Conservation Plan: 472 Richmond Street, St. Paul's Cathedral – the "Beaver Fence"

Downtown Loop Bus Rapid Transit and Infrastructure Improvement

City of London

60619570

January 2022

Delivering a better world

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13

Quality Information

Prepared by

Liam Ryan, BA.
Cultural Heritage Specialist, Junior

Reviewed by

Tara Jenkins, M.A., GPCertCHS, CAHP
Cultural Heritage Specialist, Lead

Approved by

Adria Grant, M.A., CAHP
Associate Vice President
West & Ontario Department Manager

Revision History

Rev #	Revision Date	Revised By:	Revision Description
0	September 9, 2021	Tara Jenkins	Draft of Conservation Plan
1	November 2021	Tara Jenkins	Revised Conservation Plan based on City Heritage Planner comments
2	December 16, 2021	Liam Ryan	Revised Conservation Plan based on City Heritage Planner comments
3	January 10, 2022	Tara Jenkins	Revised Conservation Plan based on St. Paul's Cathedral comments

Distribution List

# Hard Copies	PDF Required	Association / Company Name
0	✓	City of London

Prepared for:

City of London

Prepared by:

Liam Ryan, BA
Cultural Heritage Specialist, Junior
Liam.Ryan@aecom.com

Tara Jenkins, MA, GPCertCHS, CAHP
Cultural Heritage Specialist, Lead
D +1-226-377-2838
tara.jenkins@aecom.com

AECOM Canada Ltd.
410 – 250 York Street, Citi Plaza
London, ON N6A 6K2
Canada

T: 519.673.0510
F: 519.673.5975
www.aecom.com

Table of Contents

1. Introduction 1
1.1 Project Context 1
1.2 Property Impacts of the Project on 472 Richmond Street 1
1.2.1 Alignment Options- The Preferred Option 2
1.3 Need for a Conservation Plan 2
1.3.1 Objectives of the Conservation Plan 3
1.4 Current Property Ownership 3
1.5 Physical Description of the Property 3
1.6 Cultural Heritage Status 6
1.7 Methodology 6

2. Legislature and Policy Considerations 7
2.1 Planning Act and the Provincial Policy Statement 7
2.2 Ontario Heritage Act 7
2.3 The London Plan 8
2.3.1 Heritage Conservation District 8
2.3.2 Municipal Regulatory Context for Designated Heritage Property Alterations and Easements 9

3. Conservation Principles 10
3.1 Introduction 10
3.1.1 Parks Canada Standards and Guidelines for the Conservation of Historic Places in Canada 10
3.1.2 Eight Guiding Principles in the Conservation of Built Heritage Properties 10

4. Statement of Significance 11
4.1 Reasons for Designation – 472 Richmond Street 11

5. Historical Overview 13
5.1 The Property 13
5.2 St. Paul's Cathedral 13
5.3 The Customs House 13
5.4 The Beaver Fence 14
5.5 Historical Significance of the Beaver 24

6. Existing Conditions 27
6.1 Study Area Existing Conditions 27
6.1.1 The Fence 27
6.1.2 The Railing System 27
6.1.2.1 Rail Posts 28
6.1.2.2 Horizontal Rails 28
6.1.2.3 Medallions 28
6.1.3 The Foundation Cap Stones 28
6.1.4 The Foundation and Footings 29

6.1.5 The End Posts....29
6.1.6 Assembly Method....30
6.1.7 Other Landscape Features....30

7. Recommended Approach of Heritage Conservation....31

7.1 Determining the Primary Treatment....31
7.1.1 Conservation Treatments of the Beaver Fence....31
7.1.2 Goals of Conservation....32

8. Conservation Measures- Proposed Conservation Interventions....33

8.1 Responsibility....33

9. Action Plan and Implementation....43

9.1 Approvals Process....43
9.2 Monitoring....43

10. Sources....44

11. Select Photographs....46

12. Qualifications....81

List of Appendices

Appendix A: Construction Level Drawings
Appendix B: Special Provisions
Appendix C: MHSTCI Eight Guiding Principles In the Conservation of Built Heritage Properties

List of Figures

Figure 1: Location of the Beaver Fence and the Approximate Alignment of the Relocated Beaver Fence, 472 Richmond Street, London.... 5

List of Tables

Table 1: Proposed Conservation Interventions- Specifications.... 35

List of Images

Image 1: St. Paul's Cathedral Property at 472 Richmond Street, London.... 4
Image 2: View of the Custom House in 1875 from Richmond Street illustrating the beaver fence.... 15
Image 3: Close-up of the beaver fence in 1875, also depicting the column and picket fence along the Cathedral property.... 16
Image 4: Image looking on Queens Avenue (circa. 1875-1880) illustrating the absence of the beaver fence.... 16
Image 5: Picture of St. Paul's Cathedral, taken 1870-1875 with a picket fence.... 17
Image 6: Image of the St. Paul's Cathedral in 1907 illustrating the cast-iron beaver fence and stone posts enclosing the property.... 18

Image 7: Zoomed image of the St. Paul's Cathedral in 1907 illustrating the cast-iron beaver fence and stone posts enclosing the property 19
Image 8: Image of the Customs House, ca. 1927, showing the beaver fence along the Richmond Street façade had been removed 20
Image 9: View for St. Paul's Cathedral in 1948 from Richmond Street, including a small portion of the beaver fence 21
Image 10: St. Paul's Cathedral in the early to mid-1950s, with a view of the beaver fence 22
Image 11: Sandblasting and painting the beaver fence in 1966 23
Image 12: Image depicting the demolition of the Custom Building illustrating the beaver fence on the north side of the building in 1971 24
Image 13: Image depicting the arms of the Diocesan of Huron 25
Image 14: Diocese of Huron on Twitter 26

List of Photographs

Photograph 1: View of beaver fence along Richmond Street in the winter illustrating the length of the fence, looking south 46
Photograph 2: View of the beaver fence along Richmond Street in the summer illustrating the length of the fence, looking south 47
Photograph 3: View of the Cathedral grounds in early spring, looking north (AECOM, April 2021) 48
Photograph 4: Manicured lawn within the Cathedral grounds, looking south towards Queens Avenue (AECOM, May 2021) 49
Photograph 5: Northern boundary of the property, showing the foundation of the former fence (AECOM, July 2021) 50
Photograph 6: Cathedral grounds, looking southwest towards the beaver fence (AECOM, May 2021) 51
Photograph 7: Hedge marking the northern boundary of the property (AECOM, July 2021) 52
Photograph 8: Stone foundation of the north side of the northern entrance to the property (AECOM, July 2021) 53
Photograph 9: Stone column of the north entrance path (AECOM, July 2021) 54
Photograph 10: View towards Richmond Street of the stone column of the north entrance path (AECOM, July 2021) 55
Photograph 11: Details of the cast-iron fence (AECOM, July 2021) 56
Photograph 12: Sandstone cap stones and concrete foundation of the fence on Richmond Street, south side of the main entrance path (AECOM, July 2021) 57
Photograph 13: View of the beaver fence on Richmond Street, looking north (AECOM, May 2021) 58
Photograph 14:The most western end posts on Queens Avenue proposed for relocation (AECOM, May 2021) 59
Photograph 15: End post proposed for relocation on Queens Avenue, showing signs of weathering and localized weathering on corners (AECOM, November 2021) 60
Photograph 16: View of the separate top cap of the end post with mortar layer with the end post (AECOM, November 2021) 61
Photograph 17: End post placed on a mortar layer with a concrete foundation (AECOM, November 2021) 61
Photograph 18: Original arrangement with where horizontal rails mortared into end posts (AECOM, November 2021) 62
Photograph 19: Modified horizonal rails which place reinforcing steel bars into holes with mortar and welding of reinforcing steel bars to horizontal rails (AECOM, November 2021) 63
Photograph 20: Former holes in the end posts (for horizontal rail attachment) that were patched up, potentially indicating the end post was turned for repairs (AECOM, November 2021) 64
Photograph 21: End post with localized repairs (AECOM, November 2021) 65
Photograph 22: Example of a cap stone in poor condition (AECOM, November 2021) 66
Photograph 23: Capstone cracking and spalling (AECOM, November 2021) 66
Photograph 24: View of mortar joint between cap stone and concrete foundation and mortar joint at each vertical rail post location (AECOM, November 2021) 67

Photograph 25: Example of mortar joint missing and the cap stone cut and notched at each joint to accommodate the post attachment (AECOM, November 2021) 67
Photograph 26:Missing section of the beaver fence on Richmond Street (AECOM, May 2021) 68
Photograph 27: Caulking below the base of the post to increase contact and seal area below (AECOM, November 2021) 69
Photograph 28: Details of a corner of the beaver fence (AECOM, May 2021) 70
Photograph 29: Pin tie of a vertical rail post (AECOM, May 2021) 71
Photograph 30: Damaged section of the beaver fence on Richmond Street (AECOM, May 2021) 72
Photograph 31: The mid horizontal rail inserted into the ends of the beaver medallion and into the receiving ends of the vertical posts. The tube is welded at each location (AECOM, November 2021) 73
Photograph 32: The flat horizontal bar was placed over the vertical rail post and welded (AECOM, November 2021) 73
Photograph 33: Beaver medallion welded to top horizontal rail (AECOM, November 2021) 74
Photograph 34: Welding with cracks, illustrating piece by piece on-site construction of fence (AECOM, November 2021) 74
Photograph 35: View of the beaver fence on Queens Avenue with buried foundation (AECOM, May 2021) 75
Photograph 36: View of the Cathedral sign and garden from Queens Avenue, looking north (AECOM, May 2021) 76
Photograph 37: Example of a vertical rail post with finial with a rounded point (AECOM, July 2021) 77
Photograph 38: Floral motif of the vertical rail post (AECOM, July 2021) 78
Photograph 39: Section of fence on Richmond Street with a modified top horizontal bar (AECOM, May 2021) 79
Photograph 40: Example of the back-support brace (AECOM, February 2021) 79
Photograph 41: Measurements of the end posts documented on July 20, 2021 (AECOM, July 2021) 80
Photograph 42: Sketch of the dimensions of the cast-iron railing system based on the July 20, 2021 site visit (AECOM, July 2021) 80

Abbreviations

CHSR - Cultural Heritage Screening Report
TPAP - Transit Project Assessment Process
BRT - Bus Rapid Transit
LACH - London Advisory Committee on Heritage
HCD - Heritage Conservation District
HIA - Heritage Impact Assessment
CHER - Cultural Heritage Evaluation Report
EPR - Environmental Project Report
MHSTCI - Ministry of Heritage, Sport, Tourism and Culture Industries
PEC - Planning and Environment Committee

1. Introduction

1.1 Project Context

In 2018, a Cultural Heritage Screening Report (CHSR) was completed by WSP for the Transit Project Assessment Process (TPAP) for the London Bus Rapid Transit (BRT) system (the 'Project'). The CHSR was written to establish a developmental history of the proposed BRT study area. The CHSR identified properties with known and potential cultural heritage value or interest that may be impacted by the Project. With the recommendation of London Advisory Committee on Heritage (LACH), Municipal Council added 347 potential cultural heritage resources identified in the CHSR to the Heritage Register as 'Listed'. In addition, the CHSR determined that the Downtown London and West Woodfield Heritage Conservation Districts (HCD) would be directly and/or indirectly impacted by the project and Heritage Impact Assessments (HIA) were required to address the impacts on the HCDs (WSP 2019:21).

In October 2018, the TPAP process was paused in a "Time Out" Process to strengthen the project's cultural heritage strategy. A total of 66 potential cultural heritage resources were identified as having potential cultural heritage value or interest and were determined to have the potential to be physically impacted by the construction of the BRT. As the project footprint was refined and reduced, the number of properties requiring further work was reduced and as a result, 51 cultural heritage resources required Cultural Heritage Evaluation Reports (CHER). The CHERs determined that 10 properties would require a HIA prior to construction. The Environmental Project Report (EPR) document for the BRT recommends HIAs for properties potentially impacted by the project post-TPAP, in the Detailed Design phase. The EPR states that during Detailed Design, mitigation measures will be addressed to minimize impacts to heritage properties.

As of October 2020, the City of London is in the Detailed Design phase of the Downtown Loop portion of the Project. The Downtown Loop will frame Dundas Place, with buses running along Queens Avenue, King Street, Ridout Street North, and Wellington Street. These corridors have been proposed to accommodate current and future traffic demands, support dedicated transit implementation, and have regard for both pedestrians and cyclists.

In March 2021, a Downtown London HCD-based HIA was completed by AECOM for the Downtown Loop. As part of the HCD-based HIA, an impact assessment was completed based on the 50% Detailed Design that determined that the property at 472 Richmond Street, the subject of this report, is anticipated to be directly impacted by the Project, and that relocation of a heritage attribute within the property, the beaver fence, will be required prior to construction.

In August 2021, a work plan was developed by AECOM's Cultural Heritage team based on the recommendation of the Downtown London HCD-based HIA for the completion of a Conservation Plan focused on the relocation of the beaver fence. The Conservation Plan was to include input from AECOM's structural engineering team and Dillon Consulting Limited, responsible for the Project's detailed design and the landscape plan. The Conservation Plan would include the relocation alignment and construction level drawings and the Special Provisions of the beaver fence for its new location.

1.2 Property Impacts of the Project on 472 Richmond Street

The property at 472 Richmond Street, known as St. Paul's (Anglican) Cathedral, is a Part IV and V designated property under the *Ontario Heritage Act*, which is situated at the northeast corner of the intersection of Richmond Street and Queens Avenue, in the City of London. The property is owned by the Incorporated Synod of the Diocese of Huron. The beaver fence, the subject of this Conservation Plan, is a heritage attribute of the property (Part IV designation By-Law: L.S.P. -3373-297). In addition, the public space in which the beaver fence encloses, is a public realm feature of the Downtown London HCD (Part V designation By-Law: L.S.P.-3419-124).

Based on the 90% Detailed Design, the design impacts approximately 0.3m x 46m of the property along its southern boundary. The detailed design also indicates that Queens Avenue will be widened at the corner of Queens Avenue and Richmond Street to accommodate a bus transit lane and a dedicated right turn lane for vehicles turning north onto Richmond Street and therefore a portion of the property will be acquired for this Project (approximately 6m²) (**Figure 1**). As the beaver fence sits along the property line boundary of Queens Avenue and Richmond Street, the impact of the road widening as proposed in the 90% Detailed Design poses a direct impact to the beaver fence. As such, and in accordance with the recommendation in the final Downtown London HCD-based HIA (AECOM 2021), the beaver fence requires removal and relocation during the construction process and must be set back to the edge of the new right-of-way within the property of 472 Richmond Street.

1.2.1 Alignment Options- The Preferred Option

Four options were explored for the new alignment of the beaver fence. Each of the options were reviewed by AECOM, Dillon Consulting Limited, and staff at the City of London including Heritage Planner, Kyle Gonyou, and the Major Projects Team. **Figure 1** and **Appendix A** (the construction level drawings)**,** provide the preferred alignment option, which moves most of the Queens Avenue portion of the fence north of the new right-of-way boundary and into the property boundary of 472 Richmond Street[1]. This alignment option includes the removal and relocation of the most western pair of end posts on Queens Avenue. The option allows the end posts to be reinstalled square to the sidewalk. This option considers laying the fence in a more direct line from the Richmond Street corner to the westerly side of the Cathedral sidewalk entrance, generally parallel with the existing fence/street. Therefore, this option avoids an awkward deflection as much as possible. This option results in a wide boulevard area in front of the fence that will include a hard surface treatment.

1.3 Need for a Conservation Plan

A Conservation Plan is a document that details how a cultural heritage resource can be *conserved* (MHSTCI, 2006). 'Conservation' is defined in the Parks Canada *Standards and Guidelines for the Conservation of Historic Places in Canada* as all actions or processes that are aimed at safeguarding the heritage attributes of a historic place, so cultural heritage value is retained and its physical life extended (Parks Canada, 2010).

As noted in **Section 1.2** above, the final Downtown London HCD-based HIA determined that 472 Richmond Street will be directly impacted by the Project, specifically causing displacement of the beaver fence, a heritage attribute of the property (AECOM, 2021). The beaver fence encloses the public space of St. Paul's Cathedral. The public space is a heritage attribute of the Downtown London HCD as it contributes to the overall public realm of the District.

A meeting with Kyle Gonyou, City of London Heritage Planner, determined a Conservation Plan was required in order to best protect and manage the impacts of the Project on the beaver fence.

Typically, a Conservation Plan is to provide direction on repairs, stabilization, and preservation activities, as well as long-term conservation, monitoring, and maintenance measures (MHSTCI, 2006). This Conservation Plan, however, is scoped to provide a short-term conservation plan for the property focused on measures required to relocate the beaver fence for the Project. This Conservation Plan provides direction on ensuring the cultural heritage value of the beaver fence is conserved during the relocation process. This report does not include a long-term maintenance plan for the property.

[1] Note, Figure 1 reflects the IFT Civil Drawings (in final review) to keep the fence alignment straight a small portion of the property will be south of the relocated fence.

This Conservation Plan is written in such a way that when work is being completed on any component of the beaver fence for the Project, those responsible for undertaking the physical work will understand:

a) The reason why the beaver fence constitutes a significant heritage attribute of the property;
b) The appropriate strategies required for its preservation and conservation during the relocation process; and
c) The municipal approval processes.

Successful conservation is concerned with the effective management of change. This Conservation Plan identifies and promotes change that will retain the historical association of the beaver fence within 472 Richmond Street, and will provide guidance in order to avoid damaging its significant cultural heritage value. The proposed relocation will involve two conservation strategies; heritage preservation and heritage rehabilitation (see **Section 6** and **Section 7** for more detail). In general, the conservation work for the beaver fence involves the following steps:

- Identifying the relocation alignment;
- Documenting its existing conditions;
- Preparing Special Provisions and construction level drawings;
- Methodologically removing and storing the heritage components of the beaver fence prior to construction;
- Rehabilitating the beaver fence (repairing and replacing missing heritage elements); and,
- Reinstating the beaver fence at its new location, including the completion of new work.

This Conservation Plan will recommend the appropriate conservation measures and an action plan to achieve the conservation objectives (see **Section 1.3.1** below). This Conservation Plan will also be a support document in the Municipal Heritage Alteration Permit package.

1.3.1 Objectives of the Conservation Plan

Based on the current 90% Detailed Design of the Project, the beaver fence within 472 Richmond Street requires removal prior to construction. Based on this direct impact, the following are the objectives of this Conservation Plan:

Objective 1: Provide the requirements necessary for the beaver fence's preservation and rehabilitation, including all new work required with construction level drawings.
Objective 2: Outline a sustainable approach to its relocation that will manage this change in the least disruptive way.
Objective 3: Provide a document that creates awareness and promotes its cultural heritage value to ensure the beaver fence continues to be enjoyed by all.

1.4 Current Property Ownership

Currently, the property at 472 Richmond Street is owned and managed by the Incorporated Synod of the Diocese of Huron.

1.5 Physical Description of the Property

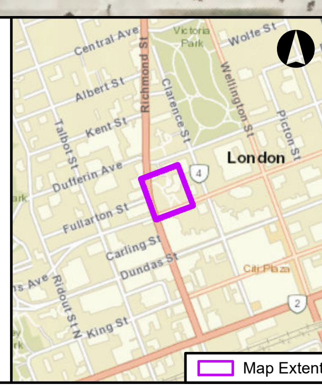
The property 472 Richmond Street is the location of St. Paul's Cathedral (**Image 1**). The property is on the east side of Richmond Street between Queens Avenue to the south and Dufferin Avenue to the north, in the downtown area of the City of London (**Figure 1**). The two-storey red brick Cathedral was constructed in 1846. A painted red brick addition was constructed between 1894 and 1895; 12 grave markers are located on the property. There is an open park-like space around St. Paul's Cathedral consisting of lawns with trees and garden beds, separating the property

from the surrounding urban landscape. The property is enclosed by the cast-iron beaver fence, which is the focus of this Conservation Plan.

Image 1:
St. Paul's Cathedral Property at 472 Richmond Street, London
(Photographed by AECOM, July 20, 2021)

Legend

- ■ Fence Gate Post
- Existing Fence
- Existing Fence Missing Beavers
- Approximate Alignment for Relocated Beaver Fence
- 472 Richmond Street- Designated Part IV and Part V of the Ontario Heritage Act



Location of the Beaver Fence
472 Richmond Street, Downtown Loop BRT
London, Ontario

The Beaver Fence - Conservation Plan

January 2022	1:700	Datum: NAD 83 UTM17 Source: MNRF 2020, City of London 2019, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan,
P#: 60619570	V#:	

AECOM

Figure 1

0 5 10 20
Metres

1.6 Cultural Heritage Status

472 Richmond Street is considered the oldest and one of the most historically interesting places of worship in the City of London (By-law L.S.P.-2534-582). It was designated Part IV of the *Ontario Heritage Act* on August 29, 2005, for its design, historical and contextual value. It is also located within the Downtown London Heritage Conservation District and therefore, designated Part V of the *Ontario Heritage Act*. The property is also listed on the Canadian Register of Historic Places. The reasons for designation associated with this property are listed below with its hyperlink:

- By-law No. L.S.P.-2534-582 (Individual designation, Part IV)
  https://www.heritagetrust.on.ca/en/oha/details/file?id=6046
- Canadian Register of Historic Places
  https://www.historicplaces.ca/en/rep-reg/place-lieu.aspx?id=15473

There is an Ontario Heritage Trust historical plaque that focuses on the history of St. Paul's Cathedral building. The plaque was erected in the lawn of the Cathedral in 1969.

1.7 Methodology

The content of this Conservation Plan is guided by the Ministry of Heritage, Sport, Tourism, and Culture Industries' *Info Sheet #5 Heritage Impact Assessments and Conservation Plans* (MHSTCI, 2006) and guided by the Ontario Heritage Trust's Tools for Conservation: *Conservation Plans for Heritage Properties* which provides a brief outline that includes topics to be discussed within a conservation plan.

The goals and objectives of this Conservation Plan by the MHSTCI *Eight Guiding Principles in the Conservation of Built Heritage Properties* (hereafter, the *Eight Guiding Principles*; MHSTCI, 2007) and the methods (treatments and interventions) for conservation are based on Parks Canada *Standards and Guidelines for the Conservation of Historic Places in Canada* (hereafter, the *Standards and Guidelines*; Parks Canada, 2010).

Field reviews of the beaver fence within 472 Richmond Street were undertaken by Tara Jenkins, AECOM's Cultural Heritage Specialist, in February, April, and May 2021 to document the existing conditions of the beaver fence. In addition, a site visit was conducted on August 4, 2021, by the AECOM structural engineering team and Dillon Consulting to develop a relocation alignment and construction level drawings and specifications of the beaver fence for its new location. On November 23, 2021, John Pucchio, AECOM's Senior Structural Engineer, returned to the property to evaluate the condition of the beaver fence.

2. Legislature and Policy Considerations

2.1 Planning Act and the Provincial Policy Statement

The *Planning Act* (1990) and the associated Provincial Policy Statement (2020) provide a legislative framework for land use planning in Ontario. The *Planning Act* requires that all decisions affecting land use planning matters "shall be consistent with" the Provincial Policy Statement. In general, the Provincial Policy Statement recognizes that Ontario's long-term prosperity, environmental health, and social well-being depend on protecting natural heritage, water, agricultural, mineral, cultural heritage, and archaeological resources for their economic, environmental, and social benefits.

Pursuant to Section 2.6 of the 2020 Provincial Policy Statement, Policy 2.6.1 states "Significant built heritage resources and significant cultural heritage landscapes shall be conserved." The 2020 Provincial Policy Statement, issued under the authority of the *Planning Act* defines "conserved" as "means the identification, protection, management, and use of built heritage resources, cultural heritage landscapes and archaeological resources in a manner that ensures their cultural heritage value or interest is retained. This may be achieved by the implementation of recommendations set out in a conservation plan, archaeological assessment, and/or heritage impact assessment that has been approved, accepted or adopted by the relevant planning authority and/or decision designated and available for the purposes of this definition."

To conserve a cultural heritage resource, a municipality or approval authority may require a heritage impact assessment and/or a conservation plan to guide the approval, modification, or denial of a proposed development or site alteration that affects a cultural heritage resource. Using tools such as heritage impact assessments, municipalities and approval authorities can further enhance their own heritage preservation objectives.

Furthermore, a policy in Section 2.6 of the 2020 Provincial Policy Statement, Policy 2.6.3, states "Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except where the proposed development and site alteration has been evaluated and it had been demonstrated that the heritage attributes of the protected heritage property will be conserved."

2.2 Ontario Heritage Act

St. Paul's Cathedral, located at 472 Richmond Street, was designated on August 29, 2005, under Part IV of the *Ontario Heritage Act*. The property is also designated Part V of the *Ontario Heritage Act*, as part of the Downtown London HCD.

The *Ontario Heritage Act* enables the protection and conservation of resources that are of cultural heritage value or interest. The property at 472 Richmond Street, St. Paul's Cathedral, is "double designated" pursuant to Parts IV and V of the *Ontario Heritage Act*. The property was designated on August 29, 2005, pursuant to Part IV of the Ontario Heritage Act by By-law No. L.S.P.-3373-297. The property was included within the Downtown HCD, which came into force and effect on June 27, 2013, pursuant to Part V of the *Ontario Heritage Act* by By-law No. L.S.P.-3419-124. Both heritage designating by-laws are registered on the title of the property.

Heritage Alteration Permit approval is required for changes that are likely to affect any of the property's heritage attributes in compliance with Section 33(1), Section 41(2.1), and Section 42(2.1) of the *Ontario Heritage Act*. Consultation with the LACH is required, and Municipal Council may decide to approve, approve with terms and conditions, or refuse the Heritage Alteration Permit application. The Heritage Alteration Permit approval, or approval with terms and conditions, must be obtained prior to alterations commencing. The refusal of a Heritage Alteration

Permit, or the terms and conditions on the approval of a Heritage Alteration Permit, may be appealed to the Ontario Land Tribunal.

2.3 The London Plan

The London Plan is the City of London's new Official Plan (Council adopted, approved by the Ministry with modifications, and the majority of which is in force and effect). *The London Plan* sets out a new approach for planning in London which emphasizes growing inward and upward so that the City can reduce the costs of growth, create walkable communities, revitalize urban neighbourhoods and business areas, protect farmlands, and reduce greenhouse gases and energy consumption. The plan sets out to conserve the City's cultural heritage resources so they can be passed on to future generations.

Specifically related to heritage conservation, *The London Plan* outlines a number of policies related to the conservation of cultural heritage resources within the city. The General Cultural Heritage Policies ensures that new development is compatible, and the following policies provide direction:

> *(565_) New development, redevelopment, and all civic works and projects on and adjacent to heritage designated properties and properties listed on the Register will be designed to protect the heritage attributes and character of those resources, to minimize visual and physical impact on these resources. A heritage impact assessment will be required for new development on and adjacent to heritage designated properties and properties listed on the Register to assess potential impacts, and explore alternative development approaches and mitigation measures to address any impact to the cultural heritage resource and its heritage attributes.*
>
> *(586_) The City shall not permit development and site alteration on adjacent lands to heritage designated properties or properties listed on the Register except where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the heritage designated properties or properties listed on the Register will be conserved.*
>
> *(594_) Within heritage conservation districts established…*
> *1. The character of the district shall be maintained by encouraging the retention of existing structures and landscapes that contribute to the character of the district.*
> *2. The design of new development, either as infilling, redevelopment, or as additions to existing buildings, should complement the prevailing character of the area.*
> *3. Regard shall be had at all times to the guidelines and intent of the heritage conservation district plan.*

2.3.1 Heritage Conservation District

The Downtown is recognized for its cultural heritage value through its designation as a HCD. Physical goals of the designation of the Downtown as a HCD include:

- Encouraging rehabilitation and restoration of heritage buildings that are sensitive and respectful of their historical significance; and,
- Encouraging alterations to heritage resources that are complimentary to the District character and streetscape (Section 3.2.1, Downtown HCD Plan).

Relevant guidelines of the Downtown HCD Plan that apply to this Conservation Plan include:
Section 6.1.3.5 Materials and Section 6.2.4 Institutional and Public Realm. St. Paul's Cathedral grounds is documented in the HCD Plan. Since the 1830s the land surrounding St. Paul's Cathedral has been a landmark and an important public space for Londoners (pg. 6.58).

2.3.2 Municipal Regulatory Context for Designated Heritage Property Alterations and Easements

Since 472 Richmond Street is designated Part IV and Part V of the *Ontario Heritage Act*, the proposed work on the property requires a Heritage Alteration Permit. A Heritage Alteration Permit is required as part of any construction activity completed on the property. Any alteration work completed must align with the requirements of the heritage designation, as outlined in designation by-law, unless agreed upon in the Heritage Alteration Permit process. The completion of this Conservation Plan is a requirement as part of the Heritage Alteration Permit application with the City of London.

3. Conservation Principles

3.1 Introduction

Standards and guidelines for the conservation of cultural heritage resources are available at the federal, provincial, regional, and municipal level. These bodies of government have provided guidance regarding the identification as well as the conservation of cultural heritage resources through the publication of documents that outline best practices. This includes standards and guidelines specifically related to drafting Conservation Plans for cultural heritage resources. The following provides a review of these resources.

The City of London does not have specific Terms of Reference for the preparation of Conservation Plans. The *Ontario Heritage Toolkit, Info Sheet # 5: Heritage Impact Assessment and Conservation Plans* (MHSTCI 2006) was reviewed to provide direction on content in the development of this plan. In addition, the methods for conservation approach in this Conservation Plan are based on the Parks Canada *Standards and Guidelines* (2010), along with the MHSTCI *Eight Guiding Principles* (2007).

3.1.1 Parks Canada Standards and Guidelines for the Conservation of Historic Places in Canada

The Parks Canada *Standards and Guidelines* provide an overview of the principles of conservation and can be used as a reference when drafting conservation plans. They provide a general guideline for properties that are listed as part of the Canadian Register of Historic Places as National historic sites. These guidelines are often established as conservation strategies, provide a framework that can be adopted and applied to many heritage properties that are not listed as part of the register but designated by municipalities in Canada. The Parks Canada Standards are Guidelines are available online at:
http://www.historicplaces.ca/en/pages/standards-normes

As outlined in the *Standards and Guidelines* there are three stages involved in the conservation process as it relates to historic places: understanding, planning, and intervening. This Conservation Plan for 472 Richmond Street uses these three stages as a tool for conservation review, evaluation, and implementation.

The first part of this Conservation Plan examines the ***Understanding*** stage with regards to the beaver fence, its context, and its condition.

The second part of this Conservation Plan is structured such that the primary treatment options are considered with an appropriate approach determined for the relocation of the beaver fence. This represents the ***Planning*** stage.

The third part of this Conservation Plan involves the detailed recommendations for intervention, by prescribing the methods and actions to address the conservation requirements, using the conservation approaches. This represents the ***Intervening*** stage.

3.1.2 Eight Guiding Principles in the Conservation of Built Heritage Properties

The *Eight Guiding Principles* were established by the MHSTCI to provide a basis for best practice decisions regarding heritage conservation based on international charters. These are similar to *the Standards and Guidelines* and provide an intellectual framework for decision making in architectural conservation. They also provide conservation rationale for activities or interventions that may affect the character, features or context of a heritage property. The *Eight Guiding Principles* are attached in **Appendix C**.

4. Statement of Significance

The following Statement of Significance has been excerpted from the City of London By-Law L.S.P.-3373-297.

4.1 Reasons for Designation – 472 Richmond Street

St. Paul's Cathedral, seat of the dioceses of Huron is the oldest church in London and one of the most historically interesting churches in the City of London.

Historical Attributes

The first resident missionary to serve the London area was the Rev. E.J. Boswell who arrived in 1829. The first frame church of St. Paul's was opened by Reverend Benjamin Cronyn in 1834. The church was destroyed by fire on Ash Wednesday 1844, and the cornerstone of the present structure was laid in June of the same year. On Ash Wednesday 1846 the new church was opened for worship. The Diocese of Huron was separated from the Diocese of Toronto in 1857. The Rev. Benjamin Cronyn was first Bishop and the church of St. Paul's was declared his Cathedral Church. It was here for the first time in the British Empire a synod elected a bishop.

On Cronyn's death in 1871, Rev. Isaac Hellmuth, Rector and Dean of Huron, became the second Bishop. Hellmuth conceived the idea of building a great Cathedral (Holy Trinity) on the corner of Richmond and Piccadilly; only the Chapter House was completed where the Bishopric was moved to in 1873. It remained there until 1883, on Hellmuth's resignation. The third Bishop, Very Rev. M.S. Baldwin (Dean of Montreal) returned the seat to St. Paul's in 1883. In 1894/95 the Cathedral was enlarged to its present proportions and Cronyn Hall was built.

The Cathedral has hosted many illustrious visitors to London including the Archbishop of Canterbury (1963), the Governor General of Canada, the Right Honourable Jeanne Sauve (1989) and the Most Reverend Desmond Tutu, Archbishop of Cape Town and Metropolitan of South Africa (1990).

Architectural Attributes (Exterior)

The nave and tower of this church were designed in the English Gothic Revival style by the architect William Thomas and was constructed in 1844-46. Thomas was a distinguished Toronto architect who designed many well-known Ontario buildings including St. Michael's Cathedral in Toronto and Brock's Monument at Queenston.

The Tower

The dominant tower on the west end is crowned by a coffered brick cornice and four large, slender pinnacles. The date 1845 is on a shield high up on the outside. A multiple of pinnacles decorate other parts of the building. Details include label stops over the main entrance, side doorways and windows if the nave. The gargoyles on the pinnacles and doorways are carved from stone quarried at Portland Bill, the same quarry that Christopher Wren used to build St. Paul's Cathedral in London, England. Some of the decorations represent kings and queens, some grotesque faces (gargoyles) and some acanthus leaves. The overall effect of the spires and pinnacles create an elaborate silhouette against the sky.

An important tradition in downtown London is the peal of bells housed in the tower of St. Paul's. The first bells, a peal of six, were cast by C&G Mears of London, England in 1851. The bells were shipped across the Atlantic and then conveyed from Port Stanley to London by oxcart. In 1901, the Meredith Family commissioned casting of a chime of ten bells by the English firm of Gillett and Johnson. In addition, a weight-driven Gillett and Johnson clock was donated. The clock, each of its three faces measuring over 5 feet, was

installed along with the 1901 chime of bells. It plays the full Westminster Chimes on the hour, the quarter, half and three-quarters as well as striking the hours. In 1935, the six original bells were recast to make the present peal of eleven. The bells are operated from a carillon console on the first-floor tower room and they are played before and after Sunday services as well as for special weekday services.

The Windows

The stained-glass windows are perhaps one of the most outstanding aspects of the Cathedral. Perhaps the most significant of the windows were those created by the Louis Tiffany Company. The two windows next to the Nativity window and the two opposite were all created by Louis Tiffany in the late nineteenth century. In 1996, the 150th anniversary of the Cathedral, four new memorial stained-glass windows designed and made by Christopher Wallis, were placed in the remaining locations in the nave. Three windows depict the life of St. Paul, the fourth is a Nativity window.

Other Building

In 1894/95 Cronyn Hall was built complete with a small tower in the same style as the Cathedral tower, to house church and synod 0ffices and provide a hall for meetings. At the same time, the present wide transcepts and spacious chancel and sanctuary were built. Because red brick was used for this massive building project, the original yellow brick of the tower and front (west) wall were painted red to match.

The cast-iron fence with the beaver motif owes its origins to the federal Customs House building, at the corner of Richmond Street and Queens Avenue, which was demolished in 1971. The fence was purchased by the Cathedral in 1887 and moved to demarcate the property along Richmond Street. In 1974 the Cathedral extended the fence, continuing the original design, to surround the whole grounds after the purchase of the property where the Customs House stood.

Contextual Attributes

The open space around the Cathedral provides a welcome vantage point to view the Cathedral and the surrounding architecture. The grounds of the Cathedral once served as a graveyard for the village of London. Eventually most of the interred and their grave markers were transferred to Woodland Cemetery, which is owned and operated by the Cathedral.

5. Historical Overview

5.1 The Property

St. Paul's Cathedral is located at 472 Richmond Street on the east side of Richmond Street, between Queens Avenue to the south and Dufferin Avenue to the north. Historically, 472 Richmond Street was in Lot 15, Concession 1, in the Geographic Township of London, Middlesex County. The property is now situated in the City of London's downtown core, within the Downtown London Heritage Conservation District.

The property includes a two-storey red brick building with a tower. The building is surrounded by open public space which includes a cemetery with 12 grave markers. The public space is enclosed by the cast-iron beaver fence.

The cultural heritage value of the beaver fence is rooted in its historical association with the former Customs House, now the site of St. Paul's Cathedral, a seat of the Diocese of Huron. The following provides a brief historical overview of each of the buildings.

5.2 St. Paul's Cathedral

In 1834, The Anglican congregation held services on the property of 472 Richmond Street in a wooden structure (Ontario Provincial Plaque). In 1844 the wooden structure was destroyed by fire on Ash Wednesday. After the fire, the present brick church was built and opened for worship on Ash Wednesday in 1846. The nave and tower of the new church was designed in the Gothic Revival style by Toronto architect William Thomas. The main tower features six peal of bells that were cast by Mears Company of London England in 1851 and then shipped across the Atlantic Ocean. In 1901, the clock and chimes of 10 bells, made by Gillett and Johnston of England and donated by the Meredith family, were installed (Parks Canada, 2005). In 1887, the picket fence was replaced with the cast-iron beaver fence (see **Section 2.4**, below for further details on the beaver fence).

In 1893, the congregation began an ambitious building program, raising the chancel and building the present wide transepts, spacious chancel and apse (London Free Press, November 17, 1966). The old side galleries were removed, and an elaborate system of roof beams were devised to make pillars unnecessary (London Free Press, November 17, 1966). One of the most outstanding aspects of the church is its stained-glass windows, including the windows created by Louis Tiffany Company in the late 19th century (City of London, by-law L.S.P. -33373-297). In 1894-1895, the church was expanded to house church offices and hold meetings (City of London, by-law L.S.P. -33373-297). This expansion also included the construction of Cronyn Hall which was dedicated to the first Bishop of the Dioceses of Huron, Reverend Benjamin Cronyn. Cronyn Hall was built with a small tower in the same style as the church tower (City of London, by-law L.S.P. -33373-297). The total cost of the building program, in which the fence was a part, was $50,000, four times the cost of the original church (London Free Press, November 17, 1966). Today, St. Paul's Cathedral is the oldest church in the City of London (City of London, By-law L.S.P. -33373-297).

5.3 The Customs House

In 1869, the Minister of Public Works recommended the purchase of land from Dean Hellmuth for the site of a Customs House (LAC, 1869-0704). In 1872, the Diocese of London, at the behest of Bishop Isaac Hellmuth, sold the southwest corner of 472 Richmond Street East to the Canadian federal government (John Lutman, Archivist, Diocese of Huron, 2021). After the sale of the land, in 1872-1873, the Department of Public Works built the Customs House on the property (John Lutman, Archivist, Diocese of Huron, 2021). It was designed by a London architect, William Robinson, in a restrained Second Empire Style (Ivey Family London Room Digital Collections, description of PG L17). The Customs House was opened in 1873 as the area's military headquarters (London Free Press, August 2, 1971).

In 1884, the Minister of Public Works recommended purchasing more land from St. Paul's Cathedral in the amount of $5,000 needed for the enlargement of the Customs House (LAC, 1884-0988). In the same year, the land was purchased, London architect George Durand designed an addition on the rear of the Customs House building and doubled its size (John Lutman, Archivist, Diocese of Huron, 2021). In 1966, the Customs House was the headquarters for the Western Ontario region of the Canadian army (London Free Press, November 17, 1966). The building was demolished in 1971 and the Diocese of Huron re-acquired the property.

5.4 The Beaver Fence

The cast-iron beaver fence encloses the grounds of St. Paul's Cathedral, and is a heritage attribute of the property. The fence was originally associated with the federal Customs House building which opened in 1873 and was demolished in 1971. The earliest known image that depicts the beaver fence is a photograph of Customs House dating to about 1875 (**Image 2** and **Image 3**). The beaver fence is shown on the Richmond Street (front) façade of the Customs House. It appears the cast-iron beaver fence is extending on either side of the stone steps of the Customs House entrance. An examination of photographs from the late nineteenth century suggests that the beaver fence was only on the Customs House property along Richmond Street and a wood picket fence demarcated the grounds of St. Paul's Cathedral along Richmond Street and Queens Avenue (**Images 2-5**).

At the time of this Conservation Plan, it is unclear if the fence was designed by William Robinson or it was a standard Department of Public Works design (John Lutman, Archivist, Diocese of Huron, 2021). On July 12, 2021, a request was made by AECOM to the Library and Archives of Canada (LAC) that hold select 1872 architectural drawings of the City of London Customs House. The design drawings for the front façade were requested to see if the original design plans included the beaver fence (RG11M 80103/11; 2171432). The drawing was received, however only features the clock tower design details. At the time of the completion of this Conservation Plan, no design drawings on the front elevation of the Customs House were acquired.

In 1875, the beaver fence spanned the width of the front façade of Custom House along Richmond Street (**Image 2**). A 1966 London Free Press article documents that the fence had been extant since about 1870 (London Free Press, November 17, 1966). In 1887, the beaver fence was purchased by the Cathedral for $250 from the Canadian Government and was moved to demarcate the property along Richmond Street (London Free Press, 1966, p. 49; City of London, by-law L.S.P. -33373-297). This fence replaced the picket fence which had become rotten (London Free Press, November 17, 1966). The fence, which was part of a renovation project, is noted as a monumental work in Reverend Orio Miller's book *Gargoyles and Gentlemen*, a history of the Cathedral dating from 1834 (London Free Press, November 17, 1966).

A lithograph postcard of St. Paul's Cathedral in 1907 shows the beaver fence extant, with a tall masonry foundation (**Image 6** and **Image 7**). In addition, the 1907 image shows a fence extending along the north boundary of the Cathedral property. A picture of Custom House taken in 1927 shows the view of the front façade from Richmond Street after the beaver fence was removed (**Image 8**). **Image 9** and **Image 10** are photographs in the mid-twentieth century which shows the beaver fence with its stone foundation.

In November of 1966, the Cathedral spent $900 to repair the beaver fence. The London Free Press noted the winters had rusted the iron and cracked the mortar between the stone. On November 17, 1966, sandblasters were used to clean the iron and stone (**Image 11**). A primer coat of paint was then applied and was topped with a finish coat of black paint. Cracks in the stone foundation were filled and then covered with a clear waterproofing liquid. The repair work was undertaken over the course of a couple of days (London Free Press, November 17, 1966).

A 1971 photograph on the day of the demolition of Custom House shows that the beaver fence has not yet been built along Queens Avenue (**Image 12**). It was not until 1974 when the Cathedral extended the beaver fence, continuing

its original design, to surround the whole grounds after the purchase of the property where the Customs House once stood (Parks Canada, 2005).

Correspondence with John Lutman, Archivist, Diocese of Huron, indicates the St. Paul's Cathedral fonds located at the Diocese of Huron Archives at Huron University may contain detailed information concerning the installation of the beaver fence along its full length along Richmond Street and Queens Avenue, but he did not have access to those specific archives at the time of this Conservation Plan due to the COVID-19 pandemic restrictions. Currently, the Diocese of Huron have not located the cast of the beaver medallion.

Image 2:
View of the Custom House in 1875 from Richmond Street illustrating the beaver fence[2]

[2] *Ivey Family London Room Digital Collections: PG L17*

Image 3:
Close-up of the beaver fence in 1875, also depicting the column and picket fence along the Cathedral property[3]

Image 4:
Image looking on Queens Avenue (circa. 1875-1880) illustrating the absence of the beaver fence along Queens Avenue near the Custom's House[4]

[3] *Ivey Family London Room Digital Collections: PG L17*
[4] *Ivey Family London Room Digital Collections: PG F76a*

Image 5:
Picture of St. Paul's Cathedral, taken 1870-1875 with a picket fence[5]

[5] *Ivey Room London Room Digital Collections, PG L55*

Image 6:
Image of the St. Paul's Cathedral in 1907 illustrating the cast-iron beaver fence and stone posts enclosing the property[6]

[6] *Posted on Vintage London Facebook group*

Image 7:
Zoomed image of the St. Paul's Cathedral in 1907 illustrating the cast-iron beaver fence and stone posts enclosing the property[7]

[7] *Posted on Vintage London Facebook group*

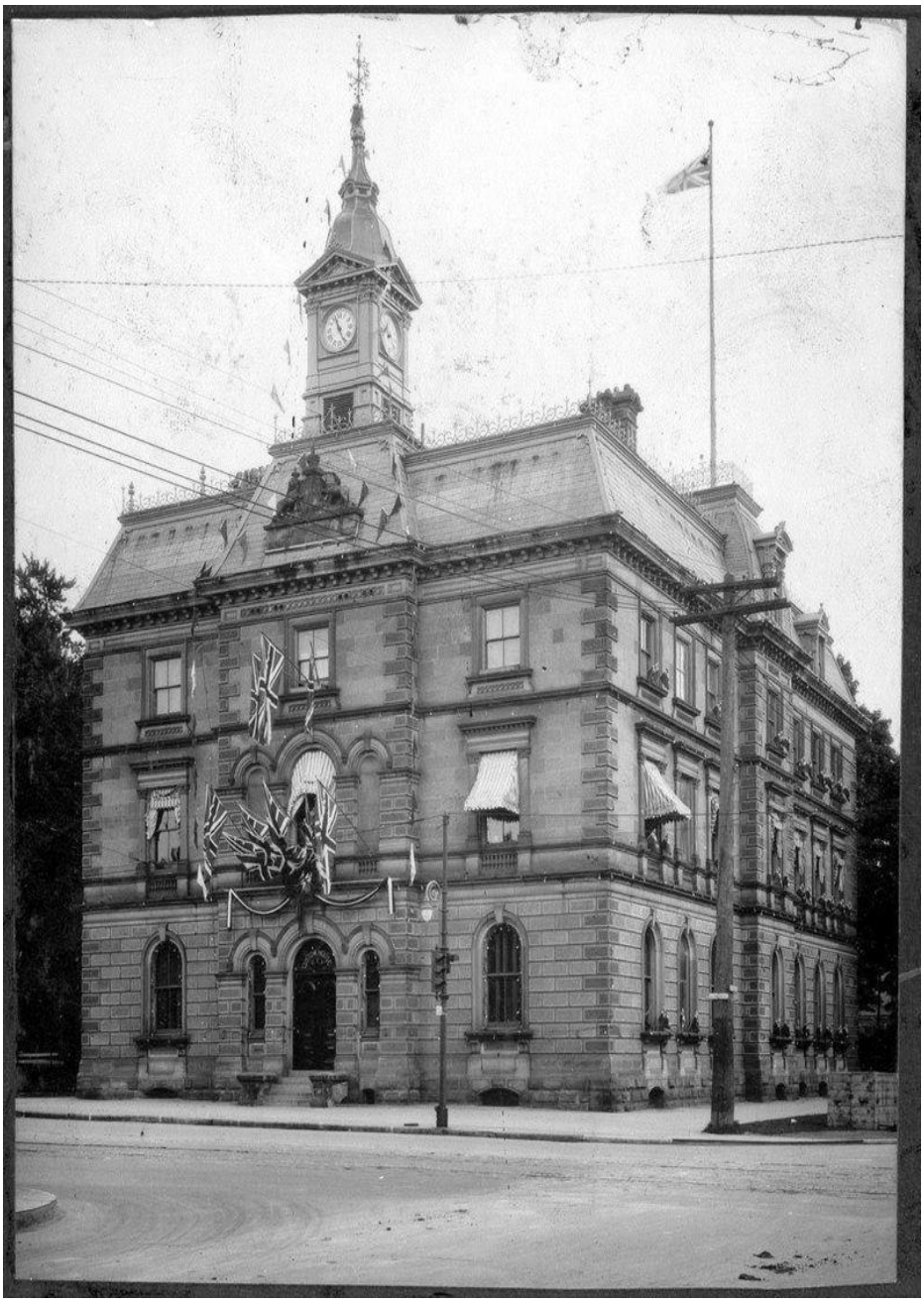


Image 8:
Image of the Customs House, ca. 1927, showing the beaver fence along the Richmond Street façade had been removed[8]

[8] *Library & Archives Canada*

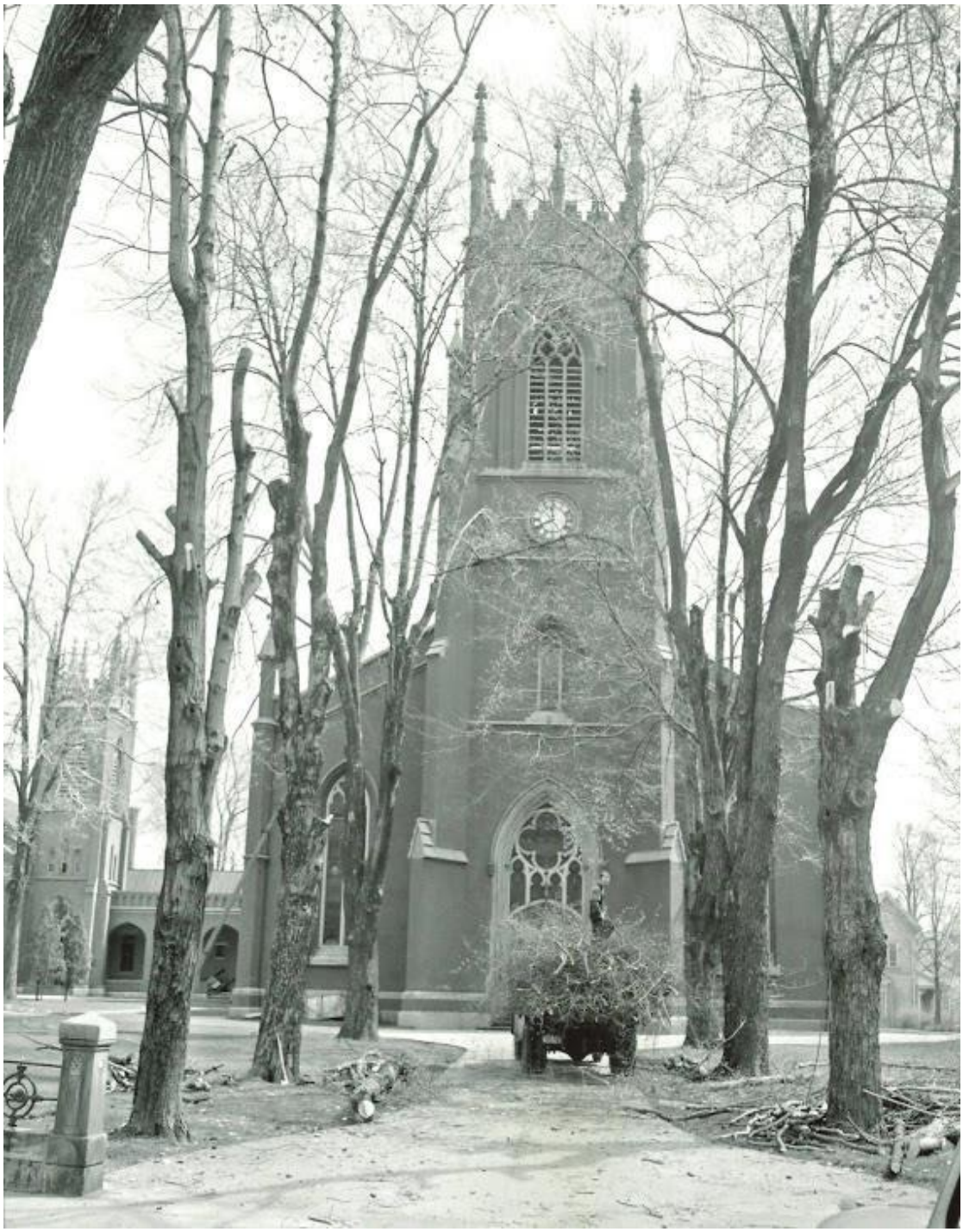


Image 9:
View for St. Paul's Cathedral in 1948 from Richmond Street, including a small portion of the beaver fence[9]

[9] *London Free Press, April 26, 1948*

Image 10:
St. Paul's Cathedral in the early to mid-1950s, with a view of the beaver fence[10]

[10] *Posted on Vintage London Facebook group*

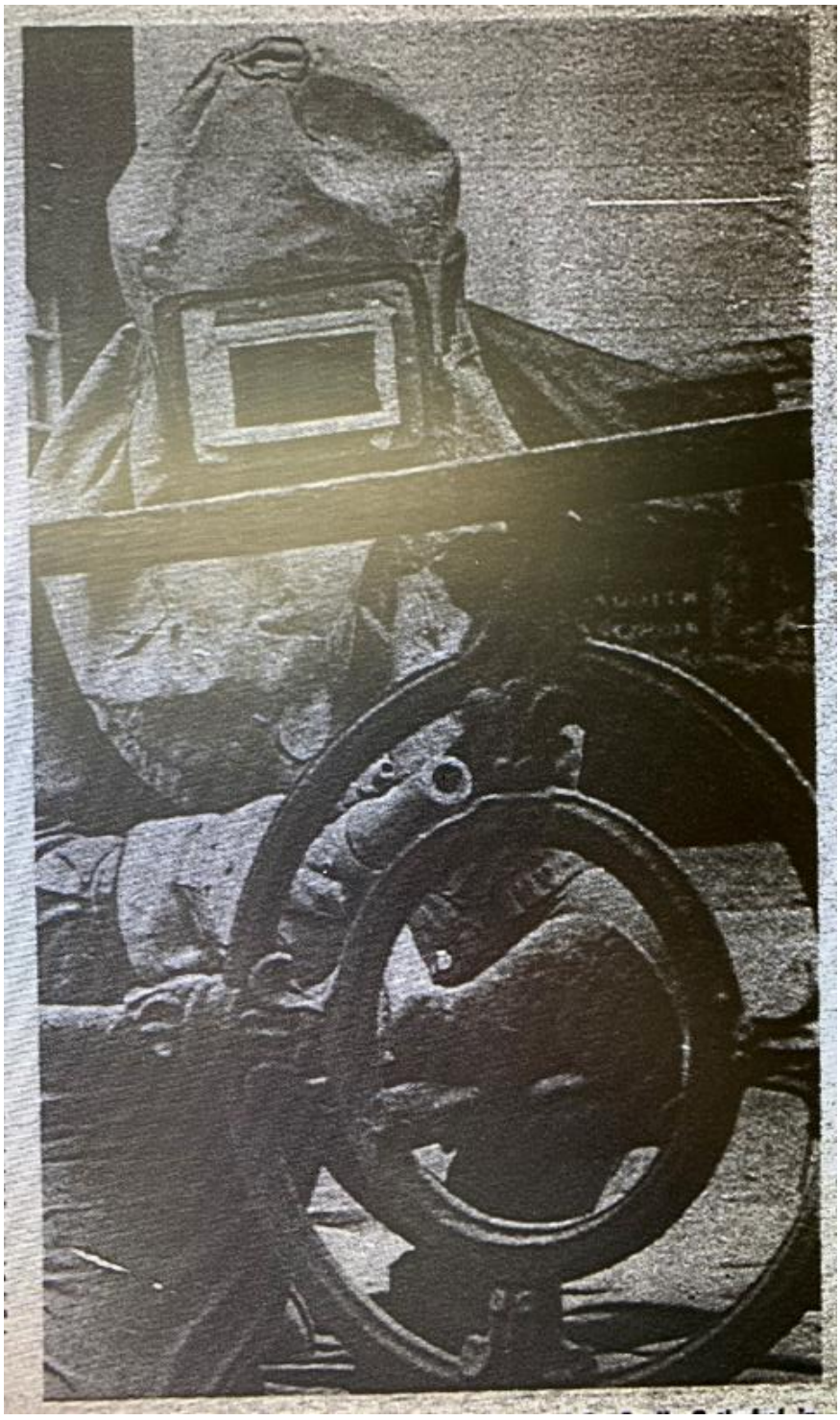


Image 11:
Sandblasting and painting the beaver fence in 1966[11]

[11] *London Free Press, Thursday November 17, 1966*

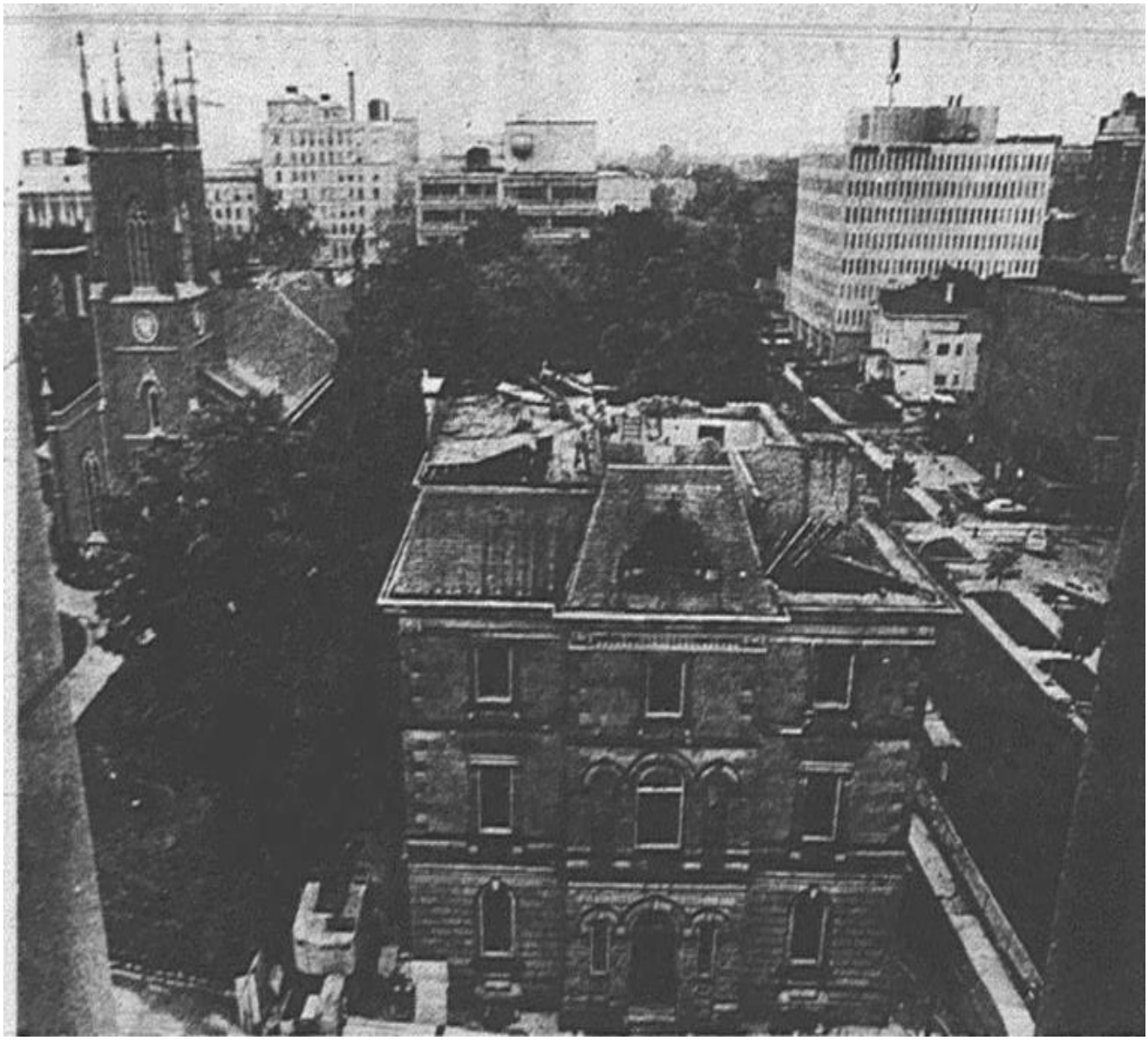


Image 12:
Image depicting the demolition of the Custom Building illustrating the beaver fence on the north side of the building in 1971[12]

5.5 Historical Significance of the Beaver

In the late 1600s and early 1700s, fur hats were in fashion which dramatically increased demand for the acquisition of beaver pelts (Government of Canada, 2020). King Henry IV of France saw the fur trade as an opportunity to acquire much-needed revenue and to establish a North American empire. Both English and French fur traders were soon selling beaver pelts in Europe at 20 times their original purchase price (Government of Canada, 2020).

[12] *London Free Press: August 21, 1971*

Given the trade for beaver pelts was so profitable, some Euro-Canadians felt compelled to pay tribute to the beaver in Canada (Government of Canada, 2020). For example, in 1621, Sir William Alexander, who was granted title to Nova Scotia, was the first to include the beaver in a coat of arms. In 1678, the Hudson's Bay Company put four beavers on the shield of its coat of arms to show how important the hard-working rodent was to the company.

There were an estimated six million beavers in Canada before the start of the fur trade, but by the mid-19th century, the beaver had become close to extinction. During its peak, 100,000 pelts were being shipped to Europe each year. Luckily, as the beaver was coming close to extinction, Europeans had taken a liking to silk hats and the demand for beaver pelts disappeared. Today, thanks to conservation and silk hats, the beaver – the largest rodent in Canada – is alive and well across the country (Government of Canada, 2020).

Given the history of companies and governments using the image of the beaver for representative and monetary purposes, as well as the fact the beaver actually lives in every province of Canada, the beaver was given official status as an emblem of Canada when the *National Symbol of Canada Act* received Royal Assent on March 24, 1975 (Government of Canada, 2020)[13]. This made the beaver Canada's official national animal.

As noted above, the beaver fence was first associated with the Customs House. The Customs House was where goods were stored, inspected and their duties assessed. Given the beaver's historical significance, it is only fitting that a beaver is represented on the fence associated with the Custom House, a building associated with Canadian trade. As a building built by the federal government, the beaver motif in the fence of the Customs House provided a decorative element to the front façade of the building and symbolized not only the Canadian government, but also Canadian trade.

As well as being Canada's national animal, the beaver motif also reflects the Diocese of Huron's coat of arms (historicplaces.ca; St. Paul's Cathedral) (**Image 13** and **Image 14**). The beaver is thought of as an ancient totem animal of the Huron-Wendat Nation and appears in the arms of the Bishopric of Huron. Therefore, the beaver motif in the fence as it was relocated from the Customs House property and is now associated with St. Paul's Cathedral is still fitting since it reflects the Diocese of Huron's Coat of Arms.

Image 13:
Image depicting the arms of the Diocesan of Huron[14]

[13] *The historical significance of the beaver is from a Euro-Canadian perspective and the Indigenous communities may attribute different values to the beaver.*

[14] *http://www.heraldry-wiki.com/heraldrywiki/wiki/File:Huron.rel.jpg*

Image 14: Diocese of Huron on Twitter

6. Existing Conditions

6.1 Study Area Existing Conditions

As part of good conservation practices, an assessment of the condition of the beaver fence was completed to inform the conservation treatments and interventions developed for this Conservation Plan.

Site visits at 472 Richmond Street were completed on February 10, April 19, May 12, and July 20, 2021, by Tara Jenkins, Cultural Heritage Specialist, at AECOM, in order to document the existing conditions of the beaver fence. Measurements provided below were taken with a hand-held measuring tape by Tara Jenkins and Sam Mansor, a Structural Engineer at AECOM. In addition, on August 4, 2021, a structural review was completed by AECOM's team and Dillon Consulting in order to determine the fence's realignment and draft construction level drawings and the construction specifications. On November 23, 2021, John Pucchio, AECOM's Senior Structural Engineer, returned to the site to evaluate the condition of the beaver fence. Select photographs from all the site visits are included in **Section 11** of this report (**Photographs 1-42**).

The construction level drawings with construction specifications are attached in **Appendix A** and the Special Provisions on the beaver fence provided for Tender are attached in **Appendix B**.

6.1.1 The Fence

The beaver fence is located on the property of 472 Richmond Street in Downtown London. The fence is not there to guard the public against a safety hazard but rather to delineate a property boundary. It encloses St. Paul's Cathedral and its grounds, a public space. The fence spans the south property boundary along Queens Avenue, measuring 98.08 metres in length including the corner and spans the west property boundary along Richmond Street for 83.5 metres. There is evidence in **Image 6**, above, that the beaver fence extended along the north property boundary and has been since removed with only the foundation remaining. The remaining foundation can be seen in **Photograph 5**.

The beaver fence is made up of four main components:

1) The railing system
2) The foundation cap stones
3) The foundation and footings
4) The end posts

6.1.2 The Railing System

The railing system is constructed of cast-iron. This ornamental railing system comprises of horizontal and vertical members held in place by sandstone cap stones. The cap stones are supported on a cast-in-place concrete foundation. Basic measurements of the railing system are presented in **Photograph 42**.

Overall, the cast-iron railing system is in fair condition. The railing system is need of physical repair and a new coat of paint, especially in the portion that requires relocation. In general, there is evidence of localized surface corrosion, many detached components, broken welds, and missing components. Approximately 7.3 m (23.9 ft) of the fence along Richmond Street, in two locations, is missing a portion of the railing system (**Photograph 26**, **Photograph 28**, **Photograph 30**). In addition, the fence appears relatively unstable and prone to horizontal movement with any significant lateral force. In many locations, the base of the rail posts is not in contact with the top of the cap stone.

The stability of the post and railing depends on firm contact. The lack of contact may be a major contributing factor reducing its overall stability. In many locations, caulking has been placed below the base of the rail post as a measure to increase contact and to potentially seal the area below (**Photograph 27**). It is possible the posts may have been "frost jacked" from their original position, given the susceptibility of unprotected sandstone and mortar to moisture penetration. In addition, the quality of welding appears to be poor. For example, in some locations there was a limited past attempt of grinding the welds smooth.

During the site visit, it was documented that the Diocese of Huron has in their possession three beaver medallions, several vertical posts, 10 finials, and other parts in the basement of the St. Paul's Cathedral (photographic inventory on file with AECOM).

6.1.2.1 Rail Posts

The cast-iron vertical members, referred to as the rail posts in the construction level drawings, include two sections welded to two horizontal rails. In total each rail post is 57.2 cm (2.5 inches) in height. The rail posts are decorated with a floral motif at the rail joint and a leaf motif between the bottom and top rail (**Photograph 38**). The posts are topped with finials that have rounded points (**Photograph 37**). In general, the rail posts are spaced 1.22 m (4 feet) apart from the centre point of the finials. In some cases, posts are attached to the cap stone by a pintle, visible at the joint locations between each cap stone, specifically in the newer section of the fence that was installed in 1974.

6.1.2.2 Horizontal Rails

The cast-iron horizontal rails run between the rail posts near the tops and bottoms. They hold the whole fence together and create the housing for the decorative medallions. The lower horizontal rail, referred to the mid rail in the construction level drawings, is rounded in shape (25 cm diameter)(**Photograph 31**). The top rail is rectangular in shape (20x40 cm) (**Photograph 32**).

Metal back supports have been attached to the top rail at uneven intervals, hidden by the beaver medallions, to provide additional support to the fence (**Photograph 40**). Each brace is welded to the top rail and attached to the cap stone by an anchor with a nut and washer. It is unclear if the braces were added after its construction as the fence became less stable.

6.1.2.3 Medallions

The cast-iron fence is unique in that the rails include a round medallion relief of a beaver spaced evenly between each of the rail posts, currently reflecting the Diocese of Huron's coat of arms (**Photograph 33**). The beaver relief is 30.5 cm in diameter (1 ft). Joining the inner circle to the outer circle around the beaver appears to be a variation of the fleur-de-lis. Typically, the fleur-de-lis motif is associated with the Catholic saints of France and a symbol of the French presence in North America. The beaver medallion does not connect to the foundation of the fence like the rail posts, but just to the two horizontal rails.

The existing cast-iron portion of the fence differs slightly in design from the original fence located in front of Customs House. The original fence included a simple decorative embellishment on the rail post below the horizontal top rail where it connects with the rail post (see **Image 3**, above). The fence that encloses the property today does not include this decorative element.

6.1.3 The Foundation Cap Stones

The cast-iron railing system is connected to the foundation cap stones by metal anchor pins which extend from each vertical post (**Photograph 29**). The caps within the proposed relocation section of the fence appear to be a sandstone type material. The sandstone cap stones have a bevelled edge and are generally 1.2 m (4 ft) in length and are 25 cm (9.8 inches) wide and 20 cm (7.87 inches) in height.

There are mortared joints at each vertical rail post location (**Photograph 24**). The cap stone was cut and notched at each joint location to accommodate the rail post attachment (**Photograph 25**). The joint thickness varies, and several cap stones were noted to be butted against each other with minimal mortar thickness. The mortar was in good condition in some locations and was missing/deteriorated in other locations (**Photograph 25**).

The cap stones are also connected by a mortared joint to a concrete foundation (**Photograph 24**). The mortared joint varies in thickness and was also used for levelling the fence. The mortar was noted to be in fair condition. The mortar was in good condition in some locations, while in other locations was missing/deteriorated in other locations (**Photograph 25**).

Overall, the cap stones are in fair condition with typical observations of medium weathering. There are localized areas of poor conditions, with severe weathering (**Photograph 22**), cracking, spalling (**Photograph 23**), and disintegration. There is some wear and minor damage to the roadside elevations of the caps.

6.1.4 The Foundation and Footings

The cast-in-place concrete foundation of the beaver fence is situated along the length of the property and appears to be in good condition where nominally exposed above grade (**Photograph 12**). The visible portion of the foundation shows some cracking/gaps located near the joints of the cap stone and verticals.

The concrete foundation varies in height (above grade) since it is the element of the fence that keeps the fence system appearing level for its entire length. The foundation appears to be a standard concrete mix design with a coarse aggregate. Given the age of the foundation, the concrete is unlikely to have air entrainment, as required for durability in today's mixes. The arrangement and depth of the concrete foundation is unknown. A foundation footing is likely situated at the base of the foundation wall but is not visible and its condition is unknown.

6.1.5 The End Posts

The end posts are found at four separate openings along the length of the fence which allow entrance to the public space of the property. Two openings are located on the western boundary of the property along Richmond Street and two openings are located on the southern boundary of the property along Queens Avenue. The two most western end posts on Queens Avenue are the focus of this existing conditions survey since they require relocation for the Project (**Photograph 14**).

The end posts affected by the Project along Queens Avenue are made of sandstone (**Photograph 15**). The end posts including the caps are approximately 121.7 cm (47.8 inches) in height. The posts themselves are squared, and they are 97.3 cm (38.3 inches) in height and 28 cm (11 inches) in length and width. Basic measurements of the end post are presented in **Photograph 41**. The street facing façade of the posts include a floral pattern and below a fluted pattern which appear to be worked and tooled into the sandstone. The posts are typically medium weathered with localized severe weathering (particularly around the corners). The has been some minor localized patching on the posts with a cementitious material.

The posts also include sandstone caps which appear to be original and are separate from the end posts. The caps are placed on a mortar layer with the end posts (**Photograph 16**). Any connection between the end posts and caps is currently concealed. The main end posts are placed on a mortar layer above the concrete foundation (**Photograph 17**). Any connection with the main end post and foundation is concealed. The caps of the end posts are pointed pyramidal. The stone caps are 24.1 cm (9.5 inches) in height and 35.6 cm (14 inches) in length and width.

Holes were drilled into the posts to receive the horizontal rails. The original arrangement appears likely consisted of horizontal rails mortared into the post holes (**Photograph 18**). Later modifications and repairs appear to place reinforcing steel bars into the holes with mortar (or potentially epoxy adhesive) and the welding of the reinforcing steel bars to the horizontal rails (**Photograph 19**). Some holes in the end posts for horizontal rail attachment were patched, potentially indicating the post was turned during previous repairs (**Photograph 20**). Other forms of strengthening of the horizontal rail attachment were noted (**Photograph 21**).

6.1.6 Assembly Method

The following section proposes how the beaver fence may have been constructed based on observations made by John Pucchio, AECOM's Senior Structural Engineer, of the components, joints and deterioration.

Based on Mr. Pucchio's observations, the fencing was assembled in place (on-site) in pieces, and not in sections, per the following:

- The vertical posts were positioned in the cap stone without a horizontal railing and without the finials.
- Middle horizontal railing:
    - The beaver medallions were originally separate.
    - The short round tube pieces (or mid rail) are inserted into the ends of the medallions and into the receiving ends at the posts. The tube is welded at each location. (**Photograph 31**)
    - There appears to be a weld at each connection location. It is possible that these are shop welds, but given the number of visual detachments and repairs, it is more likely they were field assembled and welded.
- Top horizontal railing:
    - The flat bar was placed over the top of the post and welded (**Photograph 32**). The joint is visual at numerous locations. The flat bar is also continuous over some vertical post locations.
    - The finials are then welded over the posts, so that piece appeared to be independent until installation. The welds are cracked, broken or repaired in many locations.
    - The beaver medallions are also welded to the top rail (**Photograph 33**). The welds are cracked, broken or repaired in many locations.
- This piece-by-piece construction is particularly evident in later period modifications such as the corner (Richmond and Queen). This would not have been possible in the shop, so it would have been field welded (**Photograph 34**). All those welds are cracked.

6.1.7 Other Landscape Features

In July 2021, the proposed new boundary of the right-of-way was staked within 472 Richmond Street. The new right-of-way will impact other features within the property including a garden south of the St. Paul's Cathedral sign (**Photograph 36**), two pine trees and two deciduous trees.

7. Recommended Approach of Heritage Conservation

7.1 Determining the Primary Treatment

The conservation treatments, including all restoration and preservation work, for the beaver fence, abide by the Parks Canada *Standards and Guidelines* to ensure the relocation of the beaver fence will adhere to conservation best practices and will lead to the development of a detailed Removal Plan and Refinishing/Refurbishment Plan.

Conservation is an all-inclusive term that refers to all forms of conservation treatment. It pertains to all the processes of looking after a place to retain its cultural heritage significance (Kalman and Létourneau 2021:218). Determining the primary treatment is considered stage two of the conservation process known as *Planning*. According to Parks Canada's *Standards and Guidelines*, before conservation activities begin, the primary treatment must be defined. Three primary conservation treatments are recognized in the *Standards and Guidelines* and are as follows:

Preservation: means maintaining a building or structure in its existing state. It is a program of maintenance and intervention designed to prevent further deterioration and to keep a building or structure 'as is' – that is, to respect the present form, material, and integrity. Emphasis is placed on the conservation of existing material. Preservation is similar to maintenance and repair (Kalman and Létourneau 2021:221).

Rehabilitation (or Adaptation): is the process of returning a property to a useable state through repair or alteration. Rehabilitation makes possible an efficient contemporary use while preserving those portions and features that are significant to the property's historic, architectural, and cultural values. Rehabilitation has also been referred to as 'new work and alteration' (Kalman and Létourneau 2021:223).

Restoration: is the process of returning a building or structure to the appearance of an earlier time by removing later material and by replacing missing elements and details. The intention of restoration is to reveal the appearance of the place at its period of greatest cultural significance. Restoration may involve the permanent loss of material that is later in date from the restoration period (Kalman and Létourneau 2021:221).

In addition, **reconstruction** may be required which means returning a place to an earlier state but distinguished from restoration by the prevalence of newly introduced material. A building or structure may require the rebuilding of one or more components within a larger restoration project (Kalman and Létourneau 2021:226).

7.1.1 Conservation Treatments of the Beaver Fence

The recommended primary conservation treatment is: **Restoration.** Based on the existing conditions assessment of the beaver fence, the fence requires repair and possible replacement of deteriorated or missing features prior to its reinstatement at a new location within the property of 472 Richmond Street. **Restoration** involves the sensitive repair of the beaver fence while protecting its cultural heritage value. Damaged or missing features will be **restored** or **reconstructed**. The replacement of missing features should be an accurate replica of the feature that keeps in character with the restoration period of the beaver fence (i.e. back to its original appearance).

The secondary conservation treatment of the beaver fence is: **Preservation.** The secondary conservation treatment is used for individual components. Given the beaver fence requires relocation for the Project, the removal process requires interim measures to protect the fence, conserve all components that are salvageable, and prevent components from damage during relocation. The missing parts and deteriorated features of the beaver fence will be **restored,** including **preserving** the main components.

7.1.2 Goals of Conservation

The following goals have been developed to include applicable aspects of the MHSTCI *Eight Guiding Principles* (**Appendix C**) for the restoration and preservation of the beaver fence:

Goal 1: Ensure the means and methods of removal of the beaver fence preserve the integrity of this heritage attribute.

Goal 2: Design all conservation interventions to respect the historic material of the beaver fence by:

- repairing rather than replacing components of the beaver fence. If parts are too deteriorated, then replace with like materials that match the forms, materials, and detailing of the sound versions of the same elements, and,
- repair the beaver fence to its restoration period before it is reinstated in its new location.

Goal 3: All conservation interventions must preserve the relocated portion of the beaver fence to be physically and visually compatible with the beaver fence that is remaining *in-situ*, including re-establishing the spatial arrangement (proportions) of all its components and the consistent elevation of the railing system.

Goal 4: Document all conservation interventions. Ensure that documentation is available for future interventions.

8. Conservation Measures- Proposed Conservation Interventions

Change is necessary to repair and restore the beaver fence during its relocation. The amount of change (or alteration) should be guided by appropriate conservation interventions. This section represents the *Intervening* stage of this Conservation Plan which includes detailed recommendations for intervention, by prescribing recommendations for the methods required in order to address the conservation requirements, using the conservation treatments (restoration and preservation).

Intervention is defined as: *Any action, other than demolition or destruction, that results in a physical change to an element of a historic place* (Parks Canada, 2010:254). To alter, means to change in any manner and includes restore, renovate, repair or disturb (MHSTCI, 2010).

AECOM's structural engineering team led by John Pucchio, with alignment input from Dillon Consulting Limited, have prepared construction level drawings, presented in **Appendix A**, and Special Provisions to assist in the relocation of the beaver fence (**Appendix B**), to support the conservation of the beaver fence, and to reflect the conservation strategies and policies outlined above. Based on the construction level drawings and the Special Provisions, the following section provides specific conservation interventions that will be undertaken to preserve and restore the beaver fence, thus preserving the cultural heritage value of 472 Richmond Street.

The City of London will be responsible for the costs related to the beaver fence relocation, including the restoration for the relocated section. The fence will be entirely relocated within the boundary of 472 Richmond Street, so it maintains its private ownership and subsequently, its long-term management and maintenance by the Diocese of Huron and St. Paul's Cathedral. Therefore, the following proposed conservation interventions in **Table 1** are short-term and include only the interventions required for the duration of the Project. However, it should be noted that the conservation interventions proposed in this Conservation Plan are developed so they do not create any long-term adverse implications to the fence.

8.1 Responsibility

The **Contractor** is responsible for protecting the beaver fence and the property during the relocation process for this Project. In conjunction with the Contractors heritage construction specifications outlined in **Table 1**, below, the Contractor shall carry out the following work:

- Develop the means and methods for removal of the beaver fence and its rehabilitation and reinstatement.
- Create a Removal Plan and Refinishing/Refurbishment Plan to outline all means and methods after review of this Conservation Plan and the specifications outlined in the construction level drawings and the Special Provisions.

All restoration and preservation work should be completed in such a way that all salvageable individual components are not damaged. Appropriate conservation interventions should be established by the Contractor prior to the removal of the beaver fence. **Table 1** outlines the requirements of the Contractor. To ensure appropriate conservation interventions are undertaken, the Removal Plan and Refinishing/Refurbishment Plan must be approved by the **Contract Administrator** prior to the fence removal.

Work for the masonry and cast-iron must be completed by **Qualified Persons**. A Qualified Person is an individual that has relevant, recent experience in the conservation of historic structures. A Qualified Mason will be required for the work related to the sandstone cap stones and the concrete foundation. A Qualified Custom Metal Specialist will

be required for the work related to the cast-iron railing system. The Qualified Persons will be required for the development of the Removal Plan and Refinishing/Refurbishment Plan, including the development of shop drawings. Work must be performed by firms having not less than 5 years of successful experience in comparable masonry and iron restoration projects, and must employ personnel with skills in the restoration process.

Three (3) weeks prior to the commencement of work for the beaver fence, the Contractor shall provide the following submissions:

1. Removals Plan:
    - Outline the methodology, equipment, cutting details, protection of components, transportation details, extents of removal and storage.
    - Detailed plans on how all components will be catalogued prior to removals.
    - Existing conditions including all elevations (top of cap stone and adjacent grade) and all dimensions (including the spacing of each post).

2. Refinishing/Refurbishment Plan:
    - Fencing: Outline methodologies for all work, connection details, welding details, shop details, coating systems and staff experience (who are undertaking the work).
    - Cap Stone and end posts: Outline methodologies for all work, new materials (including samples), connections, shop and staff undertaking the work.
    - Provide in sufficient detail the location/capacity of facilities, proposed equipment for all components of the work and proposed staff (with certifications).
    - Detailed plans for mockup assemblies.
    - Detailed plans of the relocation layout including site staking/marking, drawings, dimensions.

3. Concrete Placement Plan:
    - Reinforcing steel shop drawings
    - Formwork details and design
    - Concrete mix design.
    - Cold and Hot weather protection measures.
    - Location of all control and construction joints.

Table 1: Proposed Conservation Interventions- Specifications

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications

Entire Fence: Prior to Removal	The Contractor is responsible for the protection the beaver fence and the property during the duration of this Project.	The Contractor is required to complete the following:
		▪ A Pre-Conditions Survey and verify all dimensions and elevations, as shown on the construction level drawings (**Appendix A**).
		  ○ Discrepancies shall be submitted to the Contractor Administrator and those changes should be reflected in the submittals and shop drawings.
		▪ A survey of existing and new grades
		  ○ Vertically align the top elevation of the fence– minimize elevation changes.
		▪ Mark the preliminary layout arrangement in the new railing location
		▪ Complete a trial removal (demonstration) of a 3-metre section of the beaver fence.
		  ○ Ensure removal techniques in the Removal Plan do not damage any components of the beaver fence that are in salvageable condition.
		▪ Include a cataloguing plan in the Removal Plan. Each railing section and cap stone shall be catalogued and marked with non-permanent construction crayon. Cataloguing should match the cap stone with the post/railing sections for similar reinstatement along the new fence alignment.
		▪ After the trial, approval of the Removal Plan and the fence arrangement, in writing, is required from the Contractor Administrator and the Diocese of Huron/St. Paul's Cathedral prior to full removal of the beaver fence.
			The Contractor is required to complete the following:
			▪ A shop drawing and special provisions in the Refinishing/Refurbishment Plan to show how the relocated fence members will be laid out in the new arrangement and the integration of the corner between the relocated fence and the existing fence will be completed. There should be a careful regard for spacing, keeping the appearance of the fence proportional. A shorter panel distance is acceptable, if required.
			▪ Reinstatement should be proportional (noting that not all sections will be identical). Adjust proportions as needed to make it appear proportional with the beaver medallion located at the centre between two rail posts.
			▪ Complete a trial (demonstration) on reinstatement. Reinstate a length of 3 metres. The section must be inspected by the Contract Administrator prior to full reinstallation.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
Cast-Iron Railing System	The removal and restoration of the cast-iron railing system should be carried out by a Qualified Custom Metal Specialist, subcontracted by the Contractor.	▪ Removal Plan shall stipulate that all elements of the railing system to be salvaged (with a requirement to catalogue during removal) ▪ Include detailed methods on how to dismantle and detach the fence from the cap stones and along the railing system itself in the Removal Plan. Specify all cut locations and locate cuts at locations that may be concealed in its reassembled form. Although saw cutting is required for the railing system removal, minimize the number of cut components and maximize the length of the removed railing section to suit movement and restoration. Minimizing cuts will avoid additional repairs and damage. If back braces are required on a new fence, keep back braces attached in removal.	▪ Review the condition of all fence components and document in the Refinishing/Refurbishment Plan. ○ If parts are too deteriorated for repair, use the railing parts in St. Paul's Cathedral basement whenever possible. All parts deemed unsuitable for reuse shall be retained for review until approval for disposal is granted. ○ If there are no existing parts to replace deteriorated components, fabricate replacement components in replicate existing, materials and detailing (with the possibility of constructing new moulds for casting the beaver motif and/or the vertical rail posts, if the past moulds cannot be located by the Diocese of Huron). ▪ Review and document the condition of all connections and component joints. Grind all existing welds smooth and reweld connections for increased competency. Grind all new welds smooth. Welding shall conform to the American Welding Society AWS A5.15 (Specification for Welding Electrodes and Rods for Cast Iron). Grind all sharp edges by hand or power tools prior to preparation for coatings. ▪ Unless required to facilitate on-site assembly, shop weld all components. ▪ The relocated portion of the fence should meet a minimum standard of care (for example if a person leans on it). The intention of the refurbished design and reinstated posts is to provide a similar lateral point load capacity (as possible) to the OBC, or 1 kN (225 lbs). ▪ Where field welding has the potential to damage surface preparation, reduce extents of coating for application of coating in the field. ▪ Allow unlimited access to the City of London or representative officials for observations and quality control reviews.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
			Coating (paint): ▪ Review appropriate methods, protection and disposal requirement to remove the existing coating finish. Incorporate all proposed work in the Refinishing/Refurbishment Plan submission. ▪ As part of the Refinishing/Refurbishment Plan, Metal Specialist shall propose paint products to achieve one prime coat and flat top coat, suitable for cast iron, including sample paint colours. The flat top coat shall be black similar to the current paint colour. ▪ Surface preparation for paint systems shall be according to SSPC-SP15 – Industrial Grade Power Tool Cleaning or better, to suit a 1 mil surface profile. ▪ Final surface preparation for coating application (shop and field) shall be complete when the temperature, moisture and humidity satisfies SSPC-PA1 ▪ Application related failures in coatings shall be corrected prior to application of a subsequent coat or after the application of the flat top coat, as applicable. Where excessive coating thickness shall be scraped back and sanded to a soundly bonded coating and the area recoated to match the surrounding coating. ▪ All components coated off-site shall be protected from handling or shipping damage through the use of padded slings, separators, tie downs and other similar devices.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
Sandstone cap stones	The removal and restoration of the cap stones should be carried out by a Qualified Heritage Mason, subcontracted by the Contractor.	▪ Removal Plan shall stipulate that all cap stones should be salvaged (with requirement to catalogue in removal) ▪ Do not damage in removal. Saw cut mortar joints for removal, gently pry and carefully lift cap stones for removal. ▪ Employ multiple lift and support points along the length of each cap stone to provide uniform support in lifting and transportation. ▪ Gently grind all bonded mortar to original stone surfaces. ▪ Store off-site: For transportation after removal, caps should be placed on timber skids and stacked no more than 3 rows high per skid, with each row separated by 2 layers of plywood. A top layer of plywood should also be used for protection during transportation. Each skid should be well bound with heavy duty polyester or metal banding for transportation. Upon delivery to a storage and refurbishment location, each cap shall be reviewed for condition and damage documented. Transportation back to site shall have similar care and procedures.	▪ If sandstone cap stones become damaged in removal, procure a sandstone source to replace if needed. ○ Replacement stone should be similar in form, materials and detailing to the existing cap stone. ○ Provide a sample of new sandstone to the Contract Authority for review and approval prior to installation. ▪ Specify in the Refinishing/Refurbishment Plan if cap stone cleaning is required and/or appropriate. If cleaning is appropriate, use the gentlest means possible to obtain satisfactory results. Clean before reinstating with low-pressure clean water and soft natural bristle brush. ▪ Provide the Design for attachment of the cap stones to the new concrete foundation (see mortar specifications). Adhesive dowels may be required to firmly anchor the cap stone. The holes shall be free of dust and debris immediately prior to placement of the anchoring agent. When the anchoring agent fails to fill the hole after insertion of the dowel, additional anchoring agent shall be added to fill the hole.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
Sandstone End Posts and Caps	The removal and restoration of the end posts and caps should be carried out by a Qualified Heritage Mason, subcontracted by the Contractor.	▪ Removal Plan shall indicate that the two sandstone end posts should be salvaged and relocated. Salvage the caps of the sandstone posts, even if the posts themselves cannot be salvaged. ▪ Prior to Removal Plan submission, excavate around end posts to demonstrate how the posts should be removed for salvage and re-use. ▪ Do not damage in removal. Cover the entire perimeter in plywood and secure with banding. Saw cut mortar joints for removal, gently pry and carefully remove end posts. ▪ Employ multiple lift and support points along the length of each cap stone to provide uniform support in lifting and transportation. ▪ Gently grind all bonded mortar to original stone surfaces. ▪ A construction method for the end post relocation should be developed in the Removal Plan.	▪ Should it become necessary to replace the end posts, procure a sandstone source to replace them if needed. ○ Replacement stone should be similar in form, materials and detailing to the existing cap stone. ○ Provide a sample of new sandstone to the Contract Administrator for review and approval prior to installation. ○ Replicate the tooled pattern on the street façade side of the new posts ▪ Provide the Design on the methods of attachment of the end posts to the railing system and to the new concrete foundation (see mortar specifications). Adhesive dowels may be required to firmly anchor the cap stone. The holes shall be free of dust and debris immediately prior to placement of the anchoring agent. When the anchoring agent fails to fill the hole after insertion of the dowel, additional anchoring agent shall be added to fill the hole. ▪ Clean end posts and caps, if appropriate, utilizing the gentlest means possible to obtain satisfactory results. Clean before reinstating with a low-pressure clean water and soft natural bristle brush.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
Concrete Foundation and Footings	The removal of the foundation and the installation of the new foundation should be carried out by the Contractor.	▪ Allow for the visual review of the existing foundation arrangement for documentation purposes. ▪ Excavate, remove and dispose of concrete foundation according to OPSS 510.	▪ Construct the new foundation and footings to suit the modified fence arrangement and cap stone width. The exact configuration of the concrete foundation will be governed by the shop drawings produced by the Contractor of the layout of the fence members. ▪ Provide a concrete mix design conforming to OPSS 1350. o Since historic concrete mixes cannot be recreated with today's concrete technology, consider a coating or additive to change the colour of the new concrete, if appropriate, to help transition the new and the old foundation (which will be apparent at the corner joint) ▪ Construct the concrete according to OPSS 904 including cold and hot weather protection. Concrete shall have a compressive strength of 32 MPa at 28 days (exposure class C-1). ▪ Reinforcing steel for concrete shall be Grade 400W according to OPSS 905. ▪ Provide submissions for reinforcing steel placement and formwork design according to OPSS 904 and 919, respectively.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
Mortar Mix	A Qualified Heritage Mason, subcontracted by the Contractor, should determine the appropriate mortar mix to be used in the installation of the new fence.	▪ No mortar mix specifications are required in the Removal Plan.	This specification is to apply to all mortar joints required for the Project: ▪ In the absence of costly testing, an acceptable historical mortar mix should be used and matched as closely as possible through visual and physical comparison onsite. o Determine if the mortar mix in the Special Provisions of the acceptable mortar mix CSA A179, consisting of Type SA Hydrated Lime is acceptable. ▪ Mortar to be pre-packaged in correct colour, texture and profile to match original mortar. Mortar is to be designed to be: workable and compatible (similar to the existing mortar in compressive strength and deformability, water transmission of mortar and water absorption of masonry) with the materials to be bonded and with service conditions; durable (resistance to frost action and salt crystallization, and controlled shrinkage and bond); breathable (permeable, water absorption and vapour transmission); lower in compressive strength and sacrificial to the stone masonry units with faster initial setting as needed in Canada's cold climate. ▪ Provide a sample of mortar prior to completion of the Refinishing/Refurbishment Plan for approvals.

Material Component	Responsibility	Removal Plan Specifications	Refinishing/Refurbishment Plan Specifications
Entire Fence- Reinstall	The Contractor, the Qualified Heritage Mason and the Qualified Heritage Metal Specialist are required for the installation of the fence in its new location.	▪ Not applicable.	▪ Include procedure and methods for installment in the Refinishing/Refurbishment Plan: o Cast-in-place reinforced concrete foundation footing and walls. Excavate and backfill as necessary. o Install and connect cap stone to foundation walls o Install and connect railing system to cap stone o Refer to the Landscape Plan, however, install grass inside boundary new fence and a hard surface outside the boundary of the new fence (similar to existing conditions). ▪ Reference the Pre-Condition Survey and ensure the top elevation of the fence vertically aligns with the existing fence. ▪ Include a schedule of the sequence of work (i.e., ideal timing of when to complete the reinstallation)
Entire Fence- Post-Construction	The 1-year warranty makes the Contractor contractually responsible and liable for defects related to poor materials or workmanship.	▪ Not applicable.	▪ Prior to the expiry warranty period, an inspection should be completed by the Contract Administrator and the Diocese of Huron/St. Paul's Cathedral to review condition and implement repairs to defective work.

9. Action Plan and Implementation

This final section of the Conservation Plan in regard to the relocation of the beaver fence at 472 Richmond Street provides an outline of the actions that are required in order to implement this Conservation Plan in full. It assumes a prior series of discussions in which the various levels of government and stakeholders achieve a consensus as to the objectives and goals of this Conservation Plan.

The Contractor is required to review this Conservation Plan and implement all the conservation interventions in the Removal Plan and Refinishing/Refurbishment Plan. Once the Contractor has completed the Removal Plan and Refinishing/Refurbishment Plan and the plans are approved, all submissions and drawings will be appended to this Conservation Plan. **Section 9.1** outlines the approval process after the Plans have been approved.

9.1 Approvals Process

The following approvals are required for this Project, prior to the removal of the beaver fence at 472 Richmond Street:

1. Consult with the Property Owner.
2. Complete a Heritage Alteration Permit, under Section 42 of the *Ontario Heritage Act*. Municipal Council must make a decision on the Heritage Alteration Permit application within 90 days or the request is deemed permitted (Section 42(4), *Ontario Heritage Act*). Section 42 of the *Ontario Heritage Act* requires that a property owner not alter, or permit the alteration of, the property without obtaining Heritage Alteration Permit approval.
3. As part of the Heritage Alteration Permit application, this Conservation Plan will be reviewed by LACH. The review of this report with LACH will provide input in the Planning and Environment Committee (PEC).
4. The recommendations made by LACH on the Heritage Alteration Permit application will be presented at the PEC monthly meeting.
5. City Council considers LACH recommendation and makes a decision on approval of the Heritage Alteration Permit.

9.2 Monitoring

As recommended in **Table 1**, above, the relocation of the beaver fence requires monitoring at all stages of its relocation process including:

- All trials recommended in **Table 1** shall be reviewed and approved by the Contract Administrator.
- The conservation intervention methods of the beaver fence may be periodically reviewed by a qualified heritage professional and/or the City of London Heritage Planner, Kyle Gonyou. Any issues encountered during the relocation process should be discussed with the Contract Administrator. Consultation with a qualified heritage professional and the City of London Heritage Planner, Kyle Gonyou, may be required.
- At completion of the restoration and relocation of the beaver fence, the condition of the relocated portion of the beaver fence, after it has had time to settle, should be inspected by a qualified heritage professional and/or a City of London Heritage Planner to ensure that the conservation interventions recommended in this Conservation Plan were applied and there are no cracks or concrete failure etc.
- Prior to the expiry warranty period, an inspection should be completed by the Contract Administrator and the Diocese of Huron/St. Paul's Cathedral to review condition and implement repairs to defective work.

The Diocese of Huron/St. Paul's Cathedral will monitor and maintain the beaver fence long-term after the completion of this Project.

10. Sources

Primary and Secondary Sources:

Armstrong, F. H. (1986). *The Forest City: An Illustrated History of London, Canada.* Windsor. Windsor Publications, Ltd.

City of London. *Register of Cultural Heritage Resources.* 2019.

City of London. Heritage Designation By-Law L.S.P.-3373-297. October 25, 2005.

City of London. London Plan, 2016. Accessed online at: https://www.london.ca/business/Planning-Development/Official-Plan/Pages/The-London-Plan.aspx.

Ivey Family London Room, London Public Library, London, Ontario, Canada

Government of Canada: https://www.canada.ca/en/canadian-heritage/services/official-symbols-canada.html#a1

Library and Archives Canada (LAC). [Minister of Public] Works – [Recommending] purchase from Dean Hellmuth of site for Customs house, London, 1869. Accessed online at: https://www.bac-lac.gc.ca/eng/CollectionSearch/Pages/record.aspx?app=ordincou&IdNumber=8709&new=-8585693764842529266

Library and Archives Canada (LAC). Custom House, London, Ontario- Min. P.W. [Minister of Public Works] 1884/05/03, recd's [recommends] purchase for $5,000 form St. Paul's Church, land needed in connection with enlargement of, 1884. Accessed online at: https://www.bac-lac.gc.ca/eng/CollectionSearch/Pages/record.aspx?app=ordincou&IdNumber=27822&new=-8585692621142363039

London Free Press (1971, Aug. 21). Another Landmark Disappearing. Pg. 21.

London Free Press (1966, Nov. 17). Historic Cathedral Fence Getting Repainting Job. Pg. 49.

LTHBC: London Township History Book Committee (2001). *A Rich Heritage 1796-1997 Volume I. Families Past and Present Volume II.* The Aylmer Express, Aylmer.

Kalman, H. and M.R. Létourneau. *Heritage Planning Principles and Process*. Second Edition, 2021. Routledge, New York.

Miller, O. (1966). *Gargoyles and Gentlement – A History of St. Paul's Cathedral London, Ontario 1834 – 1964.* Ryerson Press.

Stantec. Downtown London Heritage Conservation District Plan. 2012. Accessed online at: https://www.london.ca/About-London/heritage/Documents/Hertige-Conserv-Dist-Studies/Downtown/Final-HCD-Document-March-2012-Revised-June-2013.pdf

Whebell, C.F.J. (1992). The London Stratagem: From Concept to Consummation, 1791-1855. In *Simcoe's Choice: Celebrating London's Bicentennial*. Guy St. Denis (ed.): Pp. 31-67. Toronto: Dundurn Press Limited.

Provincial Standards and Resources:

Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI). Eight Guiding Principles in the Conservation of Built Heritage Properties, 2010. Available online at: https://www.heritagetrust.on.ca/en/pages/tools/tools-for-conservation/eight-guiding-principles

Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI). *Ontario Heritage Tool Kit*, 2006. Accessed online at: http://www.mtc.gov.on.ca/en/heritage/heritage_toolkit.shtml

Parks Canada, *Standards and Guidelines for the Conservation of Historic Places in Canada*. Second Edition", 2010. Accessed online at: http://www.historicplaces.ca/en/pages/standards-normes

Ontario Heritage Act, 1990 (Amended 2009). Accessed online at: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o18_e.htm

Ontario Heritage Trust (2006). Designation of 472 Richmond Street. Accessed online at: https://www.heritagetrust.on.ca.

Provincial Policy Statement (2020). Accessed online at: https://files.ontario.ca/mmah-provincial-policy-statement-2020-accessible-final-en-2020-02-14.pdf

11. Select Photographs

Photograph 1:
View of beaver fence along Richmond Street in the winter illustrating the length of the fence, looking south (AECOM, February 2021)

Photograph 2:
View of the beaver fence along Richmond Street in the summer illustrating the length of the fence, looking south (AECOM, May 2021)

Photograph 3:
View of the Cathedral grounds in early spring, looking north (AECOM, April 2021)

Photograph 4:
Manicured lawn within the Cathedral grounds, looking south towards Queens Avenue (AECOM, May 2021)

Photograph 5:
Northern boundary of the property, showing the foundation of the former fence (AECOM, July 2021)

Photograph 6:
Cathedral grounds, looking southwest towards the beaver fence (AECOM, May 2021)

Photograph 7:
Hedge marking the northern boundary of the property (AECOM, July 2021)

Photograph 8:
Stone foundation of the north side of the northern entrance to the property (AECOM, July 2021)

Photograph 9:
Stone column of the north entrance path (AECOM, July 2021)

Photograph 10:
View towards Richmond Street of the stone column of the north entrance path (AECOM, July 2021)

Photograph 11:
Details of the cast-iron fence (AECOM, July 2021)

Photograph 12:
Sandstone cap stones and concrete foundation of the fence on Richmond Street, south side of the main entrance path (AECOM, July 2021)

Photograph 13: View of the beaver fence on Richmond Street, looking north (AECOM, May 2021)

Photograph 14:The most western end posts on Queens Avenue proposed for relocation (AECOM, May 2021)

Photograph 15: End post proposed for relocation on Queens Avenue, showing signs of weathering and localized weathering on corners (AECOM, November 2021)

Photograph 16: View of the separate top cap of the end post with mortar layer with the end post (AECOM, November 2021)

Photograph 17: End post placed on a mortar layer with a concrete foundation (AECOM, November 2021)

Photograph 18: Original arrangement with where horizontal rails mortared into end posts (AECOM, November 2021)

Photograph 19: Modified horizonal rails which place reinforcing steel bars into holes with mortar and welding of reinforcing steel bars to horizontal rails (AECOM, November 2021)

Photograph 20: Former holes in the end posts (for horizontal rail attachment) that were patched up, potentially indicating the end post was turned for repairs (AECOM, November 2021)

Photograph 21: End post with localized repairs (AECOM, November 2021)

Photograph 22: Example of a cap stone in poor condition (AECOM, November 2021)

Photograph 23: Capstone cracking and spalling (AECOM, November 2021)

Photograph 24: View of mortar joint between cap stone and concrete foundation and mortar joint at each vertical rail post location (AECOM, November 2021)

Photograph 25: Example of mortar joint missing and the cap stone cut and notched at each joint to accommodate the post attachment (AECOM, November 2021)

Photograph 26: Missing section of the beaver fence on Richmond Street (AECOM, May 2021)

Photograph 27: Caulking below the base of the post to increase contact and seal area below (AECOM, November 2021)

Photograph 28: Details of a corner of the beaver fence (AECOM, May 2021)

Photograph 29: Pin tie of a vertical rail post (AECOM, May 2021)

Photograph 30: Damaged section of the beaver fence on Richmond Street (AECOM, May 2021)

Photograph 31: The mid horizontal rail inserted into the ends of the beaver medallion and into the receiving ends of the vertical posts. The tube is welded at each location (AECOM, November 2021)

Photograph 32: The flat horizontal bar was placed over the vertical rail post and welded (AECOM, November 2021)

Photograph 33: Beaver medallion welded to top horizontal rail (AECOM, November 2021)

Photograph 34: Welding with cracks, illustrating piece by piece on-site construction of fence (AECOM, November 2021)

Photograph 35: View of the beaver fence on Queens Avenue with buried foundation (AECOM, May 2021)

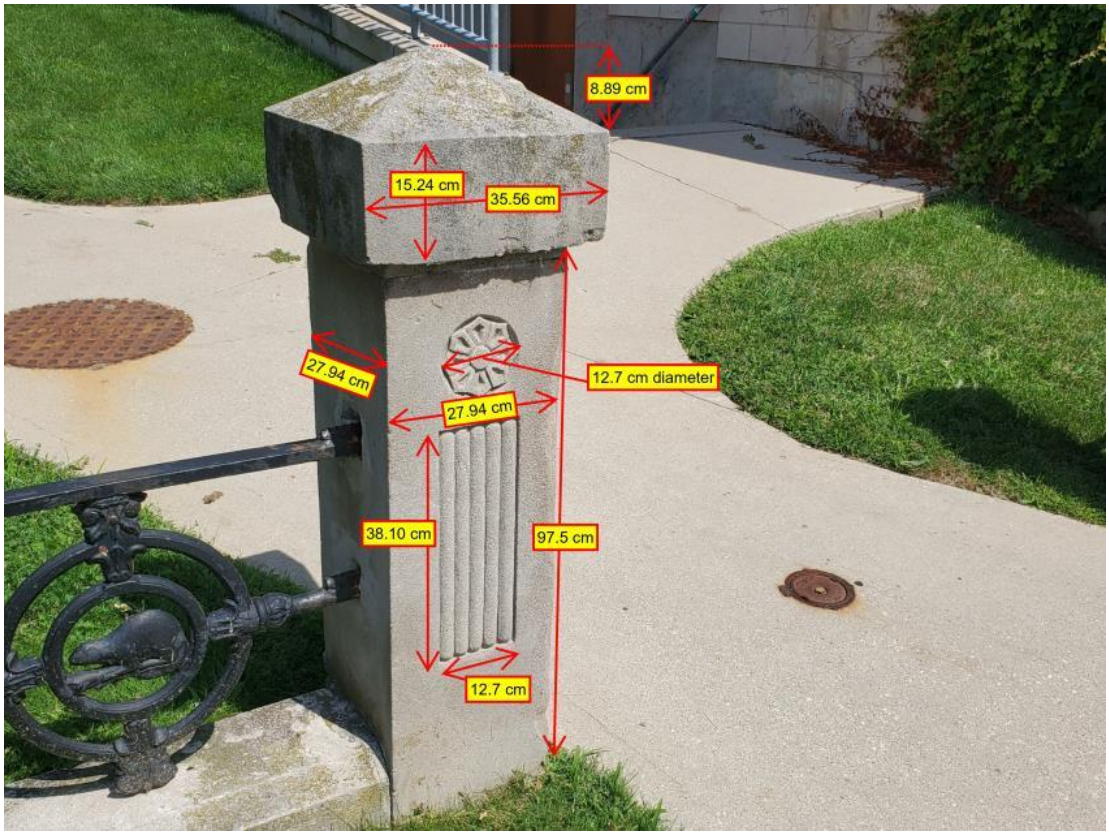
Photograph 36: View of the Cathedral sign and garden from Queens Avenue, looking north (AECOM, May 2021)

Photograph 37: Example of a vertical rail post with finial with a rounded point (AECOM, July 2021)

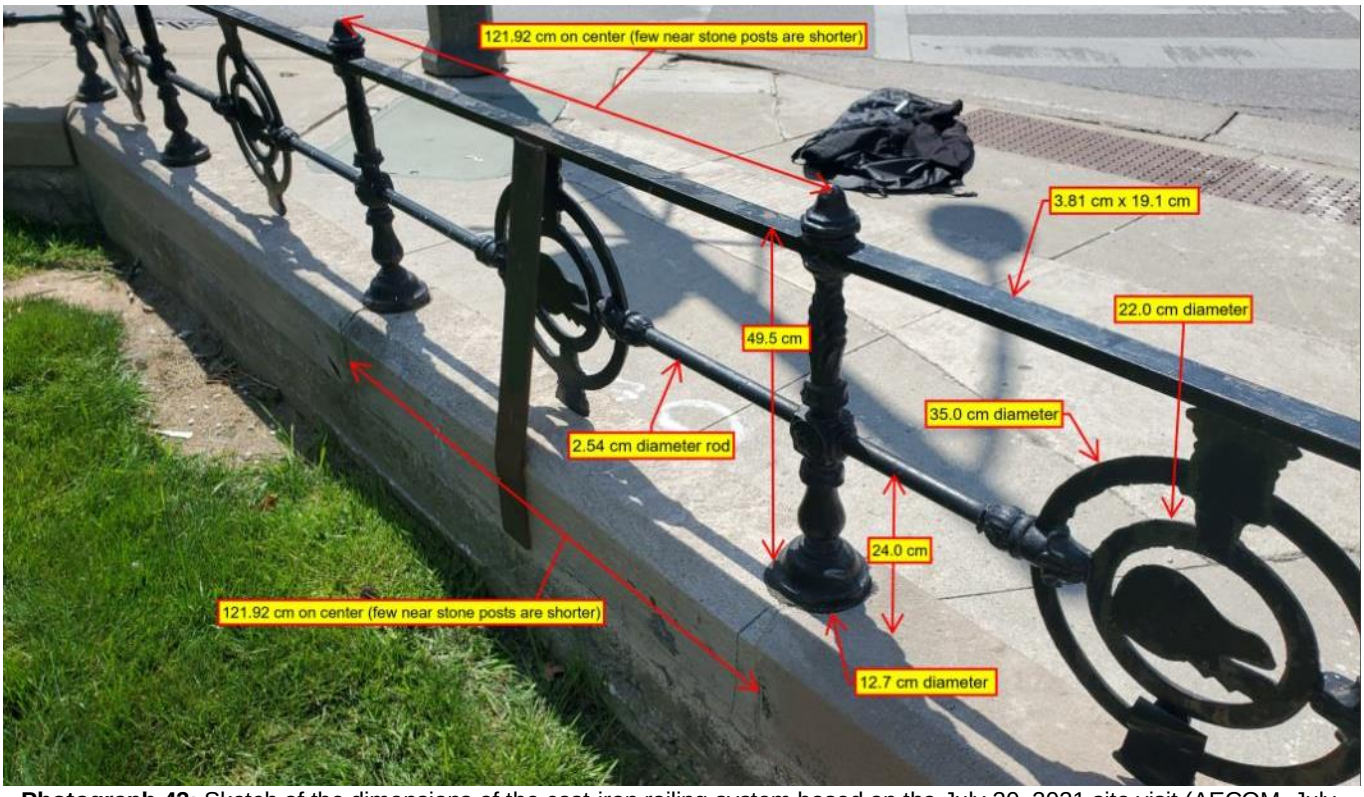
Photograph 38: Floral motif of the vertical rail post (AECOM, July 2021)

Photograph 39: Section of fence on Richmond Street with a modified top horizontal bar (AECOM, May 2021)

Photograph 40: Example of the back-support brace (AECOM, February 2021)



Photograph 41: Measurements of the end posts documented on July 20, 2021 (AECOM, July 2021)



Photograph 42: Sketch of the dimensions of the cast-iron railing system based on the July 20, 2021 site visit (AECOM, July 2021)

12. Qualifications

This Conservation Plan has been prepared by an accredited, qualified, multidiscipline team of professionals with demonstrated experience in the field of heritage conservation.

Tara Jenkins, M.A., CAHP

Tara Jenkins holds a Master's Degree in Anthropology and a Graduate Professional Certificate in Cultural Heritage Studies- Heritage Planning Option. As part of the Graduate Professional Certificate program, Tara completed a Conservation Plan course which included the completion of a Conservation Plan for the Fugitive Slave Chapel, located at 432 Grey Street, in the City of London. Tara has over 20 years of experience working in cultural resource management (CRM) and is a member of the Canadian Association of Heritage Professionals (CAHP). She has gained practical experience as a Cultural Heritage Specialist and has been the acting Project Manager for various projects including Cultural Heritage Evaluation Reports, Heritage Impact Assessments, and Cultural Heritage Resource Assessments. In her role as a Project Manager, Tara provides specialized advice and expertise to clients and stakeholders on heritage matters. She is also a voting member on London's Advisory Committee on Heritage. Project work includes the application of legislation, policy framework, and tools such as the *Ontario Heritage Act*, Provincial Policy Statement, the *Ontario Heritage Tool Kit*, Parks Canada's *Standards and Guidelines for the Conservation of Historic Places in Canada*, and other policies and processes outlined by the Ontario Ministry of Heritage, Sport, Tourism, and Culture Industries. Recently, Tara has completed applications for heritage alteration permits for municipalities and the Ontario Heritage Trust, as well as prepared Minister's Consent packages for properties of provincial significance.

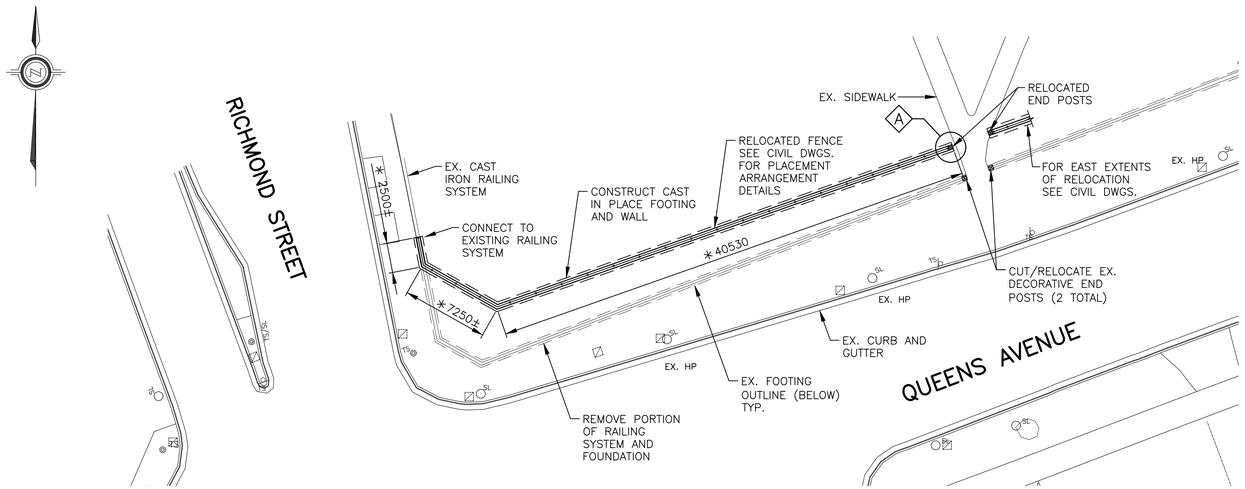
John Pucchio, P. Eng.

John Pucchio is a Senior Structural Engineer at AECOM and member of the National Trust for Canada, with a broad range of civil engineering design experience with bridges, heavy civil, dams, building structures, marine facilities and water-retaining structures, including inspection / rehabilitation of heritage / historically significant structures such as Memorial Gardens historic wall in the City of Guelph and the historic Meadowlily Footbridge in the City of London.

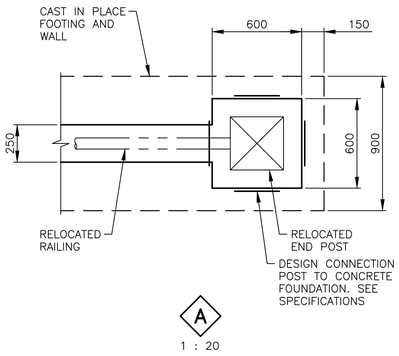
Liam Ryan, B.A.

Liam Ryan holds a Bachelor of Arts Degree in Anthropology from the University of Waterloo and is currently pursuing a Master's in Environmental Studies: Planning at York University. He has two years of experience in cultural resource management (CRM) as a Field Archaeologist for Archaeological and Cultural Heritage Services (ASI). He is now working at AECOM as a Junior Cultural Heritage Specialist. In his role as a Cultural Heritage Specialist, Liam has completed Cultural Heritage Assessment Reports, Cultural Heritage Evaluation Reports and contributed to Heritage Impact Assessments.

Appendix A: Construction Level Drawings



P L A N *(* FOR REFERENCE ONLY SEE CIVIL DRAWINGS FOR DETAILS)*
N. T. S. *(FIELD VERIFY ALL DIMENSIONS)*



GENERAL NOTES :

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH CIVIL DRAWINGS.
2. THE CONTRACTOR SHALL FIELD VERIFY EXISTING UTILITIES AND SERVICES, PRIOR TO CONSTRUCTION.

MATERIAL NOTES :

1. CLASS OF CONCRETE : CSA–A23.1 EXPOSURE CLASS, C1, 32 MPa.
2. REINFORCING STEEL : CSA –G30.18, GRADE 400W. CLEAR COVER 60mm ± 20mm.

CONSTRUCTION NOTES :

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF THE WORK. ANY DISCREPANICES SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR AS WELL AS THE PROPOSED ADJUSTMENT REQUIRED TO MATCH CONDITIONS FOR REVIEW.
2. PROVIDE ADEQUATE MEANS OF DEWATERING TO ENSURE EXCAVATIONS ARE DRY AT ALL TIMES. PLACEMENT OF CONCRETE SHALL ONLY BE MADE IN DRY EXCAVATIONS.
3. REMOVE TOPSOIL, ORGANIC AND OTHER POOR MATERIAL FROM THE PROJECT AREA. BACKFILL WALL WITH SELECT SUITABLE NATIVE MATERIAL AND GRANULAR B.

SEQUENCE OF WORK :

1. REVIEW SITE CONDITIONS. MEASURE ALL DIMENSIONS AND SURVEY ELEVATIONS.
2. CAREFULLY REMOVE AND DISMANTLE EXISTING FENCE, PILLARS AND CAP STONES IN SECTIONS. SAWCUT HORIZONTAL AND VERTICAL MORTARED JOINTS OF THE CAP STONE TO FACILITATE REMOVALS. STRATEGICALLY CUT HORIZONTAL RAILS IN LOCATIONS FOR LATER REINSTATEMENT BUT MINIMIZE TOTAL NUMBER OF CUTS.
3. BACKFILL EXISTING LOCATIONS WITH GRANULAR B AND ACCORDING TO ROADWAY DRAWINGS.
4. MOVE RAILING SYSTEM AND REHABILITATE ALL CONNECTIONS AND JOINTS TO ENSURE COMPETANCY OF FENCING SYSTEM. RECOAT RAILING SYSTEM.
5. REVIEW COMPETENCY AND CONDITIONS OF CAP STONES AND REPLACE DAMAGED STONES WITH SIMILAR PIECES OF SIMILAR STONE, WHERE REQUIRED.
6. MEASURE REHABILITATED RAILING / CAP STONES. MARK/STAKE ON SITE THE PRELIMINARY LAYOUT ARRANGEMENT IN THE NEW RAILING LOCATION. REVIEW ARRANGEMENT WITH CONTRACT ADMINISTRATOR. MODIFY ARRANGEMENT AS REQUIRED TO SUIT CONDITIONS.
7. CONSTRUCT REINFORCED CONCRETE FOUNDATION FOOTING AND WALLS. EXCAVATE AND BACKFILL TO SUIT.
8. INSTALL AND CONNECT CAP STONE TO FOUNDATION WALLS.
9. INSTALL AND CONNECT RAILING SYSTEM TO CAP STONE.
10. RESTORE AREA AND INSTALL TOPSOIL AND SOD.

EXISTING END POST

EXISTING RAILING ELEVATION

EXISTING RAILING POST

EXISTING BEAVER MEDALLION

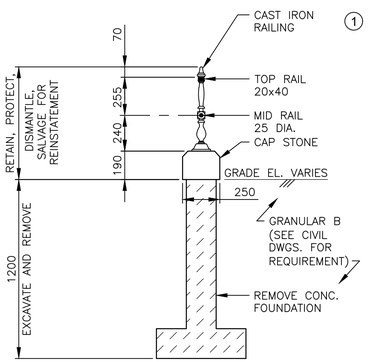
SCOPE OF HERITAGE RESTORATION WORK :

(1) CAST IRON BEAVER RAILING SYSTEM :

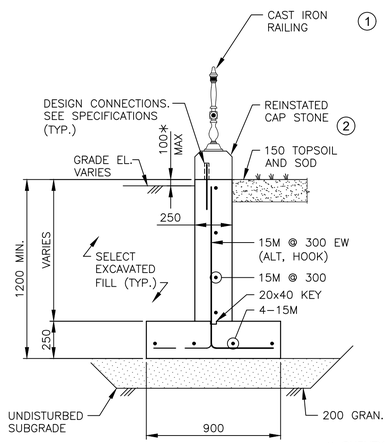
- REMOVE, REHABILITATE AND REINSTATE.
- SHOP REVIEW CONDITION OF COMPONENTS. REHABILITATE ALL CONNECTIONS AND UTILIZE EXTRA AVAILABLE COMPONENTS AS REQUIRED. FABRICATE EXTRA COMPONENTS AS REQUIRED TO REPLACE DETERIORATED COMPONENTS.
- REMOVE EXISTING COATING FINISH AND SHOP RECOAT WITH BLACK FINISH. (MINIMUM PRIMER AND FLAT TOP COAT).
- COORDINATE LAYOUT OF REINSTATED FENCE WITH SITE CONDITIONS AND CAP STONE. MATCH CORNERS IN WALL ALIGNMENT TO MATCH TYPICAL RAILING POST SPACING. PLUMB AND REINSTATE FENCE SECURELY INTO GROUT BASE.

(2) NATURAL CAP STONE :

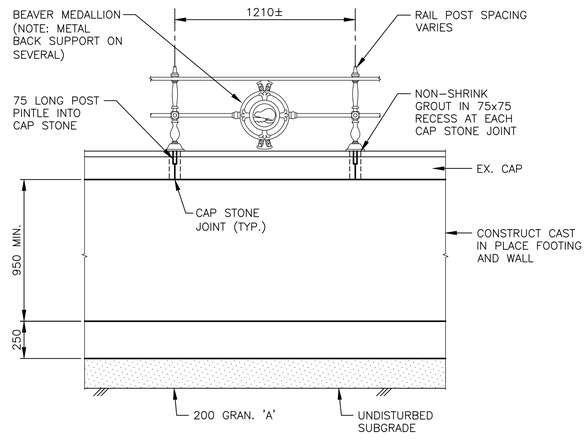
- REMOVE, REHABILITATE AND REINSTATE.
- CAREFULLY CUT CAP STONE AT MORTARED JOINTS TO FACILITATE REMOVAL. REMOVE, GRIND AND CLEAN OLD MORTAR FROM CAP STONE AS POSSIBLE.
- CATALOGUE EXISTING CAP STONES INCLUDING EXISTING PIECES NOT SUITABLE FOR REUSE. CUT/MODIFIY CAP STONES TO SUIT. FABRICATE NEW CAP STONE PIECES TO SUIT RECONSTRUCTED LAYOUT.
- REVIEW CONDITION OF COMPONENTS. REHABILITATE ALL CONNECTIONS AND UTILIZE EXTRA AVAILABLE COMPONENTS AS REQUIRED. FABRICATE EXTRA COMPONENTS AS REQUIRED TO REPLACE DETERIORATED COMPONENTS.
- REVIEW, DESIGN AND IMPLEMENT ATTACHMENT REQUIREMENTS OF THE CAP STONE TO THE CONCRETE FOUNDATION. UTILIZE A LIME MODIFIED MORTAR FOR ALL JOINTS. INSTALL NON–SHRINK GROUT FOR ALL RAILING POST ATTACHMENTS.
- COORDINATE LAYOUT OF REINSTATED CAP STONE WITH SITE CONDITIONS AND RAILING SYSTEM.



EXISTING AND REMOVALS SECTION



REHABILITATED SECTION

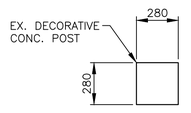


REHABILITATED ELEVATION

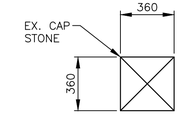
* SURVEY EXISTING AND NEW GRADES. VERTICALLY ALIGN TOP OF WALL TO SUIT. CONSTRUCT THE TOP OF WALL IN A STRAIGHT LINE BETWEEN CORNERS AND MINIMIZE SIGNIFICANT ELEVATION CHANGES. REVIEW WITH CONTRACT ADMINISTRATOR.

CAST IRON RAILING DETAILS

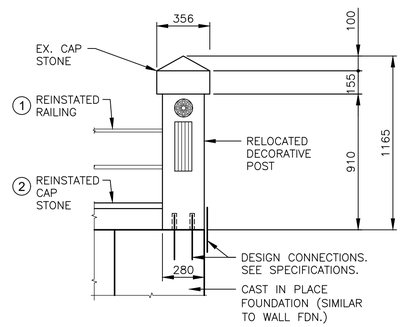
1 : 20



POST PLAN



CAP STONE PLAN



ELEVATION

END POST DETAILS – REHABILITATED

1 : 20

EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION

DETAILS		No.	REVISIONS	DATE	CONSULTANT
DESIGN	J.P.	A	ISSUED FOR	09–XX–2021	AECOM/DILLON
DRAWN	BY				
CHECKED					
APPROVED					
DATE	SEPT. 2021				

CONSULTANT OR DIVISION

AECOM
London, Ontario
519.673.0510

DILLON CONSULTING

ENGINEER'S STAMP

LICENSED PROFESSIONAL ENGINEER
J. PUCCHIO
22/09/2021
PROVINCE OF ONTARIO

London CANADA

CORPORATION OF THE CITY OF LONDON

SCALE
AS NOTED

DOWNTOWN LOOP AND MUNICIPAL INFRASTRUCTURE IMPROVEMENTS - PHASE 1

STRUCTURAL

QUEENS AVENUE RAILING (QUEENS AND RICHMOND ST. INTERSECTION) GENERAL ARRANGEMENT

PROJECT No.

SHEET No.
S100

PLAN FILE No.

DATE: 9/22/2021 11:06:21 AM DRAWING FILE: L:\DOCS\Projects\60641336 CoL RT Wellington Gateway\900_CAD_GIS\910_CAD\20–SHEETS\S\60641336–SHT–30–S100

Appendix B: Special Provisions

Suggested Tender Items

1.1	Beaver Fence	
	a) Removals	LS
	b) Refinish / Reinstall Fence	LS
	c) Modify / Reinstall Cap Stone	LS
	d) Concrete Foundations	LS

ITEM x.xx BEAVER FENCE

a) Removals
b) Refinish / Reinstall Fence
c) Modify / Reinstall Cap Stone
d) Concrete Foundations

SCOPE

This specification covers the removals, refinishing, and reinstatement of the Beaver Fence around the private property at 472 Richmond Street, including general design requirements and new concrete foundations.

The work shall be undertaken by skilled workers in the field of metal fence fabrication, masonry and concrete, with more than 10 years experience in their fields.

REFERENCES

This specification refers to the following standards, specifications or publications:

Ontario Provincial Standard Specifications, Construction:

OPSS 510	Removals
OPSS 902	Excavating and Backfilling for Structures
OPSS 904	Concrete Structures
OPSS 905	Reinforcement for Concrete

SUBMISSIONS AND DESIGN REQUIREMENTS

Identify the names and experience of staff proposed for the work, as well as the location of the shop undertaking the metal work.

Three (3) weeks prior to the commencement of work for each segment of the work, the Contractor shall provide the following submissions.

1. Removals Plan:
   - Outline the methodology, equipment, cutting details, protection of components, transportation, extents of removal and equipment.
2. Refinishing/Refurbishment Plan:
   - Fencing: Outline methodologies for all work, connection details, welding details, shop details, coating systems and staff experience (who are undertaking the work).
   - Cap Stone and end posts: Outline methodologies for all work, new materials (including samples), connections, shop and staff undertaking the work.
3. Concrete Placement Plan:
   - Reinforcing steel shop drawings, formwork details, concrete mix design.

The Contractor is responsible for the connections and methodology of working with the cast iron fence work. Utilized staff who are experienced working with cast iron.

Design Intent: Although the railing system will not perform the function as a “guard” as defined in the OBC, the railing system should provide a suitable lateral strength to prevent injury to the public. The intention of the refurbished design and reinstated posts is to provide a similar lateral point load capacity (as possible) to the OBC, or 1 kN (225 lbs).

With assistance provided by the Contract Administrator, the Contractor shall obtain approval from the property owner to enter the property.

MATERIALS

Reuse existing fence materials. Addition pieces of the fence will be provided to the contractor for use in the refurbishment. New components may be fabricated to suit deteriorated / missing pieces and shall be cast iron to match the existing fencing.

Concrete shall have a compressive strength of 32 MPa according to OPSS 1350 (exposure class C-1). Reinforcing steel for concrete shall be Grade 400W according to OPSS 905.

As applicable, dowels into the stone cap units shall be chemical adhesive type (according to the MTO designated sources list) and stainless steel dowels.

Non-shrink grout shall be non-gassing.

Mortar used bedding and pointing for stonework shall conform to CSA A179, consisting of Type SA Hydrated Lime.

Grout for post to cap connections shall be non-shrink, cementitious grout, non-metallic, with no chlorides (SikaGrout-212 or equal).

CONSTRUCTION

Adequate access shall be provided to the work area for general construction, inspection of work (by the Contract Administrator), and in the performance of the Contractor’s work.

Provide to removals, review site conditions, measure all dimensions and survey elevations of the cap stone. Modify proposed methodologies to suit the conditions.

Carefully remove and dismantle existing fence, pillars and cap stones in sections. Sawcut horizontal and vertical mortared joints of the cap stone to facilitate removals. Strategically cut horizontal rails in locations for later reinstatement but minimize total number of cuts. Catalogue all components of the fencing and cap stone. Clean old mortar from the caps by grinding or other means which will not damage the stone.

Excavate according to OPSS 902 and remove the existing concrete wall according to OPSS 510.

Mark and stake on site the proposed layout arrangement of the new railing location. Modify arrangement as required to suit conditions. Schedule a meeting with the Contract Administrator and property owner to review and signoff on the arrangement. Elevations shall be based on a survey of existing grades and suit straight vertical alignment between end sections.

Undertake rehabilitation of the railing system (in a shop setting) including all connections and joints to ensure overall competency of the fencing system. Remove the existing coating system by abrasive blast cleaning or mechanical means. Modify (by utilizing extra railing, extra owner supplied pieces and new fabrications), the existing railing to ensure that each section contains the beaver emblem and provides a

consistent / similar aesthetic appearance. Recoat railing system with a durable prime and top cop suitable for the material and surface.

Review competency of cap stones and replace damaged stones with similar stone pieces where required. Modify existing cap stone as required to suit the new arrangement and post locations. Cut new cap stone pieces to the same geometry as the existing piece.

Construct reinforced concrete foundation walls according to OPSS 904 and 905. Dowel ends of wall into existing walls with 15M@300 dowels placed vertically in the centre of the wall. Cure concrete wall. Backfill wall according to OPSS 902.

Install and connect cap stone to foundation walls according to the proposed and accepted Refinishing/Refurbishment Plan. Install and connect railing system to cap stone with pintles placed at the cap stone joints. according to the proposed and accepted Refinishing/Refurbishment Plan. Install all components plumb.

MEASUREMENT FOR PAYMENT

There will be no measurement for these lump sum tender items.

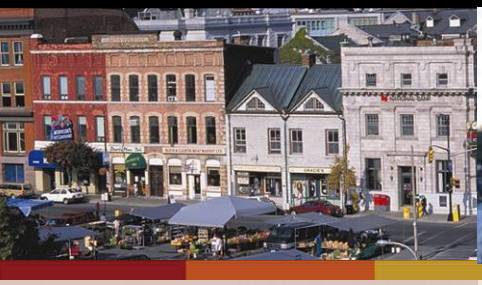
Payment shall be in accordance with the following schedule, subject to any applicable holdbacks: Payment shall be according to the percentage complete at any progress draw.

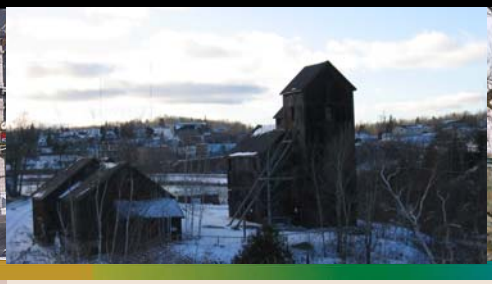
BASIS OF PAYMENT

Payment at the contract price for the above item shall be full compensation for all labour, equipment and material to do the work, including all design and quality control activities.

Appendix C: Eight Guiding Principles in the Conservation of Built Heritage Properties

Ontario





Eight Guiding Principles in the Conservation of Built Heritage Properties

The following guiding principles are ministry statements in the conservation of built heritage properties and are based on international charters which have been established over the century. These principles provide the basis for all decisions concerning good practice in heritage conservation around the world. Principles explain the "why" of every conservation activity and apply to all heritage properties and their surroundings.

1. RESPECT FOR DOCUMENTARY EVIDENCE:
Do not base restoration on conjecture.
Conservation work should be based on historic documentation such as historic photographs, drawings and physical evidence.

2. RESPECT FOR THE ORIGINAL LOCATION:
Do not move buildings unless there is no other means to save them.
Site is an integral component of a building or structure. Change in site diminishes cultural heritage value considerably.

3. RESPECT FOR HISTORIC MATERIAL:
Repair/conserve - rather than replace building materials and finishes, except where absolutely necessary.
Minimal intervention maintains the heritage content of the built resource.

4. RESPECT FOR ORIGINAL FABRIC:
Repair with like materials.
Repair to return the resource to its prior condition, without altering its integrity.

5. RESPECT FOR THE BUILDING'S HISTORY:
Do not restore to one period at the expense of another period.
Do not destroy later additions to a building or structure solely to restore to a single time period.

6. REVERSIBILITY:
Alterations should be able to be returned to original conditions. This conserves earlier building design and technique.
e.g. When a new door opening is put into a stone wall, the original stones are numbered, removed and stored, allowing for future restoration.

7. LEGIBILITY:
New work should be distinguishable from old.
Buildings or structures should be recognized as products of their own time, and new additions should not blur the distinction between old and new.

8. MAINTENANCE:
With continuous care, future restoration will not be necessary.
With regular upkeep, major conservation projects and their high costs can be avoided.

For more information, please call the Ministry of Culture at (416) 212-0644 or Toll Free at 1-866-454-0049 or refer to the website at www.culture.gov.on.ca.

Spring 2007

Disponible en français

Liam Ryan, BA
Cultural Heritage Specialist, Junior
Liam.Ryan@aecom.com

Tara Jenkins, MA, GPCertCHS, CAHP
Cultural Heritage Specialist, Lead
D +1-226-377-2838
tara.jenkins@aecom.com

AECOM Canada Ltd.
410 – 250 York Street, Citi Plaza
London, ON N6A 6K2
Canada

T: 519.673.0510
F: 519.673.5975
www.aecom.com