Saint Stanislaus Kostka Mission

CONDITION ASSESSMENT STUDY
FINAL REPORT - DECEMBER 12, 2020

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Executive Summary – December 12, 2020

Saint Stanislaus Kostka Mission, constructed in 1902, is a church with significant spiritual, historical, and cultural importance to the parishioners of St. John Paul II Parish, the Diocese of Springfield, and the community of Adams. Kuhn Riddle Architects, in association with H.B. Fishman roofing consultants and GNCB structural engineers, has been commissioned to conduct a survey of the existing roof, structural framing, and decorative metal tower ornamentations. In the course of this review, additional areas of potential repair were identified; these include the exterior masonry and the basement plaster ceiling. Detailed assessment reports and full cost estimates are attached to this summary.

The average life expectancy of slate and copper is in the 100-125 year range. Terne metal, used on the ornamental item on the towers, while a durable material, typically has a slightly shorter service life than slate or copper. Given the age of the building, it is reasonable to assume that the existing roofing, both slate and copper, and the ornamental terne metal elements are at or nearing the end of their functional life. Our field observations confirm these assumptions. An evaluation of the existing structure and masonry also revealed a number of deficiencies that need to be addressed. Again, given the age of the building, much of what was observed is typical for a building of this age. While the building structure is in no immediate danger, most of these issues need to be addressed in the next few years to prevent ongoing deterioration.

Due to the size and height of the Church, one of the major costs associated with any roofing, masonry, or structural work is the cost of erecting scaffolding to provide safe access for workers. Given the high cost of scaffolding, ideally, as much work as possible would be consolidated into one project so that repeated erection and disassembly of scaffolding is not required. The reality of budgets and fundraising may dictate that the project is phased and a one-time erection of scaffolding may not be possible.

H.B. Fishman has estimated that while the slate roof is in need of immediate repair to maintain water tightness, complete replacement may be deferred for 10-15 years. Unfortunately, much of the associated copper and terne metal flashings, copings, and the snow retention system will need replacement sooner. This will necessitate removing a fair amount of slate around the copper at valleys and edges of the roof. The poor condition of the pipe-rail snow guards and the possibility of a snow slide hitting a pedestrian dictates this repair be completed as soon as feasible. It may be more cost effective in the long run to do a total roof replacement when the metal is replaced, but again, that may not be possible given funding realities.

Of particular concern are the decorative terne metal elements such as the balconies, dormer roofs, pinnacles, and columns on the east and west towers. Terne is a lead/tin alloy that was commonly applied to stamped sheet steel. Once the coating has worn away, the underlying metal is vulnerable to rust and corrosion. All of the terne metal elements are showing signs of serious deterioration.

The lower sections of the balconies and pinnacles have visible holes in them. Some of the column shafts are missing, which brings into question the viability of the terne metal attachment points. A primary concern is that an element might come loose in a windstorm or snow slide and strike a pedestrian below. If the terne metal elements are removed, careful attention will need to be given to the attachment points and the backup wall underneath to prevent ongoing damage and water intrusion. Unfortunately, until the elements are removed, it is impossible to know exactly how they are attached and what condition the backup walls are in. We would also recommend that any removed elements be saved so they can either be repaired and reinstalled or used as a pattern for future replacement.

As part of this evaluation, we have looked at possible methods to repair the terne metal elements in place. While this may be a viable method of repair, there is some risk involved as one can only see the exposed surfaces of the metal. The integrity of the concealed metal and the attachment points cannot be fully evaluated without putting “hands on” the terne elements. Therefore, it is recommended that the elements be removed in the short term even if repair and reinstallation is ultimately desired.

If replacement or repair and reinstallation of the decorative terne metal elements is desired, consideration should be given to reproduction of elements in copper as it is less susceptible to corrosion and will be compatible with adjacent copper flashings.

As with the snow retention system and decorative metal ornaments, the plaster ceiling in the basement of the church requires immediate repair as it has begun to fail. The structural assessment identified issues with the exterior masonry. While this work was not anticipated in the original scope of this project, the on-site conditions require this potential work be included in the recommended work.

Recommendations and Probable Cost Based on Timeframe:

Immediate Timeframe:

- Perform necessary repairs to the slate and metal roofing with the understanding that the roof will need a total replacement within the next 10-15 years.
- Replace the existing damaged pipe-rail snow retention system.
- Repair the missing ridge flashing on west tower roof to prevent further water intrusion.
- Remove the decorative terne metal elements. Inspect and repair the attachment points and backup masonry and make necessary repairs to ensure the building remains watertight.
- Remove the bird and bat excrement from the tower belfries. Replace the damaged terne metal belfry roofs with new membrane roofing.
- Install bird and bat screens inside the belfry openings to prevent further damage.
- Remove the failed plaster ceiling from the basement.
- Consider removing and capping the steeple over the transept.

Immediate:

Basement structural repairs	$95,000
Tower structural repairs	$64,000
Roof repairs	$106,000
Tower decorative metal removal*	$80,000
Subtotal	**$345,000**
allowance for staging and scaffolding	$150,000
Subtotal	**$495,000**
8% general requirements	$40,000
Subtotal	**$535,000**
20% design contingency	**$107,000**
TOTAL	**$642,000**

*If replacement or repair and reinstallation of the decorative terne metal elements is desired, the cost of this work would increase by $28,000.

2-5 Year Timeframe:

- Replace the copper gutter system as recommended by H.B. Fishman.
- Make necessary structural repairs as recommended by GNCB.
- Consider insulating the attic at the ceiling level. A total roof replacement by code may necessitate the installation of insulation, and it would be cost effective to insulate the attic while the structural work is performed in that area.

- Implement a regular maintenance program as recommended by GNCB, with the understanding that this will be an ongoing process that will need to be performed every 5-10 years.

2-5 year:

Exterior masonry	$204,000
Sanctuary and sanctuary ceiling	$158,000
Attic and roof framing	$379,000
Subtotal	**$741,000**
allowance for staging and scaffolding	$125,000
Subtotal	**$866,000**
8% general requirements	$69,000
Subtotal	**$935,000**
20% design contingency	**$187,000**
TOTAL	**$1,122,000**

10-15 Year Timeframe:

- Replace the entire slate roof and associated copper flashings. New slate is the preferred material, but using a high quality asphalt shingle may be an option. The life expectancy of the asphalt shingles will probably be slightly less than 50 years as opposed to 125 years for slate.
- Replace the flat seam copper roofing with new copper.
- Replace the terne metal dormer roofing and copings with new copper.

10-15 years:

Reroof entire church	$964,000
Subtotal	**$964,000**
allowance for staging and scaffolding	$175,000
Subtotal	**$1,139,000**
8% general requirements	$91,000
Subtotal	**$1,230,000**
20% design contingency	**$246,000**
TOTAL	**$1,476,000**

If funding is available to do all the work as a single project, the total cost would be somewhat less than the sum of the totals above as the scaffolding could be rented and erected once.

Cost as a single project: $2,838,000

Below is a brief synopsis of H.B. Fishman's and GNCB's findings. A more detailed list of recommendations can be found in each of their attached reports.

H.B. Fishman Roofing Consultant Observations and Recommendations:

Slate Roofs:

- Slate is generally in serviceable condition, though broken or damaged slates need to be replaced.
- The slate on the main and smaller spires appears to be in good condition; however, some localized damage was observed.
- Most of the damaged slate is localized and appears to be the result of snow sliding off the dormers. Slate damage in other areas is due to the slate's age and normal wear and tear.
- The expected remaining service life is approximately 10-15 years.

Gutters and Gutter Liners:

- The painted galvanized steel gutter covers are in poor condition with signs of chronic leaking and localized damage. The covers are decorative and should be replaced when the copper gutter liners are replaced.
- The copper gutter liners are exhibiting signs of damage from snow slides and normal wear and tear. The overall condition of the copper liners is somewhere between fair and poor.
- Estimated remaining service life is two (2) to three (3) years.

Slate Roof Copper Flashings:

- Copper flashings associated with the slate roofing (step flashing, counter flashings, valley flashings, water tables, and ridge rolls) are generally in fair condition.
- A section of the copper hip flashing is missing on the west tower. This may be the source of water intrusion noted by the structural engineer.
- Copper flashings should be replaced when the roofing is replaced.
- The missing flashing on the west tower needs immediate replacement. This will require an aerial lift.

Copper Standing and Flat Seam Roofing:

- The existing flat and standing seam copper roofs are in less than fair condition. While most of the copper roofing appears watertight, the southwest hip roof has several cracked solder joints, a hole in one of the panels, and evidence of previous repairs indicating prior leaks.
- Replacement is recommended within three (3) to five (5) years. This work should be done in conjunction with a gutter liner replacement project as the copper roofing is tied into the gutter liners.

Terne Metal Roofing:

- Terne metal (lead-tin alloy) flashings used for slate knee wall parapet copings is in less than fair condition.
- Due to the heights involved, close inspection of the terne metal roofing on the spire dormers was not possible.
- The terne metal should be replaced when the adjacent slate and copper flashings are replaced.
- Based on the condition of other terne metal roofing, the anticipated remaining service life of the dormer roofing is estimated to be two (2) to three (3) years.

Decorative Terne Metal Elements:

- The terne metal roofing on the spire dormers needs closer inspection, but given the state of other terne metal, one can assume it is nearing the end of its functional life.
- The bases of the terne metal pinnacles are in poor condition with visible corrosion noted in numerous pinnacle bases.
- The decorative columns on the east and west towers need close inspection. A few of the column shafts are missing, but the capitols appear intact. The attachment of all of the remaining columns should be carefully inspected.
- The terne metal balconies and associated roof overhangs are in poor condition. Numerous holes were observed in the bottom of the balconies.

Snow Retention Systems:

- The existing pipe-rail snow guards show signs of impact damage and are not fully functional. This has resulted in slate damage below the snow guards.
- Immediate replacement of the snow retention system is recommended to prevent further damage to both lower building elements and pedestrians.

GNCB Structural Observations and Recommendations:

- Periodic cleaning of the masonry will manage water staining and biological growth.
- The masonry should be inspected periodically to evaluate any deterioration in the masonry ties and debonding of the face brick from the backup wall. During these periodic inspections, areas in need of repointing should be identified and corrected.
- A small area on the east side of the building above the entrance needs to be reconstructed.
- The thermal cracks on the buttresses need to be repaired. Consideration should be given to adding vertical expansion joints to these areas.

- The damaged cast stone above the north entrance needs to be cleaned and repaired. The brick dentil below also needs reconstruction.
- The chimney needs repointing and a new cap. The interior of the flue needs to be cleaned and inspected by a chimney sweep.
- The interior of the masonry above and below the belfries should be regularly cleaned and treated with limewash.
- Bird and bat droppings should be removed from the upper areas of the towers.
- New ladders should be provided to permit safe access to all levels of the towers.
- Some roof sheathing and structural elements are showing signs of water infiltration. The sheathing will need to be carefully inspected and repaired as needed when the roof is replaced. Structural elements that show signs of water infiltration should also be carefully inspected and drilled to determine the extent of water damage when the roof is replaced. Damaged structural elements should be repaired in place or replaced in kind if the damage is beyond repair.
- Over time, a number of framing connections have come loose. This is due to a combination of thermal movement and lumber shrinkage. Bolted connections should be tightened and gaps between framing members should be shimmed. GNCB recommends that a number of connections be reinforced with metal framing connectors to provide a stronger mechanical connection between framing elements.
- The cupola framing and cupola trusses at the transept need to be reinforced with engineered lumber and steel angles. Attachments at the top cord of the cupola trusses need to be reinforced. See GNCB's report for a complete list of necessary modifications to the transept framing.
- A number of other modifications to primary and secondary attic, tower, and roof framing are noted in the GNCB report. See their structural report for a full list of recommended repairs.
- There is a plaster-on-wood lath ceiling above the dropped ceiling in the basement. Over time, the plaster has separated from the wood lath. This is a safety hazard that should be immediately addressed by removal of the plaster as there is a risk of the plaster falling on someone, causing an injury.
- Blocking needs to be installed at the top of the two basement steel posts at Gridline 3 (see GNCB framing plans). Strapping should also be installed to tie the beams above together.
- Plaster repairs in the Sanctuary due to water damage and cosmetic concerns should be made after the roof is made watertight.
- The Sanctuary plaster should be inspected on a regular basis for damage due to structural movement.

ARCHITECTURAL SURVEY

The architectural portion of this study looks to survey the metal decorative elements on the east and west towers as well as the cupola above the transept.

It is noted in the RFP that many of the metal embellishments are deteriorated due to corrosion or have entirely detached from the building. The Diocese has requested that two approaches be investigated to deal with this problem:

1. Removal - This scenario looks into removing the decorative elements in question.

2. Repair/Replacement - This scenario looks at a full restoration of the existing elements or replacement where restoration is not feasible. This estimate should also include an estimated schedule of maintenance of these elements. For instance, if these elements need to be repainted often, the cost of this maintenance would inform the overall decision.

It is requested that the cost of these scenarios be separately estimated so a determination can be made by the Parish to determine which approach is feasible to accomplish.

This report is divided into three sections:

1. Overall views of existing conditions

2. Removal Scenario - This scenario looks at removing decorative items on a component by component basis.

3. Repair and Replacement - This scenario looks at repair and replacement of decorative items in a component by component basis.

ARCHITECTURAL ASSESSMENT AND RECOMMENDATION OPTIONS

SECTION 1

OVERALL VIEWS OF EXISTING CONDITIONS

GENERAL NOTES

Existing conditions have been surveyed by drone photos as well as photography taken from ground level.

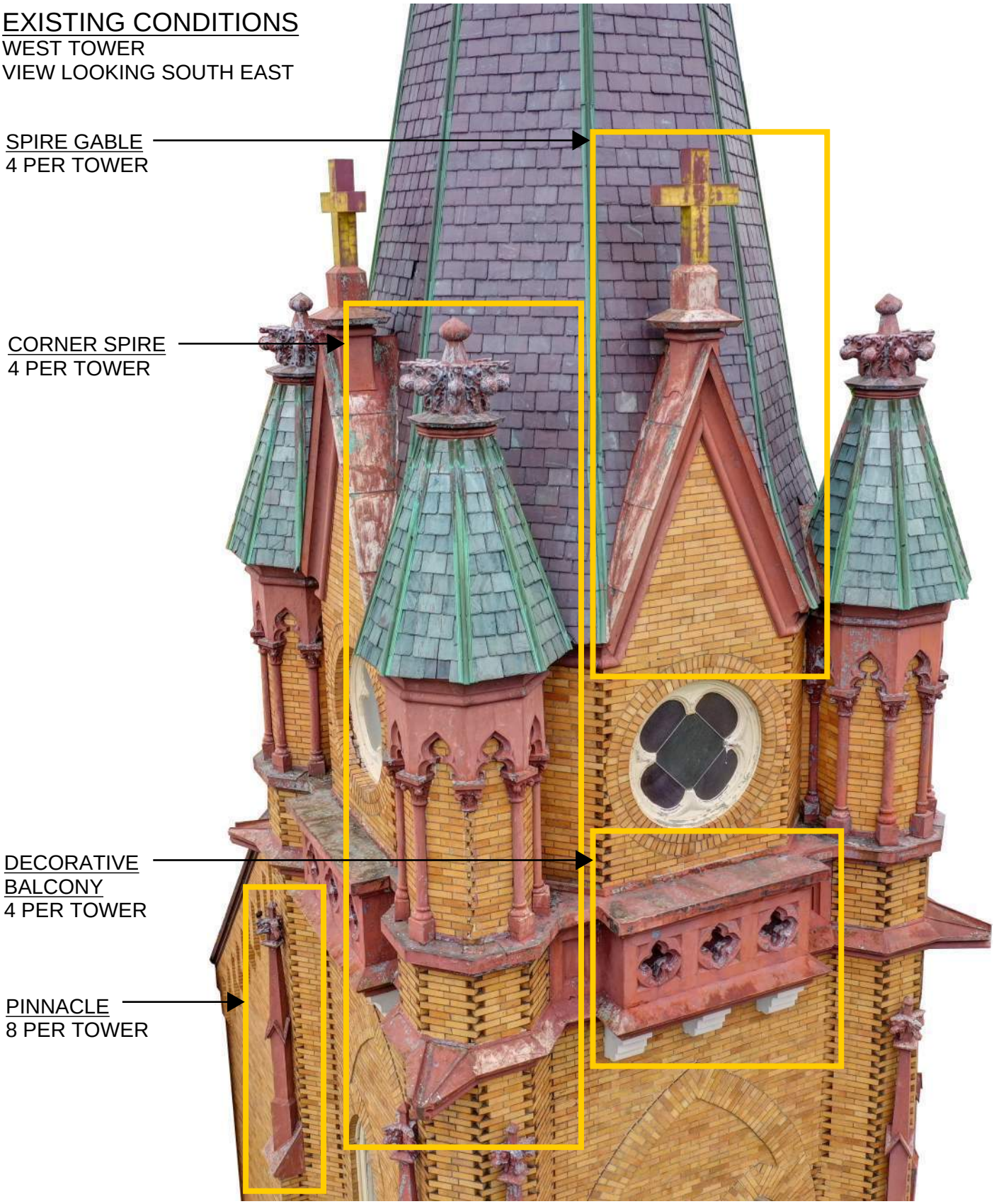

EXISTING CONDITIONS
OVERALL VIEW
VIEW LOOKING SOUTH WEST
EAST TOWER
WEST TOWER

EXISTING CONDITIONS
OVERALL VIEW
VIEW LOOKING SOUTH WEST

CUPOLA AT TRANSEPT

EXISTING CONDITIONS

WEST TOWER
VIEW LOOKING SOUTH EAST



EXISTING CONDITIONS

CORNER SPIRE, WEST TOWER
VIEW LOOKING SOUTH EAST

EXISTING CONDITIONS

WEST TOWER, BALCONY
VIEW LOOKING SOUTH EAST

EXISTING CONDITIONS

WEST TOWER, PINNACLE
VIEW LOOKING SOUTH EAST

EXISTING CONDITIONS

WEST TOWER, TOWER GABLE
VIEW LOOKING SOUTH EAST

EXISTING CONDITIONS

WEST TOWER
VIEW LOOKING NORTH-WEST

EXISTING CONDITIONS

EAST TOWER
VIEW LOOKING NORTH

EXISTING CONDITIONS

CUPOLA AT TRANSEPT
VIEW LOOKING SOUTH EAST

EXISTING CONDITIONS

WEST TOWER
VIEW LOOKING SOUTH EAST

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Keynotes/General Notes:

Project Name
Address

ROOF PLAN

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Project:	12345
Scale:	1/8" = 1'-0"
Drawn By:	Author

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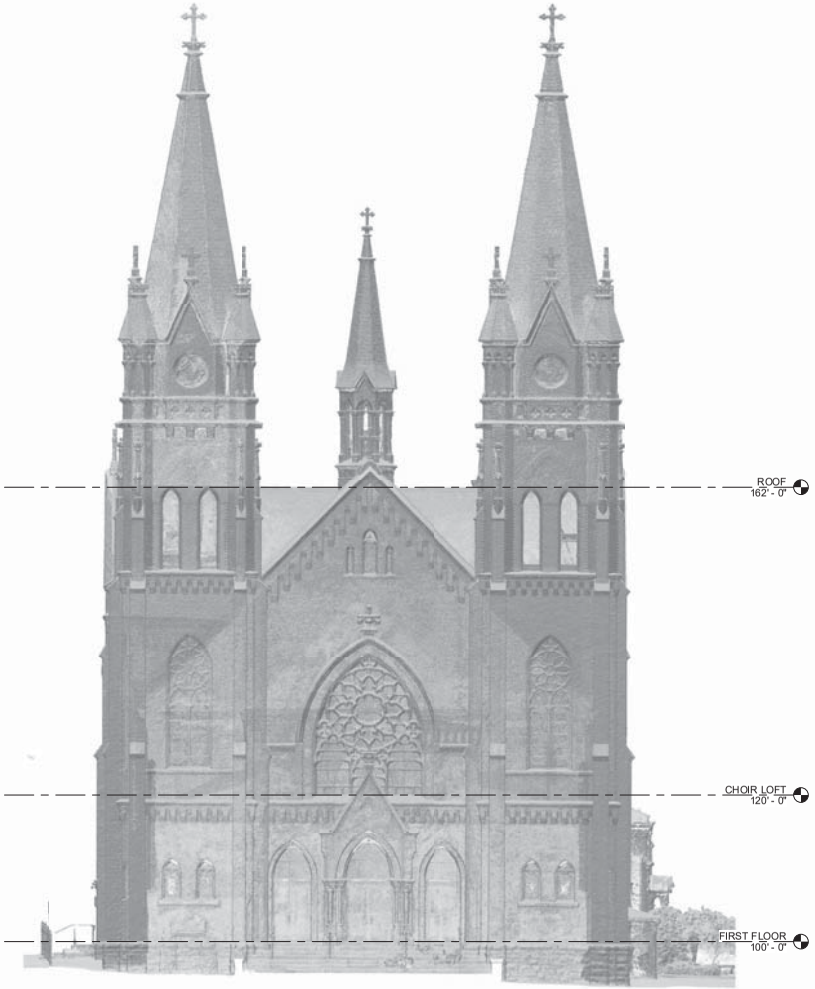

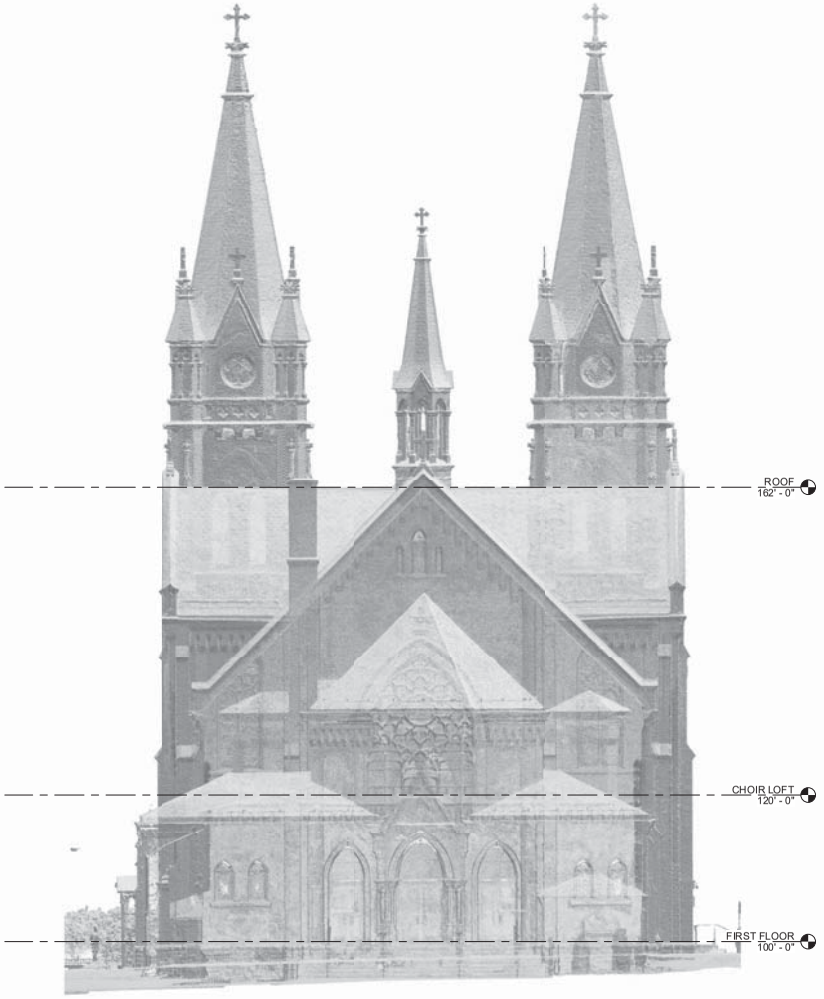

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Rev. No.	Description	Date

Project Name
Address

EXTERIOR ELEVATIONS

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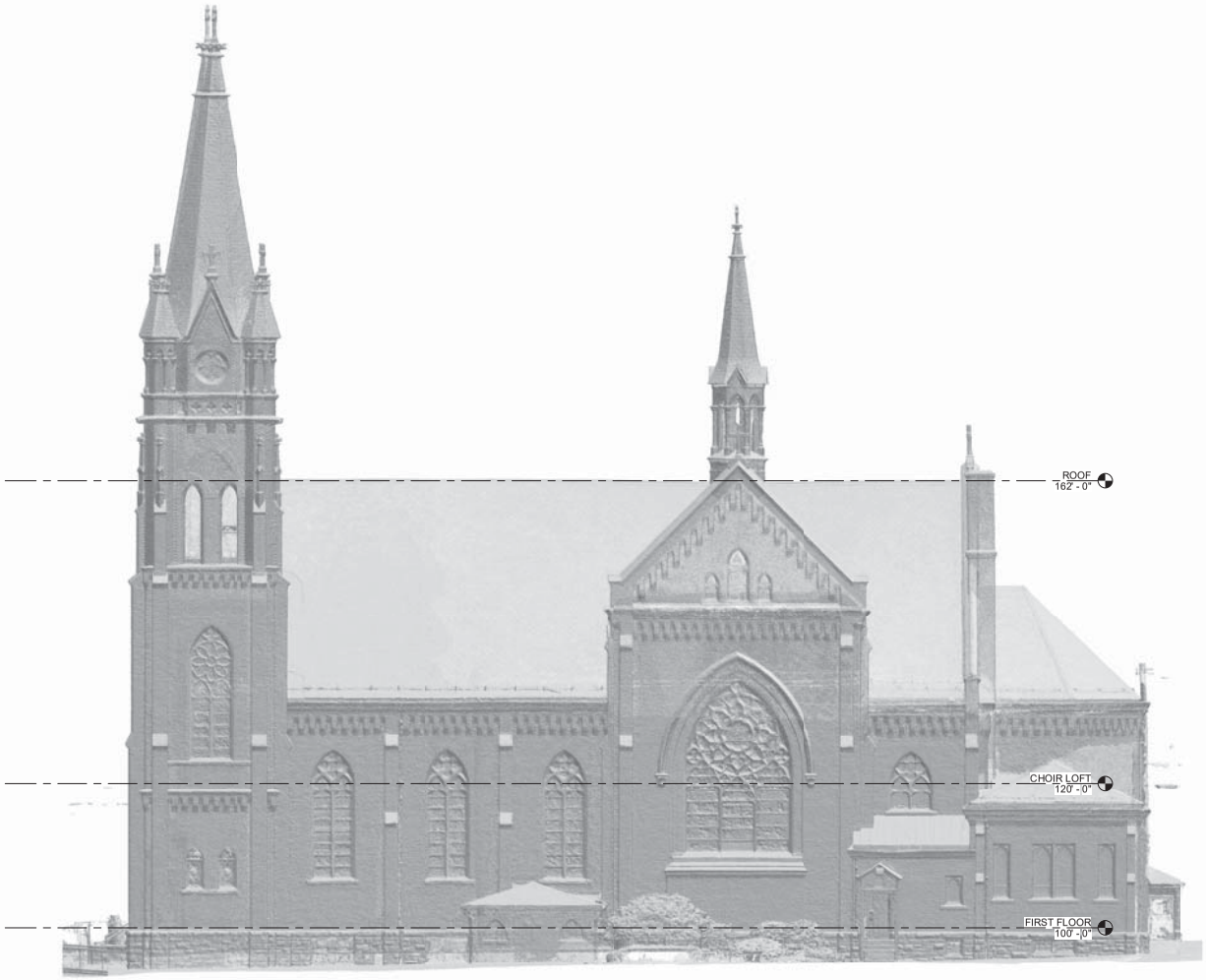

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Keynotes/General Notes:

Rev. No.	Description	Date

Project Name
Address

Unnamed

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Drawn By:	Author	

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Keynotes/General Notes:

Rev. No.	Description	Date

Project Name
Address

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Date:	Issue Date
Project:	12345
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Drawn By:	Author

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SECTION 2

REMOVAL SCENARIO

GENERAL NOTES

Due to the integration of the decorative elements into the structural and overall architectural form of the building, wholesale removal of these elements would be problematic.

The following pages depict suggested approaches for removal, encapsulation and stabilization of existing elements.

Where elements are removed, subsurface brick would need to be cleaned, repointed and repaired where elements were previously attached to the brick surface. Where elements are removed, previously unexposed areas may need to be flashed with copper to protect from water infiltration.

Where elements are encapsulated or stabilized, subsurface armature or supports need to be investigated to determine the integrity of attachment to the underlying structure.

Please note that approaches depicted are meant as preliminary suggestions in order to determine a rough scope of magnitude. Further investigation remains to determine the feasibility of suggested approaches.

SCHEME A: REMOVAL

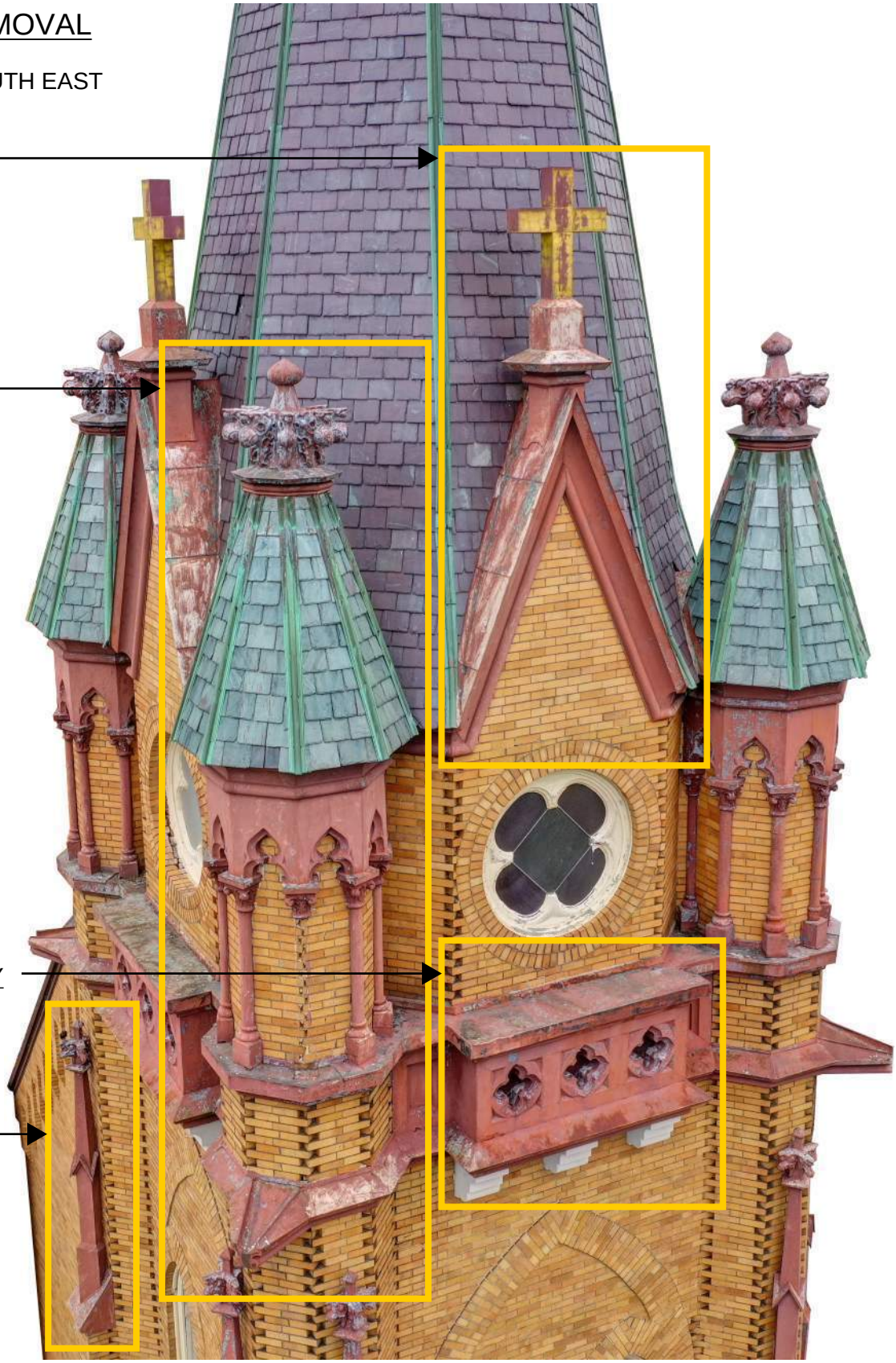
WEST TOWER
VIEW LOOKING SOUTH EAST

SPIRE GABLE
4 PER TOWER

CORNER SPIRE
4 PER TOWER

DECORATIVE BALCONY
4 PER TOWER

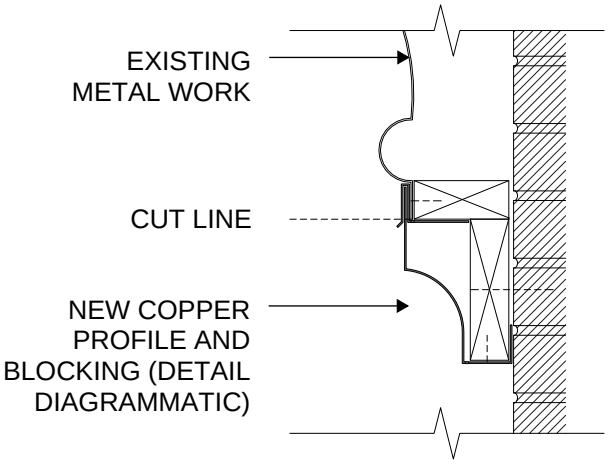
PINNACLE
8 PER TOWER



SCHEME A: REMOVAL

CORNER SPIRE, WEST TOWER
VIEW LOOKING SOUTH EAST

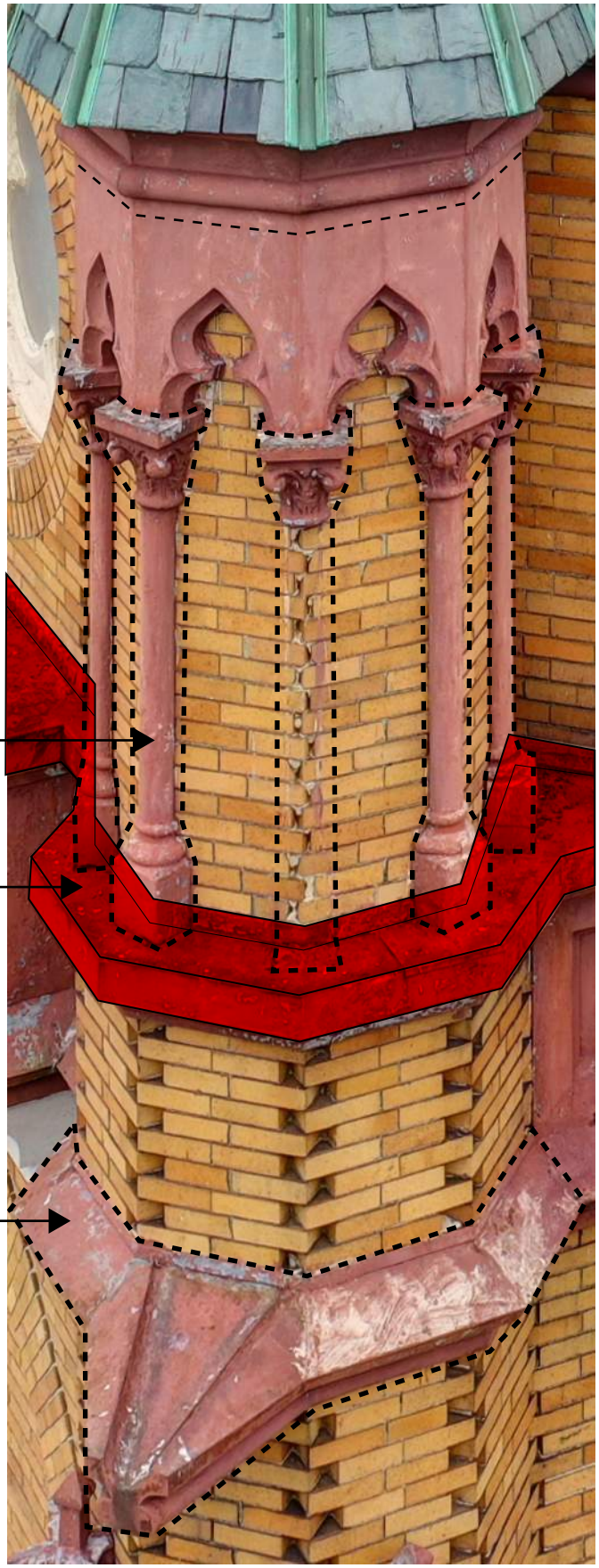
CUT ARCHITRAVE ABOVE POINTED ARCHES, SECURE/REINFORCE EXISTING SUPPORT. SEE DETAIL BELOW.



REMOVE PILASTERS & ASSOCIATED PARTS, CLEAN, REPAIR & REPOINT BRICK BENEATH

STRIP EXISTING METAL FLASHING ON UPPER LEDGE TO SUBSTRUCTURE. REPAIR AND REANCHOR IF NEEDED. WRAP LEDGE IN NEW COPPER FLASHING.

REMOVE LOWER LEDGE & SCUPPER. CLEAN AND REPOINT BRICK

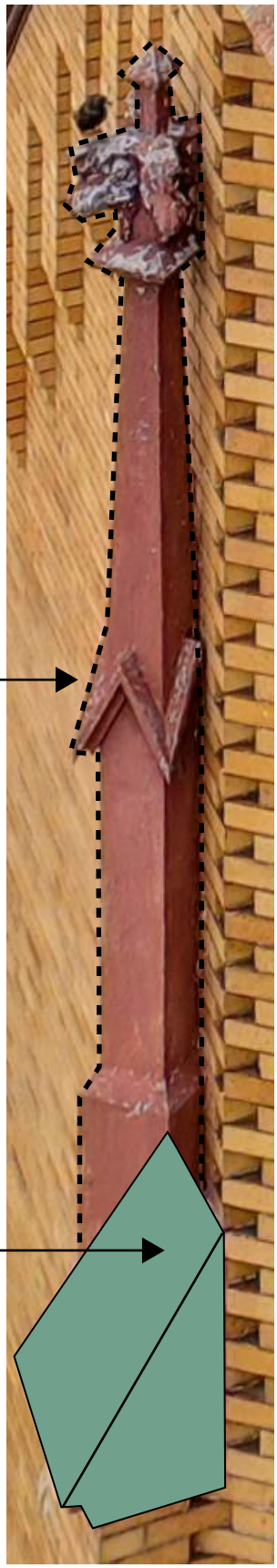


SCHEME A: REMOVAL

WEST TOWER, BALCONY
VIEW LOOKING SOUTH EAST

SCHEME A: REMOVAL

WEST TOWER, PINNACLE
VIEW LOOKING SOUTH EAST



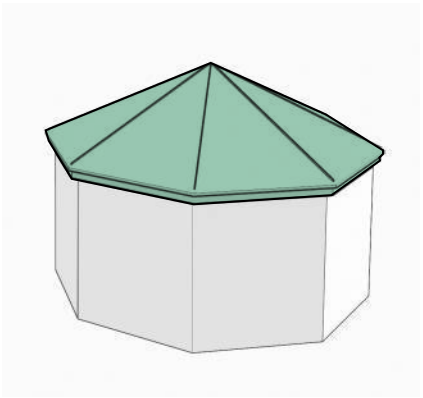
SCHEME A: REMOVAL

WEST TOWER, TOWER GABLE
VIEW LOOKING SOUTH EAST

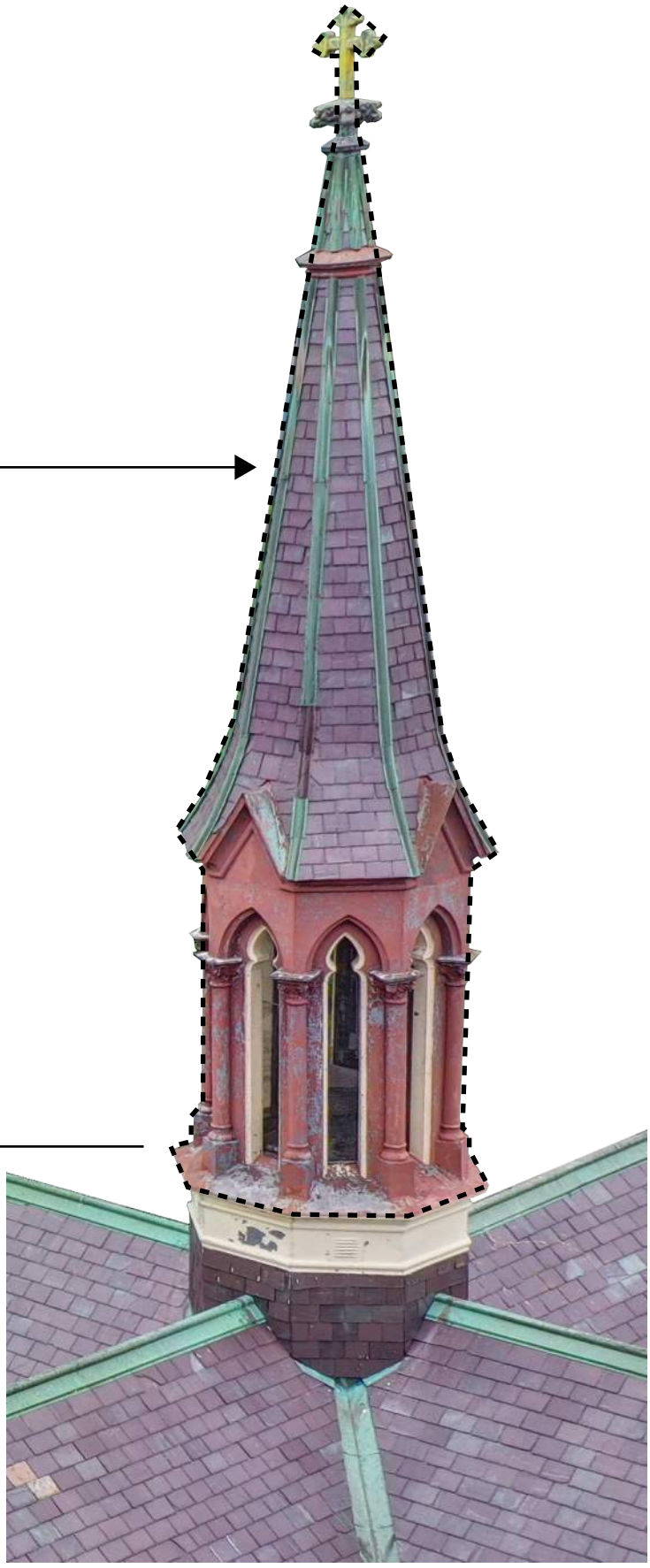
SCHEME A: REMOVAL

CUPOLA AT TRANSEPT
VIEW LOOKING SOUTH EAST

REMOVE CUPOLA



REPLACE WITH OCTAGONAL
COPPER STANDING SEAM CAP



SECTION 3

RESTORATION/REPLACEMENT SCENARIO

GENERAL NOTES

This section investigates the feasibility and approach for restoration or replacement of the decorative elements in question.

It was suggested that the architectural elements are a pressed zinc-tin alloy. This could be verified in future investigations by checking whether metal is ferrous or not with a magnet survey. For the purposes of this study we are assuming that the elements are galvanized steel.

The following procedures were suggested by a metal specialist who had worked on a similar project.

Restoration

1. Work would require full staging for both towers and spire.
2. Stripping paint off existing elements, for the purposes of this study it is assumed that the paint contains lead and would need to be abated. Bird excrement is also present and would need to be removed (see structural report recommendations).
3. Remove surface rust with a chemical rust converter.
4. Patch holes with like material as shown by diagram on pinnacle photo.
5. Prep surfaces for paint and repaint.

Reattachment

Subsurface armature or supports need to be investigated to determine the integrity of attachment to the underlying structure. Elements should be re-anchored into structure using embedded stainless steel attachments and straps.

Replication

It was suggested that some original elements were obtained through a manufacturer and therefore replicas may be available in copper. We were not able to find a manufacturer at the time of this survey but this may be an effective alternative to restoration or creating a fiberglass replica if one is discovered.

Missing elements or elements beyond repair should be replicated with fiberglass. This would entail creating form work from available elements and producing castings of those elements.

SCHEME B: REPAIR

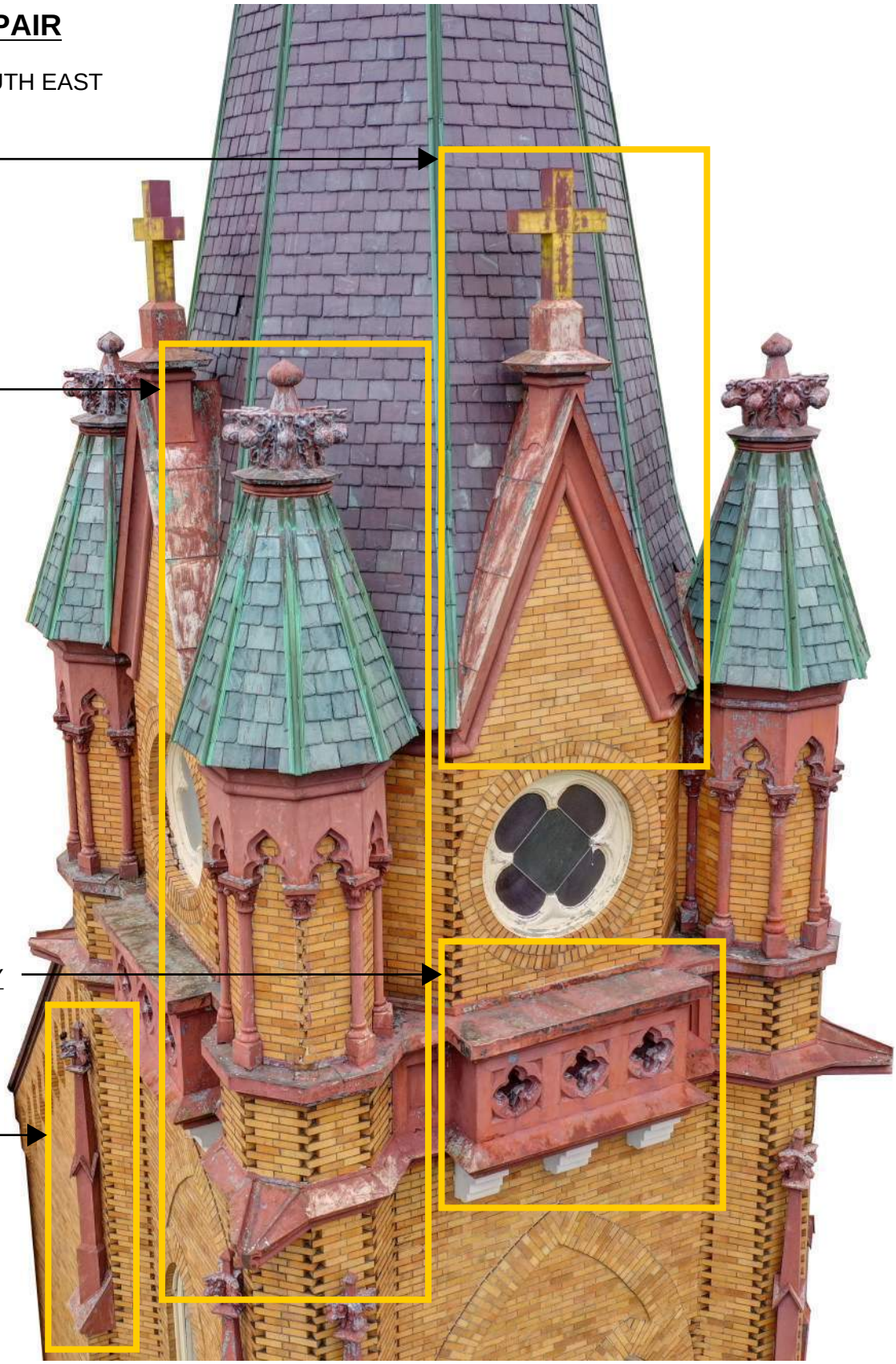
WEST TOWER
VIEW LOOKING SOUTH EAST

SPIRE GABLE
4 PER TOWER

CORNER SPIRE
4 PER TOWER

DECORATIVE BALCONY
4 PER TOWER

PINNACLE
8 PER TOWER



SCHEME B: REPAIR

CORNER SPIRE, WEST TOWER
VIEW LOOKING SOUTH EAST

ARCHITRAVE - SEE SUGGESTED PROCEDURE ON RESTORATION IN GENERAL NOTES

REPLACE ALL MISSING ELEMENTS WITH FIBERGLASS REPLICAS ANCHORED INTO BRICKWORK WITH STAINLESS STEEL ATTACHEMENTS

UPPER LEDGE - ALL FLASHING AREAS TO BE REPLACED WITH COPPER FLASHING

LOWER LEDGE & SCUPPER SEE SUGGESTED PROCEDURE ON RESTORATION. REPLACE NON ORNAMENTAL WORK WITH COPPER FLASHING

SCHEME B: REPAIR

WEST TOWER, BALCONY
VIEW LOOKING SOUTH EAST

UPPER LEDGE - ALL FLASHING AREAS TO BE REPLACED WITH COPPER FLASHING

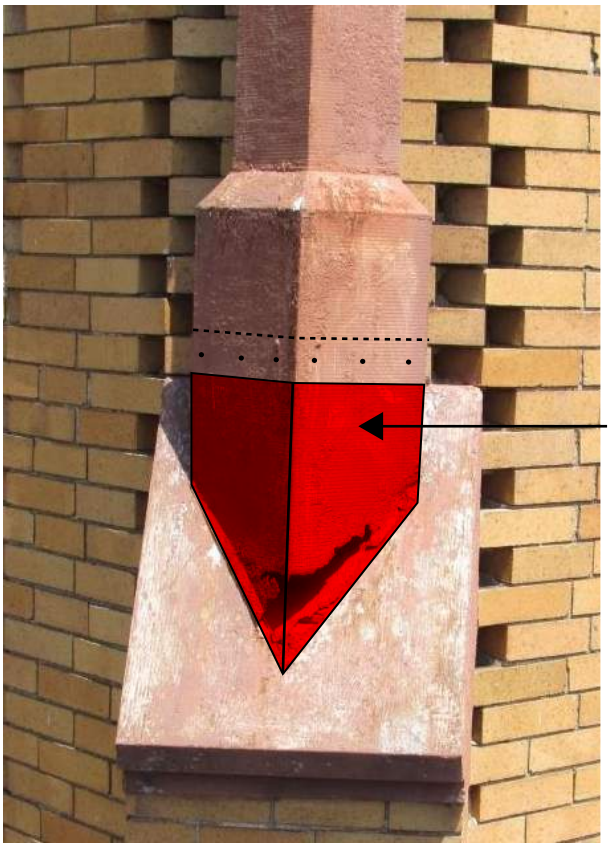
LOWER LEDGE - ALL FLASHING AREAS TO BE REPLACED WITH COPPER FLASHING

DECORATIVE TRACING - SEE SUGGESTED PROCEDURE ON RESTORATION

SCHEME B: REPAIR

WEST TOWER, PINNACLE
VIEW LOOKING SOUTH EAST

PINNACLE - SEE SUGGESTED PROCEDURE ON RESTORATION AND ATTACHEMENT IN GENERAL NOTES



WHERE DECORATIVE ELEMENTS ARE DETERIORATED, REMOVE MATERIAL AND REPLACE WITH LIKE MATERIAL. PIECES TO BE MECHANICALLY FASTENED TO EXISTING MATERIAL. PAINT TO MATCH.

ANCHOR ALL DECORATIVE ELEMENTS IN PLACE WITH STAINLESS STEEL STRAP AND ANCHOR TO ENSURE ELEMENTS ARE SECURELY ATTACHED TO STRUCTURE.

SCHEME B: REPAIR

WEST TOWER, TOWER GABLE
VIEW LOOKING SOUTH EAST

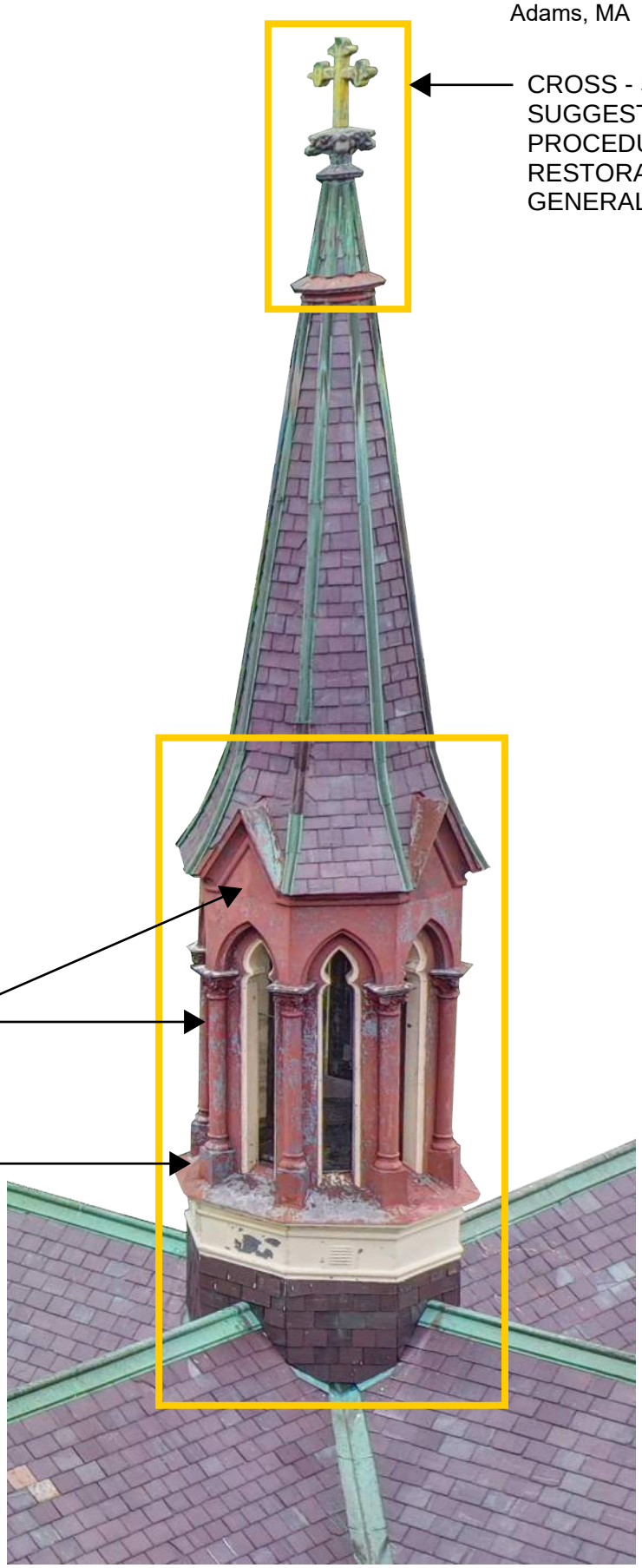
CROSS - SEE SUGGESTED PROCEDURE ON RESTORATION IN GENERAL NOTES

GABLE FLASHING - ALL FLASHING AREAS TO BE REPLACED WITH COPPER FLASHING

GALBLE COPING - SEE SUGGESTED PROCEDURE ON RESTORATION IN GENERAL NOTES

SCHEME B: REPAIR

CUPOLA AT TRANSEPT
VIEW LOOKING SOUTH EAST



SCHEME B: REPAIR

WEST TOWER
VIEW LOOKING SOUTH EAST

GABLE & ARCHITRAVE - SEE SUGGESTED PROCEDURE ON RESTORATION IN GENERAL NOTES.

PILASTERS- SEE SUGGESTED PROCEDURE ON RESTORATION IN GENERAL NOTES

ALL FLASHING AREAS TO BE REPLACED WITH COPPER FLASHING

STRUCTURAL ASSESSMENT

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EXECUTIVE SUMMARY

GNCB was retained by Kuhn Riddle Architects (KRA) to complete a Structural Condition Assessment of St. Stanislaus Kostka Mission c. 1902 (the Church) in Adams, Massachusetts. Amy Jagaczewski, P.E., Eleanor Phetteplace, E.I.T., and Jim Schmittberger of GNCB Consulting Engineers, P.C. (GNCB) conducted site visits from June 2, 2020, through June 4, 2020, at the Church in order to document the building's structural framing and existing conditions. The survey included both interior and exterior condition assessments and relied on visual observations only. An 85-foot Aerial Lift was operated by GNCB's licensed operator Jim Schmittberger to make exterior observations. GNCB operated the aerial lift for KRA and the team's roofing consultant, HB Fishman, as well. GNCB did not perform any invasive investigations. Observations and measurements were documented in field notes and photographs.

This report presents observations made during site surveys, the results of GNCB's limited structural analysis, and recommendations to preserve and stabilize the structure for continued use. Annotated photographs are included to further identify observations. Additionally, this report provides Existing Structural Framing Plans in **Appendix A.** The report is divided into Chapters that address each area of the building.

GNCB completed a limited Structural Analysis to determine allowable Live Load ratings for the first-floor framing and roof framing. The Structural Analysis is based on field measurements and assumptions regarding the weights of existing materials. Material properties are based on the age of the structure and site observations.

Live loads are the loads (weights) applied to a structural system after construction. Dead loads, or the permanent weight of the structure (e.g., planking, plaster, structure), must be deducted from the system's capacity prior to calculation of the live load capacity. Present-day building codes define environmental loads such as snow, ice, and wind to be resisted by the building's structure. In Adams, MA, roofs are designed for a 60 psf ground snow load per the requirements of the Massachusetts 780CMR – 9th Edition.

Historic structures often cannot meet these modern code requirements since framing was typically done with a more "traditional" approach vs. a calculated design approach. It is GNCB's practice to calculate and define the structural system's live load capacity in pounds per square foot (psf) and evaluate the structure's past performance and signs of overstress in framing members against the requirements of the Building Code.

A number of recommendations have been provided for the preservation and stabilization of the Church based on its continued use as a place of Assembly with fixed seating. In general, these recommendations involve the stabilization, reinforcing, and repair of wood and masonry elements. Most of these recommendations should be considered **Necessary (N)** for the future use of the structure, meaning that they should be completed within two to four years or in conjunction with architectural recommendations. Recommendations identified as **Maintenance (M)** should be regularly reviewed on a five to ten-year basis. None of GNCB's recommendations are classified as **Urgent (U)** since no condition observed indicates imminent structural failure.

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BUILDING DESCRIPTION

The building is constructed of mass brick masonry walls with wood-framed floors and roof that on the walls. It is approximately 10,000 SF in footprint and has a full depth basement (partially finished), first floor, partial balcony, and attic space. Refer to **Figure 1** for a Key Plan outlining terms used in this report.

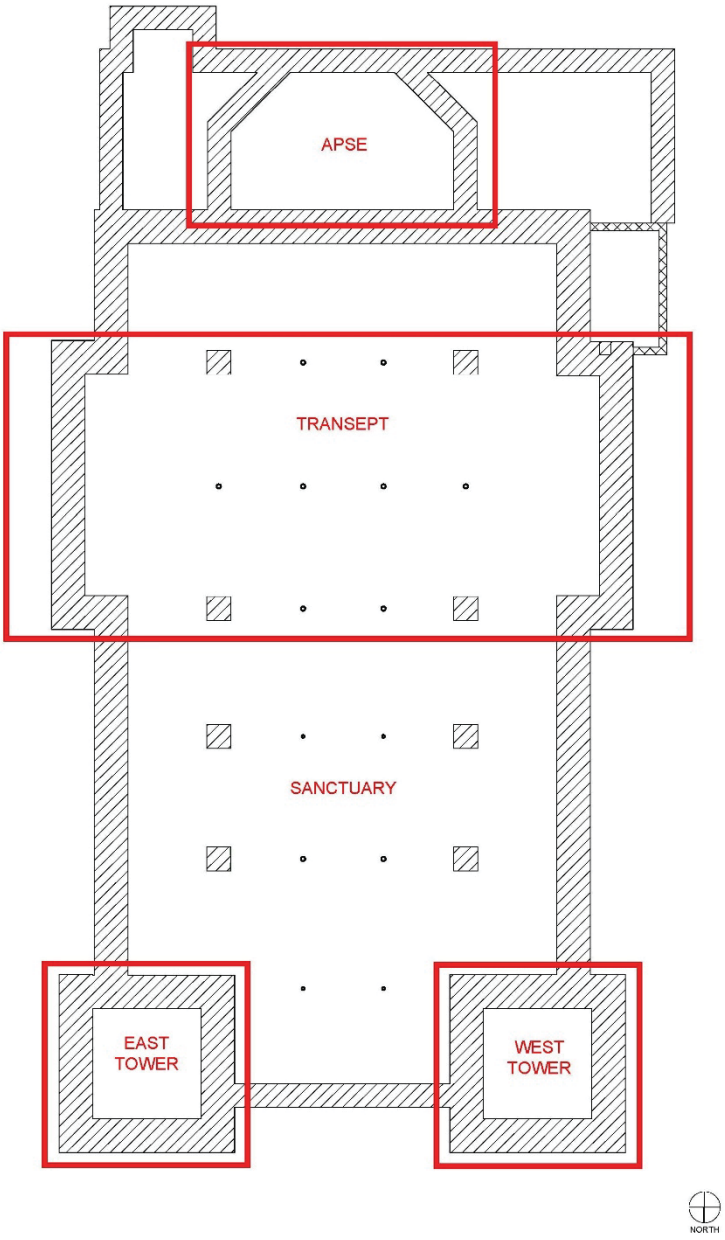

Figure 1: Key Plan

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CHAPTER 1: EXTERIOR (MASONRY ELEMENTS)

Structural Description

Refer to **Appendix A: Existing Structural Framing Plans** for additional information.

The Church is constructed with mass brick masonry walls. These walls serve to enclose the interior-protecting against weather, provide bearing support for the floor and roof framing and act as the building's lateral system. The walls consist of multiple interior red brick wythes which are tied together with traditional bonder brick courses composed of perpendicular brick headers. These bonder courses were observed at the interior of the Towers. The exterior of the masonry walls consists of a single wythe of yellow brick. Bonders were not observed indicating that the yellow brick is tied back to the red brick backup wythes with a type of mechanical anchorage. Mechanical anchorage was not observed during GNCB's site visit but given the age of the building, it is likely that the wall construction is an early type of cavity wall. Refer to Figure 2 for more information.

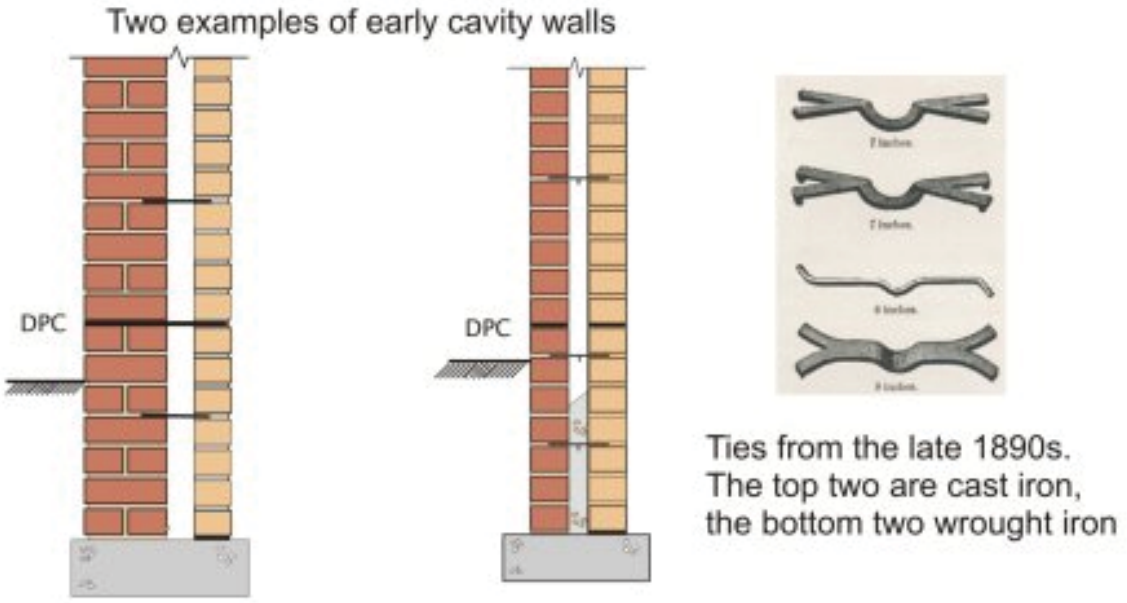

Figure 2: Cavity Wall Construction
(Image courtesy of University of West England)

Masonry buttresses are present at the perimeter of the Church. The buttresses restrain the roof framing against thrust forces and provide stability for the Church's towers.

Decorative masonry elements at the Church's exterior are constructed of cast stone (architectural concrete). These elements include stringcourses, corbels, lintels, and brackets. The base of the Church is decorated with multiple courses of dressed stone that appears to be granite. The painted sheet metal elements present at the Towers are not masonry components and were not assessed by GNCB.

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Observations

1. Refer to Annotated Photographs for additional Observations.
2. The dressed base stones are performing well but have some mortar loss and are heavily stained in some areas.
3. Early cavity wall construction sometimes degrades if water is allowed to enter the cavity and damage the metal ties. If this happens, the exterior wythes can separate from the backup masonry. No bowing or bulging was observed indicating that the Church's masonry walls are performing well and are not suffering from this potential failure mechanism.
4. The exterior yellow brick is generally performing well. There is an area on the east side of the building, above the entrance, where water damage was observed and attempted repairs were made to the mortar joints.
5. Thermal cracking was observed at a few of the masonry buttresses. Thermal cracking occurs in masonry when it does not have any expansion joints to accommodate expansion and contraction from cyclical climate changes.
6. Cast stone elements are generally performing well. One exception is the stringcourse above the north entrance which is heavily water-stained and moderate cracking was observed. As water enters the cracks in the cast stone, freeze-thaw action is pushing the cast stone outward and dragging the brick dentil below it outward. The brick in this area is cracked as well.
7. The chimney at the south side of the building appears to have been modified and extended or rebuilt. There is an obvious transition above the cast stone stringcourse where the brick masonry appears to change from the typical yellow brick to cast stone unit masonry. There is heavy mortar loss at the upper portion of the chimney which also does not have a cover. The brick liner appears deteriorated and the capstone has substantial cement loss.

Recommendations

1. The entire exterior should be regularly pressure-washed and treated with a biocide such as D/2 Biocide to manage water-staining and biological growth. Pressure washing should begin at the lowest pressure setting and work its way up in conformance with the *Secretary of the Interior's Guidelines for the Treatment of History Properties*. **(M)**
2. Reroofing recommendations should be complied with to maintain the integrity of the masonry walls. The masonry walls should be assessed on a regular basis as part of the Church's maintenance cycle to evaluate and mitigate potential deterioration in the brick ties and de-bonding of the yellow brick from the red brick backup. Repointing requirements should also be reviewed as a part of this regular assessment. **(M)**
3. The small area of poorly repaired masonry on the east side of the building, above the entrance, should be reconstructed with new replacement ties and new masonry. **(M)**
4. The thermal cracks at the corners of the buttresses should be repaired with Helifix dry-fix stainless steel anchors installed diagonally as "stitches." For best long-term performance, introduction of vertical expansion joints should be reviewed in order to prevent thermal cracks from forming at buttresses which are not yet suffering. **(M)**
5. The damaged cast stone stringcourse above the north entrance needs to be cleaned and repaired with post-installed anchors. The cracked brick dentil below should be reconstructed. **(N)**
6. The chimney should be rehabilitated by repointing the upper section and providing a new cover. A Chimney Sweep should be engaged to clean and inspect the interior brick liner. **(N)**

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Annotated Photographs

Photo E01: View of Church from northeast.

Photo E02: View of Church from southwest.

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Photo E03: Typical condition at stone base. Minor mortar loss and staining present throughout.

Photo E04: Typical dressed stone lintel at lower windows in acceptable condition.

Photo E05: Typical condition at exterior yellow brick. Note lack of bonder bricks.

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Photo E06: Example of thermal crack at buttress corner.

Photo E07: Typical buttress at tower showing brick and cast stone condition.

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Photo E08: Typical brick Pigeonhole corner detail at masonry turrets.

Photo E09: Condition of cast stone elements at north entrance.

Photo E10: Cast stone column elements in acceptable condition at north entrance. Some water staining was present.

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Photo E11: Water staining and early cracking at cast stone stringcourse above north entrance. Movement in cast stone elements beginning to crack brick dentils.

Photo E12: Typical cast stone buttress leaf to provide transition in thickness with height.

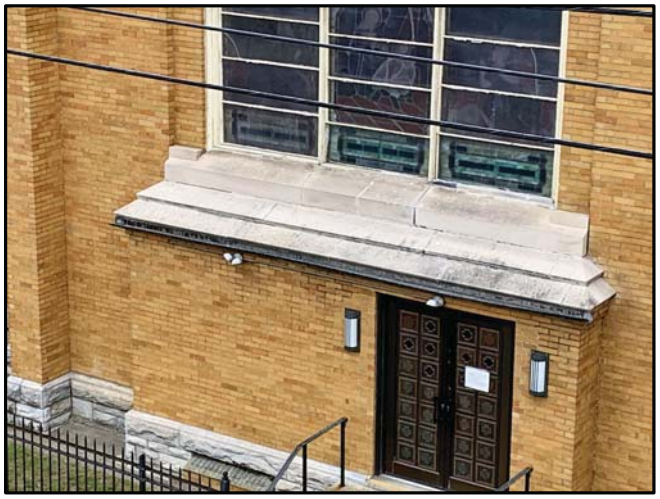

Photo E13: Water staining at cast stone stringcourse elements above west entrance.

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Photo E14: Typical brick and cast stone condition at top of buttresses and balcony at towers.

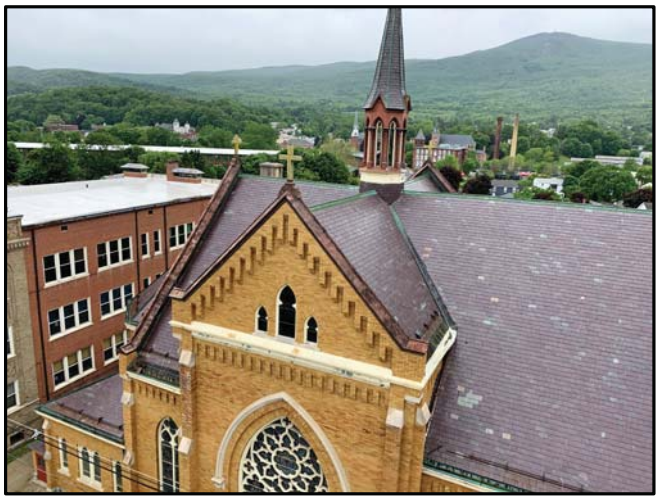

Photo E15: Cast stone stringcourse at west gable is covered with composite materials. Similar condition at west gable.

Photo E16: Mortar loss at cast stone stringcourse at chimney on south side of building. Mortar loss also present at the upper rebuilt section of chimney.

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Photo E17: No cover at top of chimney. Brick liner is deteriorated. Substantial cement loss of chimney capstone.

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CHAPTER 2: TOWERS

Structural Description

Refer to **Appendix A: Existing Structural Framing Plans** for additional information.

The Church has two towers at the north end which are essentially symmetrical, 160 feet tall, and project approximately 100 feet above the Church's eave. Figure 3 identifies the tower's various levels and components.

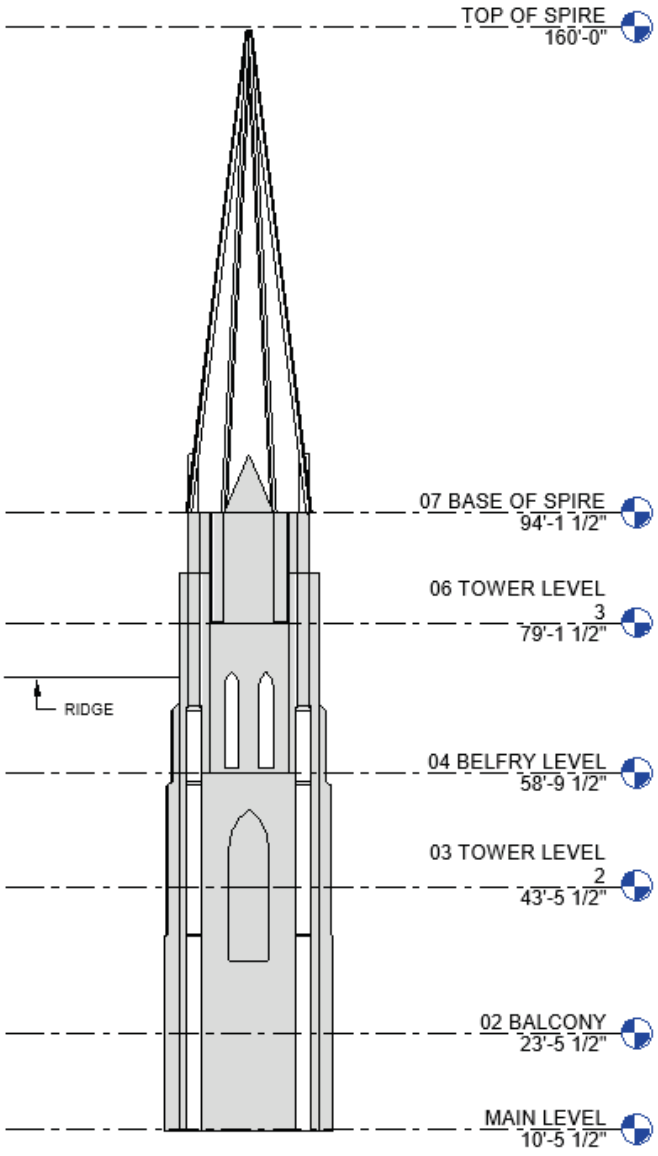

Figure 3: Tower Key Elevation

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The towers are square in footprint, approximately 15 feet by 15 feet, and have four turrets each which are topped with a painted sheet metal finial. The turrets are octagonal and are constructed with Pigeonhole corners. Each tower has an eight-sided, wood-framed spire with four masonry gables. The spire is anchored with metal hold-down rods bolted to the hip beams and down to steel girders above the belfry.

GNCB was able to access each level of the West Tower via. a variety of stairs and ladders. There is a door in the attic leading to the East Tower. GNCB was able to climb a ladder to view the belfry and belfry dunnage but no ladder was available to the upper levels.

Observations

1. Refer to Annotated Photographs for additional Observations.
2. The towers appear to be performing well. No cracking or sloping in the masonry walls was observed indicating that lateral movement due to wind or seismic activity is not excessive.
3. The red brick masonry backup is visible at the tower interiors. Due to moisture levels within the tower, the interior brick face of the masonry is beginning to flake and deteriorate.
4. The framing at the first floor, balcony, and Tower Level 2 is concealed. Wood joist framing was observed and documented at the West Tower at the Belfry and at Tower Level 3. The exposed joists appear to be performing well but water damage was observed at some locations.
5. GNCB accessed the top level (06 Tower Level) of the West Tower via a wooden ladder. This ladder is in poor condition and not safely anchored to the structure. Bird excrement is present at the entire level.
6. The wood spire framing is in generally acceptable condition although water damage was observed at roof sheathing.
7. The spire appears to be well-anchored against uplift. The eight hold-down rods and their connections to the wood hips and channel lintels do not show signs of significant deterioration. The steel channels and hold-down rods are not galvanized and have surface rust.

Recommendations

1. The interior of the masonry, above and below the belfry, should be regularly cleaned and treated with limewash. Limewash will help manage the moisture levels of the brick. Some repointing may be needed prior to limewash application. **(M)**
2. The exposed wood joists should be regularly inspected as part of the Church's maintenance program. While the framing is performing well now, it is pocketed into the masonry bearing walls which regularly cycle between wet and dry conditions. Regular maintenance should account for treating water-damaged framing. The Church may need to cut back framing and install new pressure-treated ledgers in the future. **(M)**
3. New OSHA-certified ladders should be installed to allow safe access to all levels of both towers. **(N)**
4. Bird excrement should be removed at the upper levels of the towers. This is an air-quality condition which may be hazardous for maintenance. Additionally, bird excrement will cause further damage to wood framing. **(N)**
5. Reroofing efforts at the spire should include a budget for replacing water-damaged sheathing and locally repairing damaged framing members. Some framing connections need to be reinforced where they have shifted over time. **(N)**

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6. The steel lintels and hold-down rods for the spires should be wire-brushed cleaned and treated with a rust-inhibitive paint. **(N)**

Annotated Photographs

Photo T01: Towers at north side of Church are framed symmetrically. Access to each level is possible at the right (west) tower. Levels above belfry inaccessible at left (east) tower. Note: Belfry's are open to conditions with no louvers.

Photo T02: Access to west tower from balcony level.

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Photo T03: Typical condition of brick masonry at interior face of tower above Level 2.

Photo T04: Belfry framing with moderate water damage at joist pockets into masonry walls.

Photo T05: Brick masonry corner corbels at belfry for turrets. Also shown is typical double steel channel with hold-down rods for spires.

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Photo T06: Brick removal observed at multiple locations showing composition and condition of tower masonry.

Photo T07: Wood framing for Tower Level 3 (highest level) with moderate decking deterioration.

Photo T08: Ladder to top Tower level should be replaced.

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Photo T09: Debris and bird excrement at top Tower level should be removed.

Photo T10: Metal hold-down rods at corners of spire anchor to double channels below.

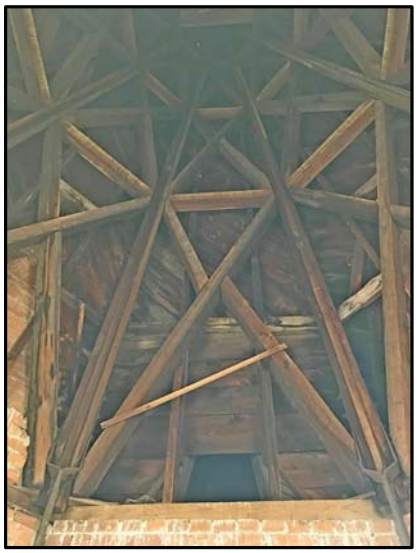

Photo T11: Some timbers at Spire are shifted and require new anchorage.

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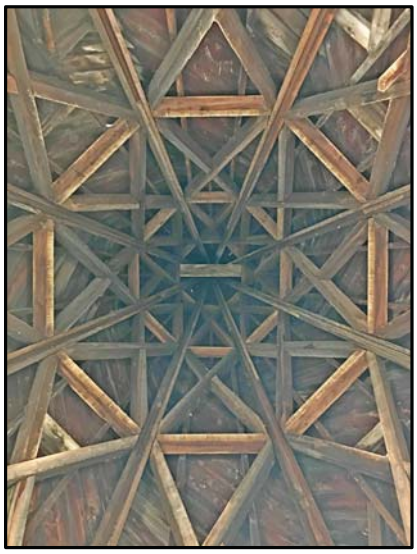

Photo T12: Typical Spire wood framing with moderate water damage.

Photo T13: Bell dunnage beams observed at above belfry floor level at east Tower.

Photo T14: Upper levels of east Tower inaccessible due to lack of appropriate ladder.

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CHAPTER 3: FOUNDATION, BASEMENT, AND FIRST FLOOR FRAMING

Structural Description

Refer to **Appendix A: Existing Structural Framing Plans** for additional information.

The basement of the Church is mostly finished with the exception of some storage areas at the southwestern corner of the basement. GNCB was able to observe foundations in these storage areas and was able to document first floor framing by popping a few of the dropped ceiling tiles in the assembly area.

The foundations appear to be constructed of field-stone mortar pointed masonry which is coated with a white sealant where exposed. The first-floor framing is generally repetitive and consists of seven bays of joist framing along the Nave and perpendicular joists at the aisles and Transept. The joists at the Nave are supported with dropped beams supported by a mixture of masonry piers and steel columns. The basement has a concrete slab-on-grade.

Observations

1. Refer to Annotated Photographs for additional Observations.
2. The dropped ceiling panels are concealing the original wood lath and plaster ceilings. The plaster ceiling is heavily deteriorated and appears to be falling on the dropped ceiling panels.
3. The steel columns at Grid 3 have steel gussets and wood blocking at the topped. Cracking was observed in the ceiling finishes at the top of the posts. GNCB reviewed the conditions above the dropped ceiling which revealed a large gap between the beams supported at the post. It appears that posts above, up to the balcony, may have been removed during past renovation work.

Limited Structural Analysis

GNCB performed a limited structural analysis of the first-floor framing to confirm its ability to support a 60 psf Live Load as is required for a gathering space with fixed seating. **Table 1** outlines the assumptions made for this structural analysis. GNCB's structural analysis indicates that the existing first-floor framing is adequate to support a 60 psf Live Load.

Table 1: First Floor Analysis Assumptions

Component	**Assumption**
Superimposed Dead Loads	
Basement Ceiling – Suspended Acoustical Ceiling	3 psf
Basement Ceiling – Wood Plaster and Lath	8 psf
Basement MEP+FP Allowance	4 psf
1st Floor Decking	3 psf
1st Floor Finishes	2 psf
Total Superimposed Dead Loads	20 psf
Material Properties	
Eastern White Pine Select Structural Joist	Fb (Bending Stress) = 1250 psi
Eastern White Pine Select Structural Beams	Fb (Bending Stress) = 1050 psi

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Recommendations

1. The original wood lath and plaster ceiling should be completely removed. The plaster has lost its attachment to the wood lath which creates a safety hazard. The existing dropped ceiling should not be relied on to catch falling plaster. **(N)**
2. Blocking should be installed at the top of the posts at Grid 3 where the beams appear to be rotated on their supports. Strapping should be installed to tie the beams together at this location. **(N)**

Annotated Photographs

Photo BF01: View of basement below Sanctuary looking south showing steel columns, masonry piers, and dropped beams.

Photo BF02: Vies of basement below Sanctuary looking north showing steel columns with gussets, masonry piers, and dropped beams.

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Photo BF03: Plaster ceiling concealed by dropped ceiling is in very poor condition and should be removed.

Photo BF04: Exposed first floor framing at south end of Sanctuary basement.

Photo BF05: Steel posts with gussets indicate removal of posts above up to balcony. Gussets support end of beams which are deflected, causing cracking in the plaster finishes.

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Photo BF06: Masonry arch in basement kitchen in acceptable condition.

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CHAPTER 4: SANCTUARY AND SANCTUARY CEILING

Structural Description

The first floor and partial balcony are entirely finished spaces. GNCB walked through all accessible spaces to review signs of structural deficiencies such as sloping, cracking, bowing, or deflections. Cracks were observed in the plaster surrounding the structural columns and at some of the plaster corbels. The cracking appears to be the result of cyclical movement in the timber framing and does not indicate structural concerns. There are signs of significant water infiltration near the intersection of the Nave and the Transept; and at the intersection of the towers and the Sanctuary.

The balcony appears to be performing well although evidence at the first floor indicates that posts from the first floor to the balcony spandrel may have been removed. It is possible that the spandrel was reinforced during previous renovations. Additionally, there is some diagonal cracking at the walls where the spandrel frames into it. This cracking may be the result of movement in the spandrel under high loads.

The Sanctuary barrel vault ceiling consists of plaster and expanded metal lath supported with wood joist framing. The joists are supported by built-up, curved timbers creating the vault ribs. The ribs meet at the apex and are compression fit. At the base, they are vertically supported by the corbels at the Sanctuary walls and posts. GNCB reviewed the condition of the corbels from below since these often show the first sign of deterioration in ceiling structures of this type. No significant cracking or deterioration was observed. Some hangers were observed in the attic which are likely erection hangers. The vertical support at the base of the ribs and the compression fit at the apex allows the ceiling vaults to behave as independent arching structures.

Observations

1. Refer to Annotated Photographs for additional Observations.
2. The finishes in the Sanctuary appear to be performing well. A few minor cracks in the plaster were observed but these do not appear to indicate a structural concern. The cracking is likely the result and typical behavior of aging plaster and cyclical movements in the timber structure.
3. Water-damaged plaster was observed along the North Transept wall. This observed damage corresponds with similar observed water damage above in attic space.

Recommendations

1. Water-damaged plaster should be repaired in kind after roofing repairs are made. **(M)**
2. Plaster and related architectural finishes should be repaired for aesthetic purposes once reroofing is complete. **(M)**
3. Interior finishes should be regularly reviewed to verify damage is not the result of structural concerns. **(M)**

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Annotated Photographs

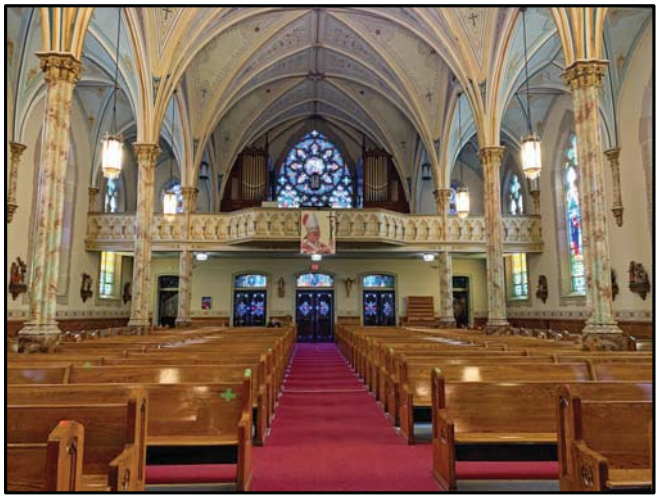

Photo SC01: View of Sanctuary looking north toward balcony and entrance.

Photo SC02: View of transept and apse, looking south.

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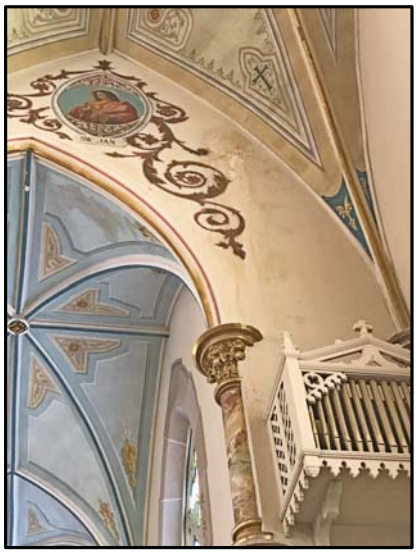

Photo SC03: Water damage present at interface of Sanctuary and transept – typical at four locations and indicative of roofing issues.

Photo SC04: Cracking at balcony spandrel beam bearing location indicates potential on-going movement.

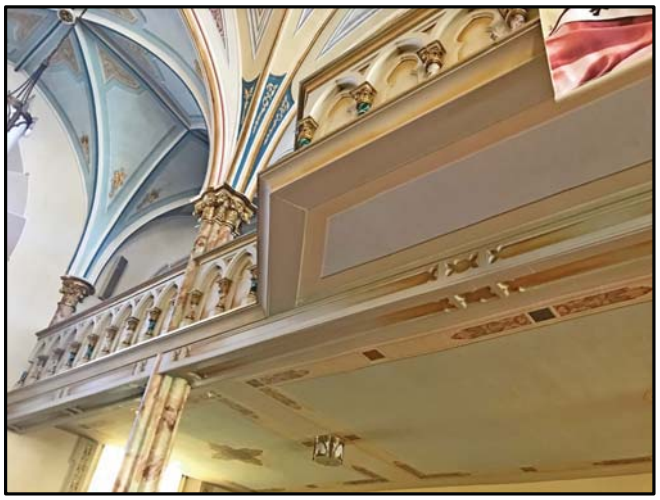

Photo SC05: Finishes on balcony spandrel may indicate previously removed post location.

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Photo SC06: Water damage observed at wall of west tower and ceiling beyond balcony. Damage indicates roofing issues.

Photo SC07: Some cracking in plaster was observed at the apex of the window at the west side of the balcony. Brick masonry arch may be expanding and contracting.

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Photo SC08: Some cracking observed at the plaster corbels at the base of the ceiling ribs.

Photo SC09: Typical ceiling construction at side aisles (as viewed in attic looking down). Sanctuary ceiling framing similar. Construction includes curved rib members meeting at apex of vault to form a compression connection. Metal wire lath and ceiling joists also visible.

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Photo SC10: Typical ceiling construction at posts. Ribs meet at 12”x12” roof support posts with a compression connection supported vertically.

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CHAPTER 5: ATTIC AND ROOF FRAMING

Structural Description – Primary Framing

Refer to **Appendix A: Existing Structural Framing Plans** for additional information.

The building's primary attic and roof structure are constructed of a series of trusses. The Typical Truss along the nave is a type of scissor truss which allows vertical clearance for the construction of the Sanctuary's barrel vault ceiling. Each Typical Truss includes a buttress frame to its east and west side which resolves the scissor truss's thrust into the exterior brick masonry buttresses. Refer to **Figure 4** for an elevation of the Typical Truss.

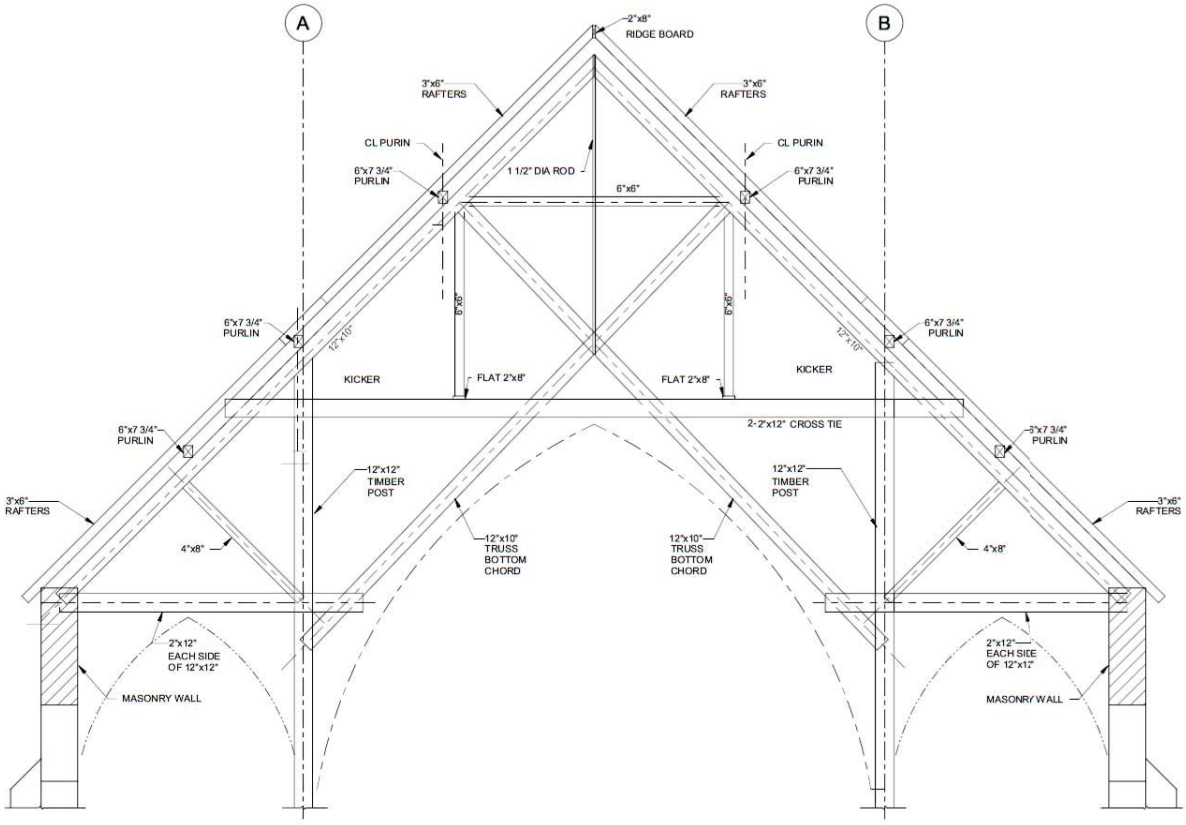

Figure 4: Typical Existing Truss Elevation

There are two additional truss types at the Church's Transept. The cupola, which projects through the roof and is framed with eight wood posts, sits on two Cupola Trusses. These trusses are jack trusses and consist of a flat built-up top chord with a 1 3/8-inch diameter tension rod. Jack trusses are a very industrial form of framing which GNCB most often sees in mill construction. It is unusual to see this type of truss in a spiritual building but it serves a very useful purpose. Refer to **Figure 5** for an elevation of the Cupola Truss.

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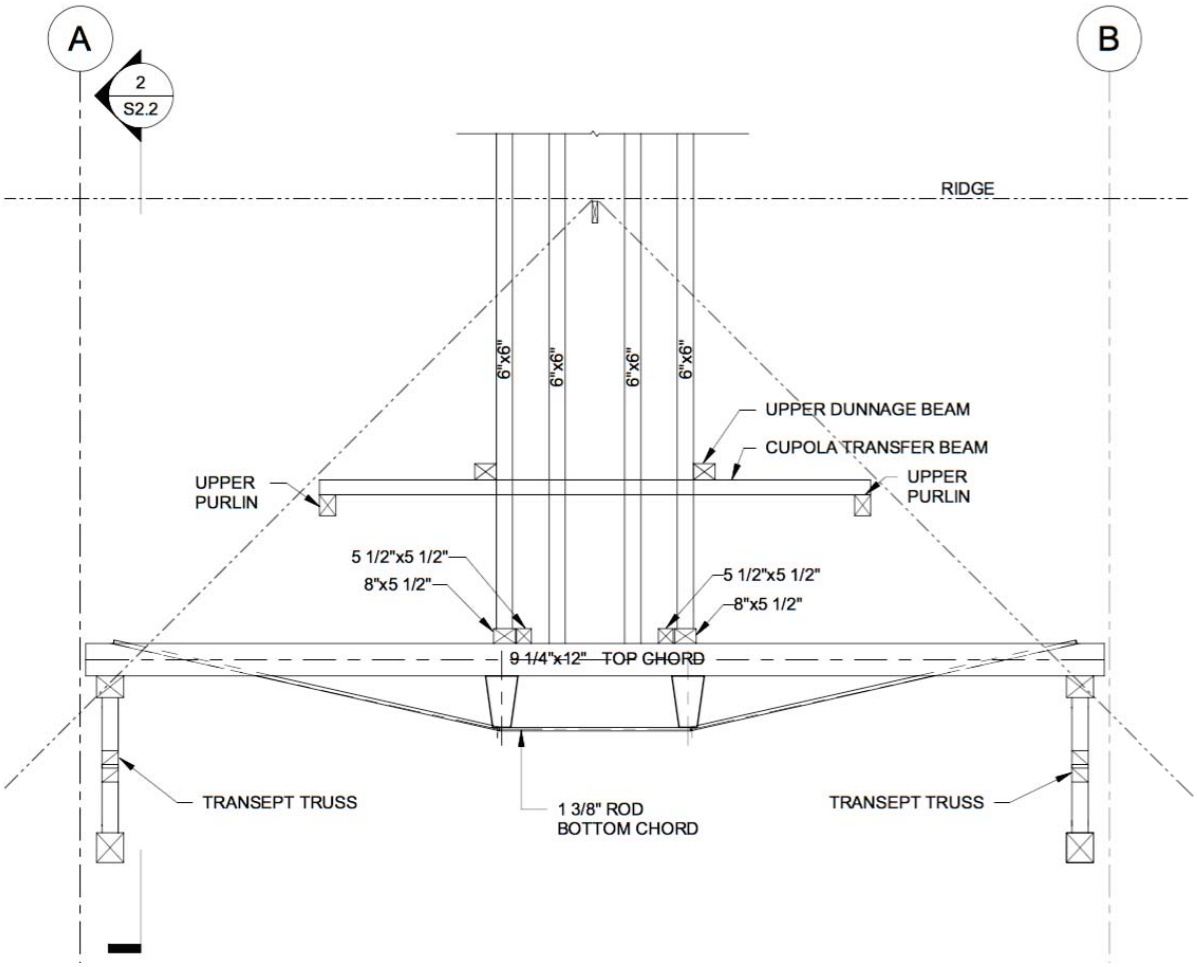

Figure 5: Existing Cupola Support Framing and Cupola Truss Elevation

The Cupola Trusses bear on Transept Trusses. These trusses span the central Nave to the Transept trusses. The Transept Trusses span the Transept in line with the masonry walls of the Nave.

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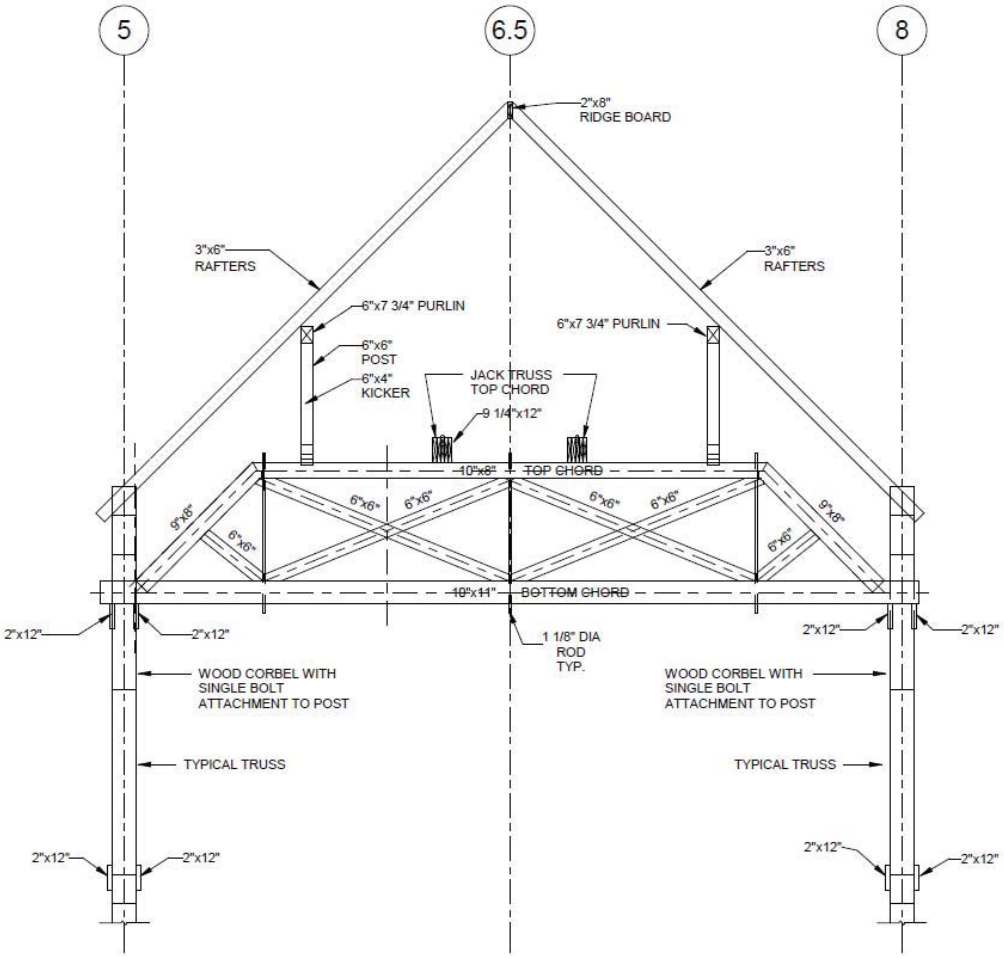

Figure 6: Existing Transept Truss Elevation

These trusses span the large openings between the Nave and the side Transepts and carry the Transept roof framing. See S1.2 for exact locations and roof framing.

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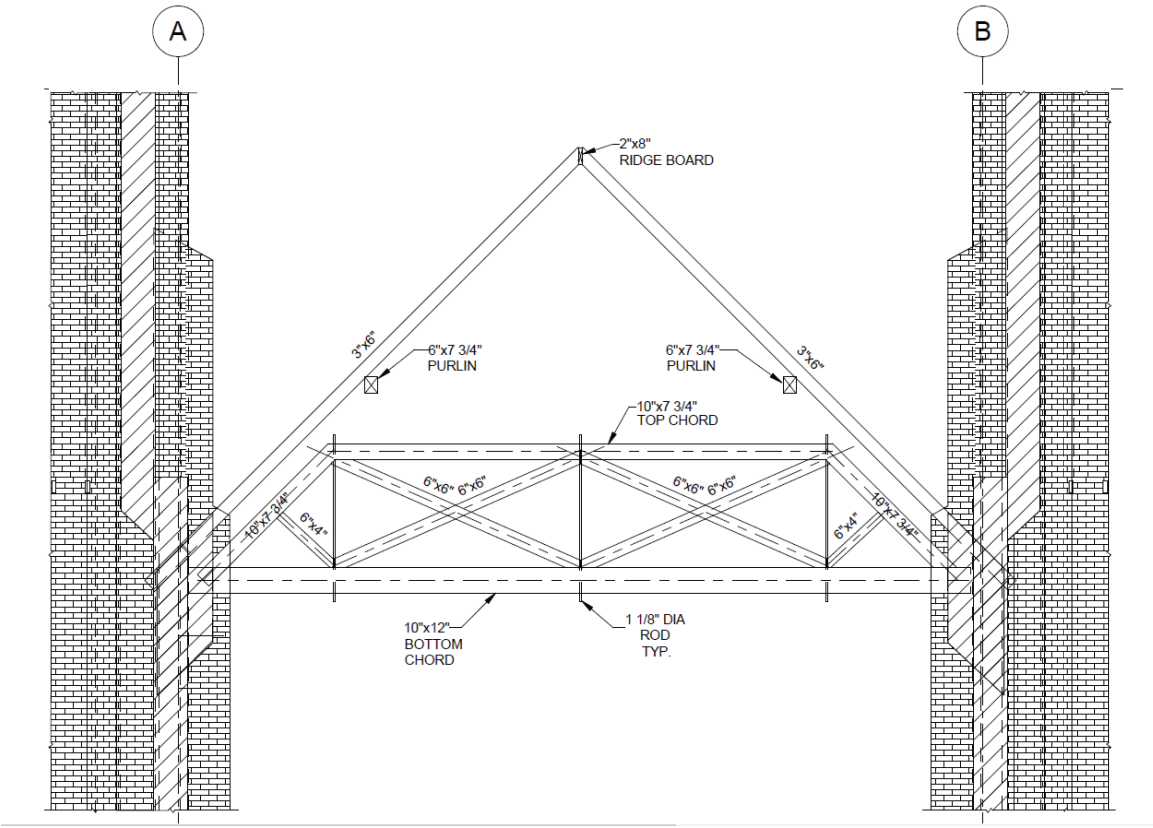

Figure 7: Existing Tower Truss Elevation

The last truss type is the Tower Truss which is located at the north end of the attic and frames into the towers. This single truss spans between the two towers at the interface of the Nave and the Narthex. The Truss supports the roof framing in these areas.

Observations – Primary Framing

1. Refer to Annotated Photographs for additional Observations.
2. Several Primary Framing members frame into the exterior masonry walls. These included wood members of the Tower Truss and Typical Trusses. Some of these locations show evidence of water damage.
3. Member shrinkage and truss movement have led to the loosening of truss member connections. This condition is typical at all trusses excluding the Cupola Trusses.

Tower Truss

4. Restrained truss movement due to masonry embedment at the Tower Truss ends has led to loose connections of most members.
5. Truss ends only partially supported by masonry Corbels at the walls of the towers.
6. Several Truss members have significant checks.

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Cupola and Cupola Truss

7. The wood Corbels of the Typical Trusses supporting the Transept Trusses are attached with only a single bolt. Movement in the Corbel is visible.
8. The Cupola framing is not mechanically attached to the Cupola Trusses.
9. Cupola Lower Dunnage beams supporting Cupola posts are visibly deflected.
10. A significant amount of the roof is being supported by the Cupola framing. The Cupola framing should be independent of the roof framing.

Transept Truss

11. The Transept Trusses show evidence of being overloaded. The top chord to bottom chord connection of the West Transept Truss is in the process of failing due to shear forces. Several Truss members are significantly checked.
12. The load path created by the roof and cupola structure applies high loads off of Truss panel points. This causes the Truss members to experience bending as opposed to resisting axial forces as Trusses are designed for.
13. The Transept Trusses bear on wood Corbels attached to Typical Trusses. These wood corbels appear to have moved under the Transept Truss end reactions.
14. Significant shrinkage and truss deflections have caused Truss member connections to become loose.

Typical Truss

15. The flat 2”x8” that support the Truss 6”x6” posts are visibly deflected indicating support is insufficient.

Limited Structural Analysis – Primary Framing

GNCB performed a limited structural analysis of the Typical Trusses, Transept Trusses, and Cupola Trusses to confirm the system’s ability to support the required Snow Load for Adams, MA and current Dead Load. **Table 2** outlines the assumptions made for this structural analysis. GNCB’s structural analysis indicates that some trusses require reinforcing and improvements to member connections. The Transept Trusses require the most reinforcement due to the high loads applied off of Truss panel points. GNCB’s analysis is based on current roofing dead loads which may increase based on the architect and roofing consultant’s recommendations for new roofing.

C

Table 2: Attic and Roof Primary Framing Analysis Assumptions

Component	Assumption
Superimposed Dead Loads	
Roof Finishes- 3/8" Slate	15 psf
Roof Finishes- Decking	3 psf
Total Superimposed Dead Loads	18 psf
Superimposed Live Loads	
Ground Snow Load (Adams, MA)	60 psf
Importance Category	III
Roof Exposure	Partially Exposed
Thermal Resistance Factor (R-Value)	R= 30
	Existing snow guards are to be replaced in kind during reroofing
Material Properties	
Eastern White Pine Select Structural Joist	Fb (Bending Stress) = 1250 psi E (Modulus of Elasticity) = 1.2E6
Eastern White Pine Select Structural Trusses, Beams, and Posts	Fb (Bending Stress) = 1050 psi E (Modulus of Elasticity) = 1.1E6

Recommendations – Primary Framing

1. Locations where evidence of water damage is observed should be closely inspected and drilled during reroofing***. Damaged members should be repaired in place or possibly replaced in kind as necessary. Reroofing should assume percentage of roof sheathing requires replacement due to water. **(N)**
2. Loose Truss connections should be shimmed tight. Install Simpson plate for mechanical attachment. **(N)**

Cupola and Cupola Truss

3. Analysis indicates that the Top Chord of the Cupola Trusses must act as a solid member to adequately support superimposed loading. Improve attachment of built-up members in Top Chord to behave as solid member. **(N)**
4. The Cupola framing should be mechanically anchored to the Cupola Truss with steel angles to resist potential uplift forces. **(N)**
5. Cupola Lower Dunnage beams supporting Cupola posts should be supplemented with engineered lumber. **(N)**
6. See Secondary Framing Recommendations for further recommendations relating to the Cupola.

Typical Truss

7. The connection of the wood Corbels at Typical Trusses on Grid 5 and Grid 8 that support the Transept Trusses are insufficient for vertical support. Install steel channel shoulder to post under existing wood Corbel. Provide solid blocking to corbel as needed. **(N)**

C

8. Install a new 4x4 vertical strut at the panel point of the Truss Top Chord and Buttress Frame Diagonal down to the horizontal to complete the load path. **(N)**
9. Install new 4x8 sister under existing 4”x8” Buttress Frame Diagonal to increase the member’s cross-sectional area. **(N)**
10. Provide solid blocking between existing horizontal 2-2”x12” Cross-Tie to support existing flat 2”x8” and 6”x6” post. Add framing clips to mechanically connect existing 6”x6” posts to existing flat 2”x8” support. Anchor existing 2”x8” support to Truss Bottom Chord. **(N)**
11. The loose connection at the top of the existing 6”x6” posts should be shimmed tight. Install Simpson plate for mechanical attachment. **(N)**

Transept Truss

12. The three top members of the Transept Truss should be reinforced. These members are significantly overstressed due to the accumulation of roof and cupola loads. These three members (1- Truss Top Chord, 2- Outer Diagonals) should each be sistered with 2- C12x13 steel channels, one each side. The installation of these new sisters will also include the reinforcing of the Top Chord to Bottom Chord connection that is in the process of failing. **(N)**
13. New 6x6 struts so be installed to deliver the load from the Cupola Truss directly to a panel point. **(N)**
14. New engineered wood strut should be installed from the top of the Purlin Post to the Truss Top Chord outer panel point. **(N)**
15. Truss members with significant splits or checks should be stitch bolted. **(N)**
16. From the analysis, some truss members rely on members acting in tension and compression. Current truss member connections do not accommodate tension member force to be transferred. Member end connections should be improved with steel plates to allow for tension load transfer. **(N)**

Tower Truss

17. New engineered wood strut to be installed from the top of the Purlin Post to the Truss Top Chord outer panel point. **(N)**
18. From the analysis, some truss members rely on members acting in tension and compression. Current truss member connections do not accommodate tension member force to be transferred. Member end connections should be improved with steel plates to allow for tension load transfer. **(N)**
19. Truss members with significant splits or checks should be stitch bolted. **(N)**
20. Truss ends should be supported by a new steel support angle anchored into masonry at towers to provide adequate bearing. **(N)**
21. The loose Truss connections should be shimmed tight. Install Simpson plate for mechanical attachment. **(N)**
22. Sister Truss Outer Diagonals with 1- 1 ¾”x9.5” LVL for necessary truss reinforcing to resist applied loading. **(N)**
23. Sister Truss Bottom Chord with 1- 1 ¾”X11 7/8” LVL for necessary truss reinforcing to resist applied loading. **(N)**

C

Structural Description – Secondary Framing

The roof is supported by repetitive wood rafters that span from eave to Low, Mid, and Upper Purlins. Rafters terminate at a ridge board. Transept Valley beams frame from sanctuary corners to Cupola Framing. The Transept Roof is framed with rafters and a singular purlin.

Observations – Secondary Framing

1. Refer to Annotated Photographs for additional Observations.
2. Several Secondary Framing members frame into the exterior masonry walls. These include wood kickers, purlins, rafters, ridge boards and top plates on masonry walls. The majority of these locations show evidence of water damage.
3. The Upper Purlins spanning the Transept show obvious deflection and are significantly overstressed for size and span.
4. The Apse was inaccessible due to the condition of the Catwalk and the lack of handrail.
5. Steel tie rods were observed between purlins at the south wall. The purpose for this could not be determined but it indicates past movement and subsequent retrofit. Further investigation is required.
6. Rafters connect to purlins with a birdsmouth connection.
7. The Cupola Transfer Beams spanning between Upper Purlins at the Transept are visibly deflected. The 2x vertical support of the valley beam is buckling and overstressed. This 2x verticals are supported by the Upper Dunnage beams that span between Cupola Transfer beams. There is no mechanical attachment of the Cupola Transfer Beams to the Upper Purlins. The Cupola framing should be independent of the roof framing.

Limited Structural Analysis – Secondary Framing

GNCB performed a limited structural analysis of the secondary structural framing system to confirm the system's ability to support the required Snow Load for Adams, MA and required Dead Load. **Table 3** outlines the assumptions made for this structural analysis. GNCB's analysis is based on snow loading for the existing Church which may increase based on the architect and roofing consultant's recommendations for new roofing. GNCB's structural analysis indicates that some of the secondary roof framing is inadequate to support the applied loads. Specifically, the Purlins are significantly overstressed for their size and span.

C

Table 3: Attic and Roof Secondary Framing Analysis Assumptions

Component	Assumption
Superimposed Dead Loads	
Roof Finishes- 3/8" Slate	15 psf
Roof Finishes- Decking	3 psf
Total Superimposed Dead Loads	18 psf
Superimposed Live Loads	
Ground Snow Load (Adams, MA)	60 psf
Importance Category	III
Roof Exposure	Partially Exposed
Thermal Resistance Factor (R-Value)	R= 30
	Existing snow guards are to be replaced in kind during reroofing
Material Properties	
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Eastern White Pine Select Structural- Trusses, Beams, and Posts	Fb (Bending Stress) = 1050 psi E (Modulus of Elasticity) = 1.1E6

Recommendations – Secondary Framing

1. Locations where evidence of water damage is observed should be closely inspected and drilled during reroofing. Damaged members should be repaired in place or possibly replaced in kind as necessary. Reroofing should assume percentage of roof sheathing requires replacement due to water damage. **(N)**
2. Purlins are significantly undersized for the applied loading. Sister all Purlins with 2- 1 ¾" x 9 ½" LVLs. Purlins spanning the transept roofs should be reinforced with 2- 1 ¾" x 14" LVLs. **(N)**
3. The catwalk to the Apse should be reconstructed with dimensional lumber, new plank, and a handrail for safe access to Apse attic. **(N)**
4. The Apse roof framing will likely need hurricane clips to resist uplift forces. **(N)**
5. Steel tie rods at south wall should be further investigated during reroofing to determine purpose and condition. **(N)**
6. The Cupola Transfer Beams, spanning between Upper Purlins at the Transept, should each be sistered with 2- 1 ¾" x 11 ½" LVLs. New 4x4 posts should be installed from the Transept Valley beam to the Upper Dunnage Beam (4) to prevent any roof load from being transferred to the Cupola support framing through the Transept Valley Beam. The Cupola Transfer Beam should be anchored to the Upper Purlins with steel angles. **(N)**
7. Hurricane clips should be installed as a part of reroofing between rafters and; purlins, masonry wall top plate, and ridge board to resist uplift. **(N)**

C

Annotated Photographs

Photo AR01: Typical configuration of Tower Truss.

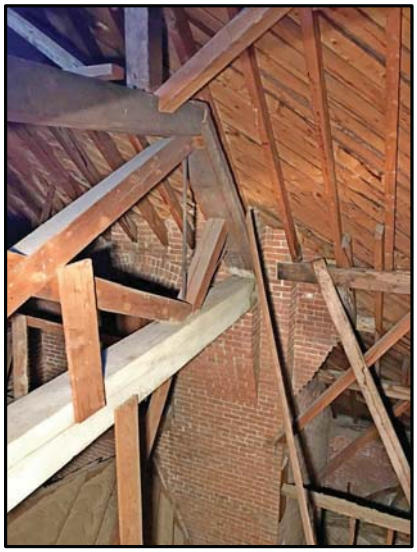


Photo AR02: Tower truss partially bears on brick corbel at Tower. Vertical support should be improved.

C

Photo AR03: Water damage observed at west Tower. Staining present at Tower Truss bottom and top chords, middle purlin, rafter, and roof sheathing.

Photo AR04: Timber strut compression connection at top of Tower Truss is loose.

C

Photo AR05: View of attic looking south showing Typical Truss configuration.

Photo AR06: Typical timber buttress frame at side aisle transfers Typical Truss thrust to outside masonry wall with masonry buttresses.

C

Photo AR07: Transept Truss sits on corbel at typical post. Connection requires improvement.

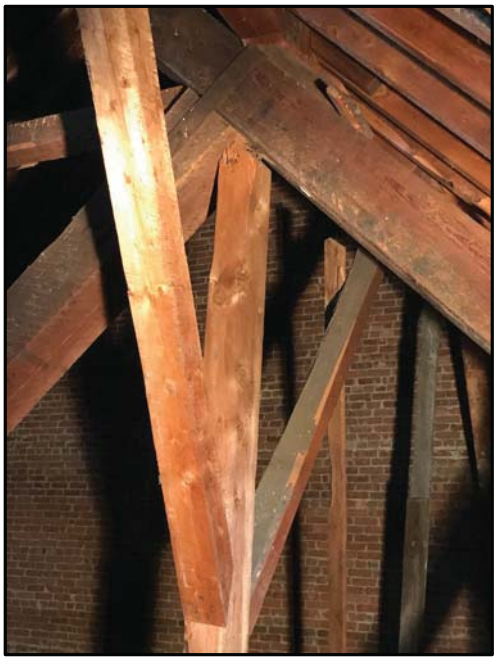


Photo AR08: Post at Typical Truss is loose where it meets truss top chord and diagonal. Common at all Typical Trusses indicating deflection in trusses.

C

Photo AR09: Typical roof framing showing multiple purlins and simple span rafters. Purlins are partially supported with kickers which frame into the Typical Trusses. Roof decking consists of diagonal sheathing.

Photo AR10: Typical Trusses are not braced at the apex.

Photo AR11: View of Transept Truss looking east.

C

Photo AR12: Diagonal compression members of Transept Trusses are loose indicating truss deflection.

Photo AR13: Transept Truss at west side of attic. Post at left side of photo supports significant portion of roof and cupola load and is not located at truss panel point.

C

Photo AR14: Transept Truss at east side of attic with deep split initiating from significant rotational checking.

Photo AR15: View of Transept Truss sitting on corbel.

C

Photo AR16: Significantly deflected Upper Purlin crosses Transept and supports Transfer Beams and Upper Dunnage Beams. Cupola posts sit on lower dunnage beam spanning between Cupola Trusses.

Photo AR17: End of Cupola Trusses (2) sit on Transept Truss at locations off of Transept Truss's panel points.

Photo AR18: Cupola Truss constructed of built-up members with vertical stubs and a high-load tension rod with turnbuckle.

C

Photo AR19: Typical framing at wall where Transept roof rafters frame into Sanctuary. Brick masonry sits on Typical Truss, adding significant weight.

Photo AR20: Water damage from roof leakage observed at walls where Transept meets Sanctuary.

Photo AR21: Rafters pocket into masonry at Towers. Cracking in door arch observed at attic entrance to east Tower.

C

Photo AR22: Valley beams at south side of Transept are deeply notched and sit on purlins. Purlins are supported by Transept Trusses.

Photo AR23: Valley beams at west side of Transept are deeply notched and sit on blocking down to Typical Truss.

C

Photo AR24: Typical roof framing at bay adjacent to masonry wall. Purlins are moderately deflected and kicker pockets directly into masonry wall. Water damage observed at abandoned roof hatch at west side of Transept.

Photo AR25: Purlin kicker at west side of north gable is rotated.

C

Photo AR26: 2x member installed at shore up Transept Valley is severely deflected. Upper Dunnage beam supporting 2x shore is also deflected under roof load. Upper Dunnage beams are supported by Transfer beams. Transfer beams are supported by Upper Purlins.

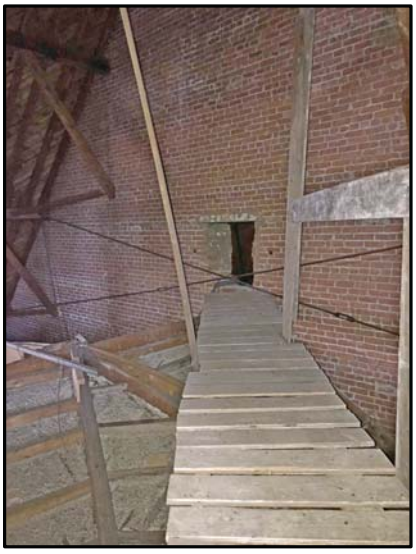


Photo AR27: Tie rods observed between middle and lower purlins at south side of attic. Rods appear to be an attempt to resist uplift loads on roof. Catwalk to attic above Apse should be rebuilt to allow safe observation of Apse roof framing.

C

LIMITATIONS

This report has been prepared exclusively for the specific application to the structures at St. Stanislaus Kostka Church in Adams, MA in accordance with generally accepted engineering and historic preservation practices. No other warranty, express or implied, is made.

In the event that any changes in condition of the Church, or site areas occur following the preparation of our report, the conclusions and recommendations contained in this report should not be considered valid unless the changed conditions are reviewed and conclusions of this report modified or verified in writing.

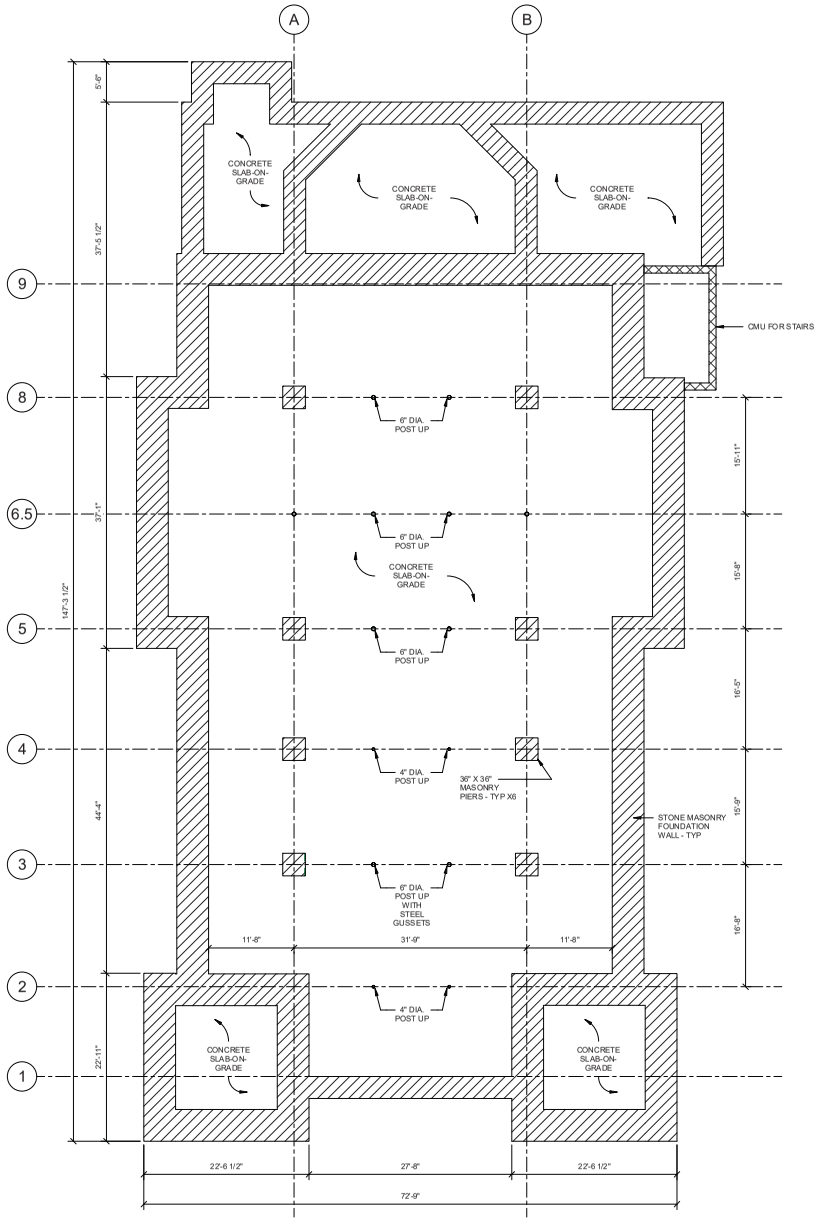
The analysis and recommendations in this report are based upon data obtained from limited field observations. These observations are limited to the exposed building's elements and to a visual assessment of damage seen at the interior and exterior of the buildings. If discrepancies, unforeseen conditions or undesirable conditions more extensive than originally thought become evident in the field, it will be necessary to re-evaluate the recommendations contained in this report.

The information provided in this report is not suitable for construction. It is for documentation, planning, and budgeting purposes only. Should the Owner decide to move forward with any of the work recommended in this report, GNCB can provide a proposal for the formulation of Construction Documents and for Construction Administration.

C

APPENDIX A: EXISTING STRUCTURAL FRAMING PLANS

C



1 01 BASEMENT
1/8" = 1'-0"

NORTH

GNCB
Consulting Engineers, P.C.
1358 BOSTON POST ROAD
POST OFFICE BOX 802
OLD SAYBROOK
CONNECTICUT 06475
PHONE: 860 388 1224
GNCBENGINEERS.COM

No.	DESCRIPTION	DATE

ISSUED DRAWINGS

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE AND ARE BASED ON MEASUREMENTS TAKEN IN THE FIELD BY GNCB WITH TAPE MEASURES. THESE DRAWINGS SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION WITHOUT VERIFICATION OF ALL DIMENSIONS BY USER.

St. Stanislaus Kostka
Mission, Adams, MA

102 Summer St, Adams, MA

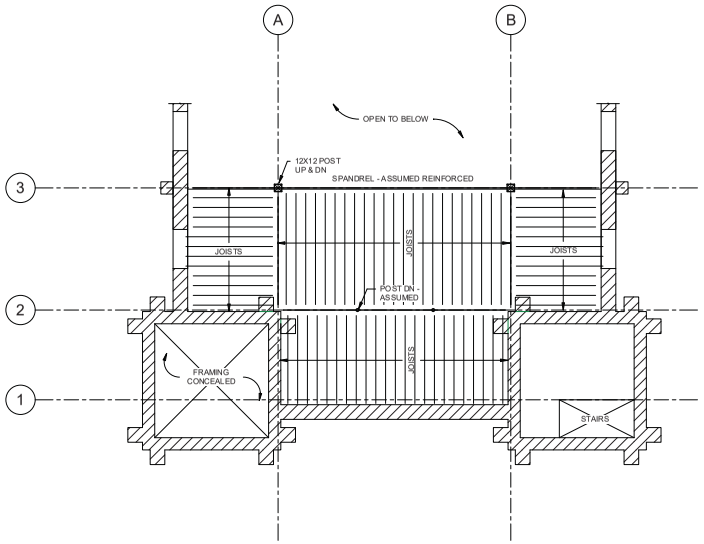
EXISTING CONDITIONS

SLAB ON GRADE AND FOUNDATION PLAN

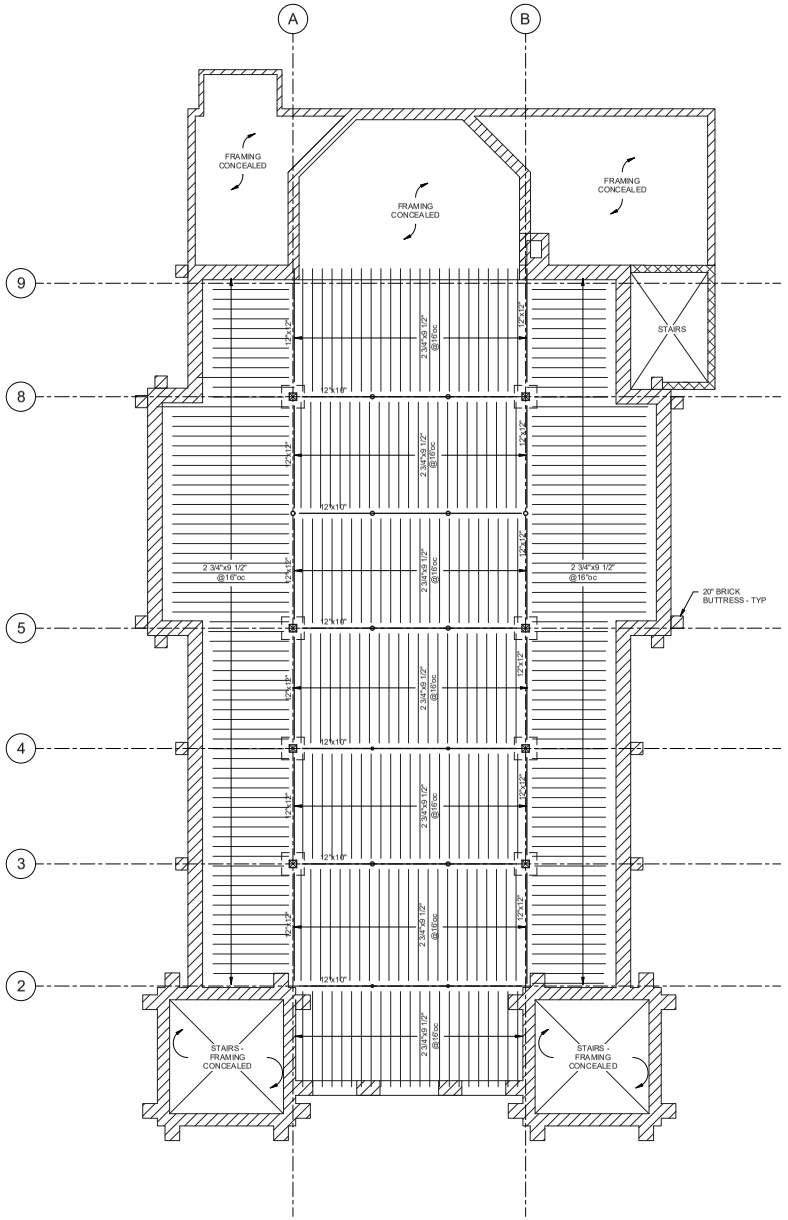
SCALE:	1/8" = 1'-0"
PROJECT NUMBER:	20080
DATE:	6/16/2020
DRAWN BY:	JJS
CHECKED BY:	AJ

S1.0

PARTIAL 3D PERSPECTIVE VIEW



2 BALCONY FRAMING PLAN
1/8" = 1'-0"



1 FIRST FLOOR FRAMING PLAN
1/8" = 1'-0"

NORTH

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St. Stanislaus Kostka
Mission, Adams, MA

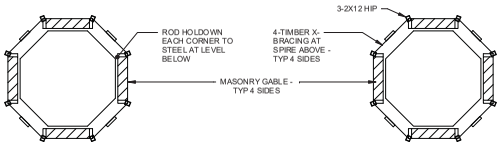
102 Summer St, Adams, MA

EXISTING CONDITIONS

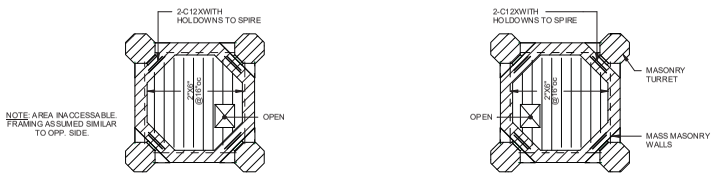
FIRST FLOOR FRAMING PLAN

SCALE:	1/8" = 1'-0"
PROJECT NUMBER:	20080
DATE:	6/16/2020
DRAWN BY:	JJS
CHECKED BY:	AJ

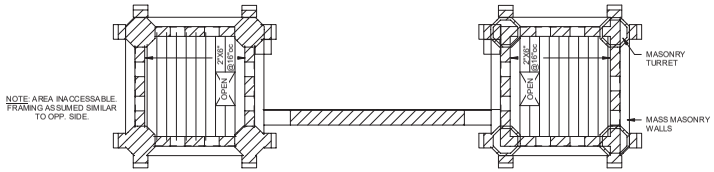
S1.1



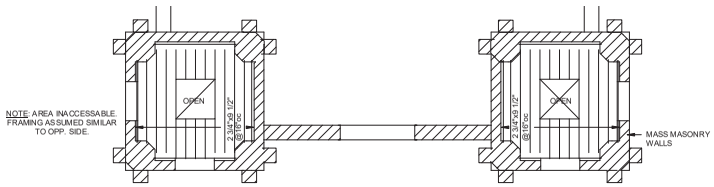
5 BASE OF SPIRE FRAMING PLAN
1/8" = 1'-0"



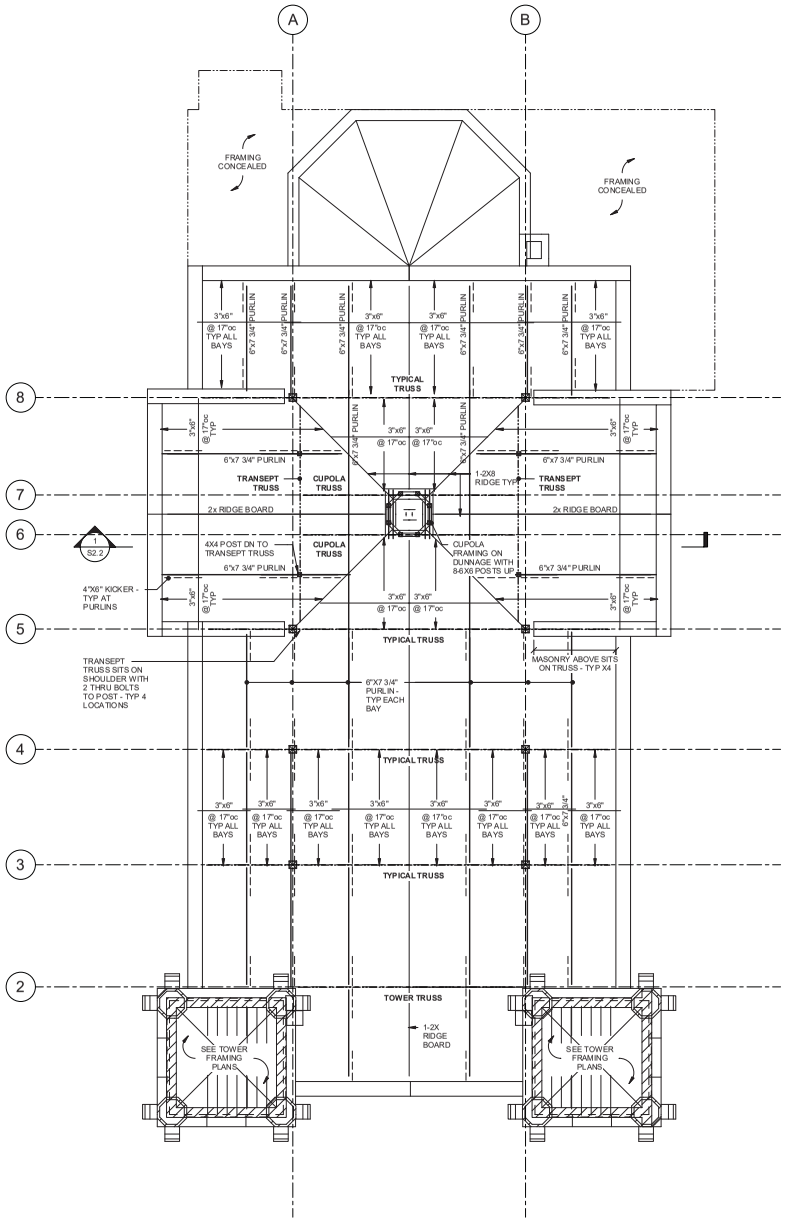
4 TOWER LEVEL 3 FRAMING PLAN
1/8" = 1'-0"



3 BELFRY FRAMING PLAN
1/8" = 1'-0"



2 TOWER LEVEL 2 FRAMING PLAN
1/8" = 1'-0"



1 ROOF FRAMING PLAN
1/8" = 1'-0"

GNCB
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OLD SAYBROOK
CONNECTICUT 06475
PHONE: 860 388 1224
GNCBENGINEERS.COM

No.	DESCRIPTION	DATE

ISSUED DRAWINGS

NOTES:

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St. Stanislaus Kostka
Mission, Adams, MA

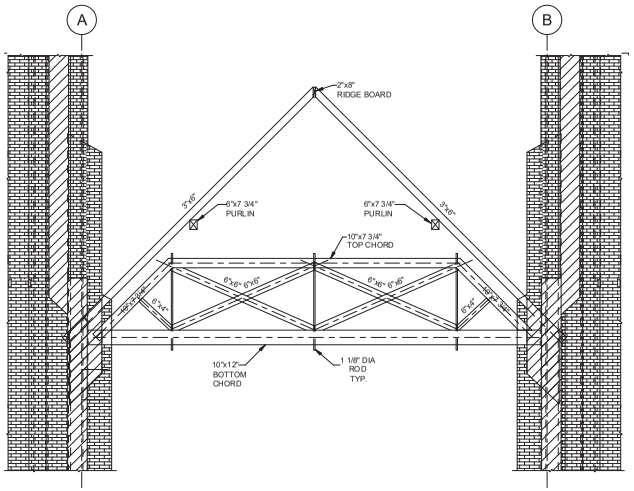
102 Summer St, Adams, MA

EXISTING CONDITIONS

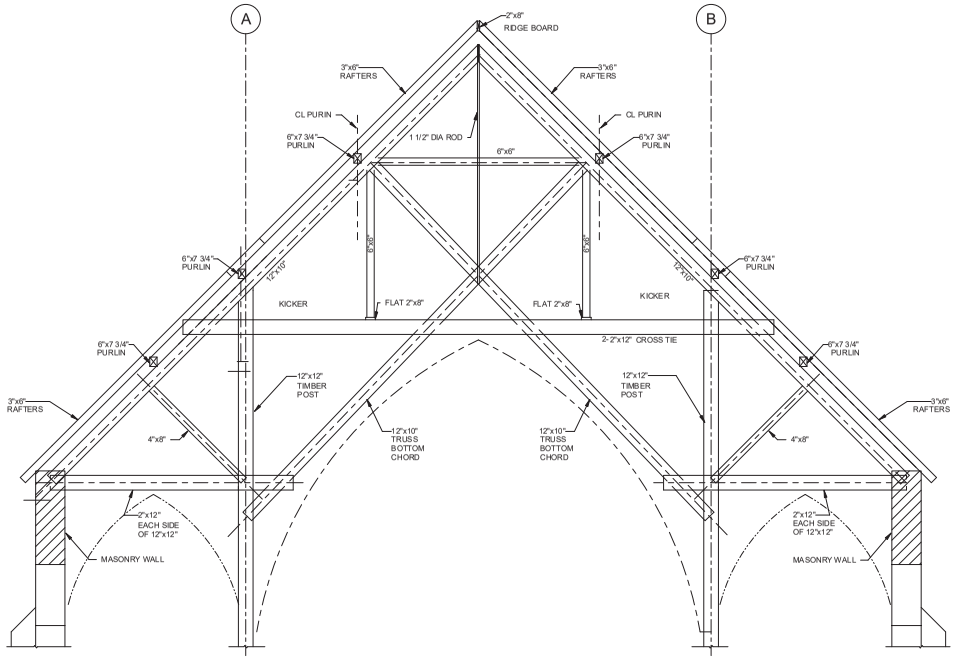
ROOF AND TOWER FRAMING PLANS

SCALE:	1/8" = 1'-0"
PROJECT NUMBER:	20080
DATE:	6/16/2020
DRAWN BY:	JJS
CHECKED BY:	AJ

S1.2



2 Section @ Tower Truss
1/4" = 1'-0"



1 Section @ Typical Truss
1/4" = 1'-0"

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St. Stanislaus Kostka
Mission, Adams, MA

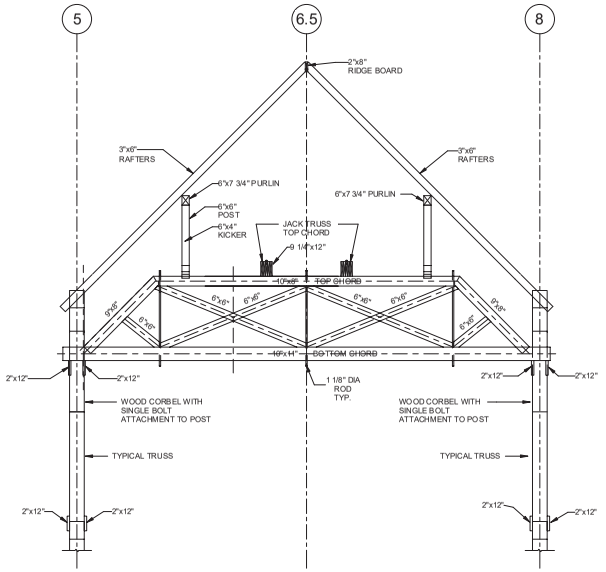
102 Summer St, Adams, MA

EXISTING CONDITIONS

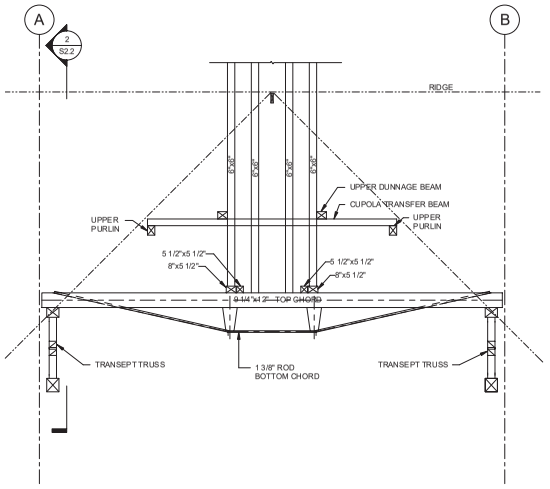
TRUSS ELEVATIONS

SCALE:	As indicated
PROJECT NUMBER:	20080
DATE:	6/16/2020
DRAWN BY:	JJS
CHECKED BY:	AJ

S2.1



2 Section @ Transept Truss
1/4" = 1'-0"



1 Section @ Transept
1/4" = 1'-0"

GNCB
Consulting Engineers, P.C.
1358 BOSTON POST ROAD
POST OFFICE BOX 802
OLD SAYBROOK
CONNECTICUT 06475
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No.	DESCRIPTION	DATE

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St. Stanislaus Kostka
Mission, Adams, MA

102 Summer St, Adams, MA

EXISTING CONDITIONS

TRUSS ELEVATIONS

SCALE:	As indicated
PROJECT NUMBER:	20080
DATE:	6/16/2020
DRAWN BY:	JJS
CHECKED BY:	AJ

S2.2

ROOFING ASSESSMENT

ST. STANISLAUS KOSTKA ROMAN CATHOLIC CHURCH
ROOF CONDITION REPORT

21 MAPLE STREET
ADAMS, MA

CONSULTANT:
H. B. Fishman & Co., Inc.
300 Pleasant Valley Road
South Windsor, Connecticut 06074
Telephone: (860) 282-9036
Fax: (860) 282-7144

CLIENT:
Kuhn Riddle Architects
Attn: Andrew Bagge, AIA
28 Amity Street, Suite 2B
Amherst, MA 01002

11 August 2020
CN 19098754.2

TABLE OF CONTENTS

ATTACHMENTS

1.0 ROOF INSPECTION SCOPE

1.1 H. B. Fishman & Co., Inc. (HBF) was retained as part of a collaborative group with Kuhn Riddle Architects (KRA) and Gibble, Norden, Champion & Brown (GNCB) to conduct an inspection survey of the St. Stanislaus Kostka Roman Catholic Church in North Adams, Massachusetts.

1.2 HBF's tasks was to evaluate the condition of the existing steep sloped slate roofs including the roofs' miscellaneous flashings and gutters, copper roofs and the North and East Tower spire roofs and Belfries.

1.3 Prepare a condition report based on our findings including pertinent photographs of these construction components and their condition.

1.4 Include in the report recommendations for repair or maintenance of the roofs, flashings and gutters and an estimated time line for their replacement.

2.0 SLATE ROOFS AND GUTTERS INSPECTION AND PHOTOGRAPHS

2.1 Photos 1, 2, 7, 9 and 10 are general views of St. Stanislaus Church. The roofs consisted of two (2) main steep sloping roofs with two (2) dormers and large towers at the northwest and northwest corners; the roofs were slate. Hip roofs at the south end were also covered with slate and copper roofing. Built-in gutters provide drainage for the roofs.

2.1.1 The East and West Main Roofs as viewed from the ground are shown in Photos 3, 6, 11 and 12; some slate were visibly damaged. Note sections of the snow retention system or pipe snow guard fence at the north end of the West Main Roof were damaged. See Photo 5. The south end snow guard fence, Photo 6, was completely damaged.

2.1.2 Photos 4, 5, 8, 9, 114 and 115 show ornamental galvanized covers of the built-in gutters; the covers had been painted. The paint at many locations was peeling from the covers. Note a large hole in the cover underside was observed on the east side Main Roof. See Photo 14. One (1) location on the west side contained a sheet metal repair. See Photo 44.

2.2 Photos 16, 45, 58, 68, 74, 79, 86, 96, 100, 107, 108, 120 and 132 show the slate on the West and East Main steep sloped roofs, dormers and on the south hip roofs. The slate was ¼" thick mottled purple and green with an 8" weather exposure. The slate condition was generally good. See Photos 17, 18, 19, 46, 59, 60, 69, 70, 80, 87, 107, 108, 121, 122, 123, 135 and 136. The tapping method of the slate produced a solid tone indicating that the slate was sound. No scaled slate was observed on any of the roofs inspected.

2.2.1 Localized broken slate in the field of the Main and dormer roofs including the south hip roofs are shown in Photos 22, 25, 61, 62, 63, 80, 81, 82, 84, 98, 110, 128 and 130. Copper nails utilized to secure the slate were exposed at some of these locations. Water can enter.

2.2.2 Repairs to damaged slate utilizing copper bibs and sealant are shown in Photos 23, 24, 47, 48, 65, 88, 89, 90, 109 and 126. Some of these had failed exposing abandoned nail holes in the slate or copper fasteners. Water can enter.

2.2.3 Other damaged and repaired slate adjacent to the walls of the east and west dormers are shown in Photos 20, 21, 67, 74, 75, 77, 82,

83 and 93. Snow slides from the dormer roofs likely caused this damage.

2.2.4 Where the Main and dormer roofs interface the roof rake, knee wall parapets reside at these locations; the parapets were covered with terne metal copings. Copper base flashings that were incorporated with the metal copings and conceal the stepflashings of the slate roof are shown in Photos 27, 49 and 51; the copper flashings' condition was fair. The condition of the terne metal copings was generally less than fair. See Photos 52, 71, 72 and 94.

2.2.5 Photos 28, 29, 50 and 131 show counterflashings incorporated with various brick building walls. The counterflashings were installed in a cut reglet joint in the brick that covers the copper stepflashings of the slate roof. See Photo 30. The condition of the counterflashings was generally fair. White sealant or Red Slaters Cement (mastic) was installed as the waterproofing.

2.2.6 Copper flashings installed where the steep sloped roofs interface one another forming valleys and at water table locations are shown in Photos 25, 26, 56, 57, 73, 95, 98 and 99. The condition of the copper ranged from less than fair to fair. Some slate was observed broken or chipped at these areas.

2.2.7 Photos 31, 32, 33, 86, 111, 120, 128, 129 and 132 show decorative copper ridge rolls covering the ridge of the Main roofs and dormers; decorative covers were also installed covering the roof hips. The condition of the copper ridge and hips covers was generally fair. The copper ridge roll was retained in place with rusted exposed nail fasteners; the fasteners were not copper.

2.2.8 The snow retention system or pipe snow guard fence, along the bottom of the Main and dormer roofs are shown in Photos 34, 38, 54, 64, 76, 91, 97, 107, 108, 113, 126 and 128. Various degrees of damage were observed to sections of the snow fence. See Photos 39, 40, 54, 64, 65, 66, 77, 78 and 92.

2.3 Built-in Gutters

2.3.1 The large Main and dormer roofs built-in gutters are shown in Photos 34, 35, 36, 38, 53, 54, 64, 76, 78, 91 and 97; the gutters were lined with copper and had positive slope to drainage leaders. The shop fabricated copper liners were soldered together and extend beneath the slate on the Main roofs and form a wide apron

on the dormer roofs. See Photo 37. Note prior repairs of EPDM had been installed to the copper liners as shown in Photos 36 and 84. Other gutter liners exhibited damage resembling that from an impact. See Photos 43 and 55. The condition of the liners was less than fair.

2.3.2 Copper twist bars incorporated with the gutter liners of the main roofs are shown in Photos 35, 36, 76, 78 and 84; the twist bars were installed only supporting the gutter center. No twist bars were installed on the dormers' built-in gutter because of the apron flashing.

2.3.3 Photos 11, 13, 35, 40, 44, 54, 55, 67, 74, 75, 77, 83, 92, 93 and 97 show copper leaders and painted PVC pipes that provide drainage for the built-in gutters for the main and dormer roofs. Two (2) leaders were present for the Main roof large built-in gutters at the north ends and one (1) leader for the south end. Each dormer roof also had one (1) leader. Note the dormer leaders extend to the outlets of the Main roof gutters.

2.3.4 The painted galvanized ornamental covers of the built-in gutters of the slate and metal roofs are shown in Photos 41, 42, 54, 67, 75, 78, 97, 114 and 117. The outboard side of the copper liner was "locked" onto the cover. As noted, paint was peeling on many areas of the covers.

2.3.5 The built-in gutters of the south, west and east hip roofs are shown in Photos 113, 126 and 127. The apron extends beneath the slate similar as to the copper liners of the dormers.

3.0 STANDING AND FLAT SEAM ROOFS INSPECTION AND PHOTOGRAPHS

3.1 The Church sloping metal roofs at the south end were standing seam and flat seam copper and terne metal; the copper standing seam roof was located above the southwest entry. See Photo 116. Flat seam and standing seam copper roofs were incorporated with the southeast and southwest hip roofs. See Photos 100 and 132. The flat seam terne metal roofs were located adjacent to these roofs. See Photos 100, 204 and 205.

3.1.1 Photos 116 and 119 show the condition of the southwest standing seam copper roof including the built-in gutter liner. The condition of the standing seam roof was less than fair. The copper apron and liner exhibited damage and was in poor to less than fair condition. The damage resembled that from an impact. See Photos 117 and 118.

3.1.2 The standing seam and flat seam roofs on the southwest and southeast hips are shown in Photos 100, 101, 102, 133 and 134; their condition was also less than fair. Repairs of sealant and cracked solder joints were observed on the west hip roof. See Photos 103, 104 and 106. A hole was also found in one (1) of the panels. See Photo 105. Water can enter.

4.0 EAST AND WEST TOWER ROOFS INSPECTION AND PHOTOGRAPHS

4.1 The East and West Towers as well as the Center Tower are shown in Photos 137, 138, 154, 156, 159, 165, 173, 182, 183 and 184. The East and West Towers consisted of an 8-sided main spire with four (4) small lower spires. Large dormers, clad with metal, were incorporated with the main spire on the north, east, south and west sides.

4.1.1 Photos 138, 139, 140, 160, 161 and 174 show the slate on the east and west main spire roofs; the slate were also the mottled purple and green. The smaller roofs on the top of the main spires were green slate. The visual condition of the slate was good.

4.1.2 Photos 139, 140 and 161 show localized damaged or cracked slate on the East and West Main Spire roofs.

4.1.3 The corners or hips of the 8-sided main spire are shown in Photos 139 and 161; the hips were covered with individual copper covers. Note in Photo 141, one (1) of the copper covers was observed missing exposing wood. Water can enter.

4.1.4 The lower spire roofs, which were also 8-sided, were clad with green slate. See Photos 142, 143, 144, 162, 171 and 172. Ornate figurines reside at the top of all of the smaller spires. The hips of the roofs were also covered with copper covers. The visual condition of the green slate was good.

4.1.5 The metal clad tower dormers on the two (2) main spires are shown in Photos 141, 142, 143, 160 and 161; the metal was terne. The visual condition of the metal was less than fair to fair.

4.1.6 Photos 145, 151, 162, 163, 164, 175 and 181 show ornate terne metal pilasters which were installed as part of the waterproofing of the small spire brick turrets; the ornate pilasters cover the pigeon hole construction of the brick. The visual condition of these ornate pilasters was less than fair. Several were observed missing.

4.1.7 Photos 146, 169 and 176 show ornate terne metal pinnacles installed on top of the brick buttresses of the East and West towers. The condition of the ornate pinnacles ranged from failed to poor. At many locations, the bottoms and other areas of the pinnacles were severely corroded. See Photos 147, 148, 149, 170 and 177.

4.1.8 The East and West towers' four (4) ornate terne metal balconies are shown in Photos 151, 157, 162, 166 and 175. Their visual condition was failed to less than fair. Some of the balconies' underside were observed corroded. See Photos 150, 152, 153, 158, 167, 178, 179 and 180. At one (1) location, wood was exposed. Water can enter.

4.1.9 Two (2) bands of ornate cornice shelves or ledges, which were also terne metal, encompass each tower above and below the balconies; these were also depicted in the photos. The terne metal was also visibly in poor to less than fair condition.

4.1.10 Drainage shelves or cornices incorporated with the openings of the towers' belfries are shown in Photos 154, 155, 168, 202 and 203; the cornice shelves were covered with copper and had been soldered. At many locations, areas of the copper had been previously covered with bituminous roof mastic installed as a repair; the mastic repair was improper.

5.0 TOWER BELFRIES INSPECTION AND PHOTOGRAPHS

5.1 The Belfries of the East and West Towers are shown in Photos 185 and 196; the East Tower Belfry presently houses the original bell and the bell wood framing. See Photo 188; the framing and bell had been removed from the Belfry in the West Tower.

5.1.1 The roofs of the East and West Belfries are shown in Photos 186 and 197; the roofs were flat seam soldered terne metal. The flat seam terne metal roofs were generally in poor condition. Note various amounts of debris was on areas of the roof.

5.12 Openings in the Belfry flat seam roofs including holes, areas of corrosion and failed flashings of the terne metal roofs are shown in Photos 187, 190, 193, 194, 195 and 198. Water can enter.

5.1.3 The Belfry roofs were sloped to the four (4) sides which contained large openings for drainage. Screens had been installed over these openings and were attached to wood blocking or directly into the terne metal roof panels. See Photos 189, 191, 192, 200 and 201. Note that wood blocking obstructed drainage.

6.0 ASPHALT SHINGLE ROOF INSPECTION AND PHOTOGRAPHS

6.1 The west side entry shallow sloped roof is shown in Photo 206; the roof was shallow in slope and consisted of No Cut-Out organic shingles. The condition of the shingles was poor. See Photo 208.

7.0 DISCUSSION AND RECOMMENDATIONS

7.1 Slate Roofs and Built-in Gutters

7.1.1 Our visual inspection revealed the mottled purple and green slate were in relatively good condition. Aerial lift access on the west, main, dormer and south hip roofs confirmed this assessment by the slate visual appearance and the performed tapping method. Due to the limited access to the East Main Roof and dormer including the Tower Roof spires, it is our opinion that the slate on these roofs were of the same condition.

7.1.2 Areas of slate damage were localized on each of the steep sloped roofs both in the roof field and adjacent to dormer walls; these areas of slate damage were due to snow slides avalanching off of the dormer roofs. The slate that were damaged in the roof field was likely due to wear and tear and the slate's age.

7.1.3 The copper liners of the built-in gutters had exhibited both normal wear and tear of the liner and localized impact damage from snow slides. The liners were relatively in less than fair condition. Past repairs to gutters were observed.

7.1.4 The painted galvanized covers of the built-in gutters exhibited chronic leaks and minor localized damage. The overall condition of the covers was poor.

7.1.5 The copper flashings incorporated with the slate roof at interfacing walls including step and counterflashings, the roof valleys and troughs (water tables) and the copper ridge roll, the copper was in fair condition. No holes or openings were observed where inspected.

7.1.6 Terne metal copings used for covering the slate roofs knee wall parapets was comprised of an alloy of lead and tin. The condition of the terne copings was less than fair. No damage or openings were observed where inspected.

7.1.7 The snow retention system, pipe snow guard fence, had sustained various degrees of impact damage resulting from snow slides; the damaged slate on the main roofs below the dormers are the result of this condition. Both the pipes and brackets of the snow fence had sustained damage including localized slate surrounding same.

7.1.8 The slate being in good condition, we estimate has a remaining service life of approximately ten (10) to fifteen (15) years. Slate that are damaged should be addressed and properly repaired.

7.1.9 Our assessment of the various metal flashings found them in generally less than fair to fair condition; replacement of the flashings is not considered required at this time.

7.1.10 Our past experiences with large slate roof assessments have found that flashings incorporated with the slate will wear out much faster and develop leak issues. To replace these flashings however, slate would need to be removed to access these areas.

7.1.11 The snow retention system is recommended to be replaced or repaired to prevent further additional damage to the slate roofs and to pedestrian traffic below.

7.1.12 The copper liners of the built-in gutters and ornamental covers we estimate have a remaining service life of approximately two (2) to three (3) years. This would require that maintenance repairs to be employed to the liners. The galvanized covers, because they are decorative, can be replaced during replacement of the liners.

7.2 Copper Standing Seam and Flat Seams Roofs

7.2.1 The copper roofs, both standing seam and flat seam, were mainly part of the roofs covering the south end hips. The roofs were incorporated and drained into the built-in gutters.

7.2.2 The condition of the copper roofs based on our inspection were in less than fair condition; the southwest corner standing seam roof accommodates water draining from the upper Main Roof. The roofs were found mostly in a watertight condition with the exception of the southwest hip roof which contained cracked solder joints, a hole in one (1) of the panels and previous repairs which indicates prior leaks.

7.2.3 The copper roofs, based on their present condition, we recommend should be scheduled to be replaced within three (3) to five (5) years. The southwest roof, where the most damage was observed, the damaged panels and improper repairs should be addressed until the roof is replaced.

7.2.4 When these roofs are replaced, the gutter liners will also need to be replaced as some exhibited impact damage from snow slides. It would be recommended as part of the replacement to incorporate new snow retention systems on these roof areas. Any openings in the liners should be repaired.

7.3 Tower Roofs and Ornate Flashings

7.3.1 The slate covering the Main and smaller spire roofs were all viewed from the aerial lift. Based on our visual inspection, reviewing our inspection photographs and the condition of the other slate roofs, we have labeled the condition of these slate as good.

7.3.2 A small amount of slate damage such as cracked and missing slate were observed on the spire roofs. Areas where water intrusion could be affecting the wood structure of the spire framing as noted in the GNCB Report may likely be where the copper hip cover was missing on the West Tower. We recommend that the missing cover be repaired. To gain access to this location, a taller aerial lift will be required.

7.3.3 The terne metal dormers incorporated with the Main Spire slate roofs need to be closely inspected; this can be performed by the roofing contractor when repairing the copper cover since the taller aerial lift would be on-site to do this work. Particular attention should be focused at the valleys of the metal clad dormers due to the amount of water run-off at these locations. The remaining service life of the metal dormers, based on our inspection, is approximately two (2) to three (3) years.

7.3.4 The ornate pinnacle flashings exhibited severe corrosion damage on both towers; water entry through these flashings has resulted in this condition likely due to the method of their fabrication.

7.3.5 The condition of the ornate pilasters covering the corners of the turrets were generally in less than fair condition with some exhibiting minor corrosion damage similar to the pinnacles. At a few locations, pilasters were missing exposing the pigeon hole construction of the brick.

7.3.6 The ornate balconies were installed as decorative pieces when the towers were constructed including the lower and upper ledges. Many of the balconies exhibited severe corrosion of the terne metal with wood exposed at one (1) location.

7.3.7 The ornate pinnacles, pilasters and balconies including the lower and upper ledges based on their present condition will require a review for their removal and replacement. Areas where pilasters were missing indicates a possible safety hazard that may

continue to occur. If minor repair work is elected, the ornate flashings and balconies can be more closely evaluated to determine what corrective actions would be required to extend the life of these ornate pieces.

7.4 Tower Belfry Roofs

7.4.1 The flat seam terne metal roofs of the Belfry will require repair to locations where holes and openings in the terne metal panels presently exist. Though the Tower Belfries are not directly affected by rain water, the watertight integrity of the roofs needs to be maintained.

7.4.2 If elected to remove and replace the existing metal roofs, a liquid applied roof membrane would be recommended which would be more resilient than the flat seam metal and less expensive.

7.4.3 The debris on the Belfry roofs should be removed to expose and repair other roof panels if necessary and to allow uninterrupted drainage of these roofs.

7.5 Asphalt Shingle Roof

7.5.1 The No Cut-Out Organic Shingles were generally in less than fair condition and exhibited normal aging. It is recommended that this roof be considered to be removed and replaced.

Respectfully submitted,

H. B. FISHMAN & CO., INC.

Michael J. Mozes, C.C.C.A., R.R.O.
Associate

MJM/cew

ATTACHMENT #1

4 June 2020
St. Stanislaus Kostka
Roman Catholic Church
Adams, MA
Site Visit Photographs

BUILDING ELEVATION PHOTOGRAPHS

Photo 1:

General view of the north elevation of the Church looking south.

Photo 2:

View of the west building elevation looking northeast.

Photo 3:

View of the west main steep sloped slate roof at the north end as viewed from the ground. A large built-in gutter resides along the bottom. The outboard side was covered with an ornamental cover. Two (2) leaders provide drainage.

Photo 4:

View of condition of the large built-in gutter underside as viewed from the ground. The ornamental galvanized cover had previously been painted. Areas of paint were peeling from the cover.

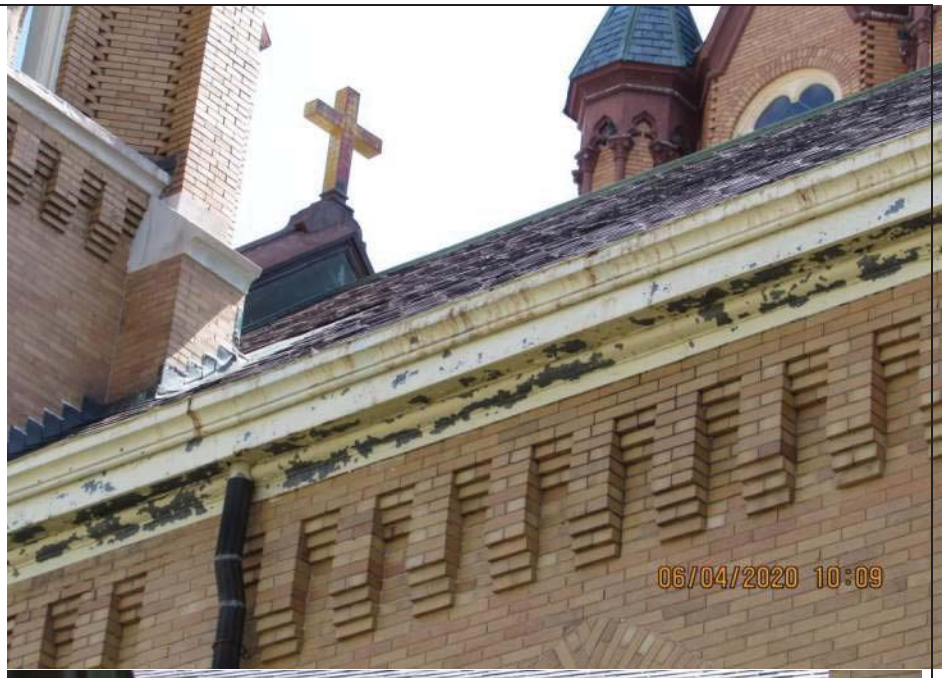


Photo 5:

View of separate location showing the condition of the ornamental galvanized cover of the large built-in gutter. Note a section of the pipe snow guard fence was damaged.

Photo 6:

View of the west main steep sloped slate roof at the south end. Note many slate were cracked and damaged. Also note, the entire pipe snow guard fence was damaged. This location was below the roof of the west dormer.

Photo 7:

View of copper standing seam roofs at the southwest corner. The roofs drain into built-in gutters.

Photo 8:

View of condition of the copper standing seam roof and large built-in gutter as viewed from the ground. Paint was peeling on areas of the ornamental galvanized cover. Note visible impact damage.

Photo 9:

View of the southeast building elevation and slate roofs. Large built-in gutters provide drainage for the upper sloped roofs.

Photo 10:

General view of the east building elevation looking northwest.

Photo 11:

View of the east main steep sloped slate roof at the south end. Slate had been repaired along the bottom.

Photo 12:

View of the east main slate roof at the north end. Localized slate in the roof field had been repaired.

Photo 13:

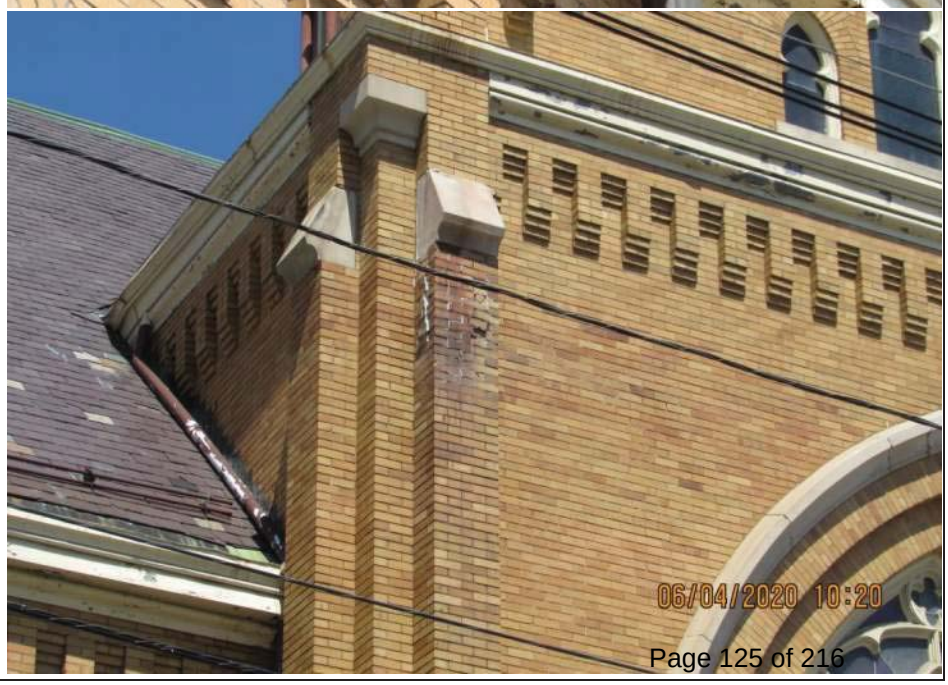
View of the underside of the large east built-in gutter. Paint was peeling on areas of the ornamental galvanized cover.

Photo 14:

View of large hole in the ornamental cover underside.

Photo 15:

View of severe spalling of the southeast brick turret. Previous repairs made to the brick with sealant.



WEST MAIN AND WEST DORMER SLATE ROOF PHOTOGRAPHS

Photo 16:

View of the West Main steep sloped slate roof at the north end.

Photo 17:

View of condition of some of the slate. The slate were 12” and 14” wide with an 8” exposure to the weather. The slate color was mottled purple and green. The slate thickness was ¼”. The slate was sound and in good condition.

Photo 18:

View of separate location showing condition of the individual slate on the West Main slate roof. The slate condition was good. Tapping method of the slate produced a solid tone at this location.

Photo 19:

View of another location on the west main steep sloped roof showing condition of the individual slate. The slate condition was good. The tapping method produced a solid tone.

Photo 20:

View of damaged and repaired slate adjacent to the north brick wall of the west dormer. This location was below the roof of the west dormer.

Photo 21:

View of exposed nail fasteners where the slate were damaged. The slate fasteners were copper. Water can enter.

Photo 22:

View of other slate damaged in the field of the north end, West Main roof. A failed copper bib repair was at one (1) of the damaged slate locations. The copper nail fasteners were exposed. Water can enter.

Photo 23:

View of one (1) of many other copper bib repairs on the north end of the West Main slate roof.

Photo 24:

View of another failed slate bib repair. Hole in slate can allow water to enter.

Photo 25:

View of copper flashing at the south wall of the West Tower. The condition of the copper flashing was fair to less than fair. Note one (1) slate had slid out of place adjacent to the flashing.

Photo 26:

View of large copper “chute” or valley between the north end West Main roof and the east side of the West Tower. The copper condition was less than fair. The solder joints of the copper exhibited prior repairs.

Photo 27:

View of the north rake parapet wall on the West Main steep sloped roof. The top of the parapet was covered with terne metal coping. Copper base flashings were incorporated with the slate roof and the metal covered parapet. The copper was in fair condition. The terne metal coping condition was less than fair.

Photo 28:

View of copper flashing at the southeast corner of the West Tower. The copper flashing condition was less than fair. Note white sealant installed along the top of the copper counterflashings and base flashings.

Photo 29:

View of the north wall of the west dormer. White sealant was installed along the top of the individual copper counterflashings. The condition of the copper was fair.

Photo 30:

View of sealant removed by HBF revealing nail fasteners securing the copper counterflashing into a cut reglet in the brick mortar joint.

Photo 31:

View looking southeast at the main roof ridge. The ridge was covered with a copper ridge roll.

Photo 32:

View of condition of the copper ridge roll. The ridge roll condition was less than fair to fair. The ridge roll was retained in place with exposed nail fasteners installed through the top slate coursings. The fasteners were rusted indicating non-copper fasteners.

Photo 33:

View of overlap joint of one (1) of the copper ridge roll sections. Rusted nails also secure the ridge roll sections in place.

Photo 34:

View of the large built-in gutter along the bottom of the West Main steep sloped roof. The gutter was lined with a copper liner. Individual copper twist bars were located in the gutter center. The twist bars extend beneath the slate. The gutter was drained by two (2) leaders.

Photo 35:

Another view showing condition of the large built-in gutter copper liner. The gutter had slope. Note several prior EPDM repairs observed to the gutter liner.

Photo 36:

View of the two (2) copper liner EPDM repairs. The twist bars were attached to the outboard side of the gutter.

Photo 37:

View of condition of one (1) of the copper liner solder joints. The solder joint contained no cracks.

Photo 38:

View of condition of the pipe snow guard fence along the bottom of the West Main steep sloped roof. Condition was generally fair.

Photo 39:

View of damaged section of the pipe snow guard fence.

Photo 40:

View of separate location showing damaged pipe snow guard fence at the south end. This location was below the north roof of the west dormer. Note leader pipe from the dormer gutter drains into the Main Roof built-in gutter.

Photo 41:

View of condition of the ornamental galvanized metal cover of the large built-in gutter. Condition of the cover was generally fair.

Photo 42:

View of peeling paint on the cover. Condition also at other locations.

Photo 43:

View of localized damaged section of the copper liner where it locks onto the galvanized cover.

Photo 44:

View of corroded bottom of the galvanized cover. This location was at the center leader location. Note a prior metal repair was at this location.

Photo 45:

View of the north facing roof of the West Dormer.

Photo 46:

View of condition of the mottled purple and green slate on the West Dormer north roof. The slate condition was good. The slate produced a solid tone during the tapping method.

Photo 47:

View of one (1) of several slate repaired with white sealant. The repair was improper.

Photo 48:

View of other slate repaired with white sealant. Sealant was also installed over nail fasteners. The sealant repair was improper.

Photo 49:

View of the west rake parapet wall of the dormer. The construction and flashings were the same as the north rake parapet.

Photo 50:

View of white sealant installed along the top of the copper counterflashings. The counterflashings were set in a cut reglet in the brick mortar joints.

Photo 51:

View of condition of the terne metal coping on the west rake parapet. Condition of the metal coping was less than fair.

Photo 52:

Another view of the terne metal coping condition.

Photo 53:

View of the large built-in gutter along the bottom of the north dormer roof. A wide copper wash resides between the gutter trough and slate. The gutter liner condition was less than fair.

Photo 54:

Another view of the condition of the copper gutter liner. Note the pipe connected to the gutter outlet drains into the Main Roof built-in gutter below.

Photo 55:

View of the east end of the large built-in gutter. Note large area contains sealant below the valley.

Photo 56:

View of valley between the Main and Dormer roofs. The valley was lined with individual copper flashings. Several slate adjacent to the valley had been repaired or were damaged. The condition of the copper was fair.

Photo 57:

View of the pipe snow guard fence condition on the north dormer roof. Several slate were missing or had been repaired.

Photo 58:

View of the south facing roof of the West Dormer. Note the entire pipe snow guard fence was damaged. Several slate were repaired and few were damaged on this roof.

Photo 59:

View of condition of some of the slate. The slate was sound and in generally good condition.

Photo 60:

View of other slate on the south dormer roof. The slate condition was sound and good.

Photo 61:

View of few localized damaged slate in the field of the south dormer roof. Copper fasteners were exposed where the slate were damaged.

Photo 62:

View of one (1) of the damaged slate. Water can enter the exposed nails.

Photo 63:

View of the other damaged slate. Water can enter the exposed nails.

Photo 64:

View of the large built-in gutter along the bottom of the south dormer roof. Prior repairs were made to the copper liner, valley and slate. The entire pipe snow guard fence was damaged.

Photo 65:

View of the damaged pipe snow guard fence. The slate below had been repaired with white sealant. The sealant repairs were improper.

Photo 66:

View of damaged brackets for the pipe snow guard fence.

Photo 67:

View of the east end of the large built-in gutter where it interfaces with the slate roof valley. Multiple repairs of sealant were installed at this location. Many slate were damaged below and also repaired with sealant.

Photo 68:

View of the south end of the West Main roof. A valley was formed between the two (2) roofs.

Photo 69:

View of the slate condition. The thickness, width, exposure and condition were the same as on the other roofs.

Photo 70:

View of condition of other slate. The two (2) green slate were from a prior repair.

Photo 71:

View of the terne metal covered south rake parapet wall. Condition was less than fair.

Photo 72:

Another view of the terne metal condition. Note nails secure the metal sections where they overlap one another.

Photo 73:

View of condition of the copper valley sections between the dormer and main roof. The condition of the copper was less than fair.

Photo 74:

View of the slate roof at the bottom. The pipe snow guard fence along the bottom was damaged. Several slate were also damaged and some had been repaired.

Photo 75:

View of some of the damaged and repaired slate. This area was below the dormer valley and roof of the south facing dormer.

Photo 76:

View of condition of the large built-in gutter and copper liner. Copper twist bars were located in the gutter center. Note one (1) leader provides drainage for the Main and Dormer roofs.

Photo 77:

Another view of the damaged slate and brackets for the pipe snow guard fence.

Photo 78:

View of condition of the painted ornamental galvanized cover of the large built-in gutter. The paint was peeling at many cover locations.

EAST MAIN AND WEST DORMER SLATE ROOF PHOTOGRAPHS

Photo 79:

View of slate on the north end of the East Main steep sloped roof.

Photo 80:

View of condition of some of the slate. Localized slate were chipped and damaged. The slate visual condition was generally good.

Photo 81:

View of other broken slate below the ridge on the East Main steep sloped roof. One (1) slate contained a metal bib repair.

Photo 82:

View of other damaged slate exposing the copper nails adjacent to the south wall of the East Tower. Water can enter.

Photo 83:

View of damaged section of the pipe snow guard fence adjacent to the East Dormer north wall. Several slate above were repaired. This location was below the north roof of the East Dormer. Note leader pipe from the dormer gutter drains into the Main Roof built-in gutter.

Photo 84:

View of few damaged and cracked slate above the pipe snow guard fence. Note EPDM repair in the large built-in gutter.

Photo 85:

View of the south roof of the east dormer. Note the copper liner of the large built-in gutter and pipe snow guard fence exhibited damage.

Photo 86:

View of valley between the south dormer roof and the south end East Main steep sloped roof.

Photo 87:

View of condition of some of the south facing dormer slate. The slate condition was visibly good.

Photo 88:

View of prior sealant repairs made to several slate. One (1) slate was damaged.

Photo 89:

View of other sealant repaired slate. One (1) contained a metal bib.

Photo 90:

View of improper slate repair made on the south roof of the East Dormer.

Photo 91:

View of condition of the large built-in gutter, copper gutter liner and pipe snow guard fence.

Photo 92:

Another view of the copper liner. The pipe snow guard fence was damaged at this location.

Photo 93:

View of painted white PVC pipe attached to the large built-in gutter outlet. Note several slate adjacent to the pipe elbow were a repair and contained sealant. Note the pipe drains into the large built-in gutter of the Main Roof below.

Photo 94:

View of condition of the terne metal rake parapet coping on the East Dormer roof. The coping condition was less than fair.

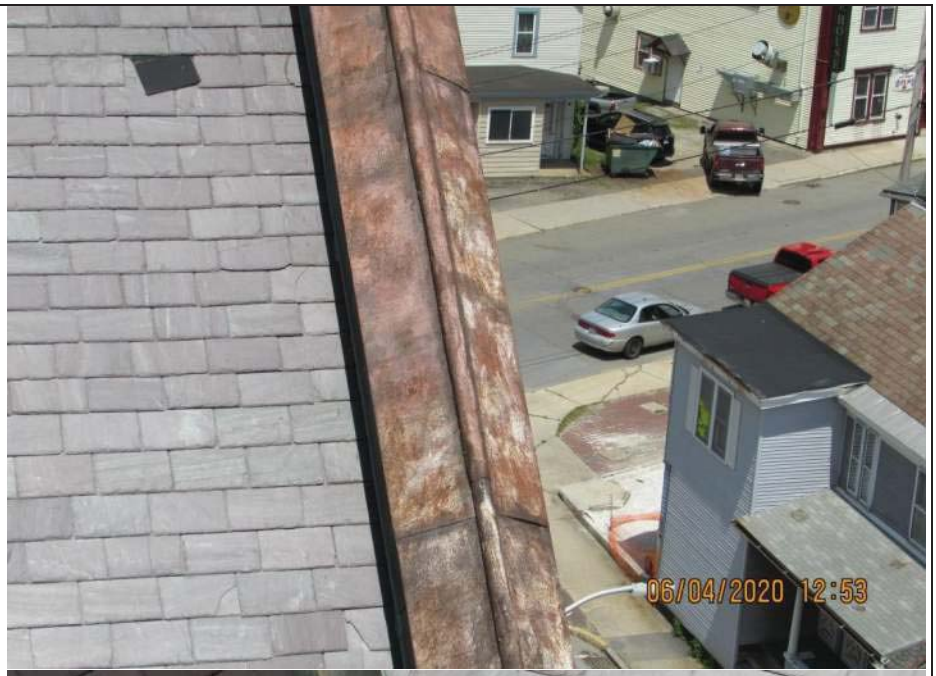


Photo 95:

View of condition of the copper valley flashings between the dormer and Main Roof. The condition of the copper was fair.

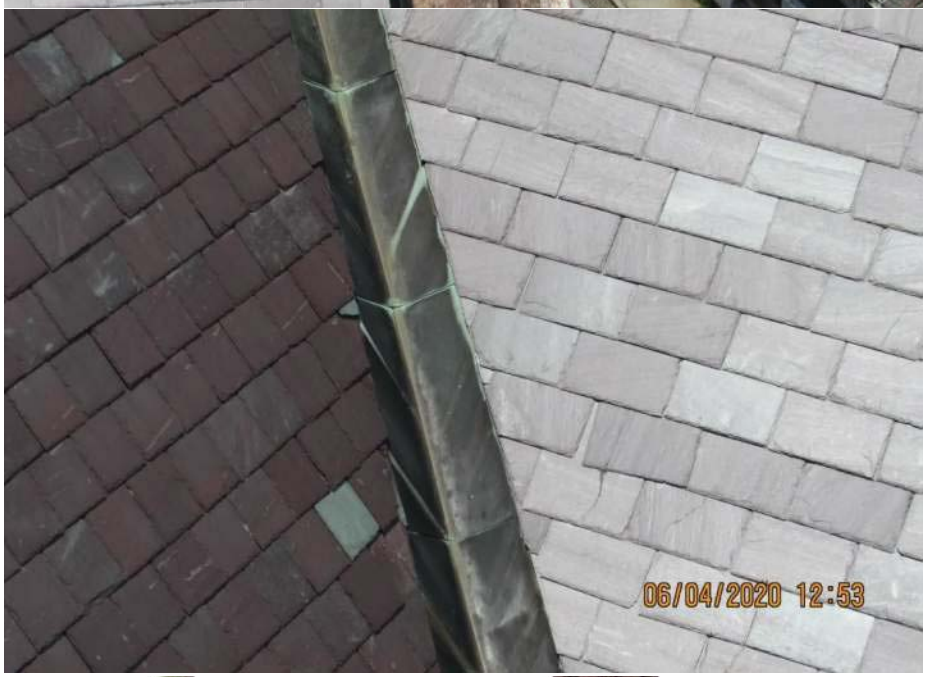


Photo 96:

View of the north roof of the East Dormer.

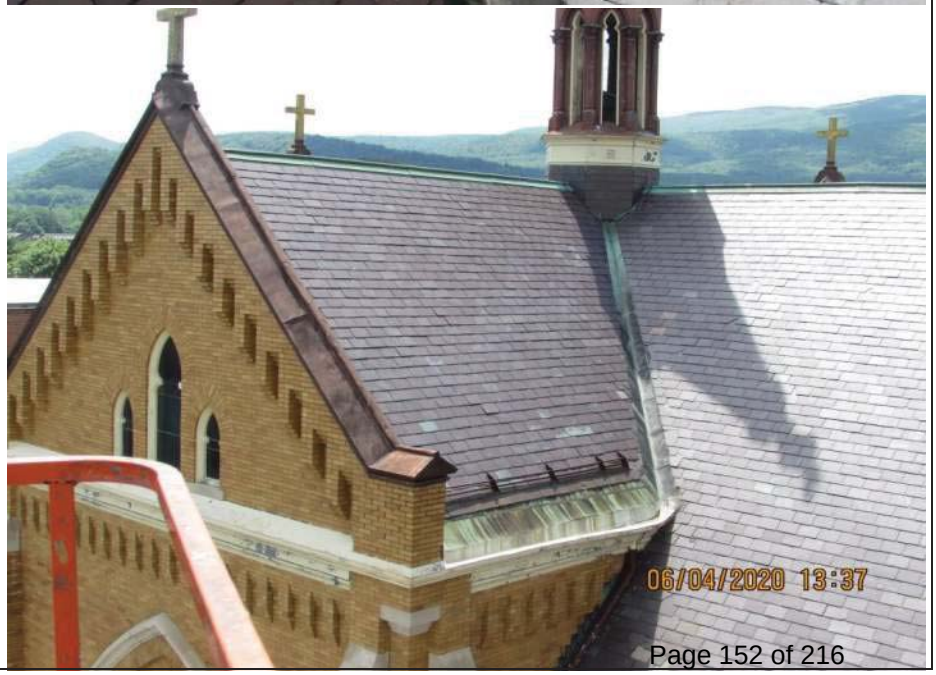


Photo 97:

View of condition of the large built-in gutter and copper liner.

Photo 98:

View of condition of the copper valley flashings between the dormer and Main Roof. Some slate were damaged and others were repaired.

Photo 99:

View of some of the broken and chipped slate adjacent to the valley.

SOUTHWEST LOWER HIP ROOF PHOTOGRAPHS

Photo 100:

View of the Southwest Lower Hip roof. The roofs were covered with the mottled purple and green slate and wide standing seam copper panels. The hips and ridge were covered with copper covers.

Photo 101:

View of condition of some of the wide standing seam copper panels. The condition of the copper was less than fair.

Photo 102:

View of old prior sealant repairs made to some of the wide standing seam panels where they lock onto a copper apron flashing. The sealant repair was improper.

Photo 103:

View of the bottom of the copper roof. A wide trough clad with copper resides at this location. Note prior sealant repairs at some of the panels' soldered joints.

Photo 104:

Another view of the prior sealant repairs made to the copper panel solder joints.

Photo 105:

View of large hole in one (1) of the wide copper panels. Water can enter.

Photo 106:

View of cracked solder seam of one (1) of the panels. Prior sealant was installed as a repair. The repair was improper.

Photo 107:

View of the slate covered West Hip roof. The general condition of the slate was good.

Photo 108:

View of the slate covered South Hip roof. Some slate had been replaced as a repair. Localized slate contained repairs of sealant. The slate condition was generally fair.

Photo 109:

View of one (1) of the sealant repaired slate. The repair was improper.

Photo 110:

View of one (1) damaged slate on the south hip roof. The copper nail fastener was exposed. Water can enter.

Photo 111:

View of condition of the copper hip roll cover. Exposed rusted nails retain the cover in place.

Photo 112:

View of condition of the copper ridge cover incorporated between the slate roof and the wide standing seam copper panels. The ridge cover exhibited dent damage.

Photo 113:

View of the built-in gutter along the bottom of the West Hip roof. The condition of the copper liner was fair.

Photo 114:

View of condition of the ornamental galvanized cover of the built-in gutter of the West Hip roof. Paint was peeling from the cover.

Photo 115:

View of underside of the ornamental galvanized cover on the south side built-in gutter. Paint was peeling from the cover.

SOUTHWEST LOWER STANDING SEAM ROOF PHOTOGRAPHS

Photo 116:

View of the copper standing seam roof at the building southwest corner. A built-in gutter provides drainage. The smaller lower entry roof was also clad with copper standing seam.

Photo 117:

View of condition of the built-in gutter and copper liner. The liner acts as an apron for the copper roof panels. The gutter exhibited damage.

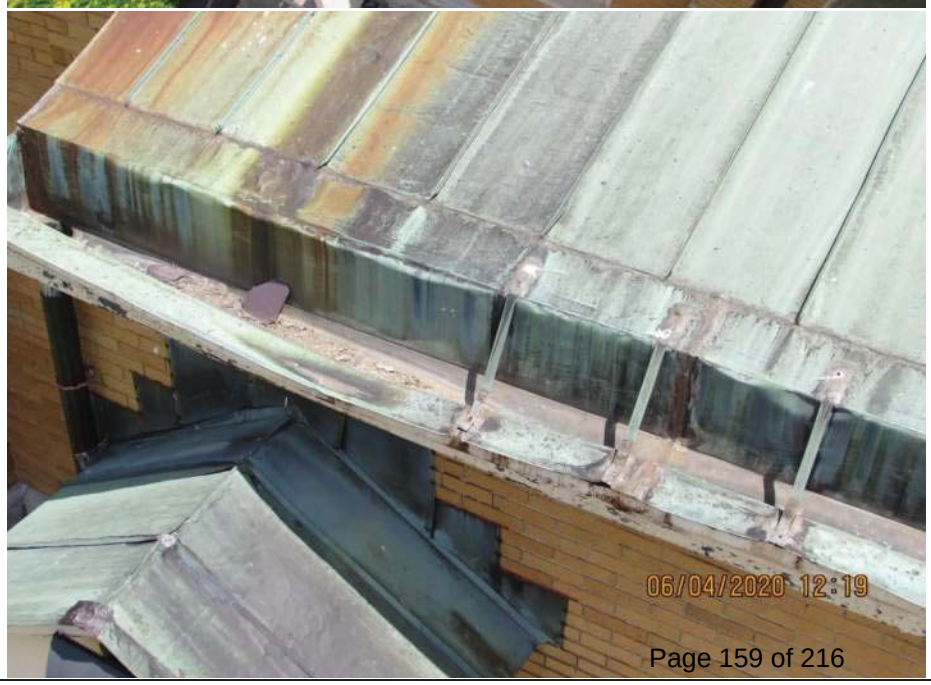


Photo 118:

View of three (3) copper bars attached to the outboard side of the built-in gutter. The bars were damaged and exhibited being repaired.

Photo 119:

View of condition of the copper standing seam roof on the lower entry. A repair had been made at the ridge end.

SOUTHEAST HIP ROOF PHOTOGRAPHS

Photo 120:

View of the Southeast Hip roofs at the building southeast corner. The roofs were covered with the mottled purple and green slate. The hips and ridge were covered with copper covers. The roofs were drained by a continuous built-in gutter.

Photo 121:

View of condition of the mottled purple and green slate. The slate condition was fair to good. The slate produced a solid tone when tapped.

Photo 122:

View of separate location showing the slate condition.

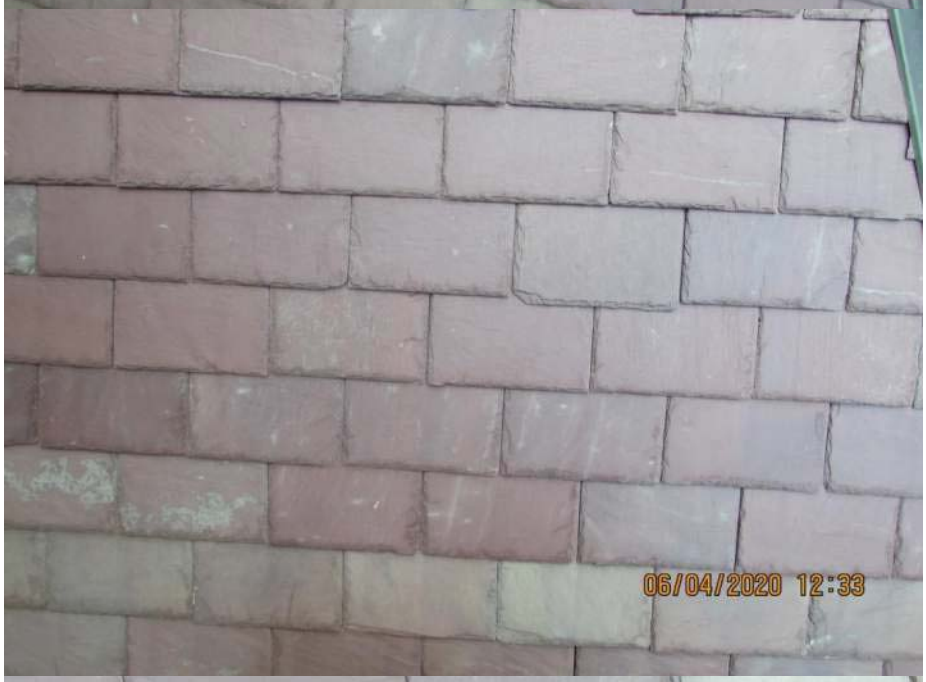


Photo 123:

Another view of the slate condition.

Photo 124:

View of copper water diverter flashing at the roof inside corner. Condition of the copper was less than fair. Note the four (4) coursings of brick were of a different type and color.

Photo 125:

Another view of the different type and color brick.

Photo 126:

View of condition of the pipe snow guard fence and copper gutter liner. Two (2) slate above the snow fence bracket were repaired with sealant.

Photo 127:

View of condition of the copper liner. Prior bituminous repairs were made to the copper soldered joint. The repair was improper.

Photo 128:

View of the southeast hip roof. One (1) slate had slid out of place.

Photo 129:

View of the east hip roof. One (1) slate had slid out of place. Several in the roof field had been repaired.

Photo 130:

View of condition of the pipe snow guard fence. Note the fasteners were exposed where the slate had slid out of place. Water can enter.

Photo 131:

View of the copper counterflashing condition where the slate roof interfaces with the south building wall. Exposed fasteners secure the flashing into the cut brick mortar joints.

SOUTHEAST LOWER HIP ROOF PHOTOGRAPHS

Photo 132:

View of the hip roofs at the building southeast corner. The roofs were slate and copper.

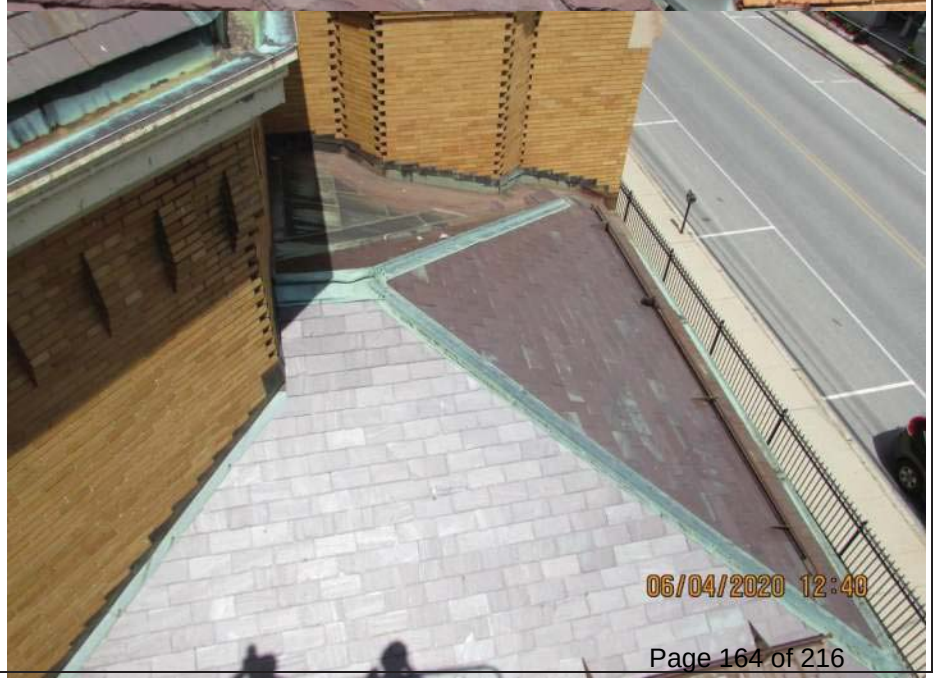


Photo 133:

View of the flat seam copper roof panels at the north end of the Southeast Lower Hip roof. Condition of the copper was less than fair. Note metal bib repairs on the north slate roof.

Photo 134:

View of broken slate from the upper east Main Roof laying on the copper panels.

Photo 135:

View of condition of the mottled purple and green slate on the East Hip roof. The condition of these slate was fair.

Photo 136:

View of condition of the mottled purple and green slate on the South Hip roof. The condition of these slate was good.

WEST TOWER PHOTOGRAPHS

Photo 137:

View of the East, West and Center Towers. The Main Spire roofs were covered with mottled purple and green slate. Green slate clad the smaller spire roofs on the East and West Towers.

Photo 138:

View of the south and east sides of the West Tower Spire roofs. The slate condition was visually good.

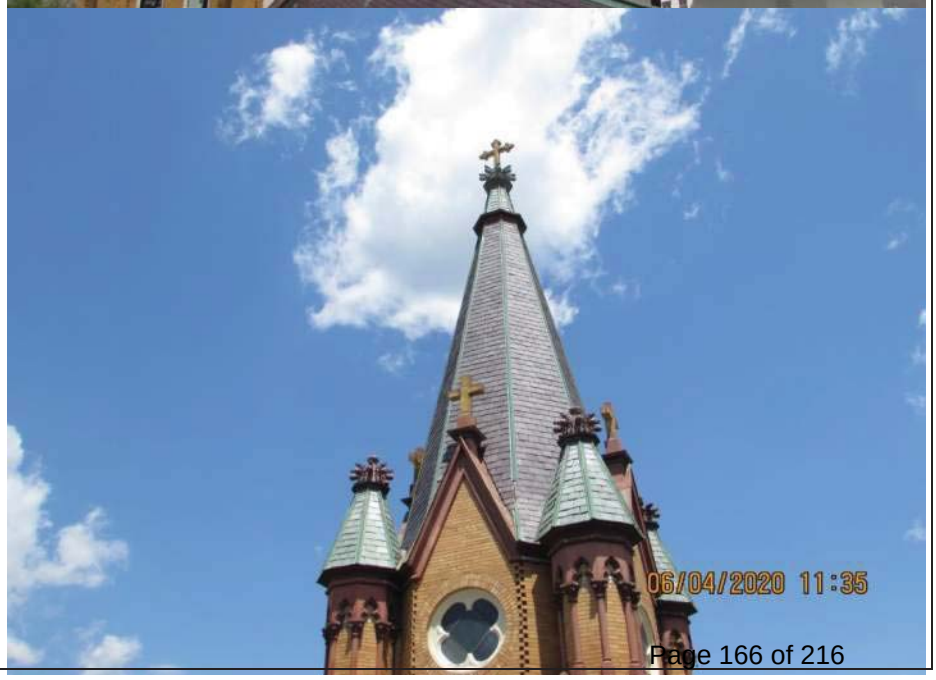


Photo 139:

Closer view of the slate and copper hip covers condition on the east side of the Main Spire roof. Note one (1) slate was damaged. Copper fasteners were exposed. Water can enter.

Photo 140:

View of other missing slate on the east side of the West Tower Main Spire roof. Copper fasteners were exposed. Water can enter.

Photo 141:

View of missing hip cover exposing wood at the Main Spire southeast corner. The wood was weathered. Water can enter. Note the south dormer roof was clad with terne metal.

Photo 142:

View of the smaller spire roofs on the east side. The roofs were covered with green slate. Note ornate figurines at the tops of each of the small spires. Ornate terne metal pilasters were installed at each corner of the octagonal brick turrets.

Photo 143:

View of condition of the green slate and the ornate figurine at one (1) of the small east side spires. The condition of slate was visibly good. The copper cover condition was fair.

Photo 144:

View of condition of the southwest corner small spire, the ornate terne metal pilasters and the architrave.

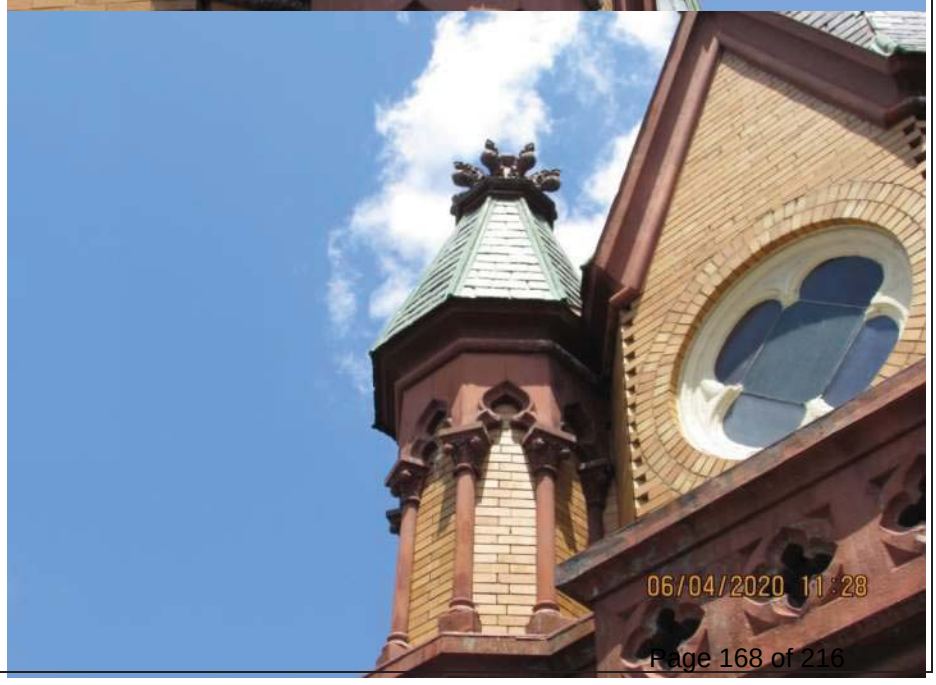


Photo 145:

View of condition of the ornate terne metal pilasters and architrave at the southeast brick turret. The metal condition was generally poor to less than fair.

Photo 146:

View of condition of one(1) of the ornate terne metal pinnacle installed on the top of the southeast brick turret of the West Tower.

Photo 147:

View of areas of corroded terne metal of the pinnacle. Water can enter.

Photo 148:

View of condition of other ornate terne metal pinnacle. The bottom of the one (1) shown was severely corroded. Water can enter.

Photo 149:

View of the southwest brick turret and the ornate terne metal pinnacle. The bottom was severely corroded. Water can enter.

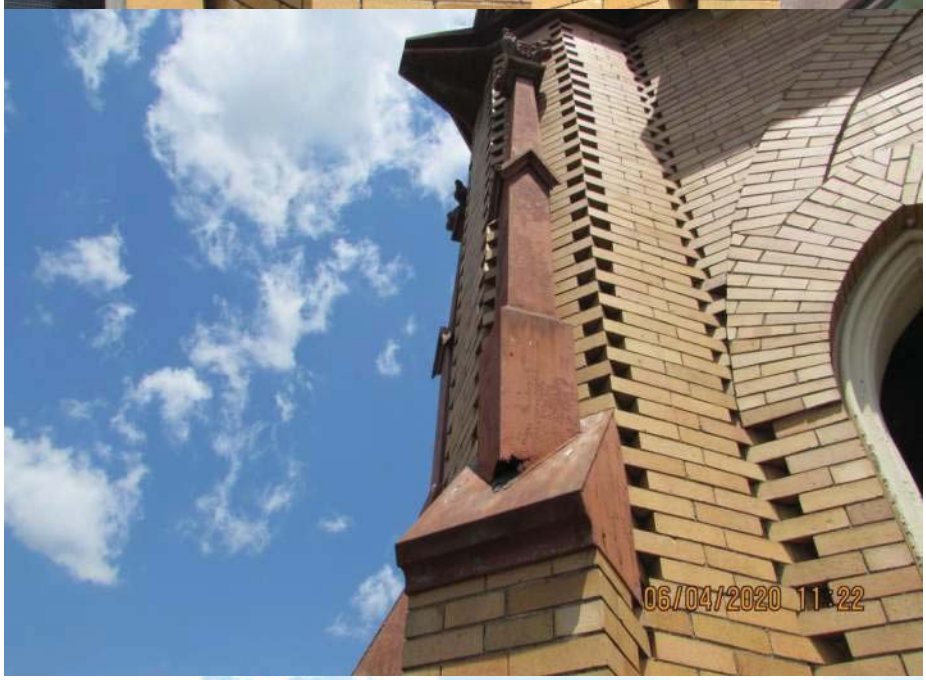


Photo 150:

View of underside of the south ornate balcony of the West Tower. Note areas of the terne metal were severely corroded. Water can enter.

Photo 151:

View of the east side ornate balcony.

Photo 152:

View of areas on the ornate balcony underside where the terne metal was severely corroded. Water can enter.

Photo 153:

Another view of the severely corroded metal of the ornate balcony. Water can enter.

Photo 154:

View of the south and west sides of the West Tower Belfry.

Photo 155:

View of copper flashing covering the south side cornice of the Belfry. The copper condition was poor. Prior repairs of roof mastic had been applied over the flashing.

Photo 156:

View of the north side of the West Tower and spire roofs.

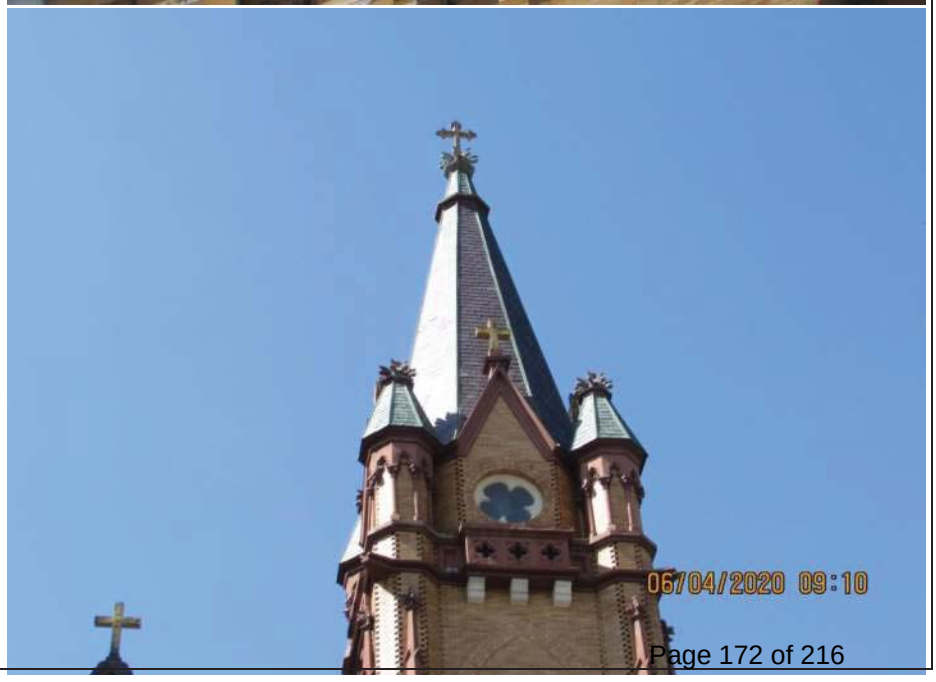


Photo 157:

View of the brick turrets, the ornate terne metal architrave, pilasters, upper and lower ledge, and the ornate balcony on the Tower north side.

Photo 158:

View of corroded areas of the ornate balcony underside. Water can enter.

EAST TOWER PHOTOGRAPHS

Photo 159:

View of the south side of the East Tower and spire roofs.

Photo 160:

View of condition of the mottled purple and green slate on the south Main Spire and the green slate on the small spires. Their visual condition was good.

Photo 161:

Closer view of the Main Spire slate condition. One (1) slate had slid out of place. One (1) slate was damaged.

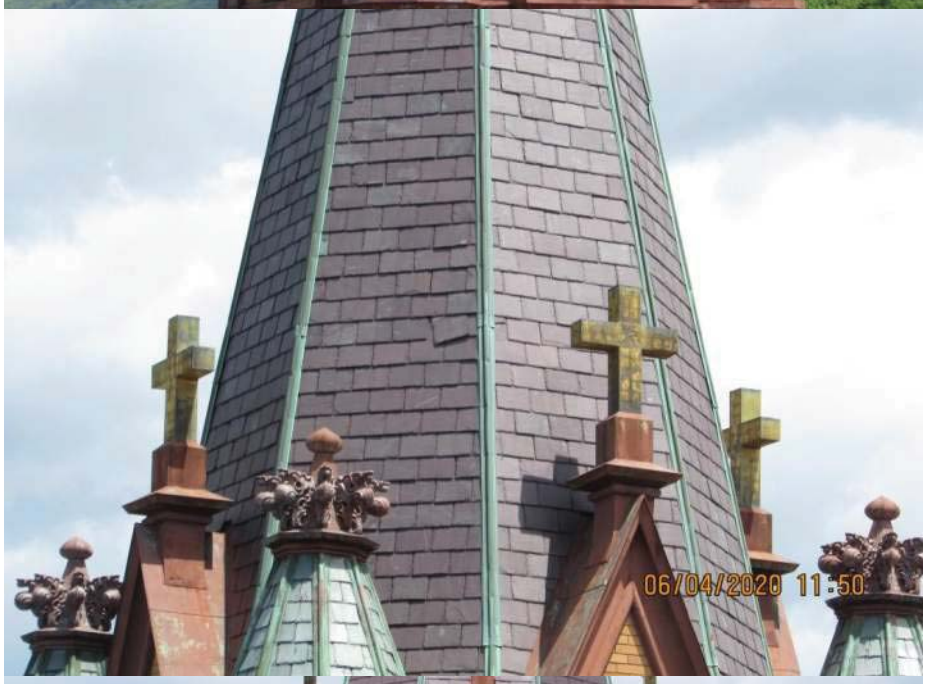


Photo 162:

View of the ornate terne metal architrave, pilasters, upper and lower ledge, and the ornate balcony. Note two (2) of the pilasters were missing at the southeast and southwest turrets.

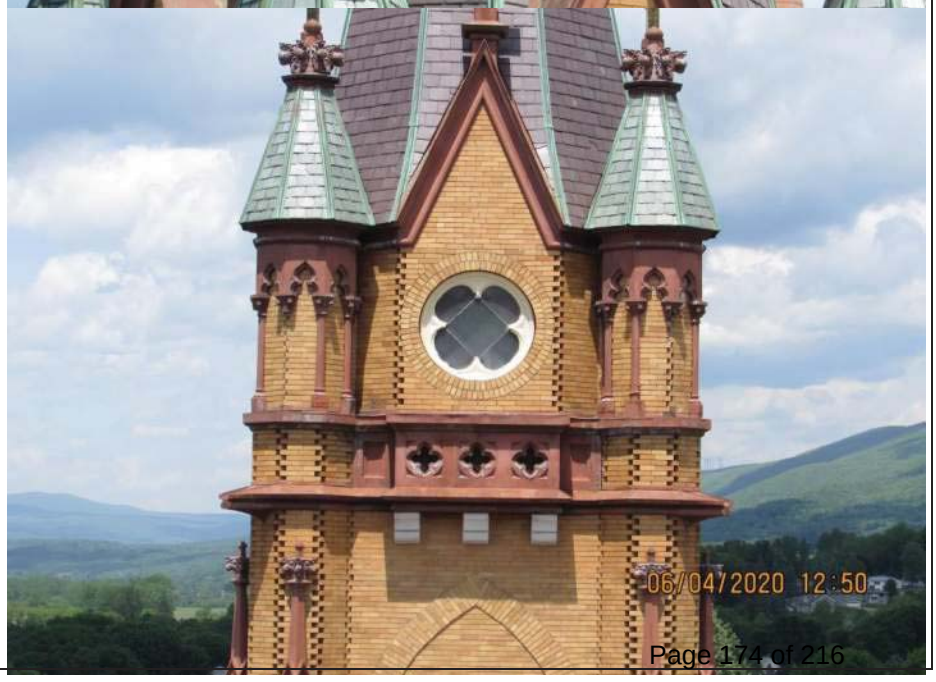


Photo 163:

Another view of condition of the ornate terne metal at the southwest turret.

Photo 164:

Closer view of the ornate metal condition at the southeast turret. One (1) of the pilasters was missing.

Photo 165:

View of the north side of the East Tower and Main Spire roof.

Photo 166:

View of the north side ornate balcony.

Photo 167:

View of severely corroded terne metal on the balcony underside. Water can enter. Corrosion also observed on the lower ledge.

Photo 168:

View of condition of the copper covered cornice on the Belfry north side.

Photo 169:

View of the ornate metal pilaster at the northeast brick turret.

Photo 170:

View of bottom of one (1) of the ornate metal pilasters where severely corroded.

Photo 171:

View of the northeast small spire roof. Note missing and disturbed slate on the Main Spire roof above.

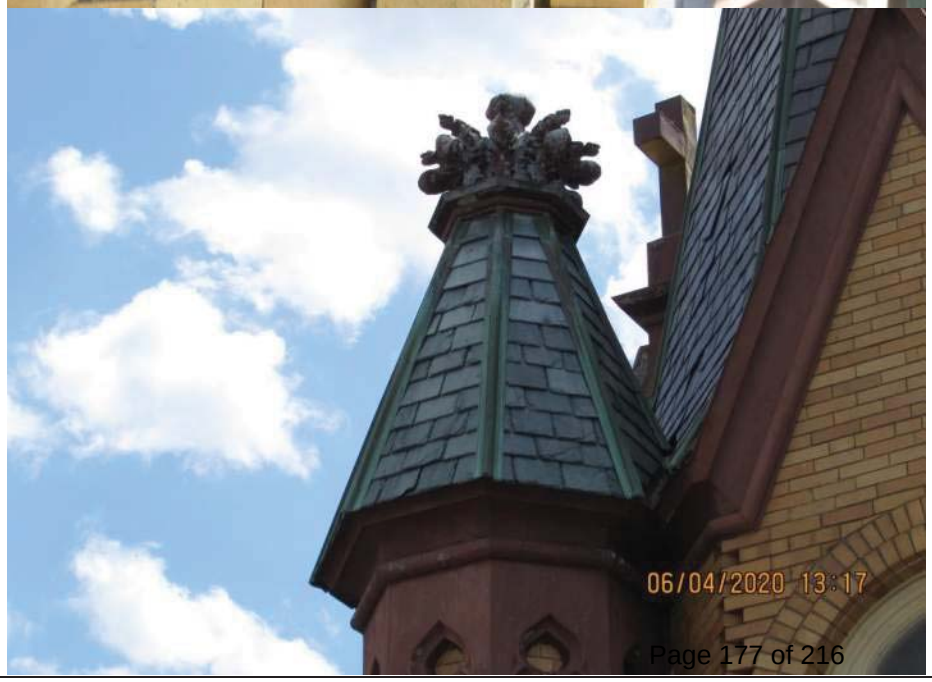


Photo 172:

View of the northwest small spire roof. The visual condition of slate was good.

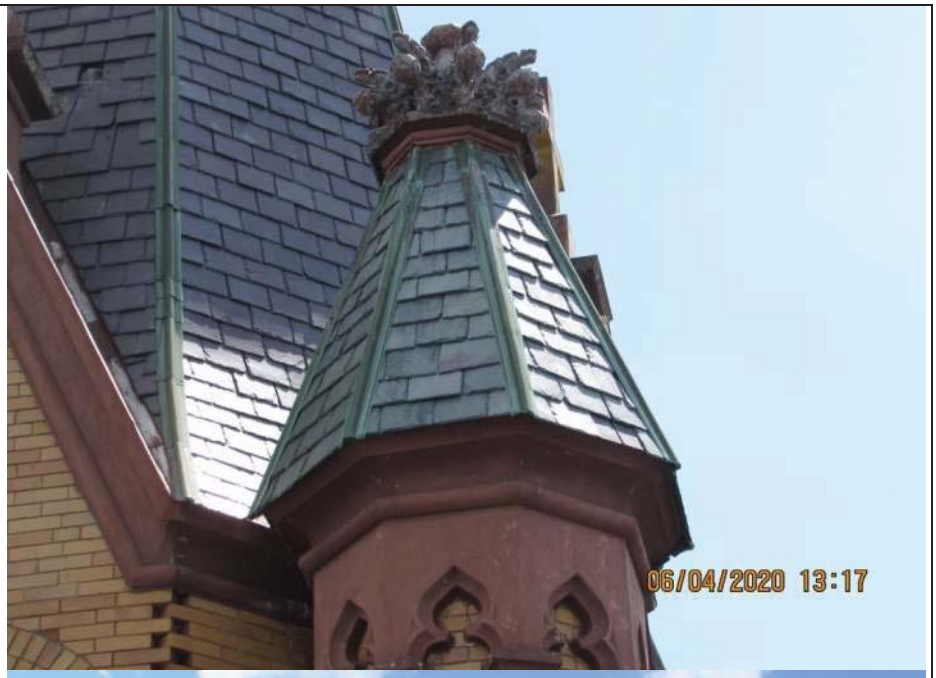


Photo 173:

View of the east side of the East Tower.

Photo 174:

View of the mottled purple and green slate on the Main Spire. The slate condition was visually good.

Photo 175:

View of the brick turrets and ornate metal architruve, pilasters, upper and lower ledge, and the ornate balcony on the east side of the East Tower.

Photo 176:

View of condition of the ornate terne metal pilasters. Several were corroded at their bottoms.

Photo 177:

Another view of the corroded bottoms of the ornate metal pilasters. Water can enter.

Photo 178:

View of the east side ornate balcony. Areas of the balcony underside and lower ledge were severely corroded. Water can enter.

Photo 179:

Another view of the east side ornate balcony at another location. Wood of the balcony was exposed where the metal was severely corroded. Water can enter.

Photo 180:

View of the south ornate balcony. Areas on the balcony underside were severely corroded. Water can enter.

Photo 181:

View of condition of the southeast brick turret ornate terne metal pinnacles. One (1) was missing. Note slate missing at bottom of the Main Spire roof above.

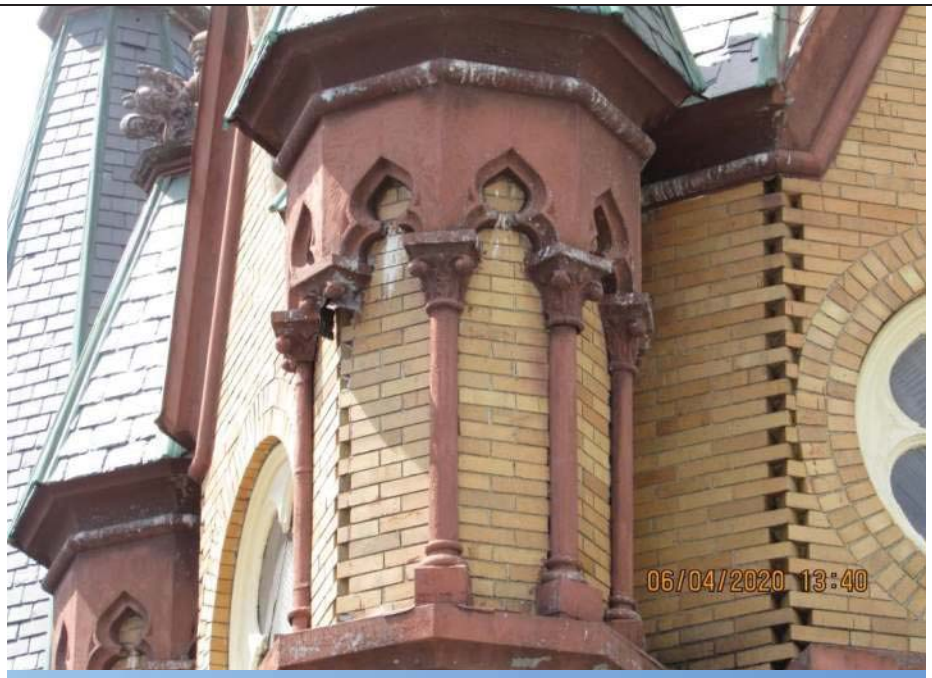


Photo 182:

View of the East Tower north side.

CENTER TOWER PHOTOGRAPHS

Photo 183:

View of the Center Tower.

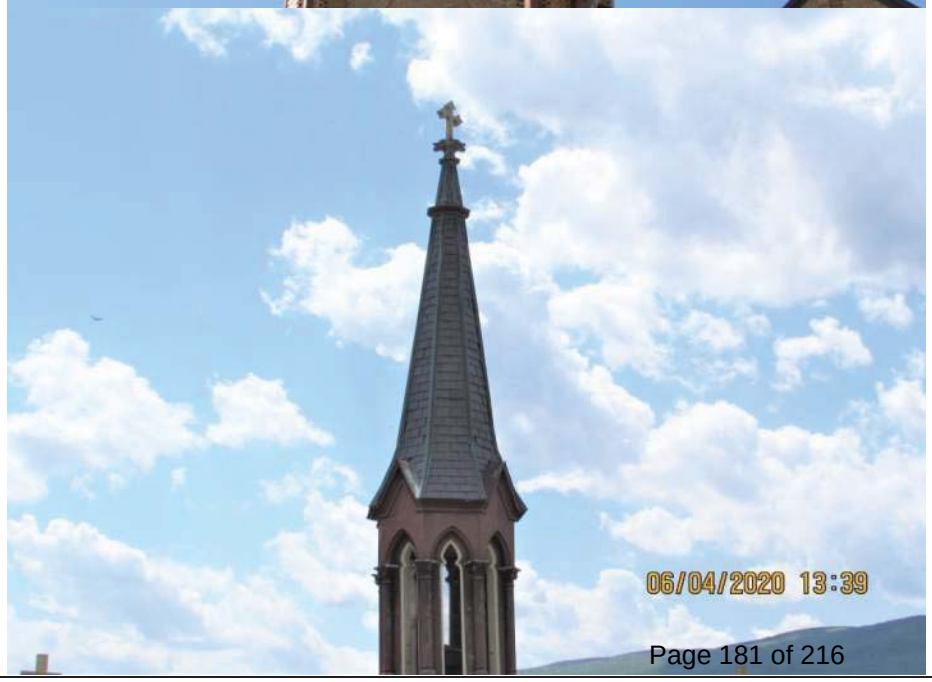
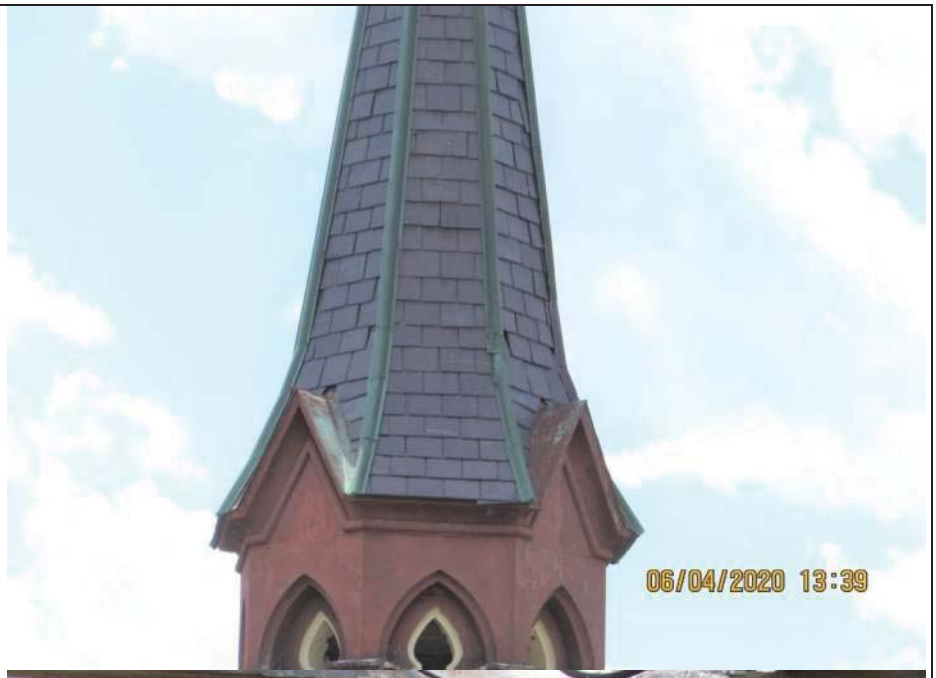


Photo 184:

View of condition of slate on the Center Tower. Condition visually good. The dormers were clad with terne metal.



EAST TOWER BELFRY PHOTOGRAPHS

Photo 185:

View of the East Tower Belfry. The exposed roof was flat seam soldered terne metal. The roof was sloped to the four (4) Belfry sides which contained openings for drainage.

Photo 186:

View of condition of some of the terne metal flat seam panels. Condition of the panels was poor.

Photo 187:

View of hole in one (1) of the panels. Water can enter.

Photo 188:

View of separate location within the Belfry showing debris and pigeon feces on the flat seam roof.

Photo 189:

View of one (1) of the drainage openings within the Belfry. Note the screen installed covering the Belfry opening had pulled out of the metal causing holes.

Photo 190:

Close up view of some of the holes in the metal. Water can enter.

Photo 191:

View of separate drainage opening. Note wood blocking utilized for attachment of the screen obstructs drainage.

Photo 192:

View of another drainage opening within the Belfry. Note debris and pigeon feces was against the wood blocking drainage.

Photo 193:

View of rusted and corroded base flashing metal. Water can enter.

Photo 194:

View of separate hole in the metal panel. Water can enter.

Photo 195:

View of metal base flashing which had pulled away from the brick wall. Water can enter.

WEST TOWER BELFRY PHOTOGRAPHS

Photo 196:

View of the Belfry flat seam terne metal roof of the North Tower.

Photo 197:

View of condition of the flat seam terne metal panels. Condition was poor.

Photo 198:

View of hole in one (1) of the panels. Water can enter.

Photo 199:

View of one (1) of several prior bituminous roof mastic repairs made to the flat seam panels.

Photo 200:

View of openings for drainage within the Belfry. Screen covering these openings was attached to wood blocking. The wood obstructs drainage.

Photo 201:

View of separate opening on the east side within the Belfry. Water drains onto the copper covered cornice and valley of the slate roof.

Photo 202:

View of old bituminous mastic materials covering the copper covered cornice as a repair.

Photo 203:

Another view of the copper covered cornice and the old bituminous roof mastic repairs.

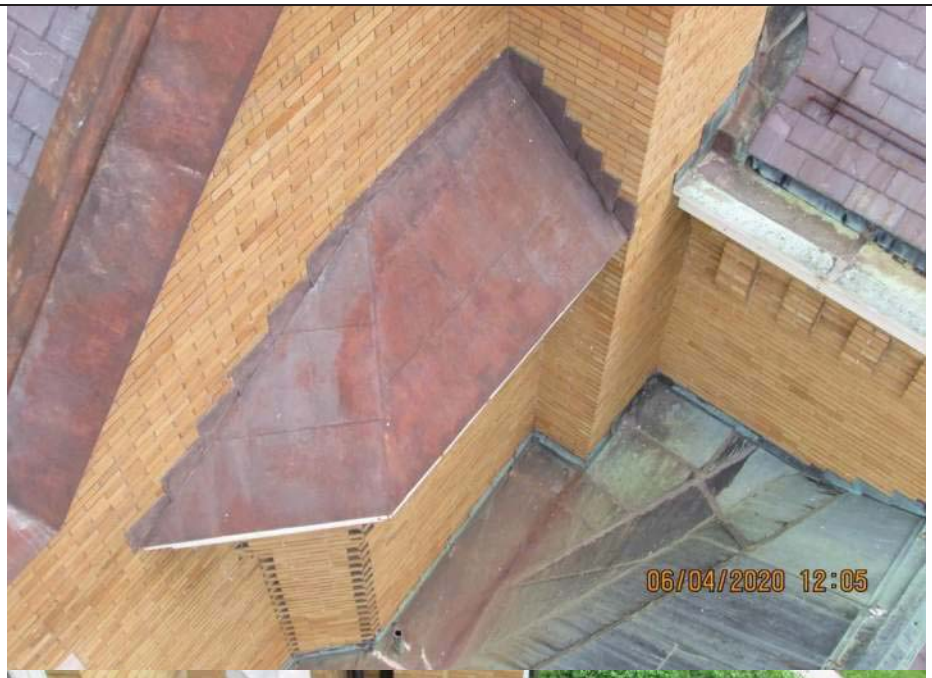
SOUTH END FLAT SEAM ROOF PHOTOGRAPHS

Photo 204:

View of one (1) of the flat seam roofs at the building south end. Condition of the terne metal panels was poor to less than fair.

Photo 205:

View of the other flat seam roof at the south west corner. Condition of the terne metal panels was also poor to less than fair.



STEEP SLOPED SHINGLE ROOF PHOTOGRAPHS

Photo 206:

View of shallow sloped roof covering the west side entry. The exposed roof was No Cut-out Organic Asphalt shingles. Condition of the shingles was poor.

Photo 207:

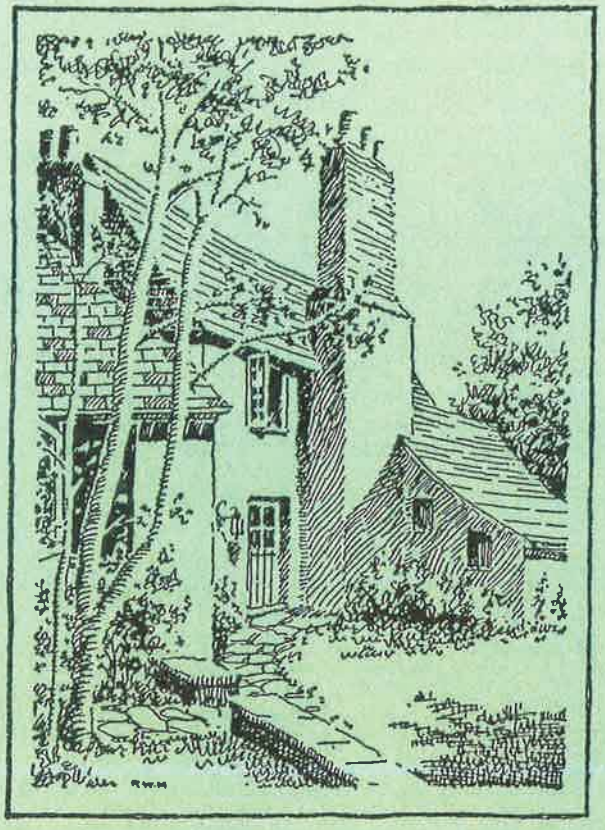
View of leader pipe from the upper Main Roof large built-in gutter that drains onto this roof. Note the original cast iron drain line had been capped.

Photo 208:

View of condition of the No-Cut Out shingles along the bottom. The shingles were decayed and dry rotted. Some along the edge were broken.

ATTACHMENT #2

SLATE ROOFS



Greenstone Slate

ARCHITECTURAL ROOFING SLATE

P.O. Box 134 • Poultney, Vermont 05764 • 802-287-4333 • Fax 802-287-5720

which is badly cut up with hips, dormer windows, etc., which should be stripped, and I do that. But the average roof lays very nicely over shingles with slates 18″ or longer, and valleys go in well over shingles. Short slates do not lay well over shingles, as the slate necessarily rests on the shingle butts and it should span at least two courses of the wood shingles.

"I lay the American method entirely, and do over-shingles work for about 25% more than the cost of stripping and reroofing with wood shingles. A 6d nail is used, which goes through the old shingles and into the roof boards. I also punch four holes in the slate instead of only two, as sometimes we don't get good nailing and have to use the other pair of holes."

Another roofer, who has made a specialty of over-shingle work secures better results where the old surface is more or less uneven, with slates 12″ and 14″ long. He says, "They lay well and fit the contours much better than the larger sizes and further they are less liable to breakage where carpenters, painters and others must use the roof." The Association partial payment plan makes reroofing with slate conveniently financed.

MAKING ADDITIONS OR ALTERATIONS TO SLATE ROOFS

Once a slate roof is properly laid it will be permanent and require little or no upkeep or care. However, houses are sometimes enlarged or remodeled. In such cases it is often necessary to join a new and old roof or to remove and alter sections of the existing roof.

It is desirable and necessary that the altered or additional roof match the existing one in both shade and texture. To obtain this result, it is advisable to secure slate of the same quality and color as the original slate. Slates from some quarries weather, that is, the color as first quarried will differ from the permanent shade resulting from a few months' exposure to the weather. Other slates are permanent or unfading and do not mellow on exposure but retain the original natural shades.

To match slates that are unfading, requires unfading slate of the same shade or slate which will weather to the desired shades. If the slate on the roof has already weathered, it can be matched with unfading slate or with weathering slates which will mellow to the desired effect. Securing slate from the original quarry, reduces trouble about matching or colors. However, in many remodeling jobs, the slate has been on the roof for many years and no record of the quarry from which it came will be available.

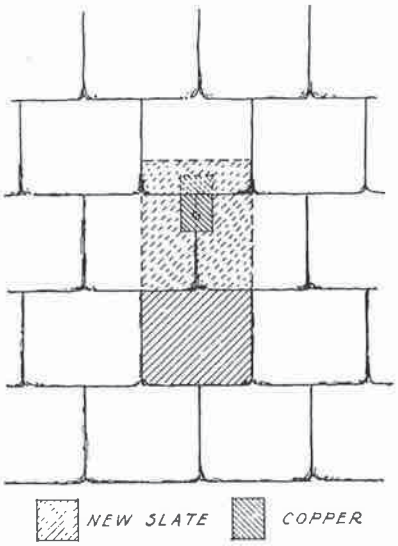
An experienced slate roofer can usually identify slate as to producing vein but in case of doubt samples may be submitted to the Association for classification.

The best method of procedure is to remove small adjoining sections and relay, mixing some new slate with the old. This will prevent a clear line of demarcation where the new work adjoins the old and the completed roof will at once present a satisfactory appearance.

In minor alterations such as adding or removing a dormer, the old slate which is removed can be used again. In dormers and other projections, the lights and shadows will differ from those on an expanse of roof, making it easier to add new slate which will be unnoticed. For example, new slates could best be used on cheeks of a new dormer using old slates on other parts. Some roofers buy up a number of old roofs from buildings which are being torn down and thus obtain old weathered slate in their yards which can be readily matched with the slate on the roof when minor alterations are made.

However, due to unavoidable causes, slates are sometimes broken on the roof. The broken slate can be repaired by the Slate Roofer. The best method is to first remove the broken slate, cut the nails with a ripper and remove any remaining small pieces of slate. Insert new slate and nail this slate through the vertical joint of the slates in the overlying course approximately 5 inches from the head of the slate, or 2 inches below the tail of the second course of the slate above; over this nail insert a piece of copper approximately 3 inches in width by 8 inches in length. The piece of copper should be inserted under the course above, lengthwise, so that it will extend a couple of inches under the succeeding course, thus insuring a proper lap and protection throughout the exposed joint in which the nail is driven. This small piece of metal should be first bent slightly concave or convex which will insure its remaining tightly in place.

When making alterations to a slate roof, only responsible and experienced slate roofers should do the work. If other workmen are required to use ladders or scaffolds on slate roofs, boards should be used under the legs or uprights to distribute the pressure.



PROPER METHOD OF INSERTING A NEW SLATE

ATTACHMENT #3

STANDARD PRACTICE FOR SHEET METAL WORK

NATIONAL ASSOCIATION
SHEET METAL
CONTRACTORS

Box Gutter Lining

Drawing No. 16

The details in Drawing No. 16 show the method of lining wood sheathed box gutters with sheet metal and connecting them to sheet metal or wood cornices and flat seam roofing.

Fig. 1 shows how the gutter is formed on sheathing laid inside of a sheet metal cornice. The cornice is constructed with a drip at *A* in the foot mold, with projecting edge at *X* above the crown mold. When the wall is built to the bottom line of the foot mold at *A*, a space of 4 in. (one course of bricks) is left and then the wall carried up as high as *F* to receive the wooden lookouts for the gutter. The wall is then continued and the rafters set. Thus there is an open space of 4 in. from *A* upward. The braces are located on the wall and wall hooks driven in the brick joint as at *B*, with the top of the hook turned inward as at C. The lower anchor on the cornice also has an acute angle as at *D*.

The cornice is set on the wall and the drip drawn snugly against the wall line by twisting the wire as at *E*. The cornice is set plumb and true by temporary fastenings and the anchor *F* bolted to the brace as at *G*. The brick wall is completed in the 4-in. space up to the top of the rafter, which holds the cornice in position.

In sheathing the gutter it is essential that all nails are driven flush and the proper grade given to the outlets. Note that there are no right angular corners in the gutter. The sheet metal gutter lining is locked to the front edge of the metal cornice as shown and turned on the roof with a lock secured with cleats. All cross seams in the gutter are cleated.

As shown at *a* the upper flange of the cornice is nailed in a straight line about 2 or 3 in. apart.

Fig. 2 shows how the gutter lining is connected to the wood cornice to allow for expansion and contraction and to avoid nailing along the front gutter edge, as is frequently done. Two methods are shown. The first one, *A*, consists of a double fold angle nailed to the top of the cornice as at *b* to which the gutter lining is locked. In the other method presented in Fig. 3, a single angle is employed with a hem edge at the bottom as shown, nailed to the front edge of the crown mold as at *C* to which the lining is locked. To cover the nail heads, the lock is turned down as shown at *B* in Fig. 4.

Expansion Joint for Box Gutter Lining

Drawing No. 17

In Drawing No. 17 is shown how the lock is made between flat seam roofing and box gutter lining so that the expansion joints may be constructed at both high and low points of the gutter lining.

Fig. 1 shows the construction of the lock at the eaves line joining the gutter lining. While a flat seam roof is here shown, this lock is used also with standing seam and batten roofing. It is also used in connection with the eaves strip on composition, flat tile, slate and Spanish tile roofs.

The upper part of the metal cornice shown in Fig. 1 has a roof flange as indicated at *A*, which is nailed to the sheathing. Over this flange the gutter lining locks as at *B*. At the eaves of the roof the gutter lining is turned out $\frac{5}{8}$ in. as shown at *C*. The flange *C* is secured every 8 or 10 in. with cleats, as at *D*, over which the roofing sheets are locked as indicated at *E*. Note the small drip bent on the roofing lock at *F*, which prevents capillary attraction.

To allow for the expansion and contraction of the gutter in its length, expansion joints are placed at the high and low points of the gutter. When the head is soldered in, the upper flange extends below the gutter flange a distance equal to *W*. The height at *X* is just enough to permit the locks on both sides of the sliding cap to slip in with ease, which is clearly indicated in Fig. 2 and 3.

In Fig. 2 is shown the connection of the heads and sliding cap at the upper end of the gutter, under the gutter flange at the eaves. Note that the sliding cap has an upturned lock at *A*, which slips under the $\frac{5}{8}$-in. outward turned flange of the gutter lining, as shown at the left and over this gutter flange and lock of the sliding cap, the roofing is locked. Where the roofing fastens over the lock of the sliding cap, the drip shown at *B* is notched out.

Fig. 3 shows clearly the connection of the heads and sliding cap at the lower end of the gutter where it joins the cornice flange. Note the broken
ong *B-C-D*. The height of the head at *F* is
ated. It should be high enough to allow
the lock *D* to slip in with ease.

To prevent the rain water from following the

(Continued on page 84)

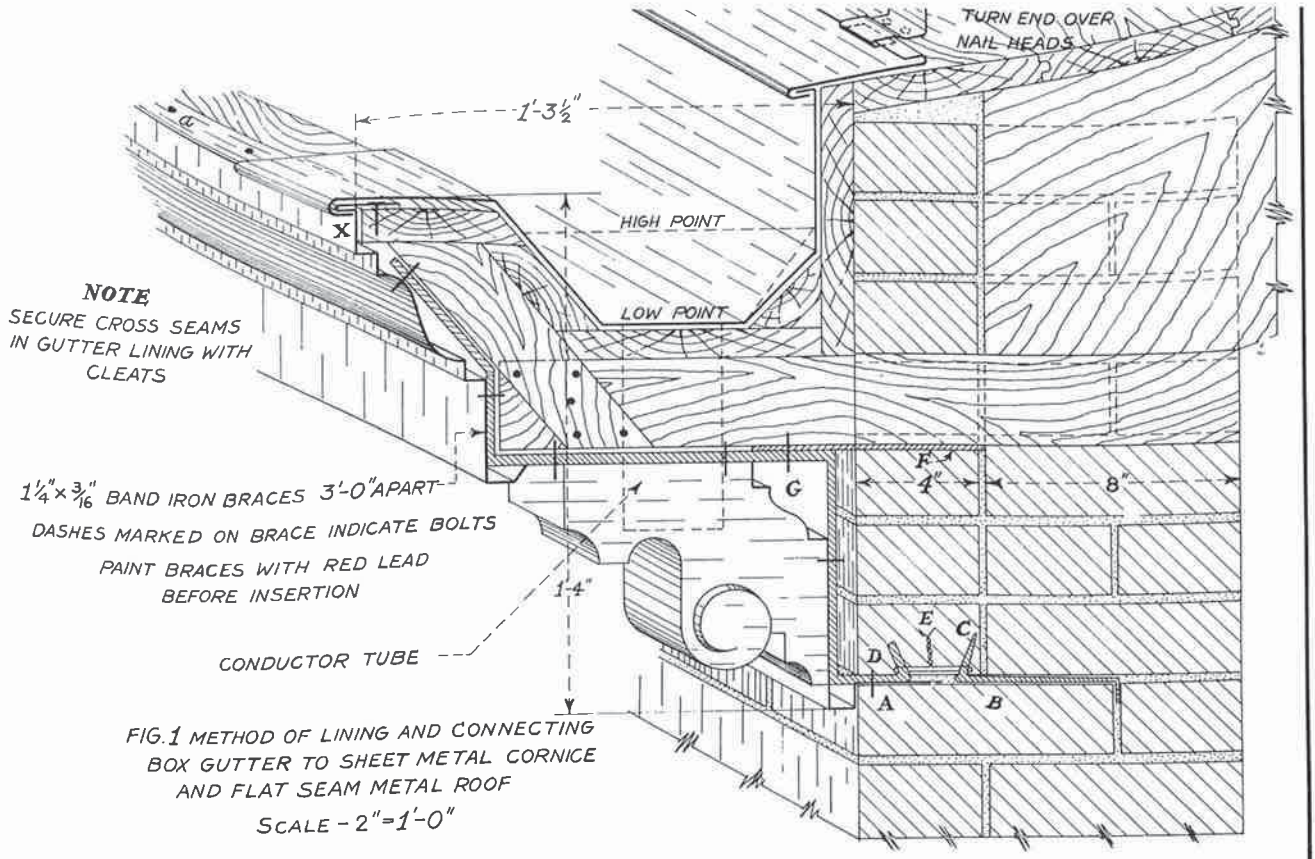


FIG. 1 METHOD OF LINING AND CONNECTING BOX GUTTER TO SHEET METAL CORNICE AND FLAT SEAM METAL ROOF

SCALE - 2" = 1'-0"

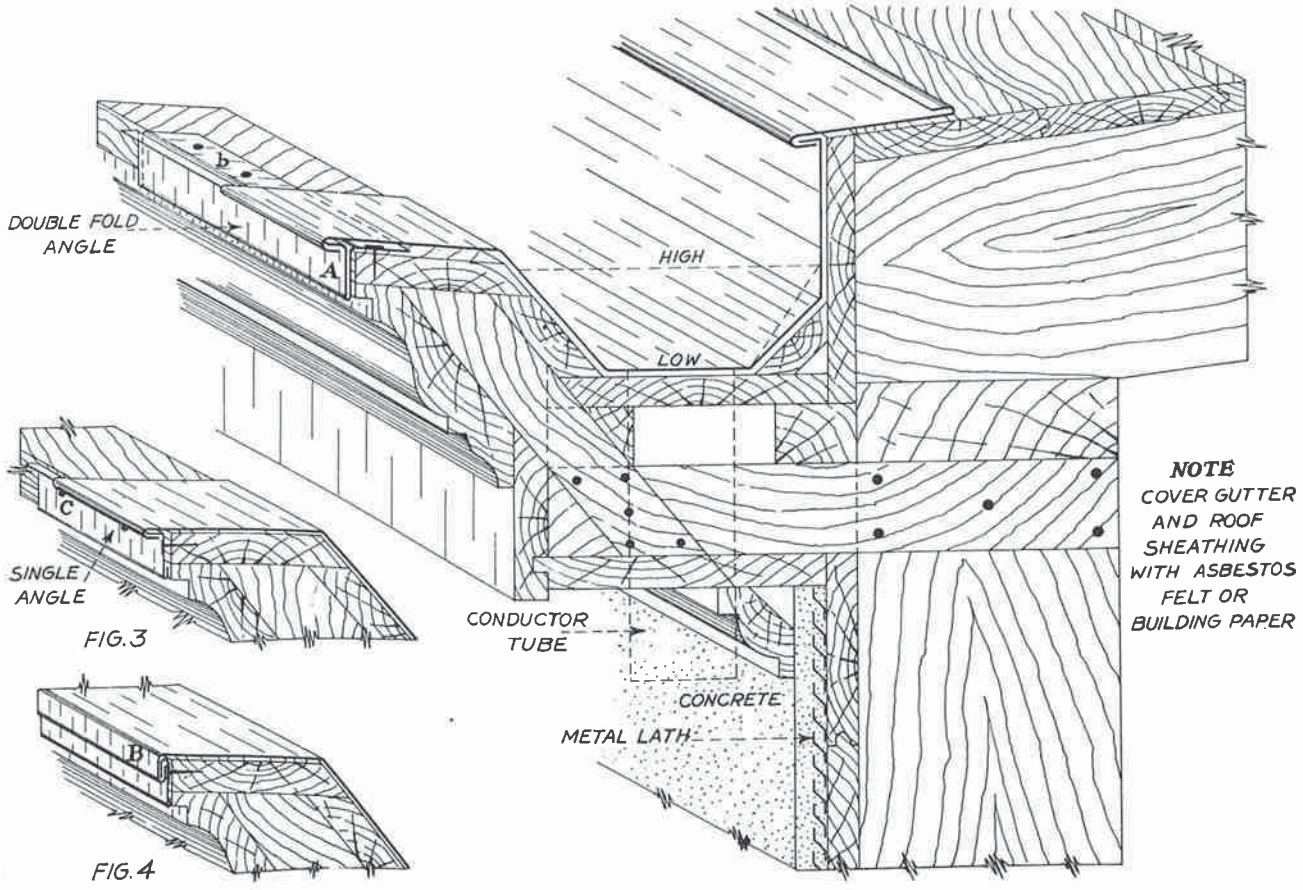


FIG. 3

FIG. 4

SCALE - 2" = 1'-0" FOR FIG. 2-3 AND 4

FIG. 2 METHOD OF LINING AND CONNECTING BOX GUTTER TO WOOD CORNICE AND FLAT SEAM METAL ROOF

TRADE DEVELOPMENT COMMITTEE National Association Sheet Metal Contractors	BOX GUTTER LINING	DRAWING NUMBER 16

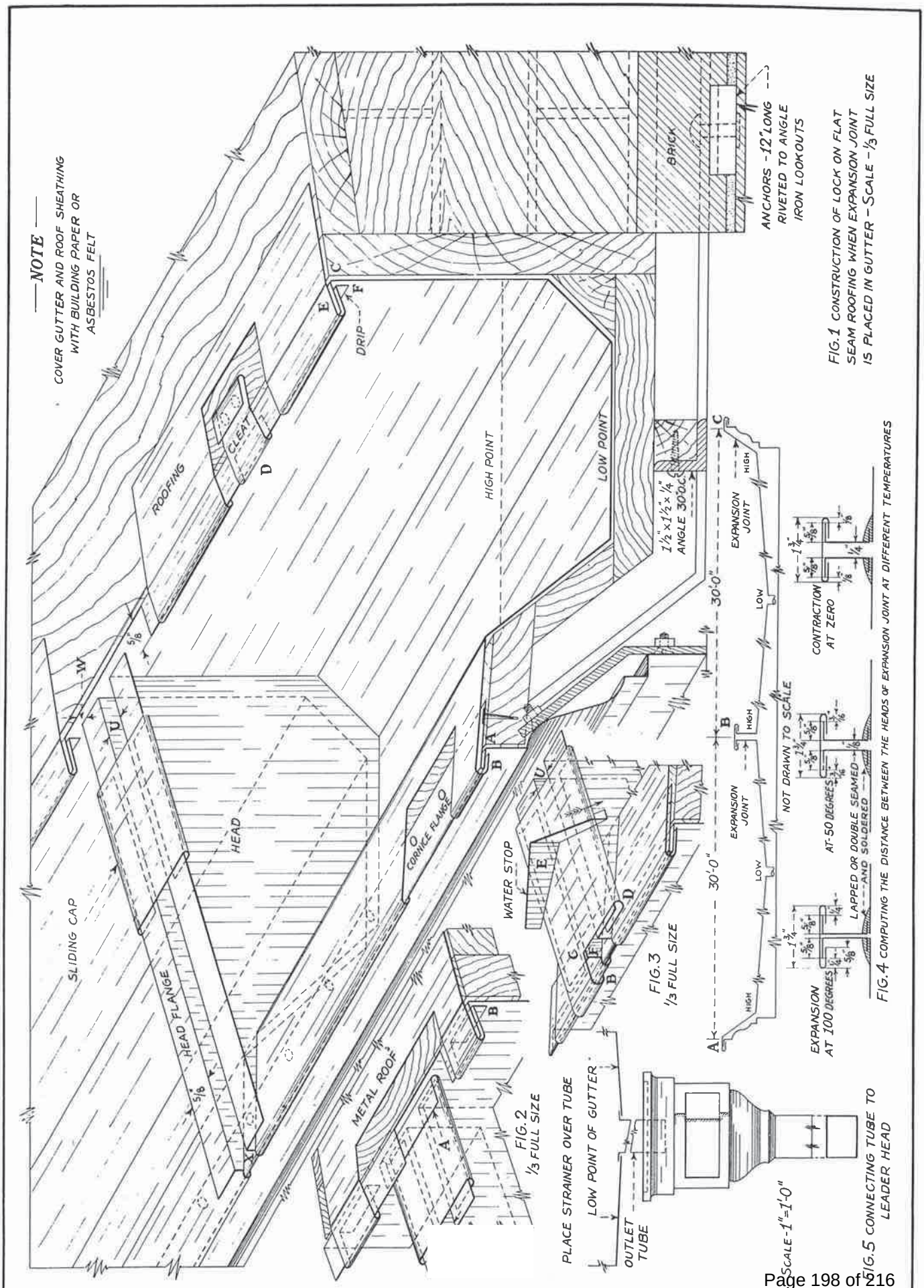


FIG. 1 CONSTRUCTION OF LOCK ON FLAT SEAM ROOFING WHEN EXPANSION JOINT IS PLACED IN GUTTER – SCALE – ⅓ FULL SIZE

FIG. 2 ⅓ FULL SIZE

FIG. 3 ⅓ FULL SIZE

FIG. 4 COMPUTING THE DISTANCE BETWEEN THE HEADS OF EXPANSION JOINT AT DIFFERENT TEMPERATURES

FIG. 5 CONNECTING TUBE TO LEADER HEAD

sliding cap and dripping over the edge of the cornice, a water stop *E* is placed at the lower end, which sheds the water on each side into the gutter, as indicated by the arrow.

Assuming that the gutter is 60 ft. long and there are two leaders or conductors, as shown in Fig. 4, and that copper is used for the lining, as the sheet copper expands and contracts approximately ⅛ in. for every 10 ft. in a rise of temperature from Zero to 100 deg., 60 ft. will expand or contract ¾ in. This is taken care of by three expansion joints, *A*, *B* and *C*, which allow for ¼ in. each. Note that the distance between the heads, as at *U* in Fig. 1, 2 and 3, is determined by the temperature at the time the work is erected. If each run of the gutter is 30 ft., as shown in Fig. 4, and the space allowed at each expansion joint is ¼ in., then if the work is being erected at a temperature of 50 deg., the minimum distance required between the heads is ⅛ in., as shown in the lower center diagram.

Fig. 5 shows a 1-in. scale drawing of the outlet tube at the low point of the gutter, connecting to the leader head.

Box Gutter Lining at Standing Seam Roof

Drawing No. 18

The methods of making connections between standing seam roofing, joining the lock on the flange of the gutter lining turned over the roof, locking the roofing to the edge turned on back of the gutter lining and securing to metal eaves strip fastened to the eaves of the roof, are presented in Drawing No. 18.

Fig. 1 shows the construction of a wood cornice over shingled siding. A double fold metal angle is nailed along the top edge of the cornice, as shown, to which the gutter lining is locked. In this construction, the gutter lining is turned over on the roof with a lock edged, as shown, to which the standing seam roofing is locked. If the roof is quite flat and it is necessary to solder the cross seams as well as the seam joining the gutter lining, then no expansion joints are placed in the gutter, because it is firmly secured to the roofing by means of the flange turning over on the roof. If, however, the roof is quite steep and it is not necessary to solder the cross seams, then expansion joints are placed in the gutter similar to the construction explained in connection with Drawing No. 17, except that the upper line of the head runs from *A* to *B* in Fig. 1 on Drawing No. 18, allowing the sliding cap to slip under the lock of the gutter lining at *A*. If the butt of the standing seam is to be turned down, the appearance is like *X*. Cleats are placed along seam of gutter lining about 8 in. apart, as shown at *Y*. When the roof is quite flat and expansion joints are required, then the gutter lining is bent, as shown in Fig. 2, with a ⅝-in. edge turned outward at the top of the gutter lining as at *C*, to which the roofing is locked. The expansion joints are made as shown on Drawing No. 17.

Fig. 3 shows the metal roofing locked to the eaves strip nailed along the eaves of a roof on which no gutter is desired.

Batten Roof Connections to Gutter

Drawing No. 19

Drawing No. 19 shows how connections are made between the gutter lining and batten roof, providing for horizontal expansion and contraction of the sheets between the battens.

When metal roofing is laid over battens the usual practice is to solder the overlaps shown by *F-F* in Fig. 2. While this is permissible when tin or galvanized iron is used for the covering, as there is practically no expansion and contraction in the 20 or 24-in. space between the battens, this method is not employed when copper or zinc is used. When copper or zinc batten roofing is laid, full allowance is made for the expansion and contraction of the metal both horizontally and vertically. On copper or zinc roof covering, the soldering of the overlaps holds the sheets rigid and firm at the eaves and prevents free movement of the metal sheets between the battens at the eaves line which defeats the very object for which the battens were cut tapered at the base as shown in *B*, Fig. 1, where a ⅛-in. taper is given on both sides of the batten.

To avoid any soldering at the eaves of the batten strip, six progressive steps in the application of the sheet metal are shown in Fig. 1 and 2. Note in Fig. 1 that the back of the gutter is

(Continued on page 37)

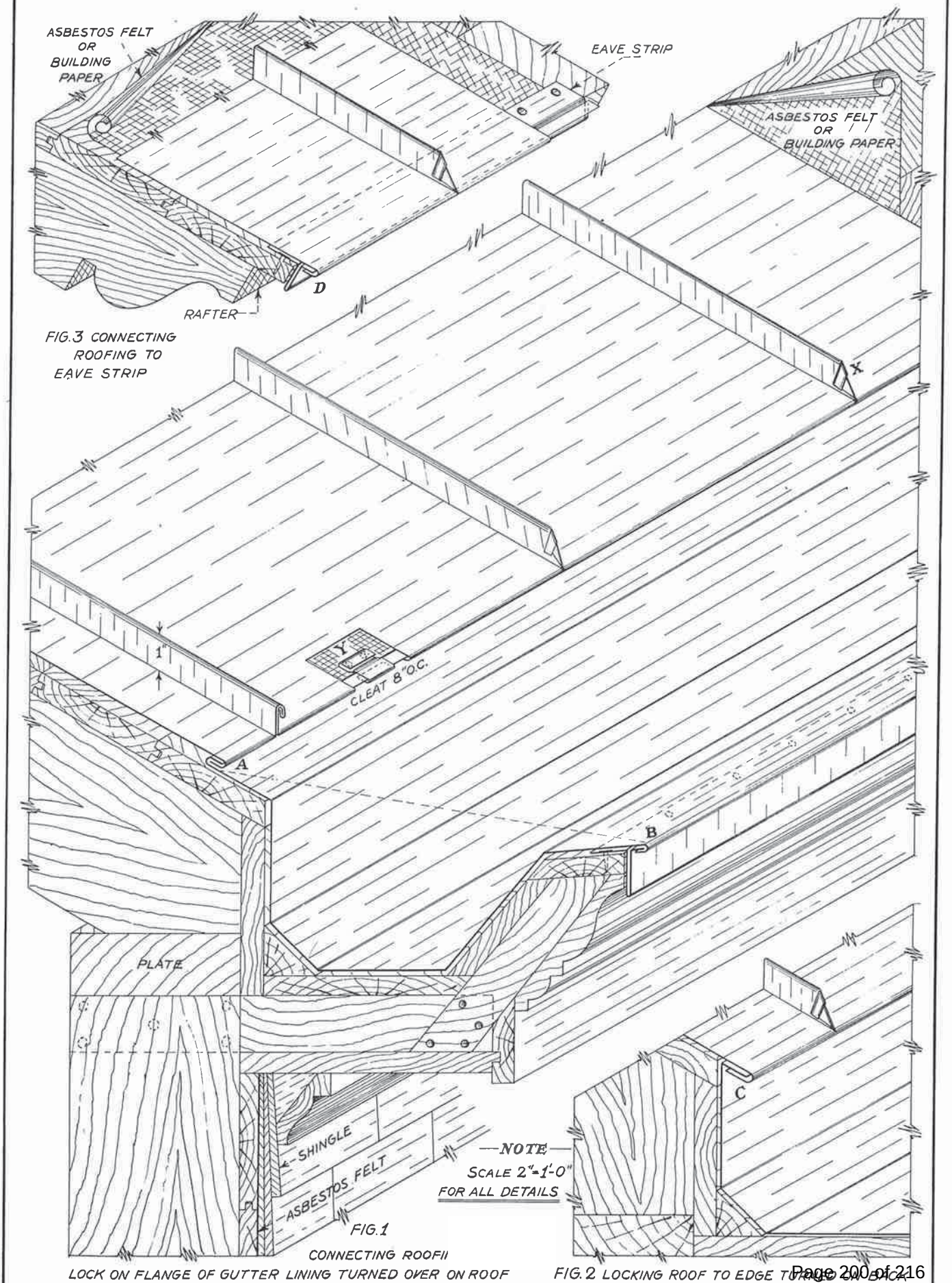


FIG. 3 CONNECTING ROOFING TO EAVE STRIP

FIG. 1 CONNECTING ROOFII LOCK ON FLANGE OF GUTTER LINING TURNED OVER ON ROOF

FIG. 2 LOCKING ROOF TO EDGE TURNED ON BACK OF GUTTER LINING

DETAILED COST ESTIMATES

COST ESTIMATE

09.16.2020

St. Stanislaus Kostka Church
Adams MA

Structures by Design, Inc.
413-586-1086

Renovation Study 1.1

Kuhn Riddle Architects

Summary

Item	Division Title				
1	Exterior Masonry Elements			$	204,333
2	Towers			$	64,255
3	Foundation, Basement & First Floor Framing			$	95,335
4	Sanctuary & Sanctuary Ceiling			$	158,000
5	Attic & Roof Framing			$	378,938
6	Roofing Recommendations			$	105,975
7	Decorative Sheet Metal Fabrications - Scheme A			$	80,220
8	Decorative Sheet Metal Fabrications - Scheme B - Net Add			$	28,287
	Subtotal			**$**	**1,115,343**
	General Ext Staging/Scaffolding per sf x 2 mo	36000	$6		216,000
	Subtotal			**$**	**1,331,343**
	General Requirements/Conditions	8.00%			106,507
	Subtotal			**$**	**1,437,850**
	Design/Estimating Contingency	20.00%			287,570
	TOTAL	*1.55*	*(note 1)*	**$**	**1,725,420**

Notes

1 *To determine total cost of one item, multiply times 1.55.*
2 *Recommended annual inspection costs are not included above. Budget $3000 average annually.*
3 *Costs shown reflect current pricing. Add 3-5% inflation annually for future work.*

St. Stanislaus Kostka Church
Adams MA
09.16.2020

Structures by Design, Inc.
Easthampton MA

Renovation Study 1.1
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
1	**Exterior Masonry Elements**						
div 02	***general***						
	temporary building protection	ls		4,000	-	1	$ 4,000
	temporary barricades	ls		3,000	-	1	$ 3,000
	dumpster	ea	0	1200		1	$ 1,200
	landscape repairs	ls	500	1500		1	$ 2,000
	cleanup	ls	100	900		1	$ 1,000
	subtotal						***$ 11,200***
div 04	***masonry***						
gen	general masonry repointing	sf	0.75	9.00		8,000	$ 78,000
gen	brick tie remediation	sf	6.50	8.00		2,112	$ 30,624
1	pressure-wash/treat masonry	sf	0.30	2.80	-	20,000	$ 62,000
2	*periodic masonry inspection - included in Summary*						
3	repair east side above entrance - replacement ties and masonry	sf	5	50		66	$ 3,630
4	thermal crack at buttress - helifix anchor	lf	13	16		440	$ 12,760
4	vertical expansion joint option - not included	ea	0	-		-	$ -
5	north side above entrance stone stringcourse - clean, replace with post-installed anchors	lf	10	30		27	$ 1,080
5	north side above entrance - rebuild brick dentil	sf	8	23		81	$ 2,511
6	south side chimney - repoint upper section	sf	0.75	15		24	$ 378
6	south side chimney - new metal cover	ea	250	100		1	$ 350
6	south side chimney - clean interior brick liner-80 lf	lf	0	1,800		1	$ 1,800
	subtotal						***$ 193,133***
	Subtotal Exterior Masonry Elements						**$ 204,333**
2	**Towers**						
div 02	***general***						
	temporary building protection	ls		1,500	-	1	$ 1,500
4	remove bird excrement (hazmat)	ls	1500	12000		1	$ 13,500
	note: bell in east tower impedes cleaning access						
4	general cleaning interior	ls	200	700		1	$ 900
	subtotal						***$ 15,900***
div 04	***masonry***						
1	interior masonry cleaning - one time (57 lf x 84 lf x 2 towers)	sf	0.1	0.70		9,576	$ 7,661
1	interior masonry limewash - one time	sf	0.1	1.20		9,576	$ 12,449
	masonry repointing/repairs - 15% surface	sf	0.75	9.00		1,500	$ 14,625
	subtotal						***$ 34,735***

Renovation Study 1.1
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 05	***metals***						
3	fabricated ladder tower	lf	70	35		44	$ 4,620
	subtotal						***$ 4,620***
div 06	***wood & plastics***						
5	roof sheathing repairs budget	ls	500	2500.0		1	$ 3,000
	subtotal						***$ 3,000***
div 09	***finishes***						
6	prep and paint structural steel	ls	400	5600		1	$ 6,000
	subtotal						***$ 6,000***
Subtotal Towers							**$ 64,255**

3 Foundation, Basement, & First Floor Framing

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 02	***general***						
	temporary building protection	ls		2,500	-	1	$ 2,500
	cleanup	ls	100	500		1	$ 600
	subtotal						***$ 3,100***
div 06	***wood & plastics***						
2	blocking at posts, strapping at beam connection	ea	60	500		6	$ 3,360
	subtotal						***$ 3,360***
div 09	***finishes***						
1	demo suspended ceiling and grid	sf	0	0.75		7500	$ 5,625
1	demo wood lath and plaster ceiling (hazmat)	sf	0	1.00		7500	$ 7,500
1	channel supports for new wallboard ceiling	sf	1.00	1.00		7500	$ 15,000
1	new wallboard ceiling	sf	1.00	2.00		7500	$ 22,500
1	new suspended ceiling and grid	sf	2.00	2.50		7500	$ 33,750
1	repair existing finishes	sf	0.10	0.50		7500	$ 4,500
	subtotal						***$ 88,875***
Subtotal Foundation, Basement, & First Floor Framing							**$ 95,335**

4 Sanctuary & Sanctuary Ceiling

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 02	***general***						
	temporary building protection	ls		6,000	-	1	$ 6,000
1	interior staging	ls	0	0	12,000	1	$ 12,000
1	cleanup	ls	100	1000		1	$ 1,100
	subtotal						***$ 19,100***

Renovation Study 1.1
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 09	***finishes***						
1	demo lath and plaster budget (hazmat)	ls	0	25000		1	$ 25,000
1	repair plaster lath	sf	0.50	7.00		1000	$ 7,500
1	repair plaster	sf	2.00	12.00		4000	$ 56,000
1	paint finishes at plaster repairs	sf	0.20	4.00		12000	$ 50,400
	subtotal						***$ 138,900***
Subtotal Sanctuary & Sanctuary Ceiling							**$ 158,000**

5 Attic & Roof Framing

div 02	***general***						
	mobilization, misc. prep	ls		6,000	-	1	$ 6,000
	cleanup	ls	100	2000		1	$ 2,100
	open roof for material access, repair roof	ls	5000	15000		1	$ 20,000
	subtotal						***$ 28,100***
div 04	***masonry***						
	masonry repointing/repairs budget	sf	700	20,000		1	$ 20,700
	subtotal						***$ 20,700***
div 06	***wood & plastics***						
	primary framing						
3	cupola truss: improve attachment of built-up members-56 lf	lf	18	38.00		112	$ 6,272
4	cupola framing: anchor to cupola truss	ea	15.00	75.00		8	$ 720
5	cupola beam: reinforce with engineered lumber	lf	12.00	20.00		224	$ 7,168
6	*see secondary framing*						$ -
7	typ truss corbels: steel saddle reinforcement	ea	90.00	300.00		16	$ 6,240
8	typ truss: add 4x4 strut 2@12' x 8 qty	lf	8	30		192	$ 7,296
9	typ truss: add 4x8 sister 12' x 2 x 8 qty	ea	35	320.00		16	$ 5,680
10	typ truss: solid blocking, clip posts, anchor support - 2 per truss	ea	20.00	150.00		16	$ 2,720
11	typ truss: shim 6x6 posts, add simpson plate	ea	20.00	100.00		16	$ 1,920
12	transept truss: reinforce 2-c12x13, 2@62 lf	lf	40	60.00		248	$ 24,800
13	transept truss: add 6x6 strut-2@16 lf x 2 trusses	lf	10	35.00		32	$ 1,440
14	transept truss: 2@10' x 2 trusses-engineered wood strut	lf	15	35.00		40	$ 2,000
15	transept truss:stitch bolt at split or check budget	lf	4.00	10.00		200	$ 2,800
16	transept truss:steel plate-2 x 17 ea	ea	25.00	60.00		24	$ 2,040
17	tower truss: engineered wood strut	lf	4.00	15.00		64	$ 1,216
18	tower truss: steel plate-2 x 12 qty x 2 trusses	ea	25.00	60.00		48	$ 4,080
19	tower truss:stitch bolt at split or check-budget	lf	4.00	10.00		150	$ 2,100
20	tower truss: add steel angle to masonry	ea	15	100.00		4	$ 460
21	tower truss: shim connection, add simpson plate	ea	20.00	100.00		12	$ 1,440
22	tower truss: sister diagonal 1.75x9.5 lvl-4@14'	lf	8	35		66	$ 2,838
23	tower truss: sister bottom chord 1.75x11.875 lvl- 56'x2	lf	9	38.00		112	$ 5,264
	subtotal						***$ 88,494***

Renovation Study 1.1

Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
	secondary framing						
2	purlins: sister 2-1.75x9.5 lvl at transept truss	lf	8	35.00		224	$ 9,632
2	purlins: sister 2-1.75x14 lvl	lf	10	39.00		832	$ 40,768
3	catwalk: framing, deck, guardrail, repairs	lf	30.00	150.00		500	$ 90,000
4	apse: hurricane clips	ea	6.00	10.00		64	$ 1,024
5	steel tie rods: inspection - not included						$ -
6	cupola: sister dunnage beams 2-1.75x11.5	lf	9.00	37.00		120	$ 5,520
7	hurricane clips during roofing - budget	ea	4	10		150	$ 2,100
	subtotal						***$ 149,044***
	subtotal primary and secondary framing						***$ 286,338***
div 09	***finishes***						
1	demo lath and plaster budget (hazmat)	ls	0	10000		1	$ 10,000
1	repair plaster lath	sf	0.50	7.00		400	$ 3,000
1	repair plaster	sf	2.00	12.00		1000	$ 14,000
1	paint finishes at plaster repairs	sf	0.20	4.00		4000	$ 16,800
	subtotal						***$ 43,800***
	Subtotal Attic & Roof Framing						**$ 378,938**

6 Roofing Recommendations

div 02	***general***						
	temporary building protection	ls		4000	-	1	$ 4,000
	temporary barricades	ls		4000	-	1	$ 4,000
	dumpster	ea	0	900.00		4	$ 3,600
	landscape repairs	ls	500	3000		1	$ 3,500
	cleanup	ls	100	2000		1	$ 2,100
	subtotal						***$ 17,200***
A	***slate roofs and built-in gutters***						
div 07	***thermal & moisture protection***						
1.8	replace damaged slate - budget (per location)	ea	20.00	180.00		50	$ 10,000
1.9	metal flashings - no work						$ -
1.10	repair damaged flashings	ls	3000	15000		1	$ 18,000
1.11	repair/replace snow retention system - budget	ls	8000.00	2000.00		1	$ 10,000
1.12	repair copper gutter liner	ls	300.00	500.00		1	$ 800
1.12	repair/paint galv gutter cover partial (includes paint)	ls	300.00	500.00		2	$ 1,600
	subtotal A						***$ 40,400***
B	***copper standing seam and flat seam roof***						
div 07	***thermal & moisture protection***						
2.3	demo copper roof	sf	3.00	3.75		660	$ 4,455
2.3	new plywood sheathing budget	sf	2.00	5.00		660	$ 4,620
2.3	new copper roof	sf	12.00	16.00		660	$ 18,480
2.4	repair/replace copper gutter liner		25.00	20.00		94	$ 4,230

Renovation Study 1.1
Itemization

		Unit	Mtl	Labor	Equipt	Qty		Subtotal
	subtotal B						***$***	***31,785***
C	***tower roofs and ornate flashings***							
div 07	***thermal & moisture protection***							
3.2	replace damaged slate - budget (per location)	ea	20.00	150.00		30	$	5,100
3.7a	terne metal dormers repair - budget	*see 'Decorative Metal Fabrications Scheme B'*					$	-
3.7b	ornate pinnacle flashings - repair	*see 'Decorative Metal Fabrications Scheme B'*					$	-
3.7c	ornate pilaster repair - budget	*see 'Decorative Metal Fabrications Scheme B'*					$	-
3.7d	balcony flashings - repair	*see 'Decorative Metal Fabrications Scheme B'*					$	-
	subtotal C						***$***	***5,100***
D	***tower belfry roofs***							
div 07	***thermal & moisture protection***							
	clean debris	ls	10.00	600.00		1	$	610
	remove metal roofing	sf	0.00	3.00		320	$	960
	liquid applied roof membrane	sf	7.00	13.00		320	$	6,400
	subtotal D						***$***	***7,970***
E	***asphalt shingle roof***							
div 07	***thermal & moisture protection***							
5.1	remove/replace organic shingles - est. 11' x 20'	sf	7.00	9.00		220	$	3,520
	subtotal E						***$***	***3,520***
Subtotal	**Roofing Recommendations**						**$**	**105,975**

7 Decorative Sheet Metal Fabrications - Scheme A

remove fabrications, repoint masonry, provide caps

div 02	***general***							
	temporary building protection	ls		2,000	-	1	$	2,000
	temporary barricades	ls		3,000	-	1	$	3,000
	dumpster	ea	0	900		3	$	2,700
	landscape repairs	ls	500	1200		1	$	1,700
	cleanup	ls	100	500		1	$	600
	subtotal						***$***	***10,000***
div 04	***masonry***							
	masonry repointing and repairs budget	sf	0.75	9.00		2,000	$	19,500
	subtotal						***$***	***19,500***
div 06	***wood***							
	cupola: demo for crane removal	ls	100	6,000		1	$	6,100
	cupola: frame and sheathe cap	sf	8	78		60	$	5,160
	tower: blocking for new flashing	sf	2	20		200	$	4,400
	subtotal						***$***	***15,660***

Renovation Study 1.1
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 07	***roofing***						
	tower: demo metal at architrave, pilasters, upper/lower ledge flashing, balcony, pinnacles, misc.	ea	100	3,200		1	$ 3,300
	tower: new copper flashing - 160 lf ea	sf	35	10		400	$ 18,000
	cupola: copper standing seam cap and flashing	sf	50	35.00		63	$ 5,355
	cupola: flashing to existing roof	lf	40	25.00		45	$ 2,925
	tower pinnacle: new copper base	ea	80	100.00		16	$ 2,880
	subtotal						***$ 32,460***
div 09	***finishes***						
	prep surfaces	sf	0	1.00		200	$ 200
	painting	sf	1.00	3.00		600	$ 2,400
	subtotal						***$ 2,600***
	Subtotal Decorative Sheet Metal Fabrications - Scheme A						**$ 80,220**

8 Decorative Sheet Metal Fabrications - Scheme B

repair or replace sheet metal fabrications, repoint masonry

div 02	***general***						
	temporary building protection	ls		1,000	-	1	$ 1,000
	temporary barricades	ls		3,000	-	1	$ 3,000
	dumpster	ea	0	900		1	$ 900
	landscape repairs	ls	200	600		1	$ 800
	cleanup	ls	100	500		1	$ 600
	subtotal						***$ 6,300***
div 04	***masonry***						
	masonry repointing and repairs behind decorative metal	sf	0.75	9.00		800	$ 7,800
	subtotal						***$ 7,800***
div 05	***metals***						
3.7a	terne metal dormers repair - budget	sf	7.00	90.00		50	$ 4,850
3.7b	ornate pinnacle flashings - repair	ea	200.00	150.00		16	$ 5,600
3.7c	ornate pilaster repair - budget 16x13'=208 lf	lf	7.00	90.00		21	$ 2,037
3.7d	balcony flashings - repair	sf	7.00	50.00		200	$ 11,400
	tower gable horizontal cap (includes roofing repairs)	sf	12.00	180.00		160	$ 30,720
	cupola repair	sf	7.00	90.00		150	$ 14,550
	cupola replacement	sf	25.00	90.00		50	$ 5,750
	subtotal						***$ 74,907***
div 09	***finishes***						
	metalwork and cupola only						
	prep surfaces - budget	sf	0	1.50		3,000	$ 4,500
	painting - budget	sf	1.00	4.00		3,000	$ 15,000
	subtotal						***$ 19,500***
	Subtotal Decorative Sheet Metal Fabrications - Sch						**$ 108,507**

COST ESTIMATE

09.22.2020

St. Stanislaus Kostka Church
Adams MA

Structures by Design, Inc.
413-586-1086

Renovation Study 1.2

Kuhn Riddle Architects

Summary

Item	Division Title				
1	Exterior Masonry Elements			$	204,333
2	Towers			$	64,255
3	Foundation, Basement & First Floor Framing			$	95,335
4	Sanctuary & Sanctuary Ceiling			$	158,000
5	Attic & Roof Framing			$	378,938
6	Roofing Recommendations			$	964,415
7	Decorative Sheet Metal Fabrications - Scheme A			$	80,220
8	Decorative Sheet Metal Fabrications - Scheme B - Net Add			$	28,287
	Subtotal			**$**	**1,973,783**
	General Ext Staging/Scaffolding per sf x 2 mo	36000	$6		216,000
	Subtotal			**$**	**2,189,783**
	General Requirements/Conditions	8.00%			175,183
	Subtotal			**$**	**2,364,965**
	Design/Estimating Contingency	20.00%			472,993
	TOTAL	*1.44*	*(note 1)*	**$**	**2,837,958**

Notes

1 *To determine total cost of one item, multiply times 1.55.*
2 *Recommended annual inspection costs are not included above. Budget $3000 average annually.*
3 *Costs shown reflect current pricing. Add 3-5% inflation annually for future work.*
4 *Roofing Recommendations Items 6F and G are new items, not included in narrative study.*

St. Stanislaus Kostka Church
Adams MA
09.22.2020

Structures by Design, Inc.
Easthampton MA

Renovation Study 1.2
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
1	**Exterior Masonry Elements**						
div 02	***general***						
	temporary building protection	ls		4,000	-	1	$ 4,000
	temporary barricades	ls		3,000	-	1	$ 3,000
	dumpster	ea	0	1200		1	$ 1,200
	landscape repairs	ls	500	1500		1	$ 2,000
	cleanup	ls	100	900		1	$ 1,000
	subtotal						***$ 11,200***
div 04	***masonry***						
gen	general masonry repointing	sf	0.75	9.00		8,000	$ 78,000
gen	brick tie remediation	sf	6.50	8.00		2,112	$ 30,624
1	pressure-wash/treat masonry	sf	0.30	2.80	-	20,000	$ 62,000
2	*periodic masonry inspection - included in Summary*						
3	repair east side above entrance - replacement ties and masonry	sf	5	50		66	$ 3,630
4	thermal crack at buttress - helifix anchor	lf	13	16		440	$ 12,760
4	vertical expansion joint option - not included	ea	0	-		-	$ -
5	north side above entrance stone stringcourse - clean, replace with post-installed anchors	lf	10	30		27	$ 1,080
5	north side above entrance - rebuild brick dentil	sf	8	23		81	$ 2,511
6	south side chimney - repoint upper section	sf	0.75	15		24	$ 378
6	south side chimney - new metal cover	ea	250	100		1	$ 350
6	south side chimney - clean interior brick liner-80 lf	lf	0	1,800		1	$ 1,800
	subtotal						***$ 193,133***
	Subtotal Exterior Masonry Elements						**$ 204,333**
2	**Towers**						
div 02	***general***						
	temporary building protection	ls		1,500	-	1	$ 1,500
4	remove bird excrement (hazmat)	ls	1500	12000		1	$ 13,500
	note: bell in east tower impedes cleaning access						
4	general cleaning interior	ls	200	700		1	$ 900
	subtotal						***$ 15,900***
div 04	***masonry***						
1	interior masonry cleaning - one time (57 lf x 84 lf x 2 towers)	sf	0.1	0.70		9,576	$ 7,661
1	interior masonry limewash - one time	sf	0.1	1.20		9,576	$ 12,449
	masonry repointing/repairs - 15% surface	sf	0.75	9.00		1,500	$ 14,625
	subtotal						***$ 34,735***
div 05	***metals***						
3	fabricated ladder tower	lf	70	35		44	$ 4,620
	subtotal						***$ 4,620***

Renovation Study 1.2
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 06	***wood & plastics***						
5	roof sheathing repairs budget	ls	500	2500.0		1	$ 3,000
	subtotal						***$ 3,000***
div 09	***finishes***						
6	prep and paint structural steel	ls	400	5600		1	$ 6,000
	subtotal						***$ 6,000***
Subtotal Towers							**$ 64,255**

3 Foundation, Basement, & First Floor Framing

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 02	***general***						
	temporary building protection	ls		2,500	-	1	$ 2,500
	cleanup	ls	100	500		1	$ 600
	subtotal						***$ 3,100***
div 06	***wood & plastics***						
2	blocking at posts, strapping at beam connection	ea	60	500		6	$ 3,360
	subtotal						***$ 3,360***
div 09	***finishes***						
1	demo suspended ceiling and grid	sf	0	0.75		7500	$ 5,625
1	demo wood lath and plaster ceiling (hazmat)	sf	0	1.00		7500	$ 7,500
1	channel supports for new wallboard ceiling	sf	1.00	1.00		7500	$ 15,000
1	new wallboard ceiling	sf	1.00	2.00		7500	$ 22,500
1	new suspended ceiling and grid	sf	2.00	2.50		7500	$ 33,750
1	repair existing finishes	sf	0.10	0.50		7500	$ 4,500
	subtotal						***$ 88,875***
Subtotal Foundation, Basement, & First Floor Framing							**$ 95,335**

4 Sanctuary & Sanctuary Ceiling

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 02	***general***						
	temporary building protection	ls		6,000	-	1	$ 6,000
1	interior staging	ls	0	0	12,000	1	$ 12,000
1	cleanup	ls	100	1000		1	$ 1,100
	subtotal						***$ 19,100***
div 09	***finishes***						
1	demo lath and plaster budget (hazmat)	ls	0	25000		1	$ 25,000
1	repair plaster lath	sf	0.50	7.00		1000	$ 7,500
1	repair plaster	sf	2.00	12.00		4000	$ 56,000
1	paint finishes at plaster repairs	sf	0.20	4.00		12000	$ 50,400
	subtotal						***$ 138,900***
Subtotal Sanctuary & Sanctuary Ceiling							**$ 158,000**

St. Stanislaus Kostka Church
Adams MA
09.22.2020

Structures by Design, Inc.
Easthampton MA

Renovation Study 1.2
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
5	**Attic & Roof Framing**						
div 02	***general***						
	mobilization, misc. prep	ls		6,000	-	1	$ 6,000
	cleanup	ls	100	2000		1	$ 2,100
	open roof for material access, repair roof	ls	5000	15000		1	$ 20,000
	subtotal						***$ 28,100***
div 04	***masonry***						
	masonry repointing/repairs budget	sf	700	20,000		1	$ 20,700
	subtotal						***$ 20,700***
div 06	***wood & plastics***						
	primary framing						
3	cupola truss: improve attachment of built-up members-56 lf	lf	18	38.00		112	$ 6,272
4	cupola framing: anchor to cupola truss	ea	15.00	75.00		8	$ 720
5	cupola beam: reinforce with engineered lumber	lf	12.00	20.00		224	$ 7,168
6	*see secondary framing*						$ -
7	typ truss corbels: steel saddle reinforcement	ea	90.00	300.00		16	$ 6,240
8	typ truss: add 4x4 strut 2@12' x 8 qty	lf	8	30		192	$ 7,296
9	typ truss: add 4x8 sister 12' x 2 x 8 qty	ea	35	320.00		16	$ 5,680
10	typ truss: solid blocking, clip posts, anchor support - 2 per truss	ea	20.00	150.00		16	$ 2,720
11	typ truss: shim 6x6 posts, add simpson plate	ea	20.00	100.00		16	$ 1,920
12	transept truss: reinforce 2-c12x13, 2@62 lf	lf	40	60.00		248	$ 24,800
13	transept truss: add 6x6 strut-2@16 lf x 2 trusses	lf	10	35.00		32	$ 1,440
14	transept truss: 2@10' x 2 trusses-engineered wood strut	lf	15	35.00		40	$ 2,000
15	transept truss:stitch bolt at split or check budget	lf	4.00	10.00		200	$ 2,800
16	transept truss:steel plate-2 x 17 ea	ea	25.00	60.00		24	$ 2,040
17	tower truss: engineered wood strut	lf	4.00	15.00		64	$ 1,216
18	tower truss: steel plate-2 x 12 qty x 2 trusses	ea	25.00	60.00		48	$ 4,080
19	tower truss:stitch bolt at split or check-budget	lf	4.00	10.00		150	$ 2,100
20	tower truss: add steel angle to masonry	ea	15	100.00		4	$ 460
21	tower truss: shim connection, add simpson plate	ea	20.00	100.00		12	$ 1,440
22	tower truss: sister diagonal 1.75x9.5 lvl-4@14'	lf	8	35		66	$ 2,838
23	tower truss: sister bottom chord 1.75x11.875 lvl- 56'x2	lf	9	38.00		112	$ 5,264
	subtotal						***$ 88,494***
	secondary framing						
2	purlins: sister 2-1.75x9.5 lvl at transept truss	lf	8	35.00		224	$ 9,632
2	purlins: sister 2-1.75x14 lvl	lf	10	39.00		832	$ 40,768
3	catwalk: framing, deck, guardrail, repairs	lf	30.00	150.00		500	$ 90,000
4	apse: hurricane clips	ea	6.00	10.00		64	$ 1,024
5	steel tie rods: inspection - not included						$ -
6	cupola: sister dunnage beams 2-1.75x11.5	lf	9.00	37.00		120	$ 5,520
7	hurricane clips during roofing - budget	ea	4	10		150	$ 2,100
	subtotal						***$ 149,044***
	subtotal primary and secondary framing						***$ 286,338***

Renovation Study 1.2
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
div 09	***finishes***						
1	demo lath and plaster budget (hazmat)	ls	0	10000		1	$ 10,000
1	repair plaster lath	sf	0.50	7.00		400	$ 3,000
1	repair plaster	sf	2.00	12.00		1000	$ 14,000
1	paint finishes at plaster repairs	sf	0.20	4.00		4000	$ 16,800
	subtotal						***$ 43,800***

Subtotal Attic & Roof Framing	**$ 378,938**

6 Roofing Recommendations

div 02	***general***						
	temporary building protection	ls		4000	-	1	$ 4,000
	temporary barricades	ls		4000	-	1	$ 4,000
	dumpster	ea	0	900.00		4	$ 3,600
	landscape repairs	ls	500	3000		1	$ 3,500
	cleanup	ls	100	2000		1	$ 2,100
	subtotal						***$ 17,200***

A	***slate roofs and built-in gutters***						
div 07	***thermal & moisture protection***						
1.8	replace damaged slate - budget (per location)	ea	20.00	180.00		80	$ 16,000
1.9	metal flashings - no work						$ -
1.10	repair damaged flashings	ls	3000	15000		1	$ 18,000
1.11	repair/replace snow retention system - budget	ls	8000.00	2000.00		1	$ 10,000
1.12	repair copper gutter liner	ls	300.00	1000.00		1	$ 1,300
1.12	repair/paint galv gutter cover partial (includes paint)	ls	300.00	500.00		2	$ 1,600
	subtotal A						***$ 46,900***

B	***copper standing seam and flat seam roof***						
div 07	***thermal & moisture protection***						
2.3	demo copper roof	sf	3.00	3.75		660	$ 4,455
2.3	new plywood sheathing budget	sf	2.00	5.00		660	$ 4,620
2.3	new copper roof	sf	12.00	16.00		660	$ 18,480
2.4	repair/replace copper gutter liner	lf	25.00	20.00		94	$ 4,230
	subtotal B						***$ 31,785***

C	***tower roofs and ornate flashings***						
div 07	***thermal & moisture protection***						
3.2	replace damaged slate - budget (per location)	ea	20.00	150.00		30	$ 5,100
3.7a	terne metal dormers repair - budget	*see 'Decorative Metal Fabrications Scheme B'*					$ -
3.7b	ornate pinnacle flashings - repair	*see 'Decorative Metal Fabrications Scheme B'*					$ -
3.7c	ornate pilaster repair - budget	*see 'Decorative Metal Fabrications Scheme B'*					$ -
3.7d	balcony flashings - repair	*see 'Decorative Metal Fabrications Scheme B'*					$ -
	subtotal C						***$ 5,100***

Renovation Study 1.2
Itemization

		Unit	Mtl	Labor	Equipt	Qty	Subtotal
D	***tower belfry roofs***						
div 07	***thermal & moisture protection***						
	Note: east tower bell may impede hazmat removal. Potential additional costs are not included.						
	remove metal roofing	sf	0.00	3.00		320	$ 960
	new plywood sheathing budget	sf	2.00	5.00		320	$ 2,240
	liquid applied roof membrane	sf	12.00	22.00		320	$ 10,880
	subtotal D						***$ 14,080***
E	***asphalt shingle roof***						
div 07	***thermal & moisture protection***						
5.1	remove/replace organic shingles - est. 11' x 20'	sf	2.00	3.00		400	$ 2,000
	subtotal E						***$ 2,000***
F	***replace all slate roofing***						
	Note: there is insufficient data to accurately quantify existing conditions. Quantities shown are rough calculations. Further investigation is required for more precise costs. Costs are based on current-year pricing. Add for future work.						
div 07	***thermal & moisture protection***						
	replace all slate roofing and associated metalwork	sf	32.00	8.00		14600	$ 584,000
	subtotal F						***$ 584,000***
G	***replace main roof with asphalt shingles, and towers/cupola with slate***						
	Note 1: there is insufficient data to accurately quantify existing conditions. Quantities shown are rough calculations. Further investigation is required for more precise costs. Costs are based on current-year pricing. Add for future work.						
	Note 2: Additional roof venting is required. Review implications of installing asphalt shingles with roofing consultant. Cost shown is for budget purposes only.						
div 07	***thermal & moisture protection***						
	replace slate roofing with asphalt shingles, new metalwork (towers/cupola not included)	sf	6.50	1.50		12100	$ 96,800
	add plywood, sleepers, eave venting, misc. for venting	sf	4.00	1.50		12100	$ 66,550
	replace towers/cupola slate roofing with new slate	sf	32.00	8.00		2500	$ 100,000
	subtotal F						***$ 263,350***
Subtotal	**Roofing Recommendations**						**$ 964,415**

7 Decorative Sheet Metal Fabrications - Scheme A

remove fabrications, repoint masonry, provide caps

div 02	***general***						
	temporary building protection	ls		2,000	-	1	$ 2,000
	temporary barricades	ls		3,000	-	1	$ 3,000
	dumpster	ea	0	900		3	$ 2,700
	landscape repairs	ls	500	1200		1	$ 1,700
	cleanup	ls	100	500		1	$ 600
	subtotal						***$ 10,000***

Renovation Study 1.2
Itemization

		Unit	Mtl	Labor	Equipt	Qty		Subtotal
div 04	***masonry***							
	masonry repointing and repairs budget	sf	0.75	9.00		2,000	$	19,500
	subtotal						***$***	***19,500***
div 06	***wood***							
	cupola: demo for crane removal	ls	100	6,000		1	$	6,100
	cupola: frame and sheathe cap	sf	8	78		60	$	5,160
	tower: blocking for new flashing	sf	2	20		200	$	4,400
	subtotal						***$***	***15,660***
div 07	***roofing***							
	tower: demo metal at architrave, pilasters, upper/lower ledge flashing, balcony, pinnacles, misc.	ea	100	3,200		1	$	3,300
	tower: new copper flashing - 160 lf ea	sf	35	10		400	$	18,000
	cupola: copper standing seam cap and flashing	sf	50	35.00		63	$	5,355
	cupola: flashing to existing roof	lf	40	25.00		45	$	2,925
	tower pinnacle: new copper base	ea	80	100.00		16	$	2,880
	subtotal						***$***	***32,460***
div 09	***finishes***							
	prep surfaces	sf	0	1.00		200	$	200
	painting	sf	1.00	3.00		600	$	2,400
	subtotal						***$***	***2,600***
Subtotal Decorative Sheet Metal Fabrications - Scheme A							**$**	**80,220**

8 Decorative Sheet Metal Fabrications - Scheme B

repair or replace sheet metal fabrications, repoint masonry

div 02	***general***							
	temporary building protection	ls		1,000	-	1	$	1,000
	temporary barricades	ls		3,000	-	1	$	3,000
	dumpster	ea	0	900		1	$	900
	landscape repairs	ls	200	600		1	$	800
	cleanup	ls	100	500		1	$	600
	subtotal						***$***	***6,300***
div 04	***masonry***							
	masonry repointing and repairs behind decorative metal	sf	0.75	9.00		800	$	7,800
	subtotal						***$***	***7,800***
div 05	***metals***							
3.7a	terne metal dormers repair - budget	sf	7.00	90.00		50	$	4,850
3.7b	ornate pinnacle flashings - repair	ea	200.00	150.00		16	$	5,600
3.7c	ornate pilaster repair - budget 16x13'=208 lf	lf	7.00	90.00		21	$	2,037
3.7d	balcony flashings - repair	sf	7.00	50.00		200	$	11,400
	tower gable horizontal cap (includes roofing repairs)	sf	12.00	180.00		160	$	30,720
	cupola repair		7.00	90.00		150	$	14,550

Renovation Study 1.2

Itemization

		Unit	Mtl	Labor	Equipt	Qty		Subtotal
	cupola replacement	sf	25.00	90.00		50	$	5,750
	subtotal						***$***	***74,907***
div 09	***finishes***							
	metalwork and cupola only							
	prep surfaces - budget	sf	0	1.50		3,000	$	4,500
	painting - budget	sf	1.00	4.00		3,000	$	15,000
	subtotal						***$***	***19,500***
Subtotal Decorative Sheet Metal Fabrications - Scheme B							**$**	**108,507**