125 CUMBERLAND STREET

CIVIC SQUARE BANDSTAND STRUCTURAL CONDITION ASSESSMENT

Lunenburg, Nova Scotia

Prepared for:

Town of Lunenburg
177 Cumberland Street
Lunenburg NS B0J 2C0

Prepared by:

RJC Engineers
1701 Hollis Street, Suite 800
Halifax NS B3J 3M8

January 6, 2025
TOR.140136.0001

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EXECUTIVE SUMMARY

As requested, Read Jones Christoffersen Ltd. (RJC) has completed a structural condition assessment of the Civic Square Bandstand located at 125 Cumberland Street in Lunenburg, Nova Scotia for the Town of Lunenburg. The intent of the study was to conduct a visual review of the above-grade portions of the Bandstand to identify any visually obvious deterioration and/or corrosion and determine the likely cause of the noted distress in order to provide recommendations for future repair.

The Bandstand is located between Duke Street and Prince Street on a shared property with Town Hall, the War Memorial and the Civic Square Playground. The Bandstand is a wood and steel structure constructed on concrete pier foundations. The Lunenburg Heritage Society reconstructed the Bandstand in 1987 as a replica to replace the original, which we understand remained until the 1960s.

Based on our visual review, the structural steel beams located below the wood decking are in very poor condition with the remaining structural elements generally in fair to good condition. The structural steel beams were observed to be experiencing severe corrosion with full cross-sectional thickness loss at localized areas of the beam webs and heavy corrosion of beam flanges. Replacement of the deck's steel structure, application of a protective coating on the Bandstand's steel columns and localized wood replacement/repair are required to restore the integrity Bandstand structure and prevent ongoing deterioration.

The table below summarizes the recommended repair options and opinion of probable costs:

SUMMARY OF RECOMMENDED REPAIR		
	Timeline	**Cost (Excluding HST)**
Key Structural and Safety Elements	Immediately	$150,000 to $200,000
All Aesthetic and Accessibility Upgrades	Immediately	$75,000 to $100,000
Total Opinion of Probable Construction Cost:		**$225,000 to $300,000**

1.0 INTRODUCTION

Read Jones Christoffersen Ltd. (RJC) was retained by the Town of Lunenburg to perform a structural condition assessment of the Civic Square Bandstand located at 125 Cumberland Street in Lunenburg, Nova Scotia (*Refer to Photo* 1 *and Photo 2 in Appendix A)* as outlined in our revised proposal dated August 19, 2024. The intent of the review was to conduct a visual review to identify any visually obvious deterioration and/or corrosion deficiencies and determine the likely cause of the noted distress in order to provide recommendations for future repair.

A brief description of the scope of the review undertaken by RJC is as follows:

.1 Detailed review of existing drawings made available to RJC to familiarize ourselves with the construction of the Bandstand.

.2 An interview with Town personnel familiar with the history of the structure.

.3 Visual review of the structural steel structure, wood elements, and concrete pier foundations where accessible from ground level and boom lift to document the existing conditions and identify the presence and extent of any visually obvious deterioration and/or corrosion. To facilitate the review of the Bandstand roof, RJC retained the services of a restoration Contractor to rent and operate a boom lift (i.e. aerial working platform).

Small exploratory holes were drilled to perform a random sampling visual borescope review of the Bandstand roof structure's steel beams that are concealed by tongue and groove ceiling boards. Upon completion of the borescope review, the exploratory holes (approximately ¼" Ø) were sealed with caulking.

The top surface of the roof was not accessed during our review; therefore, a detailed review of the Bandstand's roofing membrane was not performed or included in the scope of work for this assessment.

The date and weather conditions at the time of our visits were as follows:

October 17, 2024,	*Clear, 12°C*
October 31, 2024,	*Clear, 15°C*

Leigh Besanger, BEng, P.Eng. performed the assessment for RJC.

This report was prepared in accordance with generally accepted engineering practices. No other warranties, either expressed or implied are made as to the professional services provided under the terms of our contract and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the structure that were not reviewed by RJC.

This report is exclusively for the use and benefit of the client identified on the first page of this report and is not for the use and benefit of, nor may it be relied upon by, any other person or entity. The contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the client.

2.0 DESCRIPTION & BACKGROUND

The Bandstand is an approximately 30 ft. tall by 30 ft. wide octagonal structure located east of Town Hall in Lunenburg's Civic Square. This Bandstand was constructed as a replica of the original, which we understand stood until the 1960s. The Lunenburg Heritage Society constructed this iteration of the Bandstand in 1987. It is our understanding no significant repairs or modifications have been performed on the structure since original construction.

Based upon our review of available drawings and documents:

.1 20" diameter cast-in-place concrete pier foundations were poured on 4 ft. square, 1'-6" thick footings. The concrete piers, eight total, are partially above grade and the footings are fully below grade.

.2 10" square HSS structural steel columns are anchored to the concrete pier foundations and extend to the underside of the roof's steel beams. Column HSS wall thickness is not indicated on the available drawings.

.3 The eight steel framing beams of the Bandstand deck are bolted to the columns just above the column baseplates. These beams converge at the centre point of the Bandstand deck with 14" diameter by 1/2" thick steel plates welded to the top and bottom of the beams (*Refer to Photo 3 in Appendix A*). A similar connection detail is shown for the eight steel roof beams.

.4 C-channel struts are bolted to the deck's sub-framing beams, and C-channels also span from column to column at deck and roof level.

.5 Drawings indicate nailer boards bolted to the top side of the deck's sub-framing beams and struts, and the underside of the steel roof beams. The 2x4 wood deck and tongue and groove ceiling boards are fastened to these nailers.

.6 The bell-curved-shaped roof structure above the roof's steel beams is comprised of dimensional lumber consisting of nominal 2"x8" and 2"x10" joists, 2"x4" verticals and 1"x4" braces. The roof deck consists of two layers of 3/8" plywood, 15 lb. building paper, and roof membrane.

.7 The space below the Bandstand deck is enclosed by vertical trim boards, with one access hatch located on the southeast side (approximately).

.8 Decorative wood guardrails and bench seating enclose the Bandstand deck, except on the north side, where two wood step platforms provide access to the Bandstand off a concrete pathway.

2.1 DOCUMENT REVIEW

The following partial drawing sets were available for review:

.1 An undated 4-sheet drawing set titled *Lunenburg Bandstand*, bearing the logo of Lydon Lynch Architects.

2.2 INTERVIEW WITH TOWN PERSONNEL

The following history and information were obtained through interviews with Town of Lunenburg personnel and residents familiar with the Bandstand:

.1 An inspection by another Consultant and subsequent inspections by Town building officials prompted the Spring 2024 closure of the Bandstand. It is our understanding no formal reporting was provided after the initial inspection by others.

.2 During our review on October 17, 2024, a resident of the Town passed by and noted that they last painted the Bandstand approximately 15 years ago, in preparation for a wedding, and it was their understanding it has not been painted since.

.3 The Bandstand deck is not routinely salted during winter months, but potentially de-icing salts have been occasionally used on the deck.

3.0 OBSERVATIONS

This section summarizes our observations of our visual reviews. Our observations will reference the drawings indicated in Section 2.1 and photographs from our reviews, provided in Appendix A.

3.1 STRUCTURAL STEEL

3.1.1 Deck Sub-Framing

The deck's sub-framing structural steel members are in very poor condition and replacement is required prior to reopening the Bandstand. Full cross-section thickness loss was observed in three of the eight beams (*Refer to Photo 4 in Appendix A*). Furthermore, expansive corrosion was noted on beam flanges and corrosion was noted at several connections (*Refer to Photo* 5 *in Appendix A).* A red primer was noted on the sub-framing structural steel members. Primers are not generally intended to provide any substantial level of long-term corrosion resistance or protection.

3.1.2 HSS Columns

The vertical HSS columns and column baseplates are in fair condition and abrasive blast cleaning and recoating are required to protect the columns for the long term and limit the potential for future corrosion (*Refer to Photo* 6 *in Appendix A)*.

3.1.3 Roof Beams

Based on our random sampling visual borescope review during our boom lift review, the steel roof beams appear in good condition *(Refer to Photo 7 and Photo 8 in Appendix A).* The roof beams are also coated with a red primer. Repairs or application of a protective coating are not considered a requirement at this time.

3.2 WOOD ELEMENTS

3.2.1 Wood Decking

The wood decking generally appears in fair condition but removal and replacement are recommended during the replacement of the underlying structural steel *(Refer to Photo* 9 *in Appendix A).* No significant rot or deterioration was observed on top or underside surfaces.

3.2.2 Wood Guardrails

The wood guardrails appear in fair condition and could likely be salvaged, locally repaired and repainted. Some balusters were loose or missing, and some cracking was noted in the top and bottom rails *(Refer to Photo 10 and Photo 11 in Appendix A).* In general, the existing guardrails appear to meet the height requirement of 42" prescribed by the building code.

3.3 CONCRETE ELEMENTS

3.3.1 Pier Foundations

Except for some corrosion staining and minor cracking, the visually accessible portions of the concrete pier foundations appear in good condition and no repairs are considered necessary at this time *(Refer to Photo 12 in Appendix A).*

3.4 NON-STRUCTURAL ELEMENTS AND MISCELLANEOUS CONSIDERATIONS

3.4.1 Accessibility Considerations

In alignment with the Town's desire to improve accessibility, it is recommended that a new barrier free ramp be constructed at the existing access to Bandstand *(Refer to Photo 13 in Appendix A).*

3.4.2 Wood Benches

The wood benches around the perimeter of the deck are in fair condition *(Refer to Photo 14 In Appendix A).* Localized repairs and repainting are recommended.

3.4.3 Ornamental Steel

The ornamental steel brackets below the perimeter of the roof are in poor condition *(Refer to Photo 15 and Photo 16 in Appendix A).* Widespread corrosion and peeling paint were noted during our review from the boom lift. Abrasive blast cleaning, recoating, and localized repairs are required to restore aesthetics.

3.4.4 Roof Ornament

The roof ornament shown on the drawings no longer exists *(Refer to Photo 17 in Appendix A)*. Replacement is recommended to restore this heritage element.

4.0 CONCLUSIONS/DISCUSSION

Based on the results of our visual review, the observed level of corrosion of the structural steel below the deck has impacted the safe live load carrying capacity of the Bandstand deck and removal and replacement are required before the Bandstand can be reopened to the public. The observed level of corrosion appears due to a high humidity exposure condition acting on unprotected structural steel. Furthermore, any past usage of de-icing salts would have the potential to exacerbate this corrosion.

The level of corrosion observed on the column and column baseplates does not appear to have reached a level to have affected the safe live load carrying capacity; however, abrasive blast cleaning and recoating are recommended to extend the effective service life of the columns.

The Bandstand guardrails also require repair or wholesale removal and replacement, before the Bandstand is reopened. The loose/detached connections and missing balusters pose a potential safety risk.

Repairs to the non-structural elements noted in Section 3.4 are not considered a requirement in order to reopen the Bandstand to the public; however, these localized repairs are recommended to be performed in tandem with the structural repairs to restore the historical aesthetics and limit the potential for ongoing deterioration/corrosion.

5.0 RECOMMENDATIONS

RJC recognizes that the Bandstand holds historical significance and is meaningful to residents and visitors who attend live music, and other gatherings at the Bandstand. Therefore, the recommended options below are presented such that the scope of rehabilitation work may vary depending on the Town's budget constraints. It is understood that the extent of repair could range from repair/replacement of key structural and safety elements required for reopening, to a full rehabilitation program, targeted at repairing the key structural elements plus all aesthetic and accessibility-related repairs.

RJC would be pleased to discuss the best path forward for Bandstand repairs with the Town and, if needed, update our recommendations in a subsequent draft of this letter. In general, the recommended repairs are outlined as follows:

5.1 KEY STRUCTURAL AND SAFETY ELEMENTS

In general, repair of key structural and safety elements includes:

.1 Removal and temporary storage of the existing wood guardrails, and benches.

.2 Removal and disposal of the existing wood decking and structural steel beams.

.3 Abrasive blast cleaning of column and column baseplates. The existing coating should be tested for lead prior to sandblasting and repairs.

.4 Welding of new connection brackets to columns.

.5 Application of a new protective coating on the columns (the lower third at a minimum).

.6 Installation of new corrosion-resistant structural steel beams (hot dipped galvanized, stainless steel, or coated).

.7 Installation of new wood decking.

.8 Reinstallation of repaired and repainted guardrails or installation of new.

.9 Repainting and reinstallation of existing wood benches.

5.2 ALL AESTHETIC AND ACCESSIBILITY UPGRADES

In general, the aesthetic repairs and accessibility upgrades include:

.1 The installation of a new roof ornament.

.2 Abrasive blast cleaning, localized repairs, and recoating of the ornamental steel brackets.

.3 Construction of a new barrier free accessibility ramp at the existing access point.

6.0 OPINION OF PROBABLE CONSTRUCTION COSTS

The following cost estimates presented for the repair of the Bandstand represent our opinion of the probable construction cost based on the limited information obtained during this condition survey assessment. The final costs will not be known until such time that the work is tendered and completed. It is not possible to accurately forecast the final bid unit prices that may be tendered for the work because they are directly related to the construction climate at the time of tendering. The costs noted below should be treated as "ball-park" or Class D[1] (+/- 25%) figures only and cannot be guaranteed accurate.

6.1 KEY STRUCTURAL AND SAFETY ELEMENTS

The probable construction cost for the above-noted repair program, assuming all the work is performed in one phase, is in the order of approximately $150,000 to $200,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

6.2 ALL AESTHETIC AND ACCESSIBILITY UPGRADES

The probable construction cost for the above-noted repair program, assuming all the work is performed in one phase, is in the order of approximately $75,000 to $100,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

SUMMARY OF RECOMMENDED REPAIR		
	Timeline	**Cost (Excluding HST)**
Key Structural and Safety Elements	Immediately	$150,000 to $200,000
All Aesthetic and Accessibility Upgrades	Immediately	$75,000 to $100,000
Total Opinion of Probable Construction Cost:		**$225,000 to $300,000[2]**

[1] Class "D" probable costs – a statement of general requirements and an outline of a solution (degree of accuracy +/- 25%). Probable Construction Costs are in 2025 dollars and do not include soft costs, engineering fees, material testing, permits or HST unless noted otherwise.

[2] Opinion of Probable Costs do not include for the remediation, abatement, and disposal of any hazardous materials such as lead paint, asbestos, or otherwise.

7.0 CLOSING REMARKS

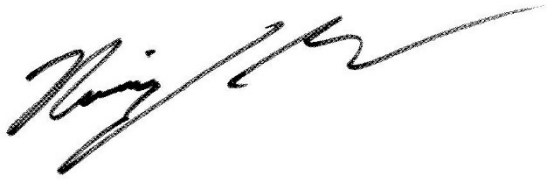
Thank you for selecting Read Jones Christoffersen Ltd. for this assessment. At the Town's approval, RJC would be pleased to proceed with design development for our repair recommendations. Should you have any questions or concerns, please do not hesitate to contact this office.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Leigh Besanger, BEng, P.Eng.
Building Science and Restoration Engineer

Reviewed by:



Nigel Parker, MEng, P.Eng., LEED® AP BD+C
Principal

APPENDIX A

PHOTOGRAPHS

January 6, 2025
TOR.140136.0001

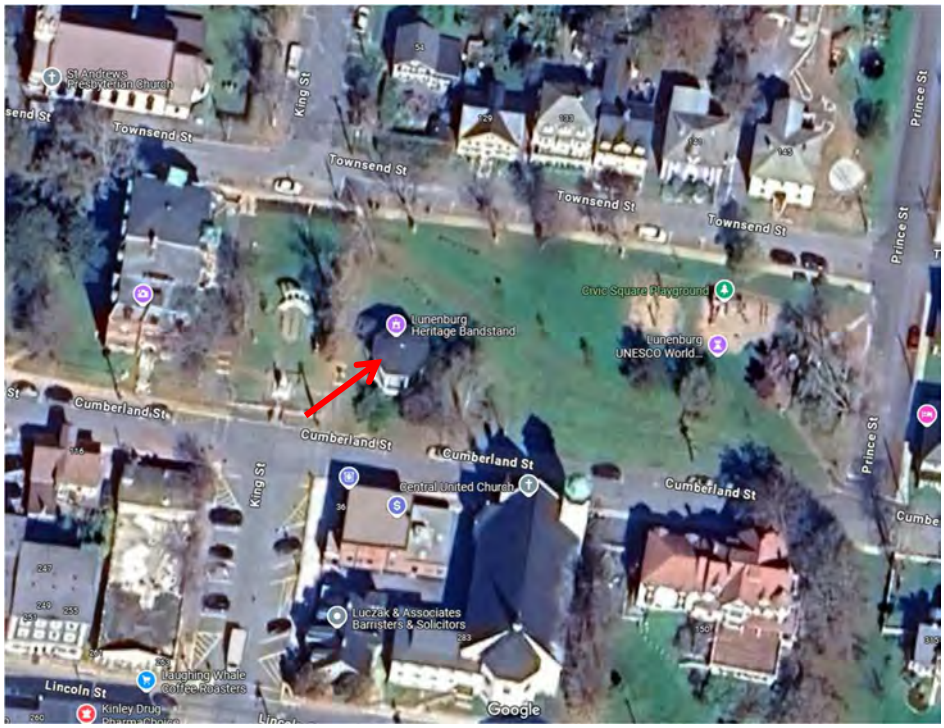


Photo 1: Google Maps aerial view excerpt of the Bandstand located at 125 Cumberland Street

Photo 2: Overview of Bandstand north elevation (facing Cumberland St.)

Photo 3: Underside of central point of deck's structural steel

Photo 4: Full cross-sectional corrosion steel beam web

Photo 5: Corrosion and expansive corrosion by-products on beam flange

Photo 6: Structural steel beam to column connection (typ. at eight locations)

Photo 7: Borescope image of roof steel connection

Photo 8: Borescope close-up image of roof steel beam flange

Photo 9: Overview of wood decking, benches and guardrails

Photo 10: Guardrail with temporary strapping and loose balusters

Photo 11: Section of guardrail with missing baluster

Photo 12: Concrete pier foundation and vertical trim below the Bandstand deck

Photo 13: Access platforms on north side of Bandstand

Photo 14: Overview of wood benches

Photo 15: Peeling paint and corrosion on ornamental steel brackets

Photo 16: Peeling paint and corrosion on ornamental steel brackets

Photo 17: Ornament missing from roof of Bandstand

119 CUMBERLAND STREET

TOWN HALL BUILDING ENVELOPE CONDITION ASSESSMENT

Lunenburg, Nova Scotia

Prepared for:

Town of Lunenburg
177 Cumberland Street
Lunenburg NS B0J 2C0

Prepared by:

RJC Engineers
1701 Hollis Street, Suite 800
Halifax, NS B3J 3M8

January 24, 2025
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EXECUTIVE SUMMARY

As requested, Read Jones Christoffersen Ltd. (RJC) has completed a building envelope condition assessment of the Town Hall located at 119 Cumberland Street in Lunenburg, Nova Scotia for the Town of Lunenburg. The intent of the study was to conduct a review of the visible and accessible portions of the Town Hall building envelope components to identify any visually obvious areas of leakage, and deterioration to determine the likely cause of the noted distresses in order to provide recommendations for the future repair.

The Town Hall, constructed in 1893 and recognized as a Historical Property, is located between Duke Street and Prince Street on a shared property with the Bandstand, the War Memorial and the Civic Square Playground. Originally a Town Hall and Courthouse, the building now serves as the Town's administrative offices and Council chambers. The Town Hall is a three and a half storey, mass brick structure with a wood framed roof and a stone foundation.

Based on our visual review, the roofing materials are in good to poor condition, the brick exterior is in good to fair condition, the windows and doors are in fair to poor condition, and the foundation is in fair condition. Exploratory exterior brick openings (circa 2022 by others) were reviewed. Various locations of leakage were observed inside Town Hall, and localized areas of building envelope deterioration were noted. Targeted repairs are recommended to restore the integrity of the building envelope and prevent ongoing areas of leakage and structural deterioration.

The table below summarizes the recommended repair options and opinion of probable costs:

SUMMARY OF RECOMMENDED REPAIRS		
	Timeline	**Cost (Excluding HST)**
Roofing Repairs	Within 2 years	$350,000 to $460,000
Brick Rehabilitation	Within 5 years	$600,000 to $700,000
Window Replacements	Within 5 years	$400,000 to $575,000
Foundation Waterproofing	Within 5 years	$300,000 to $400,000
Total Opinion of Probable Construction Cost:		**$1,650,000 to $2,135,000**

1.0 INTRODUCTION

Read Jones Christoffersen Ltd. (RJC) was retained by the Town of Lunenburg to perform a building envelope condition assessment of the Town Hall located at 119 Cumberland Street in Lunenburg, Nova Scotia *(Refer to Photo 1 to Photo 5 in Appendix A)* as outlined in our revised proposal dated August 19, 2024. The intent of the review was to conduct a survey of the visible and accessible portions of the building envelope to identify any visually obvious leakages, deterioration or deficiencies and determine the likely cause of the noted distress in order to provide recommendations for future repair.

A brief description of the scope of the review undertaken by RJC is as follows:

.1 Review of available historical information and previous condition assessment reporting prepared by others and provided to RJC by the Town of Lunenburg.

.2 An interview with Town personnel familiar with the use and history of the structure.

.3 Visual review of the accessible portions of the roof, windows and doors, brick and stone masonry, and building foundation. To facilitate the review of the existing exploratory openings on the exterior brick, RJC retained the services of a restoration Contractor.

The date and weather conditions at the time of our visits were as follows:

October 21, 2024, Mostly Clear, 20°C

Leigh Besanger, BEng, P.Eng. performed the assessment for RJC.

This report was prepared in accordance with generally accepted engineering practices. No other warranties, either expressed or implied are made as to the professional services provided under the terms of our contract and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the structure that were not reviewed by RJC.

This report is exclusively for the use and benefit of the client identified on the first page of this report and is not for the use and benefit of, nor may it be relied upon by, any other person or entity. The contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the client.

2.0 DESCRIPTION & BACKGROUND

The Town Hall is a three and a half storey mass masonry structure, with a wood framed roof and stone foundation constructed in the Second Empire style. Based on historical information available, we understand that the Town Hall is recognized as a Municipally Registered Property within Canada's Historic Places registry, it was designed by architect Henry Busch, construction was finished in 1893, and therefore the building is approximately 131 years old.

We further understand that the building exterior remains substantially original in appearance except for the removal of the clock tower and roof cresting from the east elevation, door modifications/upgrades, replacement of slate roofing with asphalt and modified bitumen, and fire escape upgrades on the Townsend Street frontage.

No drawings were made available; therefore, based upon our visual review, the Town Hall building envelope is generally comprised of:

.1 Mass brick exterior walls that appear approximately 13" thick *(Refer to Photo 6 in Appendix A)*, with projecting pilasters, cut-stone embellishments and masonry arches with granite keystones typical over windows and doorways.

.2 The punched and dormer windows typically consist of single-pane, wood frame window assemblies, some fitted with aluminum storm windows. Additionally, many windows have been retrofitted to accommodate window-mounted air conditioning units.

.3 The wood-framed Mansard roof constructed on top of the mass brick exterior walls generally consists of three different roofing materials: asphalt shingle, modified bitumen sheet membrane, and copper *(Refer to Photo 7 and Photo 8 in Appendix A)*. Furthermore, dormers and roof projections are detailed and flashed with wood trim, copper cornices, lead flashing, roofing mastic and sealants.

.4 Gutters appear constructed of galvanized steel sheet metal and are painted black. Downspouts are either copper or PVC and typically terminate at ground level into foundation drain catchments *(Refer to Photo 9, Photo 10 and Photo 11 in Appendix A)*.

2.1 DOCUMENT REVIEW

No drawings were made available; however, the following draft report and online references were available to RJC as part of our review:

.1 Lunenburg Townhall Building Condition Assessment, prepared by Fishburn Sheridan Atlantic Inc. and dated October 24, 2022.

.2 Standards and Guidelines for the Conservation of Historic Places in Canada, a pan-Canadian collaboration, 2nd Edition. (https://www.historicplaces.ca/media/18072/81468-parks-s+g-eng-web2.pdf)

.3 Lunenburg Old Town Heritage Conservation District Plan & Bylaw with Design Guidelines, prepared by Bill Plaskett Heritage & Community Planning for the Town of Lunenburg, and dated April 2001. (https://townoflunenburg.ca/heritage/148-heritage-conservation-district-plan-and-bylaw/file.html)

2.2 INTERVIEW WITH TOWN PERSONNEL

The following information was obtained through interviews with Town of Lunenburg personnel during our review:

.1 Administrative, planning, permitting, and building inspection staff occupy the Town Hall building and offices regularly, and Council occupies the chambers and associated rooms semi-regularly.

.2 The upper floor of Town Hall is largely unoccupied or is used for storage space. We understand that this is partially due to leaks and the overall condition of the rooms.

.3 In recent years, Town of Lunenburg staff and Council members have expressed concern about the building's condition which has led to discussions on plans for future usage. It is our understanding that these discussions prompted the 2022 Building Condition Assessment by others and this subsequent building envelope condition assessment.

3.0 OBSERVATIONS

This section summarizes our observations of our visual review from ground level, off fire escape stairs, interior spaces, and accessible roof areas. A representative from the Town of Lunenburg facilitated our review of the Town Hall interior spaces and highlighted known areas of leakage, distress, and deterioration. Photographs from our review have been included in Appendix A of this report.

3.1 ROOFING AND ROOFING DRAINAGE

As noted in Section 2.0, the roofing materials appear to be a combination of asphalt shingle, modified bitumen sheet membrane, and copper. Furthermore, dormers and roof projections are detailed and flashed with wood trim, copper cornices, lead flashing, roofing mastic and sealants.

.1 The asphalt shingles on the roof over the north portion of the building generally appeared newer and in good condition *(Refer to Photo* 12 *in Appendix A).* However, where this asphalt shingle roof transitions to the various copper roof projections, the roofing mastic tie-ins are deteriorated and in poor condition. These tie-ins are a suspected source of leakage *(Refer to Photo 13 in Appendix A).*

.2 The asphalt shingles on the steeply sloped faces of the Mansard roof and roofing terminations around the dormer windows and projections generally appeared to be in poor condition *(Refer to Photo 8 in Appendix A).* From inside, black roofing paper exists around the window frames *(Refer to Photo 14 in Appendix A).* Typical construction practices would suggest that this building paper was installed on the Mansard roof prior to installation of the existing asphalt shingles.

.3 The modified bitumen sheet membrane is in fair condition and appears to be nearing the end of its effective service life *(Refer to Photo 7 in Appendix A).* The granulation is showing signs of wear and localized liquid-applied membrane patch repairs were noted. Additionally, the various tie-ins and terminations appeared in poor condition and are a suspected source of leakage *(Refer to Photo 15 in Appendix A).*

.4 The copper roof elements were generally inaccessible for up close review, but where visible, appear to remain in fair condition with some corrosion staining *(Refer to Photo 16 in Appendix A)*. As noted above, the roofing mastic tie-ins around the copper roof projections appeared in poor condition and are a suspected source of leakage *(Refer to Photo 13 in Appendix A).*

.5 The gutters appeared in fair condition but the paint finish is peeling and the leaf screens are deformed and detached in some areas *(Refer to Photo 9 in Appendix A).*

.6 The downspouts are in fair condition but it was noted that several of the anchors and strapping affixing the downspouts to the building have pulled/failed *(Refer to Photo 17 in Appendix A)*.

3.2 EXTERIOR BRICK AND STONE MASONRY

Overall, the exterior brick and stone masonry of the Town Hall are in fair condition with localized areas of deterioration observed.

.1 It is evident that modifications, repairs and replacement have been performed over the years, particularly adjacent to the building entrances *(Refer to Photo 18, Photo 19 and Photo 20 in Appendix A)*. In addition to colour and texture differences between brick and mortar, polyurethane sealant was observed at the joints between the different vintages of brick. The sealant appeared in fair to poor condition with some crazing and cohesive tears visible *(Refer to Photo 21 and Photo 22 in Appendix A)*.

.2 Localized areas of brick deterioration were noted at various locations around the building but appeared mostly concentrated on the northwest corner pilaster, along the full height of the downspout on the west elevation, between the horizontal stone embellishments on the west elevation (below the second storey), and on and adjacent to the southwest corner pilaster. Deterioration was observed in the form of loose and missing mortar joints, cracked brick, craze cracking and spalled brick faces *(Refer to Photo 23, Photo 24, Photo 25 and Photo 26 in Appendix A)*.

.3 Run-off and organics staining were noted on the exterior brick and stone surfaces in a few areas. Notable areas of staining included the east face of the pilaster east of the Cumberland Street entrance, north of the east elevation entrance, and on north elevation surfaces adjacent to the steel fire escape stairs *(Refer to Photo 27, Photo 28 and Photo 29 in Appendix A)*.

.4 Efflorescence was observed on exterior brick surfaces, but it does not appear to be a widespread issue or concern *(Refer to Photo 30 in Appendix A)*.

.5 Some exterior brick surfaces appeared bowed and out of plumb, notably, at the top of the northwest corner pilaster *(Refer to Photo 31 in Appendix A)*.

3.3 EXISTING EXPLORATORY OPENINGS IN EXTERIOR BRICK

Several exploratory openings exist in the brick exterior. It is our understanding that these openings were created by others during a 2022 assessment *(Refer to Photo 11 in Appendix A)*. With the assistance of a

restoration Contractor, the temporary red-painted plywood coverings were removed for RJC's review at the following three existing openings:

.1 On the north face of the northwest corner pilaster *(Refer to Photo 32 in Appendix A)*.

.2 Adjacent to the downspout at the approximate mid-point of the west elevation *(Refer to Photo 33 in Appendix A)*.

.3 On the south elevation of the building, adjacent to the southeast corner pilaster *(Refer to Photo 34 in Appendix A)*.

We observed the following at these openings:

.1 One wythe of brick was removed to expose the wythe behind and wood was installed to re-support the outer wythe of brick at the openings.

.2 No visually obvious indications of deterioration were observed within the openings that were uncovered.

Note, after our review, the ports were closed and sealed.

3.4 WINDOWS

Given their age, the single pane wood framed windows appeared in fair condition.

.1 Some wood, paint and sealant deterioration were noted on the exterior window frames, sashes and sills. Where noted on the inside of the windows, failing paint finish and wood deterioration are likely due to interior condensation *(Refer to Photo 35 and Photo 36 in Appendix A)*.

.2 From inside the Mansard roof attic space, "daylighting" was observed around some of the window frames indicating discontinuities in the water and air control layers *(Refer to Photo 37 in Appendix A)*.

.3 Newer vinyl and aluminum frame windows were noted in the unoccupied space located above the Council chambers *(Refer to Photo 38 in Appendix A)*. It is unknown when these windows were replaced.

.4 Cracked panes were noted in a few locations which should be replaced *(Refer to Photo 39 in Appendix A)*.

3.5 EXTERIOR DOORS

In general, the exterior doors remain in fair condition but in the vicinity of the door openings, moisture ingress issues are evident.

.1 At the south elevation Cumberland Street and east elevation entrances, peeling and blistered paint and extensive deterioration to interior finishes (plaster, trim, mouldings etc.) have occurred as a result of moisture ingress which is suspected to be occurring at the joints between different vintages of brick and areas of deteriorated sealant *(Refer to Photo 40 and Photo 41 in Appendix A)*.

.2 The fire escape exit at the top of the steel stairs on the north elevation, leakage staining and deterioration were noted on interior finishes *(Refer to Photo 42 in Appendix A)*.

3.6 STONE FOUNDATION WALLS

Where visible and accessible in the basement, the interior surfaces of the stone foundation walls appeared in fair condition *(Refer to Photo 43 in Appendix A)*.

.1 The basement appeared dry during our review; however, we understand that moisture ingress into the basement is a common occurrence, and indications of leakage were noted. Given the void spaces between the stones of the foundation walls, and the likelihood that waterproofing materials are not installed on the exterior surfaces of the stone foundation walls, it is anticipated that moisture ingress into the basement will persist unless addressed.

.2 Parging materials installed on the interior surfaces of the stone foundation walls in localized areas appeared in poor condition from ongoing moisture ingress *(Refer to Photo 44 in Appendix A)*.

.3 The basement bulkhead hatch appeared unsealed at ground level *(Refer to Photo 45 in Appendix A)*.

3.7 INTERIOR SPACES

Representative areas of the building interior were reviewed for signs of deterioration related to leakages and deficiencies in the building envelope.

.1 Cracking was observed on interior plaster wall and ceiling surfaces which is expected for a building of this age and type *(Refer to Photo 46 and Photo 47 in Appendix A)*.

.2 Extensive deterioration from leakage was noted in the unoccupied space on the top floor on the north side of the building *(Refer to Photo 48, Photo 49 and Photo 50 in Appendix A)*.

.3 Moderate deterioration from leakage was noted in plaster finishes inside the Council chambers and various office spaces inside the building *(Refer to Photo 51 and Photo 52 in Appendix A)*.

.4 The above noted deterioration due to leakages/moisture ingress appears to directly translate to the condition of the roofing materials at the tie-in and termination locations between different types of roofing materials, around dormer windows, and at the various copper roof projections.

4.0 CONCLUSIONS/DISCUSSION

Based on the results of our visual review, the Town Hall building envelope appears to be in fair to poor condition and repair and rejuvenation are needed in the near term to limit the potential for future building envelope deterioration, structural deterioration, and ongoing leaks into the building.

The tie-ins, terminations, and transitions between the various roofing materials, around dormer windows and copper roof projections appear in poor condition, susceptible to moisture ingress and no longer performing as intended. Furthermore, the modified bitumen roofing over the south portion of the building appears deteriorated and nearing the end of its effective service life.

The asphalt shingle roofing over the north portion of the building appears newer and in good condition and repairs do not appear necessary at this time. However, the asphalt shingles on the steeply sloped surfaces of the Mansard roof faces appear deteriorated and in fair to poor condition.

The mass brick walls are experiencing localized deterioration in the form of loose and missing mortar joints, cracked masonry, and craze cracking and spalling on brick faces. This deterioration appears concentrated at the northwest and southwest corner pilasters, and in various areas on the west elevation, with other lesser areas of deterioration noted on the other elevations of the building.

With the exception of a few cracked panes and some deterioration on the wood framing, sashes and sills, the windows are performing as intended given their age. The thermal performance will remain limited due to single-pane construction and regardless of rejuvenation efforts but could be improved with wood window replacement using dual-glazed windows to retain the heritage aesthetic. Furthermore, the addition of external wood storm windows may also be considered as part of a window rehabilitation program, depending on heritage constraints.

While the doors appear in good to fair condition, moisture ingress is occurring in the vicinity of the east and south elevation doors, and the third storey fire escape door. Deterioration will persist and progress until the water and air control layers are rectified.

Although the basement appeared dry during our review, we understand moisture ingress is an ongoing issue, and evidence of previous leakage was noted which indicates a lack or failure of an existing waterproofing system.

5.0 RECOMMENDATIONS

The most cost-effective approach with respect to construction would be to undertake the Town Hall rehabilitation in a single project; however, we understand that budget constraints may dictate that this work be phased over several years. Based on the observed levels of deterioration, we recommend that phasing not exceed 5 years and follow a sequential top down approach, with priority placed on completing the roofing repairs within 2 years, followed by brick rehabilitation, window replacements, and foundation waterproofing in the next 5 years. Under this repair strategy, the largest suspected contributors to moisture ingress are prioritized; therefore, the potential for building envelope and structural deterioration to occur at an accelerated rate is reduced. This repair strategy is proven to produce more long-term, durable repairs.

5.1 ROOFING REPAIRS

It is recommended that the existing modified bitumen roofing on the low slope portions be removed and replaced along with the replacement and upgrade of the tie-ins and terminations at all transitions between the various roofing materials, around dormer windows and copper roof projections.

A detailed destructive investigation was not completed on the copper roofing elements; however, due to the extent of recommended roofing rehabilitation, it may be advantageous to repair or replace the copper during the same phase of work to take advantage of economies of scale. Should replacement of the copper be required, new copper or colour-matched aluminum roofing materials are potential options, depending on heritage constraints.

Likewise, for the asphalt shingles on the steeply sloped Mansard roof faces, while repairs are being performed at dormer window tie-ins and terminations, it may be advantageous to replace the asphalt shingles at this time.

5.2 BRICK REHABILITATION

It is recommended that a widespread brick cleaning and targeted brick rehabilitation program be executed to address staining and areas of concern such as deteriorated mortar joints, cracked and spalled brick masonry units, and deteriorated sealants. As noted in Section 3.2, concentrations of brick deterioration exist at the northwest and southwest corner pilasters and elsewhere on the west elevation. Furthermore, brick and sealant repairs should target known areas of moisture ingress at Cumberland Street and east elevation entrances.

5.3 WINDOW REPLACEMENTS

It is recommended that all windows be replaced with insulated glass units (IGUs) to improve thermal performance and air tightness. However, we understand that rehabilitation with dual-glazing may be limited depending on heritage constraints. Although new windows can be specified to replicate the appearance of the existing windows using wood framing, it is anticipated that wholesale removal and replacement will have the greatest impact, of all of the presented recommendations, on the overall appearance of the building.

5.4 FOUNDATION WATERPROOFING

In order to limit the likelihood of future leakage and the associated structural deterioration of the foundation, we recommend that a waterproofing system be installed on the exterior perimeter surfaces of the stone foundation walls. In general, a new waterproofing system would include protection and drainage boards, an option for rigid insulation and improvements to the foundation drainage system if needed.

It is recommended that moisture and air control layers be re-established around the bulkhead hatch, this could be executed as part of the foundation waterproofing work, or as stand-alone rehabilitation.

6.0 OPINION OF PROBABLE CONSTRUCTION COSTS

The following cost estimates presented for the Town Hall building envelope repairs and rejuvenation represent our opinion of the probable construction cost based on the limited information obtained during this condition survey assessment. The final costs will not be known until such time that the work is tendered and completed. It is not possible to accurately forecast the final bid unit prices that may be tendered for the work because they are directly related to the construction climate at the time of tendering. The costs noted below should be treated as "ball-park" or Class D[1] (+/- 25%) figures only and cannot be guaranteed accurate.

The following opinions of the probable construction cost are presented as follows:

6.1 ROOFING REPAIRS

The probable construction cost for the roofing repairs, assuming all the work is performed in one phase, is in the order of approximately $350,000 to $460,000 plus H.S.T., in 2025 dollars, which includes a recommended contingency allowance of $50,000 to $60,000 for copper roofing repairs, but excludes engineering fees, soft costs, and material testing costs.

6.2 BRICK REHABILITATION

The probable construction cost for a brick rehabilitation program, assuming all the work is performed in one phase, is in the order of approximately $600,000 to $700,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

6.3 WINDOW REPLACEMENTS

The probable construction cost for a window replacement program, assuming all the work is performed in one phase, is in the order of approximately $400,000 to $575,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs. Please note that window replacement costs are variable depending on the specific composition of window replacements and the level of window frame deterioration when the work is performed.

[1] Class "D" probable costs – a statement of general requirements and an outline of a solution (degree of accuracy +/- 25%). Probable Construction Costs are in 2025 dollars and do not include soft costs, engineering fees, material testing, permits or HST unless noted otherwise. Furthermore, probable costs do not include any direct or indirect costs associated with potential trade tariffs, as the impact referpotential trade tariffs will have on the costs for the recommended repairs cannot be accurately forecasted.

6.4 FOUNDATION WATERPROOFING

The probable construction cost for a foundation waterproofing program, assuming all the work is performed in one phase, is in the order of approximately $300,000 to $400,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

SUMMARY OF RECOMMENDED REPAIRS		
	Timeline	**Cost (Excluding HST)**
Roofing Repairs	Within 2 years	$350,000 to $460,000
Brick Rehabilitation	Within 5 years	$600,000 to $700,000
Window Replacements	Within 5 years	$400,000 to $575,000
Foundation Waterproofing	Within 5 years	$300,000 to $400,000
Total Opinion of Probable Construction Cost:		**$1,650,000 to $2,135,000[2]**

[2] Opinion of Probable Costs do not include for the remediation, abatement, and disposal of any hazardous materials such as lead, asbestos, or otherwise.

7.0 CLOSING REMARKS

Thank you for selecting Read Jones Christoffersen Ltd. for this assessment. RJC would be pleased to assist you with the implementation of our recommendations. Should you have any questions or concerns, please do not hesitate to contact this office.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Leigh Besanger, BEng, P.Eng.
Project Engineer

Reviewed by:

Duncan Rowe, BASc, MEng, P.Eng., LEED® AP, BECxP, CPHC
Principal

APPENDIX A

PHOTOGRAPHS

January 24, 2025
TOR.140136.0001

Photo 1: Google Maps aerial view excerpt of the Town Hall located at 119 Cumberland Street

Photo 2: Overview of Town Hall north elevation (Townsend Street entrance)

Photo 3: Overview of Town Hall east elevation

Photo 4: Overview of Town Hall south elevation (Cumberland Street Entrance)

Photo 5: Overview of Town Hall west elevation

Photo 6: Approximate thickness at the top of west elevation brick mass wall

Photo 7: Newer asphalt shingle roofing, modified bitumen sheet membrane, copper roof projection. Note localized liquid-applied patch repairs

Photo 8: Stained asphalt shingle roofing around dormer window on steeply sloped Mansard roof face and failing window framing paint finish (north elevation)

Photo 9: Close up of gutter with failing paint finish and deformed and detached leaf screen

Photo 10: Copper downspout (note discontinuity)

Photo 11: PVC downspout terminating below-grade

Photo 12: Newer asphalt shingles on north portion of roof

Photo 13: Roofing mastic tie-in in poor condition at transition between asphalt shingles and copper

Photo 14: Building paper terminating inside attic/storage space at window opening

Photo 15: Modified bitumen roofing termination below asphalt shingle roofing

Photo 16: Copper dome roof located above north elevation Townsend Street entrance

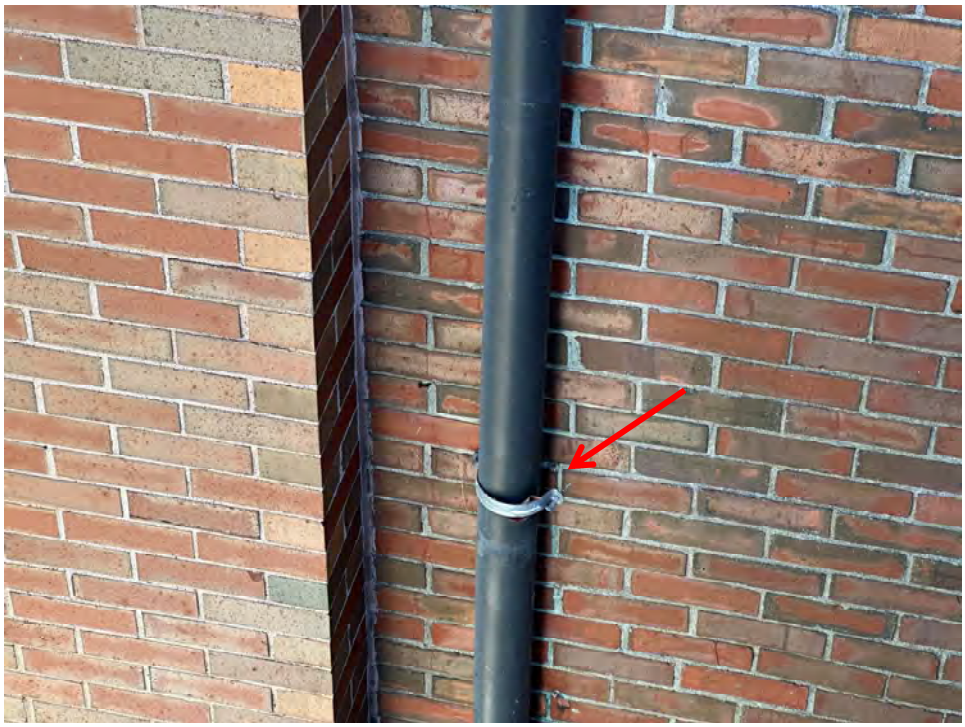

Photo 17: Pulled/failed anchor for downspout strapping

Photo 18: Existing brick repair areas near west elevation entrance

Photo 19: Existing brick repair areas near south elevation Cumberland Street entrance

Photo 20: Existing brick repair areas near east elevation entrance

Photo 21: Sealant between different vintages of brick with cohesive tears

Photo 22: Sealant between different vintages of brick with crazing

Photo 23: Close up of brick cracking and deterioration at northwest corner pilaster

Photo 24: Close up of brick cracking and deterioration along west elevation

Photo 25: Overview of mortar joint deterioration in vicinity of west elevation downspout

Photo 26: Overview of brick face spalling near southwest corner pilaster on west elevation

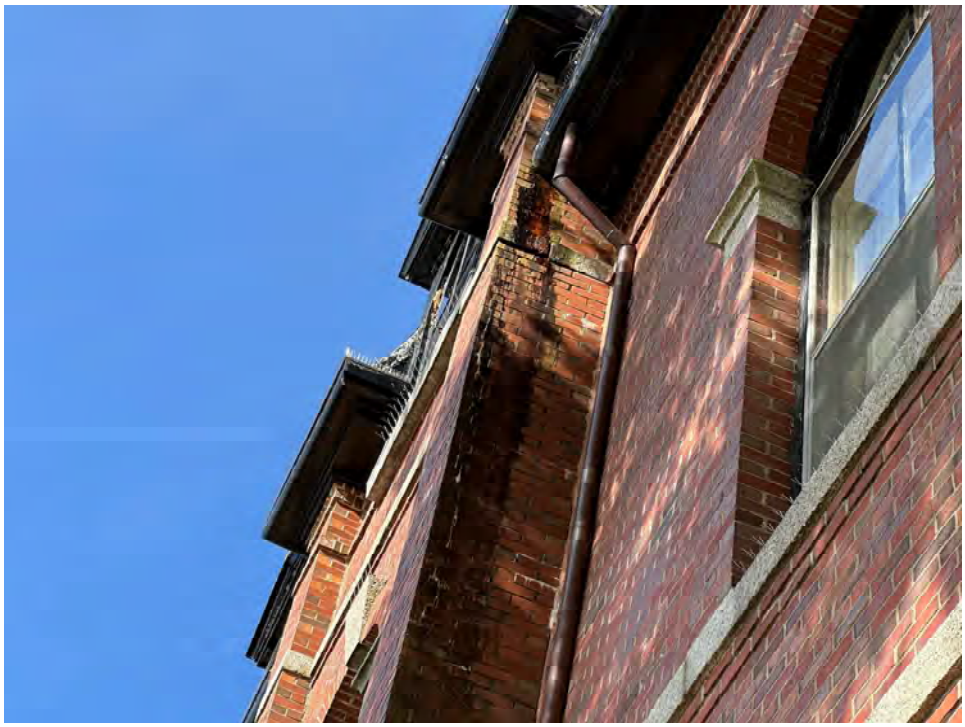

Photo 27: Overview of staining from gutter run-off on south elevation Cumberland Street entrance

Photo 28: Overview of organics staining below fire escape stairs on north elevation Townsend Street entrance

Photo 29: Overview of run-off and organics staining below gutter likely from overflow

Photo 30: Efflorescence on pilaster adjacent to south elevation Cumberland Street entrance

Photo 31: Slight bow at top of northwest corner pilaster

Photo 32: Exploratory opening on north face of northwest corner pilaster by others and reopened for RJC review

Photo 33: Exploratory opening on west elevation by others and reopened for RJC review

Photo 34: Exploratory opening on south elevation by others and reopened for RJC review

Photo 35: Peeling paint and deterioration on wood window, likely from condensation

Photo 36: Peeling paint and deterioration of exterior wood detailing above retrofit vinyl window

Photo 37: Daylight at window opening in attic/storage space

Photo 38: Newer vinyl windows in an unoccupied room on north side of third floor (typ. at four dormers)

Photo 39: Cracked pane on second floor office window on west elevation

Photo 40: Moisture ingress deterioration above south elevation Cumberland Street entrance

Photo 41: Moisture ingress deterioration above east elevation entrance

Photo 42: Moisture ingress deterioration at third storey fire escape door

Photo 43: Stone foundation wall

Photo 44: Deteriorated parging material on stone foundation wall

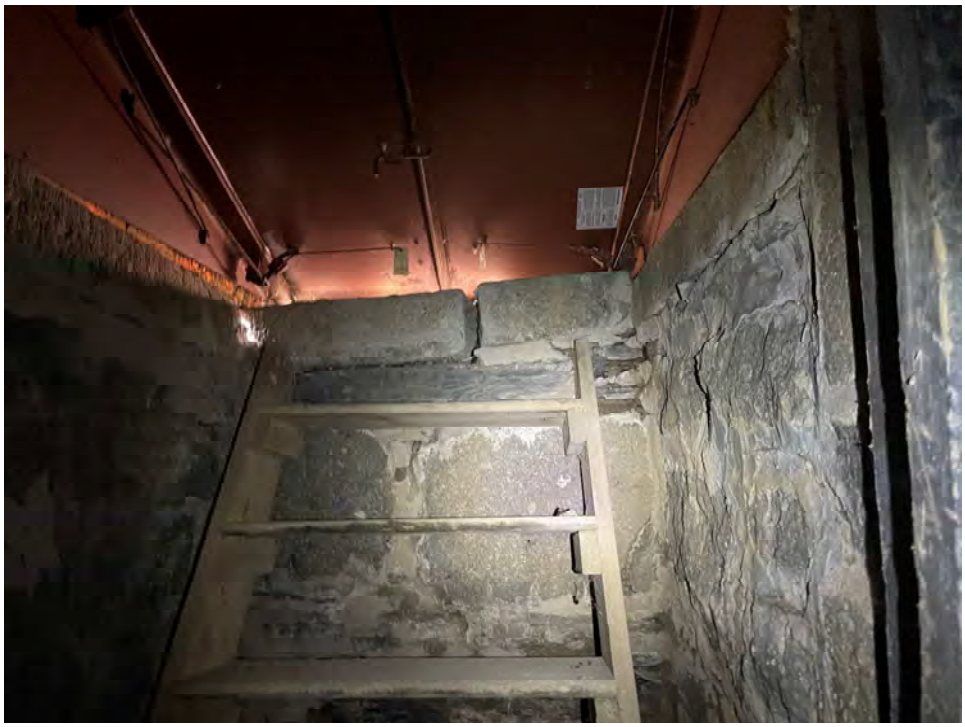

Photo 45: View from inside basement bulkhead hatch with daylight indicating no air or water seal in areas

Photo 46: Cracking on ceiling inside building (typ. at several locations)

Photo 47: Cracking on ceiling inside building (typ. at several locations

Photo 48: Deterioration from moisture ingress on third floor unoccupied space

Photo 49: Deterioration from moisture ingress on third floor unoccupied space

Photo 50: Deterioration from moisture ingress at dormer window on third floor unoccupied space

Photo 51: Deterioration from moisture ingress on second floor in Council chambers

Photo 52: Deterioration from moisture ingress on third floor

40 & 42 DUKE STREET

OLD FIRE HALL BUILDING ENVELOPE CONDITION ASSESSMENT

Lunenburg, Nova Scotia

Prepared for:

Town of Lunenburg
177 Cumberland Street
Lunenburg NS B0J 2C0

Prepared by:

RJC Engineers
1701 Hollis Street, Suite 800
Halifax, NS B3J 3M8

January 24, 2025
TOR.140136.0001

TABLE OF CONTENTS

EXECUTIVE SUMMARY

As requested, Read Jones Christoffersen Ltd. (RJC) has completed a building envelope condition assessment of the Old Fire Hall located at 40 & 42 Duke Street in Lunenburg, Nova Scotia for the Town of Lunenburg. The intent of the study was to conduct a review of the visible and accessible portions of the Old Fire Hall building envelope components to identify any visually obvious areas of leakage, and deterioration to determine the likely cause of the noted distresses in order to provide recommendations for the future repair.

The Old Fire Hall, constructed in 1928, is located on the east side of Duke Street, between Townsend Street and Cumberland Street. It is a two storey, structural clay tile and brick structure with concrete foundation walls and footings, and a flat wood truss roofing system. We understand that the building has been vacant since late 2021.

Based on our visual review, the brick exterior is in good to fair condition, the roofing materials appear in poor condition, and the windows and doors appear in good to fair condition. Two exploratory brick openings were reviewed to determine the condition and composition of the building envelope. Various locations of leakage were observed inside the Old Fire Hall, and localized areas of brick deterioration and mortar step cracking were noted. Repairs should be targeted based on the intended future use of the building, but at a minimum, the roofing membrane requires replacement, the wood cornices should be repaired and repainting and resealing should be done at window and door frames in the near-term to limit leaks and prevent structural deterioration.

The table below summarizes the recommended repair options and opinion of probable costs:

SUMMARY OF RECOMMENDED REPAIR		
	Timeline	**Cost (Excluding HST)**
Near-Term Repairs and Rehabilitation	Within 2 years	$200,000 to $250,000
Long-Term Repair and Retrofit Considerations	TBD	$60,00 to $80,000
Total Opinion of Probable Construction Cost:		**$260,000 to $330,000**

1.0 INTRODUCTION

Read Jones Christoffersen Ltd. (RJC) was retained by the Town of Lunenburg to perform a building envelope condition assessment of the Old Fire Hall located at 40 & 42 Duke Street in Lunenburg, Nova Scotia *(Refer to Photo 1 to Photo 3 in Appendix A)* as outlined in our revised proposal dated August 19, 2024. The intent of the review was to conduct a survey of the visible and accessible portions of the building envelope to identify any visually obvious leakages, deterioration or deficiencies and determine the likely cause of the noted distress in order to provide recommendations for future repair.

A brief description of the scope of the review undertaken by RJC is as follows:

.1 Review of available drawings provided to RJC by the Town of Lunenburg.

.2 An interview with Town personnel familiar with the history and usage of the structure.

.3 Exploratory removal and replacement of exterior brick masonry at a sample of locations to expose the condition and composition of the concealed elements of the building enclosure. To facilitate the review of the exploratory openings on the exterior brick, RJC retained the services of a restoration Contractor for the openings.

.4 Visual review from ground level, roof level and the building's interior of the accessible portions of the brick exterior, doors, windows and roof.

The date and weather conditions at the time of our visits were as follows:

October 21, 2024, Mostly Clear, 20°C

Leigh Besanger, BEng, P.Eng. performed the assessment for RJC.

This report was prepared in accordance with generally accepted engineering practices. No other warranties, either expressed or implied are made as to the professional services provided under the terms of our contract and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the structure that were not reviewed by RJC.

This report is exclusively for the use and benefit of the client identified on the first page of this report and is not for the use and benefit of, nor may it be relied upon by, any other person or entity. The contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the client.

2.0 DESCRIPTION & BACKGROUND

The Old Fire Hall is a two storey, structural clay tile and brick structure with concrete foundation walls and footings, and a flat wood truss roofing system. Available drawings are undated but a stone engravement on the southwest corner of the building indicates: constructed circa 1928, built by R.E. Corkum, and designed by Leslie R. Fairn Architects. We understand that the building was most recently occupied by the Nova Scotia College of Art and Design (NSCAD) until 2021 but their lease was not renewed and the building has been vacant since.

Based upon our review of available drawings and our visual review, the Old Fire Hall building enclosure is generally comprised of:

.1 The building footprint is approximately 3,400 sq. ft. overall.

.2 Approximately 16" thick concrete foundation walls. No reinforcing steel is detailed on the drawings.

.3 4" thick exterior brick cladding, with a multi-wythe structural clay tile back up wall.

.4 Wood-framed windows and doors.

.5 The original or existing roofing membrane type is not indicated on available drawings, but we understand the wood truss roof system was re-strengthened in 2017 by others.

2.1 DOCUMENT REVIEW

The following drawing sets were provided to RJC as part of our review:

.1 Firemens Building, Lunenburg, N.S. drawings, prepared by Leslie R. Fairn Architects and undated.

.2 Roof Strengthening Old Fire Hall, Lunenburg Issued for Tender Drawings, prepared by Eastpoint Engineering and dated May 24, 2017.

2.2 INTERVIEW WITH TOWN PERSONNEL

The following information was obtained through interviews with the Town of Lunenburg personnel during our review:

.1 The Town of Lunenburg is considering the future use of this building with potential options including office space, workshop space and/or storage space.

3.0 OBSERVATIONS

This section summarizes our observations of our visual review from ground and roof level, and interior spaces. A representative from the Town of Lunenburg facilitated our review of the interior spaces and highlighted known areas of leakage, distress, and deterioration. Photographs and key figures from our review have been included in Appendix A of this report.

3.1 FOUNDATION WALLS

.1 The above grade surfaces of the concrete foundation wall appeared in good condition, as visible from the building exterior and basement area.

3.2 EXTERIOR BRICK

.1 Overall, the exterior brick masonry cladding of the Old Fire Hall remains in good condition with localized areas appearing in fair condition. Localized deterioration was observed in the form of brick cracking and mortar joint step cracking. Touch-up sealant repair attempts were noted at areas of step cracking which is not a recommended repair method *(Refer to Photo 4 to Photo 5 in Appendix A)*.

.2 The brick masonry cladding is constructed in a common bond pattern with five stretcher courses and one header course spaced every sixth course *(Refer to Photo 6 in Appendix A)*.

.3 It appears that the brick masonry cladding is intended to be a mass wall system that is undrained and face-sealed.

.4 Brick-infilled openings exist on the lower portion of the north elevation. Soldier course brick exists above these openings and it is evident that mortar was installed over the lintel shelf angles *(Refer to Photo 6 in Appendix A)*.

.5 The configuration of the west elevation bay doors has been altered since original construction. Bricks dissimilar in appearance, exist around the four bay doors – the original drawings show three bay doors with windows in between *(Refer to Figure 1 and Photo 2 in Appendix A)*.

3.3 STRUCTURAL CLAY TILE

.1 Where visible from inside the building, the structural clay tiles appeared in good condition. No areas of significant cracking or deterioration were noted *(Refer to Photo 7 in Appendix A)*.

.2 Where visible, the typical structural clay tile bond pattern appeared to alternate between two courses on edge, and one course on bed *(Refer to Photo 7 in Appendix A)*. Available drawings indicate the ground level wall thickness as 16", the second floor wall thickness as 12", and the attic space wall thickness as 8". As such, in addition to the exterior brick masonry and air space, the ground floor likely has three wythes of structural clay tile, the second floor wall has two, and the attic space wall one wythe.

.3 The original drawings detail plaster installed on the structural clay tiles inside the building. No insulation is shown on the drawings and based on our visual survey, the original wall thicknesses appear to correspond to existing conditions.

3.4 BAY AND ACCESS DOORS

.1 There are four bay doors on the west elevation and one bay door on the east elevation and they all appeared in fair condition, and it is our understanding they perform as intended *(Refer to Photo 8 in Appendix A)*. However, if the Town is considering converting this building to occupied space, it is anticipated that these doors will negatively affect the overall thermal performance of the building and the general comfort of the occupants.

.2 Two access doors exist off Duke Street (west elevation), one exists off Townsend Street (north elevation), and two exist off the rear (east elevation).

.3 Except for the north elevation door which appeared newer and in good condition, the other older doors were observed to be in fair to poor condition. Furthermore, the wood door frames at all locations need rejuvenation, resealing and repainting *(Refer to Photo 9, Photo 10 and Photo 11 in Appendix A)*.

3.5 WINDOWS

.1 The vinyl windows throughout the building appear newer and in good condition. However, the vinyl windows were installed into the original wood window openings which are in poor condition and require repairs, resealing and repainting *(Refer to Photo 12 and Photo 13 in Appendix A)*.

3.6 ROOFING ASSEMBLY

.1 The existing roof membrane, which appeared to be a modified bitumen sheet roofing overlain with a liquid-applied membrane, appeared deteriorated and in poor condition. Blistering, debonded areas and alligator cracking were noted and tie-ins at roof projects also appeared deteriorated *(Refer to Photo 14, Photo 15 and Photo 16 in Appendix A).* Given the recent investment into roof re-strengthening, it is recommended that the roofing membrane be removed and replaced to protect the underlying structural system and prevent leaks into the building.

.2 From ground level, failing paint finish and areas of splitting and warping were noted on the underside of the wood cornices on the north, west and south elevation walls (located approximately 600 mm below the roof edge) *(Refer to Photo 17 in Appendix A).* The top surfaces of the cornices were not accessible for our review, but based on how the cornices are detailed on the original drawings, there is the potential for moisture ingress into the wall assembly if waterproofing and watershed are not maintained on the cornices *(Refer to Figure 2 in Appendix A)*.

3.7 EXPLORATORY OPENINGS IN EXTERIOR BRICK

Two exploratory openings were created in the brick cladding to allow for a localized sample review of the concealed elements of the building enclosure *(Refer to Photo 18 and Photo 19 in Appendix A).* The exploratory openings were approximately 24" by 18" in size and were performed to examine the condition and composition of the building envelope.

.1 In general, the condition and composition at both exploratory openings were observed to be the same. The following wall construction was observed (from exterior to interior):

- Clay masonry brick (4")
- Air space (1/2")
- Structural clay tile back up wall (thickness varies)

.2 Membrane was not observed on the structural clay tile back up wall at either exploratory opening.

.3 Brick ties were not observed at either opening exploratory openings, which is typical for brick mass masonry cladding constructed with the observed bond pattern.

.4 The removed brick was reinstated.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our visual review, the Old Fire Hall building envelope appears in fair condition with the existing roofing membrane and the wood framing around doors and windows in poor condition. We understand that the extent of rehabilitation and upgrades is largely dependent on the outcome and future use of the space. As such, near-term repair and rehabilitation recommendations are presented below assuming no change in layout or function and long-term repair and retrofitting recommendations are presented for the Town's consideration and planning for the future use of the building.

4.1 NEAR-TERM REPAIRS AND REHABILITATION

If the Town anticipates that the future use of the space will not be decided for some time, extending beyond a period of 2 to 3 years, then as a starting point, it is recommended that the following repairs be performed in the near-term to prevent continued structural/building envelope deterioration and leaks:

.1 Removal and replacement of the roofing membrane. Roof insulation could also be added or upgraded during replacement of the membrane and this should be confirmed pending space use.

.2 Removal and replacement of waterproofing/flashings and repainting on the wood cornices

.3 Localized repointing on brick cladding, and

.4 Repainting and resealing of wood framing around the window and door openings.

4.2 LONG-TERM REPAIRS AND RETROFITTING

If the Town desires to upgrade the building envelope for long-term use of the space, then it is recommended to complete the above noted repairs in combination with considering the following improvements:

.1 Removal and replacement of exterior access doors – two on east elevation, two on west elevation.

.2 Removal or retrofitting of the existing bay doors – one on the east elevation, four on west elevation.

Note, for cold climates, numerous studies have determined that the optimal window-to-wall ratio (WWR) for energy performance is approximately 25% to 35%. With the bay doors considered as "windows" in this determination, the west elevation WWR is calculated to be approximately 28%. In

general, retrofits would upgrade the air and moisture control at the bay doors, improve localized thermal performance, and allow for the overall aesthetic of the building to remain intact.

If changing the building's exterior aesthetic is not an option due to the Town's heritage conservation policies, then hygrothermal analysis of the structural clay tile and brick masonry wall is recommended to study the impacts of insulating the walls from the inside, with spray foam or otherwise. Without first assessing the critical freeze-thaw saturation point of the masonry, insulating the building from the inside has the potential to initiate rapid deterioration of the masonry wall structure by reducing the drying potential of the wall assembly and increasing freeze-thaw risk. In general, a hygrothermal analysis and assessing the feasibility of insulation upgrades are considered beyond the scope of this report. As such, the associated costs have not been included in our Opinion of Probable Construction Costs presented in Section 5.2.

5.0 OPINION OF PROBABLE CONSTRUCTION COSTS

The following cost estimates presented for the repair and upgrade of the Old Fire Hall represent our opinion of the probable construction cost based on the limited information obtained during this condition survey assessment. The final costs will not be known until such time that the work is tendered and completed. It is not possible to accurately forecast the final bid unit prices that may be tendered for the work because they are directly related to the construction climate at the time of tendering. The costs noted below should be treated as "ball-park" or Class D[1] (+/- 25%) figures only and cannot be guaranteed accurate.

5.1 NEAR-TERM REPAIRS AND REHABILITATION

The probable construction cost for the above noted repairs and rehabilitation program, assuming all the work is performed in one phase, is in the order of approximately $200,000 to $250,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

5.2 LONG-TERM REPAIRS AND RETROFITTING

The probable construction cost for above noted repairs and rehabilitation program, assuming all the work is performed in one phase, is in the order of approximately $60,000 to $80,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

SUMMARY OF RECOMMENDED REPAIR		
	Timeline	**Cost (Excluding HST)**
Near-Term Repairs and Rehabilitation	Within 2 years	$200,000 to $250,000
Long-Term Repair and Retrofit Considerations	TBD	$60,00 to $80,000
Total Opinion of Probable Construction Cost:		**$260,000 to $330,000[2]**

[1] Class "D" probable costs – a statement of general requirements and an outline of a solution (degree of accuracy +/- 25%). Probable Construction Costs are in 2025 dollars and do not include soft costs, engineering fees, material testing, permits or HST unless noted otherwise. Furthermore, probable costs do not include any direct or indirect costs associated with potential trade tariffs, as the impact referpotential trade tariffs will have on the costs for the recommended repairs cannot be accurately forecasted.

[2] Opinion of Probable Costs do not include for the remediation, abatement, and disposal of any hazardous materials such as lead, asbestos, or otherwise.

6.0 CLOSING REMARKS

Thank you for selecting Read Jones Christoffersen Ltd. for this assessment. RJC would be pleased to assist you with the implementation of our recommendations. Should you have any questions or concerns, please do not hesitate to contact this office.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Leigh Besanger, BEng, P.Eng.
Project Engineer

Reviewed by:

Duncan Rowe, BASc, MEng, P.Eng., LEED® AP, BECxP, CPHC
Principal

APPENDIX A

PHOTOGRAPHS & FIGURES

January 24, 2025
TOR.140136.0001

Photo 1: Google Maps aerial view excerpt of the Old Fire Hall located at 40 & 42 Duke Street

Photo 2: Overview of Old Fire Hall north and west elevation

Photo 3: Overview of Old Fire Hall east elevation

Photo 4: Localized step cracking with touch-up sealant repair attempts

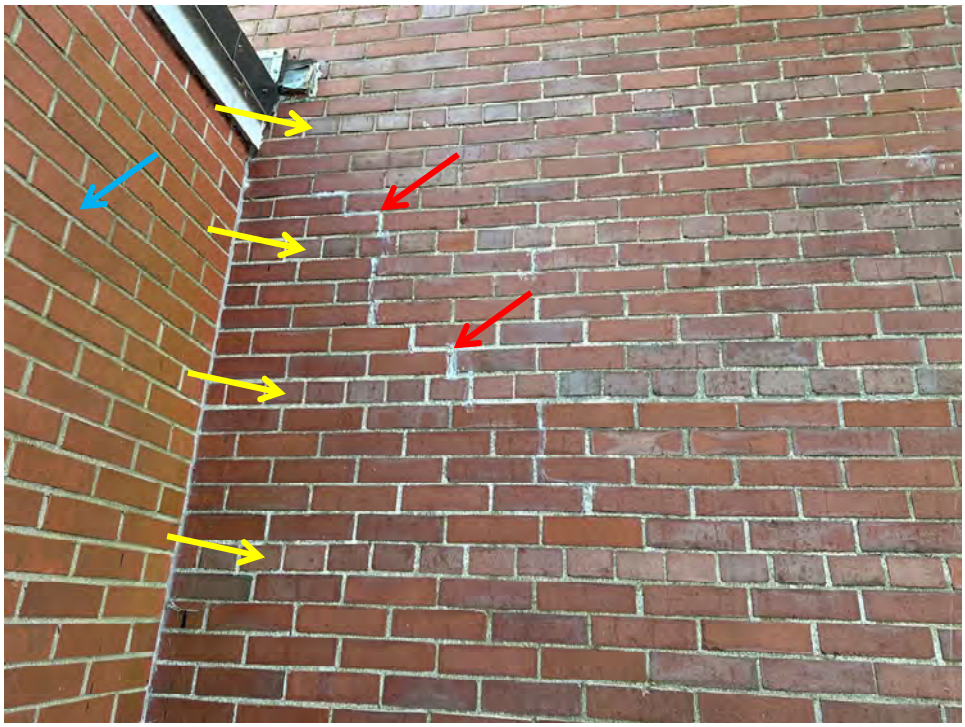

Photo 5: Typical brick masonry bond pattern. Yellow arrows at header courses. Red arrow at step cracking with touch up sealant repair attempt. Blue arrow on west wall of Electric Light Shop

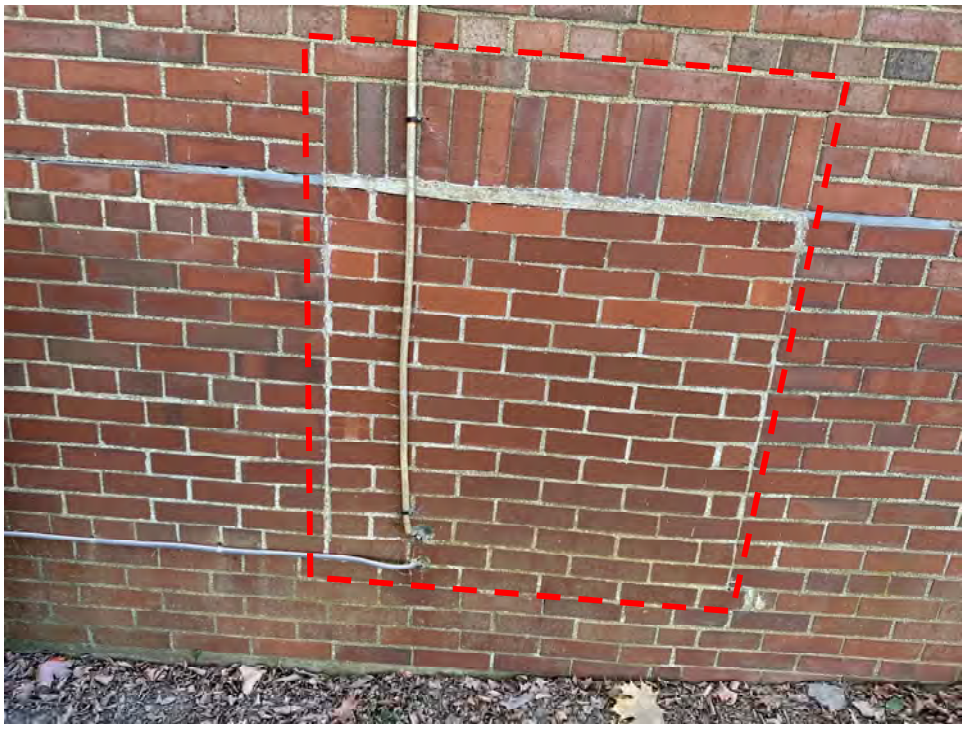

Photo 6: Brick infill at pre-existing window opening (typ. at two locations)

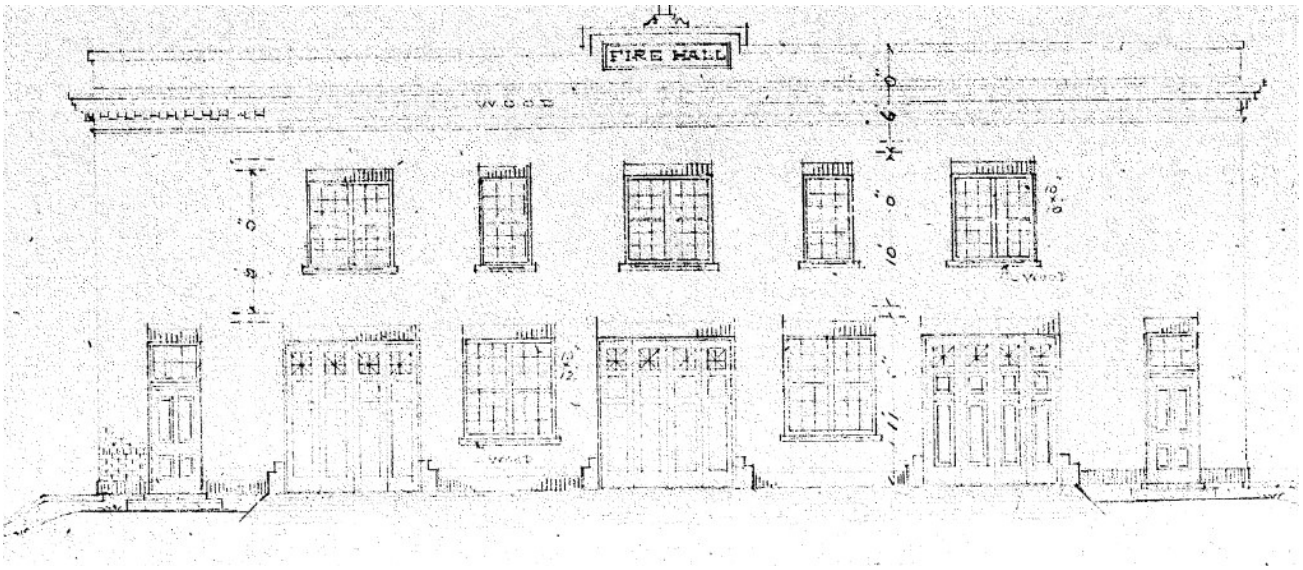

Figure 1: Original (circa 1928) bay door configuration on east elevation from circa 1928 drawings

Photo 7: Structural clay tile as visible from building basement. Yellow arrows at on bed courses

Photo 8: West elevation bay door interior (one of four)

Photo 9: Basement access doors and bay door on east elevation (rear of building). Blue arrow on south wall of Electric Light Shop

Photo 10: Close up of east elevation door with deteriorated wood threshold and failing paint finish

Photo 11: Close up of west elevation door with failing paint finish near southwest corner of building

Photo 12: Interior close up of newer vinyl window (typ. throughout building) set in original wood frame in fair to poor condition

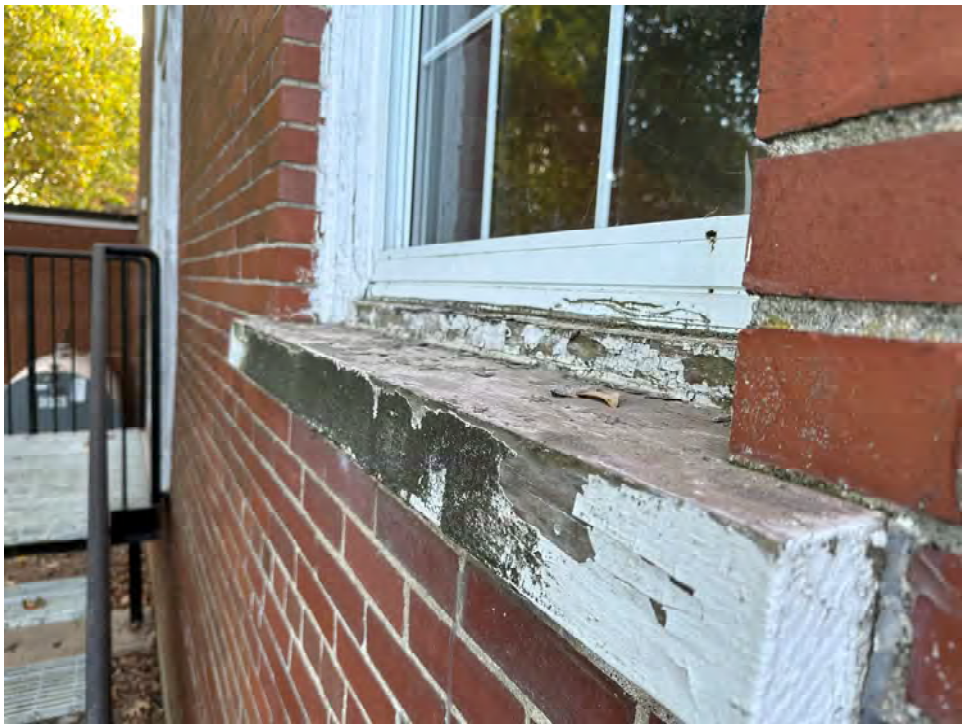

Photo 13: Failing paint finish on exterior window sill (typ. condition at others)

Photo 14: Overview of existing roofing membrane

Photo 15: Close up of deteriorated roofing membrane that had a coating applied overtop

Photo 16: Alligator cracking on roofing membrane telescoping through the coating at north chimney

Photo 17: Failing paint finish and deterioration on underside of wood cornice at southeast corner

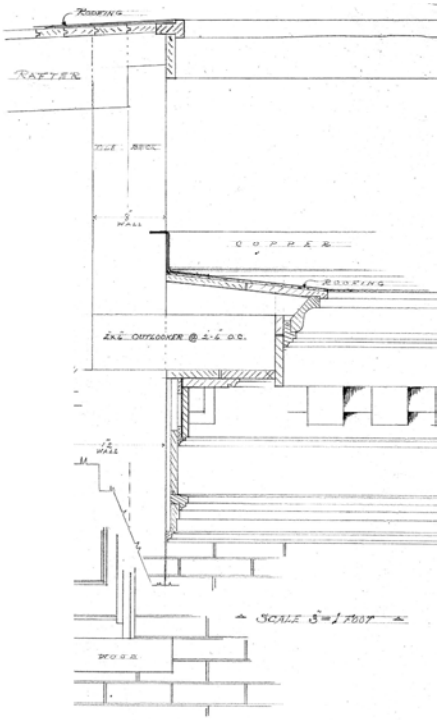

Figure 2: Original (circa 1928) typical cornice detail. Note, moisture ingress has potential to deteriorate "outlooker" and wall cavity if the cornice detailing is poor

Photo 18: Exploratory brick opening on north elevation

Photo 19: Exploratory brick opening on south elevation

107 CUMBERLAND STREET

ELECTRIC LIGHT SHOP BUILDING ENVELOPE CONDITION ASSESSMENT

Lunenburg, Nova Scotia

Prepared for:

Town of Lunenburg
177 Cumberland Street
Lunenburg NS B0J 2C0

Prepared by:

RJC Engineers
1701 Hollis Street, Suite 800
Halifax, NS B3J 3M8

January 24, 2025
TOR.140136.0001

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EXECUTIVE SUMMARY

As requested, Read Jones Christoffersen Ltd. (RJC) has completed a building envelope condition assessment of the Electric Light Shop located at 107 Cumberland Street in Lunenburg, Nova Scotia for the Town of Lunenburg. The intent of the study was to conduct a review of the visible and accessible portions of the Electric Light Shop building envelope components to identify any visually obvious areas of leakage, and deterioration to determine the likely cause of the noted distresses in order to provide recommendations for the future repair.

The Electric Light Shop, constructed in 1958, is located east of Duke Street and is connected to the east (rear) elevation of the Old Fire Hall. We understand that the building serves as much-needed storage space for the Town of Lunenburg and Nova Scotia Power. The Electric Light Shop is a one storey, concrete masonry unit (CMU) and brick structure with concrete foundation walls and footings, and a flat open web steel joist (OWSJ) roofing system.

Based on our visual review, the brick exterior is in fair to poor condition, the roofing materials appear in good condition, and the windows and doors appear in fair to poor condition. Two exploratory brick openings were reviewed to determine the condition and composition of the building envelope. Various locations of leakage were observed inside the Electric Light Shop, and localized areas of brick deterioration and CMU cracking were noted. Localized exterior brick repairs and the replacement of a window unit are recommended in the near term to restore the performance of the building envelope. Furthermore, it is recommended that the CMU cracking be monitored over 24 month period to assess the impact that the cracking is having on the overall structure.

The table below summarizes the recommended repair options and opinion of probable costs:

SUMMARY OF RECOMMENDED REPAIR		
	Timeline	**Cost (Excluding HST)**
Localized brick repairs	Within 2 years	$10,000 to $15,000
Removal and replacement of window unit	Within 2 years	$7,500 to $10,000
Implement crack monitoring program	Immediately, for 24 months	$5,000
Total Opinion of Probable Construction Cost:		**$22,500 to $30,000**

1.0 INTRODUCTION

Read Jones Christoffersen Ltd. (RJC) was retained by the Town of Lunenburg to perform a building envelope condition assessment of the Electric Light Shop located at 107 Cumberland Street in Lunenburg, Nova Scotia *(Refer to Photo 1 to Photo 3 in Appendix A)* as outlined in our revised proposal dated August 19, 2024. The intent of the review was to conduct a survey of the visible and accessible portions of the building envelope to identify any visually obvious leakages, deterioration or deficiencies and determine the likely cause of the noted distress in order to provide recommendations for future repair.

A brief description of the scope of the review undertaken by RJC is as follows:

.1 Review of available drawings provided to RJC by the Town of Lunenburg.

.2 An interview with Town personnel familiar with the history and usage of the structure.

.3 Exploratory removal and replacement of exterior brick masonry at a sample of locations to expose the condition and composition of the concealed elements of the building enclosure. To facilitate the review of the exploratory openings on the exterior brick, RJC retained the services of a restoration Contractor for the openings.

.4 Visual review from ground level and the building's interior of the accessible portions of the brick exterior, doors, windows and roof.

The date and weather conditions at the time of our visits were as follows:

October 21, 2024, Mostly Clear, 20°C

Leigh Besanger, BEng, P.Eng. performed the assessment for RJC.

This report was prepared in accordance with generally accepted engineering practices. No other warranties, either expressed or implied are made as to the professional services provided under the terms of our contract and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the structure that were not reviewed by RJC.

This report is exclusively for the use and benefit of the client identified on the first page of this report and is not for the use and benefit of, nor may it be relied upon by, any other person or entity. The

contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the client.

2.0 DESCRIPTION & BACKGROUND

The Electric Light Shop is a one storey, concrete masonry unit (CMU) and brick structure with concrete foundation walls and footings, and a flat open web steel joist (OWSJ) roofing system. Available drawings indicate the building constructed circa 1958 and designed by C.D. Davison & Company Architects. We understand that the building is not occupied on a day-to-day basis, but instead, primarily used as storage space for the Town of Lunenburg and Nova Scotia Power.

Based upon our review of available drawings and our visual review, the Electric Light Shop building enclosure is generally comprised of:

.1 The building footprint is approximately 3,300 sq. ft. overall.

.2 Approximately 12-1/2" thick concrete foundation walls. No reinforcing steel is detailed on the drawings.

.3 Solid brick pier walls exist along the south elevation between the bay doors and building access doors. Additionally, reinforced concrete bond beams exist above the south elevation door openings with a projection at the bottom of the bond beam to support the brick cladding above.

.4 The north and east walls and a short portion of the west wall of the building consist of 8" thick CMU, 4" thick exterior brick cladding, and a solid brick bond beam at the top of the wall and below the window openings.

.5 Since the Electric Light Shop was built as an addition onto the Old Fire Hall, the majority portion of the west wall is original to the Old Fire Hall.

.6 Based on the drawings, the roofing assembly above the OWSJ is comprised of tongue and groove decking, vapour barrier, 1/2" rigid insulation, and bonded roofing membrane.

2.1 DOCUMENT REVIEW

The following partial drawing set was provided to RJC as part of our review:

.1 Warehouse for the Town of Lunenburg drawings, prepared by C.D. Davison & Company Architects and dated August 22, 1958.

2.2 INTERVIEW WITH TOWN PERSONNEL

The following information was obtained through interviews with the Town of Lunenburg personnel during our review:

.1 The Town of Lunenburg has limited storage space within Town limits, so it is important that this building remains in a usable state for equipment storage purposes.

.2 Nova Scotia Power has an agreement with the Town of Lunenburg to use a portion of the shop/warehouse as storage space for their equipment.

3.0 OBSERVATIONS

This section summarizes our observations of our visual review from ground level and interior spaces. A representative from the Town of Lunenburg facilitated our review of the interior spaces and highlighted known areas of leakage, distress, and deterioration. Photographs from our review have been included in Appendix A of this report.

3.1 FOUNDATION WALLS

.1 The above grade surfaces of the concrete foundation wall appeared in good condition.

3.2 EXTERIOR BRICK

.1 Overall, the exterior brick cladding of the Electric Light Shop remains in fair condition with localized areas appearing in poor condition. Localized deterioration was observed in the form of brick cracking, craze cracking, spalled brick faces, and efflorescence staining *(Refer to Photo 4 to Photo 6 in Appendix A).*

.2 Weep holes were noted on the drawings and were observed at the base of the brick cladding *(Refer to Photo 7 in Appendix A).*

3.3 SOLID BRICK PIERS

.1 Overall, the solid brick piers along the south elevation of the Electric Light Shop appeared in fair condition with localized areas appearing in poor condition. Similar to the brick cladding, localized deterioration was observed in the form of brick cracking, craze cracking, spalled brick faces, and efflorescence staining *(Refer to Photo 8 to Photo 9 in Appendix A).* Efflorescence staining was also noted from inside the building on the interior surfaces of the brick piers indicating long-term moisture build-up *(Refer to Photo 10 in Appendix A).*

3.4 CMU WALLS

.1 The perimeter CMU walls of the building appeared in fair condition, except for some vertical cracking at three locations that ranged from approximately 1 mm to 5 mm wide. No control joints were noted in the CMU so it appears likely that these cracks are the result of long-term thermal-related movement, and the CMU cracked where it was locally restrained and forces concentrated.

.2 At the first location on the east perimeter wall, the observed crack extended from the top of the foundation wall to the bottom of the window opening *(Refer to Photo 11 in Appendix A).*

.3 At the second location of the east perimeter wall, the observed crack extended full wall height *(Refer to Photo 12 in Appendix A).*

.4 On the north perimeter wall, the observed crack extended approximately half-way up the wall *(Refer to Photo 13 in Appendix A).*

3.5 BAY AND ACCESS DOORS

.1 The bay doors appeared in fair condition and it is our understanding they perform as intended *(Refer to Photo 14 in Appendix A).*

.2 The main access door on the south elevation appeared newer and in good condition *(Refer to Photo 15 in Appendix A).*

3.6 WINDOWS

.1 The two vinyl windows next to the main access door appeared newer, in good condition and performing as intended *(Refer to Photo 15 in Appendix A).* The older wood cladding surrounding the windows is in fair to poor condition.

.3 The wood-framed window unit on the east end of the south elevation appears original, the wood framing appeared deteriorated and signs of leakage were observed on the inside of the building *(Refer to Photo 16 to Photo 17 in Appendix A).*

.4 The three aluminum-framed windows on the east elevation appear original and in fair condition. In the middle window, one of the panes was cracked *(Refer to Photo 18 in Appendix A).*

.5 The wood-framed windows on the north elevation appeared original and in fair condition. The drawings indicate translucent "Alsynite" panels beside these windows. As visible from the building interior, these panels appeared to remain, but from the exterior, they were covered by painted wood plywood and may have been an original clerestory feature *(Refer to Photo 19 in Appendix A).*

3.7 ROOFING ASSEMBLY

.1 The roof was not accessible during our review, but the roof membrane appeared newer and in good condition when viewed from inside the Old Fire Hall building *(Refer to Photo 20 in Appendix A).* RJC does not know when the roofing membrane replacement occurred.

.2 Leakage staining was evident inside the building on drop ceiling tiles and at other locations on wall surfaces below the roof *(Refer to Photo 17 and Photo 21 in Appendix A).* However, the underside of the tongue and groove roofing boards appeared in fair condition and it is unknown if this observed leakage staining pre-dates the installation of the newer roofing membrane.

.3 Newer roof flashing was observed around the perimeter of the building *(Refer to Photo 22 in Appendix A).*

3.8 EXISTING EXPLORATORY OPENINGS IN EXTERIOR BRICK

Two exploratory openings were created in the brick cladding to allow for a localized sample review of the concealed elements of the building enclosure *(Refer to Photo 23 and Photo 24 in Appendix A).* The exploratory openings were approximately 600 mm by 450 mm in size and were performed to examine the condition and composition of the building envelope.

.1 In general, the condition and composition at both exploratory openings were observed to be the same. The following wall construction was observed (from exterior to interior):

- Clay masonry brick (±100 mm)
- Air space (±25 mm)
- CMU back up wall

.2 Membrane was not observed on the CMU back up wall at either exploratory opening.

.3 Brick ties were observed at both exploratory openings.

.4 The removed brick was reinstated.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our visual review, the Electric Light Shop building envelope appears to be in fair condition overall and performing as intended for the building's current function. However, localized repair of exterior brick and replacement of the window unit at one location are recommended in the near term to restore the integrity and maximize the effective service life of the building enclosure.

With respect to the CMU wall cracking, there does not appear to be an immediate need to strengthen, support/brace or stabilize the wall structure at these locations; however, crack monitoring over the next 24 months is recommended and would be a prudent measure to verify that the cracking is not progressing. In general, crack monitoring would include the installation of crack gauges at select locations and intermittent site visits (ideally at temperature highs and lows) to record crack width changes.

5.0 OPINION OF PROBABLE CONSTRUCTION COSTS

The following cost estimates presented for the repair and monitoring of the Electric Light Shop represent our opinion of the probable construction cost based on the limited information obtained during this condition survey assessment. The final costs will not be known until such time that the work is tendered and completed. It is not possible to accurately forecast the final bid unit prices that may be tendered for the work because they are directly related to the construction climate at the time of

tendering. The costs noted below should be treated as "ball-park" or Class D[1] (+/- 25%) figures only and cannot be guaranteed accurate.

5.1 BRICK REHABILITATION

The probable construction cost for a brick rehabilitation program, assuming all the work is performed in one phase, is in the order of approximately $10,000 to $15,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

5.2 WINDOW UNIT REPLACEMENT

The probable construction cost for a window unit replacement, assuming all the work is performed in one phase, is in the order of approximately $7,500 to $10,000 plus H.S.T., in 2025 dollars, excluding engineering fees, soft costs, and material testing costs.

5.3 CRACK MONITORING

The probable engineering cost for a 24-month long cracking monitoring program is in the order of approximately $5,000 plus H.S.T., in 2025 dollars, excluding soft costs.

SUMMARY OF RECOMMENDED REPAIR		
	Timeline	**Cost (Excluding HST)**
Localized brick repairs	Within 2 years	$10,000 to $15,000
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Implement crack monitoring program	Immediately, for 24 months	$5,000
Total Opinion of Probable Construction Cost:		**$22,500 to $30,000[2]**

[1] Class "D" probable costs – a statement of general requirements and an outline of a solution (degree of accuracy +/- 25%). Probable Construction Costs are in 2025 dollars and do not include soft costs, engineering fees, material testing, permits or HST unless noted otherwise. Furthermore, probable costs do not include any direct or indirect costs associated with potential trade tariffs, as the impact referpotential trade tariffs will have on the costs for the recommended repairs cannot be accurately forecasted.

[2] Opinion of Probable Costs do not include for the remediation, abatement, and disposal of any hazardous materials such as lead, asbestos, or otherwise.

6.0 CLOSING REMARKS

Thank you for selecting Read Jones Christoffersen Ltd. for this assessment. RJC would be pleased to assist you with the implementation of our recommendations. Should you have any questions or concerns, please do not hesitate to contact this office.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Leigh Besanger, BEng, P.Eng.
Project Engineer

Reviewed by:

Duncan Rowe, BASc, MEng, P.Eng., LEED® AP, BECxP, CPHC
Principal

APPENDIX A

PHOTOGRAPHS

January 24, 2025
TOR.140136.0001

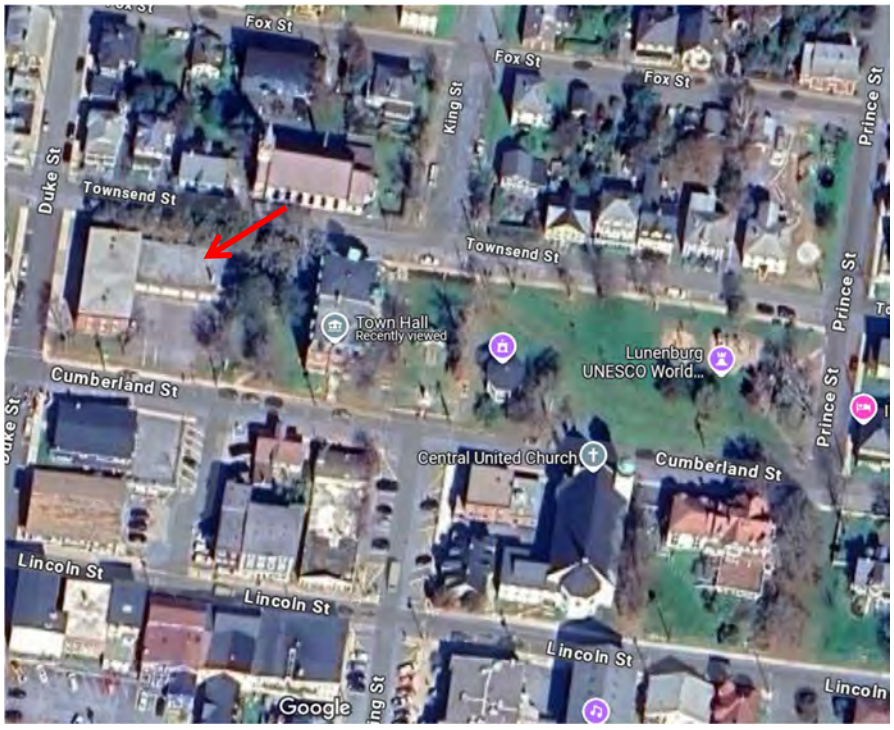

Photo 1: Google Maps aerial view excerpt of the Electric Light Shop located at 107 Cumberland Street

Photo 2: Overview of Electric Light Shop south elevation

Photo 3: Overview of Electric Light Shop north elevation

Photo 4: Brick deterioration on east elevation below brick sills

Photo 5: Brick deterioration at northeast corner

Photo 6: Brick cracking on north elevation

Photo 7: Close-up of weep hole at base of north elevation exterior brick

Photo 8: Brick deterioration on south elevation solid brick pier

Photo 9: Brick deterioration on south elevation solid brick pier and above concrete projection/lintel from likely moisture accumulation and unsealed penetrations

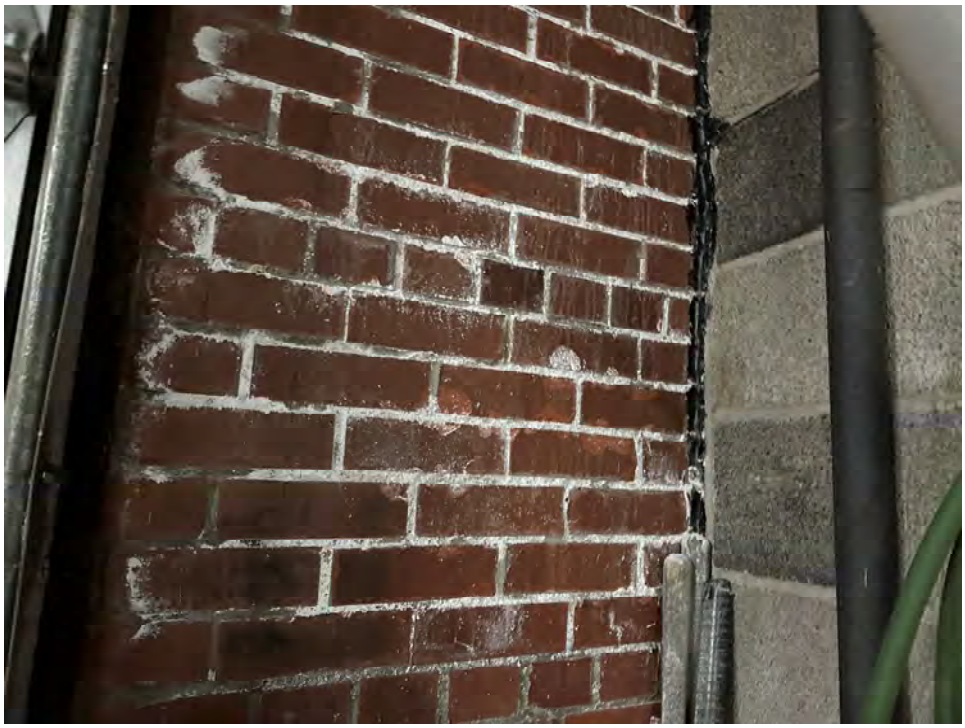

Photo 10: Efflorescence build up and staining on interior surface of solid brick pier (inside building at Photo 9 location)

Photo 11: CMU cracking below window opening on east elevation wall

Photo 12: Full wall height CMU cracking adjacent to window opening on east elevation

Photo 13: CMU cracking on north elevation wall

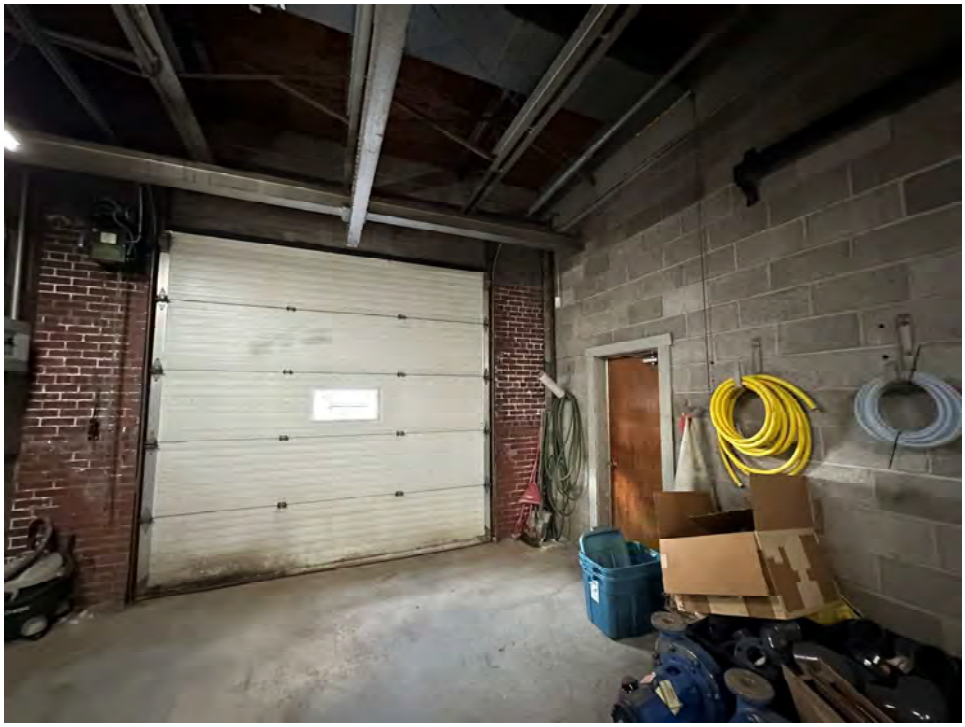

Photo 14: Bay door as visible from inside the building

Photo 15: Newer door and windows at Electric Shop entrance set in older painted plywood cladding

Photo 16: Deteriorated window unit on south elevation

Photo 17: Deteriorated window unit as visible from building interior. Note, leakage staining on ceiling tiles above

Photo 18: Cracked pane on east elevation aluminum-framed window with wired glass

Photo 19: Wood-framed window and plywood coverings on north elevation wall

Photo 20: Overview of roofing membrane as visible from inside Old Fire Hall building

Photo 21: Indications of roof leakage on interior wall surface

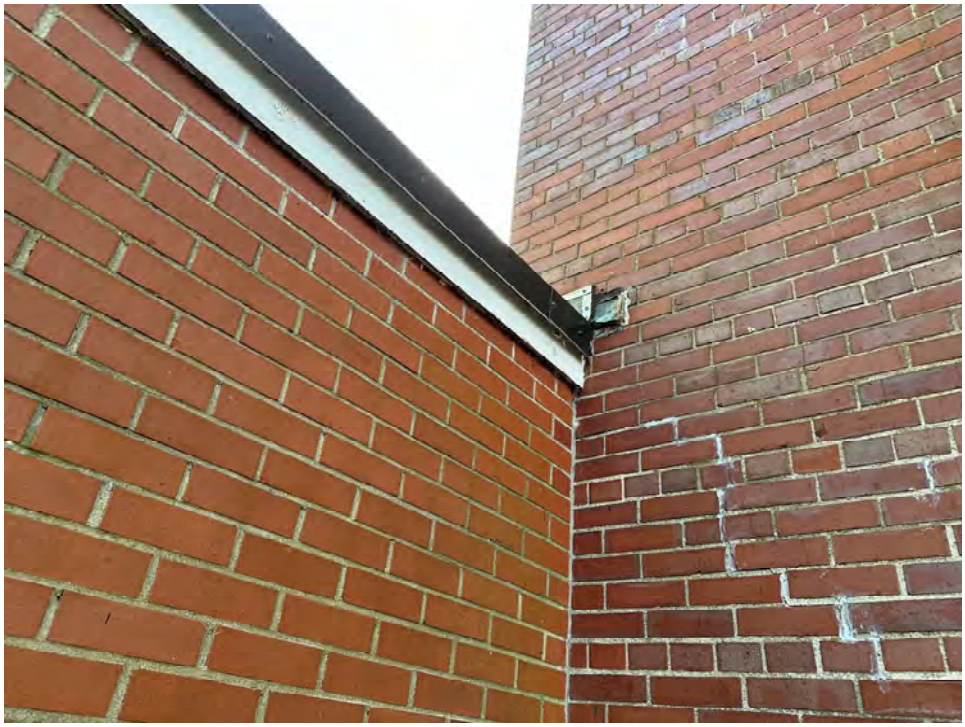

Photo 22: Newer roof flashing at top of west elevation wall at transition to Old Fire Hall building

Photo 23: Exploratory brick opening on east elevation

Photo 24: Exploratory brick opening on north elevation