Conditions Assessments and Treatment Reccomendations for

UNITARIAN MEMORIAL CHURCH

FAIRHAVEN, MASSACHUSETTS
19 DECEMBER 2019

VOLUME I

Spencer, Sullivan & Vogt
ARCHITECTURE · PRESERVATION

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

In December 2018, Spencer, Sullivan & Vogt (SSV) was engaged by the Unitarian Memorial Church (UMC) in Fairhaven, Massachusetts for a comprehensive conditions assessment of the building with treatment recommendations. The study focused on the church building itself and the cloister but did not include the Parish House or Harrop Center. The intent of the study is to establish a baseline for dealing with the building's moisture problems and to address problems with the building envelope. This study involved assessment of the building on both the exterior and interior to understand its long-standing moisture issues as well as other issues.

Faced with the challenge of maintaining this elaborate structure and ensuring its aesthetic integrity and functional utility, the stewards of the church were initially led to seek this assessment because of issues in the tower and the staining on the interior walls of the church sanctuary. Through the process of observation and study it rapidly became apparent that the masonry conditions on the interior and exterior are being driven by the exterior water penetration issues. These are conditions that have been observed before, although no effective ways to stop the water penetration have been implemented. A significant part of this study responds to the request to mitigate the staining that can be observed on the interior, which itself is integrally linked to issues with the building's exterior envelope.

Consultation with the structural and masonry consultants supplemented the architectural observations of the causes of many of these issues that are allowing leaking and moisture penetration to the interior. The issues result from original design decisions, deferred maintenance, and inadequate means of addressing the problems over many years. The good news is that the leaking problems can largely be controlled via the treatment recommendations in this report that include attention to:

- Roofing & Flashing – drainage management
- Masonry
- Windows

After these critical steps there can be interior treatment to address the aesthetic appearance resulting from the leaks. Additional work can address the problems of the functionality of the monumental bronze doors and cloister security issues. Finally, hazardous materials were identified at the site and need to be abated in work areas.

Current situation

The exterior of the building envelope was reviewed both architecturally and structurally. Considering its age and many water issues, much of the detail and beauty of the UMC survives intact, including the carvings, much of the woodwork, the organ, bells, bronze doors, and stained glass.

After over 100 years of sustained water penetration through the limestone walls,

however, the stonework exhibits signs of moisture infiltration and in certain places advanced decay has led to spalling and stone elements falling. These are hazards that left unchecked will take a drastic toll on the building, and indeed they present a safety hazard to occupants at the present. Other parts of the building should be brought up to code for accessibility. The architectural observations are coupled with observations from our consultants.

The structural analysis disclosed that there are eroded mortar joints, limestone erosion, efflorescence, rising damp, corrosion of steel structural members, and settling – all due to moisture issues. All of these issues are systemic and characteristic of conditions across the building; however, they do not pose insurmountable problems, and all are solvable if the right attention is put to each of them. In particular there needs to be a comprehensive effort across the building to stop water penetration at the roof that is penetrating the walls and leading to many of the issues. Fortunately none of the issues is so bad as to present any immediate structural peril to the building, but if left unchecked these conditions will present even more serious problems in the future.

Similarly with the masonry assessment, the overall structure is sound and especially the limestone carvings on the exterior are in very good condition given their age. However, the limestone trim elements in the exterior walls are in a more advanced condition of disrepair, and this again is due to water infiltration. Whereas the sculptures on the exterior are not taking in water, the water inside the walls leaches out through the limestone trim elements in the walls making them much more prone to damage from water infiltration. In particular the cycle of freeze-thaw each year has led to decay of these elements, in particular at the large east arched window.

An interview a man who was involved with the construction of the UMC buildings, as well as the architect's drawings indicated that at least some walls are constructed with a gap between the brick and the stone that was filled with sand. It seems to be a counter-intuitive detail that would lead to many problems, and it needs to be verified if the walls are constructed in this manner. While there is no definitive evidence ruling out the use of cavity walls in the UMC buildings until all the walls are studied, it would appear that these types of walls do not predominate in the construction of the church itself. Nevertheless, whether there is an air cavity or not in the walls, there is significant capillary action that is wicking moisture through the porous limestone leading to issues on both the exterior an interior.

The masonry issues must be dealt with as soon as possible in order to prevent instability that could jeopardize the decorative elements these stones support such as the stained glass. In addition, inadequate water shedding systems have led to chronic moisture penetration that has bled to the interior limestone facing of the sanctuary. Metal ties in the wall that hold the limestone facing in place have rusted, and this has leached through the stone and discolored it on the interior surfaces. In areas with the worst water penetration, the stone has become weakened and in some cases has actually fallen away or fallen out in chunks. Not least is the safety hazard presented by such conditions of falling stone, but there is also the danger again to the delicate carvings and the overall beauty of the interior appearance, which is marred by these brownish stains. While there are effective means to stanch the water penetration,

there is no easy fix for the stains, which run completely from the back to the front side of the interior facing limestone. One option would be replacing the stones, a costly initiative. Another might be coating the stones once the leaking has stopped to cover up the appearance of the damage.

The stained glass windows were assessed by Roberto Rosa of Serpentino Stained Glass and largely determined to be in fair condition. Julie Sloan's 2005 report also exhaustively examined the windows and provided prioritized treatment recommendations. Sloan identified six windows in the sanctuary at the first level of priority, including the large east window, four in the south clerestory, and one in the north clerestory. Serpentino corroborates Sloan's observations in recommending immediate attention to the east window and further inspection at close range of the clerestory windows to determine a course of work.

The Plexi-glas panels covering much of the stained glass have yellowed and obscure the glass both from within and without. Moreover, in certain locations, improper venting of the Plexi-glas is actually doing more harm than protective good. Serpentino removed much of the Plexi-glas during the site visit and recommends to remove the remaining Plexi-glas to enhance the visibility of these beautiful windows that are a true treasure and only keep the protective panels in areas most subject to potential vandalism.

Finally, hazardous asbestos-containing materials were identified on the site in many of the sealants and roofing materials. These will need to be removed by qualified abatement specialists in any of the areas where repair work is proposed.

We have projected a budget of **$???** to implement the Immediate Repairs and Improvements (1-2 years), **$???** for the costs of the Short-Term Repairs and Improvements (3-5 years), and **$???** for the Long-Term Repairs. We estimate that it will cost approximately **$???** to incorporate an accessible bathroom and pathway to it in the building.

The estimated annual maintenance budget is **$???** with a recommended sinking fund of **$???** per year as a set-aside for future capital projects. While these costs are challenging, regular annual maintenance forestalls critical and costly repairs. A sinking fund, otherwise known as a cash reserve, is basically a savings account. The idea is to set aside funds annually in anticipation of major capital improvements such as roof replacement, painting, and replacement of aged mechanical systems. Such a fund represents fiscal prudence and may serve to inspire donors who can consider UMC beneficiaries of their estate plans.

The good news is that the building's problems can be largely controlled via the treatment recommendations in this report. Fortunately, identification of the physical maladies of the building is coinciding with the realization by the building's stewards that it has great historic value and potential for preservation as a magnificent structure for the future.

Another aspect that should be considered are accessibility requirements. Per the regulations of the MAAB, any work that costs over 30% of the assessed value of

the building will trigger compliance requirements. The code requirements will need to be considered as part of the ongoing building evaluation.

The images on the following pages of this Executive Summary present a broad overview of conditions at the building that are covered in detail in the second section of this report on page 49.

METHODOLOGY

The report represents a collaborative effort between SSV and the stewards of the UMC. The client was represented by Bob Rocha and members of the church staff. The project team was assembled and coordinated by Lynne Spencer, partner and preservation principal at SSV. Lynne directed on site investigations with the assistance of preservation architect Doug Manley who observed conditions and made treatment recommendations. Architectural designer Curtis Perrin synthesized these observations, developed the historic research components of the report, and coordinated its final assembly.

SSV assessed the building envelope and interior conditions and documented them with narrative and photographs. Several visits were made to the church for purposes of observation in a variety of seasons and climactic conditions. The first of these was in March, to get an overview of problems the church itself observed as well as to do research in the church archives on previous repairs. The second visit was in April, followed by a lengthier visit over the course of four days from July 29 through August 1. For this lengthy inspection, an 80-foot lift was hired so that a comprehensive examination of the exterior of the structure could be performed on all faces. Additionally drone photography was used to get views of the roof and tower beyond those provided by the lift, and further observations were made from the ground and various other roofs. Present for the multiple days were representatives from Structures North Consulting Engineers, Ivan Myjer providing masonry consulting, Roberto Rosa providing expertise on stained glass, and Titan Roofing was present to guide thinking about the existing roofs. Selective repairs were made by Titan to roofing at this time, in particular to EPDM membranes. Samples were collected from throughout the builting of potential hazardous materials which were given to Fuss & O'Neill for analysis. Plexi-glas was removed from the stained glass windows, and some patching was performed as well as make-safe removals.

All photographs were taken by SSV unless otherwise indicated. The final report was issued both as a printed document and in electronic format as a portable document format (pdf).

The report

The report is organized as follows:

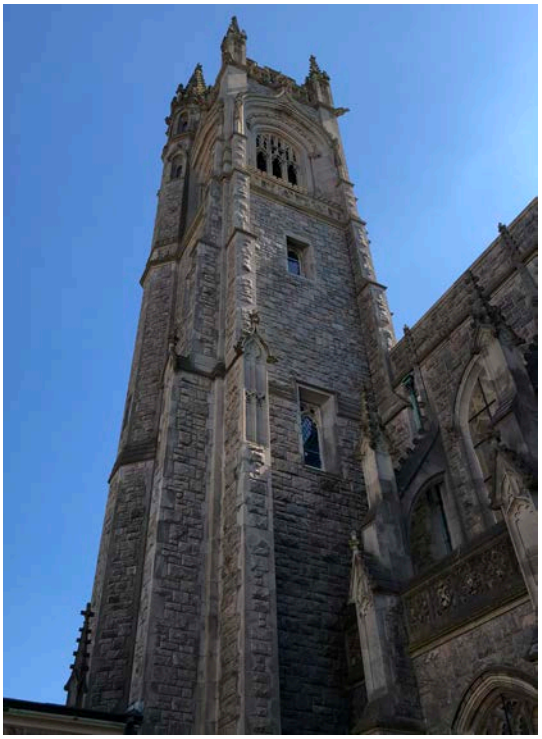
Part One of the report, History & Significance, begins with a brief history and

stylistic description of the building. Next is a list of character defining features, the physical elements that define the building's architectural significance and should be retained in any restoration scheme. The Preservation Guidelines section describes how alterations to the building should be approached to retain and celebrate the building's architectural significance.

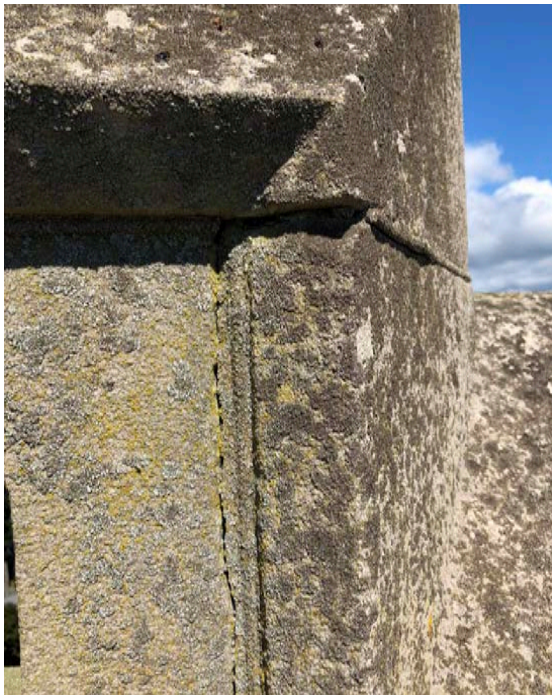
Part Two, Existing Conditions & Treatment Recommendations, includes an examination of conditions at the building, both exterior and interior, from the roof to framing to the foundation, and recommendations for repair. Structural, mechanical, and hazardous materials assessments and a building code analysis are provided for the existing structure.

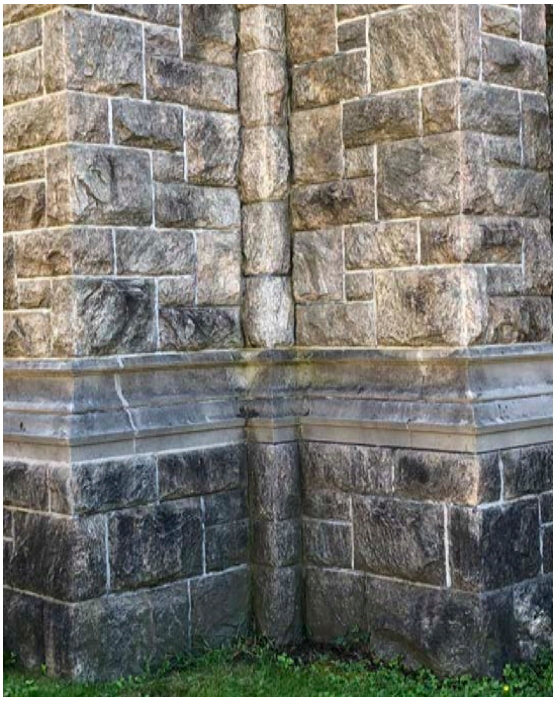
The Appendix includes photographic documentation of the building and resources used in preparation of the report.

From any direction this is an extraordinary edifice: clad in locally quarried granite, trimmed in limestone, featuring truly unique stained windows and bronze doors. Yet the problems of preserving and maintaining such a complex structure pose a number of challenges.



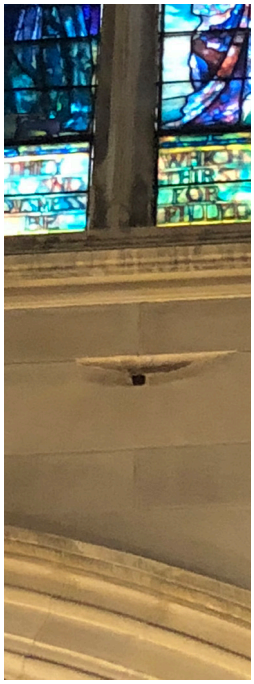
Erosion and staining of the limestone at the narthex entry may be an indication of water shedding exacerbated by the inherent qualities of the stone itself. In other situations, the moisture rich atmosphere of this seaside community fosters organic growth. And while many of the mortar joints in the ashlar granite walls appear intact, there are telltale signs of deterioration. An abiding concern is construction technology employed in the building of the church, which involves ferrous metal ties linking exterior granite veneer to the inner limestone veneer through the infill masonry.

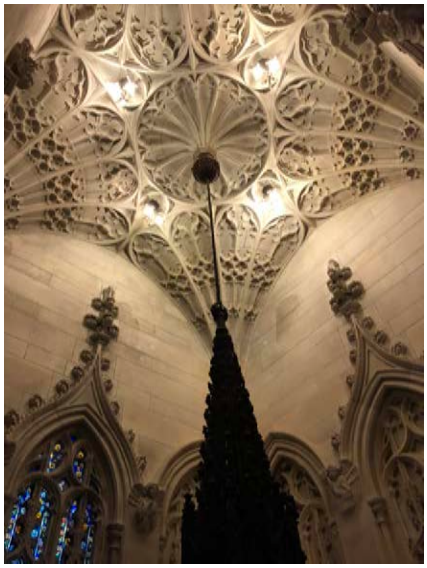


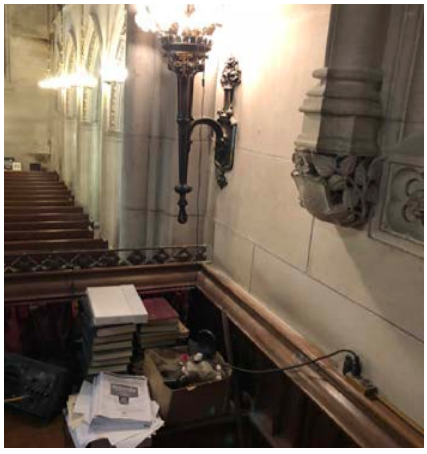


Linking the sanctuary to the Parish House is the cloister with its magnificent mosaic floor. Concerns about the slow rise of this floor may be related to steel or iron beams used in the original construction. The analytic skills of both structural engineer John Wathne and masonry consultant Ivan Myjer were called upon to determine what is at issue. Appropriately, Ivan has expertise in mosaic design and fabrication. With the analysis come treatment recommendations to arrest deterioration and preserve the entire architectural ensemble.

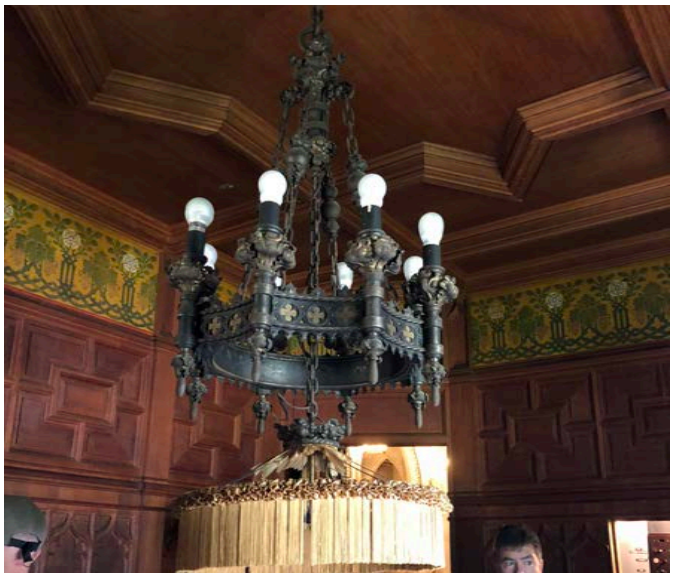
Perhaps the most glaring problems originate with roof and gutter issues. Staining on the interior limestone was observed as far back as the 1920s. Continued problems are writ large on the walls, obscuring the beauty and grace of this place. Even more troubling is spalling, where a section of stone literally pops off as a result of water penetration and rusting ferrous ties.

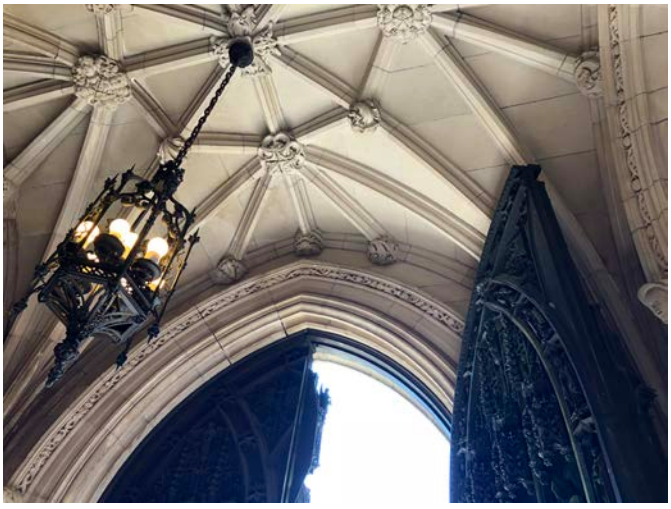




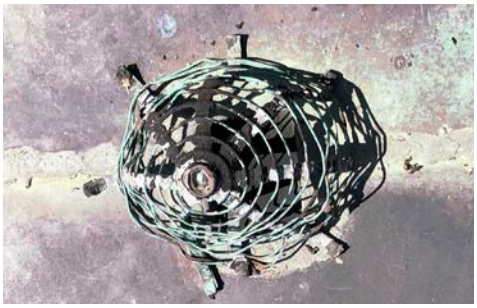


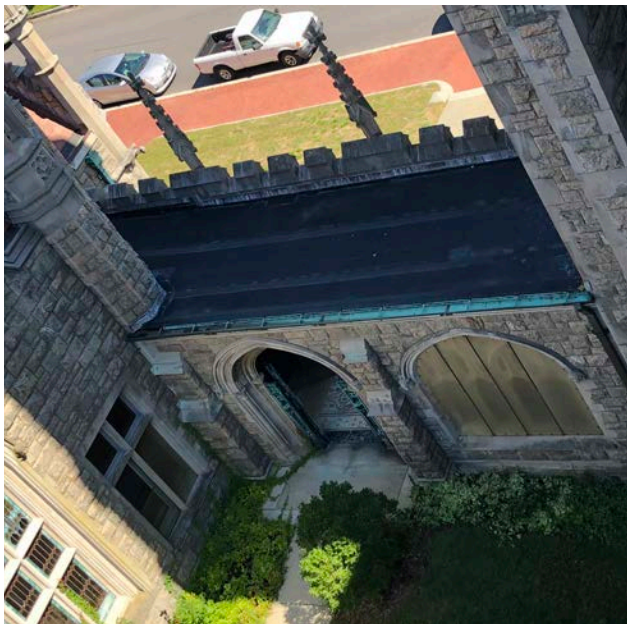
The beauty of the Sanctuary is both its intricate design and craftsmanship and the quiet grace it embodies. The Baptistry with its carved oak baptismal font, molded plaster, radial fan-vaulted ceiling, and marble flooring is a complex ensemble. Original chandeliers and sconces, vaulting and ribbing, pews and pulpit all radiate the highest level of craftsmanship and the need to keep the water out!

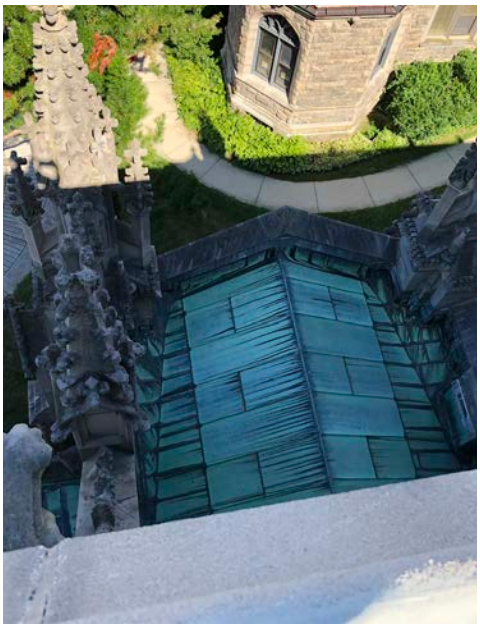


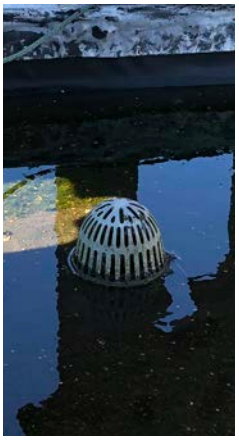


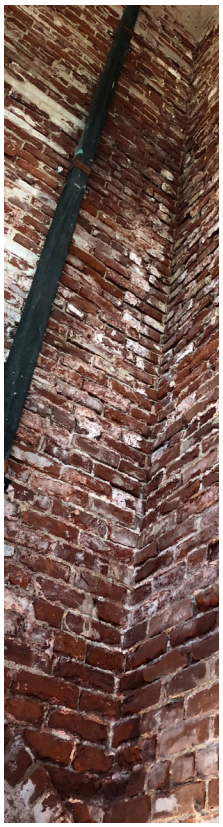
Keeping water out (and heat within) has been an ongoing and at times agonizing challenge for the stewards of this church. A 2004 roof project replaced the copper gutters, leaving the Sanctuary pitched roofing intact. Drainage is provided by piping to collector boxes and downspouts. It is unclear where water goes once underground, nor is it absolutely certain that leaking into the sanctuary has been eliminated. Although water problems in the basement may be limited to some rising damp as seen on the brick piers, getting a better understanding of drainage may be analyzed by video cameras in one or two locations. Other sections of roof appear to be aged. Examination by SSV along with Jon Bates of Titan Roofing evaluated conditions and best treatment methods.





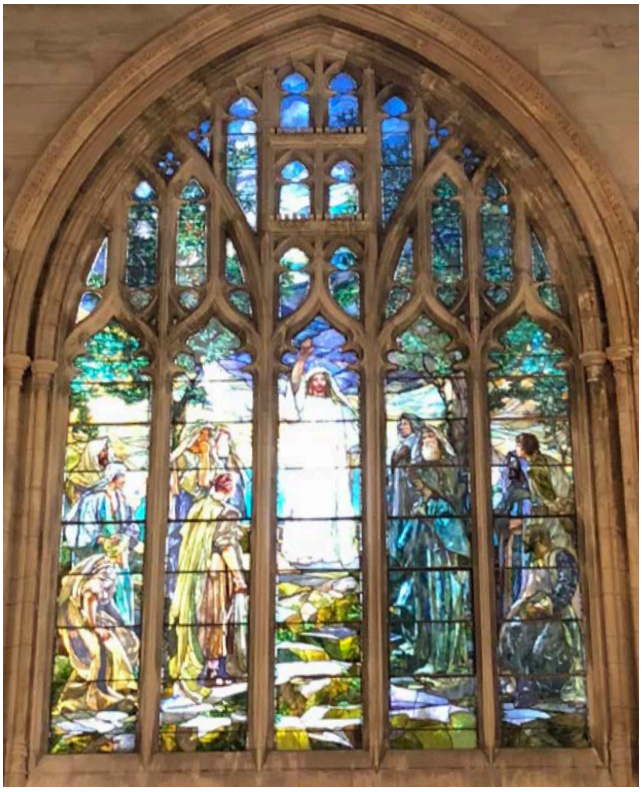


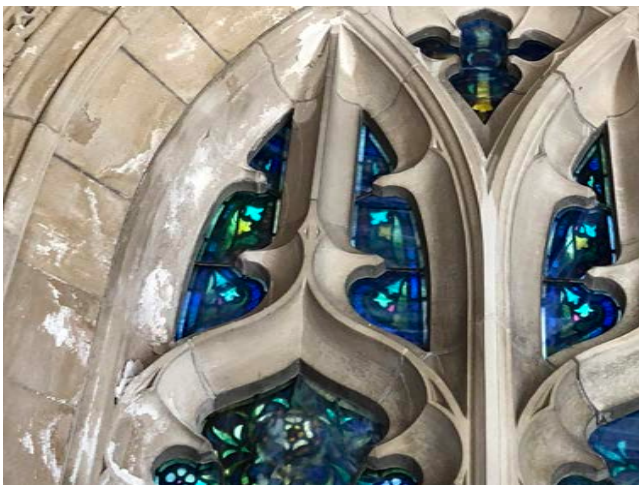


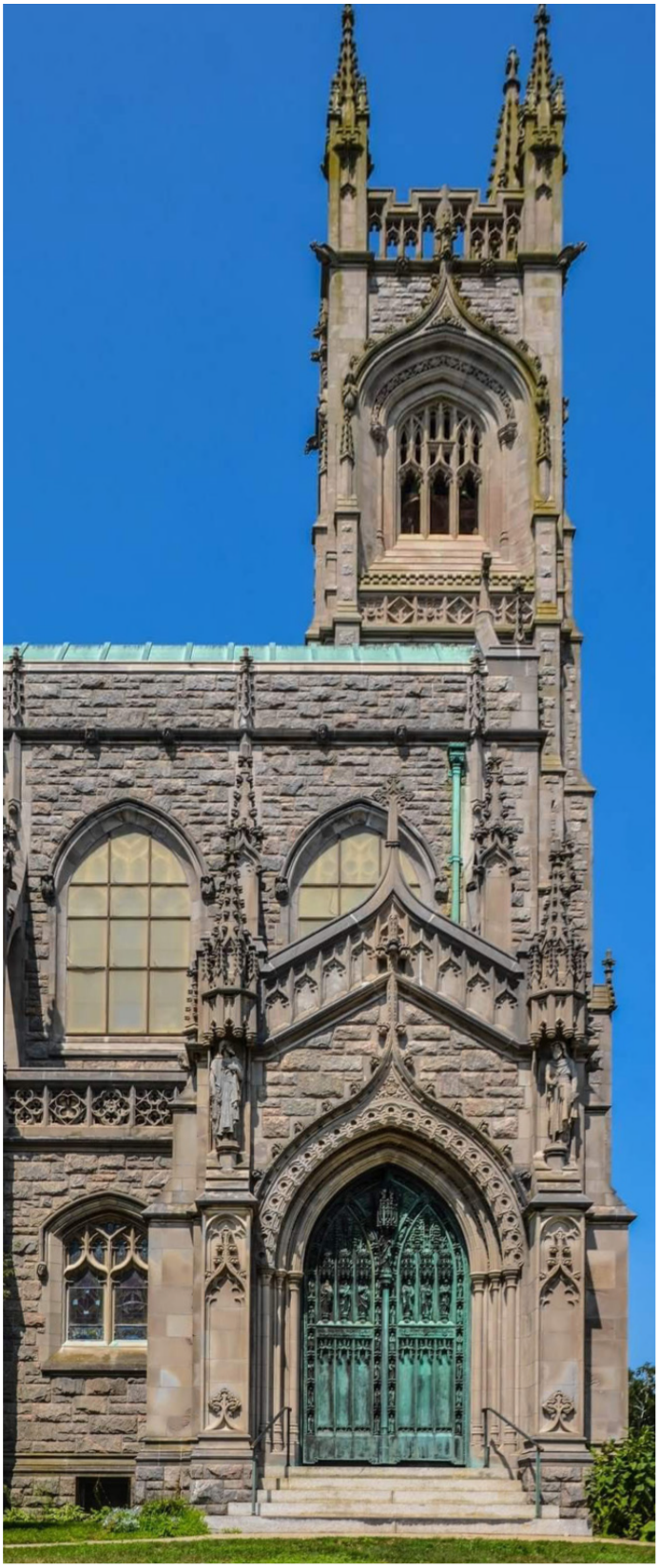


The tower is a significant concern as it shelters eleven magnificent bells. Deteriorated mortar joints, spalled brick, and efflorescence all indicate problems, including standing water and cracked stones. The lightning rod system is generally well anchored, and the grounds adequate.

The stained glass windows feature truly unique glass painting by Robert Reid, apparently the first and only time this impressionist painter applied his talent to stained glass. The yellowing polycarbonate panels were removed to alleviate potential problems, including water penetration at the jambs and heat build-up which can accelerate deterioration of the lead cames. This revealed the original slightly rippled outer glazing. We understand that the stained glass has been previously assessed. This study is benchmarked by a new assessment by Roberto Rosa at Serpentino Stained Glass.







(pinterest.com, © Lynne Vance)

The steeple of the Unitarian Memorial Church and the bronze doors today.

PART 1: HISTORY & SIGNIFICANCE

OVERVIEW

The Unitarian Memorial Church (UMC) of Fairhaven, Massachusetts is an exceptional example of English Gothic style architecture and is argued by some to be the most elaborately detailed church in America. Its soaring tower serves as a landmark visible for miles around, and its architecture creates a rich visual effect through vertical lines, large windows, and decoration. It is a building that deserves careful study.

A gift to his native town by Standard Oil tycoon Henry Huttleston Rogers, it was designed by Charles Brigham, whose architectural output already included many notable commissions by the time he was selected for the UMC in 1901. It was reputed to have cost in excess of $1 million at the time it was completed in 1909. It is constructed of granite, with delicate limestone carvings, and a standing seam copper roof, while limestone and marble richly carved surfaces adorn the interior.

The sanctuary is elaborated with hand-carved woodwork by the renowned sculptor Johannes Kirchmayer, with an ornate pulpit, choir screen, angels in the rafters, and marble floors with inlaid bronze. Completing the sumptuous array are artist Robert Reid's stained-glass windows, whose paintings show remarkable execution in the faces and follow a chromatic theme that moves from night to day across the length of the building, with each window becoming progressively brighter.

Ironically, the flamboyant detail and lavish fittings of this building are also preservation issues, because each of these complex elements presents its own unique challenges for upkeep and repair. Water infiltration and its effects on the delicate interior limestone carvings are a major concern stemming from the original construction details. Related problems that also trace their origins to historical construction materials and assemblies are resulting in other serious damage to interior finishes and envelope related problems. Safe operation of the church as well as preservation of its assets depend on a detailed, technical analysis from an architectural preservation firm with expertise in comprehensive assessments of historical construction.

Today, the architecture of New England's Unitarian churches is most often associated with nineteenth-century meetinghouses or the expressive organic forms of Frank Lloyd Wright because these are seen to express the simplicity and dignity of clearly articulated beliefs. Nevertheless, UMC also plays out the idea of Unitarianism in its architecture in its own way that accords with the Seven Principles of Unitarian communities. First is the free and responsible search for meaning, which is embodied in this church's dedication to craft and workmanship, as a visible proof of an

honest search for quality. Then there is also the idea of respect for all existence, seen in the way in which this construction reaches toward the interdependence of all its parts. There is an attitude amid the many parts and decorations of this building of acceptance and a free and responsible encouragement of memory. Combined with the way culture develops from within an existence of which we are all part – the self-contained parts of the church seem additive, individual, rather than integrated in a way that would suppress their identities. Finally, the organization of physical effort to bring these values together in a building is part of the process by which common goals are brought about by the action of human minds and communities along with the aspiration for beauty, which is in line with the goal of a community of worth and dignity for every person.

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BUILDING DESCRIPTION

The UMC comprises a complex of buildings that occupy an entire block in Fairhaven: The Church itself, the Parish House, and a former Parsonage (now the Harrop Center). These buildings were all designed by architect Charles Brigham in the early 20th century for his wealthy client Henry Huddleston Rogers as gifts to the town he grew up in and are all inspired by English medieval prototypes. Within a block of the UMC are also the library, town hall, and several other civic buildings also designed by Brigham for Rogers as gifts to the town.

The Church and Parish House are in the Gothic style and are linked by a cloister with bronze gates. The two-story church sanctuary runs east to west, with a corner belfry tower at the northeast end and an entrance porch with enormous sculptural bronze doors on the southeast corner facing west.

The Church is constructed of mass masonry bearing walls faced on the exterior with ashlar granite from a local quarry that was on Rogers's own land and with carved limestone ornament and corner quoins. The nave is 115 feet high and flanked by one-story ambulatories divided into five bays with buttresses extending to the top of the clerestory and each having a non-structural flying buttress. The east and west elevations have large ogee windows with Gothic tracery and stained glass windows, and there are additional ogee windows in the side bays of the nave and ambulatories. The belfry tower is 156' tall, with small openings on the lower levels, and large lancet openings at the top for the bells, surmounted by a roof with a pierced stone balustrade and pinnacles and a larger lantern for the engaged stair tower at the northeast corner that his higher than the pinnacles at the other three corners. The principal entry to the building is via the cloister that leads to a large wooden door with carved figures, and there is opposite this entry a ceremonial entry in the west elevation with intricately detailed, massive bronze doors. Across all the faces of the building there are numerous limestone figural carvings, crockets, finials, and other ornamentation.

On the interior, the sanctuary walls are faced in limestone and leads to a choir at the west end. The ceiling is supported on wood trusses each with elaborate carving and a wooden angel. There is intricate wood paneling for the organ casework that flanks both sides of the altar and for the oak pulpit. There is gothic ornament in the limestone ribs and a limestone ceiling in a fan design. The floors, pulpit base, and platform are marble, and there are thirty-two decorated wooden pews.

A similar degree of elaborate ornament is found in the cloister, which has double bronze gates on the north and south elevations, carved stone corbel heads, and a mosaic tile floor.

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CHARACTER DEFINING FEATURES

Every old building has a distinctive identity and character. Character-defining features are the significant, observable, and experiential aspects of a building that define its architectural power and personality. These are the features that should be retained in any restoration or rehabilitation scheme in order to protect the building's integrity and to maintain eligibility for preservation grant funding and rehabilitation tax credits.

Character-defining elements include the overall shape of the building and its materials, craftsmanship, decorative details, and interior spaces and features, as well as the various aspects of its site and environment. They are critically important considerations whenever building work is contemplated. Inappropriate changes to historic features can undermine the historical and architectural significance of the building, sometimes irreparably.

This survey of the building identifies the elements that contribute to the unique character of the exterior of the original. The bulleted items in this section should be considered important aspects of the historic nature of the building and changes to them should be made only after careful consideration.

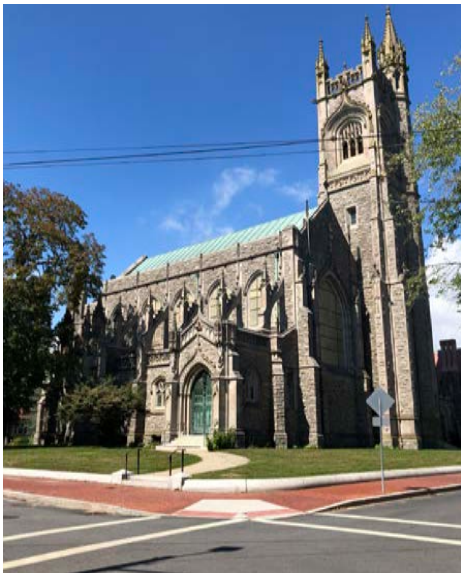
NOTE: Essentially the entire building is character defining, because this is a unique structure in which every element was conceived in the most artful way as part of the whole composition. Missing elements should to the extent possible be replaced with in-kind materials. It is hard to think of any contemporary interventions that would be appropriate on such a structure except those designed to accommodate universal access. In the event such accessibility requirements are desired or triggered, it would be necessary to introduce them in such a way that the character-defining features enumerated here not be negatively altered.

Exterior

Setting: *The topography, population density, and other influences that are noteworthy to the property.*

- The UMC is one of a campus of three buildings on a level lot occupying a whole block with steps rising to the east cloister entrance and steps to a west portico with monumental bronze doors. The entire site is carefully maintained with manicured lawns and plantings.

Location



Gothic shape with tower

Shape: *The form of the building. The massing that gives the initial visual impression of the structure.*

- A mostly-symmetrical cruciform plan, linked to a cloister on the north connecting to the Parish House.
- Gable-ended nave with pinnacled tower at the northeast corner and flying buttresses along the north and south nave elevations.
- Largely patterned on English medieval Gothic architectural prototypes.

Roof and Roof Features: *Typically the most dominant element of a building. Often the element that most informs the shape of the building.*

- Gable-ended copper roof intersected by transepts and with lower roofs covering the aisles.
- Tower with flat roof.

Roof

Foundations: *Base of the building, openings for entries, and other features such as steps and ramps.*

- Granite stone foundations.

Openings: *Windows and doors. These often reflect the hallmark features of specific architectural styles.*

- Monumental bronze double doors on south entry porch.
- Monumental bronze entry gates at cloister.
- Wood door to enter sanctuary from cloister.
- Wood doors in west elevation.
- Large arches in tower for bells.
- Large ogee windows, symmetrically arranged in five bays, on north and south elevations with stained glass by Robert Reid.
- Monumental ogee windows on east and west elevations with significant stained glass by Robert Reid.
- Additional smaller openings at aisles and lower levels of east and west elevations, all with stained glass by Robert Reid.

Openings

Trim and Secondary Features: *Casings at windows and doors, moldings, cornices, watertables and other additive features.*

- Arched limestone lintels and sills at ogee windows.
- Grilles at basement windows.
- Elaborate program of sculpture and ornament in limestone across the entire exterior.
- Carillon bells in tower.

Materials: *The visible kit of parts that comprise the exterior envelope of the buildings.*

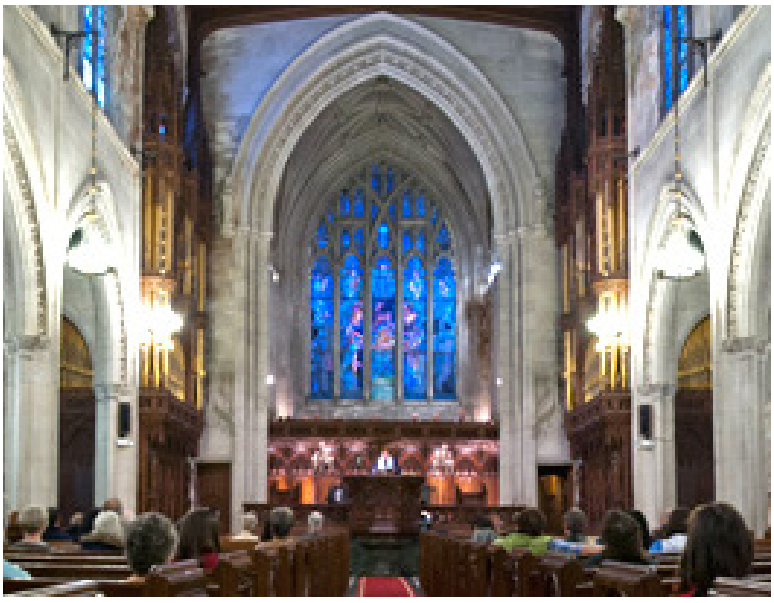
- Granite.
- Limestone.
- Brick.
- Copper.
- Stained Glass.
- Wood.
- Marble (interior).

Interior: *The rooms and interior details that give the building its defining internal character.*

Every element on the interior is character-defining. Some of the standouts worthy of particular mention:

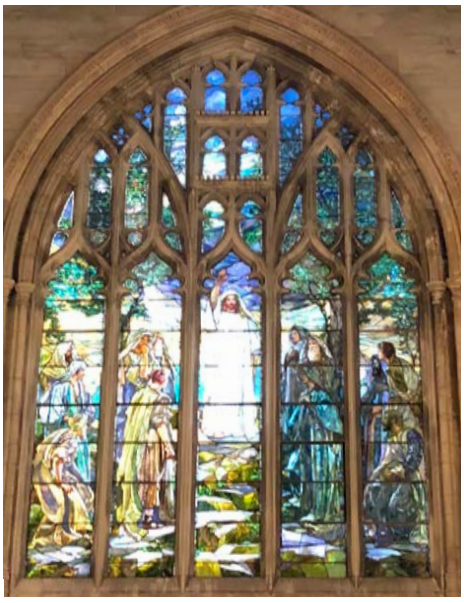
- Elaborate program of interior decoration in carved stone.
- Intricate woodwork at the organ, pulpit, choir, and pews.
- Marble floors with inset brass decoration.
- Decorated trusses with large angels.
- Limestone facing on interior walls.
- Granite columns.
- Organ.

Elaborate decorative scheme and trim materials



uufairhaven.org

Interior, typical level of elaborate detail



Stained glass

BUILDING REPAIR CHRONOLOGY

report by CURTIS MAXWELL PERRIN

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Brigham, Coveney & Bisbee architects (1907)

Building Repair History

This chronology identifies all known repairs to the Unitarian Memorial Church and was compiled from a thorough search of the church archives, the Millicent Library archives, and the reports on the building available from past architects who have worked on the building. Special thanks are due to Bob Rocha for his assistance in gathering these materials.

The Fairhaven Unitarian Memorial Church has gone through many maintenance programs and restorations over the course of more than a century of its existence. The main focus of these efforts has been water issues, in particular leaking at the Sanctuary roof. Some of the causes for these leaks are inherent to the design of the building and cannot be 'solved' and instead require regular attention. But this is not an excuse for repairs that just solve a symptom without getting to the cause. There are miscellaneous non-professional repairs throughout the building (lots of goo!) that should be reassessed as well; such repairs just 'buy time' until a real repair can be performed, but there will come a time when this type of work catches up with the situation, leading to even more drastic repairs being required. What is needed is a comprehensive approach that identifies the shortcomings of some of the flaws in the details of the original building that have led to these problems within a framework for managing them to prevent further damage.

The first problematic 'symptom' related to the design was the extreme tautness of the taper of the original pinnacles, which broke off a couple of times early after the tower was completed. The first time this happened was in 1912, when the tower had only been standing for eight years, and a gale wind dislodged one of the pinnacles on the tower. Again in 1914 another pinnacle was blown from the tower and entirely demolished by the force with which it hit the ground. In fact, a highly critical appraisal of the church penned by Norman Hesseltine appeared in major newspapers at the time it was constructed. Although much of Hesseltine's gripe with the building comes off as shrill aesthetic quibbling, he does accurately note a certain "folly" in the way the building played with basic structural rules of Gothic architecture to support parts of the church in improbable ways. Such shortcomings definitely led to events like the pinnacles being so thin they too easily sheared off in high winds.

Design issues were not limited to things like the pinnacles. It seems that the architect Charles Brigham had aesthetics more than performance in mind when he came up with the design for the church, and a number of its features were designed with attention to their looks but insufficiently detailed for durability. Indeed, one issue that has plagued the building from its early days is a poor detail at the termination of the copper standing-seam roofing, where it meets the limestone at the edge of the building. In order to avoid the copper staining the limestone below, it was held back from the edge of the building, but this lack of an overlap has led to failures of the caulking joint from very early in the building's existence.

Part of this difficulty may stem from alterations to the original design of the Sanctuary while construction was underway. Originally a plain finish was called for on the walls, but this was upgraded to ornamental limestone tablets above the watertable and limestone quoins throughout the ashlar to the top of the tower. It is possible that some of the later problems with the building can be traced to this design change, which was undertaken in 1902 after the building was already partially constructed. Portions of the walls that had already been built were torn down owing to this change in plans, but it is unclear if the details of how the roof and walls were to meet were adequately re-thought at this time. The Sanctuary uses concealed gutters behind the parapets at the top of the walls that drain through lead sleeves

(Standard Times, 6/4/1983)

Aerial view of church.

(Church Archives)

Church Sanctuary under construction.

(Church Archives)

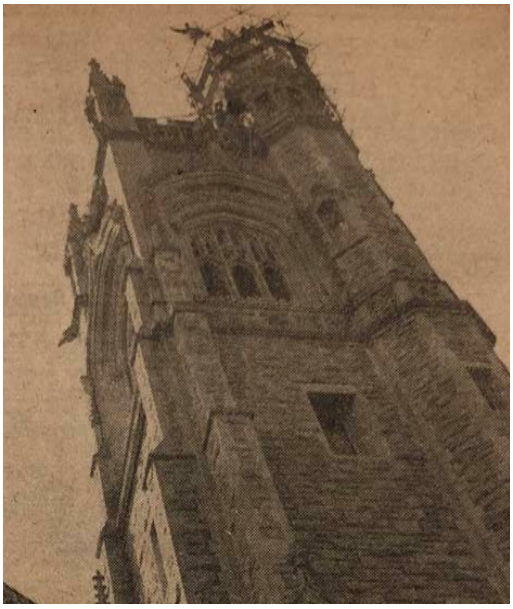
Early photo of church with historic landscaping.

set into the masonry wall, and as a result any leak in these gutters or sleeves has a direct and catastrophic effect on the masonry below the gutter. Moreover, the decision to use limestone blocks instead of the plain finish originally contemplated introduced porous stone to the mixture, and ever since there have been issues with the water leakage passing through these limestone blocks and spreading throughout the sanctuary. As early as 1922, a detailed report by Kilam, Hopkins, & Greeley of Boston was attempting to deal with this issue by recommending waterproofing on all exterior walls.

Perhaps part of the blame for this leaking condition comes from the wall construction methods that Brigham adopted for the church. The walls are actually 'two' walls: A granite and limestone wall stands 'outside' an inner wall of red clay bricks. Some accounts say there is a space within these walls filled with sand, according to an interview with Jack Masten, who was involved with the original construction; however, this sand layer has not been observed to date in cases where the walls have been opened up for inspection. It remains unclear whether portions of the building use this construction method. Regardless of whether there is a gap filled with sand, moisture wicking from the exterior wall through to the interior surfaces has been an ongoing issue. Rather than shedding off the wall, a variety of inadequate joint protections has led to capillary action carrying water through the stone to the interior surface. Rather than passing out of the wall, any water that does enter travels a great distance causing damage all along the way. Water damage of this sort is apparent in dramatic fashion around the windows and on the north and south walls of the sanctuary. The appearance of the damage is only exacerbated by the porous limestone blocks on the interior, which carry minerals (and moisture) through internal fissures to the visible surfaces on the interior of the chruch, creating unsightly stains. The original drawings note that instead of limestone blocks, these inner walls were to have been simply finished with plaster.

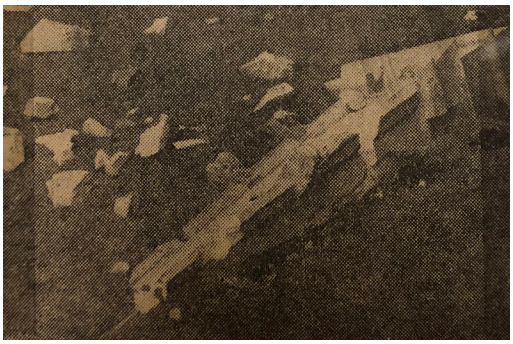
Another issue noted in the Kilam, Hopkins & Greeley report was the structural steel used in the tower. Considered innovative for its time, a combination of structural steel, brick, and stone supported the massive weight of the spires and its 10 tons of bells hung within. Indeed, in some places buttresses of the tower are there for appearance only, and they are in fact supported from beneath by cantilevered concealed steel in the wall and do no 'buttressing' whatsoever. Evidently, however, even in 1922 Greeley noted that the structural steel was exposed to the weather and liable to rust. The condition at present in the church is that over 100 years of these water issues has rusted out the steel in some places in the tower, in particular in the bell-ringing room. Massive water infiltration has also deteriorated the mortar in this area, and the bricks have 'decayed'. On the outside, ashlar blocks and limestone quoins (from the design change back in 1902) are now falling from the tower; on a visit in March 2019 three blocks had fallen over the period of just two months prior and were lying in the gutter on the church roof. These assessments of the structural steel were reiterated by workmen from Sullivan & Foster, Inc. of New Bedford in 1940. They did repairs on the tower, removing much of the corroded steel and replacing the steel frames with brick; in order to accomplish this work all the pinnacles had to be removed from the tower with cranes (each pinnacle weighing from ½ to 4 tons).

1956 again saw extensive work on leak issues, with projects on the valleys and gutters of the church and pointing of masonry in the tower; this extensive work continued all the way through 1958. Another major event was the 1959 lighting strike on the tower, which knocked off several feet of the topmost spire and hurled another smaller spire to the ground – approximately 2 tons of masonry fell. The cloister suffered extensive damage from the falling stones, while another pinnacle approximately 7 feet long was embedded in the ground like a giant lawn dart. By 1960 as the repairs to this lightning strike were underway, a decision was made (because of costs – the insurance payment was insufficient for full replacement) to simplify the design of the tower and eliminate the middle pinnacles and reduce the height of the eight smaller pinnacles and brace them by bronze rods so that they would not fall in the future. Although this decision was motivated simply by finances, it was a wise decision, as the tower has not suffered further pinnacles flying off since then! The opinion of the architect at this time (Tallman, La Brode, Drake & Underwood) was that the tower appearance had been improved by these changes, which made it closer to a pure English Gothic and gave added "lift" to the main spire. The invoices for these repairs do record the installation of rolls of asbestos felt in the roofing at this time.



(Standard Times, 8/27/1960)

Scaffolding for repair of spire after lighting strike.



(Standard Times, 5/22/1959)

Spire after lightning strike.

(Church Archives)

Waterproofing was already a problem in 1957 when this photo was taken.

(Church Archives)

Repairs in 1957.

A prescient 1967 article in the *Standard Times* noted the difficulty of maintaining the Fairhaven High School building, also by the same architects, and this led to a statement from the Church's House Committee that "the buildings are now 60 years old, irreplaceable, ornate, and in need of long-range planning and a constant program of maintenance and updating." While this recommendation saw the need, unfortunately the many issues with simply keeping up day-to-day with the many smaller maintenance problems got in the way of a comprehensive plan for the maintenance of the church for years to come. Nevertheless, this statement from 1967 does point to the importance of having an overall plan and strategy for dealing with these wonderful buildings that nevertheless have reached the point where many of their elements are failing. Throughout the 1960s and 1970s, rather than a comprehensive plan, there were a plethora of spot repairs on the roofs – installing flashing here, replacing portions of copper there, patching where possible with 4-ply tar and felt roofing, and the like. The Annual Reports through the 1960s and 1970s keep repeating the problems of spalling and erosion, noting the seriousness of walls that were shifting out of plane, stones falling, leaks, deterioration of all types; yet, no comprehensive plan of action was contemplated, and funds appear to have been insufficient for all but the most immediate repairs.

This situation got to be so extreme, that in 1973 fragments from broken carvings (both wood and stone) were being stored in boxes in the church basement. It was noted at this time that leaks from the sanctuary roof were so extreme that the limestone in the sanctuary interior had become badly stained. However, it was not to be until 1980 that a major step was taken in terms of maintenance with the creation of an outline of repair needs for the building, including a detailed chart of repairs with projected costs. Shortly thereafter, the church raised a significant amount of money through an auction sale at Christie's of several tapestries and other valuable items that had been the bequest of a descendant of H. H. Rogers. This money, presumably, became the fund from which comprehensive plans for the maintenance of the building were carried out.

(Standard Times)

Workers from Flagship Roofing making repairs in 2002.

Therefore, in 1985 Dyer/Brown Architects recommended a conditions evaluation, and finally in 1986 architect Carol Ann Nelson of Design & Conservation in New Bedford did a major, comprehensive inspection report of all the campus buildings. Pursuant to this report several important repairs were carried out on the Parish House, but also on the church flying buttresses were stabilized, the east and south walls were repaired, and a large amount of gutter work was done. Again in 1987 Nelson oversaw roofing and sheet-metal work on the Sanctuary, relaying of stonework on the Sanctuary gables, and other major repairs on the stonework. A second phase of this restoration work took place in 1988 with further reconstruction of walls, flashing remediation, and leaks sealed. Fans were installed in the Sanctuary to improve air circulation after a major repair of the organ in 1989. Nelson wrote in 1993 that the church was still faced with many issues having to do with failed or missing water-control elements. She noted that the staining on the church walls is the result of water traveling in the hollow walls. Nelson also spearheaded getting the church listed on the National Register in 1996, which allowed for MPPF grants for some work to be performed.

(Church Archives)

2004 gutter and roof repairs.

Subsequent to Nelson's careful and meticulous work, Deborah Durland of Durland & Van Voorhis architects undertook a master plan in 1999, with long-term maintenance recommendations, and a subsequent list of projects needing to be funded in 2009. However, despite these planning initiatives, work has been carried out more in an 'as-needed' manner because of financial constraints against a comprehensive project, with 'spot' masonry and roof repairs carried out nearly on a yearly basis since 2000.

Organ

Even though wetness has been a perennial issue at the roof line, it would appear overly dry conditions from excessive heating were also an issue lower down in the building. Decay processes from low winter humidity led to issues with the organ's casework as well as the instrument itself. The original organ suffered greatly for years from from improper humidity control; even though many recommendations were given to purchase humidification equipment to stabilize the organ, no decision was made, and eventually the organ "disintegrated" in 1967, leading to its finally being completely rebuilt in 1970. This was a decision that was subject to a large amount of deliberation, and reports and assessments were sought from at least three organ specialists throughout the 1960s on what to do. Prior to this, the organ had

(Church Archives)

Organ with original set of 3 pinnacles (center removed)

essentially been a theatre-type organ, with the sorts of orchestral musical effects that would have characterized such an instrument and were the vogue of the early 1900s. At the time of its rebuilding, by Francis Robert Roche of Taunton, the decision was taken to reconstruct the organ as a more classical instrument, and registers were added to give it "English, French, German, and American" sounds. The original organ had 2200 pipes, but by the time Roche was finished with the overhaul it had 3550 pipes and was compared in stature to the one at Boston Symphony Hall. The elaborate case of bog oak had to be modified, and the center pinnacles were removed to accommodate the new pipes. These pinnacles were stored in the basement of the church, where unfortunately moisture has caused them to fall apart completely. Even after the rebuild, no humidification system was installed, so Roche complained shortly thereafter that a great amount of damage was being caused by the forced hot air heating system not only to the organ but to the woodwork and carvings throughout the building, some of which had become discolored, split, and brittle to the point they could not be so much as touched. Once again humidification was recommended, and an effective system was finally installed in 1972.

(Church Archives)

The bell ringing room has extensive deterioration of the walls due to moisture infiltration.

Chimes

Simultaneously the bells had also developed problems of their own. Reports of the Property Committee from the 1950s onward referred to problems with the operation of the chimes, which were "rarely working." A special Chimes Committee was formed to deal with this problem and investigated options for repairing the bell-ringing mechanism, eventually culminating in the decision to hire the Verdin Co. to electrify the bell system. Modifications were made to the system so that it could retain both its bronze and wooden clappers as well as the hand-ringing system alongside the electronic system that played automatic rolls. As this work was underway, it was noted in 1970 that the bells were loose in their framework and that the funeral bell was completely inoperable. This bell system was again overhauled in 2003.

The belfry in the spire has no pan on its floor to collect water and no outlets for water that penetrates through the large louvers during storms. As a result, for over 100 years any water that entered this space percolated down through the walls of the tower affecting the mortar, bricks, and structural steel. This water infiltration has been allowed to progress so long that currently the walls in the bell ringing room below the 10-ton bells themselves are completely friable. A finger run across the bricks shows that they are now completely spalled and turning to dust. There is almost no mortar left between the bricks, and visible through the bricks where they have simply fallen out is the structural steel, which itself is completely rusted and brittle. Very little structural material supports the tower anymore, and this is evident in the way that buttresses that are supported by this steel are starting to fall apart.

(Church Archives)

The heavy weight of the beautiful church gates is weakening the attachments to the stone at their hinges.

Gates & Doors

The bronze gates on the east and west sides of the cloistered walk as well as the massive bronze doors on the south entrance are another issue. These beautiful creations of Brigham, Coveney & Bisbee were cast in the foundry of Jonathan Williams in New York. Their figures were first carved by Kirchmayer in Boston before being cast in bronze. Each door weighs 4500 pounds, and it seems the joint where their hinges connect to the stone was inadequately contemplated by the original architect, which has led to sagging of the doors and settling of the structure around them. Even in 1912, the year the doors were dedicated, there were already reports of the bolts holding them in place coming loose and causing the doors to sag. This is a problem that has been exacerbated over the years both with the large doors in the south entry and the gates in the cloister. The heavy weight of the doors in the south entry has led to the settlement of the stones that support them, which have partially sunk with respect to the rest of the structure around them and are causing other parts of the walls to decouple as the weight of the doors pulls them away. In the cloister, the settling of the gates, combined with the heaving of the mosaic floor from frost has led to situations where the gates became inoperable and damaged the mosaic tiles beneath, and these were repaired in 1991 by Marnz Mayer. There are clear cracks and splits in the stones that support these gates.

Vandalism

Another problem for the church unrelated to structural issues stemming from design problems has been vandalism. Copper downspouts and conductors were stolen from the church

numerous times, leading to eventual replacement of them with aluminum. One record of a lawsuit in the church archives even follows the case of one of the church's own roof workers, who allegedly repaired the roof while simultaneously stealing copper from it! From the 1950s onward there has been constant vandalism, including thefts, broken windows, broken floodlights, and other nuisances. This activity seems to have peaked in the late 1960s and 1970s when "disillusioned youths" (as a report described them) seem to have been particularly fixated on the church. Some of these issues have been addressed by securing the west porch and cloister areas to prevent them being spots for congregation. A particularly egregious case of vandalism was in 1974, when a vandal broke one of the beautiful windows that Robert Reid had designed. The shards of this broken window were lovingly created into 10 miniature leaded-glass pendants and sold to church members.

(Church Archives)

Church windows with Lexan.

Windows

At the same time as this act of vandalism, Douglas Hancock from Hauser Studios was completing the first-ever survey of the stained glass in the church. He noted that the windows were beginning to sag and bulge and recommended an overall plan for the maintenance of this most important part of the church's decorative legacy, and finally in 1978 a vote passed to have Hauser Studios install protective Lexan on all the windows and perform repairs on them. 2005 saw an encyclopedic analysis of the condition of the stained glass from Julie Sloan, a stained glass consultant working in conjunction with Durland & Van Voorhis, Architects. This report looked at poor repair techniques from prior work and gave detailed cost analysis for full restoration of all the windows in the church. Critically, she recommended removal of all the protective glazing but did also concede that if it is desired to keep the protective glazing it must be properly ventilated going forward.

(Church Archives)

Closing Remarks

From its construction, the Unitarian Memorial Church has been noted for the richness of its decorative scheme and the incredible, lavish amounts of money spent in realizing it. At the dedication in 1906 a sumptuous leather-bound book was prepared as a keepsake, which documented the many features of the building. A further book written by Mildred Mosgrove in 1940 illustrated the complexity of the decorative scheme in the building, which uses church iconography carved into the stone and woodwork and represented in glass on the windows to tell a story about spiritual life and its emotional meaning. Contemporary reports in major newspapers including the *New York Times* repeatedly stressed the gates, the doors, the font, the bells, the windows, and the organ were the 'best ever' created and the 'most expensive' ever commissioned. Each of these elements of the building was exhibited at showings that lasted for months in New York and Boston before the works of art were brought to Fairhaven for final installation in the church. Ever since, the church has been a destination for both worshipers and aesthetic pilgrims alike, and it is essential to consider how to shepherd these incredible features into the future so they are preserved for the appreciation of future generations.

(Church Archives)

Fairhaven's Unitarian Memorial Church is therefore at a critical juncture. The types of repairs that have 'bought time' throughout the years, have bought all the time that can be had. There is no more room for patches and 'goo' to hold up the building, as its serious structural flaws are now exceeding efforts to stave off the inevitable major problems that will happen if action is not taken. What is needed is a comprehensive plan for the maintenance of this incredible asset, but even more importantly what must be considered is how to fund such a scope of work. In the past, master planning exercises for the church have created awareness, but they have not pushed the fundraising to make the needed repairs happen. The present report stresses that awareness of the technical flaws in the building is only half the picture, and the other half is going to need to come in the shape of a definite course of action to raise the money to fund these essential repairs.

(Church Archives)

The beautiful faces of Robert Reid's stained glass that deserve full protection once a comprehensive management scheme for the Church's preservation needs is planned and funded.

DATE	WORK	NOTES
1901	Church stone is granite taken from Love Rock, a ledge near Fort Phoenix in Fairhaven on the property of H. H. Rogers; ornamental portions are dark toned limestone from Royal Blue quarries in Indiana.	*Sunday Standard*
12/14/1901	Work temporarily stopped at church by labor dispute. Stone cutters union in talks with contractors & will go to work Monday if they erect sheds for the men to work in.	*Fairhaven Star* newspaper online
2/8/1902	Portion of walls torn down, owing to change in plans. Original idea for tower was a plain finish, with minimal use of limestone, but revised plans call for ornamental limestone tablets above the watertable and limestone quoins throughout the ashlar to the top of the tower.	Newspaper clipping
4/5/1902	Portuguese laborer fell from roof of parish house and struck his head, landing among iron girders.	*Fairhaven Star* newspaper online
4/12/1902	Work proceeding on church with four arches at south side of interior and same amount of work on north side.	*Fairhaven Star* newspaper online
5/17/1902	Roofs over north and south aisles now in position.	*Fairhaven Star* newspaper online
6/28/1902	Work in Parish House plaster complete and putting color on it and ceilings. Tracery window in south side of Parish House has been put up. Groined valuts in cloister are up.	*Fairhaven Star* newspaper online
7/26/1902	Order placed for chimes with Meneely Bell Co. of Troy, NY.	Newspaper clipping in church archives
9/27/1902	Clerestory walls of church are nearly up to main cornice. Tower has reached 78' and after 10' more are reached it will be roofed over for the winter. The portion of the tower over 78' is the most elaborate and will be of carved limestone. In Parish House three fireplaces are set and mosaic floor will be laid. Foundation walls of parsonage started by Z. W. Dodge, the contractor. Excavation partially completed.	*Fairhaven Star* newspaper online
10/11/1902	Work on church progressing. Mosaic floor in vestibule of Parish House being laid. Foundation for Parsonage nearly in.	*Fairhaven Star* newspaper online
10/25/1902	East tracery window at south end of Parish House Corridor nearly in. Workmen from A. B. Cutter company of Boston are doing the decorating in the Parish House. Two main chandeliers in Parish House will be hung next week. Parsonage foundation nearly complete.	*Fairhaven Star* newspaper online
11/8/1902	Vault over chancel is completed. Two limestone cappings for rear turrets on church arrived. Each weighs 5,600 lbs. Parish House walls being decorated. Curbing around the lot has been put in. Ashlar laid for Parsonage.	*Fairhaven Star* newspaper online
11/22/1902	East and West gables nearly completed. West turrets being put up. Preparations being made to put up steel roof trusses, and after this derrick will be taken down. Tower has reached height of 78' and will be covered for winter. Parish House floors being laid. Schooner loaded with terra cotta for floors and roof arrived. First floor of parsonage is nearly on and work on stone walls has commenced.	*Fairhaven Star* newspaper online
1/3/1903	Work on church progressing as rapidly as weather permits. Parish house nearly done.	*Fairhaven Star* newspaper online
1/3/1903	Dedication of Memorial Parish House	Newspaper clipping
2/28/1903	Model section of ceiling of church put up to give architect Charles Brigham a chance to see it in place. It will serve as a model for wood carvers who are to reproduce it in oak. Nearly all the limestone tracery for the windows in the church has been set.	*Fairhaven Star* newspaper online
4/25/1903	Tower reaches 90' - the grade of the bell deck.	Newspaper clipping
5/2/1903	Spare room over ladies' parlor in Parish House is to be used as 'antique room' to contain old mahogany furniture from the old Unitarian Church including a number of chairs, pictures, and a couch.	Newspaper clipping

8/1/1903	Parish house being erected. White Hunter limestone. Tudor style. Ground broken on 3/25/1901. Lot bounded by granite curbing with hammered circular face. Sidewalk is brick 8'-6" wide. Walls are rough ashlar from ledge at Fort Phoenix in Fairhaven. Trimmings are Indiana limestone. Bases of chimneys are granite and blue limestone. Chimney pots are terra cotta, carved. Carved blue Indiana limestone decorations surmount the turrets. Two pinnacles on each of the six gables are surmounted by carved Gothic finials. Pinnacles and gargoyles are limestone, patterned after those in Ely Cathedral. Main entrance approach via granolithic walk about 10' wide. Building is approached by steps. once inside there is a long corridor, extending from women's parlor on north to the cloister that connects the church with the parish house. Paneled wainscoting 4' high on both sides of the hall. Walls dressed in gray with borders of gold and colors. Arched ceiling is tinted in gold over sliver leaf. Over the oak doors opening to the dining hall are wood tracery transoms. At south end of corridor is white limestone tracery window. Also leaded skylight near main entrance. At right and left of main entrance are stairways leading to basement lavatories. Rails, posts, and dado are quartered oak. Women's room is directly under women's parlor; floor is hard pine, coat rooms off main parlor. Men's room is under minister's room and is reached by stairway at left. Basement has cement floor finished off for different purposes. Heating is by three heaters. Northwest corner under kitchen is the scullery, finished in slashed oak. Women's parlor had paneled oak wainscoting, stained dark. Smaller panels have carved shields and scrolls. North side has fireplace with hand painted tiles and tiled hearth. Five tracery windows. Floor quartered oak. To left of main entrance is minister's room. Tiled fireplace. Walls tinted in three leather effects, some on canvas. Three tracery windows. Dining hall ceiling is in form of an oval, with oak beams forming panels with decorative fruit designs. Panels in ceiling tinted light. Large chandeliers suspended from chains. Tables are oak with pine tops and seat 150. Dining chairs are plain and all oak. China and silver service for 300. From dining hall doors open to Sunday School and entertainment room. Elaborate ceiling with hammer beams of oak. Color scheme is red and green. Much elaborate carving and rich tracery on windows. Stage with footlights and scenic equipment. Mural over stage of Psalm 150. To left of stage is Sunday School library, finished in oak with wainscoting. Kitchen in oak with tiled wainscoting, floor is hard pine, cupboards. To left of main entrance are stairs to smoking room with fireplace.	Newspaper clipping
8/15/1903	Tower reaches height of 123' - carving of limestone pinnacles will commence next wee.	Newspaper clipping
8/22/1903	Carpenters are working on the ceiling of the church, which is finished in English oak.	Newspaper clipping
11/7/1903	Last stone in tower laid and staging removed. Bell chimes being shipped from Meneely Bell Co.'s works at Troy, NY	Newspaper clipping
11/14/1903	Bell chimes arrived. 11 bells are the "most expensive in the world" and took one year to build. They weigh about 10 tons. They will hang in a frame made of 8 1/2 x 8 1/2 timber. Lightest bell is 350 pounds and heaviest is 3600 pounds. Bells are rung by hand.	Newspaper clipping
11/21/1903	Chime bells have been placed in position and ringing apparatus is being installed.	Newspaper clipping
12/5/1903	Staging removed from tower. Very little exterior work remains and finishing of the interior is being rapidly pushed along. Chimes are being adjusted.	Newspaper clipping
12/12/1903	Chimes tested	Newspaper clipping
12/19/1903	Chimes accepted and there was a concert with H. H. Rogers present, his first time hearing them.	Newspaper clipping
3/19/1904	Organ has arrived and will soon be installed. Organ made by Hutchings-Votey Organ Co.	Newspaper clipping
4/9/1904	First time chimes officially played.	Newspaper clipping
4/9/1904	Installation of organ commenced.	Newspaper clipping
4/23/1904	Organ is being erected. It has 2,450 pipes and electro-pneumatic action. Console is connected via 65' of cable containing 372 wires. Instrument is blown by a 1 1/2 HP electric motor.	Newspaper clipping
5/14/1904	Granolithic walks being laid around Parish House and Parsonage.	*Fairhaven Star* newspaper online
6/4/1904	Work on the church is nearly complete. What remains to be done is polishing of interior walls, cleaning and fixing the church furniture in position. Grading around the buildings and planting of trees and shrubbery is being done by James Garthley.	Newspaper clipping
9/17/1904	Church is ready to be dedicated. Audience is limited to 295, the capacity of the church.	Newspaper clipping
9/24/1904	Dedication of church postponed due to illness of H. H. Rogers.	Newspaper clipping
10/8/1904	Church was dedicated on Tuesday, followed by elaborate bell concert.	Newspaper clipping
10/15/1904	Art critic of *New York Tribune* praises the beauty of the church's stained glass windows.	*Fairhaven Star* newspaper online
3/10/1906	Unitarian parsonage connected by telephone.	Newspaper clipping
6/23/1906	Robert Reid placed nine stained glass windows representing the 9 beatitudes. Nativity and Sermon on the mount on the east and west ends were already in place.	Newspaper clipping

7/21/1906	Bronze gates on east and west sides of cloistered walk placed in position. Gates are said to be the "finest set of gates ever cast" and each pair weighs about 1800 pounds. Gates were on exhibit in NYC for six months before installation.	Newspaper clipping
12/29/1906	Small aisle windows placed; work of Robert Reid. There are 12 windows with names of families associated with the Fairhaven society perpetuated in them.	Newspaper clipping
5/8/1908	New communion table and used for first time.	Newspaper clipping
11/14/1908	Wood carving for new baptismal font was showing at the Boston Architectural Club. It took three men six months.	Newspaper clipping
11/28/1908	Plan announced to place bronze gates at south vestibule similar in design to those at cloister walk. White marble statue of Motherhood planned for a niche in the interior, life-size. Baptismal font will soon be added.	Newspaper clipping
1909	Quoting an article in the *New York Times.* Article on the Nativity window notes that most of the window obscures light, with the exception of the center that lets in light that diminishes as it falls outward. Another interesting aspect of the window is the attempt to "do away with the difference in quality between the robes and wings of the terrestrial and celestial figures and their faces." Reid has "tried by plating to make the faces more purely glasswork and less painting, striving to get the modeling of the flesh, in fact, with as little actual drawing as possible, utilizing the resources of modern wavy and streaked glass as far as feasible so that the entire glass surface of the window shall be homogeneous. This proceeding makes for unity of decorative effect and shows how strong in this painter is the feeling for the treatment of large surfaces. Not so much the story is he concerned with as the general scheme as it belongs to the interior which is to be decorated." As compared to medieval glass, there is less translucence and less naivete - "the whole is conceived in the spirit of the modern wall decoration. It is a brilliant surface rather than a window meant to let in the light of heaven." Painted sketches for the windows were exhibited at an exhibition of 10 American painters at the Durand-Ruel galleries.	Newspaper clipping
2/1/1909	Rogers instructed the architects (Brigham, Coveney & Bisbee) to design two magnificent brass doors to cost about $20,000.	Newspaper clipping
3/27/1909	Baptismal font will be in position before Easter.	Newspaper clipping
4/3/1909	Baptismal font was put in place last week, about 20' tall, said to be finest in country. Work took a number of years.	Newspaper clipping
4/10/1909	Silver service for the church arrived along with a safe in which to keep it. Designed by Brigham, Coveney & Bisbee. Pieces were on exhibition in Boston. Paten is larger than used by Catholics and outer rim has 12 medallions, in 11 of which are names of Apostles, and Implements of the Passion in the 12th.	Newspaper clipping
10/5/1910	New heavy oak screen placed near south entrance to protect congregation from draughts. Weighs 400 lbs.	Newspaper clipping
circa 1911	Gates were cast in the foundry of Jno. Williams, Inc., of New York. Woodwork carving for the gates was done by Kirchmayer in Boston before being cast in the foundry.	
3/25/1911	Vote to place a tablet in memory of H. H. Rogers.	Newspaper clipping
5/20/1911	Bronze doors at south entrance are being placed in position.	Newspaper clipping
6/3/1911	Bronze doors have been set in place, but work will require 2 or 3 more weeks for completion for ornamentation.	Newspaper clipping
6/3/1911	Amount required for H. H. Rogers memorial tablet has been raised - $800.	Newspaper clipping
6/17/1911	Bronze doors completed, last of the decorative figures being put on. Each door weighs about 4500 lbs.	Newspaper clipping
7/14/1911	Letter from Brigham, Coveney & Bisbee explaining iconography of baptismal font.	Letter in church archives
2/22/1912	Gale wind dislodged stone pinnacle on church tower, fell on deck of tower, cutting through the copper and partially demolished the ornament. New one ordered and placed in position.	House Committee Report
2/3/1912	Rogers memorial tablet placed in position at east wall.	Newspaper clipping
5/25/1912	Tablet and bronze doors dedicated on third anniversary of death of H. H. Rogers.	Newspaper clipping
9/19/1912	Defect discovered in bronze door, the bolt holding it becoming loosened and causing the door to sag. Repaired.	House Committee Report
4/26/1913	English ivy was planted around the church, a gift from H. H. Rogers.	Newspaper clipping
9/6/1913	Two corner houses on the Memorial Church property on Walnut Street are to be removed.	Newspaper clipping
3/1/1914	Pinnacle blown from tower and entirely demolished. Replaced.	House Committee Report

11/24/1914	Contract to install tablet "Unitarian Memorial Church"; resurface, clean, and point walls inside south vestibule and on east wall in church. Furnish and erect one new pinnacle. Remove and properly reset by means of long brass rod all old pinnacles on tower of church. Repoint all defective joints in stonework on outside walls of east and south of church. Above work to be performed by W. J. Sullivan Co., Limestone & Marble Mills, Boston, MA. Removing broken plates of wired glass from window in east wall of church and replacing same with 1/4" ribbed glass. Also installing division rods, reducing size of each individual plate. Work to be performed by A. B. Cutter.	Letter in church archives
1915	Equipping Parish House with Mazda lamps in place of the old style carbon lamps. Similar lamps will be installed in Sanctuary and Parsonage.	House Committee Report
1915	Installation of gas in Parish House and Parsonage.	House Committee Report
1915	Drop curtain installed on stage of Parish House.	House Committee Report
1915	Changes to electrical switches in organ loft - old style snap switches replaced with knife switches.	House Committee Report
1917	On account of the War, it was decided not to open the church to visitors last summer.	House Committee Report
1/5/1922	Letter from Charles Coveney, architect, about what plans are preserved. Engineer's layout of heating and ventilating. There is no plumbing drawing. Plans elevations and sections at 1/4" scale. Wiring diagrams.	Letter in church archives
1/24/1922	Report on the Fairhaven Church, detailed notation of conditions by Greeley & Hopkins of Kilam, Hopkins & Greeley of Boston. Recommendation to install waterproofing on all exterior walls. Secure pinnacles from falling. Sewer backs up in basement in extreme storms. Structural steel in the tower is exposed to weather and consequently liable to rust.	Letter in church archives
6/8/1923	Cellar filled with smoke because dampers of the heater were closed	Newspaper clipping
9/30/1927	Lot on southeast corner of Green & Union streets to be raised and curbed.	Newspaper clipping in church archives
12/6/1929	Robert Reid obituary. Notes that Reid "loved his windows above everything he ever accomplished." On his last visit to the church, Reid waited till sunset and then pointed out how the last rays of the sun shine upon the face of the Christ child."	Newspaper clipping
10/3/1930	Painting of one of the Wise Men, gift of the late Robert Reid will be hung in the manse, vestry, or some other suitable place.	Newspaper clipping
5/6/1937	Church defaced by vandals who climbed a ladder left against south exterior wall and broke off part of the limestone ornamentation.	Newspaper clipping
4/12/1938	Chester Meneely of the Meneely Bell Co. inspected the bells and found them in good condition. Discovered one bell was slightly off correct tone, which will be remedied. Same man has been chiming the bells for 34 years since installation: Clifton A. Hacker.	Newspaper clipping
4/21/1938	May modernize memorial chimes following inspection. The chimes are D, E, F, F sharp, G, G sharp, A, B, C, C sharp, D, and E and are in the key of D. There are two sets of hammers: one of wood, one of iron. Nothing definite on idea of a few changes to have the chimes a little more modern.	Newspaper clipping
7/18/1940	Repair towers at west door. The towers were reinforced by steel frames when they were built, but steel has corroded. Contractor will replace steel frames by brick. Workmen from Sullivan & Foster, Inc., of New Bedford are doing the work. Staging is being constructed along west entrance.	Newspaper clipping
8/1/1940	Pinnacles removed to replace steel frames. One of the two larges truck cranes in New England with 20-ton lifting capacity being used. Pinnacles are built in 4 sections and were removed by crane for repair. Sections range in weight from 1/2 to 4 tons each. Crane has 80' beam that can reach 110'. Work will take 3 weeks. Staging constructed to protect stained glass and side of church.	Newspaper clipping
8/8/1940	Crane removed to Navy Yard.	Newspaper clipping
6/7/1947	Contract with Tellman, LaBrode & Rounseville for work on railings with Anchor Post Fence Division.	Letter in church archives
1949	8 or 10 leaded glass windows in the Parish House being repaired.	House Committee Report
1949	Installation of new kitchen equipment,	House Committee Report
1949	Installation of brass railing on steps outside Parish House.	House Committee Report
8/2/1950	Upgrades to heating system of Church and Parish House. Gordon T. Maxfield, plumber. Zoning system added.	House Committee Report
2/16/1951	Plan for choir loft modifications by William Tallman, architect.	Plans in church archives

11/25/1951	Article about history of the church notes that Ralph Waldo Emerson had served as preacher for six months in Fairhaven. Church was H.H. Rogers's tribute to his mother. Constructed along 15th-century Gothic lines. Inspiration drawn from Amiens Cathedral in France, with richly decorated carvings that are largely scriptural, bearing messages of the Bible, the prophets, and the saints and Christ. Principal teachings of Christ are developed in the windows and dramatized by a gradual growth and change of color beginning with dark blues for the Nativity and ending with glowing colors of the Sermon on the mount. Floor is of Italian and French marble in which are set 12 brass inlays of the Zodiac. Parish House has stage equipped with scenery and complete lighting system. Parsonage is an Elizabethan cottage. Church is made of local granite called Love Rock, which inspired a poem by Dr. Robert Collyer: "Son's love built me, and I hold / Mother's love, engraved in gold. / Love is in and out of time, / I am mortal stone and lime, / Would my granite girth were strong / As either love, to last as long."	Newspaper clipping
7/24/1952	Dense smoke pouring from basement causes alarm; turned out to be papers burning in furnace. Chimney was moist from weeks of disuse and failed to draw. No damage.	Newspaper clipping
6/26/1953	Fire Insurance Appraisal. Provides detailed quantities on building materials used to construct (reconstruct) the building. Detailed Structural analysis.	
10/4/1954	Article on history of church notes that an interesting incident in its history was the arrival of Rev. William Miller in 1841, who was a leader of the early Adventist movement that predicted the coming of the end of the world, but his preaching was dismissed by the congregation. First recognized Unitarian minister was Rev. Thomas Dawes in 1844.	Newspaper clipping
12/19/1955	Installation of automatic fire protection equipment in Parish House. Gamewell Co.	Letter in church archives
1956	Extensive work on valleys and gutters of church roof and tower, pointing of masonry in tower, painting of windows and trim, and installation of new blower and related equipment for organ.	Annual report
8/5/1956	Installation of new organ blower by Classic Organ Co. (Norman Foss).	Letter in church archives
2/27/1957	Letter from Tallman, LaBrode & Rounseville. Photostats of original plans have been sent; they are copies of the files in Boston.	Letter in church archives
10/31/1957	Contract with New Bedford Iron Works for bronze hand railing.	Letter in church archives
1957	Roof work involving both slate and copper completed on Parish House.	Annual report
1957	Heavy maintenance and cleaning of organ continued from previous year.	Annual report
1957	Pointing of masonry on west wall of Parish House.	Annual report
1957	Cracked terra cotta chimneys on Parish House secured by banding.	Annual report
1957	New heating plant installed in Parsonage.	Annual report
1957	New carpeting in choir loft.	Annual report
10/31/1957	Church building consultant Dr. John R. Scotfort visited the church to advise on expansion problems - to see how the church can get more use out of the buildings and fit a church school. Suggests using ground floor of parsonage as pre-school and first two grades of church school and second floor for graces between second grade and junior high school. This would require minister moving out of Parsonage. He recommended redecorating in the Parish House to get rid of "heavy and old-fashioned" furniture. He said the Gothic style of the buildings is independent of the style of furniture put into them. See his report.	Newspaper clipping in church archives
11/1/1957	Bronze rail at south steps of church & choir lighting installed. Includes detailed drawing.	Letter in church archives
11/12/1957	Doorway between dining room and front parlor has been closed and book shelves and cupboards put in its place.	House Committee Report
11/12/1957	Section of roof over Ladies' Parlor taken up to exterminate large beehive - and in front of Parsonage. Quantities of honey removed.	House Committee Report
11/12/1957	Overhaul of organ.	House Committee Report
11/12/1957	Roof repairs, new copper flashings, walls of Parish House pointed.	
12/17/1957	Proposal for choir lighting from Rambusch, NY.	Letter in church archives
1958	Continuation of outside roof repair work, specifically replacing valleys, slate, and repairing copper roof over Green Street door of Parish House. Work done by Howard S. Bates.	Annual report
1958	Repairs to gutters on NE and NW sides of Parsonage.	Annual report
1958	Lighting plan for choir loft prepared by Rambusch Company.	Annual report
1958	Blocked sewer led to a flood in basement of Parish House and Parsonage.	Annual report
1958	Conversion of dumb-waiter in Parish House to cupboards.	Annual report
1958	Extensive work on the organ by Mr. Foss.	Annual report
7/2/1958	Letter from new minister about repairs required at Parsonage. Includes plan by Tallman, LaBrode & Underwood for duct installation. Includes measured plans for Parsonage.	Letter in church archives
1959	Decision to remove one row of the rear pews.	Annual report

5/21/1959	Lightning strikes tower knocking off several feet of topmost spire and hurling smaller spire to the ground. Damage unofficially at $25,000. Approximately 2 tons of masonry fell. Cloister was damaged with several beams broken and its copper roof damaged by falling stones. One spire approximately 7' long was embedded in the ground in the area between the church and Parish House.	Newspaper clipping in church archives
5/27/1959	Lightning strike. Detailed assessment of damages.	Letter in church archives
8/13/1959	Lightning strike. Insurance settlement is less than hoped, so to lower cost certain pinnacles will be eliminated.	Letter in church archives
10/2/1959	Proposed renovations for Parish House by Tallman, LaBrode & Rounseville. Basement area classrooms with acoustic tile. Includes measured plans for portions of Parish House.	Letter in church archives
circa 1960-70	Recessed spotlights installed over the sanctuary nave in false oak ceiling. Lights installed in choir loft.	Application for National Register of historic places
1960	Repairs to wood carvings, including minute carving around choir loft and repair to two broken figurines.	Annual report
1960	Hurricane damage: trees down, window in south organ loft blown in, stone ornament on rear of church toppled. Two finials on manse came off.	Annual report
1960	Alter stairways, install fire escapes and doorways	Permit number 119-60
1/26/1960	Plumbers' Supply Co. did check of humidity in church and found it only 20%, which is too low; should be between 35 to 45%. Recommend installation of Walton humidifier for the organ.	Letter in church archives
2/6/1960	Report on condition of organ by Welte-Whalon Organ Company. It is in bad condition, ciphers continually, many stops and pipes do not function, action has become slow. Hutchings organs cannot be rebuilt. New action of simpler design is advised. Organ console is worn out. Instrument is not tonally distinguished. It is just a quasi-theater type of organ attempting to reproduce an orchestra while neglecting classical tradition of organ building.	Letter in church archives
2/26/1960	Lightning repairs. Middle pinnacles will be eliminated and reduction in height of eight small pinnacles at base of main spire because even though they are braced by bronze rods the wind is too much for them.	Letter in church archives
5/29/1960	Edward Gammons organ consultant recommends replacement of the organ. It was designed at a time when there was a tendency to want organs to imitate the sound of an orchestra and that "the sounder tonal principles inherited from the English and continental traditions were weakened and largely lost sight of from the turn of the century until the 1930s."	Letter in church archives
6/25/1960	Repairs begin on tower after lightning damage.	Letter in church archives
6/30/1960	Repair work on tower after lighting damage. Limestone was reconstructed during the winter by Joseph F. Carew, Inc. of Boston. Architectural firm of LaBrode, Drake & Underwood of New Bedford, with William Tallman as senior partner, supervising repairs. Work includes placing lightning rods.	Newspaper clipping
7/14/1960	Church stonework damaged by fire in front of the building caused by two small boys who lit excelsior used to protect the limestone blocks during transport. Required expensive treatment to clean them.	Newspaper clipping
7/14/1960	Lightning repairs. Detailed report on damage from lightning strike.	Letter in church archives
8/26/1960	Install fire detectors in the organ loft. Gamewell Co.	Invoice in church archives
8/31/1960	Lightning repairs. Remove 5 pinnacles and shafts and reset on shafts approx 12" high. Eastern Construction Co.	Invoice in church archives
8/31/1960	Lightning repairs. Replace pinnacle #7. Joseph F. Carew, Inc.	Invoice in church archives
9/8/1960	Lightning repairs. Install 2 rolls asbestos felt, roof coating. Considine Roofing.	Invoice in church archives
9/28/1960	Install Protectowire Automatic Fire Detection system in the Manse.	Invoice in church archives
10/1/1960	Lightning repairs. Bill from architects Tallman, LaBrode, Drake & Underwood.	Invoice in church archives
10/14/1960	Lightning repairs. Extend ground cable on West side of main tower. Boston Lightning Rod Co.	Invoice in church archives
10/17/1960	Lightning repairs. Assessment. Center pinnacles were eliminated. Eight small pinnacles were lowered. Opinion of the architect Tallman is that this has improved the appearance of the tower by making it closer to English Gothic and gives added "lift" to the main spire. Manse renovation is complete.	Letter in church archives

1961	Replacement of switch boards and fuse box in Parish House, Harrop Center. Installed outside flood-light for Harrop Center front walk. Installed lighting at floor level in Green St. entrance to Parish House.	Annual report
1961	Installed pipe covering on heat pipes in basement of church and Parish House.	Annual report
12/10/1961	Detailed report by Edward Gammons (Groton School) on the state of the organ. Recommends planning for a new organ.	Letter in church archives
1962	Replaced dangerous BX cable in the church; installed electrical outlets; installed new main switch in church basement	Annual report
1962	Refinished outside of 4 doors.	Annual report
8/29/1962	Repair copper conductor. Gorton T. Maxfield, Master Plumber.	Invoice in church archives
1963	Installation of night lights at rear of church and cloister to prevent vandalism.	Annual report
1963	Fireproof storage area in basement of Parish House for storage.	Annual report
1963	Replacement of concrete walks and replacement/resetting of granite steps at various locations.	Annual report
1963	Refinishing of ceiling, walls, woodwork, and floor in Men's Room.	Annual report
1963	Refinishing of floors in church office and Ladies' Room.	Annual report
1963	Continued work on exterior door refinishing.	Annual report
11/21/1963	"Small parties of boys and girls have been meeting … in the porch at the west side of the church, … defacing the building and scratching obscene words on the stonework."	Letter in church archives
1964	Completion of refinishing work on exterior doors.	Annual report
12/15/1965	Report from Philip A. Beaudry on what to do with organ. Recommends just good maintenance.	Letter in church archives
1965	First step in series of major repairs to organ.	Annual report
1965	Installation of exterior floodlighting.	Annual report
1965	Stage footlight installation.	Annual report
1966	Clearing of NW corner of church property for future placement of "Wayside Pulpit."	Annual report
1966	Storm windows installed on Minister's Office.	Annual report
1967	Report completed on massive waterproofing needed at the church to prevent irreparable damage.	Annual report
1967	Pipe organ has "disintegrated."	Annual report
1967	Chimes are rarely working. Recommend new electronic mechanism.	Annual report
1967	Harrop Center needs attention on both interior and exterior before deterioration of teak sets in.	Annual report
1967	Recommendation to light tower with concealed spotlights.	Annual report
1967	House Committee alerts church membership that "the buildings are now 60 years old, irreplaceable, ornate, and in need of long range planning and a constant program of maintenance and updating."	Annual report
1967	*Standard Times* ran an article on the difficulty of maintaining the High School. Similar problems with the Church.	Annual report
11/13/1967	Letter from Philip A. Beaudry about the organ. Last year recommended just maintenance, however work has not been sufficient to hold back decay process from low humidity and winter heating. Swell chest needs to be replaced. Recommends installing humidification. Casework will need to be removed.	
1968	Floodlights installed underground to prevent further vandalism.	Annual report
1968	Contract has been set to replace deteriorated copper roof over N aisle of church with 4-ply tar and felt roofing. Also repair copper gutters in Parish House library with Thyokol.	
1968	Leak developed in joint of copper sheets on S aisle of church and 30' of flashing needs to be repointed.	Annual report
1968	Protective glass in 2 sections of E window was broken by vandals and replaced by Joseph LaRoche & Son of Boston.	Annual report
1968	Placement of humidifiers in church organ have got the organ running again. Work done by Mr. Bowker.	Annual report
1968	Old wooden chairs that were donated by Rogers family were replaced by new ones, and the old ones were donated to Millicent Library.	Annual report
1968	Repair to chipped step at Green Street entrance.	Annual report
1968	Sump pump and dehumidifier installed at Parsonage.	Annual report
1969	Teak on Harrop Center should not be stained or painted.	Annual report
1969	Chimes committee report on what to do about the bells.	Annual report
2/5/1969	Proposal for Verdin Company to install modern electric solenoid chiming action.	Letter in church archives
1970	More serious vandalism than in previous years included several broken windows, stolen copper downspouts - "disillusioned youth."	Annual report

1/14/1970	Letter from Verdin Co. about electrification of the bells. The bells operate with two systems, bronze clappers and wood clappers. It would not be possible to electrify the wood clappers. Recommends elimination of the wood clapper system. Alternative proposal would retain hand action of bells along with electrification. Further proposal for automatic roll player.	Letter in church archives
2/9/1970	Letter from church to Verdin Co. opting for proposal 1 (Hand action renovation).	Letter in church archives
3/4/1970	Bells are loose in their framework and chain links are in poor condition. Tolling bell used for funerals inoperable. Town-wide campaign raising money to overhaul the chimes is underway.	Newspaper clipping in church archives
3/9/1970	Wiring will need to be run to tower for electrification of bells. Includes specifications.	Letter in church archives
5/21/1970	Proposal for rebuilding of organ from Robert Roche. Includes specifications.	Letter in church archives
7/13/1970	Bell electrification completed.	Letter in church archives
12/27/1970	Organ restored by Francis Robert Roche of Taunton. 20 of the best stops of the original organ characterized by English sounds have been saved, and to them have been added English, French, German, and American. Humidity of waterfront community warped and split the wood mechanism. Roche will replace the original pine parts with imported mahogany. Case is elaborately carved English bog oak from 1904. Finished instrument will have 3400 pipes instead of the original 2200. The present four divisions (three manuals and a pedal board) will be increased to five. 56 ivory stop knobs carved with old English lettering arrived from Bloomfield, Kent, England where they were made by craftsman David Allen. Tin pipes made in Holland. Most of the remaining construction done in Roche's shop in Taunton.	Newspaper clipping
1971	Installation of modern cylinder locks on exterior doors and bolts on seldom-used doors.	Annual report
1971	Repair of leaded glass windows in church and Parish House.	Annual report
1971	Repair of all cellar windows.	Annual report
7/15/1971	Bells in need of service.	Letter in church archives
8/22/1971	Tribute article to Adalbert Zwing, who carved much of the woodwork in the church. He was raised in Bavaria, where wood carving was the chief occupation, attended the village school for carving. He and his brothers did the massive doors depicting the apostles at the Fairhaven church. Used oak for making statues but scrollwork and fine details done in softer wood. Wood sculpting studio was in Worcester and lived in Arlington.	Newspaper clipping
11/22/1971	Organ makes debut in recital. 2 enclosed divisions, four unenclosed divisions, 62 ranks, and 3550 pipes, played from a 3-manual console. Organ is compared to the one at Boston Symphony Hall.	Newspaper clipping
1972	Continued vandalism. Leaded glass windows in west porch of sanctuary were smashed out twice; floodlights repeatedly broken.	Annual report
1972	Minister's Office moved to room directly above church office.	Annual report
1972	Wireless hearing aid system installed in church.	Annual report
1972	Replacement of paneling in stairway to Ladies' Room	Annual report
10/16/1972	Letter from Roche Organ noting present forced hot air heating system has caused a great amount of damage to various interior parts of the building and its furnishings. Woodwork and carvings throughout the building are dried out to point of being discolored, split, and cracked - and rendered too brittle to be so much as touched. Also ruined old organ mechanism and furniture. Chairs in the church are no longer safe to use. Recommends humidification.	
10/20/1972	Committee votes to approve humidification system for organ.	Letter in church archives
11/27/1972	Committee votes to install Autoflow Imperial No. 80 power humidifier for organ.	Letter in church archives
1973	Erection of railings at Green Street entrances.	Annual report
1973	Storage shed. Purchase of a small 10' x 10' building to house yard equipment.	Annual report; Permit number 736-73
1973	Douglas Hancock from Hauser Studios made preliminary survey of stained glass in Church and Parish House. As originally built, these windows were secured by fastening their leading to rigid metal bars extending horizontally across their openings; in a great number of cases this fastening has come away and the windows are now bulging and insecure.	Annual report
1973	Spalling and erosion are taking their toll on the exterior limestone and carved figures. Portions of stone have broken away and fallen down. Gables at the east and west ends of the Parish House have shifted with respect to the adjoining walls. At least one stone in a flying buttress south of the Sanctuary has shifted considerably. The door leading from the cloister into the baptistry cannot be fully opened due to the rising of the mosaic floor of the cloister. Much repointing is needed between the granite blocks. The whole limestone part of the buildings needs to be treated with silicone to postpone further deterioration. Exterior teakwood on Harrop Center has deteriorated.	Annual report
1973	Brick wall surrounding the property requires repair.	Annual report
1973	Significant interior deterioration at Parish House (see report for details).	Annual report

1973	Sanctuary limestone is stained from leaking roof; fragments broken off carvings are stored in a box in the basement. Openings to rear porch need to be secured against vandals. Carved woodwork needs to be oiled.	Annual report
1974	Painting of Parsonage.	Annual report
1/24/1974	Church window broken by vandal. Article calls it a Tiffany window. Shards of the broken window were made into 10 miniature leaded-glass window pendants on a silver chain by artist Courtney T. Gifford, and sold to church members. Shattered window was a small window in the rear of the building. Gifford was plant engineer for New England Telephone.	Newspaper clipping
9/18/1974	Removal, replacement, and rebuilding of brick sidewalk at church undertaken by Manuel Pavao.	Newspaper clipping
1975	Refinishing of outside wood trim on Sanctuary.	Annual report
7/21/1975	Vandalism to church.	Letter in church archives
1977	All locks re-keyed.	Annual report
1977	Survey about heating of the buildings with recommendations for changes.	Annual report
1977	New toilet in minister's study in church.	Annual report
4/25/1977	Proposal from Hauser Studios of Stained Glass in Winona, Minn. to install protective Lexan and perform repair on windows. Specifications included.	Letter in church archives
1978	Main door to church from cloister has been power planed and now operates freely. Cloister has been repaired and sealed against deterioration.	Annual report
5/28/1978	Vote by Board of Governors to install Lexan protective covering at approx $45,000	Letter in church archives
11/22/1978	Theft of working painting for Nativity scene (Wise Man) by Robert Reid & other items from church.	Letter in church archives
1978-79	Burglar and fire alarm system installed. Wires and holes appear where originally there were none around doors, windows, walls, and ceilings.	National Register application
1979	Emergency lighting installed in sanctuary.	Annual report
1980	Sanctuary lighting repaired and leaks sealed.	Annual report
1/10/1980	Outline of repair needs on building. Includes detailed chart of repairs with projected costs.	Letter in church archives
5/30/1980	Article on history of church notes that stone for the building was hauled from H. H. Rogers's estate. Beneath the pews are square blocks of marble from Tennessee. Base of pulpit is Alps green marble, also used at base of organ and front steps of platform. The floor of platform is Knoxville marble covered with heavy Turkish carpet. Friends of H. H. Rogers are depicted in the carvings, notably Dr. Robert Collyer of NYC and his daughter Millicent and granddaughter Beatrice M. Benjamin in the stained glass windows in the center nave. A shining knight in armor next to Dr. Collyer's portrait is perhaps Rogers's interpretation of himself. Doors of the church weigh 2 1/4 tons each, a church mouse peeks out of the wall near the south entrance.	Newspaper clipping
1981	Contracts for fire & smoke detectors; exterior pointing & caulking; replaster stucco Harrop Center; stabilize gable ends of Parish House; lintels in basement of sanctuary.	Annual report
4/1981	Elevations of pointing details and notations for sealant and Lexan on Parish House. LaBonte & Humphrey, Architects, Acushnet, MA	Plans in church archives
1982	Gable end in auditorium has been secured.	Annual report
8/18/1982	Install 630SF of Goodyear .60 mil Batten Rubber Roofing. New Bedford Roofing.	Invoice in church archives
10/20/1982	Cover all leaded glass windows in Harrop Center with bronze colored aluminum combination windows all glazed with 1/8" polycarbonate. Pietraszek Art Glass.	Invoice in church archives
1983	Storage shed (cancelled).	Permit number 2770-83
1983	Lexaning of remaining buildings.	Annual report
1983	Dining room and auditorium floors refinished.	Annual report
1983	Buildings videotaped for insurance purposes.	Annual report
2/14/1984	Church sells tapestries valued at $120,000 at Christies. An Aubusson carpet went unsold. Tapestries were chinoiserie type made in Berlin in second quarter of eighteenth century and were part of the bequest given to the church in 1967 by a descendant of H. H. Rogers.	Newspaper clipping
6/9/1985	Masonry pointing and rebuilding done by Eastern Construction. Roofing work by Apollo roofing.	
8/15/1985	Proposal from Dyer/Brown architects to do conditions evaluation at the building.	Letter in church archives
1986	Major inspection report by Carol Nelson. See report.	Letter in church archives
6/18/1986	Board of Governors motion to make the following repairs pursuant to Carol Nelson's report on the building conditions in order of priority: Stabilize terra cotta chimneys; repair to south parapet at NW Parish House gable; stabilize flying buttresses; repairs to East wall and South entrance of church excluding tower; large gutters; east wall masonry.	Letter in church archives
6/20/1987	Roofing and sheet metal work overseen by Carol Nelson.	Invoice in church archives

6/24/1987	Relay stonework at peak of Sanctuary wall gable; remove cross and four coping stones. Carol Nelson with Eastern Construction.	Invoice in church archives
9/30/1987	Relay stonework that has moved at walls where voids have developed behind stonework or where stonework has moved in excess of 1/8" outward; relay 96sf of stonework at base of NE corner chimney; relay 76SF of stonework at parapet over E entrance to Parish House; relay 107 SF of stonework at NE gable; relay 174 SF of stonework at two parapets at bay windows on E wall of Parish House; relaying of backing brickwork and resetting of capstones at these two parapets; scaffolding. Carol Nelson with Eastern Construction.	Invoice in church archives
1988	Completion of work in phase 1 of exterior restoration program. All stonework of east sanctuary and Parish House walls, south porch area, and the NE corner area of Parish house has been completely repointed and reconstructed where significant stone movement had occurred.	Annual report
1988	New roofs and flashings applied to area above south porch, offices, and sanctuary, where a wide gutter separates the main copper roof from the stone parapet.	Annual report
1988	Rebuilding of a firebox in the south boiler and a variety of major electrical projects.	Annual report
1988	Completion of restoration work begun in 1987. Repairs to masonry included repointing the stonework of the south porch and the east sanctuary wall, the east wall of the parish house, and the walls and chimney at the northeast corner of the parish house.	Annual report
1988	Reconstruction of sanctuary wall and in peaks and parapets above the minister's study and the church office.	Annual report
1988	Roofs of the south porch, minister's study, church office, and the area above the Green Street entrance were replaced and new flashing installed.	Annual report
1988	Flashing replaced and large rain gutters repaired on the sanctuary roof. Several major leaks were found and sealed, but a problem still exists in an area of the east sanctuary wall during severe rain storms.	Annual report
1988	Contracted with Apollo Roofing to replace flashing and repair copper gutters on the parish house roof above the basement entrance to stop a severe leak and damage to the interior wall at the rear of the auditorium stage.	Annual report
1988	Application of linseed oil to teak trim in Harrop Center gables. Paint and plaster repairs in Parish House kitchen.	Annual report
1988	Two large glass globes in light fixtures in Parish House hallway were accidentally broken and have not been able to find a glassblower to recreate them.	Annual report
1989	Extraordinary repairs to the church organ including re-leathering of the static bellows.	Annual report
1989	Sandblasting and repainting of Harrop Center fire escape.	Annual report
1989	Refinishing front and rear Parish House entrance doors.	Annual report
1989	Replacement of wooden walkways that connect sections of Harrop Center fire escape and protect copper roof over the west porch, library, and kitchen.	Annual report
1990	Chimney disassembly by Jos. Gnazzo Co.	Letter in church archives
1990	Removal of four chimneys and bid for new terra cotta in progress.	Annual report
1990	South wall and parapet have leaks.	Annual report
1990	Rehanging of the sanctuary door on the north side, doors leading to office repaired, parlor and dining room floors refinished, new lamp installed outside Harrop Center.	Annual report
1990	To increase efficiency, fans may be installed in sanctuary to save 25-30% on heating bills. Will also help preserve wood and organ. Checking for possibility to convert from oil to gas heat.	Annual report
5/5/1990	Analysis of four chimneys on parish house to determine if they should be repaired or replaced. Carol A. Nelson of Design & Conservation in New Bedford will determine if they can be dismantled and recast. Millicent Library had similar chimneys that were dismantled and recast. The mortar in the terracotta is crumbling and falling out, and the terra cotta has fissures. A survey of the building's preservation needs was carried out in 1987. First phase was repairs on east walls of parish house and church, the peaks, and porch roofs. Second phase is the chimneys. Third and fourth phases are work on the exterior granite and tower area, but there is no plan for when that work will be carried out. The church is a 1/3 size model of Winchester Cathedral. Nelson began her association with Brigham's architecture in Fairhaven in 1979-80 with major restoration of Town Hall. Went on to restore important interiors at Fairhaven High School, including Knipe Auditorium and Room 7. In 1990 she supervised a $500,000 repair to Millicent Library.	Newspaper clipping
11/9/1990	Chimney elevations and drawing set prepared by A. Surma.	Plans in church archives
1991	South wall of sanctuary repointed.	Annual report
1991	Chimneys of Parish house sent to Ohio for use as molds in new terra cotta replacements.	Annual report
1991	Auction to dispose of surplus furnishings.	Annual report
1991	New fans installed in sanctuary by Days Electric.	Annual report

1991	Mosaic tiles in cloister replaced and epoxy put under loose sections to ensure no further water damage.	Annual report
1991	New microphones installed in sanctuary.	Annual report
1991	Chimney fabrication by Superior Clay.	Letter in church archives
1991	Mosaic floor repair by Marnz Mayer.	Letter in church archives
1991	Masonry pointing on south wall by Jos. Gnazzo Co.	Letter in church archives
1992	Light fixture in Parish Hall outside of Church Office was rewired.	Annual report
1992	Chimneys installed at Parish House.	Annual report
1992	Vandalism to downspouts of Sanctuary and Parish House; some downspouts replaced.	Annual report
1992	Furnace of Harrop Center replaced with two smaller units.	Annual report
1992	Five ceiling fans installed in sanctuary. Must be turned off when sanctuary is lighted.	National Register application
7/31/1992	Rebuilding of terra cotta chimneys on Parish House, work overseen by Carol Nelson & Eastern Construction, Inc. Install thru-wall flashing at base of all chimneys; Eastern will "pin" chimneys together with staples at inside rather than vertically from top to bottom; tops of unused chimneys sealed with plywood and neoprene rubber flashing.	Invoice in church archives
10/28/1992	Install 6-zone alarm panel in Parish House. Wayne Corp.	Invoice in church archives
11/20/1992	Breaking and entry via basement window. Damage in the sanctuary to grape leave railing above organ loft screen. Broke down a basement door. Thefts of downspouts and scuppers.	Letter in church archives
11/22/1992	Repairs to crest of choir screen. T. Lopes Furniture Repairing.	Invoice in church archives
12/7/1992	Inspection and adjustment of bell system by I. T. Verdin, Co.	Invoice in church archives
1993	Phase 1 of organ preservation project completed.	Annual report
4/6/1993	Letter from Carol Nelson. Many issues still face church with failed or missing water-control elements. Stain on East wall of church is probably caused because wall is hollow and collecting water from a remote source; leak is not yet causing major damage to interior stonework so it is not yet an emergency. Church needs to think about handicap accessibility, with entrance and toilets. Exterior has only been partially repointed and roofing has only been partially repaired. Portion of exterior wall from the northeast corner of Parish House to South Church entrance, excluding cloister and tower, was repointed in 1987, and some roofing and gutter work was done in 1987. Additional pointing work at upper and lower south wall of church was done in 1991. Portion of mosaic floor in cloister was repaired in 1991. New terra cotta chimneys were installed at Parish House in 1992.	Letter in church archives
5/10/1993	Install sections of copper conductor at church and parish house. Universal Roofing.	Invoice in church archives
10/20/1993	Copper downspouts were stolen in 1992. Because this material is constantly stolen, replaced with aluminum instead. Work was done by Derrick Bates, who allegedly stole other copper material from the church in the course of performing the work.	Letter in church archives
1994	Limestone is shifting in north wall of sanctuary.	Annual report
1994	Sanctuary roof is leaking.	Annual report
1994	Masonry joints opening up in west wall of Parish House.	Annual report
1994	Harrop Center chimney leaks.	Annual report
1994	Installation of new alarm system.	Annual report
4/19/1994	Letter from MHC, MPPF request is being held on file until the program is reactivated.	Letter in church archives
4/28/1994	Letter from MHC, finding the Parsonage and Parish house eligible for listing on NRHP meeting Criterion C and Exception A, and possibly Criterion A in local level. More information needed.	Letter in church archives
1995	Concrete ramp, driveway, & walk	Permit number 8612-95
3/1995	Memories of Jack Masten on the construction of the church. "The walls of the Parish House and Sanctuary are really two walls. Outside is granite from Love's Ledge, and the inner wall is red clay bricks. The space in between was filled with sand. Roof of Sanctuary is 32 oz copper/sq ft, 2" tongue and groove boards; 2" air space 6" red clay brick and 2" clay tile - supported by steel beams, 6' of space between the roof and the ceiling of the sanctuary. Choir loft has lights that have never been lighted. Buttress on south side of tower is supported by a steel beam set into wall. Choir room has loose panel in ceiling, and another loose panel in minister's study - for access to the above ceiling. There are just steel beams above. Green marble came from Switzerland and yellow from France. White from Kentucky."	Letter in church archives

5/23/1995	Application sent for National Register program. Hoping to get matching funds from Commonwealth to work on a major project like the Tower.	Letter in church archives
5/25/1995	Letter from Commonwealth acknowledging receipt of National Register nomination.	Letter in church archives
8/11/1995	Plant honey locust tree. Roseland Nursery.	Invoice in church archives
10/30/1995	Letter from Commonwealth acknowledging fine application and enclosing comments from MHC before completion of nomination.	Letter in church archives
11/21/1995	New rolls received for the chimes from Grace Church in New Bedford, which was computerizing its system.	Church archives
11/27/1995	Handicap ramp. Argus Construction.	Invoice in church archives
1996	Install handicap bathrooms.	Permit number 8686-96
2/22/1996	Letter to MHC supplying requested information for National Register nomination. Details on construction are scant because H. H. Rogers kept roster of workers, wages, costs of materials, etc. all to himself.	Letter in church archives
3/1/1996	Application to MPPF with detailed existing conditions statement. Damage to building from water infiltration was inspected in January 1986 by Design & Conservation using a movable lift. Concealed gutters has catastrophic effect. Patches in copper and mastic. Masonry problems from infiltration. Defects in stone itself. Hollow cavity type walls created extensive problem with no easy solution, because walls lack flashings on the interior and lack weep holes. Water entering through joints around windows travels through walls. Stones have shifted at parapets, in some cases as much as 2-3". Flying buttresses are moving outward. Terra cotta chimneys at parish house are "frightening."	Letter in church archives
4/19/1996	Letter from William Straus, State Representative, supporting request for Open Space Bond funding to assist church.	Letter in church archives
4/25/1996	Letter from Senator Mark C. W. Montigny to State Historic Preservation Office, supporting request for grant to fund major repair project.	Letter in church archives
5/4/1996	Letter of intent for preservation restriction to Elisa Fitzgerald at MHC.	Letter in church archives
5/23/1996	Town voted to support application for $90,000 for major exterior repairs to sanctuary.	Letter in church archives
6/21/1996	National Register nomination scheduled for consideration by State Review Board on Sept. 11, 1996.	
6/27/1996	Application to MPPF rejected.	Letter in church archives
7/27/1996	Lexan removed and replaced with storm windows. Four tru-channel storm windows in music office. Stevens Home Improvement Center.	Invoice in church archives
8/6/1996	Church will be considered by MHC for nomination in National Register.	Letter in church archives
9/11/1996	Voted eligible for National Register Listing.	Letter in church archives
12/9/1996	Repairs to roof by Richard J. Mulroy. Repaired rubber roof at SE side over doorway; repaired copper roof on W driveway side; repaired copper roof on Main Church; replaced 9 slates on Green St over main entrance; replaced 2 slates on north side behind chimney.	Invoice in church archives
1997	Handicap ramp completion and dedication.	Permit number 9321-97
1997	Refurbishing of Lady Fairhaven Park.	Annual report
2/28/1997	Pre-application for MPPF third round. Prepared by Carol Nelson of Design & Conservation.	Letter in church archives
4/2/1997	Report from Angela J. Merkert of recommendations for Church Growth. See report.	Letter in church archives
4/14/1997	Letter to Representative William Strauss seeking support for matching grant of $100,000.	Letter in church archives
4/14/1997	Letter to Senator Montigny seeking support for matching grant of $100,000.	Letter in church archives
5/1/1997	Construct handicap bathroom in Harrop Center. R. P. Valois & Co.	Invoice in church archives
5/16/1997	Meeting minutes with architect Carol Nelson in preparation for application for MPPF grant.	Letter in church archives
6/13/1997	Letter acknowledging pre-application and requesting submission of full application for MPPF	Letter in church archives
7/11/1997	Construct concrete handicap ramp for Harrop Center. R. P. Valois & Co.	Invoice in church archives
7/22/1997	Church application to become National Historic Site. Questions of what grants to apply for. Church has only minor experience in fundraising.	Letter in church archives
9/30/1997	National Register name changed from Rogers Memorial Church to Unitarian Memorial Church.	Letter in church archives
9/20/1997	Repair/reconstruction work & set plaque in stone provided by church. Rex Monumental Works, Inc.	Invoice in church archives
12/18/1997	Remove beech tree, cherry tree, & spruce tree. Recable chestnut tree. Levesque's Tree Service.	Invoice in church archives
1998	Restoration of Nativity Window lighting.	Annual report

1998	Repairs to tower and courtyard lighting.	Annual report
1998	Carol Nelson is continuing work on leak problems.	Annual report
1998	Review of heating and power systems.	Annual report
1998	Study committee appointed for long-range kitchen needs.	Annual report
4/21/1998	Install complete sound system with hearing impaired system, choir monitoring system. Avcom Technology, Inc.	Invoice in church archives
1999	Master plan by Durland & Van Voorhis.	Web site.
1999	Repair gutter sections on sanctuary roof.	Annual report
1999	Deleading of three classrooms on 2nd floor of Harrop Center.	Annual report
1999	Restoration and repainting of Harrop Center fire escape.	Annual report
1999	Masonry repairs to NE corner of Parish House.	Annual report
1999	Investigation of what to do with oil storage tanks.	Annual report
1999	Report on costs to air condition offices.	Annual report
1999	Architect Deborah Durland completed survey of property with long term maintenance recommendations. See reports.	Annual report
5/24/1999	EPDM roof repairs at various locations. Repair of copper cricket behind chimney. Universal Roofing & Sheet Metal Co.	Invoice in church archives
2000	Beginning restoration of Lady Fairhaven Park.	Annual report
2000	Replacement of fire alarm system.	Annual report
3/30/2000	Masonry restoration & consulting. Victory Construction Corp. Patch 2 precast capstone using Jahn mortar from Cathedral Stone Products, Inc.; Seal 2 10' joint sections between copper gutter and concrete with Pecora, Tremco, or equivalent caulking. Backer rod as required to be 1/3 wider than joint. Inspection of all precast concrete capstones and concrete gutter joints for failure/leakage.	Invoice in church archives
11/15/2000	Sanctuary roof repairs. Open cricket for visual inspection. Plywood install on cricket side of front wall. Install new copper cricket. Resolder bottom of battens. Universal Roofing. Choir roof repairs.	Invoice in church archives
11/20/2000	Masonry restoration & repairs; repointing; asphalt cleaning to some face areas less mortar joints. Paul Choquette & Co. Historical Masonry Restoration Artisans.	Invoice in church archives
2001	Electrical - replace panel.	Town permit office
2001	Installation of new fire alarm system and new electrical switch/circuit breaker panel with surge suppressors/lightning arrestors at main electrical supply. Numerous updates to existing electrical outlets and switches.	Annual report
2001	Replacement of sump pump in boiler room.	Annual report
2001	Repair of cloister mosaic flooring.	Annual report
2001	Revision of the Building Use forms with new rates and structures for type of use.	Annual report
2001	Renovation of Minister's Office. Repairs and painting. New lighting. Storm windows.	Annual report
2001	Repairs and painting of Harrop Center kitchen.	Annual report
2001	Completion of phase 2 of re-landscaping of Lady Fairhaven Park.	Annual report
2/8/2001	Replace copper sleeve drain on SW roof corner & perform remedial roof repairs to main church roof at south side. Universal Roofing.	Invoice in church archives
2/13/2001	Reflash membrane roofs; replace Harrop Ctr flat copper roof; replace upper north choir copper gutter; repointing around north choir gutter; open up sheathing at upper north choir gutter to locate water penetration; new plywood sheathing for new copperwork; patch cracks in existing standing seams at upper north choir roof; unclog drain at lower choir south roof over minister's office; replace sleeve to scupper at lower choir south roof; locate and repair leak at upper south nave gutter; mosaic tile repairs at sanctuary door. Universal Roofing.	Invoice in church archives
8/29/2001	Removal of mosaic tiles at large doors at Sanctuary hallway where door hangs on floor; removal of existing subflooring of concrete to 3" below top of floor; repour floor to allow reinstallation of mosaic pieces; finish grouting. Paul Choquette & Co.	Invoice in church archives
2002	Phase 1 of repair of tower bells to operating condition.	Annual report
2002	Refinishing of parish hall and auditorium floors.	Annual report
2002	Numerous repairs/updates to existing electrical devices.	Annual report
2002	Occupancy ratings for the parish hall and auditorium updated.	Annual report
2002	Lawn equipment storage shed roof replaced.	Annual report
2002	Roofing repairs to sanctuary west side entryway.	Annual report
2002	Revision of the Building Use forms with new rates and structures for type of use.	Annual report
2002	Completion of Harrop Center kitchen storage closet.	Annual report
2002	Restoration of antique brass candlestick in sanctuary.	Annual report
10/3/2002	at Harrop Center - repair leak on toilet; install and repair toilet. David Dias Plumbing & Heating.	Invoice in church archives

10/11/2002	Flagship Roofing. Repair to copper roof above west entry to church; solder copper patches over holes in copper roof; where electrical conduit penetrates roof, fabricate and solder copper sleeve and seal connection with EPDM flashing; remove conduit clamp in copper roof and solder screw holes. Electrical conduit needs to be refed by an electrician.	Invoice in church archives
2003	New basement and 3rd floor lighting in Harrop Center.	Annual report
2003	New outside security lighting for rear parking area.	Annual report
2003	Replacement of ceiling spotlights and ring lights in sanctuary.	Annual report
2003	Rebuilding of firebox in boiler #1 and general heating maintenance.	Annual report
2003	Replacement of two circulation pumps for heating system.	Annual report
2003	Plumbing repairs to Parish House Kitchen, Bathroom, and outside faucet.	Annual report
2003	New varnish on rear door of Parish House.	Annual report
2003	Parish House front door and Cloister doors refinished.	Annual report
2003	New landscape plan approved for Lady Fairhaven Park.	Annual report
2003	New sound system for Parish House.	Annual report
2003	Tower bells repaired.	Annual report
2003	Painted Harrop Center porch.	Annual report
5/2/2003	Roof inspection for leaks; heating system inspection. Durland, Van Voorhis architects.	Invoice in church archives
6/19/2003	Bruce Gardzina. Phase 2 of repair of tower bells. The ringing mechanism installed circa 1971 using 240V DC solenoids and 10 lb hammers, mounted to 14 x 14 timbers on steel platforms. Platform consists of 2 steel plates approximately 14" square and sandwiched together through 1 1/2" rubber shock absorbers by four 1/2" bolts. Exposure to elements has caused rust failure at several bolts, where since 1996 mounting of solenoid units is augmented with metal strapping. Rubber shock-absorbing washers are worn out, putting additional strain on bolts. Refurbish each unit by replacing all bolts and rubber washers; lubricate all parts; repair and reattach housing covers; repair several holes in tower screen.	Invoice in church archives
11/17/2003	Flagship Roofing. Clean all gutters; repair flashings at north and south side of gutters at high elevation; perform repairs at lead counter-flashings in walls; caulk open areas in masonry parapets above counter-flashing; at lower level south side refasten EPDM at drain location install patch and flash new EPDM trunk into drain.	Invoice in church archives
2004	Harrop Center heating and various plumbing repairs.	Annual report
2004	Harrop Center 2nd floor classroom chimney, wall, and floor repair.	Annual report
2004	New toilet installed in Sanctuary basement.	Annual report
2004	Replacement of sconce lights in Sanctuary.	Annual report
2004	Sanctuary basement windows reglazed and repainted.	Annual report
2004	Plumbing repairs to Parish House Kitchen and Bathroom.	Annual report
2004	2 new stoves in Parish House kitchen.	Annual report
2004	Electrical service upgrade to Parish House kitchen.	Annual report
2004	Repainting of flag pole over Green St. entrance.	Annual report
2004	Electrical - power vents/ wiring.	Town permit office
2004	Partial roof replacement.	Permit number 14858-04
2004	Piping - backflow.	Town permit office
2004	Gas - boiler.	Town permit office
2004	Electrical - wire equipment.	Town permit office
2004	Gas - replace stoves.	Town permit office
8/9/2004	Report on history of chimes.	Church archives
8/16/2004	Workers from Flagship Roofing & Sheet Metal in East Freetown work on the roof. See photos in file.	Newspaper clipping in church archives
2005	Kitchen renovation.	Annual report
2005	Fixed roof leaks in Parish House and Harrop Center.	Annual report
2005	Electrical work in all buildings.	Annual report
2005	Plumbing repairs in Parish House.	Annual report
2005	Re-wire light fixtures in cloister.	Annual report
2005	Re-wire three light fixtures in Sanctuary.	Annual report
2005	Two fire doors replaced in Harrop Center.	Annual report
2005	Replacement of bathroom window in Harrop Center.	Annual report
11/6/2005	Extensive stained glass condition analysis report from Julie Sloan, stained glass consultant for Durland & Van Voorhis Architects.	Report on file in church archives
2006	Re-wire remaining five light fixtures in sanctuary.	Annual report

2006	De-leaded and re-painted remaining second floor of Harrop Center.	Annual report
2006	Fixed roof/gutter leaks in Harrop Center.	Annual report
2006	Electrical work in Harrop Center and Parish Hall.	Annual report
2006	Library renovation including refinish floors and add electrical outlet.	Annual report
2006	New sump pump in Parish House.	Annual report
2006	Plaster work in Parish House and Sanctuary.	Annual report
2006	Re-key all locks.	Annual report
2006	Re-wire light fixtures in Harrop Center.	Annual report
2007	Converted all lighting to CFL bulbs.	Annual report
2007	New handicap ramp to Cloister.	Annual report
2007	Kitchen renovations: new refrigerator, new covering for table.	Annual report
2007	Electrical work in Harrop Center.	Annual report
2007	Toilet replacement in sanctuary bathroom.	Annual report
2007	Electrical work in Parish House.	Annual report
2007	New doorbell system in Parish House.	Annual report
2007	Repainting rear entrance to Parish House.	Annual report
2007	New directional signs in Parish House.	Annual report
2007	Repairs to stack & rebuild columns.	Permit number 17767-07
2007	Electrical - replace lights.	Town permit office
2008	Chimneys of Harrop Center rebuilt by Dupre Masonry, who were inventive in finding a way to maintain the historical look without expense of custom cast replacements.	Annual report
2008	Designed improvements to Harrop Center fire escape but not yet implemented.	Annual report
2008	Electrical repairs are consuming a substantial part of budget "with no end in sight." Wiring replaced in Parish House basement and inside south organ case.	Annual report
2008	Major problems with Harrop Center oil burners and power vents. Gas furnace on 3rd floor of Harrop Center also updated.	Annual report
2008	Thermostats throughout the campus are problematic.	Annual report
2008	Architect Durland & Van Voorhis has compiled a prioritized list of projects that need to be funded.	Annual report
3/28/2008	Proposal for new protective glazing on stained glass windows from Bovard Studio, Inc.	Report on file in church archives
2009	Architect Deborah Durland identified several displaced granite blocks in the upper W wall. Dupre Masonry with assistance from Flagship Roofing did necessary repairs and sealed the vertical joints in the limestone capstones of the sanctuary.	Annual report
2009	Sanctuary walls require repointing to fix the water infiltration.	Annual report
2009	Heating system requires maintenance - Harrop Center system is a particular problem.	Annual report
2009	Floors refinished in Auditorium and Dining Room. Floor have been sanded so many times the wood is thin and running out of wood.	Annual report
2009	Finally able to acquire replacement globes for lights in front hall of Parish House.	Annual report
2009	Replacement of roofs at Office and Minister's Office facing Green St. Both were rubber roofs at least 20 years old. Had hoped to replace with copper but price was too prohibitive. Flagship Roofing.	Annual report
2009	Wayne Electric and Alarms continues to work on the electrical system of the buildings. They know the system well and are sensitive to historical nature of the buildings when they work - important because original wiring was often done in a way that is no longer accessible.	Annual report
7/2009	A large piece of limestone fell in the Choir loft.	Annual report
2011	Replacement of fire alarm box in basement of Parish House; switch from telephone-based system to wireless system. There is only one smoke detector on the entire campus (in the organ case); the rest are heat detectors but should be upgraded to smoke detectors.	Annual report
2011	Gas - 2 furnaces replace; Replacement of both furnaces in Harrop Center.	Town permit office; Annual report
2011	Refinishing of floors in Auditorium and Dining Room	Annual report
2011	Fireplace in Church Office being rebuilt to preserve its beauty.	Annual report
2012	Rewiring of chimes in belltower.	Annual report
2012	Construction of metal grates to protect Lexan in West Porch of Sanctuary that bew down in winter storms	Annual report
2013	Build 3' x 31' boardwalk over roof of Harrop Center to connect fire escapes	Permit number 222 74-13; Annual report
2013	Work on heating system. $350K was spent 10 years ago to replace the system on which ~$250K is still owed, so it is critical to maintain this investment.	Annual report

2013	Air conditioner cages constructed to satisfy requirements from insurance company.	Annual report
2013	Electrical upgrades by Wayne Electric.	Annual report
2013	Recommendation for a full-time property manager in order to properly and proactively maintain the property's grounds, systems, and overall physical assets.	Annual report
2014	Plumbing work; Parish House urinal project.	Town permit office; Annual report
2014	This was the first winter where there were not any serious heating system issues.	Annual report
2014	Convert kitchen dumbwaiter to broom closet.	Annual report
2014	New linoleum floor in kitchen and hallway.	Annual report
2014	Walls and ceiling replaced in Sanctuary bathroom.	Annual report
2014	Removal of some Lexan exposing beautiful church windows.	Annual report
2014	Bell tower survey for upgrade and replacement. Step 1 of a major capital project that must take place over the next 3-5 years.	Annual report
2014	Cloister gates ground down so they would open and close fully.	Annual report
2014	Cracks in copper roof of Harrop Center porch soldered to resolve leaks.	Annual report
2014	Gas - piping.	Town permit office
2015	Seeking payments from Verizon for roof repair due to damage from the severe winter. Time frame is 2-3 years.	Annual report
2015	Church needs to plan for capital project for Bell Tower Upgrade and replacement of Bell Supports; time frame 6-18 months. One of the larger bells has rotted structural steel supports and will fall at some point.	Annual report
2015	Recommendation to hire a full-time property manager. "We have the region's most beautiful building valued at well over $1 billion in replacement costs. The building is over 100 years old and needs serious attention and project management every day. Not to mention that the building and grounds need to be inspected every day. This would have eliminated our recently haveing 10 downspouts stolen. It is obvious that the thieves worked at this theft over several nights."	Annual report
2015	Plumbing - Replace water heater.	Town permit office
2016	Choir loft railing replaced.	Annual report
2016	Rubber roof over Green St. entrance replaced.	Annual report
2016	New railing in meeting room.	Annual report
2016	Men's bathroom urinal project completed.	Annual report
2016	New hot water heater in Harrop Center.	Annual report
2016	New signs at Green and Center; new Harrop Center sign.	Annual report
2016	Major Harrop basement clean-out.	Annual report
2016	Jack and file down Green St. gates so they do not scrape floor.	Annual report
2016	Siding on SW corner of Harrop Center repaired.	Annual report
2016	Harrop kitchen floor replaced.	Annual report
2016	New doors on shed.	Annual report
2016	Electrical - Install dvr.; full security camera system installation managed by Chad Perry.	Town permit office
2017	Pruning and reinforcement of elm and horse chestnut trees	Annual report
2017	Reassessment of fire extinguisher inventory and installation of new ones.	Annual report
2017	Stairs to basement in Parish House rebuilt and repaired.	Annual report
2017	Removal of old lexan from outer windows of Parish House and Sanctuary.	Annual report
2017	Installation of wifi access points in Sanctuary.	Annual report
2017	Repair and replacement of motors, pumps, and bearings in boiler room.	Annual report
2017	Repair of copper downspouts in bell tower.	Annual report
2017	Repair and restoration of fireplace tilework in Minister's Study.	Annual report
2017	Organ case repairs.	Annual report
2017	Discussions begun to fund repair of the organ.	Annual report
2018	Phase 1 of installing smoke detectors in Parish House. Phase 2 scheduled for next year.	Annual report
2018	Replacement of pumps and motors in heating system.	Annual report
2018	Ongoing project to remove Lexan from windows. Reveals need for painting and caulking around windows that have been covered for over 40 years.	Annual report
2018	Tree removed after damage in storm.	Annual report
2018	G. Bourne Knowles brought in a lift truck to shovel snow off flat roofs to minimize leakage from melting snow.	Annual report
2018	Installation of security cameras to mointor grounds.	Annual report
2018	Replacement of deteriorated areas of sidewalk to alleviate safety hazard.	Annual report

2018	Decorative paint in Office restored. Office ceiling cleaned as well as upper walls in Dining Room, making quotations easier to read an revealing the signature of the artist W. B. Symonds. Work funded by an anonymous donor.	Annual report
2018	Masons removed cracked pieces of limestone on the south wall of the sanctuary resulting from a rusting iron tie inside the wall.	Annual report
2018	Bell tower drainpipe replaced.	Annual report
2018	Overhead lighting in sanctuary updated with LED units.	Annual report
2018	Work done in organ chests to protect organ from roof leaks and falling limestone.	Annual report
2018	Bathroom behind the pulpit painted.	Annual report
2019	Electrical - 2 door chimes; new wiring & lighted button at front door, wiring to rear door.	Town permit office
2019	Electrical - install smoke detectors.	Town permit office

PRESERVATION GUIDELINES

The consideration of repairs, renovations, and maintenance at the Salem Athenaeum should be guided by the significance of the buildings and site as framed by the National Register, Massachusetts Historical Commission, and the character defining features identified in this report. *The Secretary of the Interior's Standards for the Treatment of Historic Properties* should be used to inform all work at the building. The Standards provide advice on the preservation and protection of cultural resources and recognize four treatments: Preservation, Rehabilitation, Restoration and Reconstruction. The first three are relevant to this project.

Preservation

Preservation is defined "as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project."

Rehabilitation

Rehabilitation is defined "as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural or architectural values."

Restoration

Restoration is defined "as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project."

General Application of the Standards

Additions

Additions to a historic structure should be respectful and subordinate to the original building. Although the addition should possess similar mass, proportions and materials and can feature complementary stylistic details, it should not replicate the original building and should be readily distinguished as new construction.

Materials

When repairs are required, original building materials should be replaced in kind – brick for brick, wood for wood, slate for slate. When traditional replacement materials are not available or are economically unfeasible, substitute materials that mimic the look, feel, and workability of original materials may be considered. Care should be taken when deciding to use a synthetic material, however, since modern products may interface poorly with traditional building materials, offer limited longevity versus traditional materials, and experience color shifts and other deteriorative changes.

Siding & Trim

Substitute siding materials cannot rival the distinctive, historic appearance of wood clapboards, or shingles. Although substitute materials such as vinyl or cement board siding may offer short-term benefits in terms of maintenance and durability of color finish, they have inherent disadvantages. Vinyl siding severely compromises the historic integrity of a building and its application often obscures character defining trim elements or necessitates their removal. Cement board siding lacks the distinctive tapered profile of wood siding, is difficult to install (it requires screws instead of nails), and degrades over time. It performs poorly and takes on water during freeze-thaw cycles and where butt ends have not been properly prepared. PVC and fiberglass materials do not match the physical properties of original materials.

Wood Windows and Doors

Wood windows and doors are character defining features and essential elements in a historic building's distinctive architectural design. Repairing and weatherizing existing wood doors and windows is always the preferred approach for historic buildings and provides energy efficiency comparable to new elements. When windows have exceeded their useful lives and retention is not practical or economically feasible, an approach that combines repairing old windows where possible and introducing new windows where necessary is recommended.

Paint Finishes

Original paint formulations and colors are character-defining elements that are often lost over time because the paint materials themselves are relatively short-lived. When repainting is necessary to preserve the integrity of the envelope, the colors chosen should be appropriate to the style and setting of the building. If the intent is to reproduce the original colors or those from a significant period in the building's history, they should be based on the results of a scientific paint analysis.

Traditional lead-based paints, which offer excellent longevity, durability, and color stability, are no longer available in the United States. The highest quality latex-based paints available should be employed instead, after thorough surface preparation and priming. The application of a permanent vinyl or ceramic liquid coating system is damaging to wood, irreversible, and historically inappropriate.

Application of the Standards at the Salem Athenaeum

Preservation of the character-defining features and architectural integrity of the building should be of paramount concern for the building's stewards.

Preservation of Character Defining Features

Roofing

All copper roofing should be retained as much as possible and repaired with in-kind material whenever possible. Missing sections of copper roofing should be replaced in accord with the original designs whenever possible, except in cases where it would cause undue leaking. Leaders and collector boxes should be replaced or repaired in-kind, except in cases as with the through-wall leader where performance issues may require different treatments to prevent leaking.

Stone & Masonry

All stone and masonry materials should be retained, repaired, and maintained. If changes are contemplated or elements become damaged and require repair, the original stone or brick should be matched.

Windows

Missing sections of original glass should be replicated by a qualified glazier to match original designs. Plexi-glas that has yellowed and is obscuring the original windows should be removed and either not replaced or replaced with new materials, properly installed to allow for ventilation.

Doors

The original door materials and design are important to the design aesthetic of the building. The doors should be carefully preserved, and the door openings should not be changed. Where necessary the doors should be fixed for proper operation.

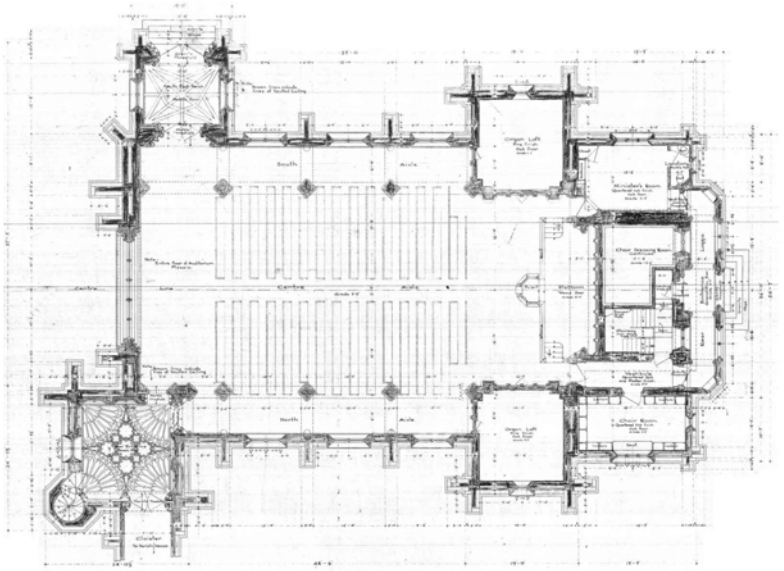
Adaptation

Any adaptations of the structure to meet accessibility requirements should be tactfully performed to minimize as much as possible disruption of the original appearance of the spaces and to use materials that match the originals as much as possible.

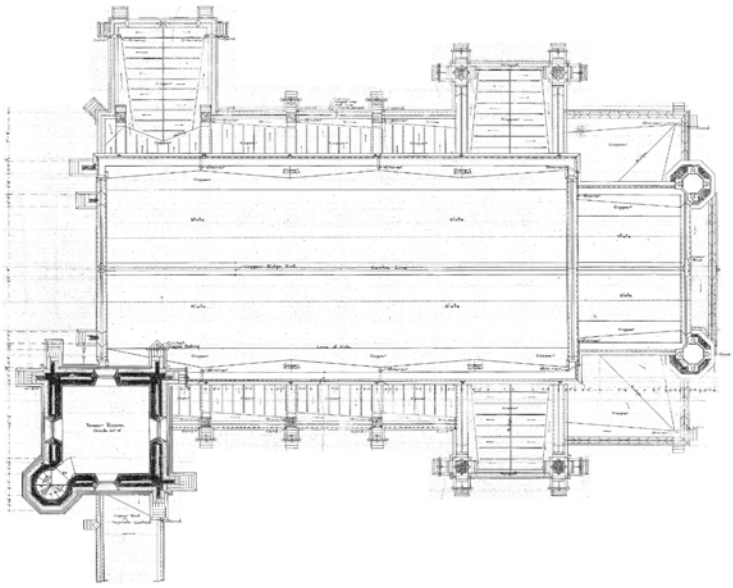
Wood Casings, Cornices, Columns, and Other Trim Elements

All wood materials should be retained, repaired, and maintained. If the replacement of damaged elements is unavoidable, the original wood profiles should be replicated.

w



EXISTING FIRST LEVEL PLAN



EXISTING ROOF PLAN

N

0' 10' 20' 50' 1/32" = 1'-0"

PART 2: EXISTING CONDITIONS & TREATMENT RECOMMENDATIONS

EXTERIOR CONDITIONS

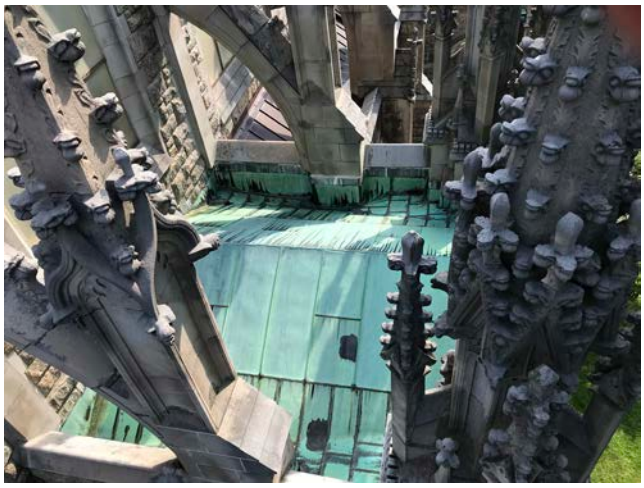
Roofing

The roof presents many issues because of problems in the original construction as well as the variety of repairs and attempts to stop the leaks that use different methods and have been performed at different times. Some areas of the roof have standing and flat seamed copper, with ages that range from original to the building to relatively new. There are all manner of patches and sealants applied to these sections in attempts to deal with the leaks that are plaguing the building.

Other areas of the roof have EPDM membrane, again showing a variety of ages, conditions, and deficiencies. During out assessment inspection, a roofing mechanic was able to make some emergency repairs to the membrane, but there are still obvious defects at termination details, particularly at the cloister roof.

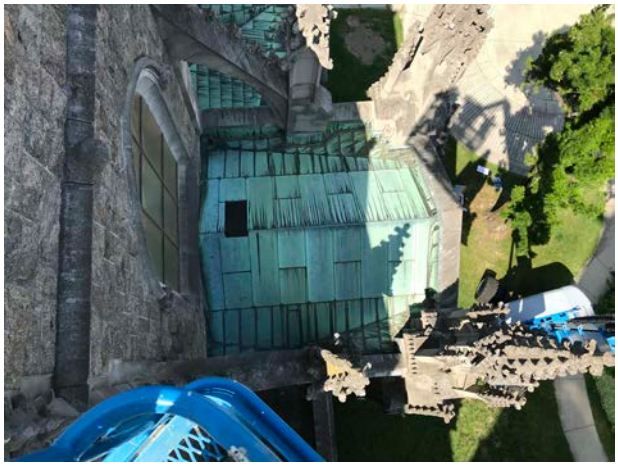
The lack of through-wall flashing under the coping stones is a major contributor to masonry problems. See the Masonry Assessment on page 95. A particular area of concern is the rain leaders that pass through the upper walls of the nave and are constructed in such a manner that water penetrates into the wall, causing the seepage into the interior limestone facing that has profoundly affected the interior of the sanctuary. These penetrations and the leaders, collectors, and downspouts allied with them need particular attention.


Newer copper replacement roof over west ambulatory and porch.


Older copper roof with numerous patches at west transept.


Older copper roof at southwest corner with numerous patches and open joints in solder.

Detailed view at southeast corner roof shows many campaigns of repairs to open seams with mastic.



Original copper roof beyond its life expectancy.

Original copper roof beyond its life expectancy at northeast corner.

Rain leaders enter the building and are the suspected cause of interior damage.

Downspouts from the nave roof drop to the aisle roof then enter the building briefly to then go to external collector boxes.

Current roof is .060 EPDM applied on top of 4-ply bitumen roof on plywood. During August 2019 assessment a number of holes in the EPDM were patched.

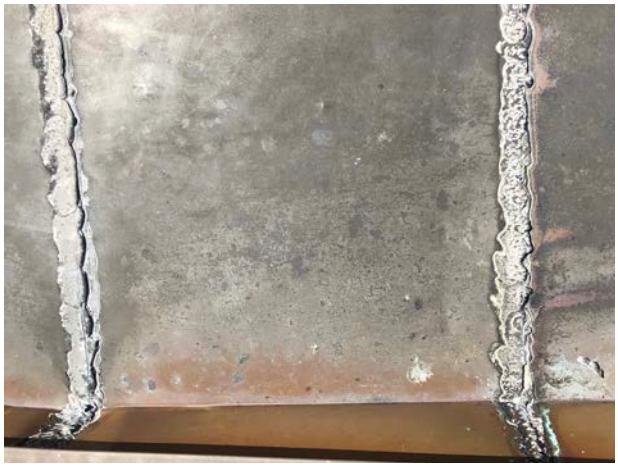
Elbows at downspouts have blown out from freeze-thaw cycles and copper is beyond its expected life.

Caulking at coping stones has failed. Note that the caulking has tested positive for asbestos.

Older copper roofing with numerous patches over choir at west end of building.

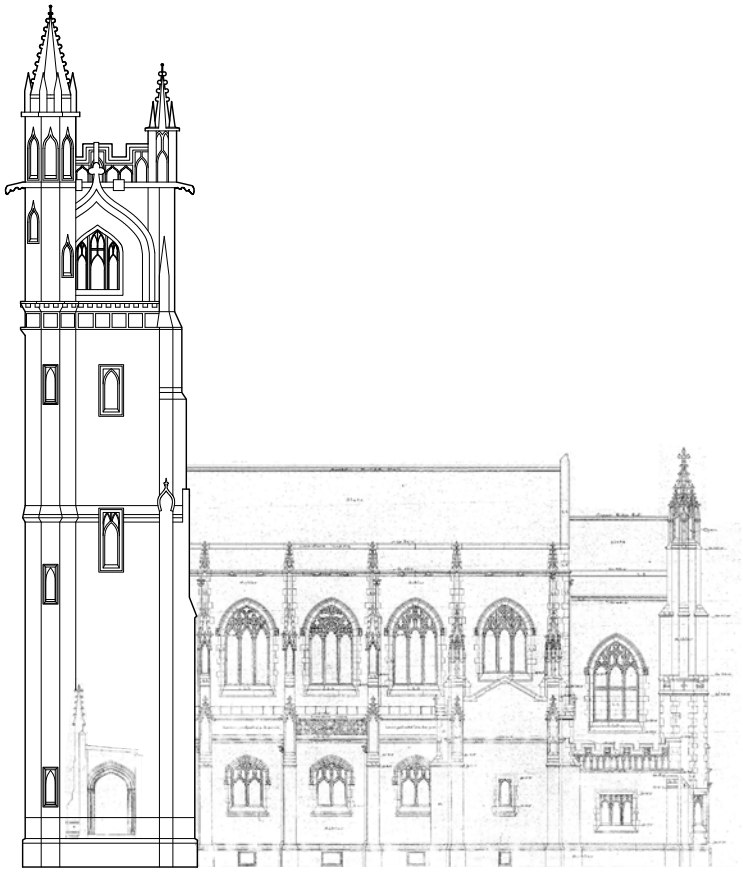
Old rain leader assembly at northwest corner of nave. Note: Some of these older assemblies were sleeved with new copper leaders during recent copper work.

Newer replacement copper at nave roof valleys, and older copper roof at nave peak, possibly completed in 2004.



Newer replacement copper at north side of nave roof. While this is relatively recent work (2004), there is evidence of cracked solder.

Hatch cover has mastic patching along its upper edge, an indication of leaking.



EXISTING NORTH ELEVATION

0' 10' 20' 50' 1/32" = 1'-0"

North Elevation

The north elevation shows evidence of stone movement at the copings, open mortar joints, and frost-damaged stone. Across this (and across the building in general) caulk has been used to seal many gaps, and much of this caulk has been found to contain asbestos. Localized repairs to decorative elements that have cracked and/or are missing are required.

A major factor in the condition at this wall is that the coping stones have no through-wall flashing. See the Masonry Assessment at page 95. The aisle roof has an old bitumen covering, and the black felt in the assembly contains asbestos (see report on page 125).

The transept roof is most likely the original copper and contains numerous mastic repair. The high roof trough has newer replacement copper but showed signs of cracked solder. The downspouts that travel through the masonry walls were replaced when the roof was replaced, but they are still inaccessible and suspected of continuing to cause moisture problems in the walls.

A number of fractures in the limestone exhibit frost damage. Pinnacles are cracked and missing, most likely at locations where they were secured with ferrous pins.

The stained glass windows have yellowed protective glazing (see assessment on page 121).


Stone movement, asbestos-containing caulk, open joints.

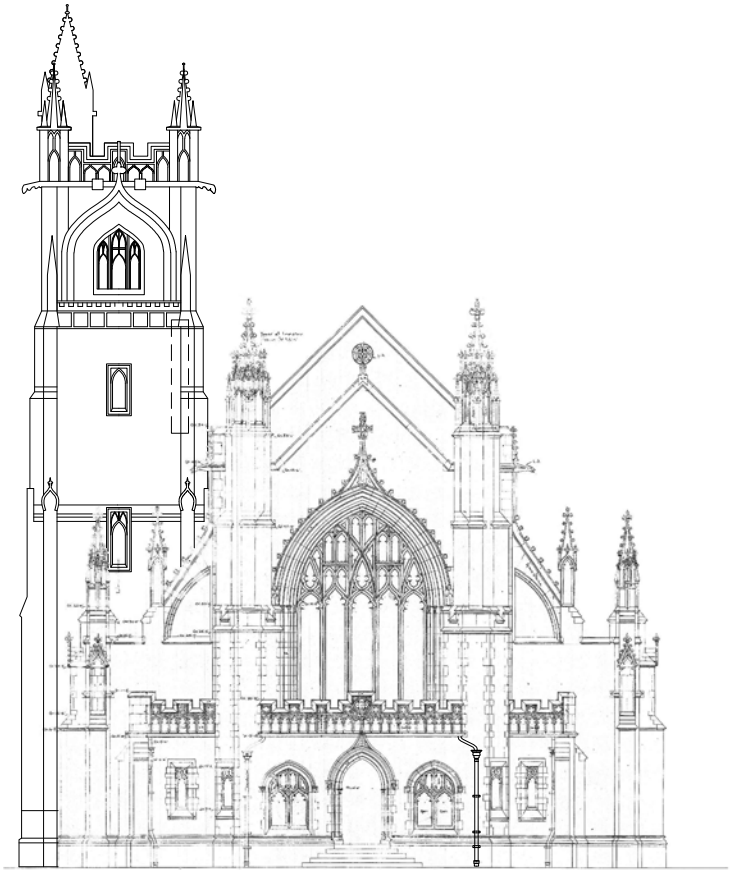

Open mortar joints.


Frost-damaged trim stone.

Frost-damaged trim stone.

Missing and cracked finials and defective mortar joints.

Angel at this location has had cracked wing repaired with epoxy (and appears to be holding).



EXISTING WEST ELEVATION

0' 10' 20' 50' 1/32" = 1'-0"

West Elevation

The tower roof both at the uppermost level as well as at the bell level is a concern related to the leaks in the tower. There are many failures of flashing and caulking, and the existing caulking is asbestos-containing.

There are downspouts at both sides of entry on this elevation that lack collector boxes. There is also a rusted metal box above window on south side of west elevation.

Security issues at the west porch have been an ongoing concern, and the porch roof has been leaking. There are missing and/or cracked finials (similar to the north elevation).

EPDM roof was patched during assessment and should be replaced.

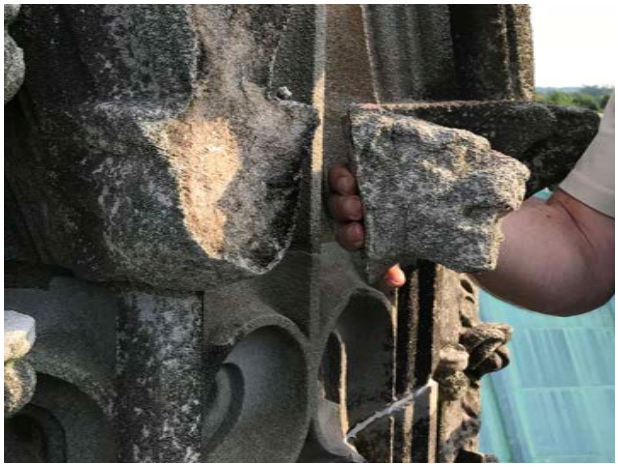
Tower roof has many failures of flashing and caulking on this roof. Note that white caulking was determined to be asbestos-containing.

Cracks at buttress stone.

Failed caulk at gable coping. Note: This caulk contains asbestos.

Cross at peak of roof is loose and cracked.

Finials on pinnacles have organic growth that should be removed followed by a careful inspection for loose elements to be re-installed with non- ferrous pins.

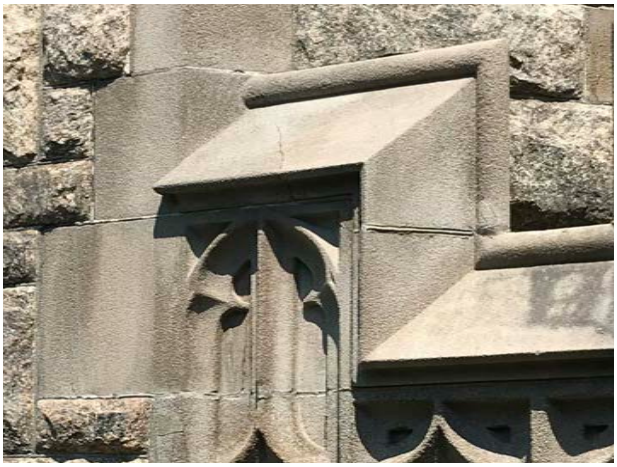


Inspection team removed a figure's head at the right pinnacle that showed severe evidence of weathering due to a crack that had been there a long time.

At the south side of the west elevation, the inspection team removed a precarious finial.

Eroded stones at interior of porch arches.

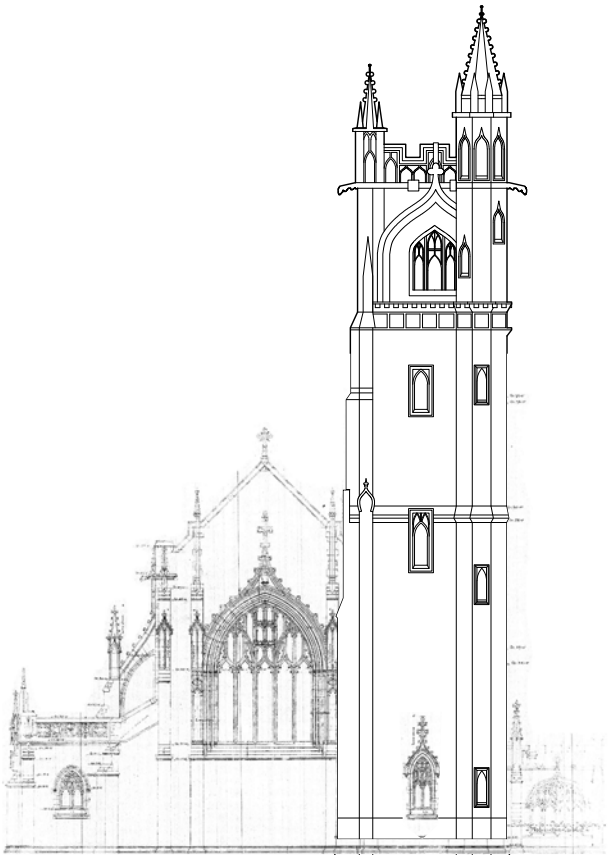
Lost and cracked finials due to corroded steel pins at north side of west elevation.



Cracked stones at parapet above porch.

Note: Typically most of the glazing compounds at stained glass windows were found to be asbestos-containing.

Downspouts and metal box above window.



EXISTING EAST ELEVATION

0' 10' 20' 50' 1/32" = 1'-0"

East Elevation

Other maintenance issues at the tower that present themselves are the masonry joints in the tracery parapet. There has been considerable mortar loss at these locations that needs to be addressed, and the shingle stone sills beneath the parapet also have open joints that are leading to water infiltration.

There is bad flashing at the tower roof and gray caulk that contains asbestos. The membrane roof is past its usable life.

In addition to the limestone decay and localized stone damage that characterizes all the elevations on the building, there is also a vertical crack on the tower.

The large eastern window has severe stone weathering and stone movement. This window had Plexi-glas which was removed during the inspection because it was contributing to bad conditions.

There are security issues at the cloister, which is currently covered in yellowed Plexi-glas.

There are many open joints and cracks in limestone tracery parapet above the tower roof.

Remove small tree growing nearly at top of tower.

Shingle stone sills have open joints causing water infiltration.

Stone cross at gable peak is cracked and loose.

Spalled limestone at gable coping.

Yellowed Plexi-glas security panels at the cloister should be replaced with material and methods to improve aesthetics while maintaining security

Deteriorated stone at arch over main window is evidence of water infiltration and movement of stone.

Vertical crack at mid-level of tower.

EXISTING SOUTH ELEVATION

0' 10' 20' 50' 1/32" = 1'-0"

South Elevation

There is further evidence of deteriorated and broken stone on this elevation. The flying buttresses are not structural; nevertheless, arch stones in the flying buttresses have slipped and require pinning to stabilize them.

The existing bronze doors do not close properly, and the stonework around them requires treatment to improve their operation. See the Structural Assessment for a good discussion of the cause of the door problems (on page 79).

As on the north elevation, there are cracked and/or missing finials and the same issues with the high roof trough and the through-leaders that may not be shedding water correctly.

The exquisite sculptures in the niches are in remarkably good condition and have weathered far less than the trim stones because

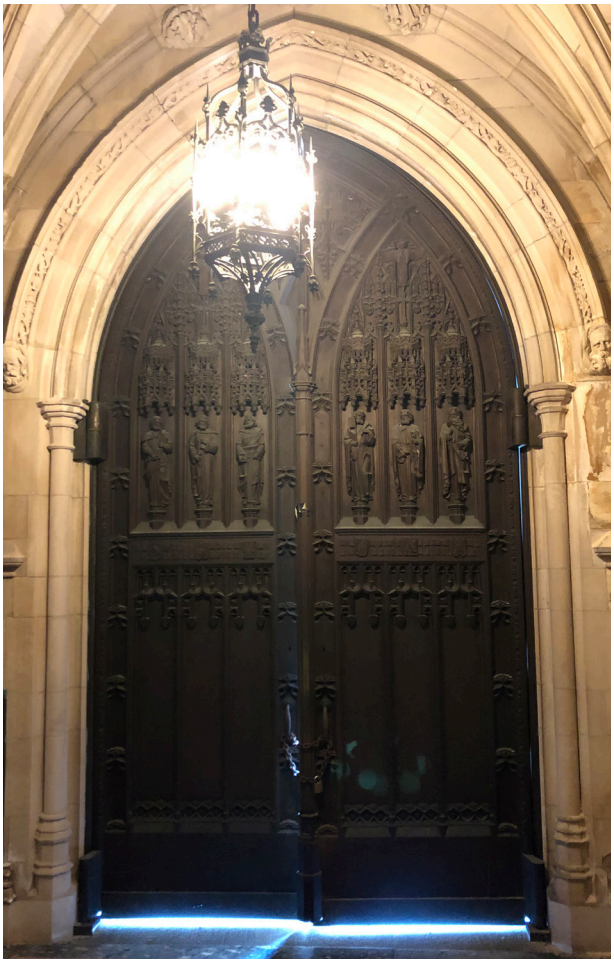
Evidence that there may have originally been finials here at all four elevations.

Arch stones at the flying buttresses have slipped due to movement and require pinning to stabilize the stones.

Deteriorated and broken stone.

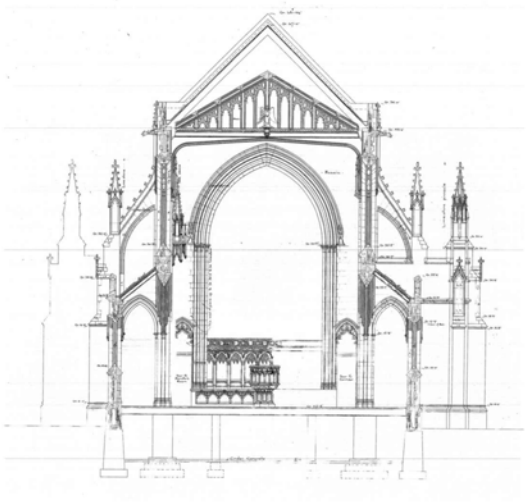
Cracks and spalls.

Cracked finial.



Existing bronze doors are difficult to operate due to a combination of factors: A slipped arch stone, a compressed rubber shim at the hinge, and perhaps an undersized pintel hinge. See Structural Assessment on page 79.

EXISTING EAST INTERIOR ELEVATION



EXISTING WEST INTERIOR ELEVATION

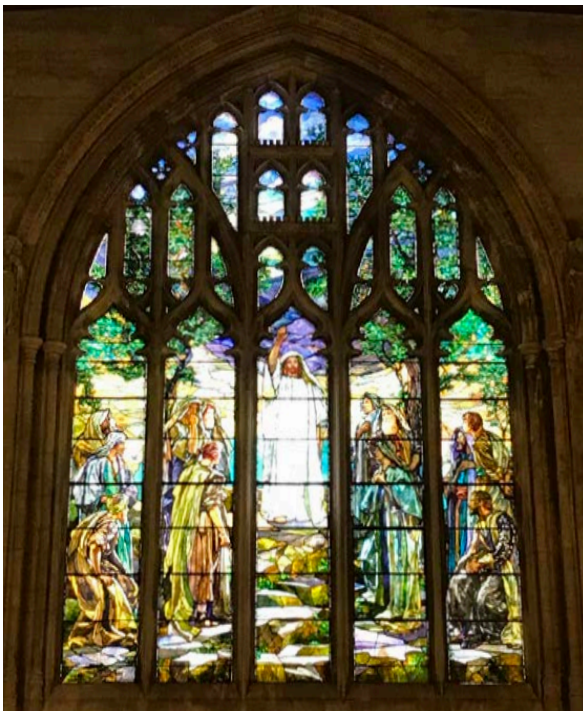
EXISTING NORTH INTERIOR ELEVATION (SIM. TO SOUTH)

0' 10' 20' 50' 1/32" = 1'-0"

INTERIOR CONDITIONS

The interior presents water damage on many surfaces. The contaminants have leached through the stone and probably cannot be effectively cleaned. The first step is to stop the leaks so there is no further exfoliation or loss of decoration at the interior. A decision needs to be taken as to whether to replace the damaged stone on the interior or leave it in place.

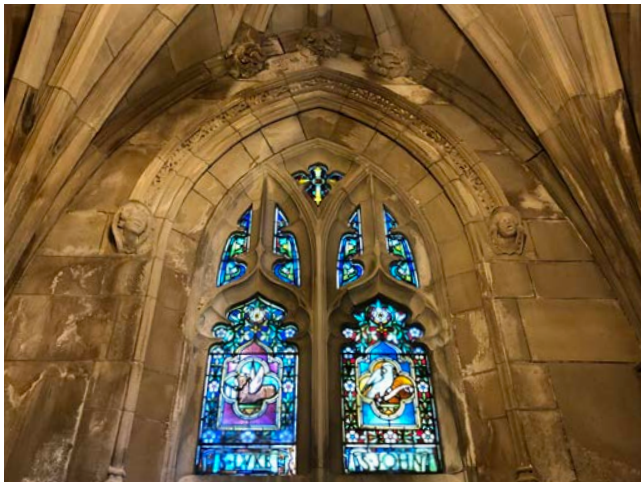
The Plexi-glas protective glazing on the exterior of the windows diminished the visibility of the beautiful windows on both the interior and the exterior. Sections of this Plexi were removed during the site visit to reveal conditions beneath. In general protective glazing is not recommended except in areas threatened by vandalism.



Water damage at the stone around the east window presents serious problems that had also affected the space between the window and the Plexi-glas. During the on-site investigation and lift survey, the Plexi-glas was removed from this window because it was doing more harm than good. This image shows the window after removal of the Plexi-glas, which now permits the full beauty of the window to shine forth both on the interior and exterior of the building. Similar treatment is recommended for all the Plexi-glas covered windows except those in areas requiring protection from vandalism.

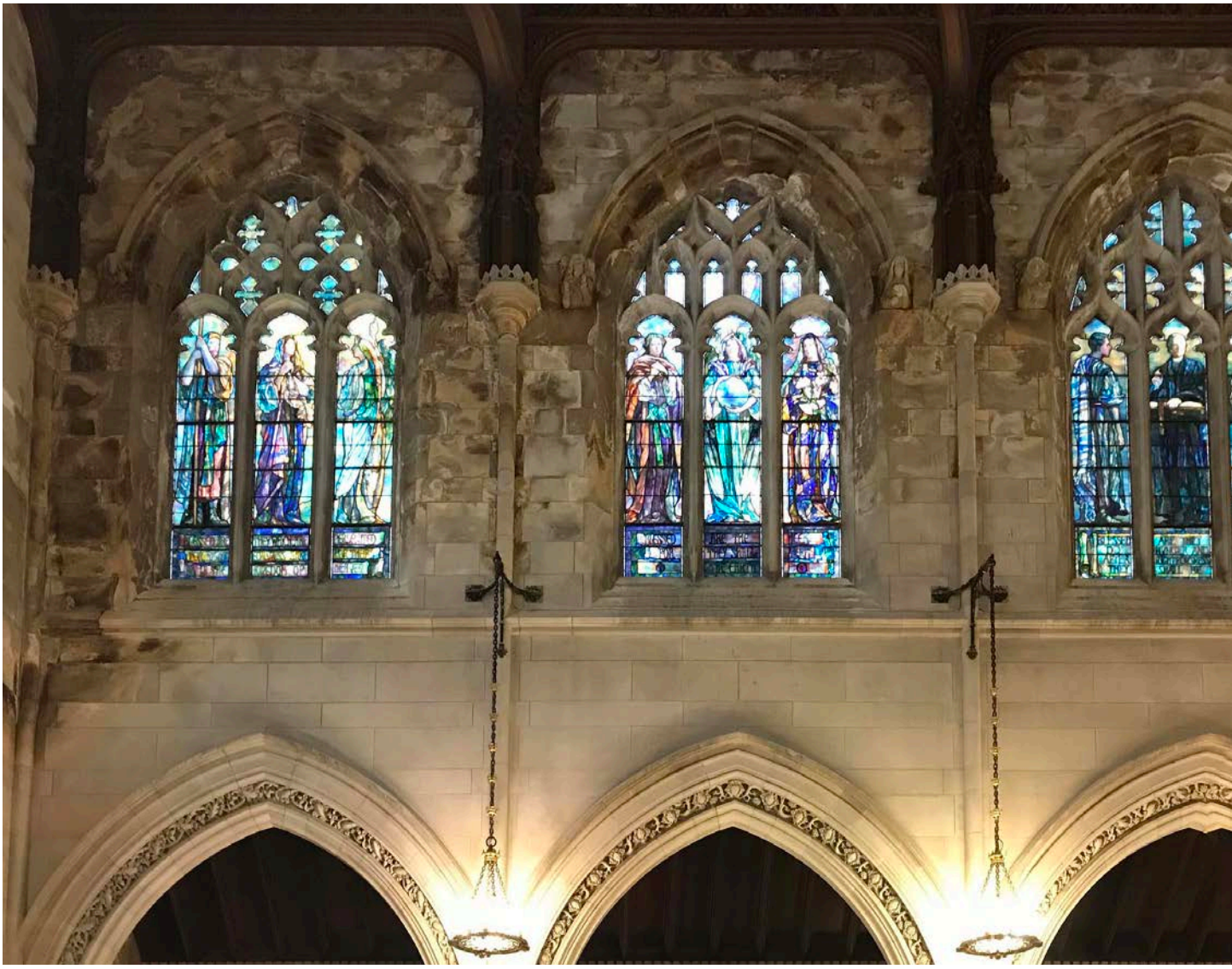
East window that has benefited from Plexi-glas removal during the lift inspection to allow original glass's beauty to be visible and also remove a condition that is causing excess moisture against the glass. The outermost layer of the original glass (visible here) is a ripple texture.

Moisture effects on southwest entry portico. The moisture issues at the building's interior sweep from the east window around the south side and through the choir to the northwest corner. All areas show the effects of moisture penetration that has caused leaching of colored oxides, rust, and other materials.

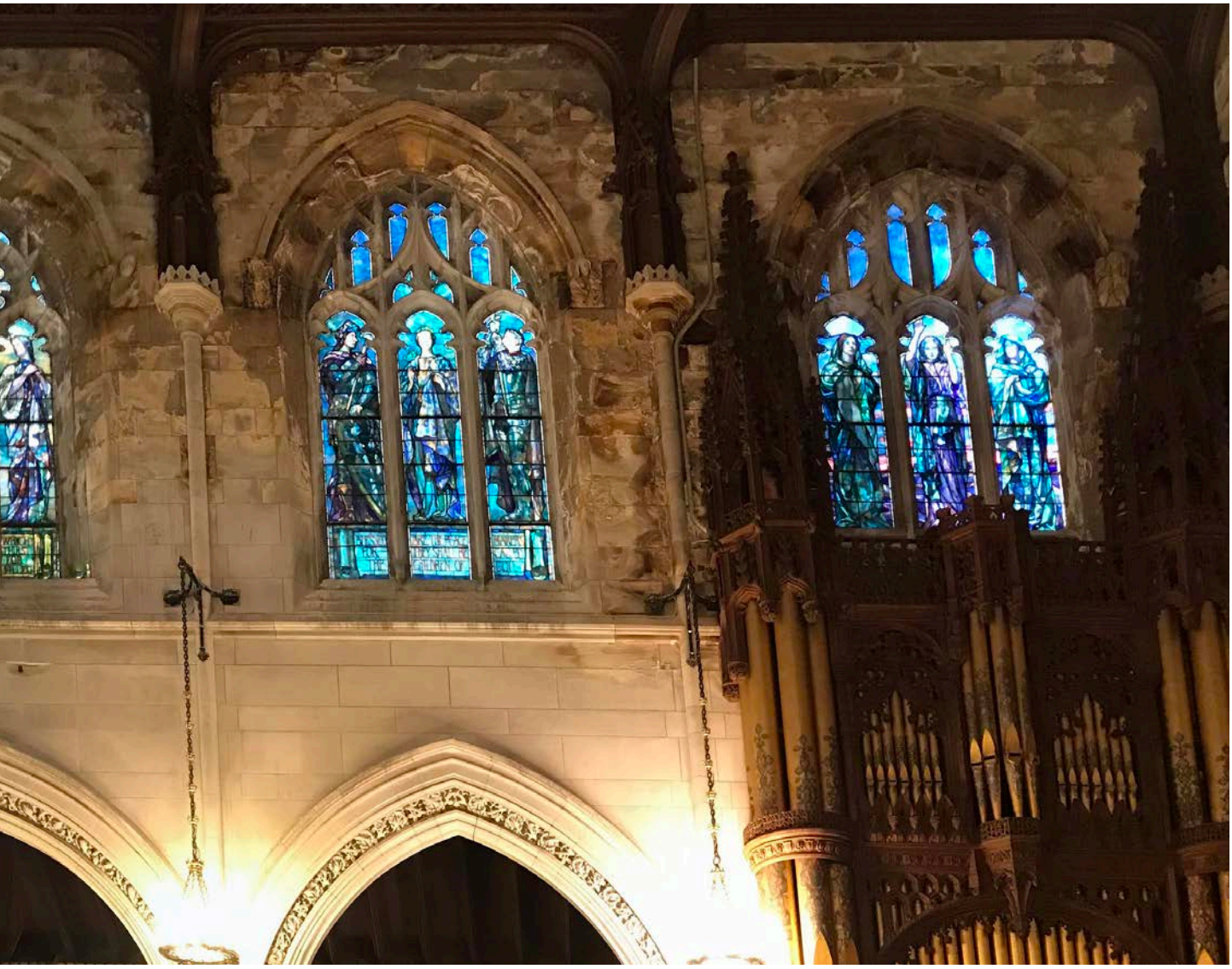


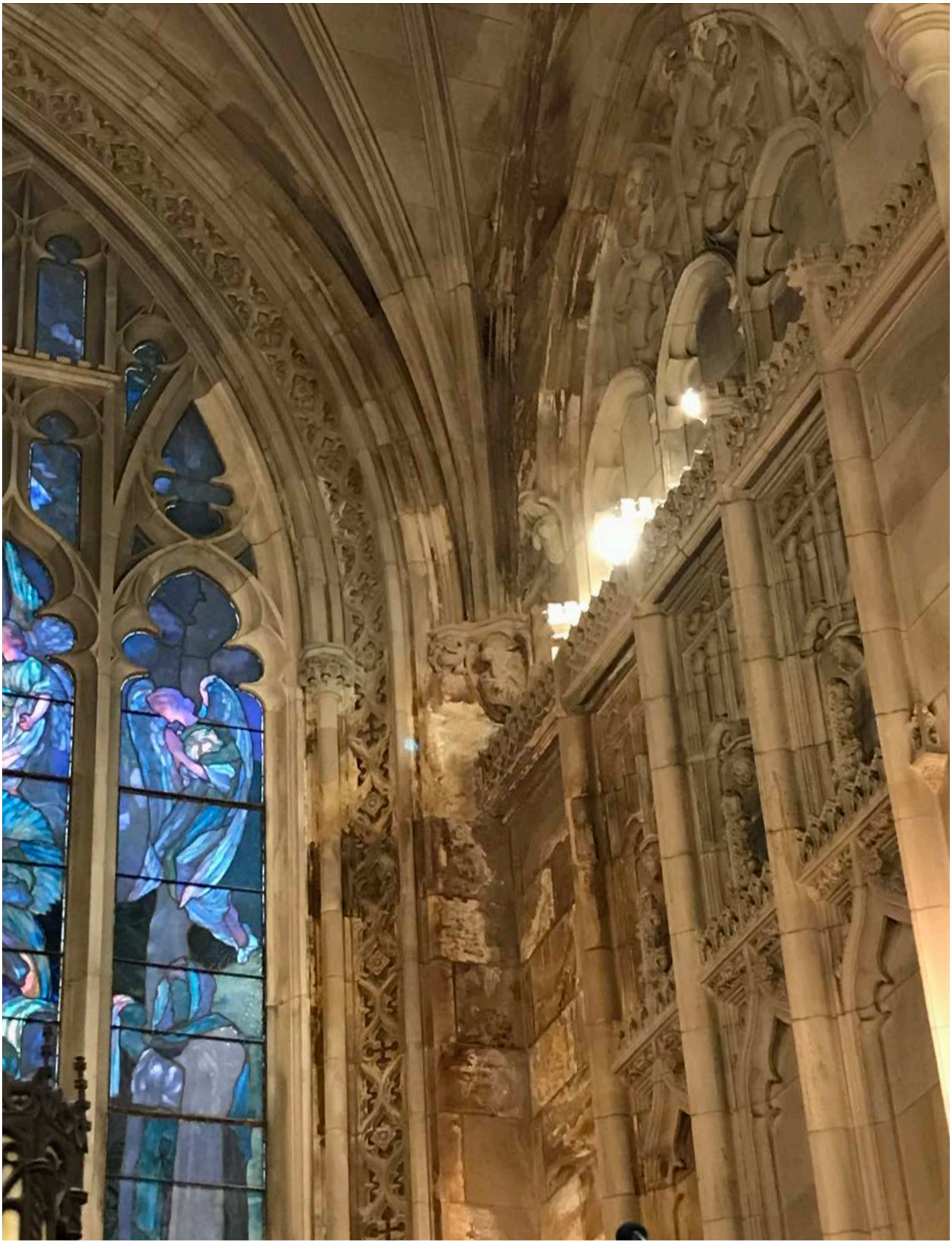
Southwest entry portico moisture effects.

Southwest entry portico moisture damage.



The south wall presents particularly pronounced moisture damage between the windows that is apparent across the entire face of the wall.





Moisture damage continues around the back of the choir and is particularly severe at the northwest corner.

STRUCTURAL ASSESSMENT REPORT

Please read the full report for a detailed assessment.

Summary

- Eroded mortar joints were observed across the building's elevations. These should be Properly raked and re-mortared. Some mortar joints in the limestone are cracked rather than eroded, suggesting movement in the stones. These joints should be raked and then injection grouted. Causes of movement should be arrested.
- There is limestone erosion at the trim but it has not advanced to the point that work is urgent. It should be observed, and where necessary can be addressed with surface repairs or dutchmen in extreme cases. Cracking at the tower should be investigated more carefully and repaired with required methods on a case-by-case basis. Where limestone elements have shifted significantly they should be removed and pinned, or re-set with injection grout. At the flying buttresses it may be impractical to re-plumb slipped elements, it is recommended to pin stones in place.
- Efflorescence is a sign of water infiltration, so before it is addressed by cleaning, the source of the water penetration needs to be identified and stopped.
- Rising damp in the basement is a long-standing issue and cannot be addressed without a major intervention. It is recommended to repoint the existing joints and replace the most damaged bricks.
- The steel structure under the mosaic floor in the cloister is corroded and expanding. It would be impossible to replace this structure without destroying the floor, so it is recommended to cathodically protect the steel by grounding it to a transformer that will electrically counter the natural corrosion and stop the rusting.
- The monumental bronze doors to the sanctuary on the south elevation require chinking and grouting the mortar bed joints and trimming of the head of the door surround and/or the door to free the stuck leaf from its compressed-in-place condition, and the rubber shim should be replaced with a plastic one, and the door pintles should be examined to see how they can be adjusted to support a freely-moving door leaf.
- Corroded steel beams in the attic above the organ lofts should have brick around them removed so they can be cleaned of rust and reinforced with new steel attachments, and then replace the brick.
- Efflorescence and cracking on the interior is a result of moisture penetration, so the sources of the infiltration should be identified and stopped. Leaks should be stopped on the exterior.
- The badly rusted steel beam supporting the tower buttress in its southwest corner should be replaced, while steel transfer beams between the upper and mid-level tower sections are rusted and should be cleaned and painted to prevent further corrosion. Interior brick should be repointed and surrounding brickwork at openings needs to be deeply repointed.

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Salem, Massachusetts 01970-3517
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September 19, 2019

Spencer Sullivan and Vogt, Architects
1 Thompson Square #504
Charlestown, MA 02129

Attention: Doug Manley

Reference: Unitarian Universalist Society of Fairhaven, Fairhaven, MA

Dear Doug:

On July 30 and 31, 2019 we visited the Unitarian Universalist Society of Fairhaven to perform a general visual evaluation of the structure. The following is a brief summary of our findings and ***recommendations***.

General Description:

The Unitarian Universalist Church in Fairhaven is a grand gothic revival structure in the town's center. Exterior wall construction is of a gray-pink granite with Indiana limestone trim and multi-wythe red brick back-up. The structure is a combination load-bearing steel frame on perimeter masonry walls, with a brick and structural clay tile arch construction forming the floors and roof.

For the purposes of this report, the front of the church will be considered to face due east.

Noted Conditions and Recommendations:

Exterior-

E1: The mortar joints in the exterior stonework are for the most part in good condition, however mortar joints have eroded in several areas, including the following:

Main Church

- At the southeast corner. The joints between the quoin stones and between the quoins and the ashlar are eroded, along with the joints along the corner's return on the east elevation.

- At the easternmost flying buttress and pilaster on the South Elevation.

- At the lower portion of the north pinnacle of the west elevation.

- At the peak of the west-facing upper (clerestory) gable.

- The head joints of the "shingled" sill stones of the large window on the east elevation.

- At scattered locations on the upper west gable, including the trefoil vent.

Tower

- At the projecting arises on the octagonal turret at the tower's northeast corner.

- At projecting southeast and southwest buttresses.

- Between the stones that form the arch over the tower's east belfry opening, eroded to the point that there is little mortar left.

- Deeply eroded at the upper portions of both of the southwest buttresses.

- At the north and south surrounds of the west belfry opening.

- At scattered locations on the tower's south face.

- At each of the pinnacles at the top of the tower, along with the upper portion of the turret.

Eroded mortar joints should be ground out and repointed with a compatible mortar.

E2: The mortar joints in some of the limestone work are cracked, rather than eroded, suggesting a minor shifting of the stones. This occurs at the following locations:

Main Church Structure

- At the coping head joints over the east gable, which have been covered by sealant.

- In the bed joints of the limestone accents over each side of large stained glass window on the east elevation. The joints have been covered with sealant.

- Vertically between the carved limestone panels that form the east and west parapets over the southeast entry vestibule. This likely relates to the noted pinnacle movement in Item E4.

Tower

- A major portion of the mortar joints in the complex stonework in the upper parapets between the pinnacles atop the tower, where a small centered finial at each tower face is actually missing.

Tower

- The sky-facing head joints between many of the stone “shingle courses” that form the sills of belfry openings are cracked, allowing water to enter the masonry below.

<u>Cracked mortar joints should be ground out and repointed with a compatible mortar and then injection grouted. The cause of the movement should be investigated and stopped.</u>

E3: The limestone accent and trim elements are <u>eroded at several locations</u>:

Main Church Structure

- At the southeast face at the top of the west elevation's north pinnacle.

- On curved arch over the large window on the east elevation, where the trim has effloresced and flaked due to water seepage from within.

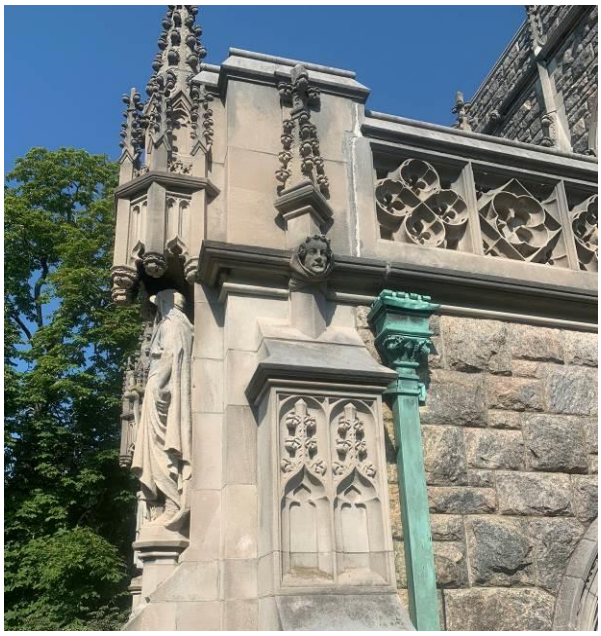
Tower

- In scattered areas on the limestone planes that surround the belfry opening, resulting in pitted surfaces.

- At and between the southeast buttresses.

<u>Most of the limestone erosion is not yet to the point that it requires intervention, however it should be monitored and eventually repaired, as it will continue. Repair may consist of mortar patching, dutchman installation, or unit replacement</u>.

E4: There appear to be <u>oriented structural cracks</u> in the exterior masonry at the following locations:



Main Church Structure

- Deviating vertical cracks between both the southeast and southwest corners of the southeast entry vestibule and the north-south-running walls into which they connect. It appears that the pinnacles are tilting forward due to some unknown driver within, such as rusting embedded steel. The cracks have been covered with sealant.

- Diagonal step cracks radiating upward to the south from the main window head arch at the east transept, and vertically below the center of the window.

- At the upper right corner of the northernmost ground-level window of the west elevation.

- At most of the head joints of the limestone string courses on the north and south clerestory walls and limestone coping above.

Tower

- Vertically at the intersecting joint between the tower's northeast turret and the east-facing flat wall. This crack runs all of the way into the interior.

- Diagonally running cracks through several of the "shingle stones" and sill at the base of the south belfry opening.

- Vertically through many of the quoin stones where the tower's northeast turret meets the north flat wall. These cracks appear to have been surface-sealed.

These cracks should be accessed and inspected, and structurally investigated on a case-by-case basis and repaired appropriately. Repair may involve stitching, pointing and/or grouting.

E5: The granite and limestone stonework has become loose and has shifted at several locations due to internal degradation of the mortar joints behind and/or surrounding them:

Main Church Structure

- At the buttress cap at the base of the east gable's south rake, where vertical cracks have formed and the upper masonry has bulged outward.

- At the bottom of the west upper gable's south rake. The parapet at this location is shifting and bulging due to loss of bond within the collar joint and back-up construction behind the facing stones, a condition that wraps the corner from the west elevation to the south.

- There is a wide crack below the coping capstone at the apex of the west lower gable, and the capstone is loose and shifting upward. The carved limestone Celtic cross, which is atop this stone, has also lifted and can be wiggled by hand. *The shaft of the cross is fastened to the capstone with an embedded metal rod, which limits its movement, and provides sufficient resistance to prevent the cross from falling over*.

- At the northeast face of the west elevation's south pinnacle, where cracking was also noted (*please see Item E4, above*).

- The limestone coping over the side walls of the sanctuary are shifted and lifted in some places, with cracked mortar joints between and below the units.

- The top of the limestone arch over the southeast entrance has slipped, reducing the effective height of the door opening.

- The limestone coping atop of the east parapet of the organ loft projection has detached and shifted toward the east.

Tower

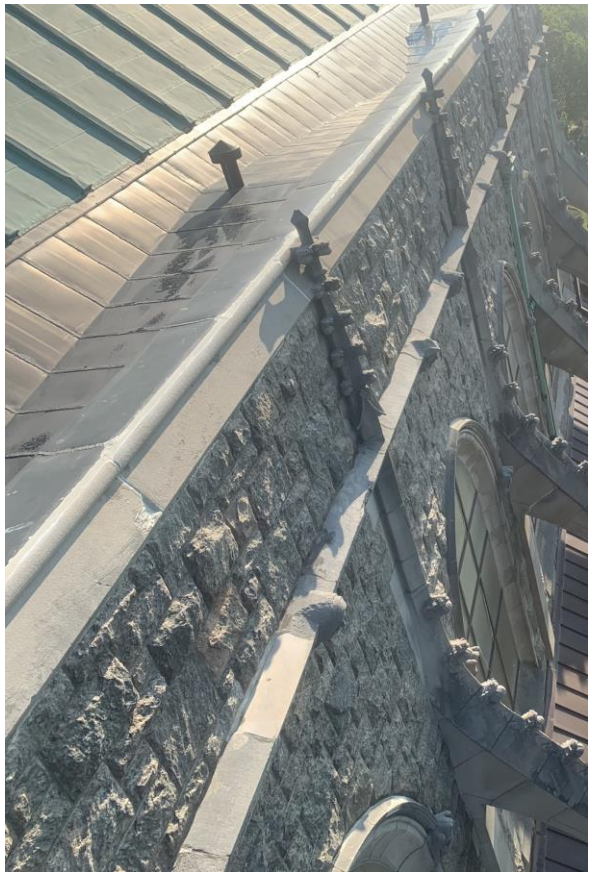
- At the south face of the tower's west-southwest buttress at about mid-height.

Depending upon the severity of damage and the amount of movement, the shifted stonework can be stabilized in place with a combination of pinning, jetting out the deteriorated material behind the shifted stones, and filling the resulting cavities with grout, or by conventionally dismantling and re-setting the shifted stonework.

E6: There are signs of water ingress and egress in the form of white efflorescent stains and streaks at the exterior and interior, and peeling paint and plaster damage at the interior:

Main Church Structure

- There is extensive water damage at the interior of the sanctuary, over the tops of the clerestory windows and to a lesser extent on the gable ends. While the masonry outside these areas for the most part looks sound, a significant amount of water is entering the structure through the walls. The most likely path, in or opinion, is through the limestone copings and trim. Limestone is a very porous material that can pass water through itself in both vapor and slow-moving liquid form. Water would soak into the limestone and seep its way into the equally porous brick back-up material, which supports the limestone. This water then seeps and evaporates out through the interior, causing the damage that has been noted on the interior.



- Efflorescence can also be seen on the exterior limestone arch soffit of the main east window of sanctuary. Water is likely taking a similar path to the sidewalls, but evaporating back out through the exterior limestone, in addition to the interior wall surfaces. In addition to the rake coping, the

crocketed ornaments over the head of the window are likely also absorbing significant water, seeps downward.

Tower

- There is a large efflorescent bloom on the south face of the lower portion of the tower.

Because efflorescence is a secondary effect of water flow, its removal should not be attempted until the flow of water has been stopped at its source.

E7: At the *Main Church Structure's* the middle two flying buttresses against the south elevation are tilting southward by 3" to 4", whereas the remaining four buttresses are not. The free stones of the half arches against the south wall have slipped downward by up to several inches following the cracking and adhesion loss in the mortar bed joints. This downward slippage has created a wedging action has forced the tops of the buttress' pinnacles to tilt outward, with respect to the church wall, which has remained stationary, being braced internally by the roof's tied steel truss system and not dependent on the buttresses for lateral restraint. Because the flying buttresses here are unloaded, ornamental elements, there is not enough compression load on the half arches to prevent their deformation, and the loss of joint adhesion can result in the stones' free slippage. The two buttresses that have moved are the only two that do not have projecting structures underneath that would tend to laterally restrain them, thus allowing the two buttress pinnacles to freely tilt.

Because it would be prohibitively difficult to re-plumb the flying buttress pinnacles, and re-positioning the slipped arch stones would result in widened joint gaps, we recommend that they stones be pinned in place. Stainless steel rods should be inserted through holes drilled from the underside of the arch and

across the debonded joints in so that the stones can be suspended, rather than wedged in place. This would relieve the lateral thrusting forces within the arches and prevent further movement.

The side aisle arches at the interior that correspond to the tilting flying buttresses also have cracks that are related to this movement (please see "*S5" below*). Interestingly, the same movement has not occurred at the north elevation.

E8: At the *Tower* the stonework has fallen off or has been removed at the south face of the southwest buttress, directly outside of the ends of a rusting cantilever beam (please see item "T5"), revealing the brick back-up construction behind it. *The stones should be re-set, and pinned and bonded back into place after the rusting beam has been repaired*.

E9: At the east face of the tower there is a small tree growing over the north spring point of the arch that spans over the belfry opening *that must be removed, as the growing root system will cause the stones to spread apart*.

Interior/ Basement-

Framing and foundation conditions visible within in the basement generally looked good, with a few exceptions.

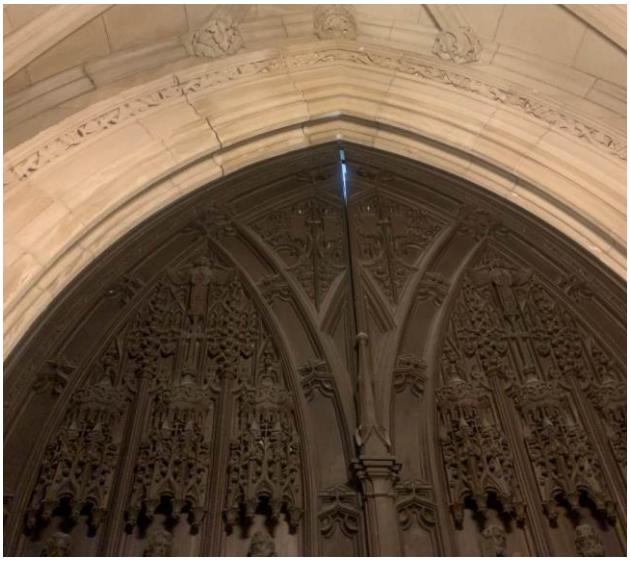
B1: Most of the brick piers that support the sanctuary level framing and three of the piers that support the side aisle columns have a minor to moderate amount of damage at the bottom due to the effects of rising dampness. This occurs when moisture from below the basement floor wicks up through the masonry and evaporates in the mortar joints and sometimes the bricks. The evaporation can enable water-laden mineral crystals to form within the masonry surfaces, causing the mortar surface to crumble and the brick surfaces to spall. *Unfortunately, short of a major intervention such as pier replacement or through-pier flashing, this is a slow acting process that has taken 100 years to reach this point with little serious structural effect. We recommend repointing the joints and replacing the most damaged bricks as the damage slowly continues*.

B2: The steel beams that support brick arches within the cloister link that runs to the Parish House are rusting on both exposed lower flange and concealed flange and web surfaces. Because steel greatly expands when it oxidizes (taking on oxygen to return to its natural ore-like state), the expanding impacted rust, especially on the masonry embedded webs, is prying the arches apart and causing the cracking and shifting that is noted on the mosaic floor surface above (*please see "S16", below*). *Because of the irreplaceable nature of the floor finish, the conventional solution of demolishing and reconstructing the floor is not appropriate in this case. Therefore the next best solution is to cathodically protect the steel by grounding it to a transformer that impresses an electrical current into the masonry via inserted electrodes that counters the natural corrosion cell and causes the rusting to stop*.

Interior/ Sanctuary Level-

S1: The beautiful mosaic floor of the cloister link is cracked and surfaces have shifted. This has been caused by rusting of the structural steel beams below (*please see "B2", above*).

S2: The two arches over the rear hall at the west entrance are cracked at the mortar bed joints. *The cause of these cracks is not obvious and should be investigated*.



S3: The door leaves of the southeast entrance are difficult to move for two reasons:

- The stone arch that spans over the doorway appears to have slipped, vertically, and to have compressed the wooden surround down onto the eastern leaf, preventing it from free motion. *The arch should*

be repaired by chinking and grouting the mortar bed joints, then the surround and/or the head of the door should be trimmed in order free the leaf from its compressed-in-place condition.

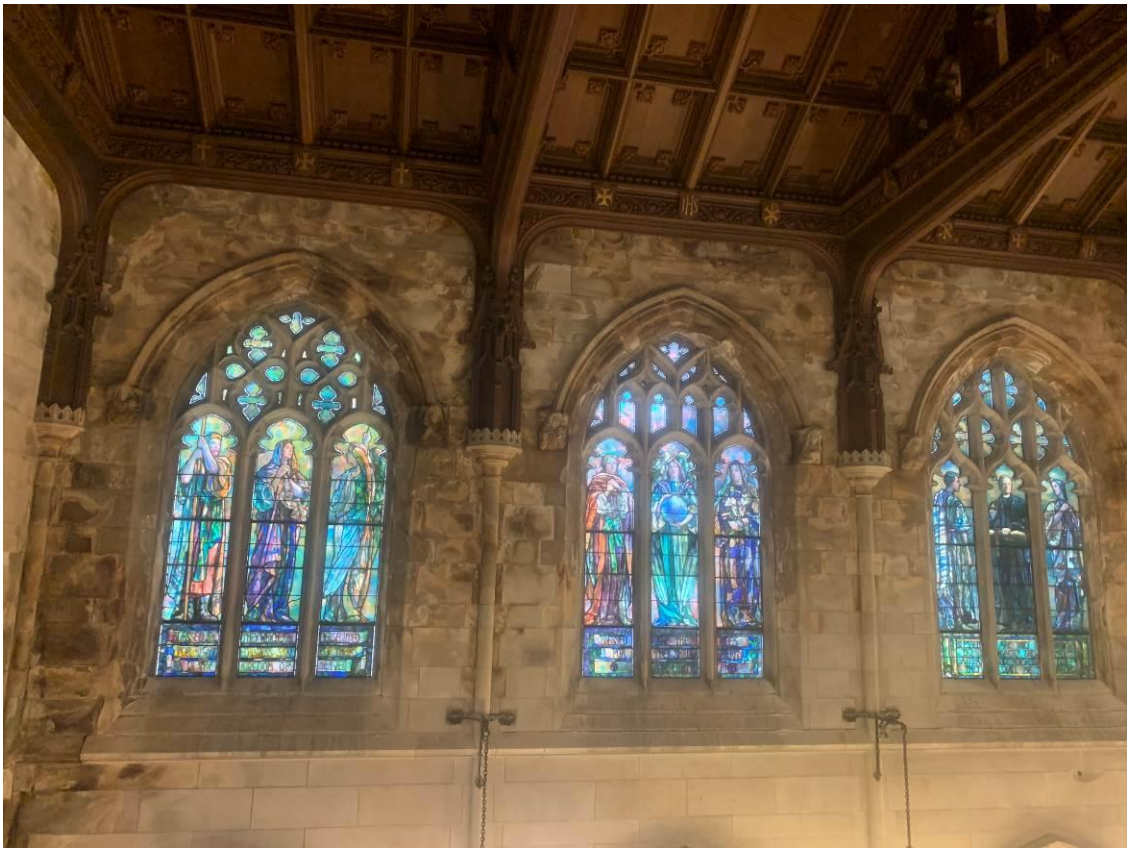
- The eastern leaf is not compressed in place, but its weight is supported on a rubber shim that helps lift it off of its hinge pintle. *The rubber shim creates enough friction on the door leaf that it is difficult to move. We recommend that the rubber shim be replaced with a hard plastic shim to reduce its resistance to the sliding leaf*.

- *All of the door pintles should be examined to determine how they can be adjusted to support a freely-moving door leaf at the proper height and position*. There is apparently concern over the ability of the pintles themselves to support the weights of the leaves. *This should be reviewed as well.*

S4: Within the small attic space over the organ loft one can see the advanced corrosion decay of the steel beam rafters that support the roof, where embedded into the east wall. This damage is directly below the sifted parapet coping stones on the exterior, which one might presume is allowing water to seep into the wall construction (*Please see item "E5", above*) and rust the ends of the beams. The east ends of the rafters are also rusted, although not below shifted coping stones, which suggests that water may be entering the masonry by seeping through the unshifted limestone. *The deteriorated ends of the beams should be exposed through brick removal, cleaned of all rust and reinforced with welded or bolted steel attachments, then painted with a rust inhibitive undercoat and an epoxy based top coat, and then the brick replaced*.

S5: The two middle, south side aisle arches are cracked at their mortar bed joints, due to the arches' elongation as part of the south flying buttress tilting noted on the exterior (*please see "E7", above*). *The arches are not structurally critical and the cracks should be repaired by deep repointing after the flying arches are stabilized at the exterior*.

S6: The upper portions of the clerestory and gable end walls, above the windows, show advanced signs of water damage in the form of efflorescence and peeling paint and plaster. *This directly relates to water seeping through the masonry via the limestone copings and trim (please see "E6", above).*



Interior/ Tower-

Second Level (first level above sanctuary)

T1: There are cracks in the brick surfaces that surround the north, south and east windows, suggesting movement or compression from rusting lintels. *The cracks should be investigated and the lintels, if found to be responsible, replaced*.

T2: There are efflorescent deposits on the upper portions of the south and east walls, and the plaster has fallen off of the upper east wall. There is also a crack and delamination of the plaster at the right side of the east window and a streak

of efflorescence at the southeast corner. *This damage is due to water infiltrating the masonry and seeping out through the interior*.

Third Level

All of the windows at this level have relatively recently constructed arches over them, which presumably replace the steel lintels which may have rusted and failed.

T3: The mortar joints are eroded and the exposed brick surfaces are efflorescent on the north (lower left), east (right half), south (most of surface) and west walls (middle and lower). Again, this was caused by water seeping though the exterior. *Although not a high priority, the eroded mortar joints should eventually be cut and pointed*.

T4: The brickwork that surrounds the door to the roof is severely damaged due to water ingress through the exterior masonry, *which should be stopped by eliminating the leaks on the exterior*.

T5: There is a badly rusted steel beam embedded in the lower left corner of the west wall. This beam cantilevers out to pick up the bottom of the tower's south-southwest buttress, which hangs over the flat wall of the sanctuary below. The expanding rust has caused distress in the masonry and structural damage to the beam, which must be replaced, as it is beyond the condition where cathodic protection would help save it.

Because of the integral interlock of the buttress, the best way to replace the beam would be to pint the lower portion of the buttress to the main tower wall and add perpendicular ties to lock the corner together in order to suspend it while the beam is incrementally

removed and replaced with new steel. The adjacent door opening would need to be filled in or shored during this work, which will temporarily weaken the corner.

T6: The steel beams that provide a transition between the upper and mid-level tower cross-section are rusted *and should be cleaned and painted*.

Belfry Level

T7: The bell frame timbers appear sound, materially, however they are split at several locations where the embedded bolts are rusting and have expanded enough to spread the wood. *The rusting bolts should be drilled out and replaced with new galvanized or stainless steel*.

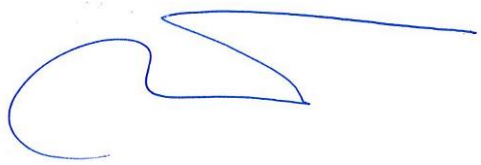
T8: The metal bell and brace components have pitting rust and *need to be cleaned and protectively coated*.

T9: The exposed brickwork on the interior is in good condition with only minor joint erosion present from weathering *and needs minor spot-repointing only when convenient*.

T10: Several of the limestone tracery mortar joints are cracked and there are intermittent gaps in the joints between the tracery and the surrounding brickwork and *must be deeply repointed in order to restore structural continuity to the system to maintain stability*.

Thank you for the opportunity to inspect this wonderful structure. Please contact me if you have any questions or if we can be of further assistance.

Respectfully yours,



STRUCTURES NORTH CONSULTING ENGINEERS, INC.
John M. Wathne, PE, President

MASONRY ASSESSMENT REPORT

Please read the full report for a detailed assessment.

Summary

- The overall masonry wall structure is sound.
- The limestone carvings on the exterior are in fair to good condition. Biological films on these elements should be removed before they cause further decay.
- The architectural trim elements made of limestone show more advanced decay than the carvings because the trim units are set into walls that have had moisture infiltration issues. Water is absorbed by the stone and freeze-thaw damage has taken place. The worst water infiltration is due to the lack of flashing below the coping stones at the top of the walls, especially on the south and east elevations, with the greatest damage at the large window on the east elevation. This puts the stained glass in this window at risk.
- Additional masonry damage is being caused by deferred maintenance of the existing water-shedding systems as well as original design decisions that were not optimal. The rust stains in the sanctuary are coming from steel anchors set deep into the masonry wall behind and are a result of back-to-front moisture migration. They will therefore be difficult, if not impossible, to remove. Replacement of badly stained stones is an approach, or coating them may be an option.
- Repair of the masonry will be coupled with maintenance of the building's water shedding systems that have been a long-standing problem. This will require dealing with open masonry joints as well as repairing leaking gutters, roofs, downspouts, windows, and adding additional flashing in critical locations where it was omitted during original construction.

Fairhaven Unitarian Church

Assessment of Interior and Exterior Masonry

December 2, 2019

Introduction

From July 30 to August 2, 2019, Ivan Myjer of Building and Monument Conservation, working as part of a team lead by Spencer, Sullivan, Vogt Architects, surveyed the masonry on the interior and exterior of the church. The purpose of the survey was to document the existing conditions of the masonry and investigate the causes of the persistent water infiltration into the interior that is responsible for the staining and stone deterioration visible in the sanctuary.

The survey was conducted from an 80-foot personnel lift as well as from the ground, and also from the vantage points provided by various roofs. During an earlier visit in April, the tower interior masonry and rooftop stonework were examined closely. During the survey some small, semidetached pieces of limestone were removed. Units that were observed to be loose or damaged but were too large and heavy to be removed without equipment were noted. These units remain priorities for future safety remediation.

Executive Summary:

The masonry walls, which consist of granite, limestone and brick masonry are structurally sound except where noted in the report by Structures North.

Almost all of the character defining limestone decorative carvings and sculptures on the exterior are in very good condition. There is a heavy accumulation of active and inactive biological films on the limestone carvings. These growths are contributing to the weathering of the stone but not in a very aggressive manner. Biological films are relatively easy to remove but it is nearly impossible to prevent the recolonization of the stone by the same, or different species, of algae, moss and lichens.

There is more deterioration of the architectural trim units fabricated from limestone than there is of the decorative carvings and sculptures. This is because the architectural trim units such as window surrounds and belt courses are set into the granite walls while the carved units are primarily freestanding. Water that enters the granite walls through open joints is absorbed by the limestone units set in the wall. If the temperatures drop quickly after the limestone is saturated, the expansive force of ice forming in the stone causes the stone to crack, delaminate and eventually fail. This type of frost related damage is happening primarily to units set in granite ashlar located below coping stones. The lack of flashing below the coping stones allows water to enter the wall through open joints between the units. The worst damage is on the south and east elevations. The units that are most affected on the south elevation are the apexes of the gothic arches as well as the engaged pinnacles and belt course located below the parapets. On the east elevation, almost all of the units that make up the outer arch of the large window are cracked – a sign of advancing frost deterioration. The damage in this location is of particular concern

because as it advances it will directly affect the stability of the stained glass set into the tracery below.

The persistent water infiltration into the masonry is caused by deferred maintenance of the existing water shedding systems as well as original design decisions regarding the setting of cap stones and coping stones without thru wall flashing.

The interior of the sanctuary is heavily stained as a result water infiltration at the top of the walls. The dark red/brown staining is caused by the rusting of steel anchors and cast-iron pipes incorporated into the masonry. The rust stains are not surface stains; they originate in the interior of the wall and travel to the exterior faces of the units. As a result of the back to front migration of the stains, they are very difficult, if not impossible, to remove. Considering that many of the stained units are also severely damaged, replacement rather than cleaning and repair of the units is likely the best solution.

The repair and stabilization of the masonry walls will require compensating for the long-deferred maintenance of the building's water shedding systems. Remedial steps include repointing open and failing mortar joints as well as joints that were repointed with hard and impermeable mortars. Additional steps include repairing/replacing leaking gutters, roofs and downspouts and windows. The complete program will also have to include adding flashing in critical locations where it was omitted during construction and replacing failed or highly deteriorated limestone units.

Summary of Principle Findings

Notes on Building Construction

The exterior of Fairhaven Unitarian Memorial Church was constructed from locally quarried granite/gneiss and Indiana Limestone attached to brick masonry walls. The granite, which has a blended grey and red/pink color was used exclusively for rock-faced ashlar. Indiana limestone, on the other hand, was used for a variety of purposes ranging from flat corner quoins and simple profiled bands to beautifully carved sculptures, ornament and pinnacles with crockets and finials. The interior of the sanctuary is clad with Indiana limestone veneer.

The original drawings as well as some contemporaneous accounts appear to indicate that the loadbearing walls of the sanctuary were to be constructed with a void in the center of the wall to limit moisture transport from the exterior to the interior. Based on the overall thickness of the walls as well as the thickness of the exterior stone units, it seems unlikely that the walls were constructed in this manner.

Mortar

There are many locations where a black mortar with a raised half round bead survive on the exterior. This mortar is very likely the original pointing mortar. The use of black mortars was very common during the final quarter of the 19th century especially in combination with gray stone or red bricks. While there are several generations of more recent mortars, no other plausible historic mortars have been observed besides the black mortar. Lab analysis of the black

mortar would not only identify the component parts of the mortar for replication purposes but would likely confirm the age of the mortar.

Granite:

The rock-faced ashlar on the exterior were fabricated from a quarry located within Fairhaven. The stone has the distinctive banding and red/gray coloring of a partially metamorphosed granite. The same stone was used on the exterior of the Fairhaven High School. It has held up very well on the exterior of both buildings.

Indiana Limestone:

Indiana limestone is a relatively soft and moderately absorbent sedimentary stone. It is susceptible to surface erosion from acid rain and as well as frost and salt damage. As the limestone erodes and the surface become more porous it is easily colonized by algae, moss and lichens – all of which are in evidence on the church. The stone is still actively quarried and replacement units are easy to obtain. It is not difficult to clean the biological films from the stone, but it is very difficult to prevent them from returning in a few years – especially in a marine environment.

Masonry Anchors:

Steel stone anchors securing the limestone units to the backup masonry are visible in the interior of the sanctuary where the edges of the ashlar have spalled as a result of the corrosion and expansion of the anchor. Both steel and bronze/brass pins were observed in the joints between finials and bases on the limestone pinnacles. In the locations where steel pins were observed the stone was cracked and/or spalled from the expansion of the corroding steel. The units secured with bronze pins were generally in much better condition.

The method with which the exterior granite ashlar and engaged limestone units are bonded to the backup masonry has not been determined as of yet. The bonding may have been achieved with steel strap anchors or with the use of header stones. Header stones are units that are fabricated deeper than the standard ashlar so that a portion of the unit is incorporated into the back up masonry as the backup brickwork is laid up.

Conditions:

General

The exterior granite ashlar units are in excellent condition and do not require any treatment except for repointing of the mortar joints between the units. The exterior limestone units range in condition from excellent to highly deteriorated. The vast majority of the limestone units are in very good condition but some of the units are eroded and heavily weathered while others are cracked, broken, spalling or delaminating. The causes of the deterioration in the limestone units varies considerably. Some of the units are cracked because of the expansion of corroding steel setting pins and anchors but others are cracked due to movement of the wall into which they were set. Still others are cracked, spalling and delaminating due to the expansive forces of ice and salts forming in the pores of the stone.

The condition of the pointing and setting mortars varies around the building depending on whether the location is more or less exposed and the degree of water that flows over the surface. The recessed joints between the granite ashlar have survived better than the joints between the limestone units. The deterioration of the limestone joints is more advanced n the locations where the units are more exposed. This is the case at the top of the tower and at the pinnacles and flying buttresses.

The pinnacles are decorated with many small carved pieces of limestone that set in beds of mortar. These joints are very vulnerable to deterioration because the size of the units only allows for a small amount of mortar. As a result, many of the smaller and thinner units are loose. Our recommendation is that all of the joints between limestone units as well as all of the joints between limestone and granite units should be repointed. In addition, all of the small finials and crockets that are set in mortar with a pin should be removed and reset in a new mortar bed with a stainless steel or bronze pin.

Water Infiltration into the Sanctuary

There is a persistent problem with water infiltration into the sanctuary. The signs of water infiltration are very visible on the light-colored interior limestone veneer. Large areas of the veneer are stained and coated with efflorescence and individual units are spalling and delaminating. The faces of some of the units have become very friable to the touch from the effects of salts transported by the water that enters the masonry.

The interior limestone units have a persistent red/brown stain produced by the rusting of steel masonry anchors as well cast-iron drains built into the walls. In addition to the rust stains, the limestone is also stained from minerals and salts dissolved from the mortar in the walls and absorbed by the porous limestone.

The causes for water infiltration into the masonry are tied to some design and construction decisions made during construction as well as deferred maintenance of the existing water management systems which include the roofs, gutters, downspouts, mortar joints, flashing, sealants and window frames.

An example of a design/construction decision that has led to water infiltration is the lack of flashing between the top of the walls and the underside of the coping stones. An additional problem is that lead joint covers were not installed on the upward facing mortar joints at the coping stones. It is impossible to keep water out of unprotected upward facing mortar joints for any extent of time. Given the manner in which the walls were constructed – without thru wall flashing - it was inevitable that water would eventually find its way to the interior.

The water infiltration into the sanctuary is more pronounced on the south wall than on the north; as well as at the junctures of the east and west walls and the south wall. The roof gutter on the north has been repaired but the one on the south has not. Most of masonry damage and staining on the south can be traced to defects in the south gutter.

Solving the water infiltration problems will require treating the entire exterior as a complete system where all of the component parts are functioning properly. The scope will have to involve

repairs to the roof and gutters, removal of the coping stones at the gables and parapets and the installation of thru wall flashing that is tied to the roof. Additional steps will have to include the repair of the downspouts, replacement of defective sealants and deep repointing of failed mortar joints.

Removing the stains from the interior will be difficult. Water infiltration has carried the rust and mineral stains from the interior of the wall to the front of the limestone veneer. In the process, the stone has become discolored not just on the surface with throughout. The chemicals commonly used to remove rust from stone contain very strong acids. Limestone is very susceptible to deterioration from acids. There are poultices which draw iron stains from porous materials using chelating compounds that bond with the metal, but these materials are most effective on stone that has become stained on the surface from dripping water not on stone that is discolored from back to front.

The limestone veneer on the interior are relatively thin. It would not be difficult to remove the stained units and replace them with new matching limestone or a less expensive material that closely resembles limestone such as cast plaster or lime stucco.

All interior masonry work must be preceded by the steps outlined above to stop the ongoing water infiltration into the interior.

Potential Safety Concerns:

The large carved Celtic crosses at the apex of the east and west gables are no longer secure. The west cross is loose on its setting bed and the east cross is cracked at the top joint. The west cross has been repaired in the past and is currently attached to the unit below with an externally mounted anchor. The crack at the east cross is most likely the result of water moving across the deteriorated bed mortar and freezing in the anchor hole.

Additional cracked units and units where earlier repairs have reached the end of their service life were noted during the survey. Removal or reattachment of these units is recommended.

During the survey, a few pieces of stone that were cracked as the result of the corrosion and expansion of steel setting pins were removed from the building as a safety precaution. While most of the finials appear to have been set with bronze pins there may still be some that contain steel pins. Given that some of the finials and crockets are loose as a result of the deterioration of the setting mortar, we recommend that all of the pinnacles be cleaned to remove the heavy accumulation of lichens on the stone and mortar and then inspected for cracks. All of the small finials should be removed and reset in a new mortar bed but cracked units should be repaired or replaced prior to resetting. In the locations where steel pins are encountered, they should be removed and replaced with either stainless steel or bronze pins to prevent problems in the future.

Preliminary Scope Recommendations

Tower Exterior:

1. Repoint 100% of limestone to limestone joints at upper tower beginning where the granite ashlar ends and the limestone begins. Where possible, install lead T's at upward facing mortar joints.
2. Repoint 100% of limestone to granite joints at tower and tower buttresses.
3. Repoint granite ashlar as required.
4. Repoint joints at limestone windows. Limestone to limestone and limestone to adjacent granite.
5. Replace/repair cracked limestone at south facet window.
6. Clean and inspect the large pinnacles for cracks.
7. Remove and reset all loose carved units on a new mortar bed with stainless steel or bronze pins.
8. Repair or replace all cracked limestone carvings.

East Gable:

1. Remove the Celtic Cross and coping stones from top of wall. Inspect all units for cracks.
2. Replace the cracked support unit directly below the upper cross and reset the cross with stainless steel anchors.
3. Inspect top of wall and backfill/grout masonry as needed.
4. Install flashing over top of wall and install coping stones with protected anchor pins.
5. Replace cracked and delaminating outer arches above the large stained glass window.
6. Repoint 100% of granite to granite and granite to limestone mortar joints at gable end.

Lower East elevation

1. Replace frost damaged limestone buttress quoins at, and just above, grade.

West Gable:

1. Remove the Celtic Cross and coping stones from top of wall. Inspect cross and support units for cracks. Replace or repair cracked units.
2. Inspect top of wall and backfill/grout masonry as needed.
3. Install flashing over top of wall and install coping stones with protected anchor pins.
4. Replace cracked and delaminating units of limestone crenelated parapet above entrance.
5. Repoint 100% of granite to granite and granite to limestone mortar joints at gable end.
6. Clean limestone at large pinnacles to remove biological films.
7. Inspect prior repairs to south large pinnacle. Remove sealants and inspect cracks.
8. Repoint 100% of pinnacle joints.

North Elevation

1. Repair flat roofs and internal downspouts.
2. Remove parapet coping stones, install thru wall flashing and reset coping stones on protected pins.

3. Repoint 100% of granite to granite joints and granite to limestone between underside of coping and top of upper gothic arches.
4. Replace delaminating frost damaged limestone units at gothic window surrounds.
5. Replace cracked delaminating frost damaged limestone units at decorative crockets engaged in granite parapet.
6. Replace cracked delaminating frost damaged limestone units at band engaged in granite parapet.
7. Repoint 100% of limestone joints at gothic windows as well as limestone to granite joints.
8. Install lead T's at upward facing joints at gothic windows and projecting limestone bands.
9. Repoint 100% of limestone to limestone joints as well as limestone to granite joints at blind window – west end.
10. Clean freestanding pinnacles and crockets. Inspect joints for failure and inspect stone for pin cracks or other types of cracks. Repoint failed joints and repair ore replace cracked stone.
11. Repoint buttresses as needed and cover upward facing joints with lead T's.

South Elevation

1. Pin and repair middle flying buttresses per Structures North recommendations.
2. Protect carved sculptures of musicians while other work is taking place. Gently clean and repoint sculptures where joints are open or cracked.
3. Repair flat roofs and internal downspouts.
4. Remove parapet coping stones, install thru wall flashing and reset coping stones on protected pins.
5. After parapet coping stones are removed at south west corner return of parapet, remove and reset granite units that have shifted.
6. Repoint 100% of granite to granite joints and granite to limestone between underside of coping and top of upper gothic arches.
7. Replace delaminating frost damaged limestone units at gothic window surrounds. South elevation has significantly more damaged window surround units than the north elevation.
8. Replace cracked delaminating frost damaged limestone units at decorative crockets engaged in granite parapet. South has considerably more damaged units than the north elevation.
9. Replace cracked delaminating frost damaged limestone units at band engaged in granite parapet.
10. Repoint 100% of limestone joints at gothic windows as well as limestone to granite joints.
11. Install lead T's at upward facing joints at gothic windows and projecting limestone bands.
12. Repoint 100% of limestone to limestone joints as well as limestone to granite joints at blind window – west end.

13. Clean freestanding pinnacles and crockets. Inspect joints for failure and inspect stone for pin cracks or other types of cracks. Repoint failed joints and repair or replace cracked stone.
14. Repoint buttresses as needed and cover upward facing joints with lead T's.

Annotated Photographs of Conditions

Open upward facing mortar joints near the top of the tower. Erosion from wind and water as well biological films and efflorescence are visible on the limestone.

The cracking and delamination of the limestone units engaged in the granite wall is primarily due to frost damage. Water that enters the granite wall is saturating the limestone in these locations. In the winter, when the temperatures drop quickly, ice forms within the pores of the saturated units.

The mortar joints repaired with sealant have accelerated the frost damage by trapping moisture within the wall. Properly formulated mortars allow moisture to exit the wall at the joints. Sealants are completely impermeable and do not allow moisture to exit.

Many of the limestone units that make up the window arches along the north and south elevations are damaged from frost. Some of these units have been repaired with mortar but the repairs have failed because the underlying water infiltration problems were not addressed before the repairs were made.

The limestone units at the large arch on the east elevation are cracked as a result of frost jacking. The network of thin cracks visible in the photograph above are the early signs of advancing frost related damage. These units are particularly important because they protect the tracery below which holds the stained glass. Left unchecked, the deterioration of the arch units will eventually undermine the stability of the stained-glass window on the east elevation.

The engaged limestone units on the east elevation gable in the photograph above are cracked as a result of water infiltration into the wall through open joints and the lack of flashing under the coping stones at the top of the wall.

Water infiltration through open vertical joints in the limestone bands is responsible for the deterioration of the mortar between the granite ashlar units located below the open joint.

The Celtic Cross on the top of the west gable is loose due to the deterioration of the setting mortar. The cross is bearing on the dowel between the units not directly on the unit and moves visibly in the wind. Currently, the cross is restrained by the lightning rod that bridges the upper and lower units of the assembly.

The unit that supports the Celtic Cross on the east elevation is cracked in several places. The cracking may be due to the corrosion of a steel pin between the units but is more likely the result of water freezing in the dowel hole in the lower unit. Water travels easily through the setting beds of freestanding units because it has access from all sides.

The finial on the left has cracked as a result of water freezing in the dowel hole not from the corrosion of a steel pin. The original pin made from bronze remains in the stone. The mortar bed of the finial in the foreground is cracked and the unit is loose. The pin at the center is keeping the unit in place but left untreated, it will eventually crack in the same manner as the unit to the left.

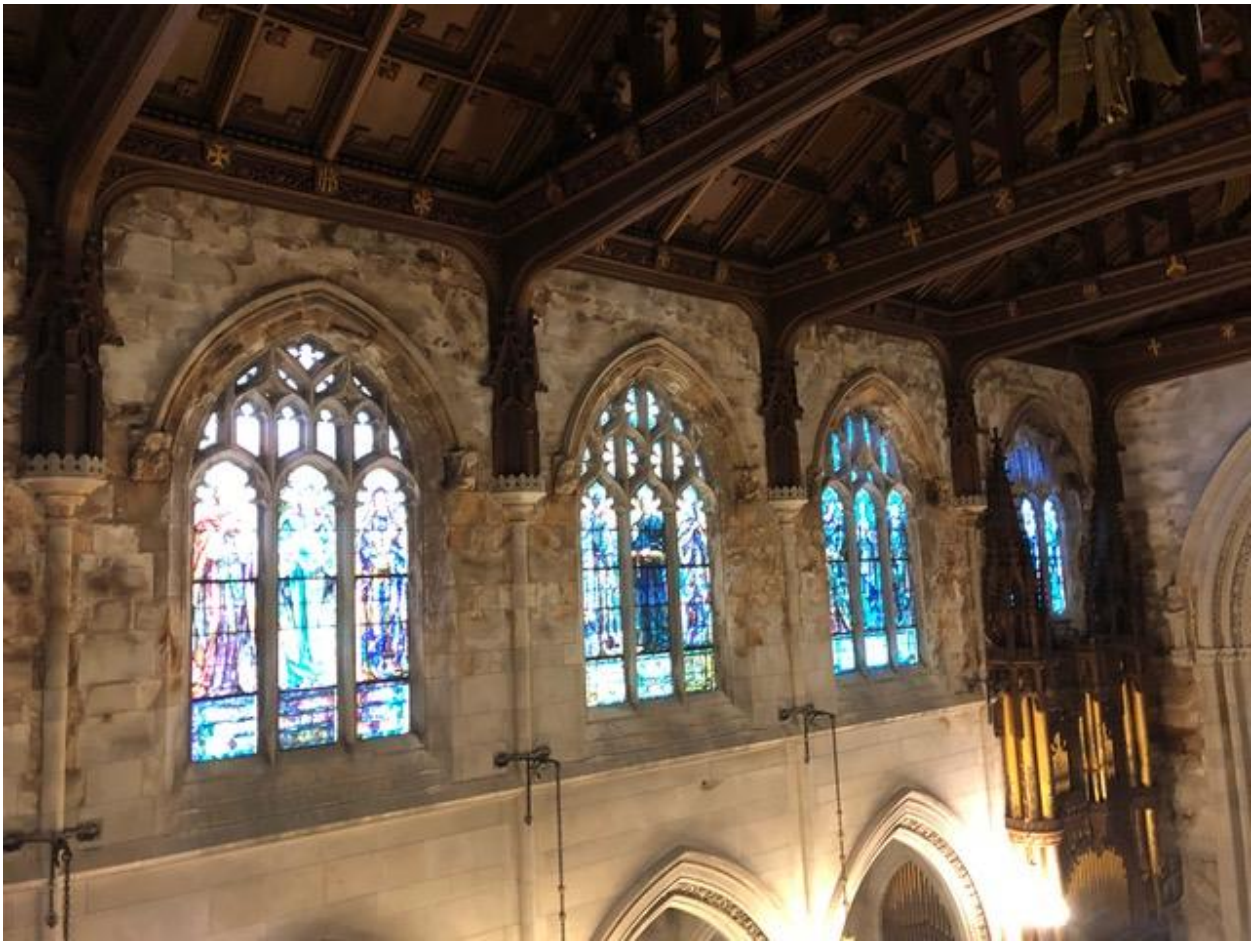
The cracking of the finial in the center of the image is due to the expansion of a corroding steel pin. When this unit was removed during the survey in August, the remains of the corroded steel pin were visible.

The large pinnacle on the southside of the west elevation was damaged by lightning and repaired with sealants. The repairs have reached the end of their service life. The cracked fragments have to be removed and reattached with an exterior rated stone epoxy.

There are several long vertical cracks running through the base of the turret on the northeast corner of the tower. These cracks are likely due to seasonal movement but it is possible that they are the result of steel incorporated into the masonry.

On the east elevation there is severe pitting and erosion of the limestone corner units. This type of deterioration is due to a combination of factors involving the weakening of the stone from salts and wind and water erosion. While this type of pitting is visible on all elevations it is more pronounced at inside corners,

The mortar to the left of the downspout is likely the original mortar. The mortar in this location has a distinctive dark almost black color and a raised, rounded profile.



The rust staining and stone deterioration on the interior of the nave are due to water infiltration from the exterior. There are several sources for the water infiltration including defects in the roof gutters, open mortar joints and lack of thru wall flashing. The rust stains are the result of the corrosion of steel anchors and in some locations internal iron downspouts.

STAINED GLASS ASSESSMENT REPORT

Please read the full report for a detailed assessment. Julie Sloan's 2005 report (see Appendix) also exhaustively examined the windows and provided prioritized treatment recommendations. Sloan identified six windows in the sanctuary at the first level of priority, including the large east window, four in the south clerestory, and one in the north clerestory. Serpentino corroborates Sloan's observations in recommending immediate attention to the east window and further inspection at close range of the clerestory windows to determine a course of work.

Summary

- Overall the windows are in fair condition, showing no serious signs of deflection or lead deterioration. No restoration work is required at this time, but there should be periodic inspection from the interior and exterior. The windows were inspected with binoculars from the ground and certain windows were able to be inspected from a lift. Most of the windows are obscured with polycarbonate coverings that prevents inspection from the exterior, although sections of the plastic covering were removed to take a closer look. From what could be observed, there are signs of lead fatigue that are not severe and that some repairs have been made over time. There is no serious issue with lead fatigue, nor is there any severe breakage.
- It is recommended to restore operation to ventilator panels that have been sealed with silicone caulk.
- It is recommended to remove all the exterior polycarbonate coverings, which offers no benefit to the windows and detracts from the full effect of the windows in the building.
- The "Sermon on the Mount" window is in the worst shape: Some plates were determined to be removed from the "Sermon on the Mount" window as well as from clerestory windows, probably during a previous repair, but it would be very hard to re-introduce new glass without knowing the hue, color, or texture of the original glass. It is recommended to use a lift to more carefully examine the condition of this window to provide a plan and cost for its conservation.

Serpentino Stained & leaded Glass INC.

21 Highland Circle - Needham, Massachusetts 02494 - Tel. (781) 760-7602 - www.serpentinostainedglass.com

December 18, 2019

Spencer, Sullivan & Vogt
1 Thompson Square Suite 504
Charlestown, MA 02129

RE: Unitarian Memorial Church
102 Green St, Fairhaven, MA 02719

The plated opalescent glass windows located at the Unitarian Memorial Church in Fairhaven, are some of the most stunning and breathtaking windows I have seen in my 31 years as a stained glass conservator. The windows were designed and fabricated by Robert Reid between 1901 and 1907. All of the windows are heavily plated with at least three layers throughout, with four and possibly five layers in some areas. The windows were inspected from the interior from the floor with binoculars. Of course, in order to properly and thoroughly inspect the condition of the clerestory windows as well as the East and West multi-lancet windows, proper access such as scaffolding would be necessary. I was able to partially inspect the multi-lancet window *"The Sermon on the Mount"* from the exterior with the use of an aerial lift.

Most of the windows are covered from the exterior with an obscured plastic covering making the windows unviewable from the exterior. While inspecting the *"The Sermon on the Mount"* window, we removed a few pieces of the obscured plastic covering in order to take a closer look at the lead and glass but discovered that under the plastic covering there was a layer of textured glass, likely original. This made it impossible for me to physically touch the window and properly inspect the true condition of the lead matrix. From what I could observe however, from the exterior, there are signs of lead fatigue, albeit not severe at this point. It also appears that some sections of this window were repaired and re-leaded at some point in the past, and a wider lead profile was used instead of the smaller, more delicate lead used by Mr. Reid.

The lower nave-aisle windows were easily reachable from the floor and I did not observe any major or concerning issues with their structural condition, lead fatigue or any severe glass breakage. Most of the once-operable ventilator panels were sealed shut with silicone sealant on the interior. Fortunately, this can be reversed and rectified by cutting and removing the silicone sealant. The steel ventilator frames can be then cleaned and lubricated to ensure proper operation.

A more serious, disturbing and unfortunate fact is the missing interior plates from the *"The Sermon on the Mount"* window as well as some of the clerestory windows, which may not be immediately obvious to the common person. When viewing the *"The Sermon on the Mount"* window from the floor with binoculars it appeared to me that plates were missing. It's likely that they had been removed during previous repairs. I was able to confirm this when viewing this window from the small balcony on the clerestory level, adjacent to the window. This is truly an unfortunate tragedy carried out by a careless, irresponsible studio for no good reason, and it has compromised the artistic integrity of the windows. Of course, the missing plates could be re-introduced to the windows during future restoration, but it would be a guess as to what color, hue, texture the original glass was.
Overall the windows in the Church are in fair condition, showing no signs of deflection or severe lead deterioration. This is especially true for the lower nave-aisle windows.

Recommendation.

No restoration work is necessary at this time; however, the windows must be inspected periodically from the exterior and interior. This will require an aerial lift on the exterior and possibly scaffolding or a scissor lift on the interior. It is of the utmost importance that all of the clerestory windows as well as the east and west multi-lancet windows be inspected up close not only from the exterior, but from the interior as well. It is impossible to accurately and properly inspect the true conditions of the lead matrix and overall conditions of the windows with the use of binoculars from the floor. This is one of the most important ensembles of plated opalescent glass windows in the country, and they must be maintained, and cared for, properly and eventually restored by a highly skilled, experienced conservation studio. The *"The Sermon on the Mount"* window is in the worst condition out of all the windows in the sanctuary. This is due to the insufficient and inadequate original support system throughout the window, coupled with the previous shoddy restoration work and the removal of the interior plates, which has weakened the structural integrity of the stained glass window. My recommendation would be to erect scaffolding or use a scissor lift on the interior in order for me to properly inspect the condition of the window. This will allow me to provide an accurate condition report and a cost for the window's conservation.

I recommend that the silicone sealant be removed, from the ventilator panels in the lower nave aisle windows, and to lubricate the frames in order for them to operate freely.

I would also recommend that all exterior obscured plastic be removed, especially if the windows are covered with the original textured glass. The current obscured plastic is offering no benefit to the windows, and it is only detracting from the architect's original design intent, and beauty of this magnificent building.

If I can be of further assistance or if you have any questions, please do not hesitate to contact me.

Sincerely,

Roberto Rosa

HAZARDOUS MATERIALS ASSESSMENT REPORT

Please read the full report for a detailed assessment.

Summary

Utilizing the EPA, OSHA, MADLS, and MassDEP protocols and criteria, the following materials were determined to be asbestos containing materials:

- Beige interior stained glass window glazing in the Bell Tower;
- White caulking (hard) on the Bell Tower roof;
- Black caulking observed on the roof accessed by the second floor Carillon Room;
- Black built up roof system felt paper along the Aisle Roof (north);
- Black asphaltic paper from the Cloister roof;
- Gray exterior stained glass window glazing; and
- Gray caulking (hard) on stones of Sanctuary exterior.

These materials should be abated by a qualified professional.

August 27, 2019

Mr. Doug Manley, AIA, LEED AP
Senior Associate
Spencer, Sullivan & Vogt
1 Thompson Square, Suite 504
Charlestown, MA 02129

RE: Asbestos-Containing Building Materials Consulting Services
Fairhaven Unitarian Memorial Church
102 Green Street, Fairhaven, MA
Fuss & O'Neill Project No. 20190483.A10

Dear Mr. Manley:

On July 30, 2019, Fuss & O'Neill, Inc. (Fuss & O'Neill) representative, Ms. Heidi Keller, performed an inspection for suspect asbestos-containing materials (ACM) at prior to proposed renovation activities at the Fairhaven Unitarian Memorial Church (the "Site"). The work was performed for Spencer, Sullivan & Vogt (the "Client") in accordance with our written scope of services dated April 5, 2019.

The United States Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation located at Title 40 CFR, Part 61, Subpart M require a property owner ensure a thorough asbestos inspection is performed prior to possible ACM disturbance during renovation or demolition activities. All suspect ACM samples were collected by a Commonwealth of Massachusetts Department of Labor Standards (MADLS)-certified and EPA-accredited Asbestos Inspector. Copies of Ms. Keller
s Asbestos Inspector MADLS certification and the EPA accreditation are attached hereto.

Samples were analyzed at EMSL Analytical, Inc. (EMSL), a Commonwealth of Massachusetts-certified and American Industrial Hygiene Association-accredited asbestos laboratory. Asbestos sample analysis was conducted using the EPA Interim Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116) via Polarized Light Microscopy with Dispersion Staining (PLM/DS).

The EPA recommends that non-friable, organically-bound (NOB) materials (e.g., asphaltic-based materials, adhesives, caulking, etc.) undergo further confirmatory analysis utilizing Transmission Electron Microscopy (TEM). Four of the collected NOB samples were analyzed by TEM.

The EPA, the Occupational Safety and Health Administration (OSHA), and the MADLS, define a material that contains greater than one percent (> 1%) asbestos utilizing PLM/DS, as an ACM.

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Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

The Massachusetts Department of Environmental Protection (MassDEP) further defines ACM as materials containing greater than or equal to (≥) 1% asbestos.

Materials that are identified as "None Detected" are specified as not containing asbestos.

Utilizing the EPA, OSHA, MADLS, and MassDEP protocols and criteria, the following materials were determined to be ACM:

- Beige interior stained glass window glazing in the Bell Tower;
- White caulking (hard) on the Bell Tower roof;
- Black caulking observed on the roof accessed by the second floor Carillon Room;
- Black built up roof system felt paper along the Aisle Roof (north);
- Black asphaltic paper from the Cloister roof;
- Gray exterior stained glass window glazing; and
- Gray caulking (hard) on stones of Sanctuary exterior.

Refer to **Table 1**, attached, for the complete list of ACWM and non-ACM identified by sample identification, material type, sample location, and asbestos content collected during this inspection. Refer to **Table 2,** attached, for the identified ACM summary.

If you should have any questions regarding the contents of this letter, please do not hesitate to contact me at 617-282-4675, extension 4706. Thank you for this opportunity to have served your environmental needs.

This report was prepared by Environmental Analyst, Heidi Keller.

Sincerely,

Robert C. Mallett
Environmental Analyst

Attachments:

Asbestos Inspector MADLS Certification & EPA Accreditation
Asbestos Laboratory Analytical Report and Chain-of-Custody Forms
Table 1 - Suspect Asbestos-Containing Materials Laboratory Analytical Data Summary
Table 2 - Asbestos-Containing Materials Inventory Summary


THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS
William D. McKinney,
Director
Asbestos Inspector
HEIDI KELLER
Eff. Date 02/27/19
Exp. Date 02/27/20
AI900730
Member of C.O.N.E.S.
BOSR
BOS-RENEW
20

This is to certify that

Heidi Keller

has completed the requisite training, and has passed an examination for reaccreditation as:

Asbestos Inspector Refresher

pursuant to Title II of the Toxic Substance Control Act, 15 U.S.C. 2646

Course Location

Institute for Environmental Education
16 Upton Drive Wilmington, MA 01887

November 2, 2018
Course Dates

18-1207-106-267547
Certificate Number

November 02, 2018
Examination Date

November 02, 2019
Expiration Date

Training Director

16 Upton Drive, Wilmington, MA 01887 Telephone 978.658.5272 www.ieetrains.com

INSTITUTE FOR ENVIRONMENTAL EDUCATION

EMSL Analytical, Inc.

5 Constitution Way, Unit A Woburn, MA 01801

Tel/Fax: (781) 933-8411 / (781) 933-8412

http://www.EMSL.com / bostonlab@emsl.com

EMSL Order:	131905848
Customer ID:	ENVI54
Customer PO:	20190483.A10
Project ID:	

Attention:	H Keller	**Phone:**	(860) 646-2469
	Fuss & O'Neill, Inc.	**Fax:**	
	146 Hartford Road	**Received Date:**	08/05/2019 8:30 AM
	Manchester, CT 06040	**Analysis Date:**	08/07/2019
		Collected Date:	07/30/2019

Project: Fairhaven Unitarian Memorial Church / 20190483.A10 / 102 Green Street, Fairhaven, MA

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
01A-HK-190730 *131905848-0001*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01B-HK-190730 *131905848-0002*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01C-HK-190730 *131905848-0003*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01D-HK-190730 *131905848-0004*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01E-HK-190730 *131905848-0005*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01F-HK-190730 *131905848-0006*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01G-HK-190730 *131905848-0007*	Bell Tower - White Plaster Rough Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
02A-HK-190730 *131905848-0008*	Bell Tower - Beige Interior Stained Glass Window Glazing	Tan Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
02B-HK-190730 *131905848-0009*	Bell Tower - Beige Interior Stained Glass Window Glazing				Positive Stop (Not Analyzed)
03A-HK-190730 *131905848-0010*	Around Exterior of Door- 2nd Floor Carillon Roof Access - Gray Caulking	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
03B-HK-190730 *131905848-0011*	Around Exterior of Door- 2nd Floor Carillon Roof Access - Gray Caulking	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
04A-HK-190730 *131905848-0012*	Roof Accessed by 2nd Floor Carillon Roof Access - Black Caulking	Black Non-Fibrous Homogeneous		90% Non-fibrous (Other)	10% Chrysotile
04B-HK-190730 *131905848-0013*	Roof Accessed by 2nd Floor Carillon Roof Access - Black Caulking				Positive Stop (Not Analyzed)
05A-HK-190730 *131905848-0014*	Roof Accessed by 2nd Floor Carillon Roof Access - White Caulking	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 08/07/2019 17:58:47

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http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131905848
Customer ID: ENVI54
Customer PO: 20190483.A10
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
05B-HK-190730 *131905848-0015*	Roof Accessed by 2nd Floor Carillon Roof Access - White Caulking	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
06A-HK-190730 *131905848-0016*	North Side Sanctuary Roof - Beige Caulking	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
06B-HK-190730 *131905848-0017*	North Side Sanctuary Roof - Beige Caulking	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
07A-HK-190730 *131905848-0018*	Bell Tower Roof - White Caulking (Hard)	Tan Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
07B-HK-190730 *131905848-0019*	Bell Tower Roof - White Caulking (Hard)				Positive Stop (Not Analyzed)
08A-HK-190730 *131905848-0020*	Bell Tower Roof - Gray Caulking (Soft)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
08B-HK-190730 *131905848-0021*	Bell Tower Roof - Gray Caulking (Soft)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
09A-HK-190730 *131905848-0022*	Sanctuary Roof- Wet Drainage - White Caulking (Hard)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
09B-HK-190730 *131905848-0023*	Sanctuary Roof- Wet Drainage - White Caulking (Hard)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
10A-HK-190730 *131905848-0024*	Aisle Roof (North)-Built Up - Black Felt Paper	Black Fibrous Homogeneous		60% Non-fibrous (Other)	40% Chrysotile
10B-HK-190730 *131905848-0025*	Aisle Roof (North)-Built Up - Black Felt Paper				Positive Stop (Not Analyzed)
11A-HK-190730 *131905848-0026*	Aisle Roof (North)-Built Up - Asphalt	Black Non-Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
11B-HK-190730 *131905848-0027*	Aisle Roof (North)-Built Up - Asphalt	Black Non-Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
12A-HK-190730 *131905848-0028*	Cloister Roof - Black Asphaltic Paper	Black Fibrous Homogeneous		60% Non-fibrous (Other)	40% Chrysotile
12B-HK-190730 *131905848-0029*	Cloister Roof - Black Asphaltic Paper				Positive Stop (Not Analyzed)
13A-HK-190730 *131905848-0030*	Cloister Roof - Black Felt Paper	Black Fibrous Homogeneous	70% Cellulose	30% Non-fibrous (Other)	None Detected
13B-HK-190730 *131905848-0031*	Cloister Roof - Black Felt Paper	Black Fibrous Homogeneous	70% Cellulose	30% Non-fibrous (Other)	None Detected
14A-HK-190730 *131905848-0032*	Cloister Roof - Orange Felt Paper	Orange Fibrous Homogeneous	98% Cellulose	2% Non-fibrous (Other)	None Detected
14B-HK-190730 *131905848-0033*	Cloister Roof - Orange Felt Paper	Orange Fibrous Homogeneous	98% Cellulose	2% Non-fibrous (Other)	None Detected

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EMSL Order: 131905848
Customer ID: ENVI54
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Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
15A-HK-190730 *131905848-0034*	Exterior Stained Glass Windows - Gray Window Glazing	Gray Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
15B-HK-190730 *131905848-0035*	Exterior Stained Glass Windows - Gray Window Glazing				Positive Stop (Not Analyzed)
16A-HK-190730 *131905848-0036*	Caulking from Stones - Gray Caulking (Hard)	Tan Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
16B-HK-190730 *131905848-0037*	Caulking from Stones - Gray Caulking (Hard)				Positive Stop (Not Analyzed)
17A-HK-190730 *131905848-0038*	Caulking from Stones - Gray Caulking (Soft)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
17B-HK-190730 *131905848-0039*	Caulking from Stones - Gray Caulking (Soft)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)
Kevin Pine (32)

Steve Grise, Laboratory Manager
or Other Approved Signatory

Initial report from: 08/07/2019 17:58:47

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http://www.EMSL.com / bostonlab@emsl.com

EMSL Order: 131905848
Customer ID: ENVI54
Customer PO: 20190483.A10
Project ID:

Attention: H Keller
Fuss & O'Neill, Inc.
146 Hartford Road
Manchester, CT 06040

Phone: (860) 646-2469
Fax:
Received Date: 08/05/2019 8:30 AM
Analysis Date: 08/12/2019
Collected Date: 07/30/2019

Project: Fairhaven Unitarian Memorial Church / 20190483.A10 / 102 Green Street, Fairhaven, MA

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
05A-HK-190730 *131905848-0014*	Roof Accessed by 2nd Floor Carillon Roof Access - White Caulking	White Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
08A-HK-190730 *131905848-0020*	Bell Tower Roof - Gray Caulking (Soft)	Gray Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
09A-HK-190730 *131905848-0022*	Sanctuary Roof- Wet Drainage - White Caulking (Hard)	Gray/White Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
17A-HK-190730 *131905848-0038*	Caulking from Stones - Gray Caulking (Soft)	Gray Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected

Analyst(s)

Matthew Conley (4)

Steve Grise, Laboratory Manager
or other approved signatory

Samples analyzed by EMSL Analytical, Inc. Woburn, MA

Initial report from: 08/12/2019 08:18:08

OrderID: 131905848

FUSS & O'NEILL
EnviroScience, LLC

108 Myrtle Street, Suite 502, Quincy, MA 02171

131905848

EMSL Customer No. ENVI54

www.fando.com

Phone (617) 282-4675 Fax (617) 282-8253

Asbestos Bulk Sample Chain-of-Custody

Sheet 1 of 2

Project Name: Fairhaven Unitarian Memorial Church **Project No.:** 20190483.A10 **Task:**

Building Name/Number: - **Project Manager:** D. Diedricksen

Site Address: 102 Green Street, Fairhaven, MA **Total # of Samples:** 39

Sample ID (#-Initials-Date)	Material Type (Size, Color, Description, Material)	Sample Location	Comments/ Quantities
01A-HK-190730	White plaster rough coat	Bell Tower	
01B-HK-190730	White plaster rough coat	Bell Tower	
01C-HK-190730	White plaster rough coat	Bell Tower	
01D-HK-190730	White plaster rough coat	Bell Tower	
01E-HK-190730	White plaster rough coat	Bell Tower	
01F-HK-190730	White plaster rough coat	Bell Tower	
01G-HK-190730	White plaster rough coat	Bell Tower	
02A-HK-190730	Beige interior stained glass window glazing	Bell Tower	
02B-HK-190730	Beige interior stained glass window glazing	Bell Tower	
03A-HK-190730	Gray caulking	Around exterior of door – 2nd floor carillon roof access	
03B-HK-190730	Gray caulking	Around exterior of door – 2nd floor carillon roof access	
04A-HK-190730	Black caulking	Roof accessed by 2nd floor carillon roof access	
04B-HK-190730	Black caulking	Roof accessed by 2nd floor carillon roof access	
05A-HK-190730	White caulking	Roof accessed by 2nd floor carillon roof access	
05B-HK-190730	White caulking	Roof accessed by 2nd floor carillon roof access	
06A-HK-190730	Beige caulking	North side sanctuary roof	
06B-HK-190730	Beige caulking	North side sanctuary roof	
07A-HK-190730	White caulking (hard)	Bell Tower Roof	
07B-HK-190730	White caulking (hard)	Bell Tower Roof	
08A-HK-190730	Gray caulking (soft)	Bell Tower Roof	
08B-HK-190730	Gray caulking (soft)	Bell Tower Roof	
09A-HK-190730	White caulking (hard)	Sanctuary roof – wet drainage	
09B-HK-190730	White caulking (hard)	Sanctuary roof – wet drainage	
10A-HK-190730	Black felt paper	Aisle Roof (North) – Built Up	

Fed Ex 7956 9403 0859

REC'D 0830 AUG 05 2019 EMSL-BOSTON

OrderID: 131905848

FUSS & O'NEILL
EnviroScience, LLC

108 Myrtle Street, Suite 502, Quincy, MA 02171

131905848

EMSL Customer No. ENVI54

www.fando.com

Phone (617) 282-4675 Fax (617) 282-8253

10B-HK-190730	Black felt paper	Aisle Roof (North) – Built Up	
11A-HK-190730	Asphalt	Aisle Roof (North) – Built Up	
11B-HK-190730	Asphalt	Aisle Roof (North) – Built Up	
12A-HK-190730	Black asphaltic paper	Cloister Roof	
12B-HK-190730	Black asphaltic paper	Cloister Roof	
13A-HK-190730	Black felt paper	Cloister Roof	
13B-HK-190730	Black felt paper	Cloister Roof	
14A-HK-190730	Orange felt paper	Cloister Roof	
14B-HK-190730	Orange felt paper	Cloister Roof	
15A-HK-190730	Gray window ~~caulking~~ glazing	Exterior stained glass windows	
15B-HK-190730	Gray window ~~caulking~~ glazing	Exterior stained glass windows	
16A-HK-190730	Gray caulking (hard)	Caulking from stones	
16B-HK-190730	Gray caulking (hard)	Caulking from stones	
★ 17A-HK-190730	Gray caulking (soft)	Caulking from stones	
17B-HK-190730	Gray caulking (soft)	Caulking from stones	

Analysis Method: ☒ PLM ☐ TEM ☐ Other _____ Turnaround Time: 72-HR

Please call EnviroScience at (617) 282-4675 if analyses will not be completed for requested turnaround time listed above.

Email Results to: hkeller@fando.com **@fando.com** **Do Not Mail Hard Copy Report** **FAX Results to: 888-838-1160.**

Special Instructions: Stop analysis on first positive sample in each homogeneous set of samples unless otherwise noted. Do not layer samples unless indicated. Do not point count. If NOB group samples are **ALL** negative by PLM, analyze the sample denoted with a star (★) by **TEM NOB** on a 72-HR turnaround time. Analyze a **MAXIMUM** of 5 samples by **TEM in noted order.**

Samples Collected by: HJK **Date:** 7.30.19

Samples Sent by: **HJK** **Date:** 8.2.19 **Time:** _____

Shipped To: ☒ EMSL ☐ Other _____

Method of Shipment: ☒ Fed Ex ☐ Lab Drop Off ☐ Other _____

FUSS & O'NEILL

Table 1
Suspect Asbestos-Containing Materials Laboratory Analytical Data Summary

Fairhaven Unitarian Memorial Church
Fairhaven, Massachusetts

Spencer, Sullivan, & Vogt
August 2019
Fuss & O'Neill Reference No.20190483.A10

Sample Number	Material Type	NESHAP Category	Sample Location	Result	Comments
01A-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
01B-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
01C-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
01D-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
01E-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
01F-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
01G-HK-190730	White Plaster Rough Coat	Non-ACM	Bell Tower	ND	
02A-HK-190730	**Beige Interior Stained Glass Window Glazing Compound**	**Cat 2 NF**	**Bell Tower**	**2% Chrysotile**	
02B-HK-190730	**Beige Interior Stained Glass Window Glazing Compound**	**Cat 2 NF**	**Bell Tower**	**Pos Stop**	
03A-HK-190730	Gray Caulking	Non-ACM	Around Exterior of Door- 2nd Floor Carillon Roof Access	ND	
03B-HK-190730	Gray Caulking	Non-ACM	Around Exterior of Door- 2nd Floor Carillon Roof Access	ND	
04A-HK-190730	**Black Caulking**	**Cat 2 NF**	**Roof Accessed By 2nd Floor Carillon Roof Access**	**10% Chrysotile**	
04B-HK-190730	**Black Caulking**	**Cat 2 NF**	**Roof Accessed By 2nd Floor Carillon Roof Access**	**Pos Stop**	
05A-HK-190730	White Caulking	Non-ACM	Roof Accessed By 2nd Floor Carillon Roof Access	ND	TEM
05B-HK-190730	White Caulking	Non-ACM	Roof Accessed By 2nd Floor Carillon Roof Access	ND	
06A-HK-190730	Beige Caulking	Non-ACM	North Side Sanctuary Roof	ND	
06B-HK-190730	Beige Caulking	Non-ACM	North Side Sanctuary Roof	ND	
07A-HK-190730	**White Caulking (Hard)**	**Cat 2 NF**	**Bell Tower Roof**	**5% Chrysotile**	
07B-HK-190730	**White Caulking (Hard)**	**Cat 2 NF**	**Bell Tower Roof**	**Pos Stop**	
08A-HK-190730	Gray Caulking (Soft)	Non-ACM	Bell Tower Roof	ND	TEM
08B-HK-190730	Gray Caulking (Soft)	Non-ACM	Bell Tower Roof	ND	
09A-HK-190730	White Caulking (Hard)	Non-ACM	Sanctuary Roof- Wet Drainage	ND	TEM
09B-HK-190730	White Caulking (Hard)	Non-ACM	Sanctuary Roof- Wet Drainage	ND	
10A-HK-190730	**Black Felt Paper**	**Cat 1 NF**	**Aisle Roof (North)- Built-Up**	**40% Chrysotile**	
10B-HK-190730	**Black Felt Paper**	**Cat 1 NF**	**Aisle Roof (North)- Built-Up**	**Pos Stop**	
11A-HK-190730	Asphalt	Non-ACM	Aisle Roof (North)- Built-Up	ND	
11B-HK-190730	Asphalt	Non-ACM	Aisle Roof (North)- Built-Up	ND	
12A-HK-190730	**Black Asphaltic Paper**	**Cat 1 NF**	**Cloister Roof**	**40% Chrysotile**	
12B-HK-190730	**Black Asphaltic Paper**	**Cat 1 NF**	**Cloister Roof**	**Pos Stop**	

FUSS & O'NEILL

Table 1

Suspect Asbestos-Containing Materials Laboratory Analytical Data Summary

Sample Number	Material Type	NESHAP Category	Sample Location	Result	Comments
13A-HK-190730	Black Felt Paper	Non-ACM	Cloister Roof	ND	
13B-HK-190730	Black Felt Paper	Non-ACM	Cloister Roof	ND	
14A-HK-190730	Orange Felt Paper	Non-ACM	Cloister Roof	ND	
14B-HK-190730	Orange Felt Paper	Non-ACM	Cloister Roof	ND	
15A-HK-190730	**Gray Window Glazing Compound**	**Cat 2 NF**	**Exterior Stained Glass Windows**	**2% Chrysotile**	
15B-HK-190730	**Gray Window Glazing Compound**	**Cat 2 NF**	**Exterior Stained Glass Windows**	**Pos Stop**	
16A-HK-190730	**Gray Caulking (Hard)**	**Cat 2 NF**	**Caulking From Stones**	**5% Chrysotile**	
16B-HK-190730	**Gray Caulking (Hard)**	**Cat 2 NF**	**Caulking From Stones**	**Pos Stop**	
17A-HK-190730	Gray Caulking (Soft)	Non-ACM	Caulking From Stones	ND	TEM
17B-HK-190730	Gray Caulking (Soft)	Non-ACM	Caulking From Stones	ND	

Cat 1 NF = Category I Non-Friable Material

Cat 2 NF = Category II Non-Friable Material

Pos Stop = Positive Stop

ND = None Detected

ACM = Asbestos-Containing Material

TEM = Transmission Electron Microscopy

FUSS & O'NEILL

Table 2
Asbestos-Containing Materials Summary

Fairhaven Unitarian Memorial Church
Fairhaven, Massachusetts

Spencer, Sullivan, & Vogt
August 2019
Fuss & O'Neill Reference No.20190483.A10

Asbestos-Containing Material Type	Locations(s)	Asbestos Content	Estimated Total Quantity	Comments
Beige Interior Stained Glass Window Glazing Compound	Bell Tower	2% Chrysotile	20 EA	
Black Caulking	Roof Accessed By 2nd Floor Carillon Roof Access	10% Chrysotile	500 LF	
White Caulking (Hard)	Bell Tower Roof	5% Chrysotile	100 LF	
Black Felt Paper	Aisle Roof (North)- Built-Up	40% Chrysotile	600 SF	
Black Asphaltic Paper	Cloister Roof	40% Chrysotile	1,000 SF	
Gray Window Glazing Compound	Exterior Stained Glass Windows	2% Chrysotile	50 EA	
Gray Caulking (Hard)	Caulking From Stones	5% Chrysotile	2,000 LF	

EA = Each, LF = Linear Feet, SF = Square Feet

ACM = Asbestos-Containing Material

REGULATORY ANALYSIS

Zoning Code Summary

The building is located in the following zoning district:

Single Residence (RA)

Religious institutional use is allowed within the district.

The regulations for building height, lot coverage, and setbacks in the district are established for residences, but required setbacks would probably apply for any additions to the structure. The minimum lot area required is 15,000 SF. Minimum frontage at street is 100'. The required minimum front setback is 20', 10' on the side, and 30' in the rear. Maximum building height is 35'. Maximum lot coverage is 50% and maximum building coverage is 30%. The building complies in all but the height requirements.

The lot size is 1.877 acres.

Parking regulations are also determined in the Zoning Ordinance.

Any planned additions to the building would need to conform to these zoning requirements.

Building Code Summary

This section of the report briefly describes the applicability of the 9th edition of the Massachusetts State Building Code (2015 International Existing Building Code – with Massachusetts Amendments) and architectural access regulations (521 CMR Rules and Regulations of Massachusetts Architectural Access Board, or MAAB).

The purpose of the building code is to:

- Establish minimum requirements to safeguard public health, safety and welfare.
- Provide life safety from fire and other hazards to building occupants.
- Protect the building from loss or damage due to fire or other environmental events.
- Provide safety to fire fighters and emergency responders during emergency operations.

In general, existing buildings are not retroactively required to conform to the current building code, except where existing health and safety conditions are considered hazardous by the local building official.

The International Building Code for new construction (IBC) would be referred to for any substantial renovation of the existing building, or if a new addition was contemplated. Existing buildings are governed by the International Existing

Building Code (IEBC). Broadly speaking, buildings that are not being changed in use or occupancy may continue to be occupied and used in the manner they have been used historically. If significant reconfiguration of spaces is contemplated, the requirements for work in affected areas would be required to conform largely to the building code for new construction, although there is some latitude for existing or historic buildings. New building systems (mechanical, electrical, plumbing, fire protection, etc.), or upgrades to existing building systems, will need to conform to the building code for new construction in effect at the time of their installation.

The IEBC divides work on existing buildings into "Repairs" and "Alterations." "Repairs" are considered in-kind replacements of existing materials and systems, and would be considered as guidelines for building maintenance. "Alterations" are categorized into three (3) levels depending upon the amount and scale of work involved.

Most recommendations for work to be undertaken at the building would be considered **Repairs**.

Broadly speaking, buildings that are not being changed in use or occupancy may continue to be occupied and used in the manner they have been used historically.

If significant reconfiguration of spaces is contemplated, the requirements for work in affected areas would be required to conform largely to the building code for new construction, although there is some latitude for existing or historic buildings.

New building systems (mechanical, electrical, plumbing, fire protection, etc.), or upgrades to existing building systems, will need to conform to the building code for new construction in effect at the time of their installation.

The building currently has no automatic fire suppression system (sprinklers). Per Massachusetts amendment to the International Building Code, alterations to buildings of more than 7,500 SF will require protection by an automatic sprinkler system. No alterations are being proposed.

We have summarized below what we believe are the most pertinent sections from the Code. We also recommend a consultation with the Town of Fairhaven Inspectional Services Department to determine their disposition regarding required code improvements to any proposed space improvements on any of the three floors.

Applicable Codes & Standards (Model Code Basis)

International Existing Building Code (IEBC), Base Volume (2015 International Building Code with Massachusetts Amendments)

- Massachusetts State Building code (780 CMR), Ninth Edition, Base Volume (2015 International Building Code with Massachusetts amendments)
- International Energy Conservation Code, 2012 Edition (IECC)

- Massachusetts Board of State Examiners of Plumbers and Gas Fitters Regulations (248 CMR)
- Massachusetts Comprehensive Fire Safety Code (527 CMR 1.00 – 2012 NFPA 1: Fire Code with amendments)
- Massachusetts Electrical Code (527 CMR 12.00 – 2014 NFPA 70: National Electrical Code with amendments)
- Massachusetts Architectural Access Board Regulations – MAAB - (521 CMR)
- Americans with Disabilities Act (ADA)

Rules and Regulations of the Massachusetts Architectural Access Board (MAAB)

Architectural access regulations in Massachusetts (521 CMR) are written to encourage making buildings and spaces barrier free to persons with physical or mental disabilities.

Note that this building is not retroactively required to outfit its facility for Universal Access. However, there are several "triggers" where work done will need to incorporate accessibility. Note that the guidelines below describe a minimum standard. Exceeding these requirements is at the discretion of the City.

Generally speaking, all new work including construction, reconstruction, alterations, re-modeling, additions, and changes in use should conform to the access regulations. This means all additions, reconstruction, remodeling, and alterations or repairs to existing public buildings or facilities which require a building permit.

If the building permit value of the work being performed amounts to less than 30% of the assessed building value and less than $100,000, only new work or renovated spaces would be required to comply. The tax assessment for fiscal year 2019 is $1,660,400 ($1,450,100 building; $210,300 land; $4,474,300 total parcel value with Parish House and Harrop Center), so the 30% threshold of the building only would be $435,030.

If the work value is under 30% of the assessed building value, but over $100,000, the work must be made accessible and both an accessible entrance and rest room are required.

If the value of the work to be done is determined to be greater than 30% of the "full and fair cash value" of the building, which is $435,030, then the entire facility would have to be made fully accessible. If spaces cannot be made accessible, a variance may be sought to allow their continued use by the public, or for exemption for certain uses. This process requires application for variance to the Massachusetts Architectural Access Board.

Whether performed alone or in combination with each other, the following types of alterations are not subject to 521 CMR 3.3.1 and do not count towards the 30% trigger. When performing exempted work, a memo stating the exempted work and its costs must be filed with the permit application or a separate building permit must be

obtained. Exceptions not counting towards the 30% trigger are:

- Alteration work which is limited solely to electrical, mechanical, or plumbing systems, to abatement of hazardous materials, or to retrofit of automatic sprinklers, and does not involve the alteration of any elements or spaces required to be accessible under 521 CMR.
- Roof replacement or repair, window repair or replacement, repointing and masonry repair work.
- Work relating to septic system repairs, site utilities and landscaping.

However, if the above work alone or in concert with additional work exceeds the 30% trigger, then it is as if the work is not exempted. Note that the cost of work is tracked over a three year span, so phased projects may be cumulative.

Code Summary

The summary below identifies some basic information about the building and how it relates to current building code requirements. The review should be used as a guide when contemplating building renovations.

A. Work Area and Classification of Work

1. This code summary is based on the Work Area Method. The renovation in the existing building will be classified as Repairs. The work of this project must comply with Chapter 6 of the IEBC.
2. Localized roofing repairs will be undertaken at all roof levels.
3. Localized masonry repairs will be undertaken at all elevations.
4. Hazardous materials abatement will be performed throughout.
5. Summary of interior square footage at each floor level:
    a. Level 0 = 4,265 NSF +/- existing
    b. Level 1 = 4,950 NSF +/- existing
    c. Choir = 310 NSF +/- existing
    d. Tower (lower level) = 230 NSF +/- existing
    e. Tower (upper level) = 230 NSF +/- existing
    f. Existing TOTAL = 9,985 NSF +/-
6. It is important to note that the building is listed on the Massachusetts Historic Register and the National Historic Register. As such, exceptions to the building code for existing construction, described in IEBC, 2015 Edition, Chapter 12, "Historic Buildings," may apply to the present uses and characteristics of the building.

B. Occupancy Classification

1. (Existing): Present uses and functions most closely resemble a Group A-4 – House of Worship use, which includes churches.
2. (Proposed): There is no proposed change to occupancy use group.

C. Minimum Construction Type: The building most closely resembles Construction Classification IIIB (ISO 2), a combination of building construction comprised of exterior walls of masonry or concrete and roof/floors of combustible material with no fire rating.

D. Fire Resistance Ratings:

1. The existing building has no fire suppression system.
2. Building Element (Table 601, Fire-Resistance rating Requirements):

a.	Primary Structural Frame:	0-hr. rating
b.	Bearing Walls, Exterior:	2-hr. rating
c.	Bearing Walls, Interior:	0-hr. rating
d.	Nonbearing Walls & Partitions, Exterior:	0-hr. rating
e.	Nonbearing Walls & Partitions, Interior:	0-hr. rating
f.	Floor Construction & Secondary Members:	0-hr. rating
g.	Roof Construction & Secondary Members:	0-hr. rating

E. Interior Finishes:

1. Interior Walls & Ceilings (IBC Table 803.11), Group A-4 (For new construction)

a.	Exit Enclosures & Passageways:	Class A
b.	Corridors, Use Group A-3	Class A
c.	Rooms & Enclosed Spaces, Use Group A-3	Class C

F. Means of Egress:

1. The basement is served by one means of egress and is used for storage and mechanical. The main floor is served by two means of egress.

G. Massachusetts Plumbing Code (248 CMR)

1. Proposed Occupancy Count (MSBC Table 1004.1.2 Max. Floor Area Allowances and Section 1004.4 and Section 1004.7):
   a. The current Massachusetts State Building Code calculates occupancy for assembly (with fixed row seating without dividing arms) at 18" per occupant. Based on this calculation, the occupancy is 363.
   b. According to the UMC, occupancy is set at 275.
2. Plumbing Fixture Counts

Proposed Population (Assembly areas only):	**275 persons**
@ 50%F / 50%M:	**138** Female
	137 Male
Fixture Calculations based on Assembly Use:	
Toilets Required, Female @ 1 per 50:	**3** required
Toilets Provided, Female:	**TBD**
Toilets Required, Male @ 1 per 100:	**2** required
Toilets/Urinals Provided, Male:	**TBD**
Lavatories Required, M / F @ 1 per 200:	**1** per gender
Lavatories Provided, Female:	**1**

Lavatories Provided, Male: **1**

3. There are existing toilets at the main and basement level of the church sanctuary, but they are not accessible. There are additional toilets in the Parish House, but only one is accessible at the back near the kitchen, and the others are in the basement and not served by an elevator. There are steps in the passageway of the Parish House that make it such that there is no accessible pathway between the sanctuary and the bathrooms without going outdoors.

H. Required Number of Wheelchair Spaces

1. Section 16.2 of 521 CMR requires six (4) wheelchair seating spaces for occupancies of between 50 to 299. Using the UMC calculation for occupancy, 275 occupants could be seated on the main floor. Therefore, 4 wheelchair spaces should be distributed around the main floor of the Sanctuary.
2. Section16.4.3 requires at least one companion seat be provided next to each wheelchair seating area.
3. Removable pews or seats may be installed in wheelchair spaces when the wheelchair spaces are not needed.
4. Section16.5 requires a permanently installed assistive listening system because the Sanctuary seats more than 50 people, has fixed seating and currently uses an audio-amplification system.

OUTLINE PLANS & SPECIFICATIONS

For architectural drawings outlining the scope of the work to be performed, please see the attached drawings numbered A1-A11, S1, and M1. These drawings are included in the pouch at the back of this book. The drawings locate and describe the recommended repairs to be executed by the Church.

Outline specifications have also been provided for the recommended repairs and appear on the next page.

OUTLINE SPECIFICATIONS

The following outline specifications describe work approaches to the items identified in this grant application. Note that instruction for access – staging, lifts, etc. are not included since access to work areas typically falls under the purview of the contractor. Specification sections below are listed by the conventional numbering sequence of the Construction Specifications Institute which maintains a general listing construction activities organized by trade or material.

QUALITY ASSURANCE

Restoration Specialist Qualifications: Work must be performed by a firm having not less than five (5) years successful experience in compatible unit masonry restoration work on at least three (3) buildings listed on the national Register of Historic places in the last five (5) years, and employing personnel skilled in the restoration process and operations indicated. Restoration Worker Qualifications: Persons who are experienced in restoration work of types they will be performing.

DIVISION FOUR - MASONRY

Maintenance of Unit Masonry

Repair of existing limestone, granite, brick and tile exterior surfaces.

Products

Prepare mockups of repointing to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation. Rake out joints in 2 separate areas, each approximately 36 inches high by 48 inches wide as indicated for each type of repointing required and repoint one of the areas.

Limestone

Where replacement Indiana limestone is required, provide stone, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work. Provide units with physical properties, colors, color variation within units, surface texture, size, and shape to match existing stonework.

Brick

Where replacement brick is required procure iron spot brick. Provide units with physical properties, colors, color variation within units matching the existing. Note the terra cotta base color and variability of units. Replacement units should match variation of extant masonry.

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Brick

Where replacement brick is required procure iron spot brick. Provide units with physical properties, colors, color variation within units matching the existing. Note the terra cotta base color and variability of units. Replacement units should match variation of extant masonry.

At locations indicated, remove stone that has deteriorated or is damaged beyond repair carefully demolish or remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing stone or unit masonry backup, rotted wood, rusted metal, and other deteriorated items. Remove in an undamaged condition as many whole stone units as possible. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water. Remove sealants by cutting close to stone with utility knife and cleaning with solvents. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement. Replace removed damaged stone with other removed stone in good quality, where possible, or with new stone matching existing stone, including size. Do not use broken units unless they can be cut to usable size. Do not allow face bedding of stone. Before setting, inspect to verify that each stone has been cut so that, when it is set in final position, natural bedding planes are essentially horizontal. Reject and replace stones with vertical bedding planes except as required for arches, lintels, and copings. Install replacement stone into bonding and coursing pattern of existing stone. If cutting is required, use a motor-driven saw designed to cut stone with clean, sharp, unchipped edges. Finish edges to blend with appearance of edges of existing stone. Maintain joint width for replacement stone to match existing joints. Use setting buttons or shims to set stone accurately spaced with uniform joints. Set replacement stone with completely filled bed, head, and collar joints. Butter vertical joints for full width before setting and set units in full bed of mortar unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.

Stone Fragment Repair

Carefully remove cracked or fallen stone fragment indicated to be repaired. Reuse only stone fragment that is in sound condition. Remove soil, loose particles, mortar, and other debris or foreign material, from fragment surfaces to be bonded and from parent stone where fragment had broken off, by cleaning with stiff-fiber brush. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4-inch- (6-mm-) diameter, stainless-steel pins set into 1/4-inch- (6-mm-) diameter holes drilled into parent stone and into, but not through, the fragment. Center and space pins between 3 and 5 inches (75 and 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into parent stone and 2 inches (50 mm) into fragment, but no closer than 3/4 inch (19 mm) from exposed face of fragment. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of fragment and parent stone, completely filling all crevices and voids. Fit stone fragment onto parent stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured. Use

shims, clamps, wedges, or other devices as necessary to align face of fragment with face of parent stone.

Brick Removal and Replacement

At locations indicated, remove bricks that are damaged, spalled, or deteriorated or are to be reused. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items. Remove in an undamaged condition as many whole bricks as possible. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water. Remove sealants by cutting close to brick with utility knife and cleaning with solvents. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement. Replace removed damaged brick with other removed brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Maintain joint width for replacement units to match existing joints. Retain subparagraph below especially for narrow joints and where multiple courses are laid. Use setting buttons or shims to set units accurately spaced with uniform joints. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated, but surface is dry when laid. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

DIVISION SEVEN – THERMAL AND MOISTURE PROTECTION

Copper Flashing

Copper flashing required by roofing, masonry and opening repairs and replacement. Comply with CDA's "Copper in Architecture Handbook." Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

Products

Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper, non-patinated mill finish. Felt to be ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated. Self-Adhering, High-Temperature Sheet to be minimum 30 to 40 mils thick. Building paper slip sheet, 3-lb/100 sq. ft. minimum, rosin sized. Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated. Fasteners for Copper, hardware bronze or Series 300 stainless steel. Solder to be ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead. Form reglets to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing and with interlocking counterflashing on exterior face, of same metal as reglet. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view. Form nonexpansion but movable joints in metal to accommodate elastomeric sealant. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

Apron, Step, Cricket, Valley Flashing, Drip Edges Eave, Rake, Ridge, Hip Flashing and Backer Flashing to be 16 oz./sq. ft. copper. Step Flashing and Counter Flashing: Fabricate flashing not to exceed 16 inches at intersection of slate roof and adjacent vertical surfaces. Extend flashing 6 inches minimum horizontally out from vertical surfaces and minimum 8 inches vertical measured at least dimension from sloped surfaces adjacent to vertical surface. Fabricate from the following material: 16 oz./sq. ft lead-coated copper.

Execution

Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA. Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 15 feet with no joints allowed within 24 inches of corner or intersection. Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. Seal joints as required for watertight construction. Clean surfaces to be soldered, removing oils and foreign matter. Do not use torches for soldering. Heat surfaces to receive solder and flow

solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces. Tin edges of uncoated copper sheets using solder for copper. Join sections of downspouts with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between – match existing copper hangers. Anchor roof edge flashing to resist uplift and outward forces. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers. Coordinate installation of counter flashing with installation of base flashing. Insert counter flashing in reglets or receivers and fit tightly to base flashing. Extend counter flashing 4 inches over base flashing. Lap counter flashing joints a minimum of 4 inches and bed with sealant.

EPDM ROOFING

Adhered EPDM membrane roofing systems, re-roofing at roof areas indicated on plans. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements. Commencement of re-roofing work shall be considered acceptance by the roofing subcontractor of the areas to be re-roofed as a suitable and properly prepared substrate. All surfaces shall be smooth, dry, clean, free of fins or sharp edges, loose or foreign materials, oil or grease. No re-roofing work shall proceed when water is present on roof, substrates or in any re-roofing materials. The Architect or the Owner's Representative reserve the right to stopwork when, in their opinion, site conditions warrant a work stoppage. The roofing subcontractor shall provide all necessary temporary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Temporary water stops shall be installed at the end of each work day and shall be removed before proceeding with the next day's work. Water stops shall be compatible with all re-roofing system materials and shall not emit dangerous fumes. Completed re-roofed areas should not be trafficked. Remaining re-roofing or associated work at every site shall be coordinated to prevent this situation by working toward roof edges and access ways. Selected re-roofing areas are visible from occupied, upper floor areas of the same and adjacent buildings. Installation care must be exercised in preparing, adhering and splicing the fully adhered roofing membrane. Refer to patching limitations later in these specifications intended to ensure neat, unwrinkled membrane applications.

Products

EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet. Thickness: 60 mils, nominal. Exposed Face Color: Black. Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application. Retain first paragraph below if applicable. Carlisle and Versico offer epichlorohydrin, and Firestone offers neoprene as a protection membrane over EPDM to resist hydrocarbons, non-aromatic solvents, grease, and oil. Protection Sheet: Epichlorohydrin or neoprene non-reinforced flexible sheet, 55- to 60-mil- thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil. Retain first paragraph below for fully adhering standard EPDM membranes and flashings to substrate. Bonding Adhesive: Manufacturer's standard. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch- wide minimum, butyl splice tape with release film. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories. Substrate Board:
ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

Execution

Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system: Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place. Verify that concrete substrate is visibly dry and free of moisture. Proceed with installation only after unsatisfactory conditions have been corrected.

Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections. Tear out any remaining flashings, counter flashings, pitch pans, pipe flashings, vents and like components to be abandoned and unnecessary for application of new membrane. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast. Prime surface of concrete deck with asphalt primer at a rate recommended by roofing manufacturer and allow primer to dry. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together. Fasten substrate board to concrete deck by means of asphalt primer applied to existing and

prepared concrete deck, and roofing manufacturer's specified cold-applied, asphalt-based adhesive. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project, as adjacent building windows provide both a near and distant view of the finished roofing surface. Make necessary preparations, utilize recommended application techniques, and apply the specified materials. Exercise care to ensure that the finished application is acceptable to the Owner.

Unroll roofing membrane and allow to relax before installing. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters. Retain first paragraph below for adhesive-splicing membrane roofing seams. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations. Repair tears, voids, and lapped seams in roofing that does not comply with requirements. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring. Install roofing membrane and auxiliary materials to tie in to existing roofing where applicable. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing

To be installed with cold-applied adhesive at roof deck above the Teach Prep Room the loggia between the east and west wing entrances. Preparation for re-roofing at this area includes complete removal to existing concrete deck surface of all previous roofing, asphalt and vegetation built-up on this concrete deck.

Products

Subject to compliance with requirements, provide Siplast, Inc., Irving, Texas, 'Paradiene 20/30 FR'SBS- modified bitumen multi-ply membrane roofing system. The flashing system consists of a catalyzed polymethyl methacrylate primer, basecoat and topcoat, combined with a non-woven polyester fleece. A two-component, PMMA-based, aggregate filled mortar used for remediation of depressions or patching concrete substrates. A pigmented, polymethylmethacrylate (PMMA) based resin for use as a wearing coat over the field of the finished roof membrane and to provide a desired color finish. Natural Quartz Anti-Skid Surfacing: A natural-colored, kiln-dried, quartz aggregate suitable for broadcast into the PMMA-based wearing layer. Metal Termination Bars, low flashing conditions: Type 304 stainless steel bars conforming to ASTM A 276, 1-1/2" wide, 1/8" thickness, prepunched with 5/16" holes, 8 inches on center. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick. Splash blocks shall be precast concrete, 30" long and 16" wide at the open end. Protective Walkway Surfacing Course: Chopped rubber particles with synthetic binders, manufactured as a protective course for foot traffic and acceptable to roofing system manufacturer, 5/16 inch thick, minimum.

Include other items as required to furnish a complete, weathertight SBS system at the locations indicated.

Execution

Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place. Verify that concrete substrate is visibly dry and free of moisture. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections. Tear out any remaining flashings, counterflashings, pitch pans, pipe flashings, vents and like components to be abandoned and unnecessary for application of new membrane. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together. Fasten substrate board to concrete deck by means of asphalt primer applied to existing and prepared concrete deck, and roofing manufacturer's specified cold-applied, asphalt-based adhesive.

Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" Install lapped base-sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows adhered to substrate with uniform coating of cold-applied adhesive. Install modified bituminous roofing membrane sheets and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants. An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project, as adjacent building windows provide both a near and distant view of the finished roofing surface. Make necessary preparations, utilize recommended application techniques, and apply the specified materials including granules. Exercise care to ensure that the finished application is acceptable to the Owner.

Base and Cap Flashing, SBS modified bitumen membrane cold-applied: Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place over the primed substrate extending 6 inches onto the field of the roof area and 6 inches up the vertical surface utilizing minimum 3 inch laps. Set the non-combustible cant into place dry prior to installation of the roof membrane base ply. Flash walls and curbs using the reinforcing sheet. After the base ply has been applied to the top of the cant, prime the base ply surfaces to receive the reinforcing sheet. Fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps onto the primed base ply surface and up the primed wall or curb to the desired flashing height. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by application of asphalt primer; allowing primer to dry thoroughly. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall or curb to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the vertical/horizontal surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges.

Copper Roofing

At selected locations, replace or repair copper roofing. Further water infiltration and damage to the stone will be arrested by replacing the roof. Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

Products

Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, 20 oz./sq. ft. (0.70 mm thick) unless otherwise indicated. Non-Patinated Exposed Finish: Mill. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

Fabrication

Retain one of first two paragraphs below. First is for custom-fabricated sheet metal roofing; second is for on-site, roll-formed sheet metal roofing.

General: Custom fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions (panel width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Fabricate sheet metal roofing and accessories at the shop to greatest extent possible. Form flat-seam panels from metal sheets 20 by 28 inches (510 by 710 mm) with 1/2-inch (13-mm) notched and folded edges. Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal roofing or manufacturers of the metals in contact. Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

Execution

Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that tops of fasteners are flush with surface. Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under sheet metal roofing. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire roof, in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days. Apply slip sheet before installing sheet metal roofing. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form

a hem on concealed side of exposed edges unless otherwise indicated. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation. Fasten cleats not more than 12 inches (300 mm) o.c. Bend tabs over fastener head. Provide expansion-type cleats and clips for roof panels that exceed 30 feet (9.1 m) in length. Seal joints as shown and as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces. Tin edges of uncoated copper sheets, using solder for copper. Attach flat-seam metal panels to substrate with cleats, starting at eave and working upward toward ridge. After panels are in place, mallet seams and solder. Attach roofing panels with cleats spaced not more than 24 inches (610 mm) o.c. Lock and solder panels to base flashing. Attach edge flashing to face of roof edge with continuous cleat fastened to roof substrate at 12 inches (305 mm) o.c. Lock panels to edge flashing and solder. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering. Clean and neutralize flux materials. Clean off excess solder and sealants. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions.

DIVISION EIGHT – DOORS & WINDOWS

Wood Door Restoration

The heavy wood doors require work to return them to suitability for daily use. The exteriors require refinishing with new stain and clear finish. The existing hardware must be refinished.

General

Engage an experienced wood door restoration firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard wood stile and rail doors is not sufficient experience for wood stile and rail door restoration work. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that restoration work is in progress. Persons must be experienced in restoration work of types they will be performing.

Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation. Approved mockups will be incorporated into

the work. Locate mockups on the building where directed by Architect. Prepare one door leaf to serve as mockup to demonstrate sample repairs of wood stile and rail doors including frame, leaf and hardware. Mock-up will show clear finish for final approval.

AWI Quality Standard: Comply with applicable requirements in AWI's "Architectural Woodwork Quality Standards" for construction, finishes, grades of wood windows, and other requirements.

Products

Wood: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; no finger joints; free of blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide. Mahogany for structure. Veneer to be clear fine-grained; acclimatized to condition of wood substrate to prevent unequal shrinking; match thickness of existing veneers – nominal ¼"; assume quarter sawn cut, plane sawn graining not acceptable. Assumed white oak, confirm with stripped piece of existing veneer. Wood Consolidant, ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated due to weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood. Two-part epoxy-resin wood-patching compound; knife-grade formulation as recommended by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge. All hardware that is intact will be cleaned, lubricated and reinstalled on the door it was mounted to prior to beginning of work. Broken hardware will be collected by contractor, placed in sealable, clear plastic bag w/ door number written legible on plastic in black permanent marker and delivered to Owner in a sturdy container. All door hardware shall smoothly operate, tightly close, and securely lock doors. Hinges shall not bind, door shall fit into opening with uniform distance between door and frame at each side. Replacement Door Hardware, Consult with Owner and Architect for each suggested replacement hardware. Finish for new hardware to be Oil Rubbed Bronze, 613. Weather stripping shall be compressible weather stripping designed for permanently resilient sealing under bumper or wiper action; completely concealed when opening is closed. Nylon brush sweep type weatherstripping; designed to be rabetted into bottom rail of door with removable sweep to allow replacement of sweep. No metal fasteners in visible locations. Fasteners of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each material joined. Match existing fasteners in material and type of fastener unless otherwise indicated. Finish repaired doors as indicated in schedule.

Execution

Protect adjacent materials from damage by historic treatment of wood stile and rail doors. Stabilize doors with loose or weakened pieces prior to moving. Clean existing wood doors of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting. Condition replacement wood members to prevailing conditions at installation areas before installing.

Have historic treatment of wood stile and rail doors directed and performed by a qualified historic treatment specialist. Remove door from opening, protect opening from weather (provide secure opening protection at first floor openings, maintain adequate egress through restoration program) and repair door on a horizontal surface and then reinstall.

Stabilize and repair wood doors to reestablish structural integrity and weather resistance while maintaining the existing form of each item. Remove coatings from exterior and interior where finish is opaque to the extent to expose areas requiring repair and to expose and arrest deterioration including applying borate preservative treatment before repair. Remove all coatings on faces to have transparent finished applied. Replace or reproduce historic items where indicated or scheduled.

Install temporary protective measures to protect wood stile and rail door work that is indicated to be completed later. Do not use abrasive methods such as sanding, wire brushing, or power tools except as approved by Architect. Dismantle door hardware; repair to proper operation. Match existing materials and features, retaining as much original material as possible to perform repairs. Unless otherwise indicated, repair wood stile and rail doors by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.

Where indicated, repair wood stile and rail doors by limited replacement matching existing material. Where doors are removed, cover resultant openings with temporary enclosures so that openings are weathertight during repair period. Provide secure opening protection at first floor openings. Schedule removal to maintain two means of egress at first floor at all times. Patch wood members that are damaged and exhibit depressions, holes, or similar voids, and that have limited rotted or decayed wood. Treat wood members with wood consolidant prior to application of patching compound. Allow treatment to harden before filling void with patching compound. Remove rotted or decayed wood down to sound wood. Apply borate preservative treatment to accessible surfaces either before applying wood consolidant or after removing rotted or decayed wood. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood. Apply patching compound in layers as recommended by manufacturer until the void is completely filled. Finish patch surface to match contour of adjacent wood member. Sand patching compound smooth and flush, matching contour of existing wood member. Replace parts of or entire wood door members at locations indicated, where damage is too extensive to patch and where replacement is indicated on the Drawings. Remove doors from openings

before performing member-replacement repairs. Remove broken, rotted, and decayed wood down to sound wood. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member. Fabricate replacement members according to AWI Section 1000 requirements for Custom Grade. Secure new wood using multiple dowels with adhesive to ensure maximum structural integrity at each splice. Use only concealed fasteners. Apply borate preservative treatment to accessible surfaces after replacements are made. Repair remaining depressions, holes, or similar voids with patch-type repairs. Reinstall units removed for repair into original openings. Replace and install weather stripping to ensure full-perimeter and meeting rail weather stripping for each operable sash and as indicated on the approved mock-ups, sample repairs.

Stained Glass Window Restoration

Glass windows surveyed by Serpentino Studios and consist of clear leaded glass and painted stained glass. Estimates are from the conservator.

Many of the leads have been peeled off and re-applied as an "overlay" most likely from repairs and glass replacement executed in the studio before the windows were delivered and installed.

There are some broken and cracked pieces of glass that need to be replaced. The support bars have rusted and detached from the leads at their points of attachment. Where possible the cracked glass will be repaired and conserved by infusing epoxy in situ. There are some areas where new glass needs to be painted and replicated, in which case we may need to remove the entire panel from its opening in order to perform the repairs.

DIVISION NINE - FINISHES

Clear Finishes

This section governs recoating of historic wood doors.

Products

Manufacturer's standard biodegradable formulation for removing paint coatings from masonry, stone, wood, plaster, and metal. Paint stripper specifically designed to remove coatings from metal surfaces and recommended for use for applications indicated.
Wood varnish -- Alkyd- or Polyurethane-Based Clear Satin Varnish: Factory-formulated, alkyd- or polyurethane-based clear varnish applied at spreading rate recommended by manufacturer. Minwax Clear Shield Protective Coating for Wood, as manufactured by Minwax Company, 10 Mountainview Road, Upper Saddle River, NJ 07458, Phone: 800-523-9299.

Execution

Prepare existing surfaces as follows: Clean existing surfaces to remove loose dirt and dust, remove surface films that will prevent proper adhesion, remove loose, blistered, or otherwise defective coatings; smooth edges with sandpaper, clean corroded iron or steel surfaces to bright metal and prime bare surfaces.

Surface preparation for existing bare and painted metal, clean galvanized surfaces with nonpetroleum-based solvents until surfaces are free of oil and surface contaminants. Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate to provide a dry film thickness of not less than 1.5 mils (0.03 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

Surface preparation for wood to receive clear finish, remove existing coating to bare wood (may require sanding based on penetration of existing coatings). Apply coats as recommended by manufacturer. Sand between coats. Apply three finish coats, minimum.

SUMMARY OF PROBABLE COSTS

Cost estimates have been prepared for each of the recommended repairs and improvements. The listed amounts are to be used as relative magnitudes of costs, based upon the proposed scope of work that we have outlined for the three prioritized categories.

- Immediate repairs (1-2 years)
- Short-term repairs and improvements (3-5 years)
- Long-term repairs and improvements (6-10 years)

Our opinion on the relative costs of each work item is based upon our past experience with similar projects. Actual construction costs may vary depending on the experience of general contractors with historic building repair and renovation work.

CYCLICAL MAINTENANCE PLAN

This section of the master plan report provides an anticipated cost for work that would be considered typical responsible exterior and building system maintenance at the United First Parish Church. These simple activities, consisting of inspection, specific tasks performed at regular intervals, and minor repairs performed at time of discovery, will slow deterioration and extend the life of the already durable materials. The recommended tasks and procedures will not prevent wear and tear on the building but will increase the lifespan of materials and will allow the cost to be amortized over a longer period of time The goal here is to recommend a limited annual investment that will help limit the scope and cost of future repairs.

Perhaps the single most important maintenance activity is an annual inspection. The building exterior should be carefully inspected from the ground, preferably by two people and the same people each year, who document any signs of deterioration on any portion of the envelope. When changes are noted, consultation with an architect or engineer may be warranted. Digital photographs should be taken to accompany the written record and stored for comparative referencing the following year.

Listed below are the column headings on the accompanying chart with a brief explanation of their meanings.

Mark

These notations correspond to the labels on the annotated plans and elevations that follow the chart and identify the element locations.

Material

The building system is the feature or characteristic that requires a maintenance and/or capital budgeting line item. For example, masonry walls comprise a building system that requires periodic repointing.

Location

A brief narrative description of the element location.

Schedule

Frequency of inspection in years.

Scheduled Maintenance Activities

The next four columns describe maintenance activities with intervals and costs for the locations identified. Maintenance activities are largely housekeeping tasks and straightforward proactive work. The frequency is in years and the maintenance work is considered routine upkeep which might require special attention from mainte-

nance personnel or an outside contractor. The intervals are suggested as as the maximum span of time between maintenance activities. Note that fractional yearly frequency means more than once a year. The cost is the estimated cost for the work based on historical information gleaned from industry standards. The annual cost is calculated for convenience to provide a total annual maintenance stipend for the building. This is idealized since some activities occur more than once a year and others only once in several years.

Maintenance Protocol

Describes the maintenance work. General observations about access to work or special requirements are made here.

Annual Maintenance Total

The chart has a bottom line showing the cumulative maintenance total per year which is approximately **$??,???**. This figure should be applied on top of annual expenses for maintenance staff, housekeeping, consumable replacements (light bulbs, etc.), snow removal, landscaping and interior maintenance items. Note that this total is averaged. Depending on the frequency of individual maintenance activities, the yearly figure may be greater or less. By budgeting the total amount annually and setting aside as a reserve funds not expended in a particular year, there should be sufficient funds for years when the scheduled maintenance expenditures are higher.

Scheduled Capital Improvements

The last four columns describe capital improvements with intervals and costs for the locations identified. Capital improvements are replacements of major building systems. The intervals are suggested as as the maximum span of time between these activities. The cost is the estimated cost for the work based on historical information gleaned from industry standards. The annual cost is calculated for convenience to provide a total annual maintenance stipend for the building. This is idealized since some activities occur more than once a year and others only once in several years.

Improvement Protocol

Describes the capital improvements. General observations about access to work or special requirements are made here.

Capital Budgeting Total

Based on the projected endurance of materials and yearly maintenance, an estimated replacement year and cost for replacement is provided (not including inflation.) Based on these numbers, an annual sinking fund number has been established of **$??,???** to address future capital projects.

APPENDICES

Please see volume 2 for extensive Appendices of the documents used in the preparation of this report. Due to the extended length of the Appendices, volume 2 is included on a flash drive in the pouch at the end of this report.