



# Allied Engineering

**Structural Mechanical Electrical Plumbing**

**St. Louis Church  
Structure, Front Façade, and Slate Roof Evaluation  
Auburn, ME**

September 15, 2021

**AEI Project: 21064**





## I. Introduction and Scope

Allied Engineering Incorporated (AEI) has performed a condition assessment for the existing structural framing and front masonry façade conditions at the Saint Louis Church on Dunn Street in Auburn, Maine. What follows here are the observations/results from our study.

The review for Saint Louis Church is based on observations made during a site visit on August 25, 2021. No drawings were available showing any of the existing framing conditions. Site observations were limited to framing conditions that were visible at the time of the site visit. No finishes/materials were removed to expose any existing framing conditions. We can make no observations for components that were not visible at the time of the site visit.



ARIEL VIEW SAINT LOUIS CHURCH



VIEW FROM CORNER OF 3<sup>RD</sup> ST. AND DUNN ST.  
3<sup>RD</sup> ST.



VIEW FROM ALONG

## II. Existing Condition Observations and Recommendations

The Saint Louis Church was constructed between 1902 and 1915. Visible areas of framing consist mostly of timber members supported by brick masonry bearing walls. The church has a basement level, a main floor level which includes the prior church pew/assembly area, a balcony level above the main floor area along Dunn Street, and floor and roof levels at the bell tower area at the corner of 3<sup>rd</sup> Street and Dunn Street.

### A. Building Structure

The bulk of the roof for the Saint Louis Church has a 9+/- on 12 pitched roof running from perimeter eave lines up to a center ridge level. The roofing consists of slate shingles. Much of the main area roof framing was visible from attic spaces with attic access through wall panels located on the Dunn Street side of the church. Observations regarding the framing conditions were possible for a number of the main roof framing components. Framing size measurements were also possible for some of the main roof framing components from the attic spaces. The roof framing consists of board sheathing supported by 2X8 timber rafters spaced about 18" apart running up/down slope supported by several heavy timber roof purlins running across slope supported by a series of heavy timber/steel rod trusses that run from roof eave to roof eave. The trusses are most typically spaced about 12'-6" +/- apart. This rafter/purlin/truss configuration is indicated in the TYPICAL TRUSS LAYOUT AT MAIN ROOF sketch provided in this report. The 2X8 rafters were checked for compliance with current/modern building code roof snow load provisions for the Auburn area and found to be acceptable.

There is an area of flat roof along the side of the church facing out towards Roak Street. The framing for the flat roof area was not observable. The flat roof is much lower than the adjacent higher pitched







ROOF TRUSS BEARING AT PERIMETER  
BRICK WALL



DETAIL A MAIN ROOF TRUSS



STEEL RODS MAIN ROOF TRUSS  
NEAR DETAIL A



DETAIL B MAIN ROOF TRUSS



DETAIL C MAIN ROOF TRUSS



DETAIL D MAIN ROOF TRUSS





MAIN ROOF FRAMING LOOKING OUT  
TOWARDS DUNN STREET



MAIN ROOF FRAMING AT ELL  
TOWARDS 3<sup>RD</sup> STREET

The flat framing for the roof of the Bell Tower consists of wood board sheathing supported by timber rafters supported by perimeter brick masonry walls and interior timber beams bearing on the perimeter brick masonry walls. The wood roof framing elements appear to be in good condition, free from any signs of significant moisture infiltration/rot, or other signs of distress or overloading. The floor framing for the Bell Tower consists of wood board sheathing supported by timber joists supported by perimeter brick masonry walls and two interior timber beams bearing on the perimeter brick masonry walls. The wood floor framing elements appear to be in good condition, free from any signs of significant moisture infiltration/rot, or other signs of distress or overloading. The bell tower has a heavy timber bracing system inboard of the perimeter brick masonry walls. The timber braces also appear to be in good condition.



BELL TOWER ROOF FRAMING

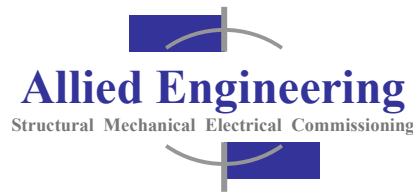


BELL TOWER FLOOR FRAMING





BELL TOWER TIMBER BRACING



The floor framing for the balcony level along Dunn Street including the balcony space at the back of the main church pew/assembly area where the organ was once located was not observable. No observations are made regarding the balcony level floor framing.

### AEI Recommendations

Based on the observations for the visible framing components made during the August 25, 2021 site visit, the existing building structure appears to be in good condition. The framing appears to be free from signs of fracture or distress, or any significant signs of damage from overload or moisture infiltration.

It needs to be noted that the existing building construction predates some modern/current building code structural provisions, especially those for resistance required to code-specified lateral loads from wind and seismic conditions. A review of the lateral load capability for the existing building is beyond the scope of this report. Current building codes may allow the building as is to be exempted from some of the modern code provisions under certain conditions but could also require that portions of the building, or even the entire building, be brought up to meet modern building code requirements depending on what alterations, changes of occupancies or other changes may be planned for when the building is reoccupied. A review of the current code requirements should be performed once the specifics for any new occupancy have been established.

### B. Front Façade

There is masonry and precast concrete damage/deterioration on the front façade that we have documented below. Much of the masonry damage requires raking and repointing, brick replacement, and at the front left gable parapet, a complete replacement of a section of the wall will be required. Additionally, the copper flashing between the roof slate and this masonry parapet wall will need to be replaced from eave to ridge.

In appendix A, there are photo elevations with markups of repair/replacement work described. AEI has attempted to develop takeoffs for these elements and provide an order of magnitude budget for the necessary work. Understand that this review is from the ground and represents a visual evaluation of condition from that vantage point. A more thorough investigation from a lift or scaffolding may reveal additional scopes of repair that have not been presented herein.

The following façade repair types are noted and required. The numbers below reflect the same numbers for hatched areas identified on the PDF photos attached in Appendix A.

1. Brick Raking and Repointing with Spauled Brick Replacement – within these areas, the condition of the brick mortar joints are either cracked or missing due to water infiltration, freeze-thaw or degradation from water passing over the surfaces. All joints should be raked/repointed and those individual bricks where surfaces are spauled or deteriorated should be cut out and replaced.

2. Brick Outer Wythe Separated from Interior Main Wythe - The outer brick wythe in these areas have separated away from the main wythe. These areas are susceptible to separation from the main wall system and should be addressed immediately. Removal of the outer wythe and removal/replacement of the precast step cap should be planned for.
3. Parapet Wall Compromised and Requires Replacement – The front gable left side has been compromised structurally and require removal/reconstruction to return this system to a functional condition. Water has continued to make way into the back side of this parapet wall at the eave/gutter to back of parapet wall intersection. The flashing running up the roof slope tie-in with the parapet should be replaced with new copper flashing as well from the eave up to the ridge. The gutter at this roof ell should be removed/replaced and reflashed parapet and with the slate shingle roofing.

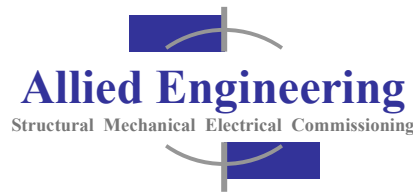
The precast caps should be removed/replaced for this area and flashing provided for the full width of the top of wall before returning the precast parapet caps. The spier should be temporarily removed/stripped/patched and coated prior to installation at top of wall corner. The sloped precast wall cap is currently covered with lead coated copper. This system should be removed/replaced in kind upon wall reconstruction.

4. Decorative Concrete Façade Above Entry Doors – This precast concrete façade is compromised in many locations and much of the coating has delaminated. A more thorough examination is required of the condition of this system as a whole. For those pieces of the system that are severely damaged beyond in-place repair, surface molds can be developed to allow cast of replacement sections. Once the limits of work have been addressed, all precast joints should be raked and regouted. When completed, the entire surface should receive a color matching concrete coating.
5. Individual Precast Repairs – There are various areas of precast degradation that require replacement with precast or covering with a similar lead coated copper cap as was done on the left side masonry column steps. These include eave decorative teeth, sloped precast caps, window decorative headers, and precast decorative sills. Each of the joints should be raked and regouted. When completed, the entire surface should receive a color matching concrete coating.

### AEI Recommendations

A more specific evaluation of the damages and quantities of repair should be performed, and design plans developed to identify limits of work, volumes of repair and to specify specific repair techniques and materials for mortar, precast element and for coating applications.

The individual scope repairs used to develop a preliminary budget and limits of work are defined above with each description. Zones of repair are noted on the annotated photos provided in Appendix A. Approximate areas of repair have been identified in the repair budget presented in Appendix B. Understand that these are based on visual examination from the ground and should be considered general Order of Magnitude estimated budgets based on a review from the ground.



The values should be used for planning purposes but are by no means to be considered as actual construction budgets for the required work.

C. Slate Roof Systems:

The slate roof appears to be in good condition throughout this building. There are specific conditions relative to the flashing along the slate to brick parapets along the front of the building, open vents, and flashing tie-in conditions with the parapet precast caps. These conditions are identified on the annotated photos provide din Appendix A.

The precast copings at all gable end precast parapet caps require that the joints be raked out and mortar reapplied to the joints. The flashing between the brick parapet walls and the slate should be reviewed in place as much of this flashing seems to have been dislodged over time and joints are open to the elements. Whether reapplication of the flashing to beneath the roof slate is necessary could not be determined from the bell tower vantage point we had. There is copper counterflashing as well that is dislodged and bowed outward, which should be reviewed, and the condition corrected to address open joints to the elements that may be allowing moisture into the attic cavity.

Further all precast caps, once raked and regouted, should be coated with an appropriately colored concrete coating to protect from them from the elements.

The copper valleys appear to be in good condition as well.

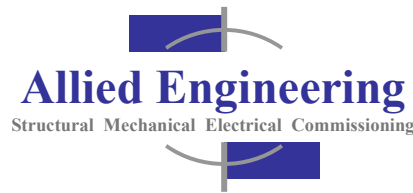
At the Dunn St side of the building the parapet wall is compromised for the left side roof slope parapet. Water is making its way into the joint between the wall and the roof slate joints. The majority of this water entry is likely at the roof eave intersection with this wall. It is very possible that ice is damming above the eave and entering the parapet wall. The parapet caps joints at this location are also in poor condition. Both of these conditions are contributing the wall damage and displacements.

The eave gutter system, the slate and flashing between roof and parapet and the parapet cap joint degradation are all contributors to the ongoing water entry condition at these locations. With the planned reconstruction of the parapet wall, each of these elements should be reconstructed properly to keep moisture out while redirecting roof runoff away from this location properly.

The following Roof Repair types are noted and required. The numbers below reflect the same numbers for hatched areas identified on the PDF photos attached in Appendix A.

6. Missing attic gravity vent hood allows moisture and birds direct access into attic cavity. Replace with a covered unit of like size as a temporary repair until such time full renovations of the facility are undertaken. At that time a full evaluation and design of appropriate attic ventilation can be performed.
7. The parapet flashing of the roof slope at the side wall should be further investigated and repaired. A counter flashing system exists along the parapet wall that extends over the roof to wall copper step flashing. The step flashing is no longer flush and is pulled out away from





the parapet allowing direct access to the step flashing. The step flashing, in turn, appears to no longer be continuously flush at the wall either, so open voids to attic and the brick parapet wall exist. These systems should be returned to their design condition, replacing any torn or damaged flashing or counterflashing as required to achieve a properly flashed/counter flashed system. In order to apply new step flashing, approximately 12-16" of slate shingle will need to be removed to facilitate installation.

8. At the eave of each of the gable dormers above the main roof slope, there is a gutter system collecting the dormer roof runoff. However, there is no visible downspout system, which is curious as we are not sure of the following:
  - a. Whether the gutter was included to act more as a snow guard for falling snow between roof levels.
  - b. Where or how the accumulated water is directed during a storm event. This condition should be reviewed more closely to determine whether a short run of downspout to the gutter system provided at the main lower eave is required.

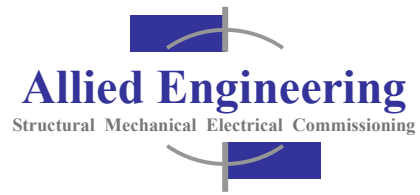
### **AEI Recommendations**

Access was limited for our review to the bell tower and at-grade observations. A more specific evaluation of the damages and quantities of repair should be performed, and design plans developed to identify limits of work, volumes of repair and to specify specific repair techniques and materials for mortar, precast element and for coating applications.

The individual scope repairs used to develop a preliminary budget and limits of work are defined above with each description. Zones of repair are noted on the annotated photos provided in Appendix A. Approximate areas of repair have been identified in the repair budget presented in Appendix B. Understand that these are based on visual examination from the ground or bell tower and should be considered general Order of Magnitude Estimated Budgets. The values should be used for planning purposes but are by no means to be considered as actual construction budgets for the required work.

We have included in the budget the cleaning for the approximate remaining brick surface area on the front façade to get a full cleaning of these surfaces. We do not recommend an application of waterproofing unless it is your intent to revisit applications on a 3 to 5 year application cycle. With the joints repointed and spalled/damaged brick replaced, the brick façade should function as intended for many years into the future.



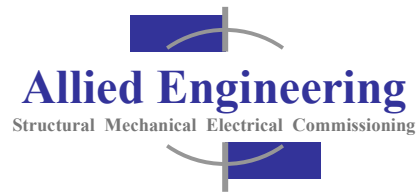


## Appendix A

### Annotated Photos







## Façade Conditions





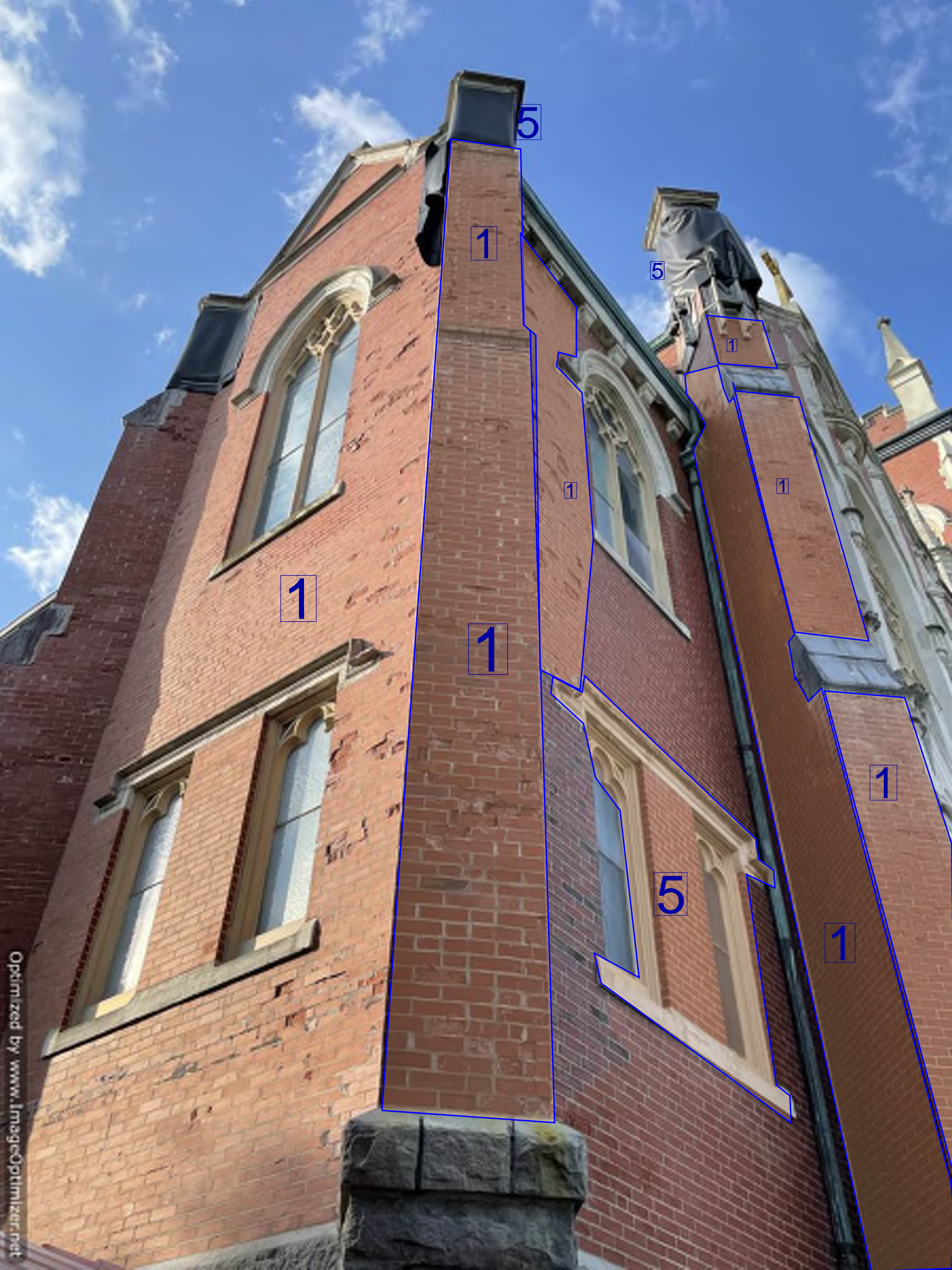


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PAROCHIAL HOUSE  
9 MAY 1918



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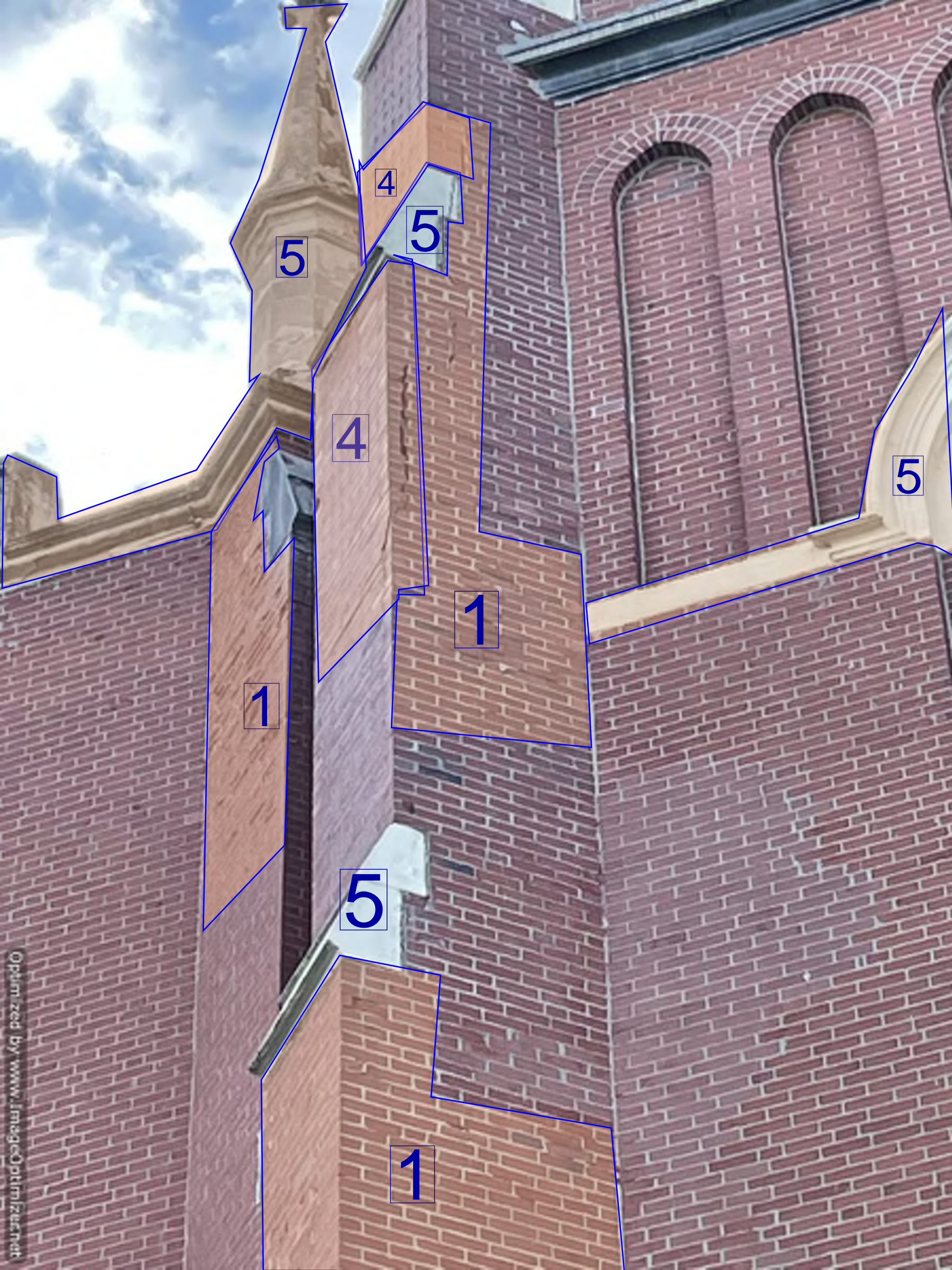
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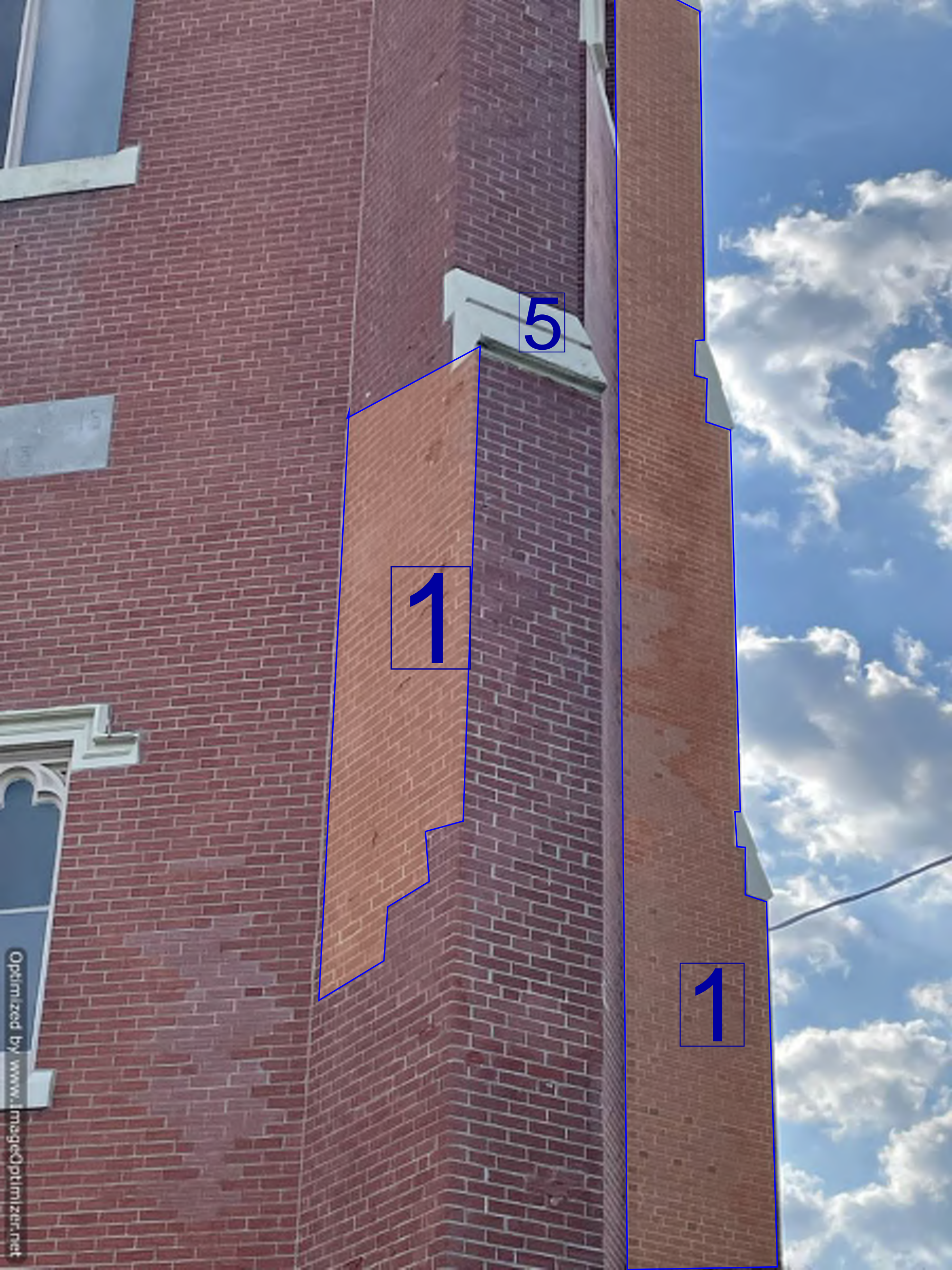


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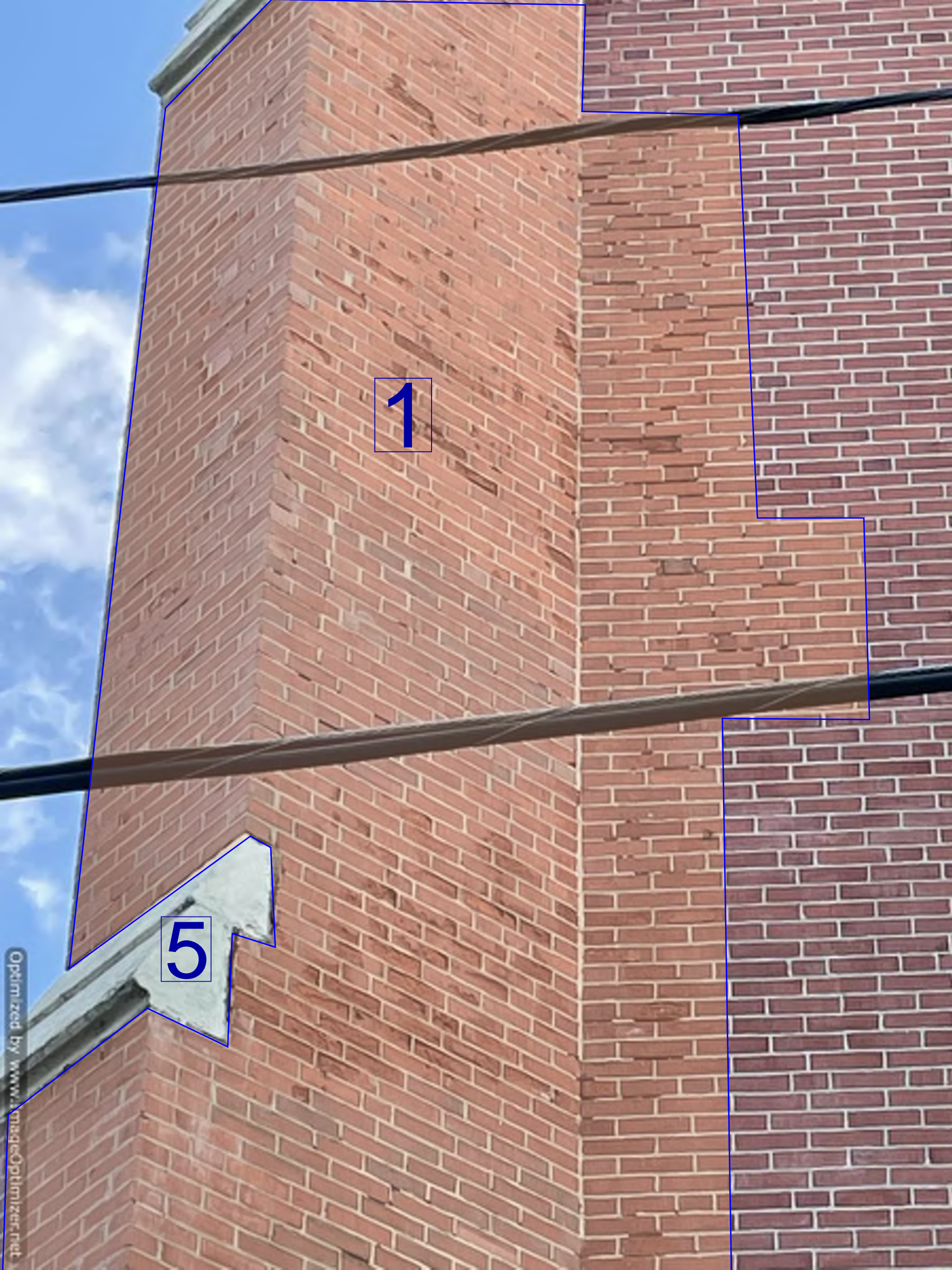


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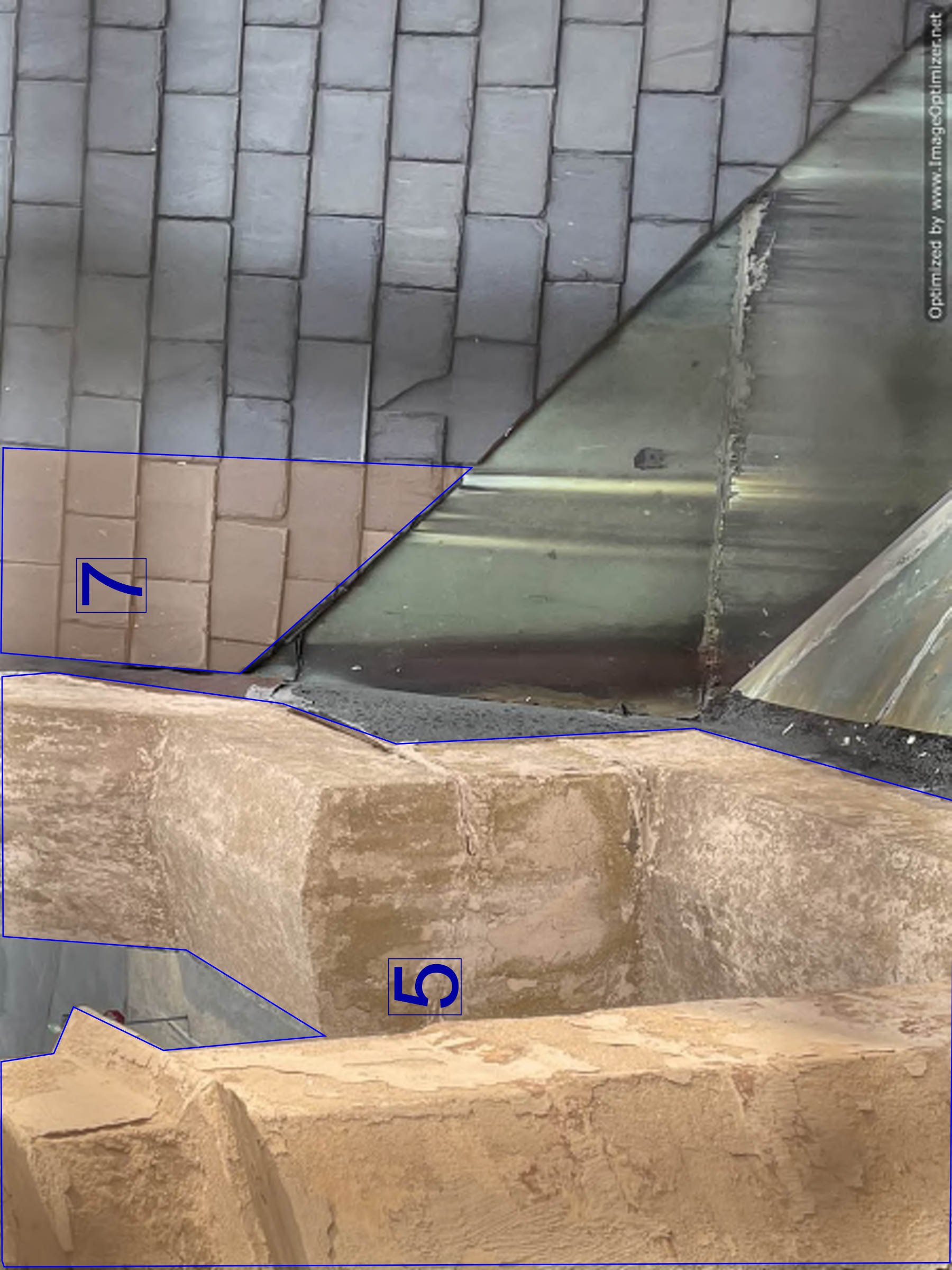
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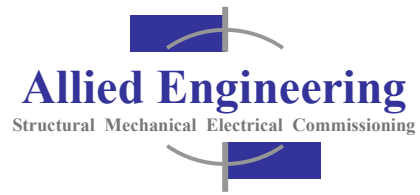


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## Slate Roof Conditions



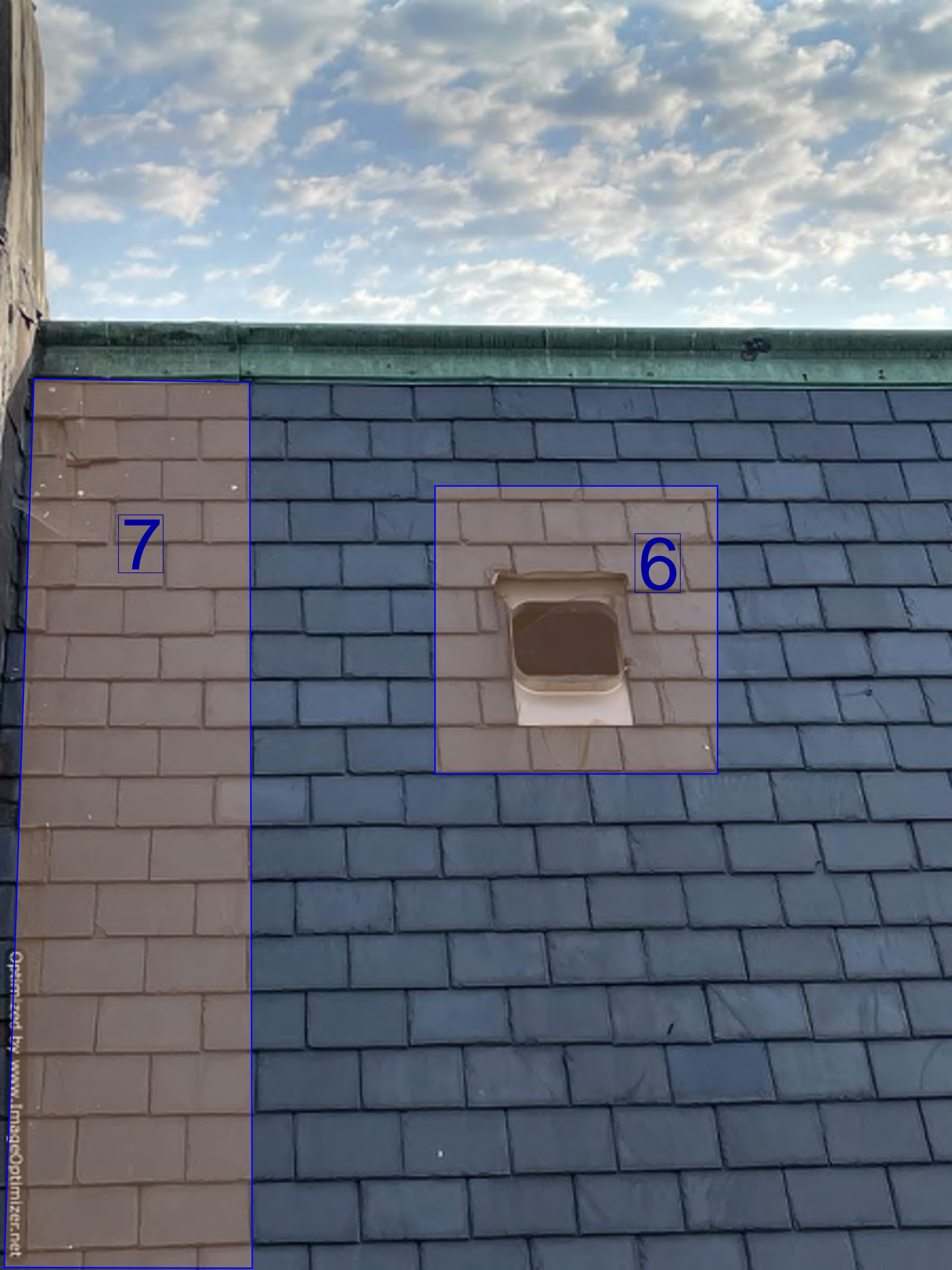




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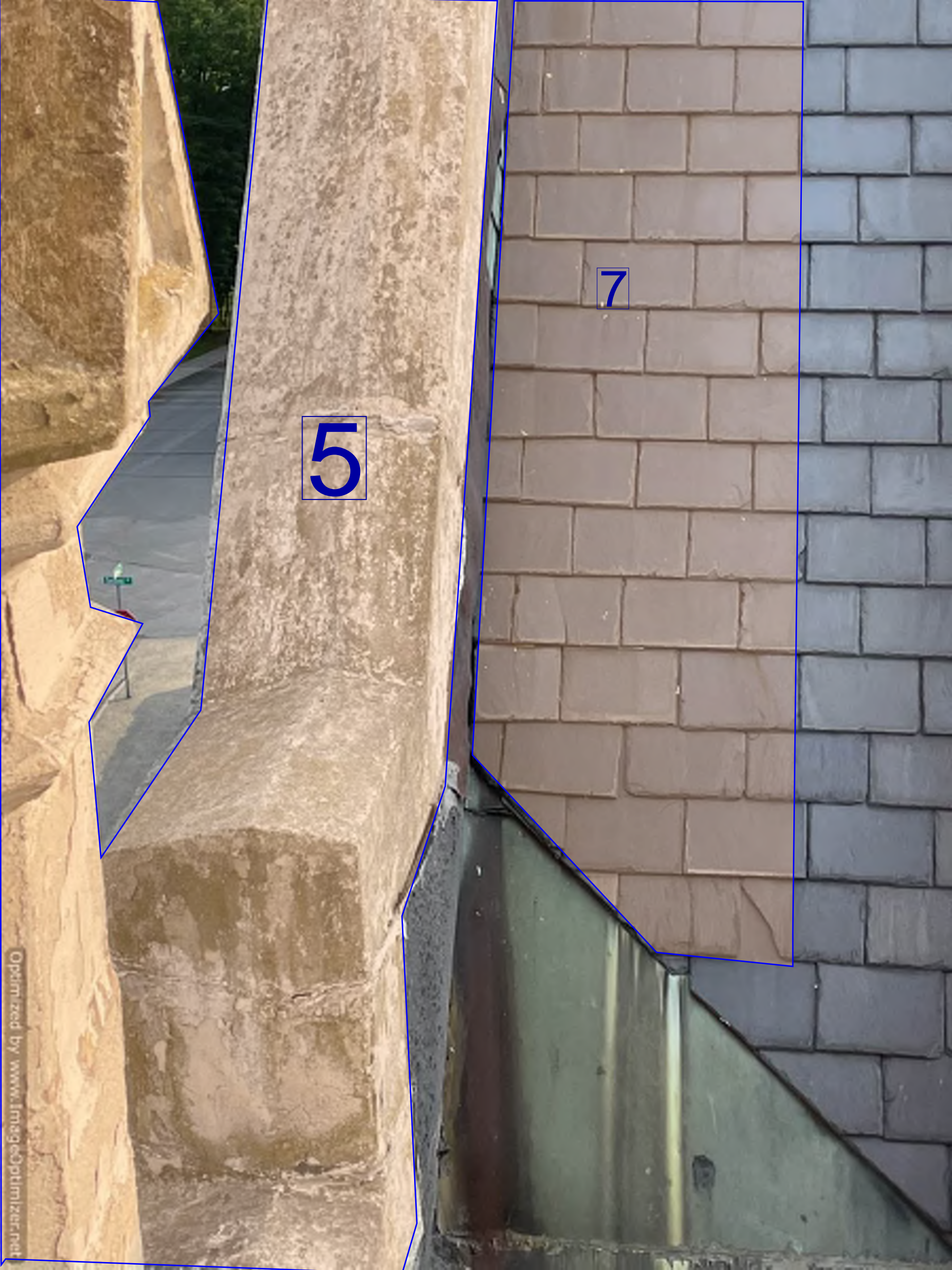




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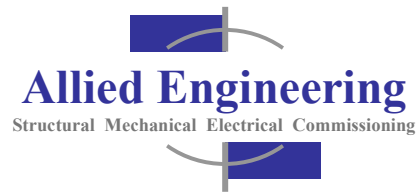












## Estimate of Probable Construction Budgets

2022 Dollars







21064

**SAINT LOUIS CHURCH, 33 DUNN ST, AUBURN, ME**

## FRONT FAÇADE RESTORATION AND REPAIR - ORDER OF MAGNITUDE BUDGET

### Budgets in 2022 dollars



REPAIR TYPE		REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	REPAIR TYPE	
Area		PRECAST DECORATIVE CONCRETE FAÇADE REPAIR OR REPLACEMENT (SF)	ROOF SLATE TILE REMOVE AND COPPER STEP FLASHING REPAIR REPLACE (LF)	GUTTER EXTENSIONS, REPLACEMENT (LS)	BRICK VENEER RAKE/REPOINT (SF)	RECONSTRUCT 3- WYTHE MASONRY FRONT LEFT TOP OF WALL, FLASHING, & COPING CAP (LS)	RIGHT SIDE TOWER, LEFT BUMP OUT UPPER WYTHER SEPARATION REPAIR (LS)	RAKE/REGROUT TOP OF WALL PRECAST COPING CAP JOINT'S FRONT WALL ONLY (LS)	REPLACE ROOF VENT AND SURROUNDING SLATE SHINGLE (EA)	REPLACE GRAVITY EXHAUST VENTS AND SURROUNDING SLATE TILE FOR ACCESS (EA)	SCRAPE AND PAINT EXTERIOR WINDOW TRIM (PER SF OF WINDOW) (SF)	MASONRY FAÇADE SURFACE CLEANING OUTSIDE REPAIR AREAS (SF)	
			80	4	1,800	1	1	1	1	1	1	160	2,600
			Subtotal	80	4	1,800	1	1	1	1	1	160	2,600
Unit Cost for Repair		\$ 225.00	\$ 30.00	\$ 245.00	\$ 1,800.00	\$ 150.00	\$ 65,000.00	\$ 7,000.00	\$ 22,000.00	\$ 2,000.00	\$ 1,500.00	\$ 30.00	\$ 25.00
Subtotal Cost for Required Repair		\$ 22,500.00	\$ 48,000.00	\$ 19,600.00	\$ 7,200.00	\$ 270,000.00	\$ 65,000.00	\$ 7,000.00	\$ 22,000.00	\$ 2,000.00	\$ 1,500.00	\$ 4,800.00	\$ 65,000.00
SUBTOTAL SCOPE ITEMS			\$534,600										
General conditions lifts, staging supervision etc. (35%)			\$187,110										
RESTORATION SUBTOTAL			\$721,710										
OH&P (8%)			\$57,737										
Bonds (3%)			\$21,651										
CONTINGENCY (10%)			\$72,171										
BUILDING RESTORATION SUBTOTAL			\$873,269										
INSURANCE (2%)			\$17,465										
TOTAL FAÇADE RESTORATION BUDGET			\$890,734										
ENGINEERING FEE FOR DESIGN & CONSTRUCTION OVERSIGHT (6.0%)			\$53,444										
TOTAL FUNDS TO BUDGET			\$944,179										