



# Southborough Public Library

Southborough, Massachusetts

## Conditions Assessment & Restoration Recommendations

December 2018



Spencer, Sullivan & Vogt  
ARCHITECTURE • PRESERVATION

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## EXECUTIVE SUMMARY

The Southborough Public Library, built in 1912, is a handsome red brick building in the Colonial Revival style designed by architect Alfred Cookman Cass. Several early additions were added to the north elevation; Town building department documents could reveal their construction dates. A compatible brick addition at the rear of the building was constructed in 1989. The library has been recommended for listing on the National Register of Historic Places on the basis of its association with Southborough's community and educational life and as an example of well-preserved 20th century municipal architecture.

Early in 2018, the Southborough Public Library commissioned the architectural preservation firm of Spencer, Sullivan & Vogt (formerly Spencer & Vogt Group) of Charlestown, Massachusetts, to assess the condition of the exterior envelope at the library and to make recommendations for its preservation and restoration. The following components were studied:

- Existing roofing membrane systems on all roofs
- Brick masonry parapet walls of original building and subsequent additions
- Metal flashing on parapet walls of original building and subsequent additions
- Painted wood windows and doors
- Main exterior entry stairs including cheek walls

Spencer, Sullivan & Vogt (SSV) reviewed drawings of the building that were provided by the Library. In October 2018 principal Lynne Spencer, preservation architect John Hecker, and architectural designer Shawn Willett visited the building to assess existing conditions.

SSV provided an outline scope of work and preliminary cost estimate for recommended restoration repairs to the Owner's Project Manager, Mary Bulso, on November 2, 2018. This report summarizes and supplements in narrative form what was previously described in the preliminary cost estimate.

Further roofing information was generated when roofing cuts were made at representative locations on November 29, 2018. On the roof of the original building, water-saturated roofing insulation was discovered below the existing roofing membrane. The cause of the water penetration still needs to be determined, but the saturated roof insulation and the roof membrane system need to be totally removed and replaced.

Hazardous material testing was recommended to determine whether any of the existing glazing putty and sealants at existing window and door openings and roofing materials contained asbestos containing materials (ACM). While the putty and sealant was free of asbestos, the roofing materials contained sufficient asbestos to

warrant removal under state-mandated hazardous materials requirements.

In summary, the SSV assessment team recommends that the existing membrane roofs be removed and replaced, selected areas of brick and stone masonry walls re-pointed, some existing wood window and door components repaired and repainted, new exterior storm windows installed on the ground level of the original building, and all existing storm windows removed and replaced.

The existing front entry stairs should be completely disassembled and then re-constructed on new concrete foundations. This is recommended because of the pronounced settlement and shifting of the stone treads, cheek walls, copings and masonry paving.

The final cost estimate for these recommendations is \$980,040 for the 1911 building and \$172,016 for the 1989 addition.



South elevation. Oct. 2018.



West elevation, south end. Oct. 2018.



West elevation of 1989 addition. Oct. 2018.

## CONDITIONS ASSESSMENT & TREATMENT RECOMMENDATIONS

The 1912 building is constructed of loadbearing mass masonry with waterstruck red brick set in light buff mortar with beaded joints. The foundation veneer and monumental entry steps are granite, and the entry columns and trim and entablature coping stone are limestone. Large divided light wood windows let abundant natural light into the main reading room as well as support areas. Commercial glass and anodized aluminum double doors replaced the original entry door at the front entrance.

### South Main Entry Stairway

#### *Conditions*

The existing stone and brick masonry stairs require complete reconstruction on new concrete foundations. Many of the stone elements are settling, rotating or migrating due to the freeze-thaw pressures of water infiltration. The rebuilt stone stair slabs and cheek walls should be detailed and built to shed water, or to allow it to drain through appropriate drain holes in the supporting structure.

Additional handrails should be provided at both sides of the reconstructed stairway to satisfy building code accessibility and safety requirements.

#### *Recommendations*

- The existing stone masonry cheek walls should be numbered, disassembled and salvaged for reconstruction. The existing front stair stone stair treads should be numbered, disassembled and salvaged for reconstruction. The existing brick paver areas at the front entry stairs should be measured and photographed and then demolished.
- Excavate for new foundations at existing front stairs. Provide new concrete foundations at existing front entry stairs, including cheek walls.
- Provide new brick pavers at front entry stairs; set in sand or stone dust setting bed to match original design and configuration. Reinstall existing center handrail. Provide color-galvanized new handrails on each side of reconstructed stairs.



Granite stair slabs at south entry have shifted and pavers show mortar loss.



Ferrous staining at granite cheek wall.



Shifted granite cheek wall at front entry.



Staining of foundation at east elevation of early addition.



Detail of typical embedded ferrous anchor.



Eroded stone slab at south elevation containing incised lettering.

- Remove existing steel grilles at both cheek walls, remove iron stains below each opening, and install new concrete masonry infill covered with cementitious coating.
- Clean rust staining at the granite slabs.

**Masonry: Brick & Stone**

***Conditions***

The focus of this assessment was on exterior brick masonry walls, stone trim and the various masonry roof parapets. When roof cuts were performed at the roof of the original building, it was clearly evident that the roof parapets have been damaged by water penetration and repeated cycles of freeze-thaw cycles. The roof parapet at the center of the south elevation is in particularly poor condition, as is the parapet of the first addition above its eastern exterior wall.

***Recommendations***

- 100% deep joint preparation and repointing should be undertaken at both faces of the entire roof parapet perimeter of the original building. The east and west parapets of the early addition should be treated in a similar manner.
- Removal of disfiguring surface-applied sealants should be performed at selected exterior brick masonry parapet wall areas along the northern portion of the original building. These materials were probably installed to seal defective mortar joints, in lieu of performing more traditional masonry cutting and repointing methods.
- Removal of embedded steel eyehooks is recommended at numerous locations, to be followed by the repointing of holes in mortar and bricks using properly tinted repair mortars. Similarly, we recommend that embedded iron anchors be cut out and removed at designated basement masonry openings. The resulting holes should be in-filled using properly tinted repair mortars.
- At the northwest corner of the original building's parapet, cracked bricks should be removed and replaced to make that portion of the parapet more water-resistant.



- The stone masonry roof cornice and entablature needs to be 100% cut and repointed at all vertical and horizontal joints. At the roof parapets, embedded metal anchors have caused spalling of numerous areas of the stone coping. Loose stone areas need to be pinned in-place. Spalled stone areas should be repaired with new matching stone “Dutchmen,” properly sized for each location.
- At the stone entablature along the south elevation, the stone slab containing the letters “SOUT” is seriously eroded from repeated water penetration, freeze thaw cycles, and the expansion of surface salts. This stone slab should be removed and replaced by a newly carved stone to replicate the existing stone slab.
- At the stone coping of the original building’s parapet, provide lead T-Caps at all skyward-facing joints. Cut vertical joints and insert lead T-Caps in bed of sealant.
- At the stone water table of the original building, and the concrete foundation of later additions, use stone masonry cleaners to remove mold, soil and other organic materials from all vertical surfaces.
- The snap-tie locations in the concrete foundation wall of the later additions should be wire-brushed to remove rust and then recesses should be infilled with a concrete patching mix.

## Roofs & Water Management

### *Conditions*

All of the roofs of the library are flat membrane material with tapered insulation and interior roof drains. This includes the original library roof as well as all later additions. High brick masonry parapets surround the perimeter of the original building and three later additions. None of the parapet walls have overflow scuppers.

Some of the roof areas are served by only one interior roof drain. There are no adjacent overflow drains in case of a blockage of the primary roof drain. Recent exploratory roof cuts revealed that the roof insulation above the original library is totally saturated with water.



Open joints at sandstone entablature.



Unfilled snap-tie openings at concrete foundation wall. Staining at water table and wall.



Ballasted roof at 1912 building.



Spalled stone coping at parapet due to improperly installed termination bars.

Water is either entering through defective roof drains, tears in the roof membrane or flashing, or through the parapet walls. Lack of a proper vapor barrier may be causing condensation to form below the roof insulation. The existing through-wall flashing beneath the stone coping stones of the roof parapet is believed to be problematic in terms of continuity and condition. Defective through-wall flashing should be replaced.

The existing membrane roofs should be replaced with new membrane roofing systems, including a new vapor barrier, new tapered insulation, new replacement roof drains, and perimeter edge flashing or parapet flashing. We recommend working with a manufacturer's representative to inspect and approve the new roof installation and obtaining a warranty of 20 to 30 years.



Epoxy compound used for repointing of selected parapet wall areas.

### Exterior Metal Parapet Flashing

The existing brick and stone masonry parapet rests on the wide, stone, projecting main building cornice. A classical stone entablature exists directly below. The base of the parapet wall is brick masonry and is protected with a wide band of lead-coated copper flashing. This flashing extends out and over the projecting stone cornice directly below.



Uncapped chimney flue at parapet.



Saw cut inside north-facing parapet reveals extreme damage to masonry.

The flashing has been face-anchored into the narrow vertical surface of the stone cornice, a practice that is not recommended. A concealed edge strip is the preferred solution for anchoring this type of metal flashing. It provides for the flashing to expand and contract with temperature swings.

There are no expansion joints anywhere at the perimeter of this parapet and cornice flashing. Expansion joints provide another means for the metal flashing to move as it expands and contracts due to changes in temperature or sun exposure.

At the inside face of many existing parapets, the stone coping stones have been severely damaged by the insertion of expansion shields and fasteners into the narrow, vertical inner faces of the coping stones. This has caused the stone to split and crack at the top horizontal surfaces of the stone coping and has resulted in the irregular pattern of patches currently visible.

The existing lead-coated copper flashing at the base of the parapet exterior and the top surface of the main building cornice should be removed and replaced with red copper or Freedom Gray zinc-coated copper. Installation of the new copper should be done with details that provide for proper expansion and movement of the various copper flashing elements.



Cracked flashing solder joints.



Restricted roof drain pipe opening.



Saw cut. Three wood boxes protect electrical junction boxes above original 1912 chandeliers below.



Failed mortar joints at brick parapet above south main entry stair.



Ballasted roof at 1989 addition.



Failed paint coating at basement window, lack of exterior storm windows.

**Recommendations**

- Remove existing metal gutter from face of roof cornice above south main entry stair.
- Demolish all existing roof system components on roofs of original buildings.
- Remove ferrous fasteners from existing copper through-wall flashing and other locations.
- Enlarge existing roof drain inlets to full diameter of vertical drain pipe below.
- Cap one roof-top chimney flue at rear wall of original library parapet.
- Provide new membrane roofs at original building and designated additions.
- Provide new membrane roof at the 1989 rear wing.
- Add overflow roof drains or scuppers wherever only one roof drain exists.
- Replace flashing at base of roof parapet and top of building cornice.
- Remove existing face-anchored lead-coated copper flashing at main building cornice of original building. Also remove vertical copper flashing at base of perimeter parapet wall. Provide new red copper main building cornice flashing with continuous perimeter red copper edge strip held in place by red copper cleats. Add new red copper expansion joints at center point of each elevation of new cornice flashing. Provide new vertical red copper flashing to base of each parapet wall of original building parapet.
- Remove limestone copings and replace through-wall flashing, then reinstall copings on stainless anchor pins.

**Windows**

**Conditions**

Windows at the main floor of library are original to the building and are generally in good condition, making restoration and repair a very viable option. These windows, which are important character-defining features of the building, provide an excellent quality

of natural light, particularly in the main reading rooms. The windows' thermal performance was improved by the installation of storm windows, but these windows have reached the end of their service life and need to be replaced. No storm windows exist at the ground level windows of the original building. This is an omission that should be corrected.

Windows at the ground floor of the first addition to the original building were replaced with new wood windows during previous renovation work at the library. While replacement may have been the most cost effective approach, the better long-term economic decision for treatment of the remaining original windows will be preservation and restoration. The old-growth wood used in fabricating the original windows will prove to be much more rot-resistant and durable than the new pine of any replacement windows.

At the window exteriors, aluminum storm windows with a white baked enamel finish have been added. The storm windows have helped protect the primary wood windows and contributed to their good condition.

The operable sashes of the wood windows are in good condition structurally, but there is fairly widespread deterioration of the glazing putty. The windows were also not designed to accommodate weather-stripping.



Existing windows at main floor with storm windows.



Deteriorated window sash at ground level of 1989 addition.



Deteriorated window caulking at 1989 addition.



Damaged wood window frame and embedded steel pintle fragment.



Perimeter sealants at 1989 windows are failing and need replacement.

The existing exterior wood window sills are weathered and have open grain, but appear to be mostly solid. The exterior wood frames are in good condition, with some deterioration at the bottoms where the wood can wick moisture from the sill. The same is true of the wood jamb and head mouldings that trim the window adjacent to the building's brick masonry exterior. There is pronounced deterioration and failure of the sealant at the joint between the wood brick moulding and the masonry opening.

All of the exterior wood window elements, including sashes, frames, sills, and brick moulding, should be thoroughly prepared and repainted.

### ***Recommendations***

- At the sills and areas of deteriorated wood, epoxy consolidant and patching materials should be applied to restore the structural integrity of the wood. Given the age of the building, it should be assumed that there will be some lead-containing paint on the painted surfaces, and therefore handling and treatment of the material, and containment and removal of dust and paint chips, will need to follow State regulations for work with lead-containing paint. Regulated precautions for worker and occupant safety must be followed.
- The existing storm windows should then be removed, and replaced with new low-profile exterior storm windows. Low-profile windows are preferred in restorations as they provide good transparency sight lines and are less obvious, allowing the original windows to be the dominant feature of the opening.

### **Doors**

Recent renovation work at the library addressed the exterior wood doorway at grade level that provides handicapped accessibility, so no work is required for them. However, the architectural elements of the portico, particularly the column bases, require selective repair and repainting or replacement. The doors and doorframes at the original south front entry stair are recent as well and do not need any remedial work or painting.

### Exterior Painting

As mentioned above, it should be assumed that there will be some lead-containing paint on the existing painted surfaces, and therefore handling and treatment of the material, and containment and removal of dust and paint chips will need to follow State regulations for work with lead-containing paint. Regulations mandating precautions for workers and building occupant safety must be followed.

At the building exterior, all loose paint at the frames, sills, and brick moulding trim should be removed and the wood should be prepared for field-applied primer and finish coats. Remove and replace glazing putty where existing glazing putty is deteriorated, loose or missing. The exterior window elements should be primed and finish coats should be applied as required to achieve full paint coverage.



Deteriorated window sill at ground level, east elevation.



Accessible entry at east elevation, ground level.



Entry doors at top of south entry stairs.



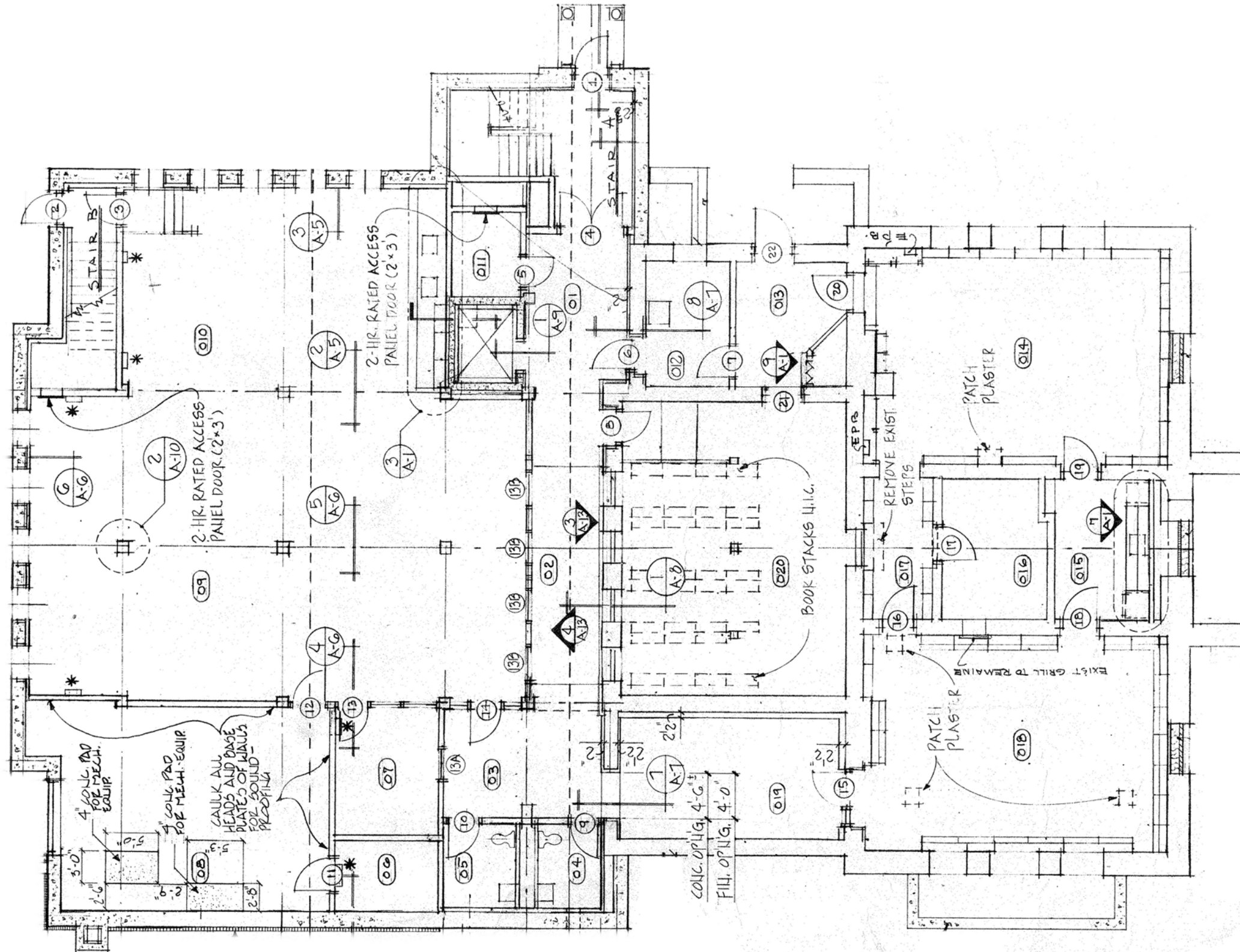
All of the exterior wood is currently painted white. The actual paint colors can be determined via paint layer analysis. This analysis would serve as a preservation tool, providing evidence for restoration of the building colors to a scheme in keeping with the style of the building and the original architect's intent.

Missing paint on wood elements and glazing.



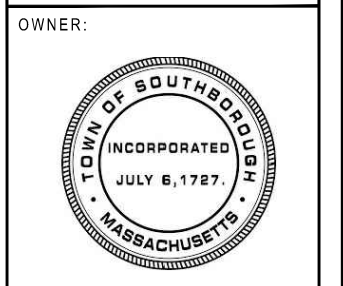
## Scope Drawings





**1** EXISTING BASEMENT FLOOR PLAN  
 3/32" = 1'-0"

ARCHITECT:  
  
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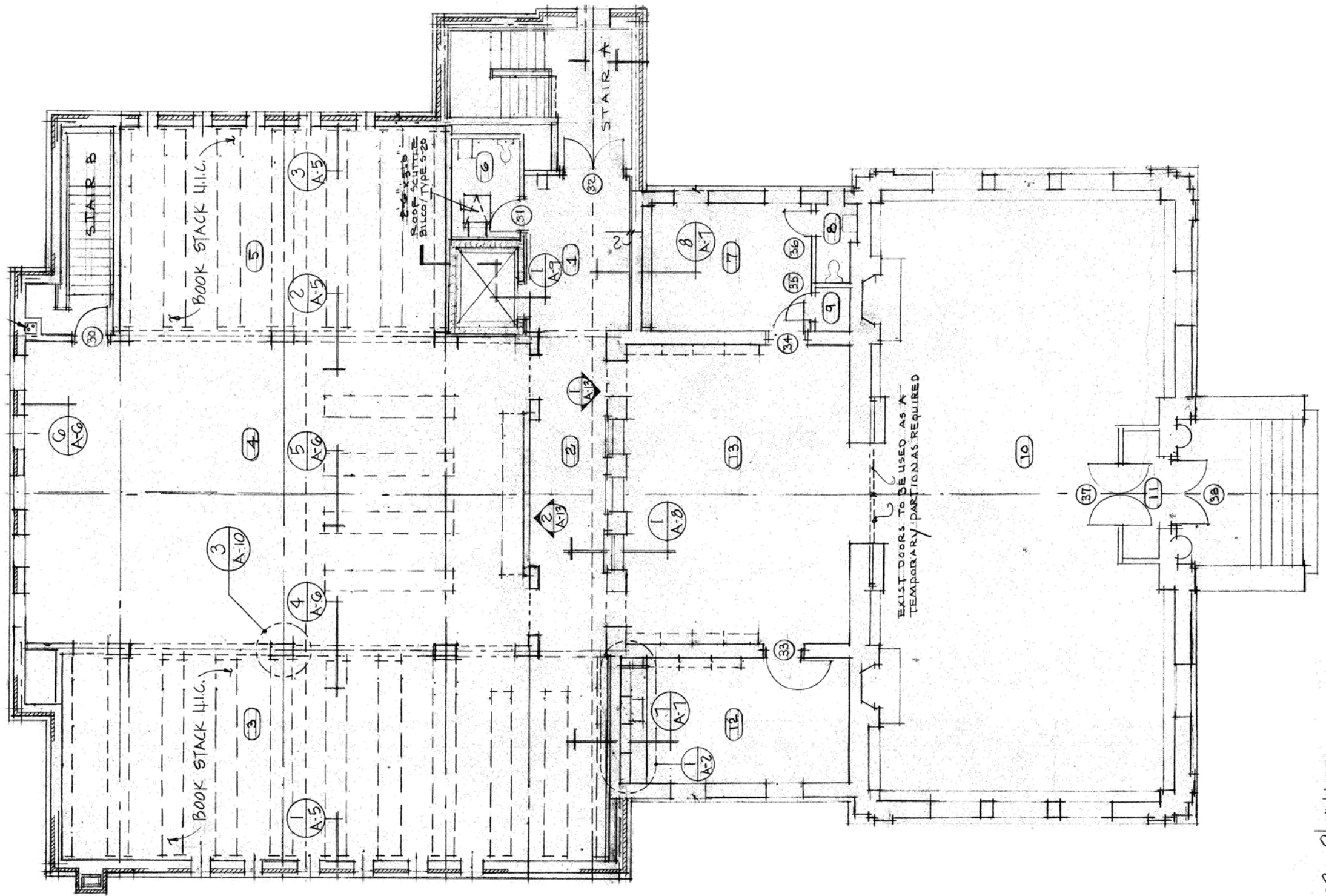
PROJECT: #1836  
**SOUTHBOROUGH  
 PUBLIC LIBRARY**  
 BUILDING ENVELOPE  
 ASSESSMENT  
 25 MAIN STREET  
 SOUTHBOROUGH, MA 01772

#	DATE	DESCRIPTION
00	Nov. 30, 2018	FOR REVIEW

ISSUANCES:

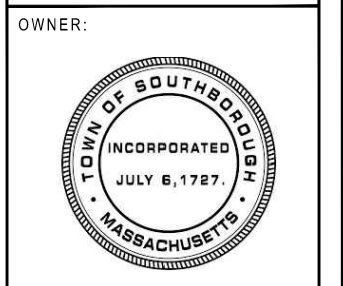
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**EXISTING  
 BASEMENT FLOOR  
 PLAN**

SHEET #:  
**AX-101**



**1** EXISTING FIRST FLOOR PLAN  
 3/32" = 1'-0"

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 25 MAIN STREET  
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#	DATE	DESCRIPTION
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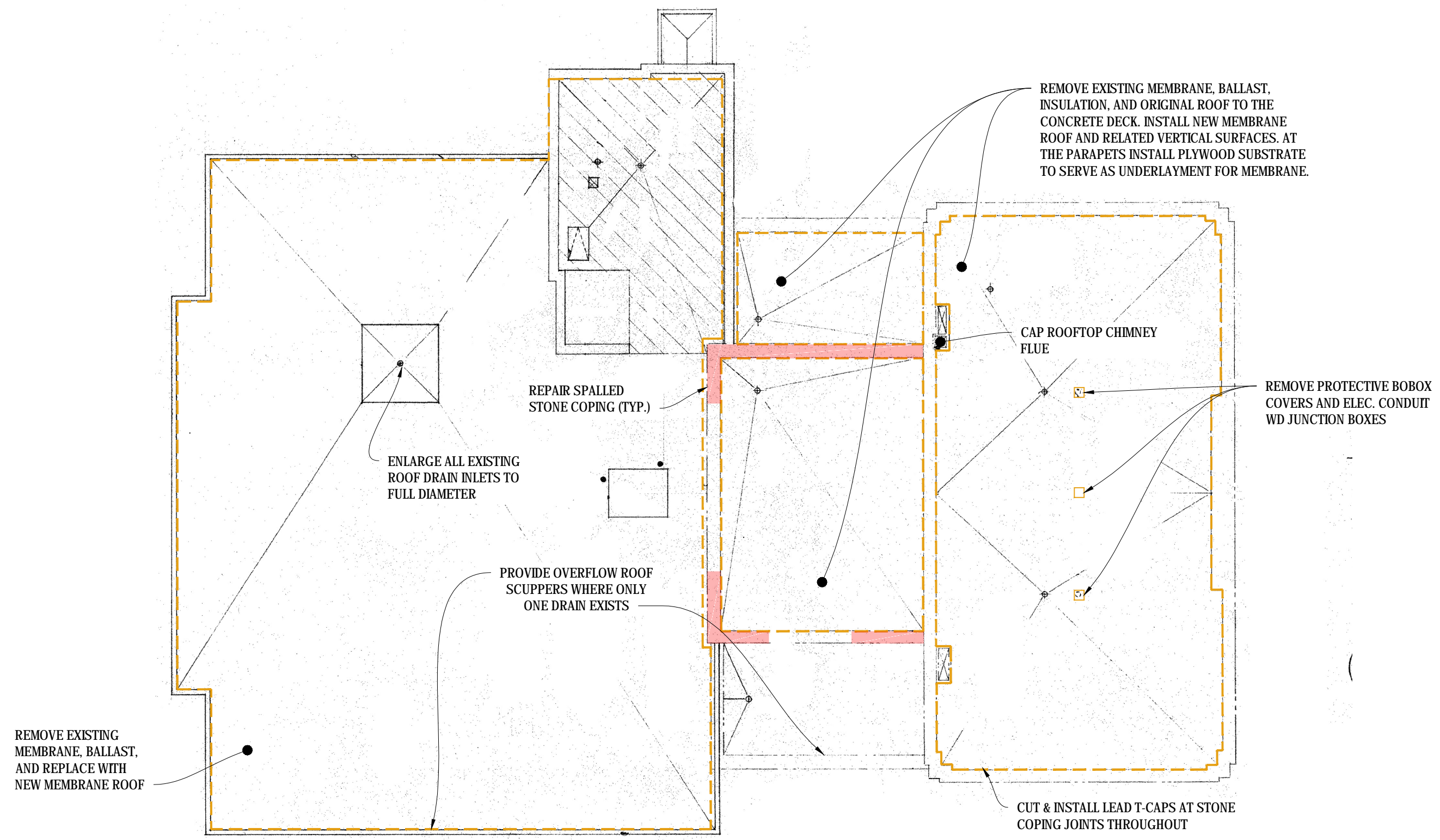
ISSUANCES:  
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**EXISTING FIRST  
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SHEET #:  
**AX-102**

#	DATE	DESCRIPTION
00	Nov. 30, 2018	FOR REVIEW

ISSUANCES:  
 SHEET TITLE:  
**EXISTING ROOF  
 PLAN**

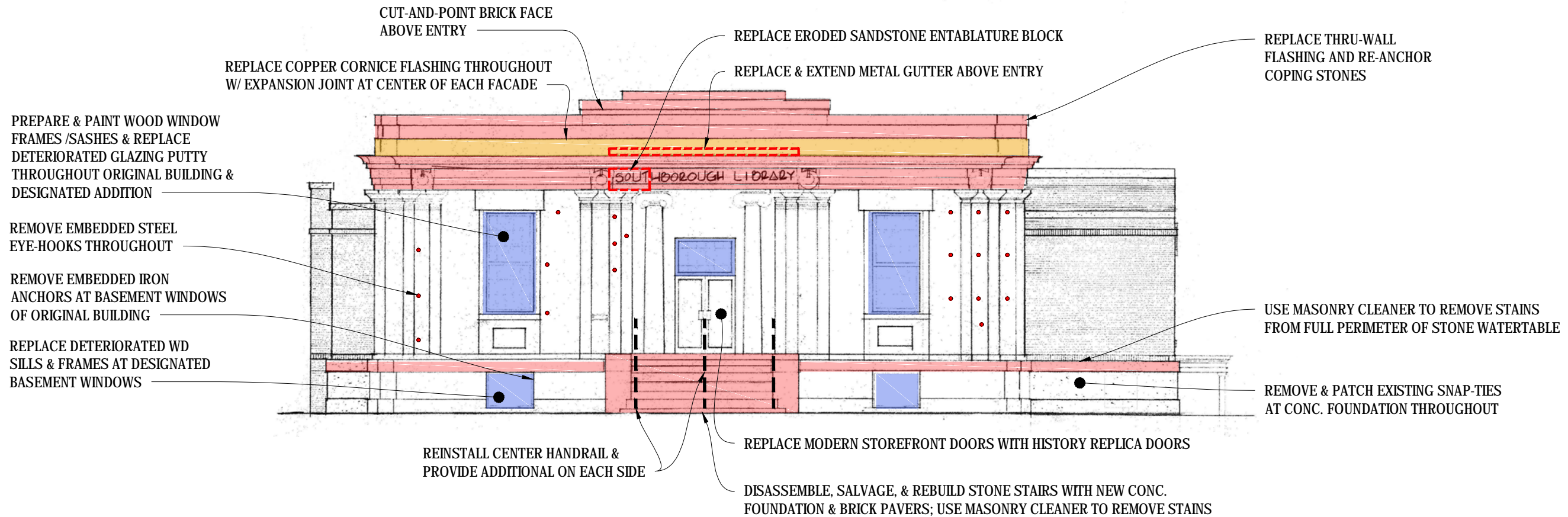
SHEET #:  
**AX-103**



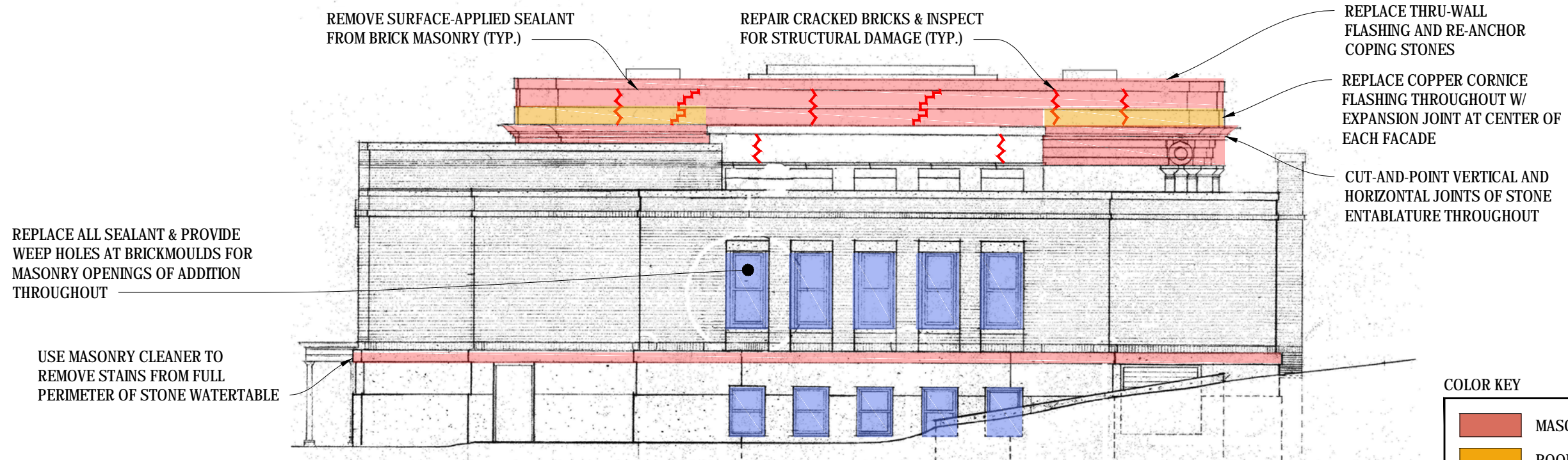
**1** EXISTING ROOF PLAN  
 3/32" = 1'-0"

**COLOR KEY**

- MASONRY
- ROOF & FLASHING
- WINDOWS



**1** EXISTING SOUTH ELEVATION  
3/32" = 1'-0"



**2** EXISTING NORTH ELEVATION  
3/32" = 1'-0"

**COLOR KEY**

- MASONRY
- ROOF & FLASHING
- WINDOWS

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OWNER:

TOWN OF SOUTHBOROUGH  
INCORPORATED  
JULY 6, 1727  
MASSACHUSETTS

PROJECT: #1836

**SOUTHBOROUGH PUBLIC LIBRARY**

*BUILDING ENVELOPE ASSESSMENT*

25 MAIN STREET  
SOUTHBOROUGH, MA 01772

#	DATE	DESCRIPTION
00	Nov. 30, 2018	FOR REVIEW

ISSUANCES:

SHEET TITLE:  
**EXISTING NORTH & SOUTH ELEVATIONS**

SHEET #:  
**AX-201**

REPLACE THRU-WALL FLASHING AND RE-ANCHOR COPING STONES

CUT-AND-POINT VERTICAL AND HORIZONTAL JOINTS OF STONE ENTABLATURE THROUGHOUT

REMOVE EMBEDDED STEEL EYE-HOOKS THROUGHOUT

USE MASONRY CLEANER TO REMOVE STAINS FROM FULL PERIMETER OF STONE WATERTABLE

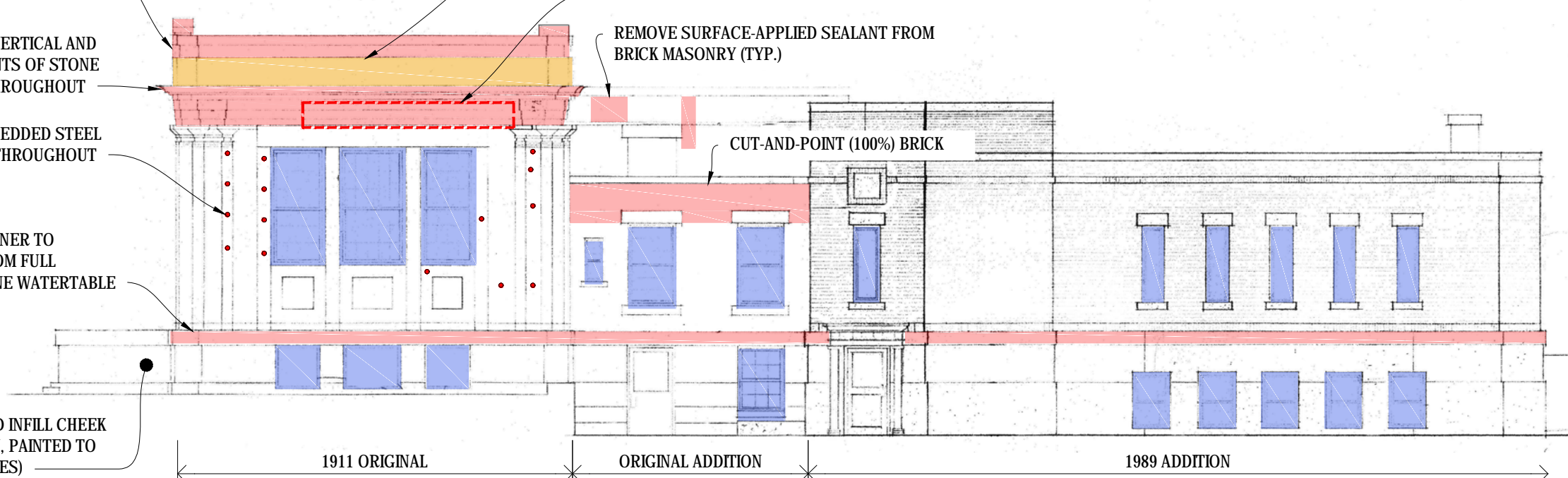
REMOVE IRON GRILLES AND INFILL CHEEK WALL OPENINGS WITH CMU, PAINTED TO MATCH GRANITE (BOTH SIDES)

REPLACE COPPER CORNICE FLASHING THROUGHOUT W/ EXPANSION JOINT AT CENTER OF EACH FACADE

REPAIR ERODED SANDSTONE ENTABLATURE BLOCKS

REMOVE SURFACE-APPLIED SEALANT FROM BRICK MASONRY (TYP.)

CUT-AND-POINT (100%) BRICK



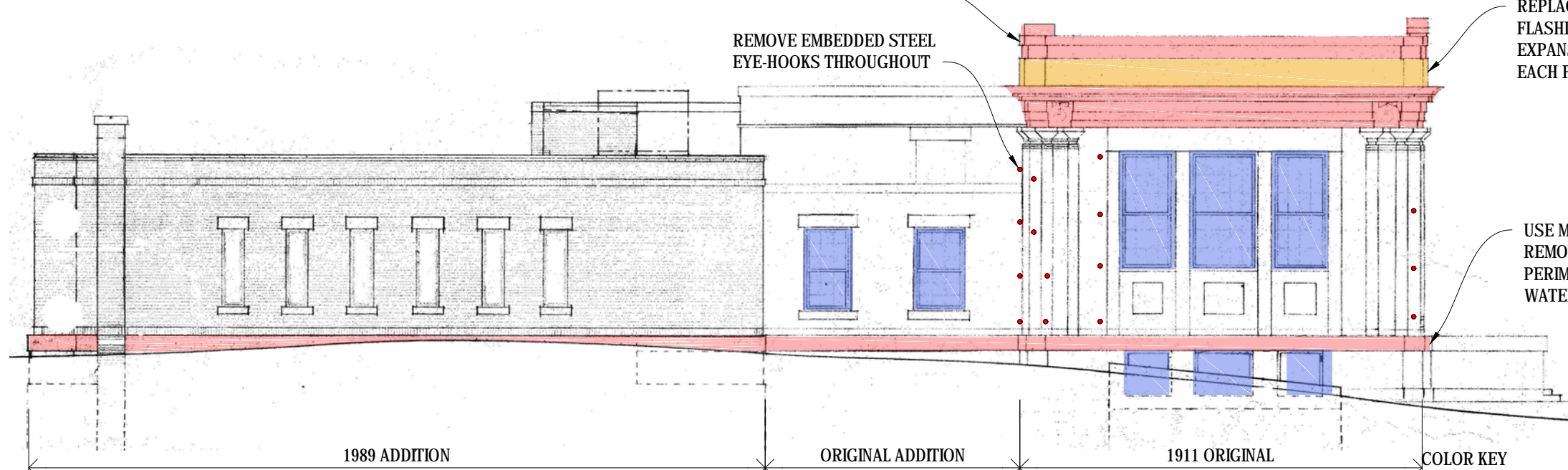
**1** EXISTING EAST ELEVATION  
3/32" = 1'-0"

REPLACE THRU-WALL FLASHING AND RE-ANCHOR COPING STONES

REMOVE EMBEDDED STEEL EYE-HOOKS THROUGHOUT

REPLACE COPPER CORNICE FLASHING THROUGHOUT W/ EXPANSION JOINT AT CENTER OF EACH FACADE

USE MASONRY CLEANER TO REMOVE STAINS FROM FULL PERIMETER OF STONE WATERTABLE



**2** EXISTING WEST ELEVATION  
3/32" = 1'-0"

COLOR KEY

- MASONRY
- ROOF & FLASHING
- WINDOWS

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OWNER:

OBJECT: #1836

**SOUTHBOROUGH PUBLIC LIBRARY**

*BUILDING ENVELOPE ASSESSMENT*

25 MAIN STREET  
SOUTHBOROUGH, MA 01772

#	DATE	DESCRIPTION
00	Nov. 30, 2018	FOR REVIEW

ISSUANCES:

SHEET TITLE:  
**EXISTING EAST & WEST ELEVATIONS**

SHEET #:  
**AX-202**

# Cost Estimate

<b>COST ESTIMATE</b>						
DIVISION	Quantity	Unit	Cost	1912	1989	Remarks:
<b>01 - General Requirements</b>				<b>BUILDING</b>	<b>ADDITION</b>	
(See Below)						
<b>02 - Existing Conditions</b>						
	Quantity	Unit	Cost	Total	Total	Remarks:
<b>4100 - Demolition</b>						
Deconstruct, tag, and number existing granite stairs and cheek walls	1	LS	\$2,500	\$2,500		
<b>8200 - Asbestos Remediation</b>						
Remove/dispose of asbestos-contaminated roofing, flashing, and caulking	2600	SF	\$8	\$20,800		
				<b>Subtotal</b>	<b>\$23,300</b>	<b>\$0</b>
<b>03 - Concrete</b>						
	Quantity	Unit	Cost	Total	Total	Remarks:
<b>0100 - Maintenance of Concrete</b>						
Use concrete cleaner to remove stains from foundation	750	SF	\$5		\$3,750	
Chip out and patch existing concrete foundation snap ties	1	LS	\$4,000		\$4,000	
<b>3100 - Structural Concrete</b>						
Provide new concrete foundation for front stone stairs	1	LS	\$25,000	\$25,000		
				<b>Subtotal</b>	<b>\$25,000</b>	<b>\$7,750</b>
<b>04 - Masonry</b>						
	Quantity	Unit	Cost	Total	Total	Remarks:
<b>0100 - Maintenance of Masonry</b>						
Use masonry cleaner to remove stains from water table	7100	SF	\$5	\$35,500		
Use masonry cleaner to remove ferrous stains from stairs & foundation walls	400	SF	\$5	\$2,000		
Cut-and-point (100%) brick parapet & designated locations	1385	SF	\$35	\$48,475		
Remove embedded ferrous eye-bolts from brick walls & repoint	1	LS	\$4,000	\$4,000		
Remove embedded ferrous anchors at basement masonry openings & patch	1	LS	\$2,000	\$2,000		
Cut-and-point (100%) sandstone entablature joints	420	LF	\$20	\$8,400		
Repair spalled stone coping from termination bar anchors	1	LF	\$4,000	\$4,000		
Install lead T-Caps at stone coping	75	EA	\$100	\$7,500		
Replace salt-weathered carved-stone lintel block "SOUT"	1	LS	\$20,000	\$20,000		
<b>2200 - Concrete Unit Masonry</b>						
Infill existing granite stair cheek wall openings with CMU	15	SF	\$55	\$825		
<b>4100(?) - Dry-Placed Stone</b>						
Reconstruct existing granite stairs & cheek wall	1	LS	\$85,000	\$85,000		
				<b>Subtotal</b>	<b>\$217,700</b>	<b>\$0</b>
<b>05 - Metals</b>						
	Quantity	Unit	Cost	Total	Total	Remarks:
<b>7300 - Decorative Metal Railings</b>						
Remove and reinstall existing center handrail in front stone stair	1	LS	\$5,000	\$5,000		
Provide 2 new galvanized metal railings on each side of front stone stair	1	LS	\$15,000	\$15,000		
				<b>Subtotal</b>	<b>\$20,000</b>	<b>\$0</b>
<b>06 - Wood, Plastics, &amp; Composites</b>						
	Quantity	Unit	Cost	Total	Total	Remarks:
<b>4600 - Wood Trim</b>						
Replace deteriorated window sills at basement level	10	LF	\$125	\$1,250		
Repair (dutchmen) window brick mould at basement level	5	LF	\$850	\$4,250		
				<b>Subtotal</b>	<b>\$5,500</b>	<b>\$0</b>



