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**Title :** **Archaeological Risk Management Plan**

**Client :** **City of Ottawa**

**Project :** **Trillium Line Extension Project**

*Revised by :* Andrew Potts

Environmental Coordinator




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*Reviewed by :* Cory van Hoof, P. Geo.

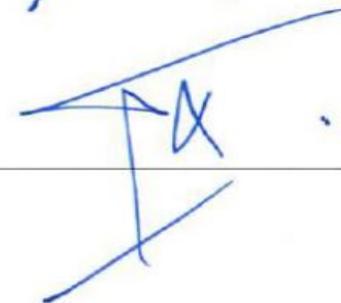
Environmental Manager




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*Approved by :* Constantinos Demetriades

Project Director




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Revision				Notes
Rev.	By	Appr.	Date	
00	CvH	IS	April 9, 2019	Issued for City submission
01	CvH	CD	June 01, 2019	Address City's comments
02	AP	CD	September 13, 2019	Address City's comments
03	AP	CD	September 13, 2019	Attached appendices

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## 1.0 Preface

This document presents the Archaeological Risk Management Plan (ARMP) that has been developed specifically for the Trillium Line Extension Project. The document describes the environmental requirements, standards and procedures that shall be followed by SNC-Lavalin personnel, and its Sub-contractors to minimize, reduce or eliminate potential environmental impacts from construction (including early works) phase of project development.

Any requirements associated with the maintenance phase shall be developed and added at a later date.

## LIST OF ACRONYMS

- **ARMP:** Archaeological Risk Management Plan
- **CA:** Consulting Archaeologist
- **CHVI:** Cultural Heritage Value or Interest
- **EC:** Environmental Coordinator
- **EEAP:** Environmental Education and Awareness Plan
- **EI:** Environmental Inspector
- **EM:** Environmental Manager
- **EMP:** Environmental Management Plan
- **EMS:** Environmental Management System
- **HSE:** Health & Safety and Environment
- **IMS:** Information Management System
- **MCTS:** Ministry of Tourism Culture and Sport
- **NCC:** National Capital Commission
- **PA:** Project Agreement
- **RSC:** Regional Supervising Coroner

## DEFINITIONS

**Archaeological assessment:** The evaluation of:

- the archaeological potential of a property (MCTS Stage 1 background study, Stage 2 property assessment), or
- the cultural heritage value or interest of an archaeological site (MCTS Stage 3).

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**Archaeological mitigation:** The implementation of strategies to mitigate impacts to an archaeological site. Mitigation strategies (MCTS Stage 4) include protection and avoidance, archaeological excavation, or a combination of the two.

**Archaeological resource:** An object, material, or physical feature that may have cultural heritage value or interest. The term may also refer to artifacts and archaeological sites. While all archaeological resources contribute to our understanding of Ontario's past, only a licensed archaeologist is qualified to analyze a specific resource to determine whether or not it meets the definition of an archaeological site under the Ontario Heritage Act and therefore warrants protection under the Act.

**Archaeological site:** Any property that contains an artifact or any other physical evidence of past human use or activity that is of cultural heritage value or interest.

**Artifact:** Any object, material or substance that is made, modified, used, deposited, or affected by human action and is of cultural heritage value or interest.

**Concurrence and/or Compliance Letter:** Letter issued by the Ministry of Tourism, Culture and Sport when an archaeological report has been accepted into the register of archaeological reports (i.e., the report and the recommendations meet the Ministry's Standards and Guidelines and any archaeological sites found were properly conserved).

**Construction monitoring:** Observing the excavation of fill at a construction site to see if archaeological resources are exposed. Monitoring is continued to either the maximum development impact depth, a level of cultural significance, or to a buried natural horizon/bedrock.

**Licensed archaeologist:** a person holding a valid Professional Consulting License under the Ontario Heritage Act.

## 2.0 Introduction

The Archaeological Risk Management Plan (ARMP) is a key component of the overall Environmental Management Plan (EMP) which allows for the integration of engineering design and the environmental mitigation through implementation of environmental protection measures. By documentation of environmental protection measures for managing archaeological discoveries in a plan, performance can readily be measured, and the need for corrective measures can be determined.

### 2.1 PURPOSE

This plan has been developed to address construction issues related to archaeological resources and provide a protocol to be followed during works of known archaeological interest and should previously undocumented archaeological resources be encountered during implementation of the Project.

This ARMP addresses, among other topics the identification of areas prone to archaeological discoveries and general and site specific measures that will be applied to manage discoveries. This ARMP also includes a description of the archaeological works required identified in the Environmental Reference Documents.

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The practices and strategies laid out in this document are intended to provide guidance to Project staff and subcontractors during construction where there is a potential to encounter previously undocumented archaeological resources.

## 2.2 REVIEW AND UPDATE

As with all environmental management plans, the ARMP will evolve as the Project progresses through the various stages of design and construction to confirm information is relevant to current site activities and operations. It will be reviewed through each stage and will be updated on an as-required basis, and in keeping with the requirements outlined in Schedule 17 of the Project Agreement and managed in accordance with project document control procedures. Revisions will be tracked in the Revision Index and revised versions of this ARMP will be circulated to the relevant parties via upload to the project's document control site (as per the Project's Document Control Procedure).

## 2.3 LEGAL REQUIREMENTS / STANDARDS / GUIDELINES

### 2.3.1 Provincial, Municipal, Private Lands

- Planning Act R.S.O., 1990
- Provincial Policy Statement (2014)
- Environmental Assessment Act R.S.O., 1990
- Ontario Heritage Act, R.S.O., c 0.18
- Standards and Guidelines for Consultant Archaeologists (MTCS 2011)
- Funeral, Burial and Cremations Services Act, 2002
- Official Plan Consolidation for the City of Ottawa, 2002 (Publication 1-32)
- A Renewed Action Plan for Arts, Heritage and Culture in Ottawa 2013 -2018 (2012)

### 2.3.2 Federal Lands (NCC, Parks Canada)

- Parks Canada's Guidelines for the Management of Archaeological Resources (Parks Canada 2005)
- Reference Guide for Archaeological Work on Federal Lands and Lands Underwater
- Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition (2010)
- Guide for the Management of Archaeological Resources (NCC 2008)
- Canadian Environmental Assessment Act, 2012

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## 3.0 Plan Implementation

### 3.1 ROLES AND RESPONSIBILITIES

#### 3.1.1 Environmental Manager

The EM will have final signing authority for changes to this plan.

#### 3.1.2 Environmental Coordinator

The EC(s) shall be responsible for the ultimate implementation and compliance with this ARMP in their respective segments or areas.

#### 3.1.3 Environmental Inspector

The SNC-Lavalin Environmental Inspector is responsible for inspecting the work sites to confirm conformance with this plan and all other applicable rules and regulations. The EI will work with the ECs for each segment to resolve any identified issues or deficiencies with the work being performed by either SNC-Lavalin personnel or its subcontractors. The logging and subsequent close up of archaeological issues will be done via SNC-Lavalin's site inspection reports.

#### 3.1.4 Consulting Archaeologist (CA)

SNC-Lavalin shall have a consulting archaeologist available to support emergency requests relating to chance discoveries of archaeological resources and discoveries of human remains. Upon request, the consulting archaeologist will provide archaeological advice and/or personnel as required to confirm compliance with this plan and associated rules and regulations.

Upon request, the consulting archaeologist will provide monitoring services in areas of concern at the time of construction activity. The consulting archaeologist will also undertake the outstanding archaeological assessments, as identified in the Environmental Reference documents listed in Schedule 17 of the Project Agreement (PA).

### 3.2 MONITORING AND REPORTING

The sites will be monitored regularly by SNC-Lavalin's EI for compliance with the ARMP. This monitoring will be done as part of the monitoring plan outlined in the EMP. Monitoring will be completed in areas identified for archaeological monitoring (as per the Environmental Reference Documents), an archaeologist must be on site for all earthworks.

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### 3.3 REPORTING

An environmental inspection report will be produced and distributed to SNC-Lavalin personnel and any relevant subcontractors for their action. Deficiencies and the associated corrective actions will be logged and tracked in the deficiency tracking matrix.

SNC-Lavalin will report to the City on ARMP compliance via the monthly environmental report should archaeological material / risks be encountered, or work occur within areas of interest.

Furthermore, archaeological monitoring, assessments and investigations will be reported by SNC-Lavalin's qualified consulting archaeologist. Results and recommendations will be added to this plan.

### 3.4 AUDITING

Auditing of all environmental compliance will be done as per the IMS-EMS and in accordance with the requirements outlined in Schedule 17 of the Project Agreement.

### 3.5 TRAINING

As detailed in the EMP, archaeological risk management considerations are covered in the Environmental Education and Awareness Plan (EEAP) and in the mandatory orientation sessions that are provided to all personnel prior to starting work on the Project. This session is mandatory for all Project personnel and is delivered by a member of the SNC-Lavalin environmental management team.

## 4.0 Risk Management

The following sections are to provide SNC-Lavalin personnel and subcontractors with guidance regarding the discovery of archaeological resources and human remains, and the completion of required archaeological assessments along the alignment. It is not intended to be a comprehensive plan for professional archaeologists; reporting, methodological, professional standards, etc. are not addressed and the relevant documentation should be consulted to confirm compliance with applicable legislation.

Furthermore, it is based upon the archaeological assessment reports provided by the City of Ottawa (the City, listed in Table 1. The Ministry of Tourism Culture and Sport (MCTS) has reviewed and concurred with the previous reports and thus any errors, omissions, or oversights from those reports are not considered here-in.

Stage 1 Archaeological Assessment Ottawa Light Rail Transit (Stage 2) Trillium Line South Extension
Supplementary Documentation Stage 1 Archaeological Assessment Ottawa Light Rail Transit Project Trillium Line South Extension

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Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment Ottawa Light Rail Transit Project Trillium Line South Extension City of Ottawa, Ontario", Dated Aug 30, 2017, Filed with MTCS Toronto Office on Sep 11, 2017, MTCS Project Information Form Number P123-0303-2016, MTCS File Number 0003716
Stage 1 & 2 Archaeology Assessment Cunningham Section of the Trillium Line South Extension. OLRT Stage 2 Trillium Alignment, authored by CTP2
Stage 1 & 2 Archaeology Assessment Supplemental Documentation Cunningham Section of the Trillium Line South Extension. OLRT Stage 2 Trillium Alignment, authored by CTP2
Stage 1 & 2 Archaeological Assessment Bowesville Station Alternative Location and Limebank Extension Alignment of the Trillium Line South Extension, authored by CTP2
Stage 2 Archaeological Assessment Trillium Line South Extension, authored by CTP2
Stage 2 Archaeological Assessment Trillium Line South Extension Supplemental Documentation, authored by CTP2
Stage 3 Archaeological Assessment Cunningham Murray Trillium Line South Extension. OLRT Stage 2 Trillium Alignment, Authored by CTP2
Stage 3 Archaeological Assessment Supplemental Documentation Cunningham Murray Trillium Line South Extension. OLRT Stage 2 Trillium Alignment, Authored by CTP2
Stage 3 Archaeological Assessment Cunningham Station Trillium Line South Extension. OLRT Stage 2 Trillium Alignment, Authored by CTP2
Stage 3 Archaeological Assessment Supplemental Documentation Cunningham Station Trillium Line South Extension. OLRT Stage 2 Trillium Alignment, Authored by CTP2

**Table 1 : Archaeological Reference Documents**

## **4.1 PERMISSIONS/PERMITS**

Should archaeological assessments be required, proper permissions and permits shall be obtained prior to commencing fieldwork. Gaining permission or permits may require consultation with federal landholders including extended planning and therefore will be sought early in the planning process. Note that for provincial, municipal, and private lands a licensed archaeologist cannot provide assessments of archaeological potential without first obtaining the proper permissions.

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#### 4.1.1 Federal Lands:

**NCC:** NCC Land Access Permit not required as access has been granted through the License of Occupation issued under the MOU between the City and the NCC. Notification to the NCC will be coordinated through the City Representative.

#### 4.1.2 Provincial, Municipal, Private Land

**Project Information Form (PIF) Number Required:** PastPort online application.

## 5.0 Current Status

The following briefly describes the present state of archaeological assessments along the Trillium line Extension corridor and provides protocols to manage encounters with previously unknown or undisclosed archaeological materials and/or human remains during construction activity. This ARMP reflects the recommendations from the archaeological assessments and associated concurrences/compliance letters received from the MTCS.

Any modifications to the design plan used to define the areas of impact and/or study areas for each archaeological assessment that may have the potential to impact archaeological resources not previously identified may require further archaeological assessments and CA will be consulted.

### 5.1 ASSESSEMENTS

- A Stage 1 archaeological assessment for the Trillium Line Extension including the Airport Link has been completed. Ministry of Tourism, Culture and Sport acceptance has been received.
- A Stage 1 archaeological assessment for the Bowesville Station Alternative Location and Limebank extension alignment has been completed. Ministry of Tourism, Culture and Sport acceptance is being sought.
- A Stage 2 archaeological assessment for the Cunningham’s Station and Cunningham-Murray sites has been completed. Ministry of Tourism, Culture and Sport acceptance is being sought.
- A Stage 2 archaeological assessment for the Trillium Line South Extension, including the new Walkley Yard location has been completed. Ministry of Tourism, Culture and Sport acceptance is being sought.
- A Stage 2 archaeological assessment for the Ellwood Diamond Grade Separation Crossing is ongoing. Ministry of Tourism, culture and Sport acceptance will be sought once completed.
- A Stage 2 archaeological assessment for the Bowesville Station Alternative Location and Limebank extension alignment is ongoing. Ministry of Tourism, culture and Sport acceptance is being sought.
- A Stage 3 archaeological assessment for the Cunningham’s Station and Cunningham-Murray sites is ongoing. Ministry of Tourism, culture and Sport acceptance is being sought.

There are three archaeological assessments that are ongoing.

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The first is the Bowesville Station Alternative Location and Limebank extension. The Stage 1 Archaeological assessment titled “Bowesville Station Alternative Location and Limebank Extension Alignment of the Trillium Line South Extension completed by AECOM in December 2017 recommended the following:

- A Stage 2 test pit survey will be required for the sections marked in green in Section 6: Figures 5 to 8 before any development takes place. The test pit survey should follow Section 2.1.2 Test Pit Survey of the Standards and Guidelines for Consultant Archaeologists (2011). This section states that test pitting is to be completed on a 5 m grid, with test pits being at least 30 cm in diameter and excavated 5 cm into subsoil. All soil is to be screened through 6 mm mesh and all artifacts are to be retained with their associated test pit. All test pits should be backfilled to grade upon completion. All test pits must be dug to within 1 m of built structures.
- A Stage 2 pedestrian survey will be required for sections marked in yellow in Section 6: Figures 5 to 8 of the reference report before any development takes place. The pedestrian survey should follow Section 2.1.1 Pedestrian Survey of the Standards and Guidelines for Consultant Archaeologists (2011). This section states that the pedestrian survey should be completed in a ploughed agricultural field which has been allowed to weather with either one large rainfall or several small rainfalls. The pedestrian survey should be done at 5 m transects with the transect interval reduced to 1 m over a 20 m area should an archaeological resource be found to confirm whether it is an isolated find or part of a larger site.
- The areas that are marked in blue striping, red and orange in Section 6: Figures 5 to 8 of the referenced report are wet, disturbed or previously assessed and do not require further assessment. They should be considered cleared of further archaeological concerns.

The City will be completing this Stage 2 Archaeological Assessment and above recommendations. See Appendix A for the referenced figures.

The second area is the Cunningham Station. An Archaeological Assessment Report Entitled, "City of Ottawa Stage 3 Archaeological Assessment Ottawa Light Rail Transit Project Cunningham Station Site (BhFv-11), Lot 18, Concession III from the Rideau River, Geographic Township of Gloucester, City of Ottawa, Ontario", Dated Sep 10, 2018 was filed with MTCS providing a response on January 25, 2019. Within this report AECOM recommended the following:

- That the portion of the Cunningham Station site that is in the OLRT study corridor be subject to Stage 4 excavation as per the Standards and Guidelines for Consultant Archaeologist (MTCS 2011). The Stage 4 should be designed to maximize data recovery for the evaluation of the heritage value or interest of the site and should consist of the systematic hand and machine excavation of the archaeologically most productive portions of the site identified on the basis of the results of the Stage 3 AA and Golder Associates Stage 4 AA.
- The hand block excavation will be focused on the areas of interest identified Figure 1 in the Supplementary Documentation and include the block excavations around high count units which produced early to mid-19th century diagnostic ceramics and cultural features. Excavation will involve the block hand excavation of 1x1m units in these designated areas. These units must be excavated by systematic levels and extend at least 5cm into subsoil unless a cultural feature is uncovered. All soil must be screened through 6mm mesh and artifacts are to be collected by layer within their associated.
- Following the hand block excavations, it is recommended that the topsoil from the areas of interest be mechanically removed in order to expose any additional cultural features. The mechanical removal of topsoil should be done using a backhoe or Gradall with a smooth edged bucket and must be supervised at all times by a licenced archaeologist. Excavations must extend a minimum of 10m beyond any identified cultural features. If features are found during this Stage 4 AA, they

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should be systematically drawn, photographed, bisected or cut into quadrants and hand excavated based on present stratigraphy. The profile views of each feature should be drawn and photographed before the remaining portion of the feature is excavated.

The City will be completing the Stage 4 Archaeological Assessment and above recommendations. See Appendix B for the referenced figures.

The third area is the Ellwood Diamond site. A Stage 2 Archaeological Assessment for Ellwood Diamond requirement will be based on final design of grade separation. The area shaded in green in figure 2-4 of Appendix C will require a Stage 2 AA in the event it is impacted by the final design.

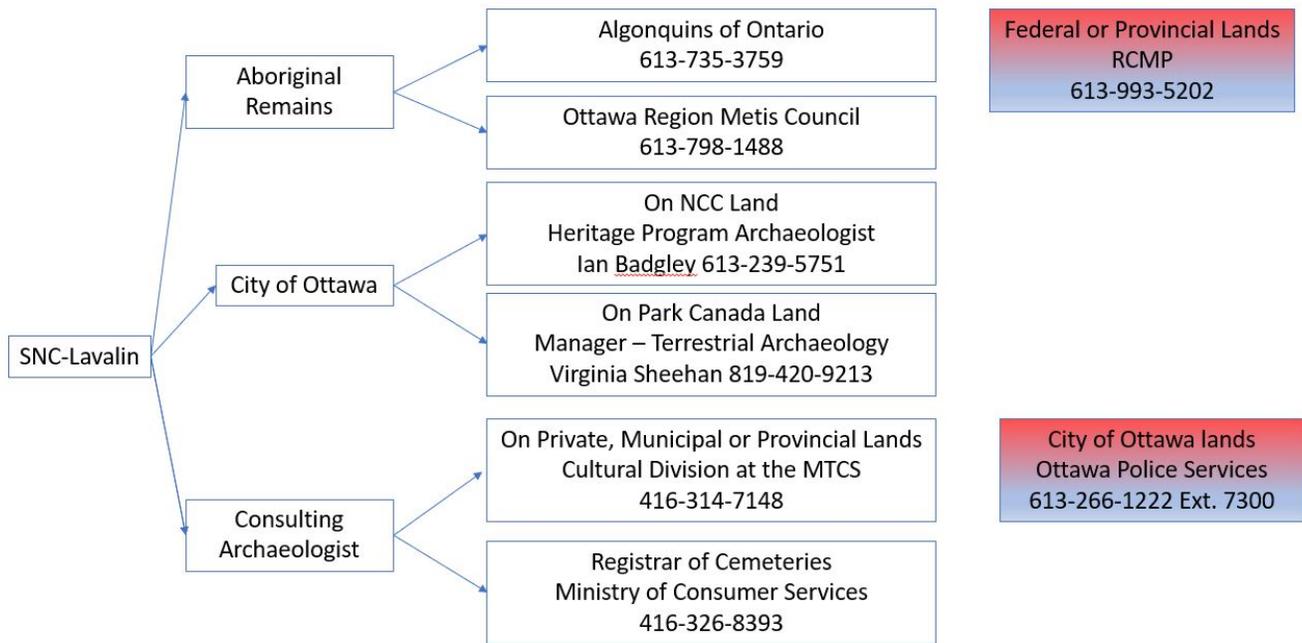
## 6.0 Protocol

### 6.1 DISCOVERY OF HUMAN REMAINS

It is important to note that the discovery of human remains will occur in two basic contexts: either through accidental discovery by an individual in unexpected circumstances, or through discovery as part of an archaeological examination/excavation of a locale by a licensed archaeologist. In the latter case, the archaeologist will possess the skills, knowledge, and expertise to assist both the police/RCMP and coroner in determining the age of the interment, as well as to assist the landowner in generating the information the Cemeteries Registrar will require to determine the nature, extent and cultural affiliation of the persons buried. His or her presence at the front end of the discovery process will greatly aid all authorities in making quick and accurate determinations, and should be relied on as much as possible in such circumstances. **If the remains are determined to be aboriginal, the Algonquins of Ontario and Ottawa Region Metis Council will be notified.**

In the event that human remains are discovered, all workers shall immediately cease work, contact the Ottawa Police Service, secure the location until such time as police services assume control of the site. Additionally, the SNC-Lavalin HSE team are to be notified. The subsequent notification will occur.

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**Figure 1: Contact Tree**

The SNC-Lavalin HSE Managers are to be immediately notified which will in turn notify senior management as per the EMP organisational chart.

## 6.2 CHANCE DISCOVERY OF POSSIBLE ARCHAEOLOGICAL RESOURCES

Should previously undocumented archaeological resources be discovered, this may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act or the relevant federal policy. The person discovering the archaeological resources must cease alteration of the site immediately and contact the SNC-Lavalin HSE team.

The sub-contractor(s) shall instruct their employees not to collect archaeological or historical materials. The locations of actual or suspected archaeological finds must be secured against theft and trespass by unauthorized individual, until such time as they have been inspected by the Consulting Archaeologist.

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## 7.0 References

AECOM

2017 Stage 1 Archaeological Assessment - Bowesville Station Alternative Location and Limebank Extension Alignment of the Trillium Line South Extension, Ottawa, Ontario

AECOM

2018 Delay in Stage 2 Archaeological Assessment of the Bowesville / Limebank Extension of the Trillium LRT, Ottawa, Ontario

AECOM

2018 Stage 3 Archaeological Assessment – Cunningham Station Site (BhFv-11), Ottawa, Ontario

CTP2

2018 Trillium Line Light Rail Transit Extension Addendum – Ellwood Diamond, Walkley Yard, Bowesville Station, Limebank Extension, Ottawa, Ontario

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## Appendix A

### Bowesville Station and Limebank Extension Study Area

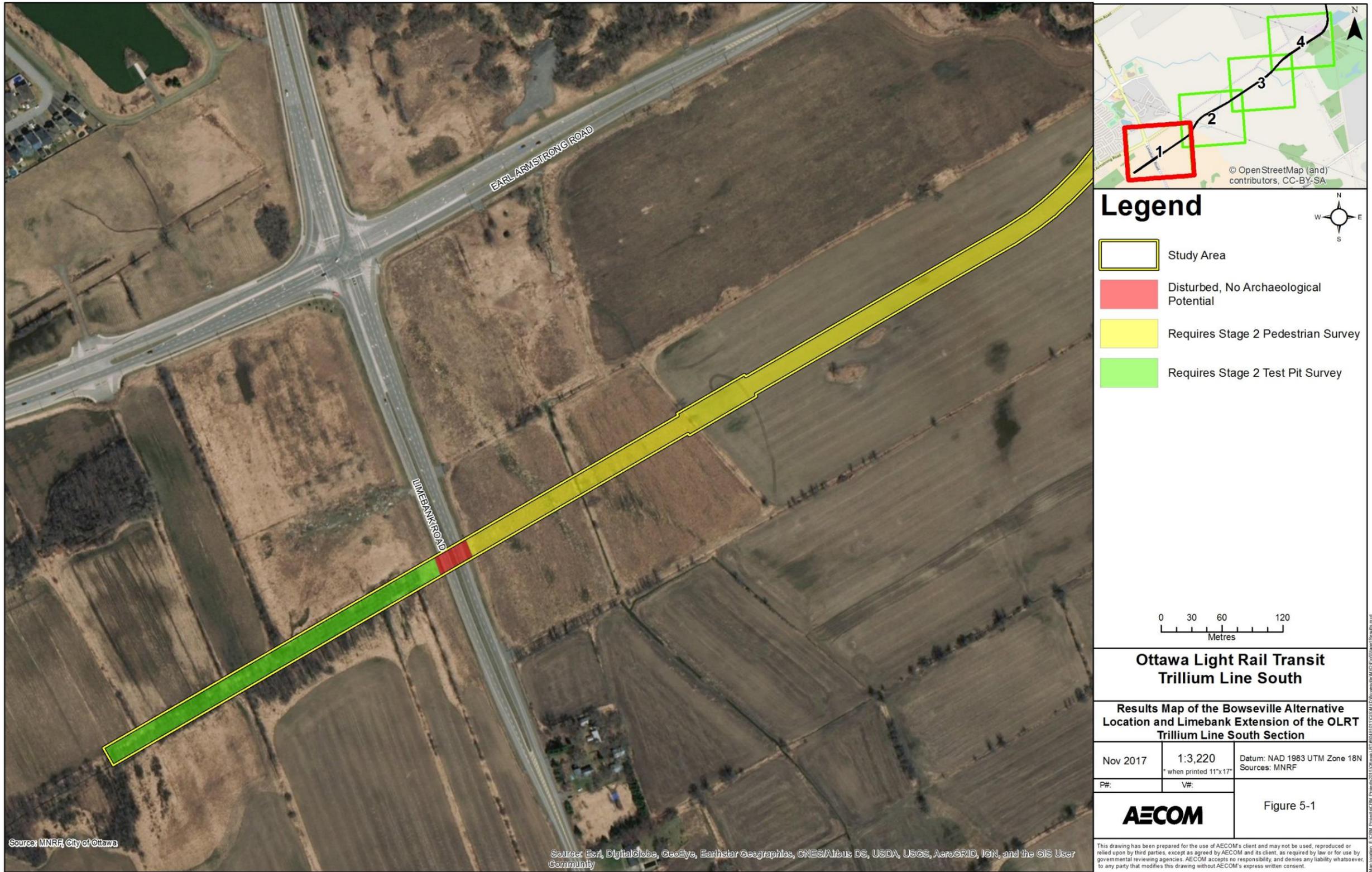


Figure 5: Results of the Stage 1 Archaeological Assessment for the Bowesville Alternative Location and Limebank Extension Study Area.





Figure 6: Results of the Stage 2 Archaeological Assessment for the Bowesville Alternative Location and Limebank Extension Study Area





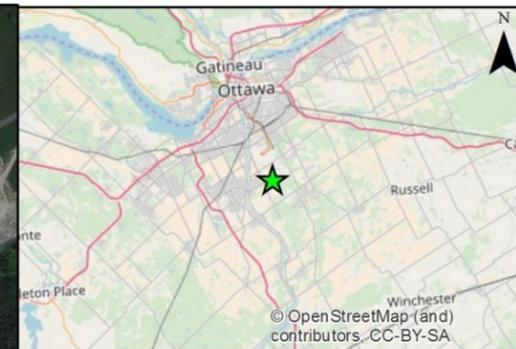
Figure 7: Results of the Stage 2 Archaeological Assessment for the Bowesville Alternative Location and Limebank Extension Study Area





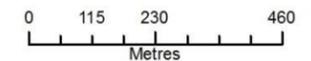
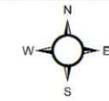
Figure 8: Results of the Stage 2 Archaeological Assessment for the Bowesville Alternative Location and Limebank Extension Study Area





### Legend

- ★ Project Location
- Study Area



### Ottawa Light Rail Transit Trillium Line South

#### The Bowsville Alternative Location and Limebank Extension of the OLRT Trillium Line South Section in Detail

May 2018	1:11,028 <small>* when printed 11"x17"</small>	Datum: NAD 1983 UTM Zone 18N Sources: MNR, NRC
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**AECOM**

Figure 2

Source: MNR, NRC

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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**Appendix B**

**Cunningham Station Study Area**

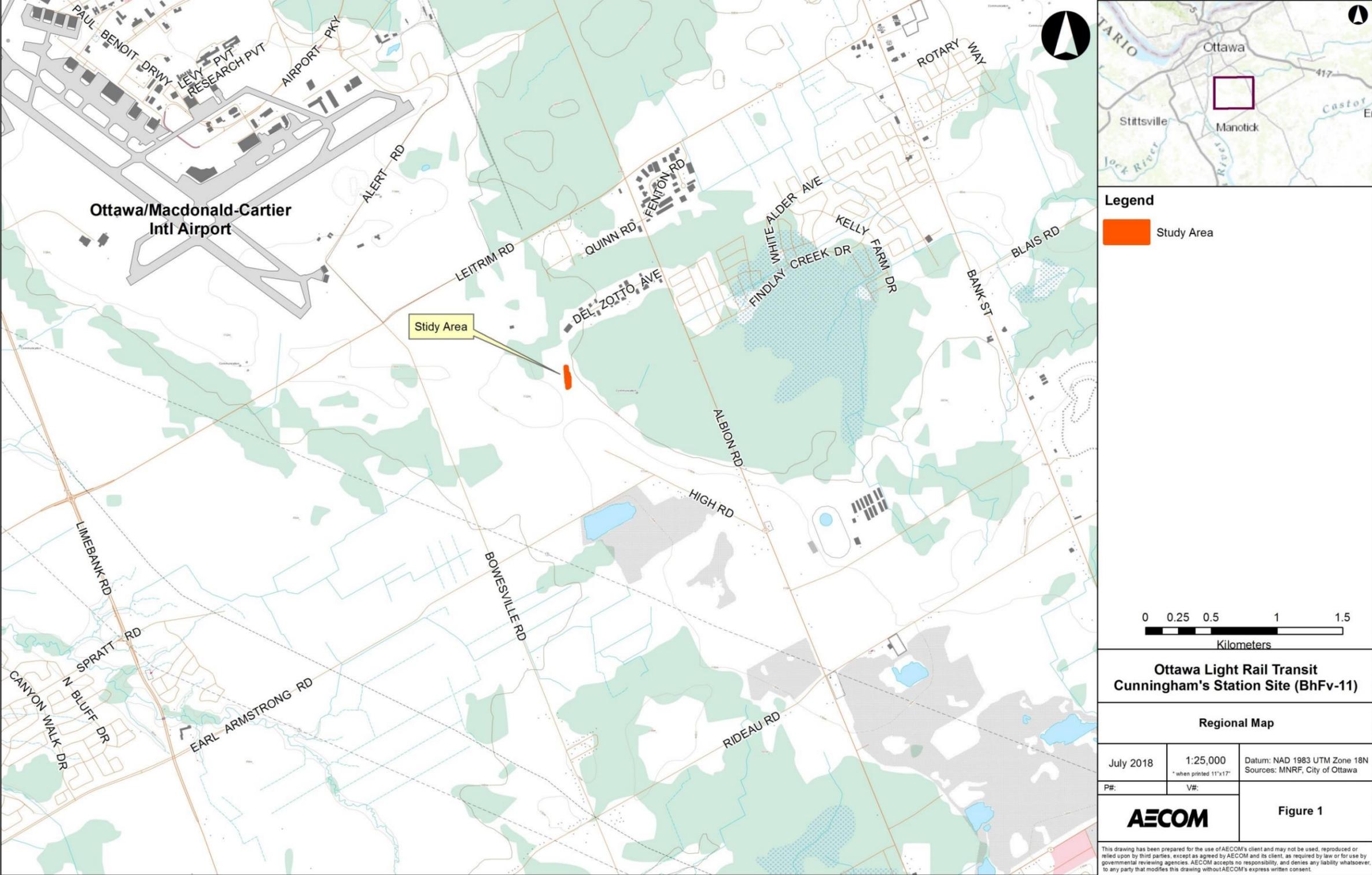


Figure 1: Regional Map of the Location of the Cunningham's Station Site (BhFv-11)



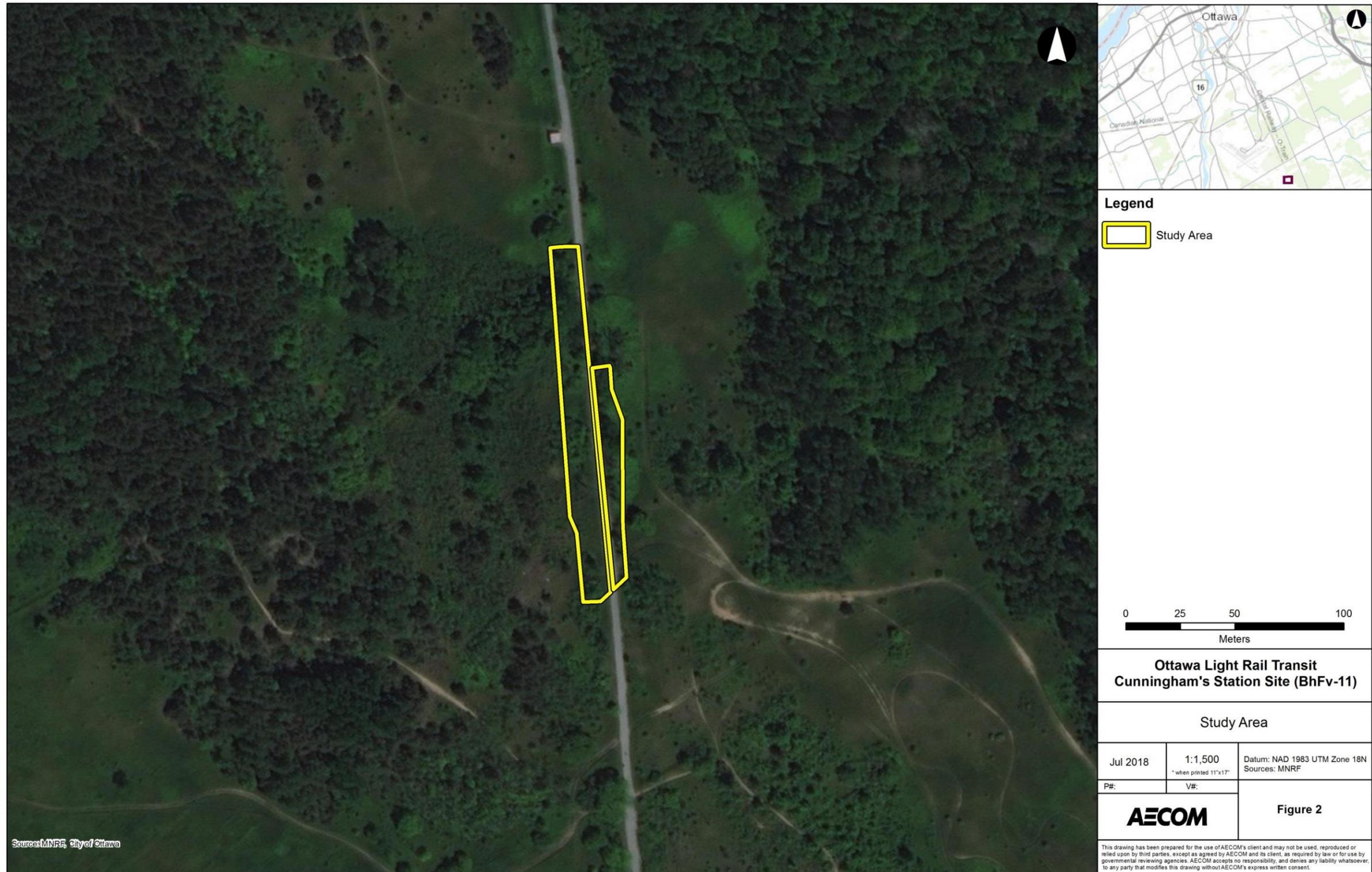


Figure 2: Location of the Cunningham's Station Site (BhFv-11) in Detail.

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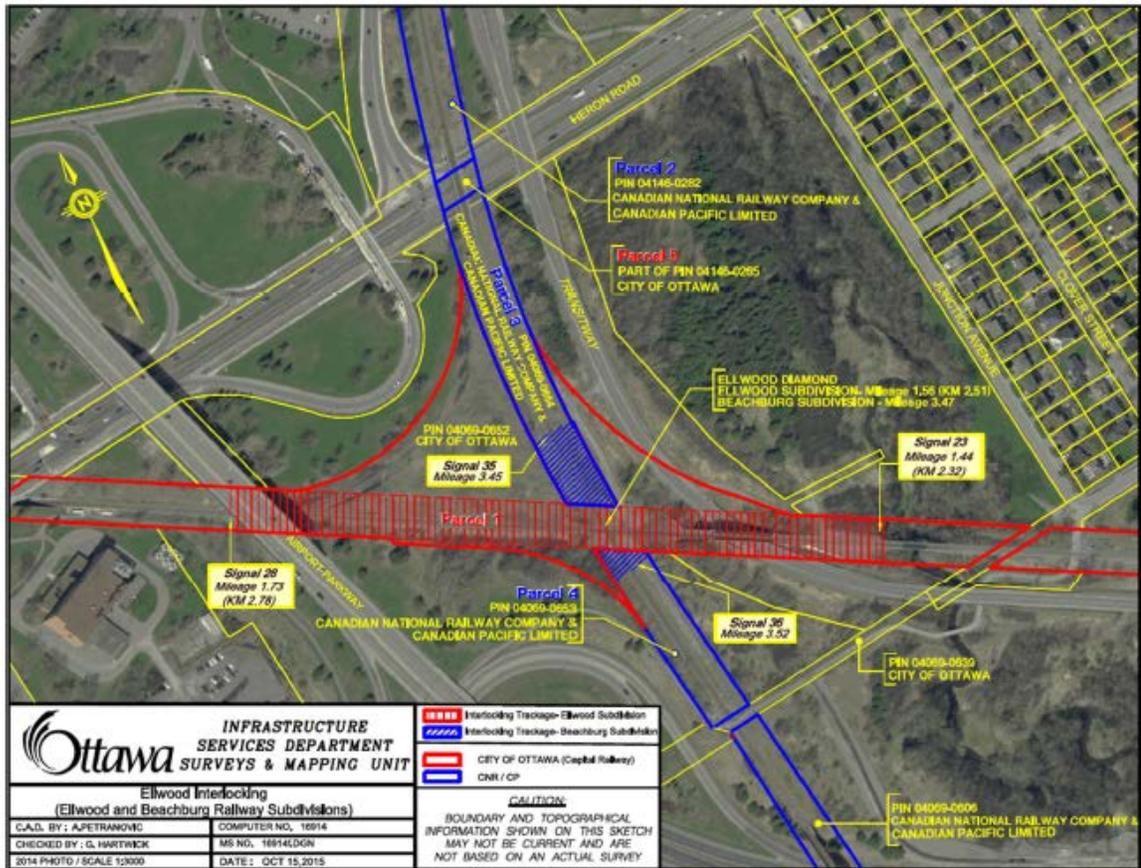
**Appendix C**

**Ellwood Diamond Study Area**

## 2. ELLWOOD DIAMOND

The existing Trillium O-Train between Greenboro and Confederation stations runs at-grade along a freight alignment and crosses a VIA Rail Canada (VIA) single-track alignment that carries the VIA Rail Toronto service. This is known as the Ellwood Diamond (Figure 2-1).

Figure 2-1: Existing Ellwood Diamond



### 2.1 Description of and Reason for the Change

The proposed expansion of the Trillium Line is expected to increase the number of O-Train crossings with longer trains. In addition, VIA has indicated it's near term intentions to provide more frequent service between Ottawa and Toronto, which will use the route that crosses the Ellwood Diamond. The City of Ottawa recognized the need to consider options to grade separate the Trillium and VIA lines at the Ellwood Diamond (CTP2, 2017a).

Multiple alternatives were considered for the Ellwood Diamond grade separation, with the focus on making adjustments to the horizontal and vertical alignment of the existing Trillium Line. These alternatives included:

## 2.2 Updated Existing Conditions

### 2.2.1 Archaeology

Much of the area within the Ellwood Diamond has been visibly disturbed by past construction and grading episodes (Figure 2-4). However, there are two areas located west of the VIA track on either side of the elevated Trillium mainline that cannot be confirmed as disturbed. . If disturbed, these two areas are subject to Stage 2 archaeological assessments as recommended in the Stage 2 Archaeological Assessment report (CTP2, 2018) for the Trillium Line.

Figure 2-4 Archaeological Potential



### 2.2.2 Cultural Heritage

There are no cultural heritage landscapes identified with the Ellwood Diamond.

### 2.2.3 Geo-environmental

Five (5) geo-environmental boreholes in the vicinity of the Ellwood Diamond were advanced as part of the subsurface investigation. A total of 10 soil samples were submitted from these boreholes for analysis of one (1) or more