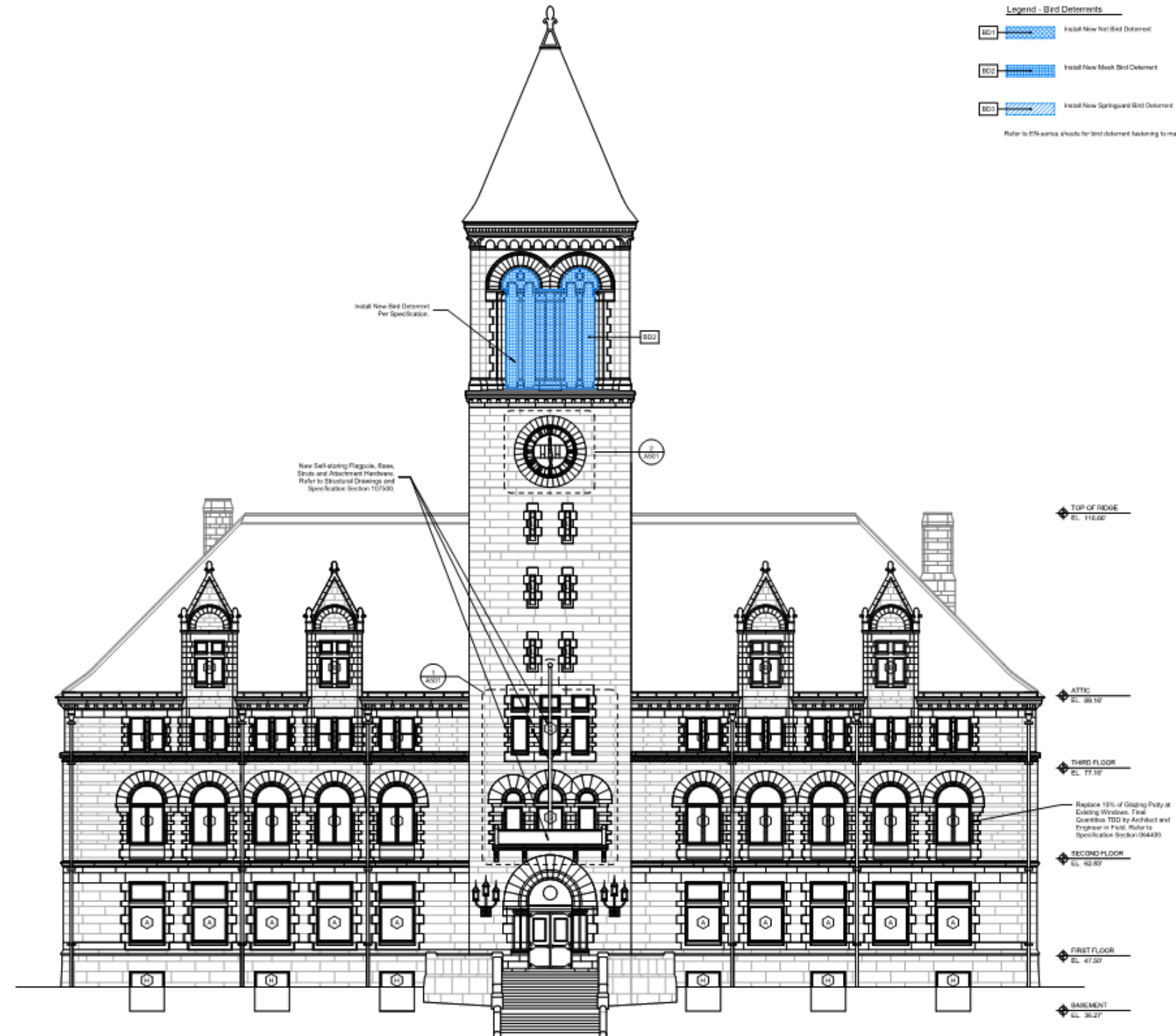
# Massachusetts Avenue Elevation

## Window Repair Scope Overview

- Window Painting
- Glazing Putty Replacement
- Window Repairs
  - Wood epoxy, dutchman

## Repairs last took place in 2015.

Intent is to paint only, potential repairs to be identified after scaffolding.



**Legend - Bird Deterrents**

- BD1 Install New Net Bird Deterrent
- BD2 Install New Mesh Bird Deterrent
- BD3 Install New Springguard Bird Deterrent

Refer to EM-series sheets for bird deterrent fastening to masonry.

**General Notes**

1. Graphic indications of work specified on drawings are intended to give location of repair and approximate size of repair only. Drawings are two dimensional and all surfaces are not represented. All work should be field verified.
2. Clean all glazing areas and inspect for poorly bonded glaze lead prior to application. Repair and clean metal elements to be glazed. Refer to specification section 069153.
3. Repair elements per manufacturer instructions, with finish coat color to match existing. Refer to specification section 069133.
4. Protect existing building and repair any elements damaged in process of glazing, painting, clock restoration, and window restoration work. Refer to project specifications.
5. Refer to EM-series sheets for masonry scope.
6. 70% of every window to receive wood epoxy restoration. 10% of every window to receive wood dutchman repair. GC to carry out cost for wood repairs. Selected contractor to perform a repair quantity survey in advance of work and provide quantities as submitted for Architect's review to determine final quantities.

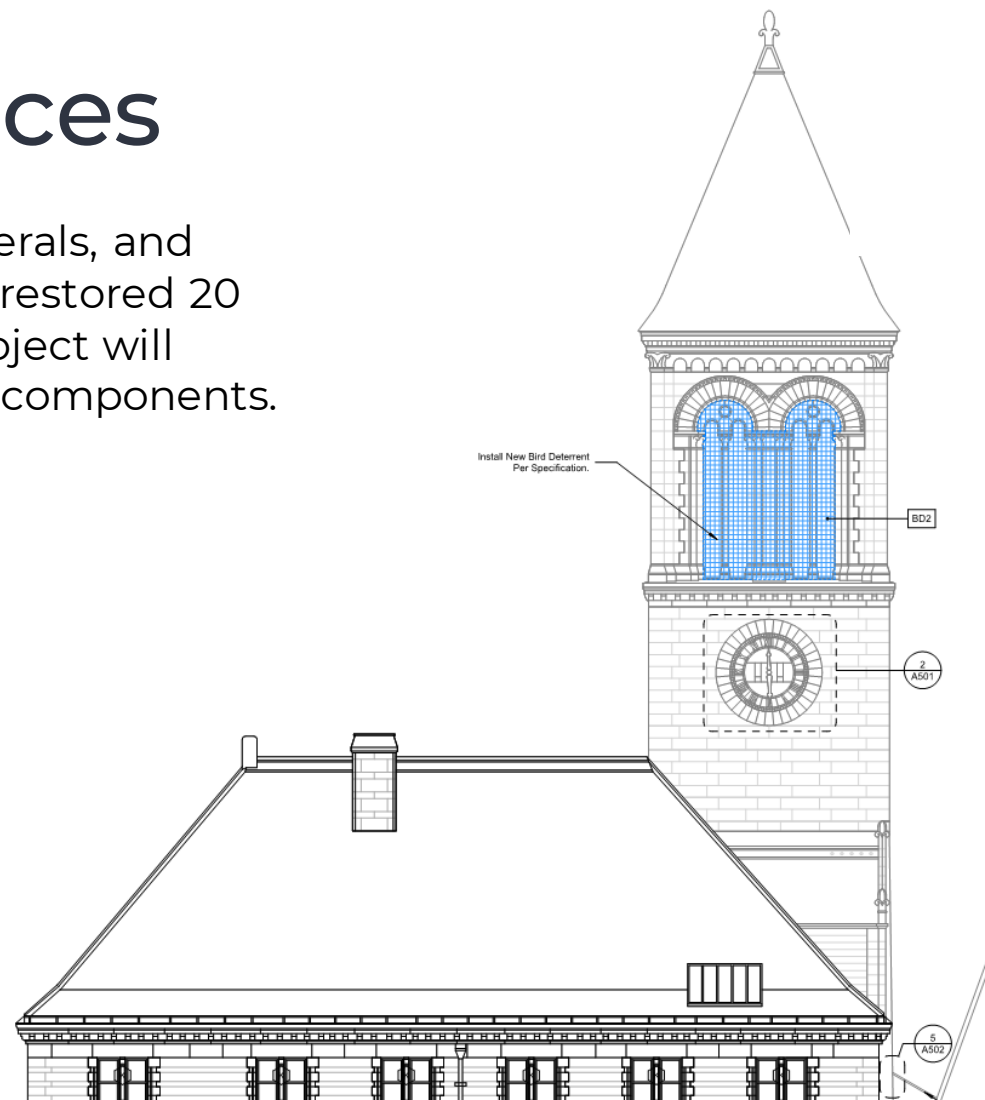
**Key Plan**  
1/32" = 1'-0"

1 South Elevation - Massachusetts Ave  
1/8" = 1'-0"

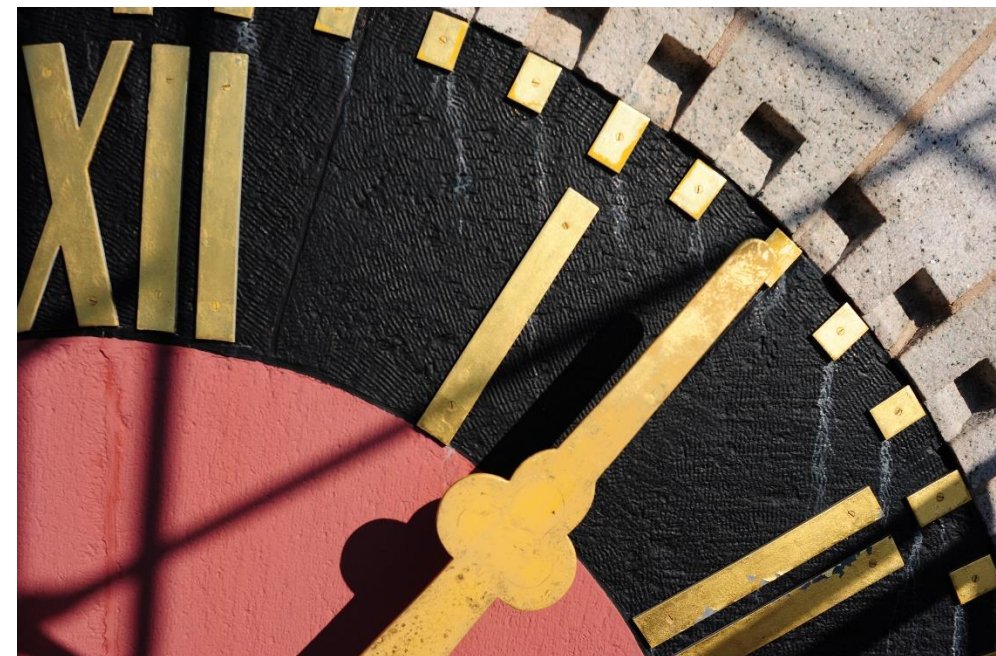
Gilding

# Clock Faces

Clock hands, numerals, and markers were last restored 20 years ago. This project will regild those same components.

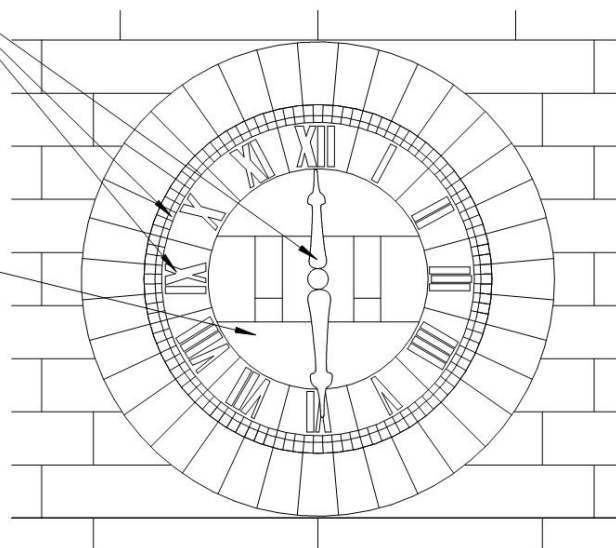


## Existing



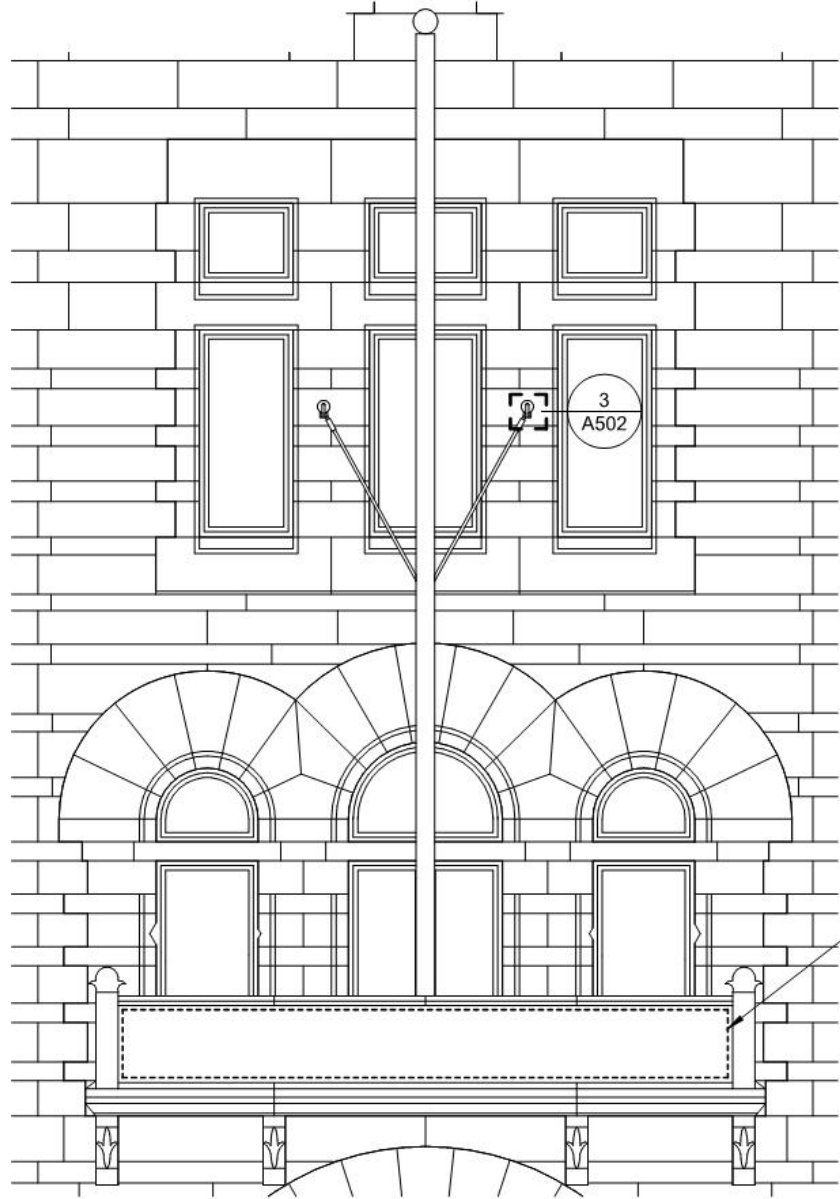
Specialty Clock Technician to Carefully Remove All Clock Hands, Clock Numbers, Second Markers, and Mounting Hardware. Clock Technician to Hand Over Clock Hands, Clock Numbers, Second Markers, and Hardware to Specialty Gilding Contractor Retained by the Painting Contractor for Restoration of Ornamental Metal and Gilding. Once Gilding is Complete, Gilding Contractor to Hand Over the Clock Hands, Clock Numbers, Second Markers, and Hardware for Re-Installation by Specialty Clock Technician.

Painter to Touch Up Paint, Repair Damage, and Restore Finish at Clock Face, Typ.



# Balcony – Front Face

The balcony lettering will also be regilded.



Gild Engraved Lettering in Field Per Manufacturer's Instructions to Match Existing. Gilding by Specialty Gilding Contractor Retained by the Painting Contractor. Refer to Specification Section 099133.



1 Balcony Elevation - Front  
1/4" = 1'-0"

# Balcony Signage Relocation

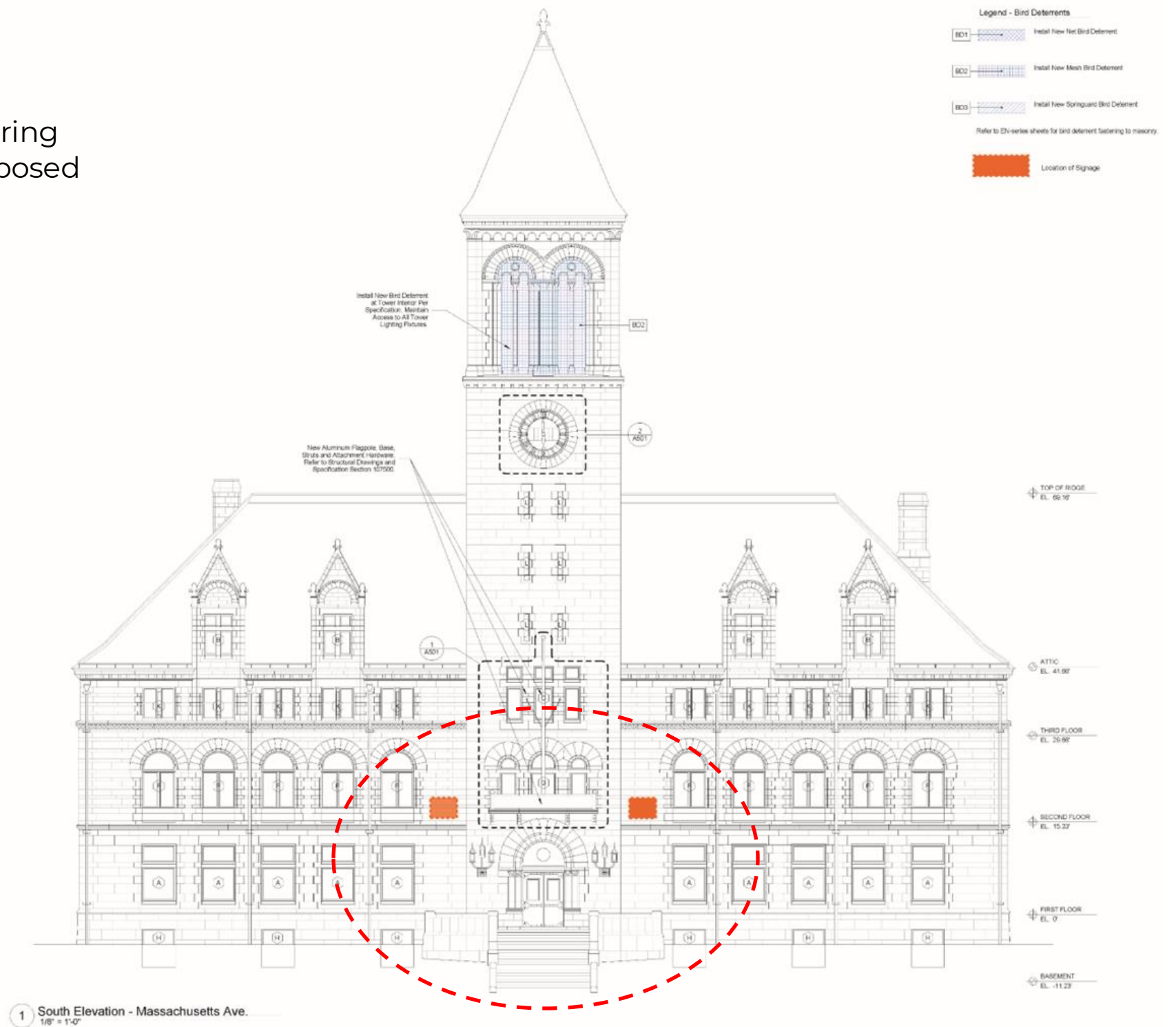


# Signage Relocation

The signs mounted on the balcony will be removed during the construction to allow for the restoration work; proposed relocation of signage to the building facade.



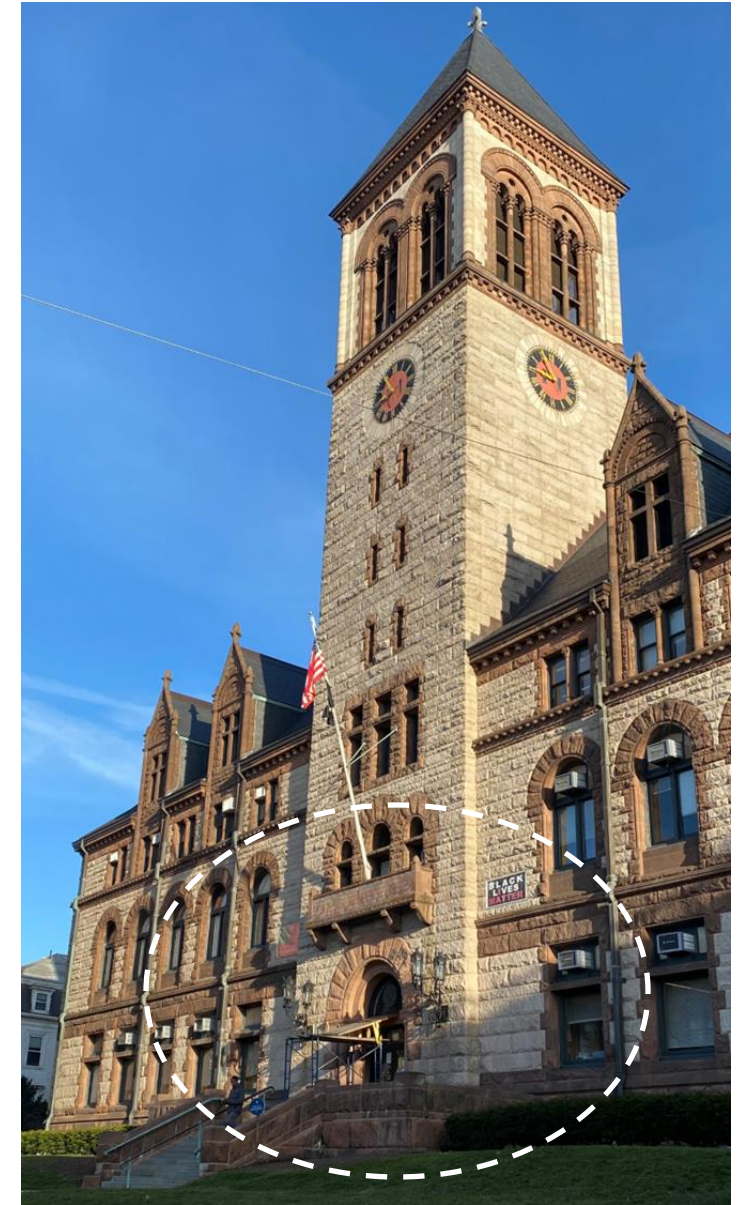
Existing Signage at Front of Balcony



Proposed Relocation  
Located on the building facade

# Signage Relocation

The proposed design separates the panels, allowing them to be appropriately framed and bolted through the mortar joints with some minimal standoffs.

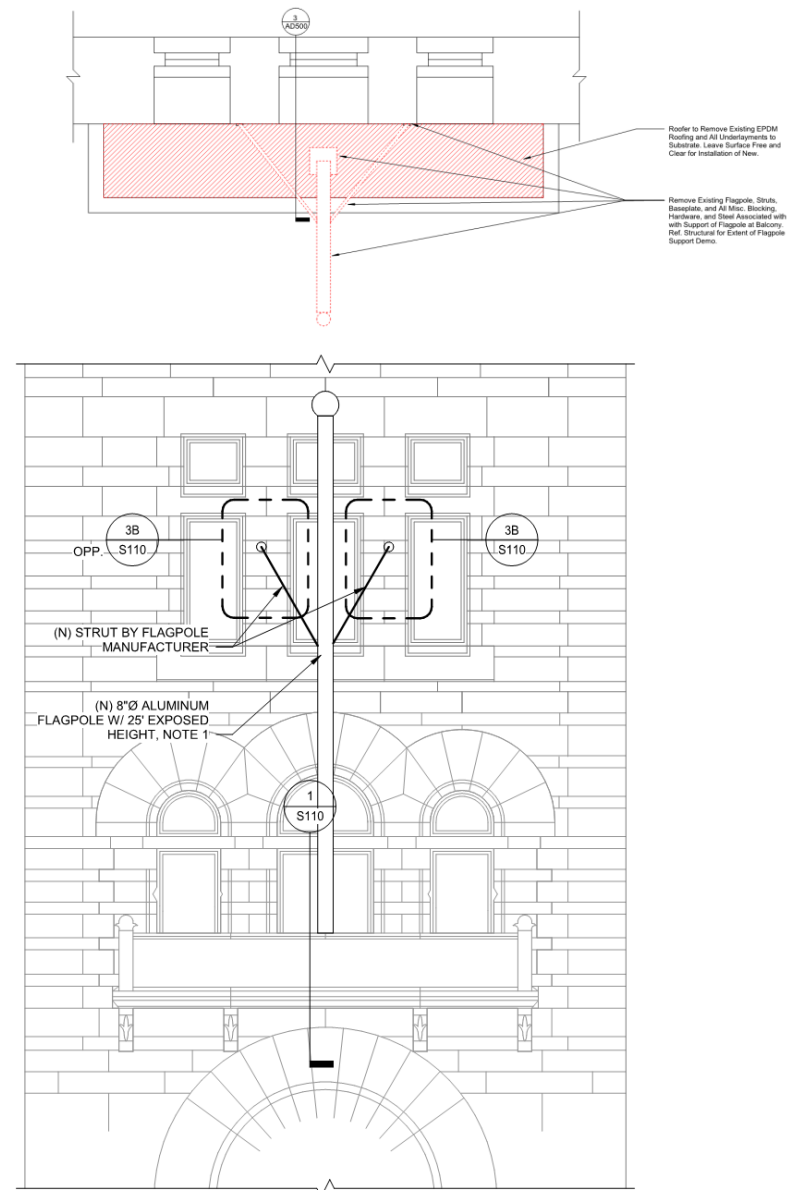


**Proposed Relocation Façade**  
Located on the building facade

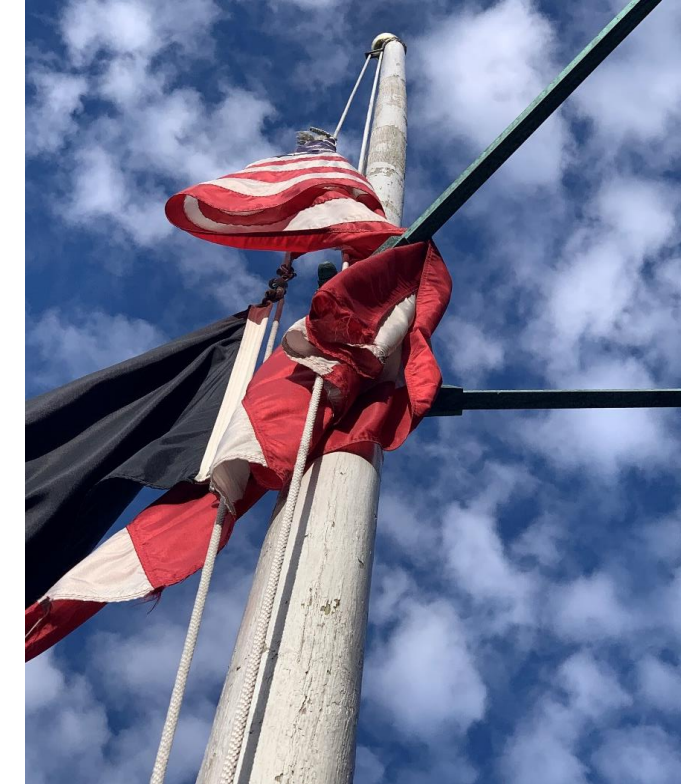
# Flagpole Replacement

# Scope and Existing Conditions

The existing wood flagpole will be replaced to address issues with the supporting base detail, the finial, and the flag tangling.

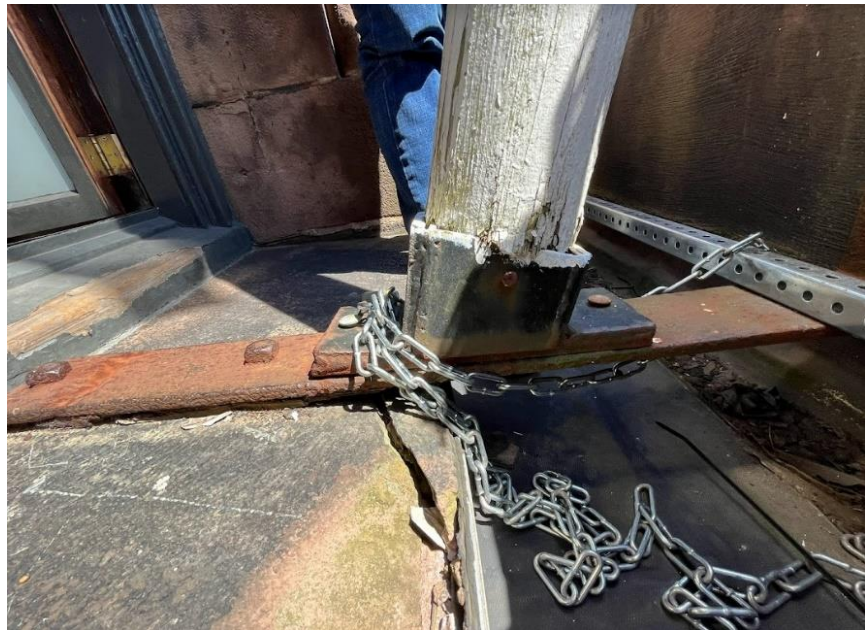


2 ENLARGED SOUTH ELEVATION - BALCONY  
1/4" = 1'-0"

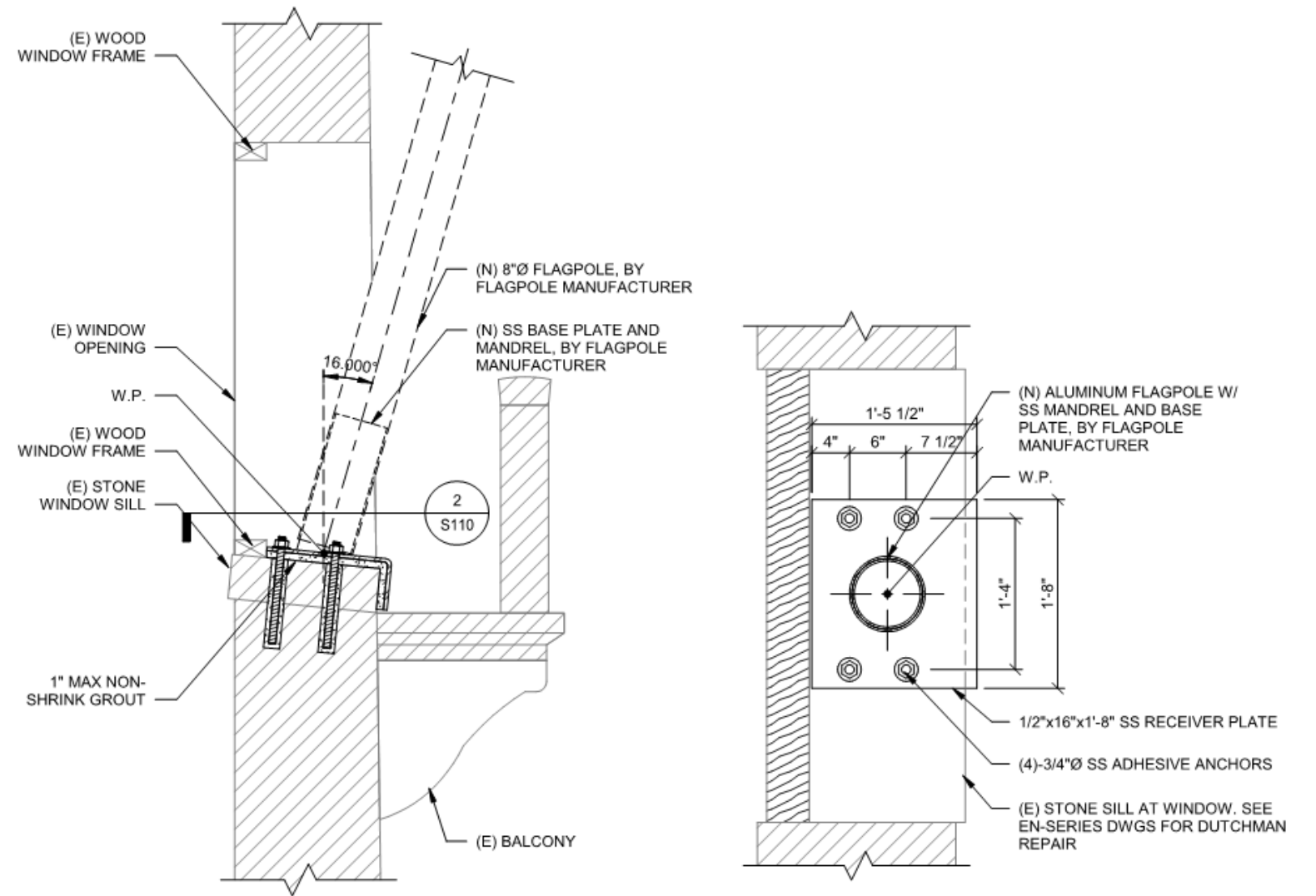


# Base Details

## Existing



## Proposed



1 SECTION AT FLAGPOLE  
 3/4" = 1'-0"

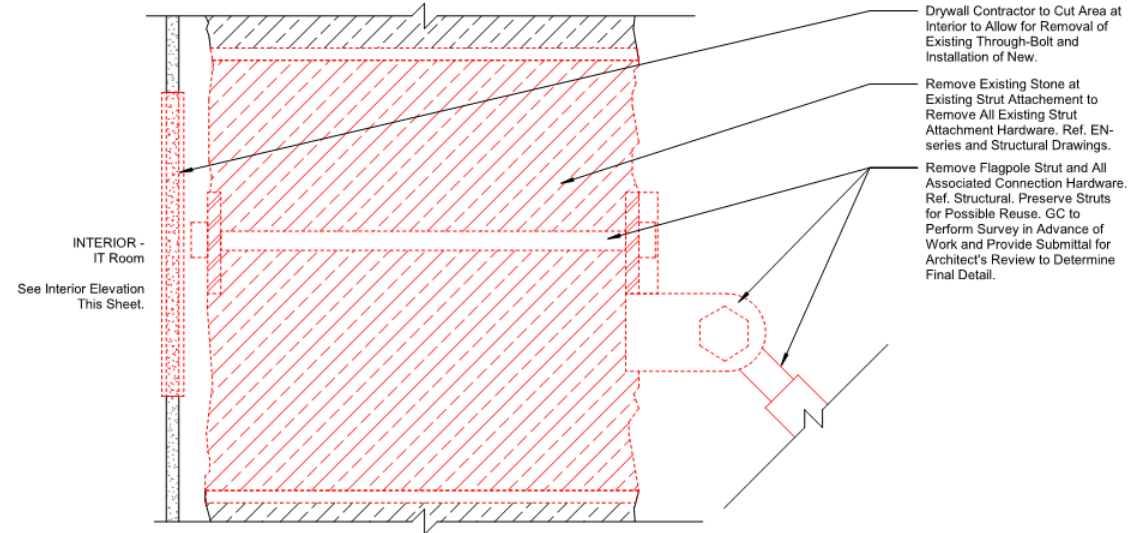
2 FLAGPOLE BASE PLATE DETAIL  
 1" = 1'-0"

# Strut Connection

## Existing

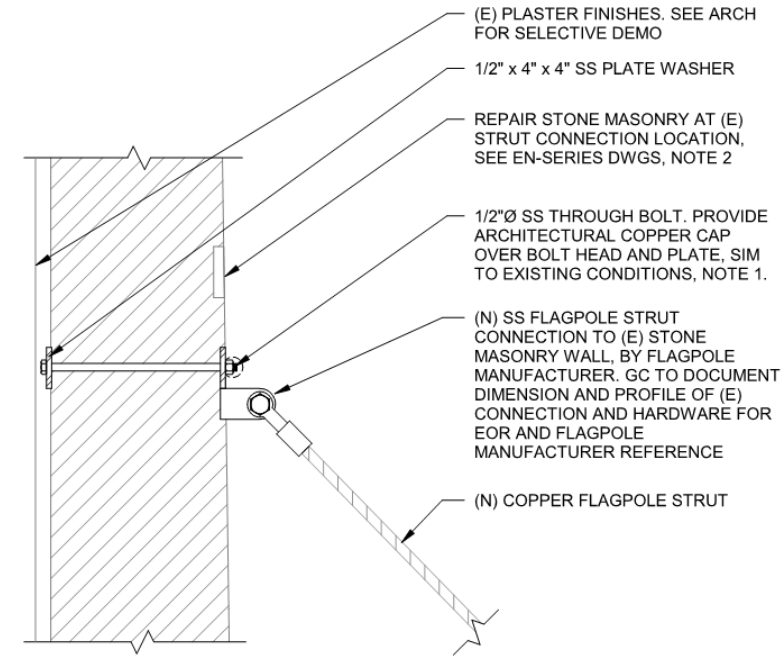


## Proposed



2 Flagpole Strut Through-Bolt Connection Demo Detail  
3" = 1'-0"

Existing IT Data Equipment Racks to be Temporarily Moved and Protected Before Commencing Work in Coordination with City of Cambridge. All Other Equipment in IT Room to be Protected Before Work Commences.



NOTES:

- GC TO SUBMIT PRODUCT INFORMATION FOR ARCHITECTURAL FINISHES AT STRUT CONNECTION FOR ARCH/OWNER REVIEW.
- OPTION TO REUSE EXISTING CONNECTION LOCATION IF THE STONE IS IN GOOD CONDITION, WITH NO SIGNS OF CRACKING OR SPALLING, AND THE EXISTING CONNECTION WAS A THROUGH BOLT CONNECTION. AFTER REMOVAL OF THE EXISTING STRUT CONNECTION, PROVIDE EOR ACCESS TO REVIEW THE CONDITION OF THE STONE.

4 SECTION AT STRUT ATTACHMENT  
1" = 1'-0"

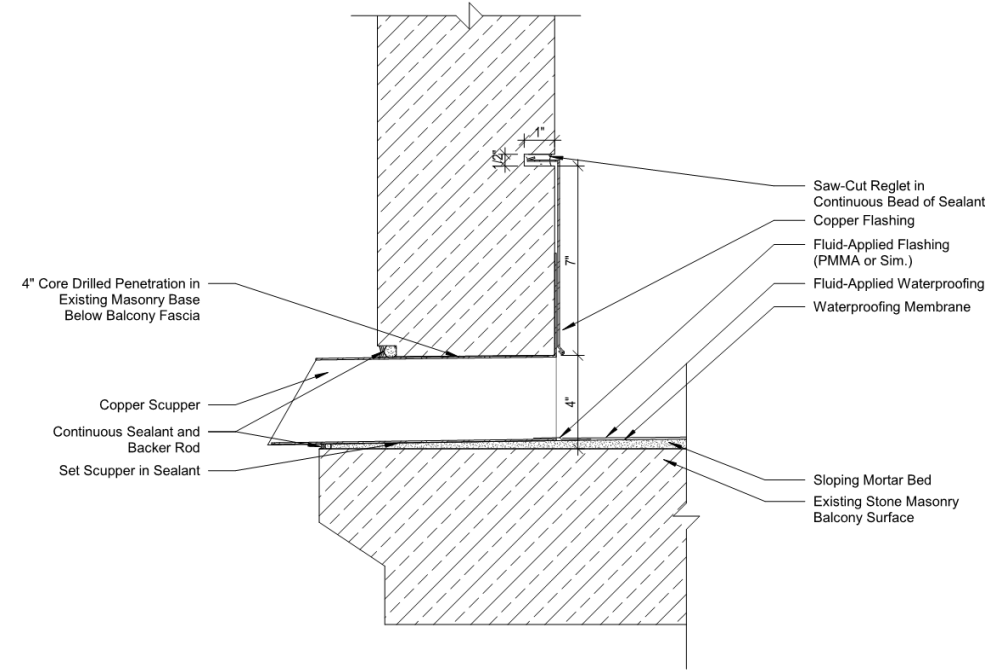
# Balcony Drainage and Roofing

# New Roofing and Drainage

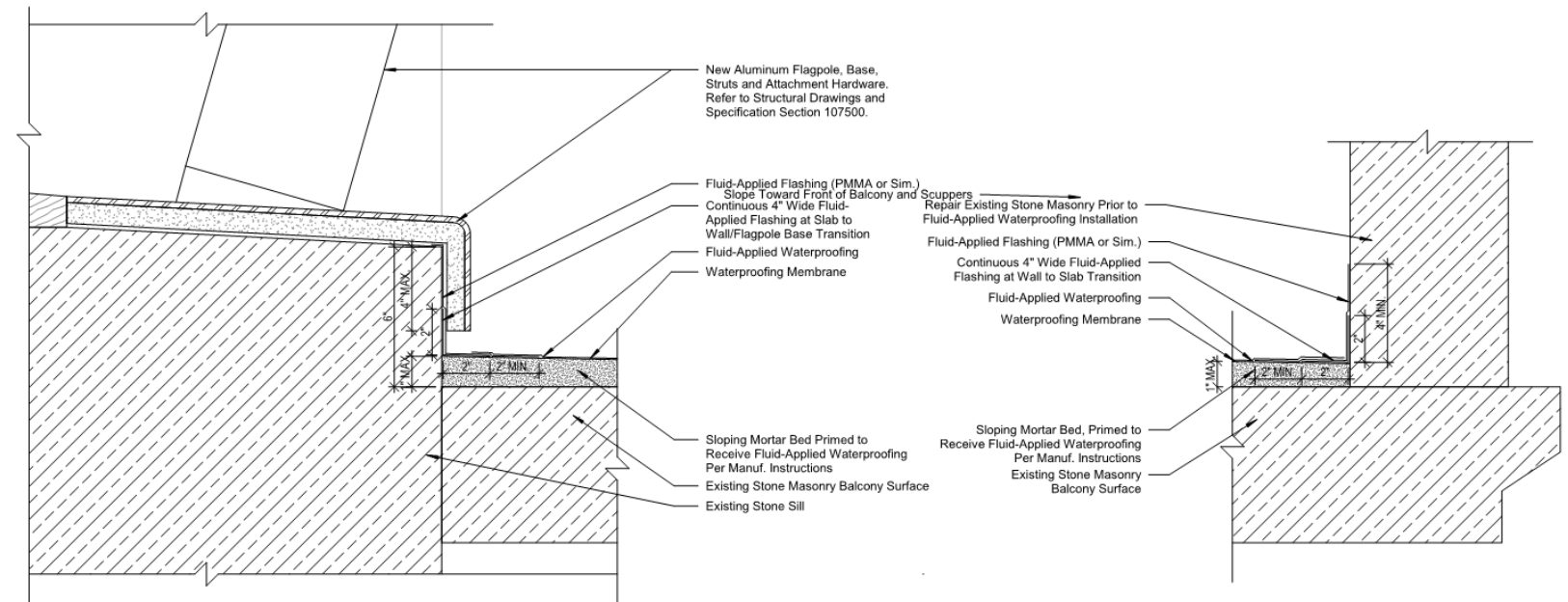
The balcony drainage is insufficient and frequently clogs. A new scupper will be added in the same location as the existing outlet to address the issue.



Existing



6 Section at New Balcony Scupper  
3" = 1'-0"



4 Section at New Balcony Roofing  
3" = 1'-0"

Proposed

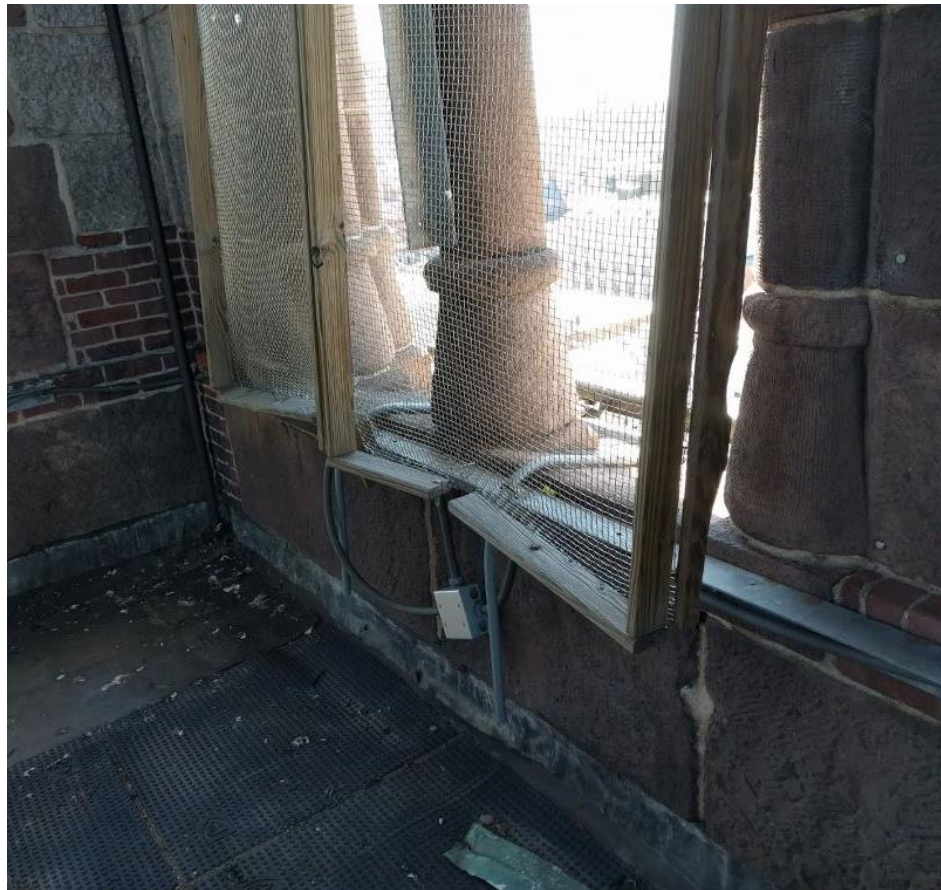


# Bird Deterrent Replacement

# Scope of Replacement

Existing bird deterrent to be removed and replaced in the following locations.

## Existing Deterrent at Tower



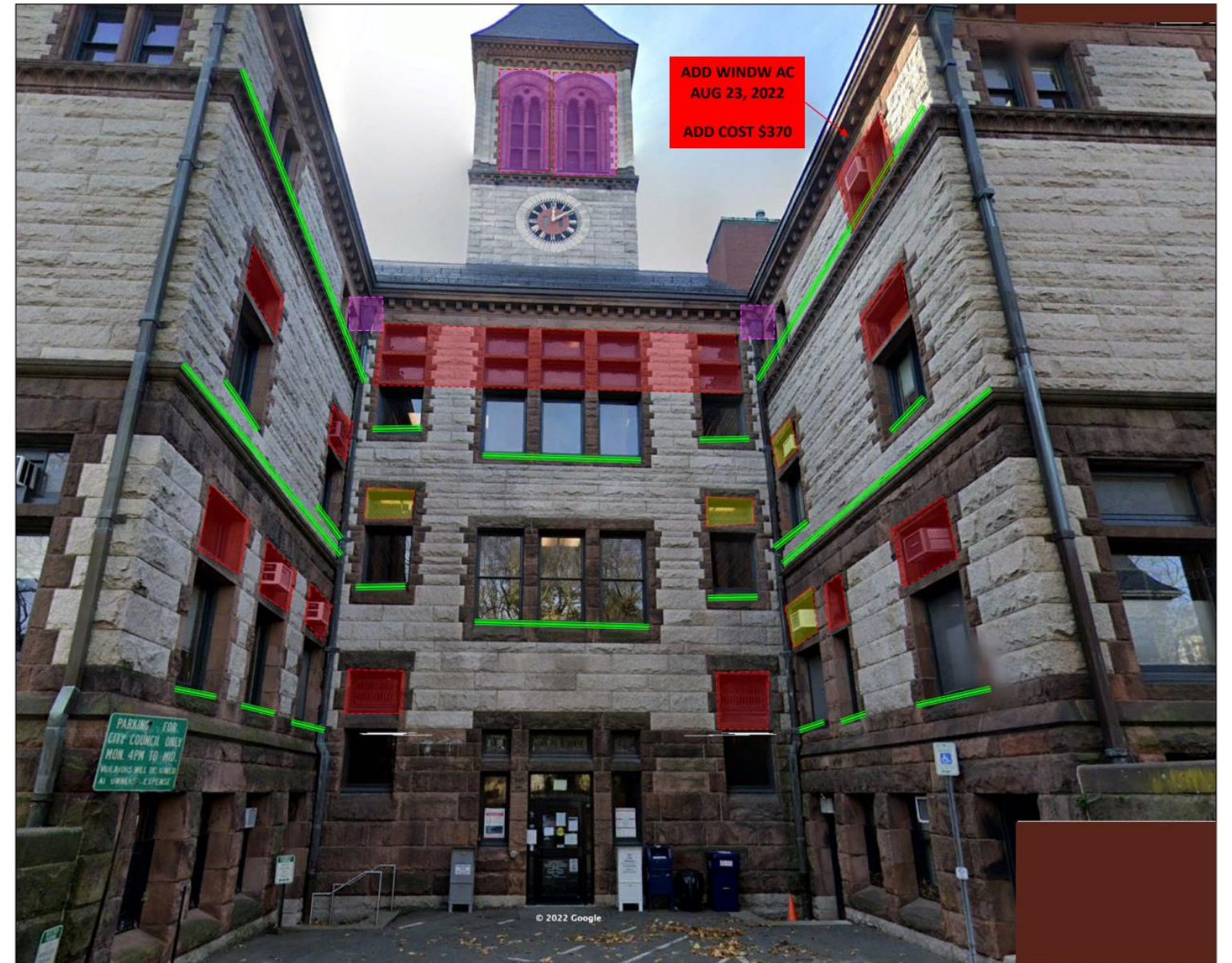
REPAIR SPRINGUARD

PERMANET GRANITE  
TO REPAIR/REPLACE

PERMANET GRANITE  
MISSING - REPLACE

INSTALL NEW SS  
PERMAMESH OVER  
GUTTER

## Rear Court – Deterrent Installation Locations



# Lightning Protection

# Lightning Protection Scope

Lightning protection for the entire building is being included in the project while building access is available via scaffolding and because of the addition of the new aluminum flagpole.



Diagrams of proposed system



## System Components

Air Terminals located on the high points



Conductors run along the roof ridge



Down Conductors run along the roof to rods on the building face run parallel to downspouts



Down Conductors run to grounding rods that connect to the underground ring



# Lightning Protection Scope

Examples of projects with lightning protection for reference.



**Example of Lightning Protection on City Electrical Shop located at 35 Third Street**

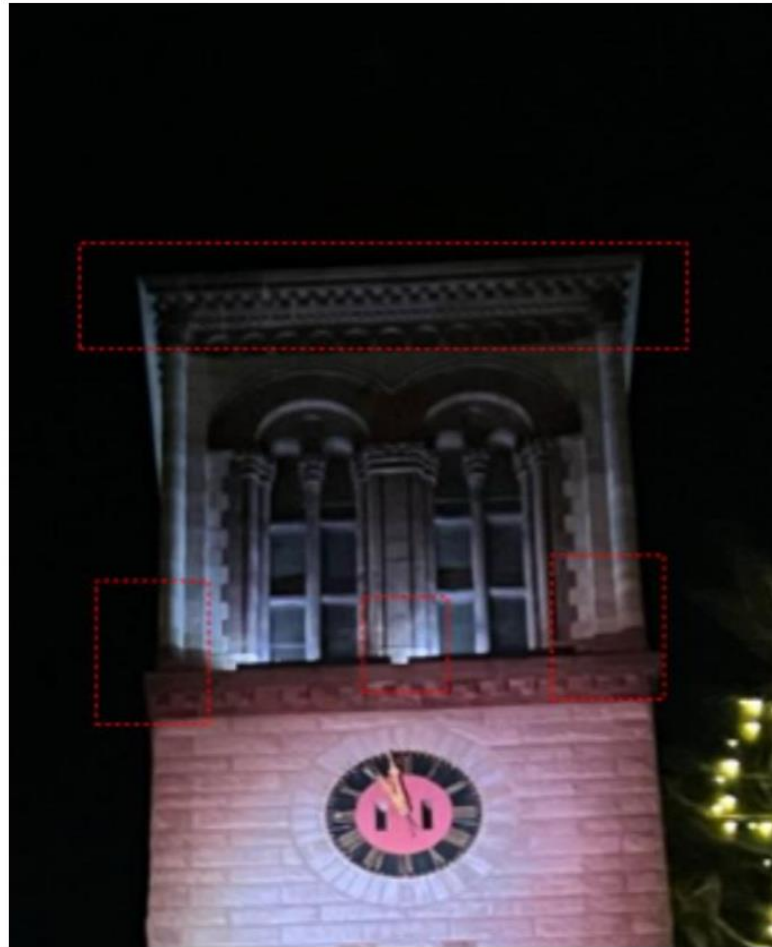


**Example of Lightning Protection on Roof (Harvard University project provided by FAA)**

# Tower Lighting Replacement

# Tower Lighting Scope

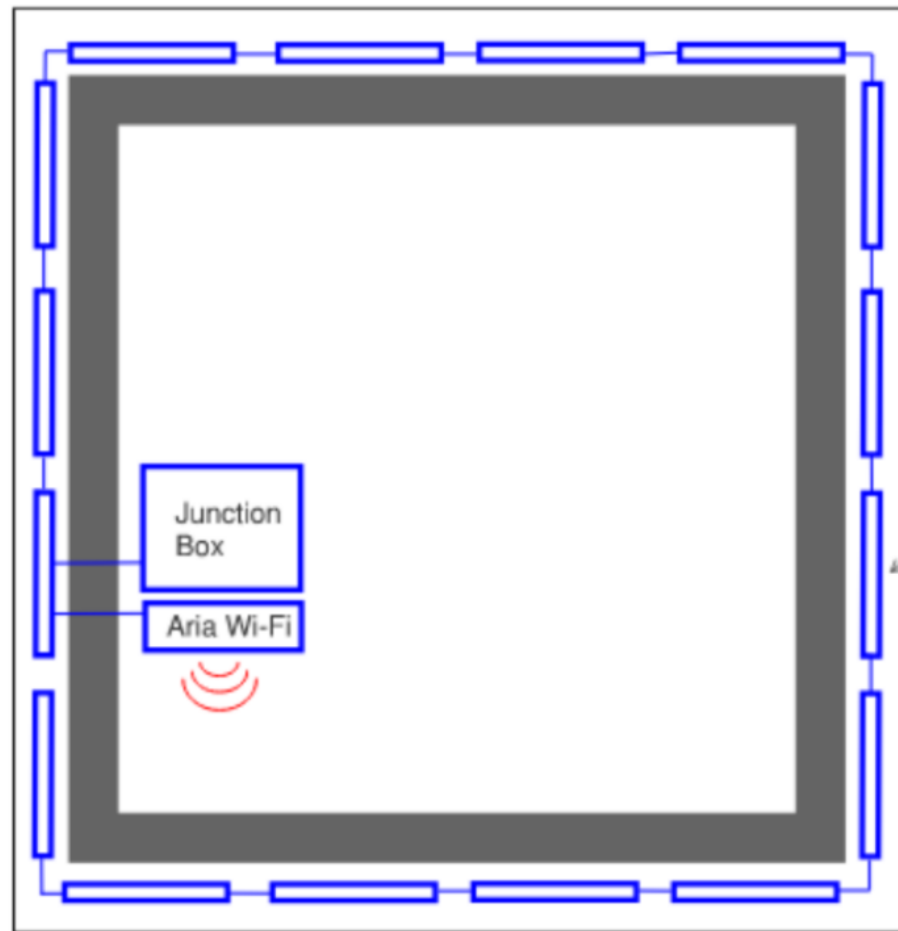
The existing tower lighting fixtures were at one time retrofitted with LED fixtures, but the system was not upgraded to match the remainder of the façade lighting. The current tower lighting provides uneven illumination, with noticeable hot spots and dark spots.



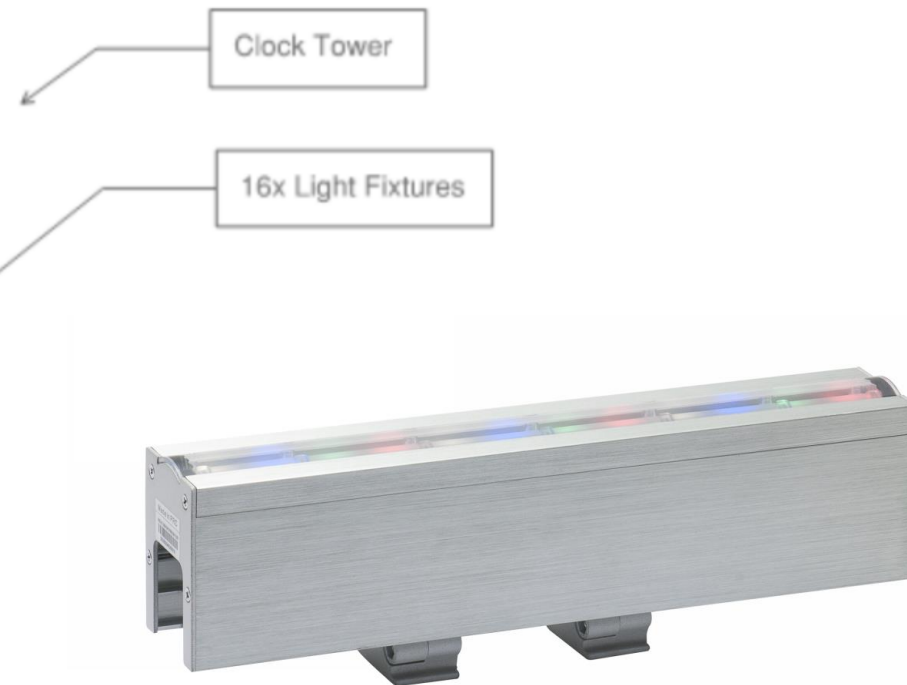
Existing Lighting at Tower



# Tower Lighting Scope



**Proposed Lighting layout at Tower**



**Fixture example (Fixture can be painted to blend with building exterior)**

**The main objective is to upgrade the lighting system into a full functioning system that is connected to the rest of the façade.**

Goal of the design:

- Graze the four top sides of the upper part of the Clock Tower evenly with light, avoiding gaps and hotspots on the façade
- Avoid the lighting fixtures from being visible during daytime from the street (as is currently the case)
- Control light direction, and avoid spilled light into the sky
- Provide color-changing lighting effect for special events lighting



# Thank You!

Project Team

**Arup**

**City of Cambridge DPW**

**Finegold Alexander Architects**

**Simpson Gumpertz & Heger**