PLANNING JUSTIFICATION REPORT:

OTTAWA AIRPORT AUTHORITY SAND AND GRAVEL PIT

Applications to Remove the Holding Provision on the Existing Zoning By-law

PART LOT 23 and 24, CONCESSION 3
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Prepared for:
Cavanagh Construction Ltd.

Prepared by:
HARRINGTON McAVAN LTD.
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282
Fax: 905-294-7623

Harrington McAvan Ltd
41 Main Street, Unit 102, Unionville, Ontario L3R 2E5
T: 905.294.8282
F: 905.294.7623

FEBRUARY 2020

Table of Contents

1.0 INTRODUCTION

This proposal would permit the establishment of a sand and gravel operation on a federally owned property that is part of the Ottawa Airport Authority lands. The property is located at 4788 Albion Road, in the geographic Township of Gloucester, City of Ottawa.

The property has an area of 63 hectares, with a proposed extraction area of approximately 33.8 hectares. Sand and gravel would be mined from above the water table, with the proposed annual tonnage limit of 250,000 tonnes. With a total estimated resource volume of 2.9 Million tonnes, and based on market demand estimates, the life span of the pit is expected to be approximately 5-10 years.

The pit operations will include a weigh scale and scalehouse, fuel storage, and an aggregate recycling/reprocessing area located close to the pit entrance. This area will also be used for stockpiling and processing of aggregates. Processing equipment will include loaders, dump trucks, portable crushing and screening equipment, conveyors, draglines and excavators.

Access to the site will be from Albion Road. The proposed hours of operation are Monday to Friday from 7am to 6pm. There will be no operations on weekends or on civic holidays.

Rehabilitation will be undertaken progressively, with the final land use plan to restore the extracted area to natural environment and agricultural after uses. Careful consideration and planning will be integral to the design of the operations and the rehabilitation of the pit, to minimize impacts.

2.0 OVERVIEW OF THE SITE

The subject property includes all of the southern half of Lot 24, Concession III, east of the former CPR tracks (now the Osgoode Link Pathway) together with the eastern half of the northern portion of the same lot, as well as a small rectangle of land in Lot 23, Concession III.

The Site is a semi-rectangular plot of agricultural and pastoral land. The Site is bounded by Albion Road on the east, semi-vegetated former extraction lands to the south, mixed forest and wetland to the west, and a golf course to the north. The Site is bisected northwest to southeast by a hydroelectric right-of-way and includes three high voltage transmission towers.

The Site topography ranges from about 110 m above mean sea level (AMSL) near the western boundary, a central north-south mound extending up to 117 m AMSL, and about 114 m AMSL near the eastern boundary. The ground surface decreases to the west of the Site with the edge of the mapped wetland coinciding to an elevation of about 108 m AMSL. There is a hydro easement located on the subject lands, with 3 towers and shown on **Figure 1**.

Adjacent lands include:

- To the north – Golf Course (Falcon Ridge Golf Club)
- To the west – rural residential uses and the hamlet of Ficko
- To the south – vacant lands and former landfill
- To the east – Rideau Carleton Raceway, and residences along Albion Road.

FIGURE 1: SITE LOCATION

Ottawa Airport Pit

Part Lots 23 & 24, Concession 3 from Rideau River
Geographic Township of Gloucester
City of Ottawa

FIGURE 2: SURROUNDING LANDS

3.0 PROPOSAL DESCRIPTION

The proposed sand and gravel pit operation will include extraction of material from above the water table, with onsite processing and shipping. Material will be excavated from the pit with loaders and excavators and will be transported to a screening plant located in the western part of the property. This portable plant will separate any larger stones and rocks from the sand. The sand will be stockpiled, then shipped from the site using highway trucks.

The larger stones and rocks which are separated by the screening plant will be moved to a crushing area for later crushing into aggregate. It is anticipated that crushing will occur only occasionally using a portable crushing plant which is brought to site when needed.

Extraction will occur sequentially in two areas in the direction shown in the Site plans. Stripping of topsoil and overburden will occur prior to extraction in areas large enough for a year's production. Topsoil and overburden will be used to build berms to create a visual and acoustics barrier and which will be seeded immediately to prevent erosion and control dust.

The floor of the Pit is proposed to be approximately 110.7 masl, resulting in excavation depths up to approximately 6 m. Excavation will take place in one lift. The hours of operation of the Pit will be within daytime hours, 7 a.m. to 7 p.m.

Following extraction each area will be progressively rehabilitated and will be returned to grassland (pasture or hay). The details of the operations and rehabilitation are shown on the Site Plans, which have been prepared in accordance with Provincial Standards for aggregate resource operations.

4.0 PROCESS AND APPROVALS

The approvals process for mineral aggregate operations generally requires applications under the Planning Act and the Aggregate Resources Act. In order to establish a pit or quarry in Ontario, the zoning on the property must allow for aggregate extraction. This process includes public consultation as well as a technical review by commenting provincial and local agencies.

We note that the subject property is currently zoned to permit aggregate extraction, with a holding provision. An application to remove the holding provision is required.

Aggregate operations in Ontario also require a license under the Aggregate Resources Act, which is issued by the Ministry of Natural Resources and Forestry (MNRF). Because the subject property is federally owned land, this proposal is not subject to the provincial Aggregate Resources Act (ARA). Despite this, the applicant is committed to addressing all of the requirements of the ARA as well as any Ministry of Environment, Conservation and Parks (MECP) guidelines for land use planning. This approach respects the process that an applicant would be required to follow on private land. All of the appropriate land use planning and technical considerations are addressed in the design of the operations and rehabilitation for the site.

The proposal also has regard for provincial and local planning policies. The key policy considerations are outlined in the Provincial Policy Statement, the Ottawa Airport Land Use Plan and the Official Plan for the City of Ottawa, and are reviewed in detail in this report.

5.0 AGGREGATE RESOURCES SUMMARY STATEMENT

The provincial standards under the Aggregate Resources Act include requirements for Site Plans together with a Summary Statement as part of the license application process. The Summary Report outlines the information and conclusions of the technical reports prepared in support of the application. As indicated previously in this report, while the ARA does not apply to federal lands, the proposed gravel pit reflects the process and standards outlined by the province for aggregate operations.

The following technical reports have been prepared for this proposal gravel pit:

- Hydrogeology Evaluation Report, Stantec
- Natural Environment Report, Stantec
- Cultural Heritage Report, Stantec
- Acoustic Assessment Report, Freefield Ltd.

In addition, as requested by the City of Ottawa, the following additional reports have been prepared:

- Stormwater Management Brief, Stantec
- Traffic Impact Assessment , CGH Transportation
- Environmental Site Assessment (Phase 1 and Limited Phase 2), Golder Associates

5.1 Planning and Land Use Considerations

The Ottawa Airport Land Use Plan was initially approved in 2008 to guide development through the designation of an appropriate mix and distribution of aviation and non-aviation commercial, industrial and other employment uses. The Land Use Plan is a Federal Minister-approved development strategy that guides the future growth of the airport lands. While not subject to further approvals, the Plan integrates, to the extent practical and appropriate, the policy and regulatory context within which it resides. Planning related documents reviewed and considered in the preparation of the Plan include the City of Ottawa's Official Plan, the National Capital Commission's Plan for Canada's Capital and Greenbelt Master Plan, the Provincial Policy Statement, and the current and draft Ottawa Airport Zoning Regulations.

The Authority commenced the 2018 Airport Master Plan (YOW 2038) and related Land Use Plan update process in 2016. This included extensive stakeholder outreach that was used to revise aviation forecasts, identify support facility requirements, and potential development options to meet forecasted needs. The Authority submitted the updated Airport Master Plan and updated Land Use Plan to Transport Canada in early 2018; the Master Plan was accepted, and the Land Use Plan was approved in August 2018.

The Plan is a guide for a strategic approach to the future of the Ottawa Macdonald Cartier International Airport (YOW) by way of a 20-year development framework which outlines the recommended use and development of airport lands and facility upgrades. Assumptions were based on current and future needs and industry trends supported by research, analyses and stakeholder consultations.

The subject property is identified as "Aviation/Non-Aviation Commercial Area according to the 2018 Land Use Plan. The Official Plan (OP) for the City of Ottawa recognizes the economic importance of the Ottawa airport to the Region, and outlines policies designed to protect the Ottawa airport from incompatible land uses. The impacts of airport operations on land use typically result in two categories of constraints on development: aircraft noise; and Airport Zoning Regulations. A third and more recent category is wildlife management the focus of which is to reduce risks to airport activity as a result of bird and wildlife movement in areas peripheral to the airfield system.

The following protection measures are outlined in the OP:

- Prohibiting new residential development and other noise sensitive uses above the 30 Noise Exposure Forecast (NEF)/ Noise Exposure Projection (NEP) contours;
- Imposing building standards on residential and other noise sensitive development between the 25 NEF/NEP and 30 NEF/NEP contours to reduce the impact of aircraft noise indoors;
- Ensuring building heights and natural vegetation respect airport obstacle limitation surfaces as established by federal aerodrome standards or airport zoning regulations, whichever case applies;
- Developing land uses and managing activities in a manner that reduces the attractiveness of these to bird species and populations that are hazardous to aircraft operations;
- Restricting land uses, activities and the use of building materials that interfere with the performance of navigation aids and telecommunication; and
- Developing land uses and managing activities in a manner that will not increase wildlife presence and elevate risks to aviation operations.

- The Airport Zoning Regulations apply to all lands, including public road allowances adjacent or in the vicinity of the airport. They are comprised of three categories of restrictive clauses relating to building heights, interference with communication, natural growth and bird hazard.

Zoning

The zoning for the proposed pit in Parcel 'C' is ME [527r}-h. This is a special exception in the Mineral Extraction zone, with a holding provision. The purpose of the ME – Mineral Extraction Zone is to:

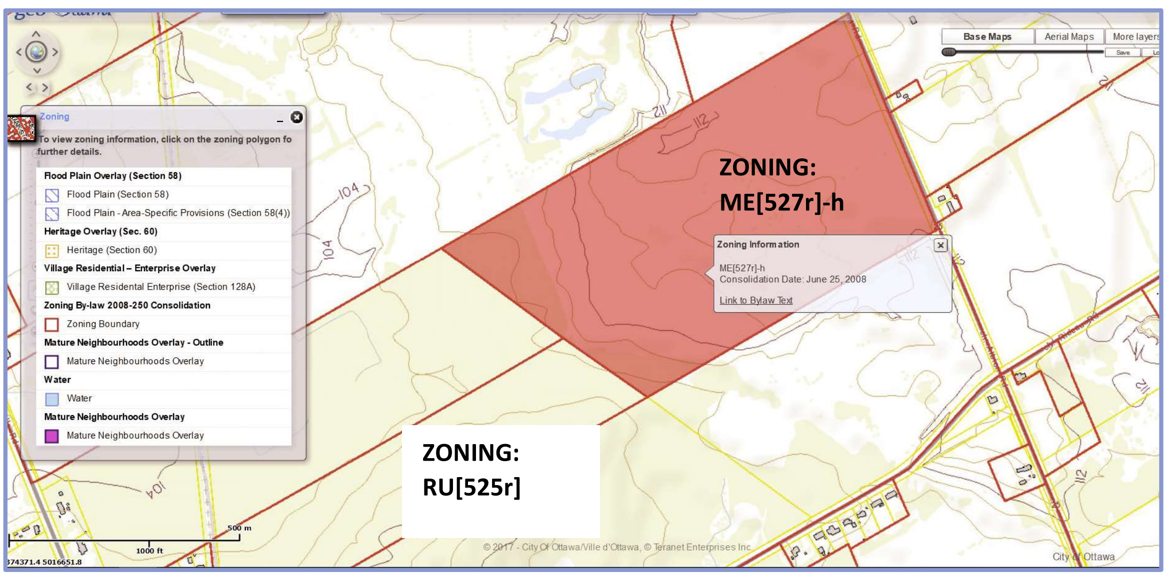
(1) permit licensed mineral extraction operations in areas mainly designated as Sand and Gravel Resource Area or Limestone Resource Area in the Official Plan;

(2) allow a limited range of permitted uses which are related to or compatible with mineral extraction operations, as well as interim uses that would not sterilize the potential of future mineral extraction operation on the lands within the ME zones;

(3) Impose regulations to minimize the impact of mineral extraction operations on the surrounding area.

A further analysis of planning is provided in Section 7 of this report.

FIGURE 3: CITY OF OTTAWA ZONING BY-LAW



5.2 Agricultural Classification

The soils on the subject property and adjacent lands are comprised of Kars gravelly sandy loam. The soil is characterised by brown sandy loam over roughly stratified sand and gravel. The Kars association is a group of soils developed in coarse-textured gravelly and cobbly, glaciofluvial materials. Kars soils form the central core of two major northwest-southeast trending glaciofluvial ridges. The largest, in Gloucester Township, extends from the Airport to South Gloucester.

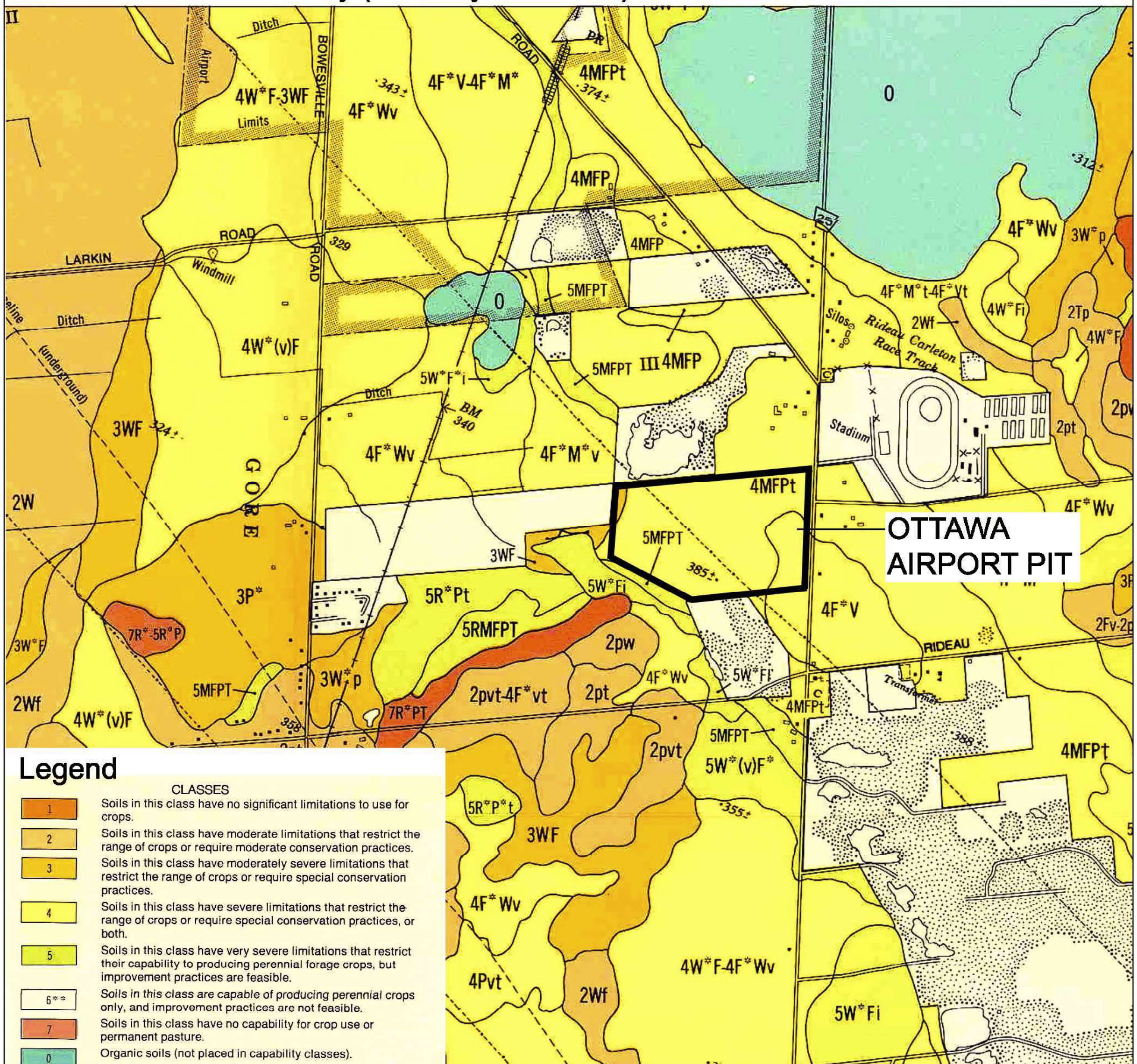
The topography of the area is gently undulating with some knolls present along the north edge and in the central part of the property. The property slopes down in a long, steady decline to the west and east from the central part of the site.

According to the Canada Land Inventory Mapping, the soils on the subject property are primarily Class 4 Soils, and exhibit limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both (**see Figure 4**).

The limitations affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. These soils are low to medium in productivity for a narrow to wide range of common field crops, but may have higher productivity for a specially adapted crop.

As the subject lands are not identified with prime agricultural lands nor is this considered a prime agricultural area, the extraction of aggregate from the site would be consistent with the policies in the Provincial Policy Statement (2014).

Figure 4: Ontario Soil Survey, Report No. 47, 1979, Agriculture Canada, Soil Capability for Agriculture in Gloucester and Nepean Townships Map, Carleton County (now City of Ottawa)



Ottawa Airport Pit

Part Lots 23 & 24, Concession 3 from Rideau River
Geographic Township of Gloucester
City of Ottawa

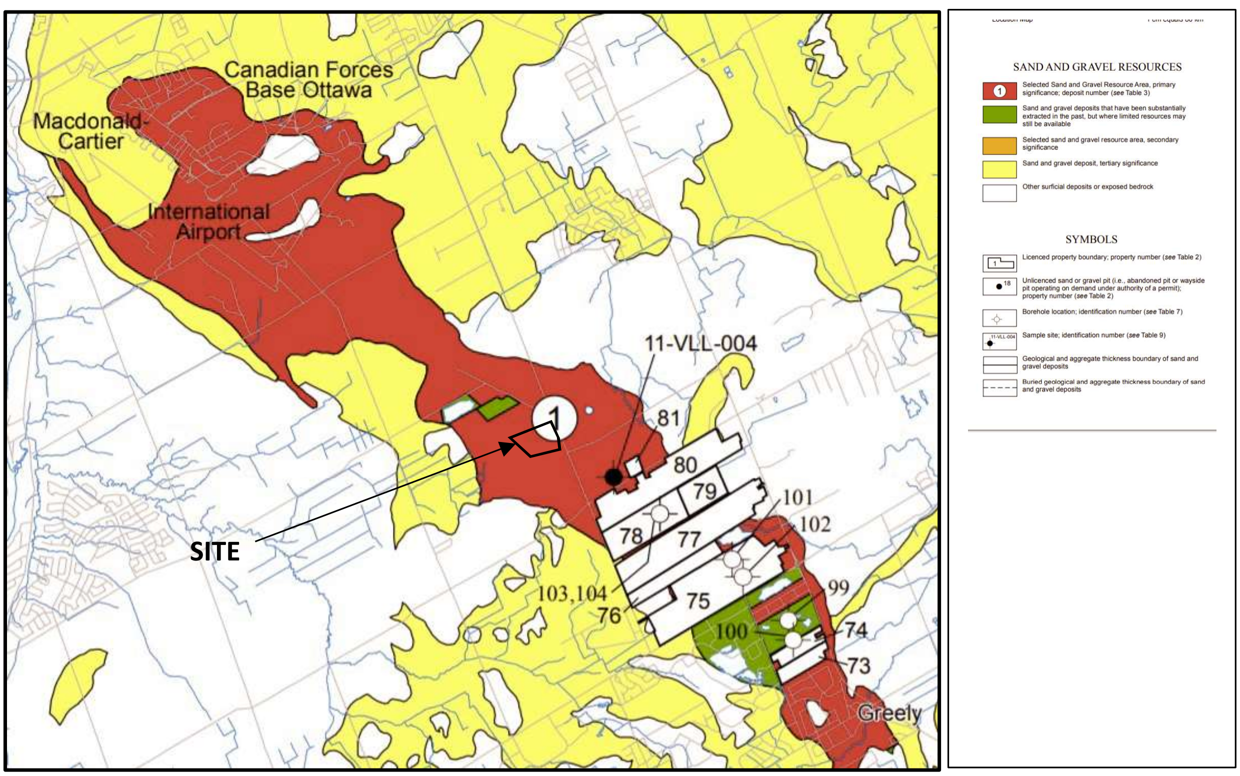
5.3 Aggregate Resources

Aggregate resource mapping indicates that the subject property is within one of the single largest undeveloped sand and gravel granular aggregate deposit within the City of Ottawa. Mapping of the area by Richard (1974), Sado and Vos (1976), Klugman and Fletcher (1979), Fletcher (1981), Gorrell (1986) and Gorrell (1996) all indicate that the sand and gravel deposit is glaciofluvial in origin and that it is, in terms of aggregate potential, a Class 1 (best) deposit.

According to the Aggregate Resource Inventory Paper for the City of Ottawa (2013), the property is located within "Selected Sand and Gravel Resource Area 1" (**see Figure 5**). The deposit extends south from the Macdonald–Cartier International Airport through the community of Greely to the southern border of the City of Ottawa and into the United Counties of Stormont, Dundas and Glengarry. As noted, the deposit is primarily a large glaciofluvial deposit of sand and gravel, with a small area of organic deposits underlying the forested wetland to the west of the Site.

Investigations at the Site by Houle (2014) confirmed deposits of sands, and sands and gravels underlain by a silty clay. The top of the silty clay was encountered at a depth of approximately 10 m in the central portion of the property. Further investigations in 2018 confirmed the quality and quantity of resource on the property.

FIGURE 5: AGGREGATE RESOURCE INVENTORY MAPPING



The deposit is valuable for its ability to produce a variety of granular aggregate specialty products, such as concrete and asphalt sand, filter media sand and others. The deposit is also very close to market and is located in proximity to other aggregate operations, located to the south and east of the site.

Like many other urban areas, many of the important sand and gravel resource areas in the City of Ottawa have become restricted due to previous extraction and human activity. As a result, these activities may have sterilized segments of sand and gravel resources. The City's Official Plan recognizes and protects significant aggregate resources areas, identified as sand and gravel and bedrock resource areas. The subject property is within an area identified by the City as a sand and gravel resource area.

5.4 Haul Routes and Traffic

The proposed access will be located at the existing intersection for the barn/stables access on Albion Road. The access intersection is anticipated to be a typical private approach design, completed as per City standards and operational requirements for site vehicles.

The aggregate operation, at maximum levels of operation, is expected to generate 12 truck trips hourly. This would typically occur during peak operating season between May and November. It is noted that daily operations are expected to generate, on overage, a lower number of truck trips, in the range of 8-10 truck per hour would be expected at typical levels of operation.

5.5 Progressive and Final Rehabilitation

In accordance with the requirements of the Aggregate Resources Act Provincial Standards, the proposed pit will be progressively rehabilitated. The rehabilitation of the extracted lands will be to agricultural land.

All existing topsoil and overburden on site will be stripped and stockpiled separately in berms or stockpiles and replaced as quickly as possible in the progressive rehabilitation process. Berms and stockpiles will be constructed on the perimeter of the site to attenuate noise and provide visual screening. The material (overburden and topsoil) in the berms will be used for progressive and final rehabilitation of the site.

The proposed rehabilitation will restore the historic activities that have occurred at this location for many years and is an appropriate land use in the context of the surrounding landscape. The proposed final rehabilitation is compatible with the surrounding lands and land use.

6.0 TECHNICAL REPORTS

As noted in the previous section, a series of technical reports and studies were completed to support the proposed gravel pit operation. A summary of the key findings is provided below:

6.1 Water Resources/Hydrogeology (Appendix A)

In support of the proposed aggregate excavation, Stantec completed a background review of the available geological, hydrogeological, and natural environment data to develop a conceptual understanding of the site hydrogeology. Groundwater monitoring information was available from 2006 and 2014 investigations, with additional monitoring undertaken in 2019. Based on the available data, the groundwater elevation at the site peaked in April 2019 at 109.3 m AMSL.

The proposed depth of excavation ranges from about 2 m to 6 m below ground surface based on topography. Extraction will remain approximately 1.5 metres above the established high groundwater table elevation. The proposed extraction also remains above the ground surface of the adjacent wetland to the west and is not expected to have any impact on wetland conditions.

The Stantec report recommends monitoring of groundwater levels on the site through the 2020 operating season and this recommendation is included on the operating page of the Site Plans.

6.2 Natural Environment (Appendix B)

Under the ARA, a Level 2 Natural Environment impact assessment and report is required when natural heritage features (e.g., wetlands, species at risk habitat) have been identified on, or within, 120 m of a site during preliminary investigations (i.e., a Level 1 assessment). During Stantec's preliminary review of available data sources and initial site reconnaissance, natural heritage features were identified as occurring on the site, or within 120 m of the Study Area. The Stantec Natural Environment report addresses the requirements for an aggregate license application, and is also intended to address the requirements of an Environmental Impact Statement (EIS) under the City of Ottawa's EIS guidelines in support of an application to remove the holding provision on the zoning.

The Stantec report identified a significant woodland and unevaluated wetland to the west of the area proposed for aggregate extraction. No portion of the woodland will be cleared by the proposed development. A setback of 30 m from the edge of the woodland is proposed as a protection measure and this is consistent with provincial policies protecting significant woodlands.

Potential habitat for Eastern Meadowlark and Bobolink (Species at Risk) have been identified on the subject lands. The Stantec report includes recommendation to mitigate any impact on bird habitat, including a restriction on clearing of vegetation during breeding season, and restoring grassland areas progressively as extraction is completed. Sediment and erosion control measures are recommended during construction and site clearing at the edges of the proposed excavation limits.

The Stantec report concludes that the phased extraction approach and progressive rehabilitation to grassland habitat being proposed by, along with mitigation measures described in their report, will ensure that potential impacts to natural heritage features on and within 120 m of the site will be mitigated. The features and their ecological functions will be maintained over the long-term consistent with provincial and local policy requirements.

6.3 Cultural Heritage/Archaeology (Appendix C)

Stantec Consulting Ltd. completed a Stage 1 and 2 archaeological assessment for the Site in 2019. The Stage 2 archaeological assessment of the study area identified two new archaeological locations. According to the Stantec report, the cultural heritage value or interest of the site has been sufficiently documented. Therefore, no further archaeological assessment is recommended. The report has been provided to the Minister of Heritage, Sport, Tourism and Culture Industries as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c. O.18 (Government of Ontario 1990b). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection, and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the Ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

6.4 Noise Impact Assessment (Appendix D)

Freefield Ltd. prepared an assessment of the potential impact of noise from the proposed aggregate operations in accordance with City of Ottawa Environmental Noise Control Guidelines1 (ENCG) and the Ontario Ministry of Environment, Conservation and Parks, MECP, guidelines for noise assessment, NPC-3002 and NPC-2333.

This noise study considers the impacts at noise sensitive points of reception potentially including residences, motels, places of worship, schools, hospitals and land zoned for a potential noise sensitive use. The noise report sets out noise mitigation measures such as berms and limits to operations which are designed to ensure all operations are in compliance with the applicable sound level limits.

6.5 Traffic Impact Assessment (Appendix E)

An estimation of the on-site activity provides a typical operation of 90 two-way trips per day (7:00am and 7:00pm) to a maximum of 130 two-way trips per day for limited time high demand projects. The resulting peak hour trips would be approximately:

- AM Peak: 9-17 inbound trips, 5-13 outbound trips
- PM Peak: 5-13 inbound and outbound trips

The anticipated trip distribution will be predominantly south to Rideau Road, with only local delivery immediately north of the site requiring trips to travel north.

As per the 4837 Albion Road Hard Rock Ottawa TIA, no intersection constraints were noted for the existing volumes and the background growth would continue to be accommodated within the existing transportation network.

7.0 PLANNING ANALYSIS

7.1 Planning Act

When carrying out its responsibilities under the Planning Act, a municipality or any other authority that affects a planning matter must have regard for the provincial interests as identified in Section 2 of the Planning Act. The provincial interests contained in Section 2 of the Planning Act are outlined in the table below.

Provincial Interests	Ottawa Airport Proposal
2(a)The protection of ecological systems, including natural areas, features and functions.	The Natural Environmental Report screening and technical evaluation prepared by Stantec identified the following natural areas and features within the proposed extraction area within 120 metres of the subject property: - Significant Wildlife Habitat (raptor wintering area, open country breeding birds, habitat for SOCC: Monarch and Grasshopper Sparrow) - Habitat for SAR (Bobolink and Eastern Meadowlark) The proposed extraction operations have been assessed for impacts on the natural environment. The Stantec report includes recommendations measures to mitigate impacts on the natural environment. These recommendations are detailed in their report and have been incorporated into the Site Plans to protect the identified features and functions on the site and adjacent lands.
2(b) The protection of the agricultural resources of the Province	The proposed rehabilitation will restore the majority of the extracted area to an agricultural/pasture use.
2(c) The conservation and management of natural resources and the mineral resource base.	Aggregate resources are a provincial interest and should be protected from incompatible land uses and developed responsibly. The proposed pit will provide a high-quality supply of mineral aggregate material to the local and regional markets.

2(d) The conservation of features of significant architectural, cultural, historical, archaeological or scientific interest.	The Archaeology Assessment Report prepared by Stantec addressed the conservation of archaeological features on the site and the report and recommendations for this property have been provided to the Ministry of Tourism and Culture and are incorporated into the Site Plans.
2(e) The supply, efficient use and conservation of energy and water	Ground and surface water features have been studied and documented in the report prepared by Stantec. Mitigation measures included on the Operations Plan including, groundwater level monitoring and restriction of surface activities minimize the potential for groundwater disturbance or contamination in accordance with provincial guidelines.
2(k) The adequate provision of employment opportunities.	The proposed aggregate extraction operation supports employment opportunities locally. These primary resource jobs present a multiplier effect that can result in the creation of additional supplemental service jobs.
2(l) The protection of the financial and economic well-being of the Province and its municipalities.	In addition to the employment opportunities created by the proposed operation, the proposed gravel pit provides a close to market source of aggregate to contribute to competition in the market. The
2(m) The coordination of planning activities of public bodies.	The interests of public bodies and agencies are considered by the circulation requirements of the Planning Act and have been incorporated into the Site Plans.
2(n) The resolution of planning conflicts involving public and private interests.	The land use planning process enables municipalities, agencies and the public to participate in the evaluation of this proposal.
2(o) The protection of public health and safety.	The operational plan contains a variety of mitigation measures that have been developed to minimize the social impact of the proposed pit operation.
2(p) The appropriate location of growth and development.	On- site investigation has confirmed the quality and extent of this resource. No significant natural or cultural heritage features will be negatively impacted by the proposed pit operation.

7.2 Provincial Policy Statement (2014)

The Minister of Municipal Affairs and Housing, under Section 3 of the Planning Act, can issue policy statements that provide direction to other ministries, municipalities and agencies on matters of provincial interest as they relate to land use planning. These policy statements are developed in consultation with other ministries and are updated from time to time. The latest PPS came into effect on April 30, 2014 and any land use decision by any authority that affects a planning matter must be consistent with the PPS. New changes were introduced to the PPS in 2019 and will come into effect on May 1, 2019. In terms of mineral aggregate operations, the 2019 PPS clarifies that the ARA regulates depth of extraction.

The Provincial Policy Statement recognizes the complex inter-relationship among environmental, economic and social factors in land use planning. The PPS supports a comprehensive, integrated and long-term approach to planning and recognizes linkages among policy areas. (Part III)

The PPS recognizes that the Province's natural heritage resources, water, agricultural lands, mineral aggregate resources, cultural heritage and archaeological resources provide important environmental, economic and social benefits. The wise use and management of these resources over the long term is a key provincial interest. The province must ensure that its resources are managed in a sustainable way to conserve biodiversity, protect essential ecological processes and public health and safety, provide for the production of food and fiber, minimize environmental and social impacts and meet its long term economic needs. (PPS, Part IV)

The subject property contains high quality aggregate resources which are of provincial significance. The Site Plans have been designed to ensure that potential impacts of the proposed aggregate operation will be mitigated.

The following table provides an evaluation of the proposal in the context of the relevant policies of the PPS. The evaluation is based largely on findings of various technical studies referenced previously in this report.

PPS (2014) Policies	Analysis
1.1.4. Rural Areas in Municipalities *Healthy, integrated and viable rural areas should be supported by:* *f) promoting the diversification of the economic base and employment opportunities through goods and services, including value-added products and the sustainable management or use*	The proposed pit is located in a rural area. The sustainable management or use of mineral aggregate resources, contributes to the local economic base. The proposed pit and the return of the lands to an agricultural use post extraction represents sustainable resource management. The use of existing transportation infrastructure also promotes efficient development.
1.1.5 Rural Lands in Municipalities: *permitted uses are:* *a) to the management or use of resources;* *b) resource-based recreational activities;* *c) limited residential development;* *d) home occupation and home industries* *e) cemeteries;*	The proposed pit represents to the use of a provincially significant natural resource (mineral aggregate) and is an appropriate rural land use.
1.2.6 Land Use Compatibility *1.2.6.1 Major facilities and sensitive land uses should be planned to ensure they are appropriately designed, buffered and/or separated from each other to prevent or mitigate adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term viability of major facilities.*	The site plans for the proposed pit have been designed to ensure that appropriate mitigation measures are in place to minimize the effects of noise and dust from the operation. The recommendations of the Noise Assessment Report incorporated into the design of the pit.
1.6.7.1 Efficient use shall be made of existing and planned infrastructure.	Truck traffic from the proposed pit will utilize Albion road and travel either north or south. The proposed pit will not require any extension or expansion of municipal infrastructure.

PPS (2014) Policies	Analysis
1.7.1 Long-term economic prosperity should be supported by: *b) optimizing the long-term availability and use of land, resources, infrastructure, electricity generation facilities and transmission and distribution systems and public service facilities;*	The proposed pit will increase the availability of close-to-market supplies of aggregate resources in this area of Ottawa.
2.1.1 Natural features and areas shall be protected for the long term.	The Natural Heritage Report has evaluated the impacts of the proposal on significant wetlands, woodlands, fish habitat, and habitat of endangered species and threatened species. The recommended mitigative measures are incorporated to ensure no negative impacts on these natural features or their functions. Special consideration has been given to the proposed rehabilitation of the site to ensure that foraging habitat for the Eastern Meadowlark and Bobolink (Species at Risk) are incorporated into the after use.

PPS (2014) Policies	Analysis
2.2.1 Planning authorities shall protect, improve or restore the quality and quantity of water by: *a) using the watershed as the ecologically meaningful scale for integrated and long-term planning;* *b) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;* *c) identifying surface water resource systems consisting of ground water features, hydrologic functions and natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;* *d) maintaining linkages and related functions among ground water features, hydrologic functions and natural heritage features and areas and surface water features including shoreline areas;* *e) implementing necessary restrictions on development and site alteration to:* *1. protect all municipal drinking water supplies and designated vulnerable areas; and* *2. protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;* *f) planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;*	No surface water features, hydrologic features or municipal drinking water sources are located on or within 120 metres of the property. The proposal will ensure the preservation of existing groundwater quality and quantity by retaining a buffer between the pit floor and the established high water table. Operational best practices have been included on the Operations Plan in order to minimize any potential for surface activities to impact groundwater quality. These include groundwater level monitoring and restriction of surface activities in accordance with provincial guidelines.

PPS (2014) Policies	Analysis
2.5 Mineral Aggregate *2.5.2.1 As much of the mineral aggregate resources as is realistically possible shall be made available as close to markets as possible.* *Demonstration of need for mineral aggregate resources, including any type of supply/demand analysis, shall not be required, notwithstanding the availability, designation or licensing for extraction of mineral aggregate resources locally or elsewhere.*	The proposed pit will provide a significant supply of commercially viable aggregate material for the local and regional market. The proposed pit will increase access to close-to-market supply of aggregates in local construction markets.
2.5.2.2 Extraction shall be undertaken in a manner which minimizes social, economic, and environmental impacts.	The technical studies prepared in support of the proposed pit demonstrate that no natural or cultural heritage features will be impacted by the development. The hydrogeological study has confirmed groundwater elevations and a series of operational practices designed to restrict activities which could present threats to groundwater have been included on the operations plan. Adherence to provincial standards for noise and dust will minimize any potential social impacts and nuisances.
2.5.3 Rehabilitation *2.5.3.1 Progressive and final rehabilitation shall be required to accommodate subsequent land uses, to promote land use compatibility, to recognize the interim nature of extraction, and to mitigate negative impacts to the extent possible. Final rehabilitation shall take surrounding land use and approved land use designations into consideration.*	As described previously in this report, the pit shall be progressively rehabilitated to agricultural uses.
2.6 Cultural Heritage and Archaeology *2.6.2 Development and site alteration shall only be permitted on lands containing archaeological resources or areas of archaeological potential unless significant archaeological resources have been conserved.*	A Stage I and II Archeological Assessment was completed by Stantec. The proposed extraction area does not contain any sites of archaeological significance. The proposal is consistent with the PPS in this regard.

7.3 City of Ottawa Official Plan

The City of Ottawa's Official Plan provides policy direction concerning mineral resources in section 3.7.4. Sand and Gravel, and Limestone Resource Areas are designated on Schedule A and B of the Official Plan, with the subject lands falling under the Sand and Gravel Resource Area designation (**See Figure 6**).

The Official Plan recognizes that sand and gravel pits are generally smaller-scale and shorter-term operations than bedrock quarries. They do not involve drilling, blasting or rock crushing and therefore pits may not need to be as widely separated from incompatible uses as quarries. Sand and gravel pits are permitted in the Sand and Gravel Resource, the Bedrock Resource, the General Rural Area without an amendment to the Official Plan.

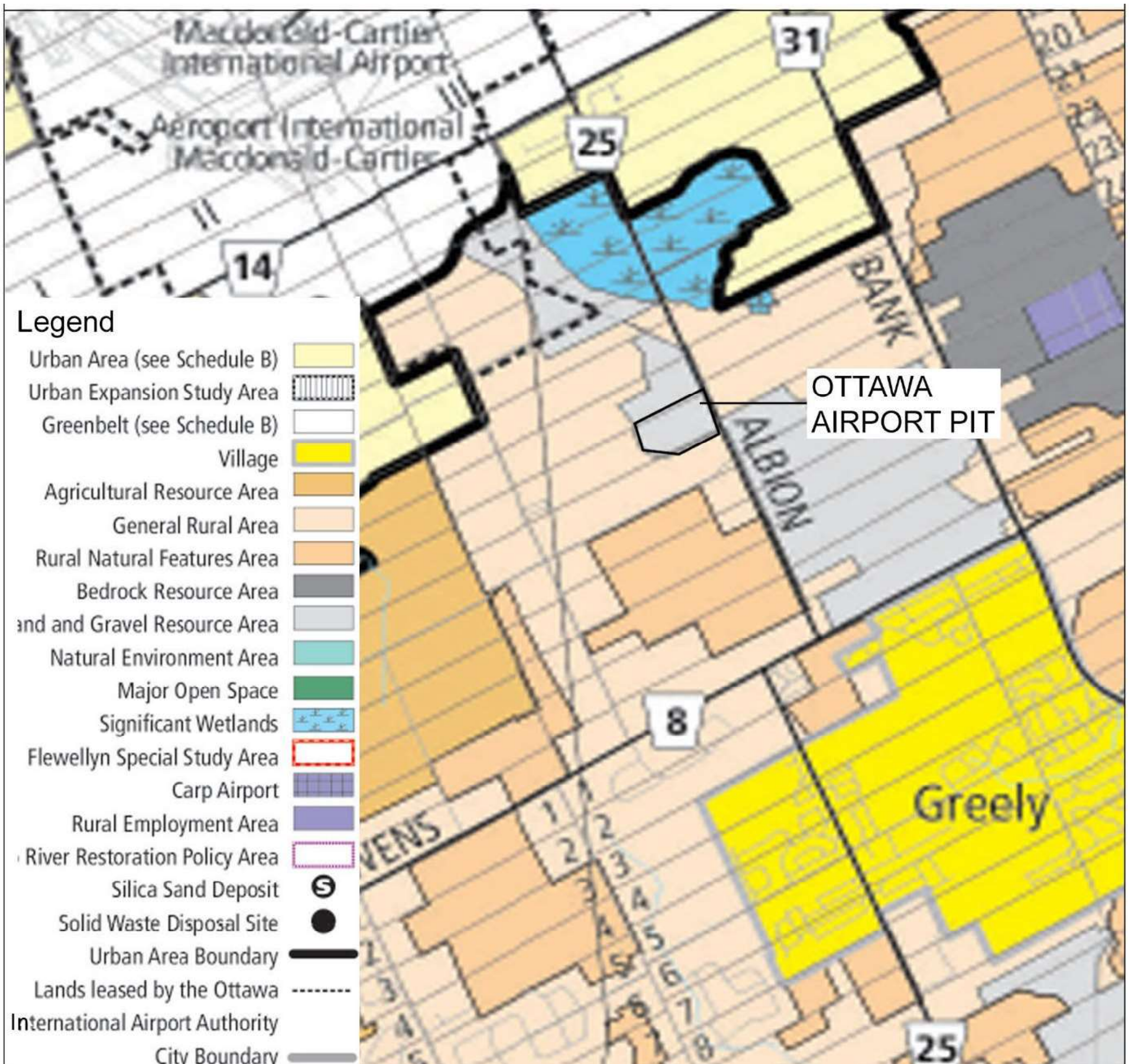
Section 3.7.4.2 of the Official Plan notes that pits and accessory uses to the aggregate extraction operation are the primary uses found on lands designated Sand and Gravel.

The City of Ottawa requires all pits and quarries that are licensed under the Aggregate Resources Act to be zoned to permit mineral extractive use operations. This zoning requirement is compulsory regardless of the Official Plan Designation on the property. Prior to the establishment of any new pit or quarry, the City requires lands be re-zoned to permit mineral extractive use, for both new pits and quarries or proposed expansions to existing ones. As indicated previously in this report, because the subject property is on federally owned lands, the provincial Aggregate Resources Act does not apply, however, the application has been designed to meet all of the requirements of the provincial legislation.

Section 3.7.4.9 outlines the study requirements for considering a new sand and gravel operation. These include groundwater elevation and assessment of impacts, description of haul routes and traffic, natural environment (environmental impact) studies, and an assessment of impact on neighbours from noise, dust, vibration, truck traffic, etc., due to the duration of the extraction operation in hours per day and number of days per week. These issues are addressed in the technical reports which have been prepared in support of the proposal, and are summarized in this report.

Section 3.10 of the Official Plan includes land use polices related to airports, including the Ottawa McDonald-Cartier International Airport (Section 3.10.1). The subject property is within the rural area, and is outside of the airport area identified on the Official Plan. As discussed, the property is designated as a Sand and Gravel Resource Area, and no change in designation is required to allow the proposed gravel pit operation.

FIGURE 6: CITY OF OTTAWA OFFICIAL PLAN, SCHEDULE A: LAND USE



Ottawa Airport Pit

Part Lots 23 & 24, Concession 3 from Rideau River
Geographic Township of Gloucester
City of Ottawa

7.4 City of Ottawa Zoning By-law

The subject property is zoned Mineral Extraction, with a holding provision (ME-527r)-h (Zoning By-law 2008-050). The purpose of the ME zone is "to permit licensed mineral extraction operations in areas mainly designated as Sand and Gravel Resource Area or Limestone Resource Area in the Official Plan". The subject property has a special exception (527r) which allows a parking lot in addition to the other permitted uses.

According to the zoning by-law, the holding provision may be removed upon compliance with the following requirements:

a) in support of the intent to extract mineral aggregates such studies or plans as the City deems necessary be prepared including those addressing hydrogeology, noise, vibration and site rehabilitation

b) the City has approved an Environmental Impact Statement submitted when the proposed mineral extraction operation is adjacent to lands zoned EP3

All of the required studies to support the proposed aggregate operation have been included with the application to remove the holding provision.

8.0 CONCLUSION

The proposal to establish a mineral aggregate operation on the subject property is supported by the land use planning analysis, the Summary Statement, the site plans and related requirements, and the associated technical reports referenced in this document.

Based on these submissions it is concluded that:

- The proposed pit is located in a provincially, regionally and locally recognized aggregate resource area.
- The deposit can be extracted in such a manner that potential environmental and social impacts are minimized.
- The matters of provincial interest as identified in Section 2 of the Planning Act have been properly assessed and the proposal has appropriate regard to these provincial interests.
- The proposed pit, through its Operations Plan, Rehabilitation Plan and the recommendations of the supporting technical reports, is consistent with provincial policy as set out in the 2014 Provincial Policy Statement.
- The Provincial Policy Statement 2014, contains policy requiring mineral aggregate resources to be protected and that as much of the resource as possible be made available as close to market as is possible. The proposal is consistent with this provincial objective as well as provincial policy related to the protection of natural heritage, water and cultural resources and the protection of public health and safety.
- The proposal is consistent with the relevant policies of the City of Ottawa Official Plan with regard to mineral aggregate extraction applications.
- The proposed pit operation has been designed to reflect best practices and incorporates recommendations of the accompanying technical reports.

The proposed pit is consistent with the 2014 Provincial Policy Statement and in the conformity with the City of Ottawa Official Plan, and the Zoning By-law.

The applicant respectfully seeks approval of the City of Ottawa to remove the holding provision of the zoning by-law to permit the proposed gravel pit.

Prepared by: Melanie Horton, MCIP, RPP
March 2020

APPENDIX A

Level 1 Hydrogeology Review
Stormwater Management Brief

Stantec **Memo**

To:	Dan Eusebi	From:	Marie Goddard, Lesley Veale
	Stantec - Guelph Office		Stantec - Waterloo Office
File:	160961321	Date:	December 19, 2019

Reference: Level 1 Hydrogeological Review, Ottawa Airport Lands – Parcel C, Ottawa, Ontario

Stantec Consulting Limited (Stantec) completed a preliminary hydrogeological evaluation in support of the proposed development of aggregate excavation pit on lands owned by the Ottawa Airport (The Site). The Site approximately 38 ha in size and is known as Parcel C, an unaddressed parcel of land located on Albion Road (Ottawa Regional Rd 25) in the City of Ottawa, Ontario (Figure 1, Attachment A). The proposed extraction pit will be above the groundwater level.

Although the project is located on federal crown lands, the following hydrogeological evaluation was completed in consideration of the Ontario Aggregate Resources Act (ARA) standards and anticipated level of effort expected by the City of Ottawa. The ARA requires that for sites with extraction above the groundwater table, a review must be prepared to determine the elevation of the water table within the site and demonstrate that the final depth of extraction is at least 1.5 m above the water table.

In support of the proposed aggregate excavation, Stantec completed a background review of the available geological, hydrogeological, and natural environment data to develop a conceptual understanding of the Site hydrogeology. This memorandum details these findings with figures included in Attachment A.

BACKGROUND

The Site is a semi-rectangular plot of agricultural / pastoral land. The Site is bounded by Albion Road on the east, semi-vegetated former extraction lands to the south, mixed forest and wetland to the west, and a golf course to the north. The Site is bisected northwest to southeast by a hydroelectric right-of-way and includes three high voltage transmission towers.

The Site topography ranges from about 110 m above mean sea level (AMSL) near the western boundary, a central north-south mound extending up to 117 m AMSL, and about 114 m AMSL near the eastern boundary (Gorrell, 2006[1]). The ground surface decreases to the west of the Site with the edge of the mapped wetland coinciding to an elevation of about 108 m AMSL.

The Site is primarily located at the eastern boundary of the Lower Rideau River watershed within the Mosquito Creek subwatershed, with about 3 ha of the southeastern portion of the Site in the South Nation Watershed. Surface water flow within the Mosquito Creek subwatershed is to the west to the Rideau River.

[1] Gorrell Resource Investigations, 2006. Aggregate Assessment and Resource Management Plan, Ottawa International Airport Holdings. Report No. 05310.

LOCAL GEOLOGY

Surficial geology mapping of the Site indicates glaciofluvial deposits consisting of sand and gravel at ground surface across the Site. A linear feature of a beach ridge and near shore bar is mapped along the western boundary of the Site (OGS, 2010[2]).

Previous investigations at the Site included one test pit excavation / monitoring well installation at TP26-06 (Gorrell, 2006[1]), and four test pit excavations at TP14-17 to TP14-20 and three monitoring well installations at BH14-1, BH14-2 and BH14-5 (Houle, 2014[3]). The investigations were completed to identify the general subsurface conditions and assess the potential quality of the aggregate materials. The precise location of the 2006 investigation is not known, but the 2014 test pits/monitoring wells are shown on Figure 1.

Investigations by Houle (2014) confirmed deposits of sands, and sands and gravels underlain by a silty clay. The top of the silty clay was encountered at a depth of approximately 10 m in the central portion of the Site in borehole BH14-5. The lateral extent of this silty clay is unknown. A lens of sandy silt was encountered on the eastern portion of the Site in borehole BH14-2 at approximately 4 m depth. These deposits represent ice-contact and near-shore sediments of the former Champlain Sea (Gorrell, 2006[2]).

Ordovician-aged limestone/dolostone bedrock of the Oxford Formation is anticipated to be located at depths ranging between 3 m and 25 m, with thinner overburden cover along the southern boundary (Gorrell, 2006[2]; Houle, 2014[3]; OGS, 2011[4]).

GROUNDWATER CONDITIONS

Groundwater monitoring was completed as part of the 2006 and 2014 investigations, with additional monitoring from 2019. Gorrell (2006) reported groundwater at TP26-06 on April 12, 2006 at a depth of 6.7 m below ground surface (BGS) at an elevation of 105.3 m AMSL.

One round of groundwater levels was collected from BH14-1, BH1402 and BH14-5 on July 31, 2014 (Houle, 2014). Between April 2019 and November 2019, groundwater levels were monitored by Thomas Cavanagh Construction Ltd. (Cavanagh) a minimum of monthly at BH14-1, BH14-2 and BH14-5. The 2019 water level results were provided to Stantec for review. A summary of the data is presented in Table 1. The groundwater elevations for April 24, 2019 are presented on the attached Figure 2.

---

[2] Ontario Geological Survey 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV

[3] Houle Chevrier Engineering Ltd., 2014. Resource Investigation OIAA Lands, 2014. Project 14-195. Draft.

[4] Ontario Geological Survey. 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release---Data 126-Revision 1. ISBN 978-1- 4435-5704-7 (CD) ISBN 978-1-4435-5705-4.

Reference: Level 1 Hydrogeological Review, Ottawa Airport Lands – Parcel C, Ottawa, Ontario

Table 1: Groundwater Elevations

Date of Reading	BH14-1		BH14-2		BH14-5	
	Depth	Elevation	Depth	Elevation	Depth	Elevation
(MM/DD/YY)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)
7/31/2014	4.75	108.60	5.57	107.51	7.63	109.18
4/24/2019	4.09	109.27	5.43	107.65	7.73	109.08
5/30/2019	4.14	109.21	5.60	107.48	7.80	109.01
6/6/2019	4.15	109.20	5.61	107.47	7.81	109.00
6/26/2019	4.29	109.06	5.39	107.69	7.91	108.90
7/29/2019	4.51	108.84	5.60	107.49	8.11	108.70
8/09/2019	4.59	108.76	5.73	107.36	8.18	108.63
8/29/2019	4.73	108.62	5.92	107.17	8.33	108.48
10/09/2019	4.78	108.57	5.94	107.15	8.40	108.41
23/09/2019	4.87	108.48	5.99	107.09	8.50	108.31
08/10/2019	4.96	108.39	6.24	106.85	8.62	108.19
24/10/2019	5.03	108.32	6.29	106.79	8.73	108.08
6/11/2019	5.03	108.32	6.39	106.69	8.81	108.00
Maximum	5.03	109.27	6.39	107.69	8.81	109.18
Minimum	4.09	108.32	5.39	106.69	7.63	108.00

HYDROGEOLOGICAL CONCEPTUAL UNDERSTANDING

The groundwater levels appear to follow a seasonal trend, being higher after spring melt and declining over the summer months. This is typical for shallow groundwater systems. Based on the available data, the groundwater elevation at the Site peaked in April 2019 at 109.3 m AMSL. Based on the 2014 and 2019 data, the shallow groundwater is located within the lower portion of the sand unit.

Surface water and/or groundwater data is not available for the wetland located to the immediate west of the Site; however, based on available ground surface elevation of 108 m AMSL, similar water levels are anticipated to be present within the wetland. The wetland and the shallow groundwater are likely hydraulically connected

Regional mapping indicates surface water within Mosquito Creek flows to the west discharging to the Rideau River, located 7 m west of the Site with a surface water elevation of about 75 m AMSL. Regional mapping was not available for shallow groundwater conditions; however, shallow groundwater may mimic surface water flow and also flow to the west.

Based on ARA standards, the maximum depth of aggregate excavation is 1.5 m above the peak groundwater level. Available data indicates that excavation could extend to 110.8 m AMSL. The maximum proposed excavation elevation is presented on Figure 2. The majority of the sand and gravel material is positioned above 110.8 m AMSL. The maximum depth of excavation ranges from about 2 m to 6 m BGS based on topography. This maximum excavation to 110.8 m AMSL is not only above the Site groundwater level but also remains above the ground surface of the adjacent wetland to the west and is therefore not expected to directly impact wetland conditions.

The aerial extent of excavation will be limited by the required set-back near Site boundaries and wetland and set-back and slope requirements for the transmission towers. Preliminary set-backs as provided by Harington McAvan are shown on Figure 1.

CONCLUSIONS

Based on our assessment, the maximum proposed excavation elevation at the Site is 110.8 m AMSL to maintain a 1.5 m buffer above the historical peak groundwater level. Based on topography, this elevation corresponds to depths ranging between 2 m to 6 m BGS across the Site. It is recommended that groundwater monitoring continue through spring 2020 to confirm peak conditions.

LIMITATIONS

This document entitled, "Level 1 Hydrogeological Review, Ottawa Airport Lands – Parcel C, Ottawa, Ontario Level 1 Hydrogeological Review, Ottawa Airport Lands – Parcel C, Ottawa, Ontario" was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Thomas Cavanagh Construction Ltd. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

We trust that this meets your current requirements. Should you have any questions, please do not hesitate to contact the undersigned.

Regards,

Stantec Consulting Limited

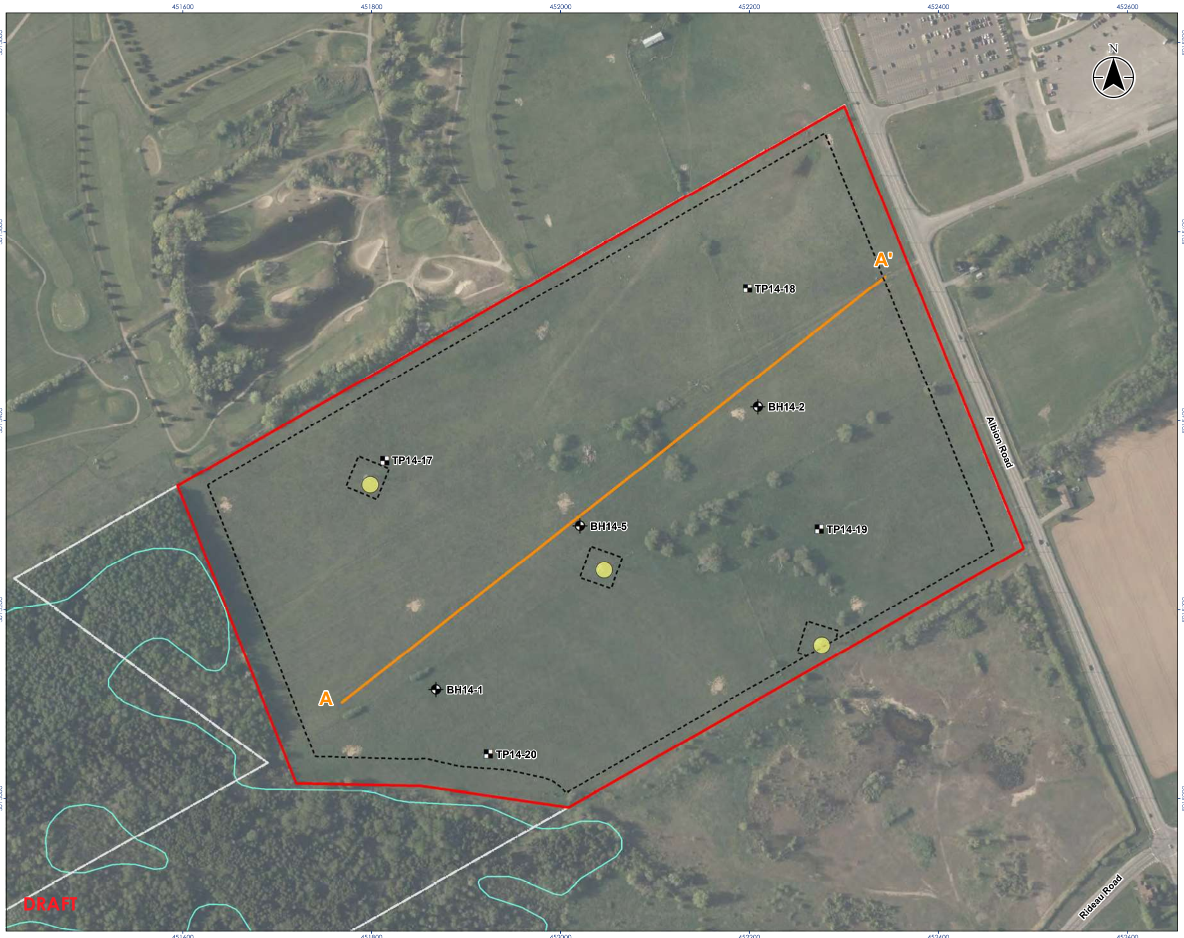
Marie Goddard M.Sc., P.Geo
Hydrogeologist
Phone: (519) 585-7109
marie.goddard@stantec.com

Lesley Veale M.Sc., P.Geo
Senior Hydrogeologist
Phone: (519) 585-7377
lesley.veale@stantec.com

Attachment A: Figure 1 Site Plan
Figure 2 Cross-Section A-A'

ATTACHMENT A:

Figure 1 – Site Plan
Figure 2 – Cross-Section A-A’

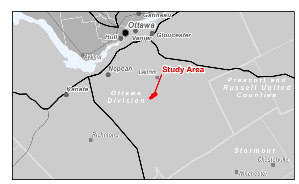


Stantec

Legend
- Site Boundary
- Setback Limit
- Monitoring Well (Houle Chevrier Engineering, 2014)
- Test Pit (Houle Chevrier Engineering, 2014)
- Hydro Tower
- Cross-Section Location
- Wetland, Not evaluated per OWES
- Subject Property Boundary

0 100 200 metres
1:4,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



Project Location
City of Ottawa

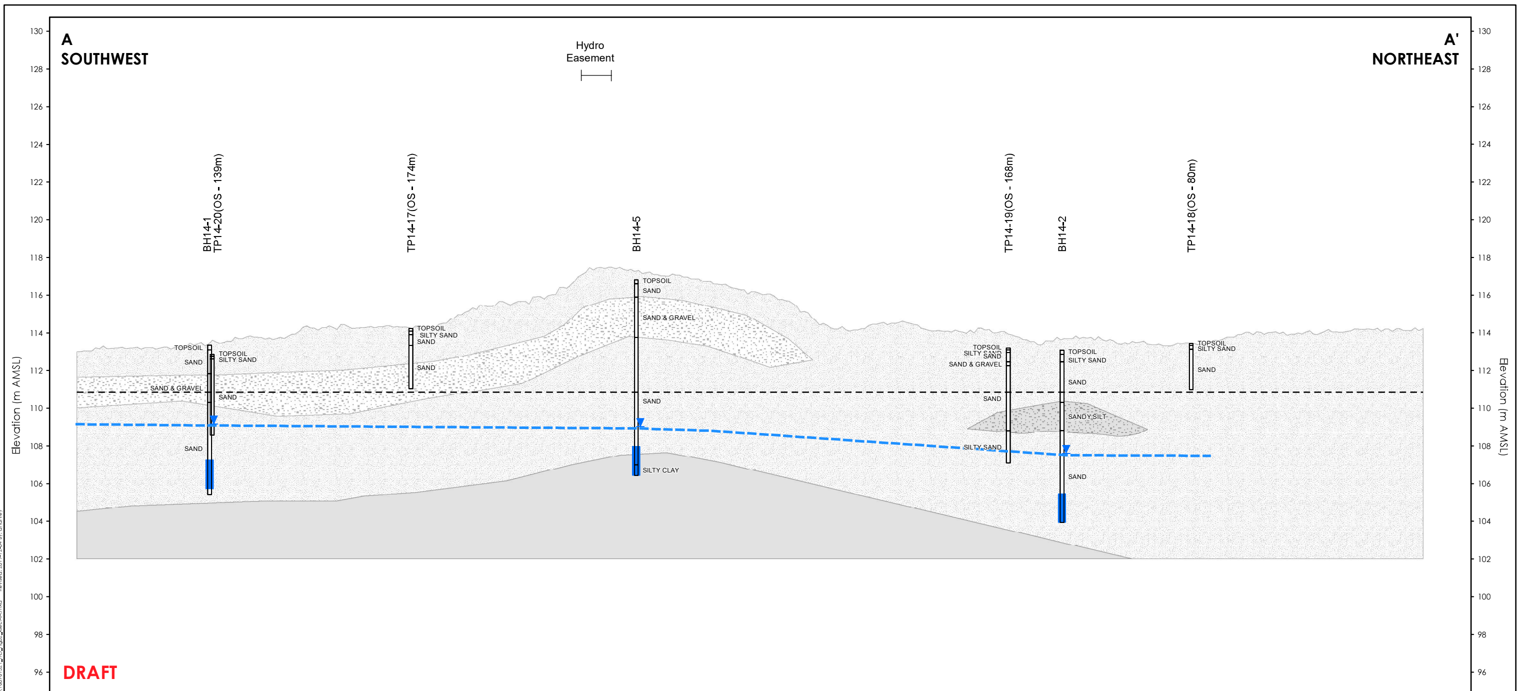
160961321 REVA
Prepared by CMC on 2019-11-20
Technical Review by ABC on yyyy-mm-dd

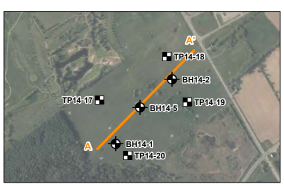
Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
1

DRAFT

Title
Study Area





Notes

1. RTD= Relative to Datum, Datum unknown.

Well ID (Offset) — MW1-15 (OS m)

Stratigraphy

Water Level (April 24, 2019)

Well Screen

Interpreted Peak Ground Water Elevation

Maximum Excavation Elevation 110.8 m AMSL

Sand

Sand & Gravel

Sandy Silt

Silty Clay

Monitoring Location	Ground Water Elevation (m AMSL) April 24, 2019
BH14-1	109.27
BH14-2	107.65
BH14-5	109.08

10x Vertical Exaggeration

0 30 60 metres

1:2,000 (At original document size of 11x17)

Stantec

Project Location
City of Ottawa

160961321 REVA
Prepared by dharvey on 2019-12-04
Technical Review by LV on 2019-11-14

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
2

Title
Cross-Section A-A'

APPENDIX B

Level 1 and 2 Natural Environment Report

Ottawa International Airport Aggregate Pit – Parcel C – Level 1 & 2 Natural Environmental Report

FINAL REPORT

February 7, 2020
File: 160961321

Prepared for:

Thomas Cavanaugh Construction Ltd.
9094 Cavanagh Road
Ashton, ON K0A 1B0

Prepared by:

Stantec Consulting Ltd.
1-70 Southgate Drive
Guelph, ON N1G 4P5

This document entitled Ottawa International Airport Aggregate Pit – Parcel C – Level 1 & 2 Natural Environmental Report was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Thomas Cavanaugh Construction Ltd. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by ____________________________________
(signature)

Josh Mansell, Can-CISEC
Biologist

Prepared by ____________________________________
(signature)

Melissa Cameron, M.Sc., OALA
Terrestrial Ecologist

Reviewed by ____________________________________
(signature)

Dan Eusebi, BES, MCIP, RPP
Senior Environmental Planner

pk \\cd1220-f02\work_group\01609\active\160961321\05_report_deliv\natural environment\rpt_160961321_lvl2_nat_env_20200207_fin.docx

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

Stantec Consulting Ltd. (Stantec) was retained by Thomas Cavanaugh Construction Ltd. (Cavanaugh) to prepare a Natural Environment Level 1 & 2 Technical Report for a proposed aggregate pit located at 4788 Albion Road, Gloucester, Ontario, K1X 1A6 (the Site), within the City of Ottawa. The pit operation will be restricted to extracting aggregate material no closer than 1.5 metres (m) above the established groundwater table. Although the project is not subject to provincial licensing requirements under the *Aggregate Resources Act* (ARA), due to its location on federal land, Cavanaugh intends to prepare an application for aggregate extraction for submission to the City of Ottawa and Ottawa Airport Authority.

Under the ARA, a Level 2 Natural Environment impact assessment and report is required when natural heritage features (e.g., wetlands, species at risk habitat) have been identified on, or within, 120 m of a Site during preliminary investigations (i.e., a Level 1 assessment). During Stantec's preliminary review of available data sources and initial site reconnaissance, natural heritage features were identified as occurring on the Site, or within 120 m of the Site (the Study Area). As such, this report has been prepared to fulfill the ARA requirements for a Level 1 & 2 Natural Environment Report. The report is also intended to address the requirements of an Environmental Impact Statement (EIS) under the City of Ottawa's EIS guidelines (City of Ottawa 2015) and the City of Ottawa's Zoning By-law, in support of an application for a zoning amendment, and is intended to demonstrate that the application is consistent with the Provincial Policy Statement (PPS) (MMAH 2014).

1.2 SITE DESCRIPTION

Cavanaugh's Site is proposed to be developed on lands owned by the Ottawa Airport. The Site is approximately 63 ha in size and is known as Parcel C, an unaddressed parcel of land located on Albion Road (Ottawa Regional Rd 25) in the City of Ottawa, Ontario (Figure 1, Appendix A).

The Site is a semi-rectangular plot of agricultural / pastoral land bounded by Albion Road on the east, semi-vegetated former extraction lands to the south, mixed forest and wetland to the west, and a golf course to the north. The Site is bisected northwest to southeast by a hydroelectric right-of-way and includes three high voltage transmission towers. Topography ranges from about 110 m above mean sea level (AMSL) near the western boundary and about 114 m AMSL near the eastern boundary, with a central north-south mound extending up to 117 m AMSL (Gorrell 2006). The ground surface decreases to the west of the Site with the edge of the mapped wetland coinciding to an elevation of about 108 m AMSL.

The Site is primarily located at the eastern boundary of the Lower Rideau River watershed within the Mosquito Creek subwatershed, with about 3 ha of the southeastern portion of the Site in the South Nation Watershed. Surface water flow within the Mosquito Creek subwatershed is to the west to the Rideau River.

2.0 ENVIRONMENTAL POLICY CONTEXT

This report has been prepared to address policies and guidelines from legislation relevant to aggregate development on federal land in the City of Ottawa, including the federal Species at Risk legislation (*Species At Risk Act 2002* (SARA)), the Ottawa International Airport Authority (CITE DOCUMENT), the City of Ottawa Official Plan ([OP) City of Ottawa 2003), and the *Conservation Authorities Act, 1990* (Government of Ontario 1990). Although the project is not subject to provincial licencing requirements of the ARA, the reporting standards for a Level 2 Natural Environment impact assessment were used in development of this report.

The policy documents discussed below were used to assess the natural heritage features and functions of the Study Area, scope the study methodologies, and determine natural heritage constraints for the Project.

2.1 FEDERAL POLICY

2.1.1 Species at Risk Act

The federal *Species at Risk Act* (SARA), 2002 was created to protect wildlife species at risk in Canada. SARA, which became law in June 2003, protects federally listed species at risk, their residences and their critical habitats. SARA also contains provisions to help manage species of special concern in order to prevent them from becoming endangered, extinct or extirpated. SARA is administered throughout Canada by Environment Canada in conjunction with provincial regulators.

The federal process through which species status are designated begins with an assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), involving a review of status reports and other available information. COSEWIC makes one of the following status designations: extinct, extirpated, endangered, threatened, special concern, or not at risk. They may also determine they do not have sufficient information to classify the species. The status designation is provided to the Minister of Environment and Canadian Endangered Species Conservation Council for review and consideration. The species status may then be added to a schedule of the SARA, which requires an amendment to the Act. Once the species has been added to a schedule, it is afforded legal protection under the SARA. There may be a timeline of several years between the COSEWIC status designation and addition to a SARA schedule.

SARA includes prohibitions against killing, harming, harassing, capturing or taking SAR, which makes it illegal to destroy their residences and/or critical habitats, and can impose restrictions on development and construction projects. Permits for prohibited activities may be issued under Section 73 of SARA.

2.1.2 Migratory Birds Convention Act

The federal *Migratory Birds Convention Act*, 1994 (MBCA) protects migratory birds and their nests (S. 4). Section 6 of the Migratory Bird Regulations (C.R.C., c. 1035) prohibits the disturbance, destruction or taking of a nest, egg, or nest shelter of a migratory bird. Nest disturbance during the course of vegetation clearing may be considered as "incidental take" and could be seen as a contravention of the MBCA.

2.2 PROVINCIAL POLICY

2.2.1 Aggregate Resources Act

This report has been prepared with reference to the provincial standards for a Class A Category 3 licence under the ARA above the water table. The standards require a Level 1 Natural Environment Technical Report to determine whether any of the following features exist on and/or within 120 m of the Site:

- Significant wetlands
- Significant habitat of endangered or threatened species
- Fish habitat
- Significant woodlands
- Significant valleylands
- Significant wildlife habitat (SWH)
- Significant Areas of Natural and Scientific Interest (ANSI)

If any of the seven natural heritage features are present, the ARA standards state that a Level 2 Natural Environment Technical Report is required to determine any negative impacts on the natural features or ecological functions for which they are identified and propose any preventative, mitigative or remedial measures that may be necessary. Based on the site characteristics including the presence of significant woodlands and potential for Endangered and Threatened species within 120 m of the site a Level II report was completed.

2.2.2 Conservation Authorities Act, 1990

The *Conservation Authorities Act* is the enabling legislation that provides the legal basis for the creation of conservation authorities ("CAs") in Ontario (Government of Ontario 1990). Generally, the *Conservation Authorities Act* directs CAs to perform a number of critical functions regarding watershed planning and management including the prevention, elimination, or reduction of loss of life and property from flood hazards and erosion hazards, as well as the conservation and restoration of natural resources. Section 28 of the *Conservation Authorities Act* empowers CAs to make regulations in the area under its jurisdiction, including the prohibition, regulation or permitting for development if the control of flooding, erosion, or the conservation of land may be affected by the development.

Pursuant to *Ontario Regulation 174/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, May 2006*, prior permission is required from the Rideau Valley

Conservation Authority (RVCA) for development within a floodplain, valleylands, wetland, or other hazardous land. Permission is also required from the RVCA for alteration to a river, creek, stream or watercourse or interference with the hydrological function of a wetland. Generally, development, interference or other alteration that may negatively impact the control of flooding, erosion, dynamic beaches, pollution, or the conservation of land are not permitted (RVCA 2010).

Development and/or site alteration within the jurisdiction of the Authority and in, on or adjacent to natural heritage features must be in accordance with the policies and guidelines in Sections 1.2, 1.4, and 1.5 of the *RVCA Policies Regarding Development Including the Construction / Reconstruction of Building and Structures, Placing of Fill and Alterations to Waterways Under Section 28 of the Conservation Authorities Act of Ontario* and must be to the satisfaction of the Authority.

The RVCA (2010) policy with respect to development in wetlands is that it “may be permitted provided it will not have an adverse effect on the control of flooding, erosion, pollution or the conservation of land and, in the case of wetlands, the hydrologic function of the wetland.”

2.3 MUNICIPAL POLICY

2.3.1 City of Ottawa Official Plan

The City of Ottawa Official Plan (Plan) was adopted by Council on in May 2003. Schedules A, B, K, and L of the Plan designate the Natural Heritage System Features and Areas, which generally include features that are protected by the Provincial Policy Statement such as significant wetlands and woodlands, and other habitat features (City of Ottawa 2003).

Section 3.2.1 of the Plan states that development and site alteration shall not be permitted within Significant Wetlands, including Provincially Significant Wetlands (PSW). According to Section 3.2.1, development and site alterations are not permitted within 120 m of the boundary of a Significant Wetland unless an EIS demonstrates that there will be no negative impacts on the wetland or its ecological function.

Section 3.2.2 of the Plan states that development and site alteration shall not be permitted within Natural Environment Areas (i.e., wetlands, Significant Woodlands, Significant Wildlife Habitat (SWH), Areas of Natural and Scientific Interest (ANSIs)). According to Section 3.2.2, development and site alterations are not permitted within 120 m of a Natural Environment Area; unless an EIS demonstrates that there will be no negative impacts on the natural features within the area or their ecological functions.

According to Section 4.7.3, development and site alteration is not permitted in fish habitat except in accordance with federal and provincial requirements. Proposed development near or adjacent to water bodies that provide fish habitat must demonstrate that the proposed development will not have a negative impact on fish habitat.

Section 4.7.4 of the Plan states that development and site alteration shall not be permitted in significant habitat of endangered and threatened species. According to Section 4.7.4, development and site alterations are not permitted within 120 m of the boundary of identified significant habitat of endangered and threatened species unless the ecological function of the adjacent lands has been evaluated and an EIS demonstrates that there will be no negative impacts on the significant habitat of endangered and threatened species or on its ecological functions.

Mineral aggregate resources policies are described in Section 3.7.4 of the OP. Important sand, gravel and bedrock resources areas are designated on OP schedules with the intent to protect aggregate resources close to markets, to protect aggregate operations from incompatible adjacent land uses and to minimize disruptions to communities and the environment from aggregate extraction activities (Policy 3.7.4.1). There are no implied restrictions to applications for aggregate operations outside the sand, gravel or bedrock resource areas. Policy 3.7.4.7 states that all pits and quarries licenced under the ARA must be zoned for mineral extractive use in the City's zoning bylaw. An environmental impact statement is required as part of an application for aggregate extraction in the City of Ottawa (Policy 3.7.4.9).

3.0 APPROACH

3.1 LITERATURE REVIEW

As part of this Level 2 Natural Environment Report, the following background documentation and related information sources were reviewed to identify natural heritage features and constraints within 120 m of the Site:

- Ontario's Natural Heritage Information Centre (NHIC 2019)
- Land Information Ontario (LIO 2019)
- City of Ottawa's Official Plan (Ottawa 2003)
- geoOttawa (City of Ottawa 2019)
- Satellite imagery (Google Earth Pro 2019)
- Fisheries and Oceans Canada (DFO) Species at Risk Mapping (DFO 2018)
- Atlas of Breeding Birds of Ontario (OBBA) (Cadman 2007)
- eBird Canada (ebird 2019)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020)
- Ontario Butterfly Atlas Online (Toronto Entomologists' Association 2019)
- Atlas of the Mammals of Ontario (Dobbyn 1994)

Some of the sources above provide data at a scale as large as 10 x 10 km. Results were therefore screened to assess their relevance to the Site and species were removed from consideration if no suitable habitat was observed on or adjacent to the Site (e.g., riverine fish species).

3.1.1 Species at Risk

For the purpose of this assessment, SAR are species listed as Threatened (THR) or Endangered (END) on SARA Schedule 1 or the Species at Risk in Ontario (SARO) list. SAR occurrences were obtained from the NHIC (MNRF 2019) and other online databases. These sources were used to determine if there were any significant floral or faunal species with potential to occur on, or within 120 m of, the Site.

3.1.2 Species of Conservation Concern

Species of conservation concern (SOCC) are considered at a number of levels, including globally, nationally, and provincially. For this report, SOCC includes species that are provincially rare (with a Provincial S-rank of S1 to S3) or listed as Special Concern (SC) on SARA Schedule 1 or SARO. Provincial ranks (S-ranks) are used by the NHIC to set protection priorities for rare species and vegetation communities. They are based on the number of factors such as abundance, distribution, population trends and threats in Ontario and are not legal designations. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be determined. Species with provincial ranks of S1 to S3, and those tracked by the MNRF, are considered SOCC. Provincial S-ranks are defined as follows:

S1: Critically imperiled; usually fewer than 5 occurrences
S2: Imperiled; usually fewer than 20 occurrences
S3: Vulnerable; usually fewer than 100 occurrences
S4: Apparently secure; uncommon but not rare, usually more than 100 occurrences
S5: Secure, common, widespread and abundant

S-rank followed by a "?" indicates the rank is still uncertain

3.2 AGENCY CONSULTATION

Pre-consultation meetings were held with the City of Ottawa on September 24th, 2019, and MNRF on ____, 2019. Staff at both meetings noted that as the project is on federal land, the protection of species at risk falls under SARA rather than the provincial ESA.

3.3 FIELD INVESTIGATIONS

In order to support the natural environment impact assessment and report for the Site, Stantec developed and initiated a field program in 2019 to identify and classify the existing conditions site conditions (e.g., vegetation communities, SAR habitat) as well as confirming the natural heritage features on, or within 120 m of, the Site that were identified through the literature review process. Stantec's field program was completed in conjunction with both the wildlife active and vegetation growing seasons – typically between April and October in any given year.

Table 3-1 provides a summary of dates and environmental conditions during Stantec's 2019 field program.

Table 3.1: ELC and Botanical Survey Dates and Environmental Conditions

Purpose of Investigation	Date	Start/End Time (24 hours)	Weather Conditions	Biologist
• General/SWH Wildlife Habitat Assessment • Breeding Amphibian Survey #1	May 07, 2019	1730 – 2230 hrs.	Temperature: 11 – 13°C Wind (Beaufort scale): 1 – 3, NW Cloud Cover: 0% Precipitation: None 24/hr. Precipitation: None	Josh Mansell
• General/SWH Wildlife Habitat Assessment • Bat Maternity Roost Habitat Suitability Assessment	May 21, 2019	0800 – 1230 hrs.	Temperature: 9°C Wind (Beaufort scale): 3 – 4, NW Cloud Cover: 50% Precipitation: Trace rain 24/hr. Precipitation: None	Josh Mansell

Table 3.1: ELC and Botanical Survey Dates and Environmental Conditions

Purpose of Investigation	Date	Start/End Time (24 hours)	Weather Conditions	Biologist
• Breeding Amphibian Survey #2 • ELC/Botanical Survey #1	May 31, 2019	1730 – 2300 hrs.	Temperature: 11 – 12°C Wind (Beaufort scale): 1 – 2, W Cloud Cover: 70 – 80% Precipitation: None 24/hr. Precipitation: ~1 – 3 mm	Josh Mansell
• General/SWH Wildlife Habitat Assessment • Breeding Bird Survey #1 • SAR Grassland Breeding Bird Transect Survey #1 • Bat Acoustic Monitor Deployment	June 5, 2019	0530 - 1130	Temperature: 12 – 16°C Wind (Beaufort scale): 1, W Cloud Cover: 100% Precipitation: None 24/hr. Precipitation: ~5 mm	Brennan Obermayer
• General/SWH Wildlife Habitat Assessment • Breeding Bird Survey #2	June 17, 2019	0630 - 0930	Temperature: 12°C Wind (Beaufort scale): 1, W Cloud Cover: 0% Precipitation: None 24/hr. Precipitation: n/a	Brennan Obermayer
• General/SWH Wildlife Habitat Assessment • Breeding Amphibian Survey #3 • Crepuscular Breeding Bird Survey #1	June 20, 2019	2000 – 0145 hrs.	Temperature: 15 – 17°C Wind (Beaufort scale): 1 – 2, SE Cloud Cover: 20 – 30% Precipitation: None 24/hr. Precipitation: ~1 – 3 mm Moon Rise: 2305 hrs. Moon Phase: Full, 91% illumination	Josh Mansell
• General/SWH Wildlife Habitat Assessment • ELC/Botanical Survey #2 • Breeding Bird Survey #3 • Bat Acoustic Monitor Retrieval	July 9, 2019	0600 – 1300 hrs.	Temperature: 15 – 19°C Wind (Beaufort scale): 1 – 2, W Cloud Cover: 0% Precipitation: None 24/hr. Precipitation: None	Josh Mansell
• General/SWH Wildlife Habitat Assessment • ELC/Botanical Survey #3	August 19, 2019	0600 – 1000 hrs.	Temperature: 28°C Wind (Beaufort scale): 2 – 3, W Cloud Cover: 20%	Josh Mansell

Table 3.1: ELC and Botanical Survey Dates and Environmental Conditions

Purpose of Investigation	Date	Start/End Time (24 hours)	Weather Conditions	Biologist
			Precipitation: None 24/hr. Precipitation: ~1 – 3 mm	

The following surveys were completed during Stantec's 2019 field program to identify and classify existing conditions and constraints at the Site.

3.3.1 Ecological Land Classification and Botanical Survey

Initial characterization of existing vegetation communities was completed by interpreting available aerial imagery. Vegetation was identified, and communities were verified and assessed in the field on, or within 120 m of, the Site following a meandering transect. Community characterizations (ecosites and vegetation types) were based on the Ontario Ecological Land Classification (ELC) system (Lee et. al., 1998).

Stantec completed vegetation community characterizations (ELC) and botanical surveys on May 31, July 9 and August 19, 2019; and were timed in order to maximize observations of species during their respective flowering periods (i.e., late spring/early summer and mid/late summer). A comprehensive vegetation inventory (botanical survey) was prepared for the Site and is presented in **Appendix C**. Dominant vegetation species within community were recorded on ELC data cards (see **Appendix D**). Common names and scientific nomenclature of the species observed follow the provincial *Ontario Species List - Vascular Plants*. Provincial significance of vegetation communities and plant species was based on the rankings assigned by the NHIC.

See **Table 3-1** for ELC and botanical survey dates and environmental conditions.

3.3.2 Breeding Amphibian Survey

Bird Studies Canada's (BSC) Ontario *Marsh Monitoring Program* (MMP) survey protocol (BSC 2003), an industry standard protocol, was used at the Site to identify breeding anurans (frogs and toads) and their associated habitat. During the survey, observers approach each potential breeding habitat feature on foot and record the level of calling (call code) anuran species heard within a three-minute period.

The amphibian call codes record four levels of calling:

- 0 – No calls heard
- 1 – Individuals can be counted, and calls are not overlapping
- 2 – Numbers of some individuals can generally be estimated or counted, others overlapping
- 3 – Full chorus, calls continuous and overlapping, and individuals not distinguishable

In accordance with the MMP protocol, surveys begin at least one-half hour after sunset and are completed before midnight. Appropriate survey conditions consist of winds less than 19 km/hr (Beaufort 3) and minimum night-time air temperatures of at least 8°C for the first survey (April 15 – 30), 13°C for the second survey (May 15 – 31) and 21°C for the third (June 15 – 30). However, surveys can be conducted at lower temperatures if there is strong calling activity observed within the general location of the study Area.

Stantec completed breeding amphibian surveys on May 7, May 31 and June 21, 2019 focusing on habitats features on, or within 120 m of, the Site. Though the first survey (May 7) was completed outside of the recommended window of April 15 – 30, the early calling species of spring peeper (*Pseudacris crucifer*), western chorus frog (*Pseudacris triseriata*) and wood frog (*Lithobates sylvaticus*) were still observed calling within the general location of the Site (pers. comm. Josh Mansell (Stantec) as of May 7, 2019. As such, it was determined by Stantec that the May 7 survey period was sufficient to capture any calls of the early calling species above that may be present on, or within 120 m of, the Site.

As there was only one potential anuran breeding habitat observed within the Site (e.g., vernal pool) (CAP19UJM004), the survey included three additional stations that focused on adjacent potential breeding habitats within 120 m of the Site.

See **Table 3-1** for breeding amphibian survey dates and environmental conditions.

3.3.3 Bat Maternity Roost Habitat Suitability Assessment

Trees on, or within 120 m of, the Site were assessed during leaf-off conditions on May 21, 2019 to identify trees that meet the criteria to support potential maternal roosts of bats (e.g., cavities, loose bark). This methodology and suitable habitat feature criteria are outlined in the *Survey Protocol for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-colored Bat* (2017) developed by the MNRF's Guelph district. Within the MNRF's (2017) protocol, there are four phases identified to determine the presence of SAR bats within a vegetation community or site:

1. Phase I: Bat Habitat Suitability Assessment
2. Phase II: Identification of Suitable Maternity Roost Trees
3. Phase III: Acoustic Surveys
4. Phase IV: Snag Density Survey

Phase I: Bat Habitat Suitability Assessment includes the identification of potentially suitable vegetation communities (e.g., FOD, FOM, FOC) based on the provincial Ecological Land Classification descriptions (Lee et. al., 1998) and was completed during the literature review phase. Phase II was completed by walking meandering transects through the adjacent (within 120 m) forested communities west and south of the Site and identifying potentially suitable maternity roost trees:

1. Standing live or dead tree greater than or equal (≥) to 10 cm diameter at breast height (DBH) with cracks, crevices, hollows, cavities and/or loose or naturally exfoliating bark

2. Oak (Quercus spp.) tree ≥ 10 cm DBH, any maple (*Acer* spp.) tree ≥ 10 cm DBH if the tree includes dead/dying leaf clusters and/or maple tree ≥ 25 cm DBH

Binoculars were used during this survey to confirm the presence of the above criteria.

When present, the location of potentially suitable maternity roost trees, identified by the criteria above, determined to be on, or within 120 m of, the Site were recorded on a handheld global positioning device (GPS).

As per the MNRF (2017) protocol, survey timing for suitable maternity roost trees differs between little brown myotis and northern myotis (leaf-off conditions) versus tri-colored bat (leaf-on). The surveys were conducted during leaf-off conditions, meeting the protocol requirements for two of the three tree-roosting bat SAR. Recognizing that dead/dying leaf clusters may no longer be present on oak and maple trees due to environmental conditions (e.g., wind) during the prescribed leaf-off conditions, Stantec completed the maternity roost habitat surveys for tri-colored bat in conjunction with the little brown myotis and northern myotis surveys (and eastern small-footed myotis). This deviation from the MNRF protocol is not considered to affect the reliability of the results, specifically for tri-colored bat, as all oak and maple trees, regardless if dead/dying leaf clusters were present, were identified and assessed.

See **Table 3-1** for bat maternity roost habitat suitability assessment dates and environmental conditions.

3.3.4 Bat Acoustic Monitoring Surveys

The bat acoustic monitoring surveys focused on the Site and suitable habitats within 120 m of the Site to determine if impacts to SAR bats are anticipated during site preparation, construction and/or aggregate extraction activities. The MNRF (2017) protocol outlines an ecosite approach to determining the placement and density of monitoring stations on a given site. However, given the quality and general lack of potentially suitable maternity trees, Stantec determined that it was important to focus on high quality habitat features as well as providing ample coverage of the Site, including vegetation community OAGM4 (which is not considered a suitable vegetation community described in above in Section 3.3.3), as well as potentially suitable habitats within 120 m. This method of site selection is a deviation from the MNRF's (2017) protocol. Five acoustic monitoring stations were established on, and within 120 m of, the Site.

Wildlife Acoustic SM4BAT FS detectors were deployed on June 5, 2019 in conjunction with breeding bird survey #1. The SM4BAT FS detectors allow for signal to noise ratio analysis. Settings on the detectors were set to:

- Gain: 12dB
- Sample Rate: 256kHz
- 16k High Filter: off
- Min Duration: 1.5ms
- Max Duration: None
- Min Trigger Frequency: 16kHz
- Trigger Level: 18dB

- Trigger Window: 1 second
- Max Length: 15 seconds

The detectors were secured to selected trees at each of the five survey stations on, and within 120 m of, the Site. Microphones were positioned away from obstacles, and away from prevailing winds where possible, to maximize the range of bat detection.

Once retrieved, bat data was analyzed using Wildlife Acoustic's Kaleidoscope Pro version 5.1.3 identification software. First, the software was used to conduct an initial screening, which removed the recordings of background noise and automatically assigns each bat call recording with a likely species; or in some cases a call remained unidentified. As the software's automated identification has a high error rate, compared to person trained in bat identification, the bat calls were then visually assessed to confirm the identification. Visual assessment involves viewing sonograms (plots of frequency vs time) of each call in Kaleidoscope Pro. All high frequency calls, which would include all SAR (i.e., *Myotis* and *Perimyotis* spp.) were visually assessed to confirm identification of each call. Low frequency calls were spot checked to confirm the presence of each species identified by Kaleidoscope Pro. Low frequency calls that were unidentified by Kaleidoscope Pro were left as unidentified, as they would not include SAR.

The MNRF (2017) protocol recommends that acoustic monitoring for bats be conducted over a minimum of 10 nights between June 1 and June 30 on nights that are above 10°C, with low winds and no precipitation. The detectors were set to record each night from 2100 hrs. until 0500 hrs. the following morning. The SM4BAT FS detectors were deployed on June 5, 2019 and were retrieved on July 9, 2019.

See **Table 3-1** for SAR bat maternity roost acoustic monitoring deployment and retrieval dates and environmental conditions.

3.3.5 Breeding Bird Surveys

3.3.5.1 Breeding Bird Point Counts

Three breeding bird surveys at the Site were completed by Stantec during the breeding bird season (June – 1st week of July) using a standard 10-minute, point-count approach with an unlimited radius, except where adjacent count circles overlap. These methods are consistent with previously approved methods by the Canadian Wildlife Service (CWS). All birds heard or seen, with the assistance of binoculars, during the ten-minute "count" were recorded. The highest level of breeding evidence observed (e.g., carrying food, nest with young), as defined in the *Ontario Breeding Bird Atlas* (Cadman et. al. 2007), was recorded at each survey station for each species encountered. The total number of individuals of each species was recorded in order to develop an understanding of population dynamics in the Site. Incidental observations made while surveyors were moving between stations were also recorded.

A total of 7 breeding bird survey stations were established on, or within 120 m of, the Site. Four of the survey stations were located within the open, grassland habitat of the Site (CAP19BBJM001-002, 006-007); and three of the survey stations were placed in the adjacent woodland habitats, within 120 m of the

Site (CAP19BBJM003-005). Furthermore, survey stations CAP19BBJM001-002, 006-007 were also located along established transects as part of the SAR grassland breeding bird transect surveys described in below Section 3.3.6.

See **Table 3-1** for breeding bird survey dates and environmental conditions.

3.3.5.2 Grassland Breeding Bird Transect Survey

In conjunction with breeding bird survey #2 and #3, Stantec completed SAR grassland breeding bird transect surveys on foot. Following the guidance in the draft MNRF *Bobolink Survey Methodology* (2011), two parallel transects 250 m apart were set-up lengthwise in a relative east-west fashion within the grassland habitats of the Site. Along each transect, point-count survey stations were established at 250 m intervals (CAP19BBJM001-002, 006-007) and were completed in combination with the breeding bird surveys described in Section 3.3.5.

Each survey station along both SAR grassland breeding bird transects were surveyed in the same manner as the survey stations in the breeding bird survey described in Section 3.3.5 including recording information on the sex and behavior SAR grassland species, specifically Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*). Locally known to breed in the general area, Grasshopper Sparrow (*Ammodramus savannarum*) was also considered during this survey. While walking between survey stations, observations of SAR grassland species are also recorded.

See **Table 3-1** for SAR grassland breeding bird transect survey dates and environmental conditions.

3.3.5.3 Crepuscular Breeding Bird Survey

Through the literature review process, the potential for crepuscular bird species (eastern whip-poor-will (*Antrostomus vociferous*) and common nighthawk (*Chordeiles minor*)) on lands in the vicinity of the Study Area was identified based on the species habitat preferences.

Although desktop and field assessments indicated that suitable habitat was not present in the Study Area, a single survey was completed in conjunction with Breeding Amphibian Survey #3 on June 20, 2019 to identify crepuscular breeding bird species in the vicinity of the Study Area. The MNRF’s (2014) draft protocol *Survey Protocol for Eastern Whip-poor-will (Caprimulgus vociferus) in Ontario* was consulted to determine the acceptable date, timing and length of the survey as well as the environmental conditions that are considered to increase calling activity, specifically for eastern whip-poor-will. Moon phase, position and illumination percentage for the Ottawa area was obtained from the publicly available website: timeanddate.com.

A total of four (4) five-minute point counts (CAP19JMEW001-004) were completed at the exact same locations as the breeding amphibian survey stations within the Site. Additionally, three (3) supplementary survey stations (CAP19JMEW005-007) were completed along Rideau Road (2 stations) and Bowesville Road, south and west of the Site respectively, which is sufficient enough to assess the categorized habitat, if present, of eastern whip-poor-will identified in the MNRF's *General Habitat Description for the Eastern Whip-poor-will (Caprimulgus vociferous)*.

See **Table 3-1** for crepuscular breeding bird survey dates and environmental conditions.

3.3.6 General Wildlife Habitat Assessment

General wildlife habitat assessments were completed at the Site concurrently during each of the surveys above. These assessments focused on the identification of wildlife habitat features, specifically Significant Wildlife Habitat (SWH) features as outlined in the MNRF's Criteria Schedules for Ecoregion 6E (MNRF, 2015). When encountered, these features were identified, recorded and assessed for significance. All wildlife species were observed by sight, sound and/or through distinctive signs (e.g., tracks, scat).

Wildlife habitat suitability assessments were also completed for SARA and ESA protected species that may occur in the area, including species identified in the NHIC database and Ontario wildlife atlases during the literature review process.

See **Table 3-1** for general wildlife habitat assessment survey dates and environmental conditions.

3.3.7 Significant Wildlife Habitat

In order to ensure a comprehensive approach to identifying and evaluating SWH at the Site, significance has been determined based on guidance provided in the *Natural Heritage Reference Manual* (NHRM) (MNR, 2010) and criteria from the *Significant Wildlife Habitat EcoRegion 6E Criterion Schedule* (MNRF, 2015) with support from the *Significant Wildlife Habitat Technical Guide* (SWHTG) (MNR, 2000) as appropriate. The NHRM divides wildlife habitat into four broad categories:

1. Habitats of seasonal concentrations of animals;
2. Rare vegetation communities or specialized habitats for wildlife;
3. Habitats of species of conservation concern (excluding endangered and threatened species); and
4. Animal movement corridors

Field assessments identified candidate SWH using guidance from the SWHTG and the SWH Criteria Schedules for Ecoregion 6E (MNRF 2015). See **Table 3-1** for Significant Wildlife Habitat assessment survey dates and environmental conditions.

4.0 ENVIRONMENTAL SITE DESCRIPTION

4.1 PHYSIOGRAPHY, GEOLOGY AND SOILS

Regional physiography is influenced by the historic Ottawa River valley and varies from clay plain to sand plain with extensive drumlins to the south (Chapman and Putnam 1984). The Study Area consists primarily of glaciofluvial deposits of sand and gravel with a small area of organic deposits underlying the forested wetland to the west of the Site (Ontario Geological Survey 2010). A linear feature of a beach ridge and near shore bar is mapped along the western boundary of the Site (Ontario Geological Survey 2010).

Investigations at the Site by Houle (2014) confirmed deposits of sands, and sands and gravels underlain by a silty clay. The top of the silty clay was encountered at a depth of approximately 10 m in the central portion of the Site in borehole BH14-5. The lateral extent of this silty clay is unknown. A lens of sandy silt was encountered on the eastern portion of the Site in borehole BH14-2 at approximately 4 m depth. These deposits represent ice-contact and near-shore sediments of the former Champlain Sea (Gorrell 2006). Ordovician-aged limestone/dolostone bedrock of the Oxford Formation is anticipated to be located at depths ranging between 3 m and 25 m, with thinner overburden cover along the southern boundary (Gorrell 2006, Houle 2014, Ontario Geological Survey 2011).

The Study Area is situated in the Kemptville Ecodistrict (6E-12) within the Lake Simcoe-Rideau Ecoregion. Over one third (37%) of this ecodistrict is under natural forest cover and an additional 22% of land cover is wetland, primarily swamp (Henson and Bodribb 2005). Land use in Ecodistrict 6E-12 is predominantly agricultural (60%); secondary uses are conservation land (6%), settlement or other developed lands (3%), and aggregate extraction (0.8%).

4.2 HYDROLOGY

Groundwater monitoring was initially completed as part of the 2006 and 2014 investigations, with additional monthly monitoring by Cavanagh at three boreholes (BH14-1, BH14-2 and BH14-5) in 2019 and provided to Stantec for interpretation (Stantec 2019). Gorrell (2006) reported groundwater at TP26-06 on April 12, 2006 at a depth of 6.7 m below ground surface (BGS) at an elevation of 105.3 m AMSL.

The groundwater levels appear to follow a seasonal trend, being higher after spring melt and declining over the summer months as is typical for shallow groundwater systems. Based on the available data, the groundwater elevation at the Site peaked in April 2019 at 109.3 m AMSL (Stantec 2019).

Surface water and/or groundwater data is not available for the wetland located to the immediate west of the Site; however, based on available ground surface elevation of 108 m AMSL, similar water levels are anticipated to be present within the wetland. The wetland and the shallow groundwater are likely hydraulically connected (Stantec 2019). Regional mapping indicates that surface water flows are to the west (Stantec 2019).

4.3 DESIGNATED NATURAL AREAS

Unevaluated wetlands were identified within 120 m of the Site during the literature review. The nearest designated features to the Study Area are an unnamed significant ecological area (woodland, provincial designation) 400 m to the west of the Site and the Leitrim provincially-significant wetland (PSW), located approximately 750 m to the northeast. The locations of features identified through literature review are shown on **Figure 2, Appendix A**.

4.4 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

Information gathered during the literature review process identified the potential for 16 SAR and nine SOCC to be found in the vicinity (1 km) of the Site (**Table 4-1**).

Table 4.1: Background List of Potential SAR and SOCC in the Study Area

Common Name	Latin Name	Provincial S-rank	SARO Status	SARA Schedule 1
SAR				
Butternut	*Juglans cinerea*	S3?	END	END
Western Chorus Frog	*Pseudacris triseriata*	S3	NAR	THR
Blanding's Turtle	*Emydoidea blandingii*	S3	THR	END
Bank Swallow	*Riparia riparia*	S4B	THR	THR
Barn Swallow	*Hirundo rustica*	S4B	THR	THR
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR
Eastern Whip-poor-will	*Antrostomus vociferus*	S4B	THR	THR
Olive-sided Flycatcher	*Contopus borealis*	S4B	SC	THR
Wood Thrush	*Hylocichla mustelina*	S4B	SC	THR
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	-
Little Brown Myotis	*Myotis lucifugus*	S4	END	END
Northern Myotis	*Myotis septentrionalis*	S3?	END	END
Tri-coloured Bat	*Perimyotis subflavus*	S3?	END	END

Table 4.1: Background List of Potential SAR and SOCC in the Study Area

Common Name	Latin Name	Provincial S-rank	SARO Status	SARA Schedule 1
SOCC				
Monarch	*Danaus plexippus*	S4B, S2N	SC	SC
Eastern Milksnake	*Lampropeltis triangulum*	S3	NAR	SC
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC
Bald Eagle	*Haliaeetus leucocephalus*	S4B, S2N	SC	NAR
Eastern Wood-pewee	*Contopus virens*	S4B	SC	SC
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC	SC
Great Egret	*Ardea alba*	S2B	-	-
Peregrine Falcon	*Falco peregrinus*	S3B	SC	SC
Short-eared Owl	*Asio flammeus*	S2N, S4B	SC	SC

4.5 VEGETATION COMMUNITIES

Vegetation Communities located on, and within 120 m of, the Site were delineated into ELC units (see **Figure 3, Appendix A**). Four naturally occurring community types were identified on, and within 120 m of, the Site. Descriptions of these communities are found in **Table 4-2** below. Adjacent land uses (e.g., transportation) and anthropogenically influenced communities within 120 m of the Site (e.g., idle aggregate operation) were identified by air photo interpretation and confirmed during a roadside reconnaissance and are not described further in **Table 4-2**.

Table 4.2: Ecological Land Classification Vegetation Types

ELC TYPE	Community Description
Woodland (WO) and Forest (FO)	
Deciduous Woodland (WOD)	
Fresh - Moist Poplar Deciduous Woodland Type (WODM5-1)	This fresh-moist poplar community is located west and south of the OAGM4 community within 120 m of the Site. This community was previously cleared and formed a portion of the existing OAGM4 community historically, and is currently dominated by pioneer, non-native and/or thicket species with a well-developed understorey. Trembling aspen (*Populus tremuloides*) is the dominant tree within the varying canopy with clumps of Manitoba maple (*Acer negundo*) occurring throughout the feature. The thick brush understorey defines this feature as the vine Virginia creeper (*Parthenocissus quinquefolia*) is dominant with abundant associates of black raspberry (*Rubus occidentalis*), red raspberry (*Rubus idaeus idaeus*) and riverbank grape (*Vitis riparia*). The herbaceous layer was abundant with common plantain (*Plantago major*), Canada goldenrod (*Solidago canadensis canadensis*) and sensitive fern (Onoclea sensibilis) with brown-eyed susan (*Rudbeckia triloba triloba*), slender-leaved goldenrod (*Euthamia graminifolia*), heal-all (*Prunella vulgaris vulgaris*) and wool-grass (*Scirpus cyperinus*) being occasional associates.

Table 4.2: Ecological Land Classification Vegetation Types

ELC TYPE	Community Description
Deciduous Forest (FOD)	
Naturalized Coniferous Plantation (FOCM6-1)	Along the northern border of the Site, south of the Falcon Ridge Golf Club, a large white pine (*Pinus strobus*) plantation was established between 1976 and 1991 and now forms a majority of the contiguous woodland within 120 m of the licence area. Now naturalized, this community also has the occasional trembling aspen and rare occurrences of green ash (*Fraxinus pennsylvanica*), eastern white cedar and silver maple (*Acer saccharinum*). Choke cherry (*Prunus virginiana*) is the most abundant shrub species with glossy buckthorn (*Frangula alnus*) and pagoda dogwood (*Cornus alternifolia*) found occasionally throughout. Sensitive fern, shinleaf (*Pyrola elliptica*), red raspberry (*Rubus idaeus idaeus*) are the abundant herbaceous species with associates of starflower, drooping woodland sedge (*Carex arctata*) and spinulose wood-fern.
Agriculture (AG)	
Open Agriculture (OAG)	
Coarse Mineral Open Pasture Type (OAGM4)	This large open pasture community is entirely within the Site and also located north of the Site. With rare occurrences of trees, both Manitoba maple and sugar maple (*Acer saccharum*) and shrubs (red raspberry), this feature is dominated by smooth brome (*Bromus inermis*) grass amongst a diverse variety of forage and cover crop species as well as typical weed species associated with these habitats. Abundant species observed included cow vetch (*Vicia cracca*), common timothy grass (*Phleum pratense pretense*), bird's-foot trefoil (*Lotus corniculatus*), common chickweed (*Stellaria media*) and occasional species included meadow goatsbeard (*Tragopogon pratensis*), red clover (*Trifolium pratense*), bladder campion (*Silene vulgaris*) and redtop grass (*Agrostis gigantea*). Livestock were not observed within the feature during Stantec's 2019 field program.
Swamp (SW)	
Coniferous Swamp (SWC)	
White Cedar Mineral Coniferous Swamp Type (SWCM1-1)	Further to the west and south of WODM5-1, within 120 m of the licence area, is a mature, mineral coniferous swamp community with an abundance of large diameter (≥50 cm diameter-at-breast height (DBH)) white cedar (*Thuja occidentalis*) and red maple (Acer rubrum) within the canopy. Occasional associates in the canopy include American elm (*Ulmus americana*), balsam fir (*Abies balsamea*), yellow birch (*Betula alleghaniensis*) and trembling aspen – many of which were also observed to be large diameter. Skunk currant (*Ribes glandulosum*) and Virginia creeper are abundant species in a lacking shrub layer. This swamp community was observed to have pockets of vernal pools with organic soils and a rich abundance and diversity of herbaceous species including the abundant spinulose wood-fern (*Dryopteris carthusiana*), northern starflower (*Lysimachia borealis*), interrupted fern (*Osmunda claytoniana*), poison ivy (*Toxicodendron radicans radicans*) and dew berry (*Rubus pubescens*). Other species of note observed within SWCM1-1 in varying abundance included royal fern (*Osmunda regalis spectabilis*), Jack-in-the-pulpit (*Arisaema triphyllum triphyllum*) and whorled wood aster (*Oclemena acuminate*). A review of aerial imagery as far back as 1976 shows this community has remained largely intact and the abundance and diversity of flora is indicative of the community's age.

4.5.1 Vascular Plant Species

A total of 70 species of vascular plants was recorded on, or within 120 m of, the Site. Of these 70, 47 species (67%) are considered to be native and 23 species (33%) are considered exotic or non-native. Vegetation community OAGM4, 23 plant species, covers the entirety of the Site. All of the native plants observed in the licence area have an S-rank of S5, indicating they are common and secure within Ontario.

Of the 70 species, three observed native species (6%) observed within 120 m of the Site have an S-rank of S4 (or some variation) indicating they are uncommon but not rare and apparently secure in Ontario; these species are green ash (S4), whorled wood aster (S4) and Virginia creeper (S4?).

None of the vascular plant species observed within the Site had a Co-efficient of Conservatism (CC) value of 9 or 10, which is an indicator of floristic quality.

A complete list of plant species recorded on, or within 120 m of, the Site is provided in **Appendix C**.

4.6 WILDLIFE

4.6.1 Breeding Amphibians

The only breeding amphibian habitat feature within the Site was observed in the northeast corner of the property within a shallow, graminoid dominated vernal pool (CAP19UJM004, see **Figure 4, Appendix A**). A total of four (4) calling spring peepers were recorded calling within this feature during Breeding Amphibian Survey #1. Additionally, a single green frog (*Lithobates clamitans*) was observed calling in this feature and was recorded during Breeding Amphibian Survey #3. No amphibians were observed calling from this feature during Breeding Amphibian Survey #2.

Three additional survey stations were established within the Study Area. CAP19UJM001 surveyed an adjacent aggregate borrow pit south of the Site that has matured into a shallow, open-water marsh feature, CAP19UJM002 surveyed the unevaluated wetland associated with the wooded areas southwest of the Site and the seasonally flooded ponds associated with the Falcon Ridge Golf Club north of the Site were the emphasis of survey station CAP19UJM003.

Table 4-3 below outlines the breeding amphibian activity with highest call code observed within 120 m, or further, of the Site observed during Stantec's breeding amphibian surveys. Spring peeper, gray treefrog (*Hyla versicolor*), wood frog (*Lithobates sylvaticus*) and American toad (*Bufo americanus*) were observed within 120 m, or further, of the Site in varying call codes.

Table 4.3: Breeding Amphibian Activity Observed within 120 m of Site

Survey Station	Species Observed	Call Code	Amphibian Survey No.
CAP19UJM001	Spring Peeper	3	Survey #1
	Gray Treefrog	3	Survey #2
CAP19UJM002	Spring Peeper	3	Survey #1
	American Toad	3	Survey #1
	Gray Treefrog	3	Survey #2
CAP19UJM003	Spring Peeper	3	Survey #1
	American Toad	3	Survey #1
	Wood Frog	2 – n/a	Survey #2
	Gray Treefrog	3	Survey #2
CAP19UJM004	Spring Peeper	1-4	Survey #1
	Green Frog	1-1	Survey # 3

All of these species observed during Stantec's amphibian breeding survey are ranked as S5 (common and secure in the province). No provincially rare, endangered, threatened, or special concern species were observed on, or within 120 m of, the Site.

The high abundance of spring peepers observed on the adjacent, surrounding landscape made the identification of additional species difficult at times. As such, an accurate call code for wood frog was not obtained at survey station CAP19UJM003 during breeding amphibian survey #2.

4.6.2 Bat Maternity Roost Habitat Suitability

During the bat maternity roost habitat suitability surveys 6 trees meeting the necessary criteria, described above in Section 3.3.3, were identified within 120 m of the Site. No trees meeting the necessary criteria were identified within the Site (relatively open OAGM4 vegetation community). Three trees (trembling aspen and white pine) were identified within the naturalized plantation, FOCM6-1, two trees (trembling aspen) were identified in the WODM5-1 vegetation community and a single eastern white cedar was identified in the swamp community, SWCM1-1. The identified potential bat maternity roost habitat is shown on **Figure 5**, **Appendix A**.

4.6.3 Bat Acoustic Monitoring

The five SM4BAT FS acoustic detectors (CAP19BATJM001-005) strategically placed at locations in the Study Area (**Figure 4**, **Appendix A**) recorded a total of 8,740 bat calls identified to species over 30 nights. Of those calls, 8,714 were identified as low-frequency calls of non-SAR species including big brown bat (*Eptesicus fuscus;* 5,933 calls), silver-haired bat (*Lasionycteris noctivagans*; 1,686 calls) and hoary bat (*Aeorestes cinereus*; 1,095 calls). Twenty-one calls were identified as those of the red bat (*Lasiurus borealis*). Five calls at three stations (CAP19BATJM003-005) were identified as the high-frequency calls of little brown myotis (*Myotis lucifugus*). No SAR were recorded at stations CAP19BATJM001-002.

Table 4-4 below provides a summary of calls recorded on the SM4BAT FS acoustic detectors within the Study Area.

Table 4.4: Ultrasonic Bat Calls Recorded in the Study Area by Species at Five Acoustic Detectors

Species	CAP19BAT JM001	CAP19BATJ M002	CAP19BATJ M003	CAP19BATJ M004	CAP19BATJ M005
Big Brown Bat	n/a	613	1,095	1,219	3,006
Red Bat	n/a	1	4	2	14
Hoary Bat	129	138	251	219	358
Silver-haired Bat	7	314	190	188	987
Little Brown Myotis	n/a	n/a	2	1	2

The Little Brown Myotis is a widespread species that lives in a variety of habitats where water is found. This species requires an abundance of insects as its sole food source, and prefers to hunt low over water, although it also forages among trees (between 3 – 6 m), as well as over lawns, streets and built-up areas. In the Study Area, the few calls of Little Brown Myotis detected by ultrasonic recorders were in open areas in proximity to water, indicating that the species was likely moving through the Study Area to forage rather than resident. This species roosts in natural cavities (under loose bark and crevices), as well as in buildings (including attics, behind shutters, siding or shingles, and under bridges) (Eder 2002; van Zyll de Jong 1985). Based on the low detection rate of Little Brown Myotis over 30 nights of ultrasonic monitoring, and that only one call was recorded in potential woodland roost habitat, habitat for Little Brown Myotis is considered absent from the Study Area.

4.6.4 Breeding Birds

4.6.4.1 Breeding Bird Point Counts

Seven breeding bird survey stations were established in the Study Area (**Figure 4**, **Appendix A**). In total, 48 species of bird were recorded on, or within 120 m of, the Site during Stantec's breeding bird surveys. Forty-four (92%) of these species are considered to be breeding on, or within 120 m of, the Site licence. All of the species observed are ranked S5 (common and secure in the province) or S4 (apparently secure in the province; uncommon but not rare), with the exception of European starling (*Sturnus vulgaris*), which is an introduced species and ranked SNA.

Six (6) bird SAR or SOCC were recorded on, or within 120 m of, the Site during Stantec's breeding bird surveys. Barn Swallow (*Hirundo rustica*) was observed foraging over vegetation community OAGM4, however, nesting habitat was not observed on, or within 120 m of, the Site. It is anticipated that this species is nesting within the available outbuildings associated with the adjacent rural properties; specifically, the paddock area of the Rideau Carleton Raceway east of Albion Road and the Site. Both Bobolink (fledged young observed) and Eastern Meadowlark (carrying food) were confirmed breeding within the OAGM2 vegetation community that comprises the Site (CAP19BBJM001-002, 006-007). Grasshopper Sparrow (*Ammodramus savannarum*) was also detected in this grassland community at CAP19BBJM001. Eastern Wood-pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*) were recorded as possible breeders (singing male) in the WODM5-1 vegetation community west of the Site at survey station CAP19BBJM004.

4.6.4.2 Grassland Breeding Bird Transect Survey

Similar to the results of the breeding bird surveys, Bobolink, Eastern Meadowlark and Grasshopper Sparrow were observed along both transects during Stantec's SAR grassland breeding bird transect surveys. Bobolink was observed to be the most abundant species observed during this survey, followed by Eastern Meadowlark and then Grasshopper Sparrow. The breeding evidence described above in Section 4.5.4. for these three species was consistent with the breeding evidence observed during the SAR grassland breeding bird transect surveys.

4.6.4.3 Crepuscular Breeding Bird Survey

Based on the habitat preferences of Eastern Whip-poor-will and Common Nighthawk and the vegetation communities observed in the Study Area, these species are not anticipated to be breeding on, or within 120 m of, the Site. During a supplementary crepuscular breeding bird survey no Eastern Whip-poor-will or Common Nighthawks were detected in the Study Area or at the three survey stations located outside of the Study Area. Eastern Whip-poor-will were observed calling widely across eastern Ontario south of the City of Ottawa on the evening of June 20, 2019 (pers. comm. Josh Mansell (Stantec)).

During Stantec's amphibian breeding survey #2, an incidental, aural observation of a Common Nighthawk flying overhead was recorded. As this species was only observed incidentally once during their migration period throughout Stantec's 2019 field program, it is anticipated that common nighthawk is not breeding in the Study Area.

4.6.5 Terrestrial Mammals

During Stantec's 2019 field program, observations of mammals were recorded as incidental observations on, or within 120 m of, the Site. The following three mammal species were observed: red squirrel (*Tamiasciurus hudsonicus*), eastern gray squirrel (*Sciurus carolinensis*) and white-tailed deer (*Odocoileus virginianus*). All of these species are ranked S5 (common and secure in the province). It is likely that other small mammal species common found in rural eastern Ontario (e.g., raccoon (Procyon lotor), striped skunk (*Mephitis mephitis*), North American porcupine (*Erethizon dorsatum*) and assorted rodents), are also found in the general area.

No provincially rare, endangered, threatened, or special concern species were found.

4.6.6 Reptiles

No reptile (snake or turtle) species were observed on the Site during Stantec's 2019 field program.

The adjacent shallow aquatic (OA) community, or ponds, associated with Falcon Ridge Golf Club north of the Site potentially provides suitable overwintering habitat for turtle species such as midland painted turtle (*Chrysemys picta marginata*) and snapping turtle (*Chelydra serpentina*), both of which are known to occur in the general area.

4.7 FISH AND FISH HABITAT

Fish habitat is not present on, or within 120 m of, the Site. The nearest confirmed fish habitat identified is the Flicko Municipal Drain located in excess of 120 m west of the licence area along Bowesville Road. The Flicko Municipal Drain is classified by the Department of Fisheries and Oceans Canada, under the Fisheries Act, as a Class F municipal drain, which is considered to have intermittent flow and is typically dry for at least 3 months and is usually void of sensitive fish species (e.g., top predators).

5.0 SIGNIFICANT NATURAL HERITAGE FEATURES

5.1 SIGNIFICANT WOODLANDS

Significant woodlands are designated at the municipal level where official plan policies are in place. Per the City of Ottawa's Official Plan significant woodland definition (Section 2.4.2), the Site is located within the Rural Area and is not subject to the Urban Area age and size threshold. Section 2.4.2 defines significant woodlands as communities assessed as forest using the Ontario Ecological Land Classification (ELC) system (Lee et. al., 1998) and meeting one of the criteria in Table 7.2, Section 7.0 of the NHRM.

The NHRM provides guidance with respect to the following woodland characteristics that indicate provincial significance:

- Woodland size
- Ecological functions including interior habitat, proximity, linkages, water protection and diversity
- Woodlands that provide uncommon features
- Woodland economic and social values

The following sections provide a framework for the evaluation of significant woodlands as it relates to the woodland communities within 120 m of the Site (WODM5-1, FOCM6-1, and SWCM1-1). This assessment is consistent with guidelines prepared by the City of Ottawa *Significant Woodlands: Guidelines for Identification, Evaluation and Impact Assessment* (City of Ottawa, undated).

5.1.1 Woodland Size

The woodland communities within 120 m of the Site have been identified on *Schedule L1 – Natural Heritage System Overlay (East)* of the City of Ottawa's Official Plan as a natural heritage system feature, which includes significant woodlands as defined in Section 2.4.2. Following the NHRM, the contiguous woodland west of the Site and within the Study Area would be considered a significant woodland based on size (> 50 ha) relative to forest cover in the surrounding region (38% cover in the Rideau River sub-watershed; City of Ottawa undated).

No woodlands occur within the Site.

5.1.2 Ecological Functions

5.1.2.1 Woodland Interior

Woodlands of a size and shape that create habitat more than 100 metres from the edge often provide habitat for species whose success depends on larger sizes and reduced disturbance; referred to as interior species.

As forest in in the Rideau River sub-watershed covers 38% of the landscape, application of the NHRM guidelines suggests that 8 ha or more of interior habitat would be required for a woodlot to be considered significant. The contiguous forest contains more than 8 ha of interior forest habitat; therefore, this woodland meets the criteria for significance based on presence of woodland interior.

There is no interior habitat in the Site. The proposed extraction limit is a minimum of 30 metres from the woodland edge, therefore no woodland interior is present within 120 m of the extraction footprint.

5.1.2.2 Proximity to Other Woodlands or Other Habitats

The NHRM indicates that woodlands should be considered significant if a portion of it is located within a specified distance (e.g., 30 m) of a significant natural feature (e.g., significant wetland) likely receiving ecological benefit from the woodland, and the entire woodland meets the minimum area threshold.

The consolidated woodland contains a provincially-designated but unnamed significant ecological area, identified as woodland in the LIO database. Based on this feature, the woodland could meet the criteria for significance for proximity to a significant natural feature.

5.1.2.3 Linkages

The NHRM indicates that woodlands should be considered significant if they are located within a defined natural heritage system or provide a connecting link between two other significant features (e.g., significant wetland) and the entire woodland meets the minimum area thresholds.

The contiguous woodland within 120 m of the Site has been identified as part of a natural heritage system on *Schedule L1 – Natural Heritage System Overlay (East)* in the City of Ottawa's Official Plan; however, the entire woodland is not contiguous and does not connect two other significant features. As such, it has been determined that there is no linkage function provided by the woodland.

5.1.2.4 Water Protection

The NHRM indicates that woodlands should be considered significant if they are located within a sensitive or threatened watershed or a specified distance of a sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse or fish habitat and meet minimum area thresholds.

The woodland communities within 120 m of the Site are not located in, or in proximity to (e.g., 50 m), sensitive water features. The adjacent shallow aquatic (SA) communities north and south of the Site are not considered sensitive water features. As such, it has been determined that there is no water protection function provided by the woodland.

5.1.2.5 Woodland Diversity

The NHRM indicates that woodlands should be considered significant if they have a naturally occurring composition of native forest species that have declined significantly south and east of the Canadian

Shield, or have a high native diversity through a combination of composition and terrain and meets the minimum area thresholds.

The woodland communities within 120 m of the Site are not considered to contain a naturally occurring composition of native forest species in decline (e.g., generally on deep-soiled uplands and fertile level plains where such locations have been largely cleared for other uses). Though vegetation community, SWCM1-1, is not considered a rare community and does not extend across a variety of terrain features, the community is considered to have a high diversity of plant species relative and is anticipated to provide increased wildlife habitat features. However, the SWCM1-1 community is a small portion of the larger woodland and on its own does not meet the minimum area threshold for Ecodistrict 6E-12, consequently it has been determined that there is no woodland diversity function provided by the woodland.

5.1.3 Uncommon Characteristics

The NHRM indicates that woodlands should be considered significant if they have: a unique species composition; a vegetation community with a provincial ranking of S1, S2 or S3; habitat of a rare, uncommon or restricted woodland plant species; or, characteristics of older woodlands. In the woodland communities within 120 m of the Site, there are no rare vegetation communities and none of the species are ranked between S1 – S3.

Vegetation community, SWCM1-1, is considered to have characteristics of older woodlands with large tree size structure, specifically the eastern white cedar and yellow birch observed in the community. However, the SWCM1-1 community is a small portion of the larger woodland and on its own does not meet the minimum area threshold for Ecodistrict 6E-12, consequently it has been determined that the larger woodland is not significant based on uncommon characteristics.

5.1.4 Economic and Social Functional Values

Economic use and social values of the woodland communities within 120 m of the Site are unknown. As the woodland is divided into multiple parcels owned by the Ottawa International Airport Authority or privately, it is unlikely to provide significant economic or social values beyond those enjoyed by the landowners.

5.1.5 Determination of Significance

Based on the above evaluation of significance, the contiguous woodland within 120 m of the Site meets the criteria for significance based on size, presence of interior forest and proximity to significant natural features. A summary is provided in **Table 5-1**.

Table 5.1: Summary of Significant Woodland Assessment per NHRM Criteria

NHRM Criterion	Significant
1. Woodland Size	Y
2. Ecological Functions	
a. Woodland Interior	Y
b. Proximity to other natural heritage features	Y
c. Ecological linkages	N
d. Water protection	N
e. Woodland diversity	N
3. Uncommon Characteristics	N
4. Economic and social values	N

5.2 SIGNIFICANT VALLEYLANDS

There are no significant valleylands on, or within 120 m of, the Site as outlined on *Schedule K – Environmental Constraints* in the City of Ottawa's Official Plan.

5.3 SIGNIFICANT WETLANDS

There are no designated significant wetlands on, or within 120 m of, the Site.

A shallow, graminoid dominated vernal pool was observed in the northeast corner of the property during amphibian surveys. This small feature provided very limited amphibian breeding habitat and is too small to be complexed into adjacent wetland features. As such, this feature is determined to be not significant.

An unevaluated wetland complex is located adjacent to the west Site boundary. This wetland complex covers an area of approximately 23 ha between Albion Road, Rideau Road and Bowesville Road. Based on vegetation community classification (ELC) within 120 m of the Site and satellite photo interpretation, the wetland consists primarily of treed swamp, a combination of cedar swamp and fresh moist poplar wetland. Both wetland types can be connected to the groundwater and based on hydrological assessment these features are anticipated to have groundwater connection. They are subject to wet periods in the spring and fall and drier periods in the summer. In the absence of a wetlandfunctional assessment, unevaluated wetlands should be treated as significant features.

The feature is discussed further in Section 7.3.

5.4 SIGNIFICANT WILDLIFE HABITAT

Wildlife habitat includes habitat for species listed as Special Concern under the ESA or ranked provincially rare (S1-S3) and the four categories of *Significant Wildlife Habitat*. The *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNRF 2015) provide descriptions of wildlife habitats and guidance on criteria for determining the presence of candidate and confirmed wildlife habitats. This section discusses these categories of significant wildlife habitat relative to the Site. A full description of the evaluation of specific types of wildlife habitat is provided in **Table B-1**, **Appendix B**. Significant wildlife habitat (candidate and confirmed) is also shown on **Figure 5, Appendix A**.

5.4.1 Seasonal Concentration Areas

Seasonal concentration areas are sites where large numbers of a species gather together at one time of the year, or where several species congregate. Only the best examples of these concentration areas are typically designated as SWH. Review of the NHIC & LIO databases did not identify any confirmed seasonal concentration areas within the Study Area. The following seasonal concentration areas were identified in the Study Area:

- Raptor wintering area (candidate) within the grassland community (OAGM2 and MEGM3)
- Turtle wintering area (candidate) within open aquatic habitat (OA) outside the Site boundary
- Bat maternity colony (confirmed) within the woodland communities (FOCM6-1 and WODM5-1)

5.4.2 Rare Vegetation Communities or Specialized Habitats for Wildlife

Rare Vegetation Communities or Specialized Habitats for Wildlife are defined as separate components of SWH. Rare habitats are habitats with vegetation communities that are considered rare (S1-S3) in the province. These habitats are generally at risk and may support wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. No rare vegetation communities were identified in the Study Area. The following specialized habitats for wildlife were identified:

- Amphibian breeding habitat (confirmed for woodland and wetland (OA, SWCM1-1) outside the Site boundary)

5.4.3 Habitat for Species of Conservation Concern

Habitat for species of conservation concern includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe. An evaluation of candidate habitats for species of conservation concern, including provincially designated Special Concern species that were identified during the background review, is provided in **Table B-1**, **Appendix B**. The following habitat for species of conservation concern were identified in the Study Area:

- Open country bird breeding habitat (confirmed) within the grassland community (OAGM2 and MEGM3)
- Eastern Wood-pewee (confirmed) within the grassland community (OAGM2 and MEGM3)
- Grasshopper Sparrow (confirmed) within the grassland community (OAGM2 and MEGM3)
- Monarch (candidate) within the grassland community (OAGM2 and MEGM3)
- Eastern Milksnake (candidate) within the grassland community (OAGM2 and MEGM3)
- Snapping Turtle (candidate) within open aquatic habitats (OA) outside the Site boundary

5.4.4 Animal Movement Corridors

Animal movement corridors are distinct passageways or defined natural features that are used by wildlife to move between habitats, usually in response to seasonal requirements. Movement corridors are identified once the following seasonal concentration areas or specialized habitats are confirmed as SWH: amphibian breeding habitat and deer wintering habitat. Candidate animal movement corridors are discussed in **Table B-1**, **Appendix B**. As all open wetland and swamp forest habitat has been confirmed as amphibian breeding habitat, no additional movement corridors have been identified or mapped.

5.5 AREAS OF NATURAL AND SCIENTIFIC INTEREST

There are no Areas of Natural and Scientific Interest (ANSI) on, or within 120 m of, the Site.

5.6 FISH HABITAT

Fish habitat is not present on, or within 120 m of, the Site.

5.7 SPECIES AT RISK (THREATENED AND ENDANGERED SPECIES)

As described in Section 4.4, above, 16 species and/or their habitat were identified as potentially present in the Study Area based on a review of background documents and databases. Habitat assessments and targeted wildlife surveys undertaken in the field confirmed that breeding habitat for Bobolink and Eastern Meadowlark is present in the grassland community (OAGM2 and MEGM3) within the proposed extraction area. Habitat for Wood Thrush is present in the woodland outside the Site boundary.

An assessment of habitat presence and use for all 16 species is provided in **Table B-2, Appendix B**.

5.8 SUMMARY OF NATURAL HERITAGE FEATURES

Table 5.2 provides a summary of the natural heritage features on, or within 120 m of, the Site.

Table 5.2: Natural Heritage Features Associated with the Site and Study Area

Natural Heritage Features	Present within Site	Present within 120 m of Site
Significant Woodlands	N	Y
Significant Valleylands	N	N
Significant Wetlands, including unevaluated wetlands	N	Y
Significant Wildlife Habitat		
Seasonal concentration areas	Y	Y
Rare vegetation communities or specialized habitats	N	Y
Habitats of species of conservation concern	Y	Y
Animal movement corridors	N	N
Areas of Natural & Scientific Interest	N	N
Fish habitat	N	N
Habitat of endangered and threatened species	Y	Y

6.0 PROJECT DESCRIPTION

Cavanagh Construction is proposing to establish a gravel pit with extraction above the established water table. The site is approximately 63 ha, of which 33.8 ha are proposed for extraction. **Figure 4, Appendix A** illustrates the Site and extraction limits. This section should be read in conjunction with the Site Plans prepared by Harrington McAvan Ltd. as part of the aggregate application. The Site Plans provide specific details regarding the existing conditions, operational plan, rehabilitation plan and cross sections (e.g., pre- and post-licencing contours, drainage, etc.).

The application for the Ottawa Site will permit a maximum annual tonnage limit of 250,000 tonnes/year produced in a permanent plant site in the western portion of the property. Shipping will be from the property to Albion Rd. Extraction will occur sequentially in 2 areas in the direction shown in the Site plans. Stripping of topsoil and overburden will occur prior to extraction in areas large enough for a year's production. Topsoil and overburden will be used to build berms to create a visual barrier and which will be seeded immediately to prevent erosion and control dust. Following extraction each area will be progressively rehabilitated with a minimum of 1.5 m of soil above the established groundwater table and will be returned to grassland (pasture or hay).

Extraction will be by loaders and trucks at the face and transported to the plant site for processing and shipping. Processing may include crushing, screening, washing and stacking. Wash water will be cleansed in wash ponds and reused. There will be no offsite discharge of water. Fuel storage and scrap storage areas will be maintained in the plant site area. Final rehabilitation of the disturbed area will be to agriculture with maximum 3:1 side slopes. Dust will be mitigated on site for the duration of the operation.

7.0 POTENTIAL ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION MEASURES

The potential impacts to natural features that might reasonably be expected to occur as a result of the proposed aggregate operation are identified and discussed in this section. Both direct and indirect impacts associated with the Project are considered and appropriate mitigation measures recommended. An assessment of overall net environmental impacts is also provided based on the implementation of appropriate mitigation, restoration and enhancement measures to improve the overall integrity of the natural system in the area. Where direct impacts to SAR habitat are expected to occur, an approach to authorization under the federal SARA is described.

This section should be read in conjunction with the Site Plans prepared by Harrington McAvan Ltd. as part of the aggregate extraction application. The Site Plans provide specific details regarding the existing conditions, operational plan, rehabilitation plan and cross sections (e.g., pre- and post-licencing contours, drainage, etc.).

7.1 VEGETATION REMOVAL

The Project is primarily located on agricultural lands (pasture); however, some grassland and tree removal will occur. A removal of 33.8 ha of vegetation community OAGM2 is expected in two areas during aggregate extraction: 16.3 ha in Area 1 and 17.5 ha in Area 2. Progressive and final rehabilitation will restore the lands to perennial grassland cover (pasture or hay) as shown on the Site Plan (Harrington McAvan 2019).

Feature edges that correspond with the limit of extraction may also experience indirect effects including inadvertent encroachment, sedimentation and erosion, and soil / root zone compaction. Indirect impacts on natural features will be mitigated through the implementation of standard environmental protection measures, which are discussed in Section 7.6, below.

7.2 SIGNIFICANT WOODLAND

A significant woodland is located in the Study Area, outside the Site boundary and separated from the proposed extraction area by a 30 m setback. No portion of the woodland will be cleared by the proposed development. A setback of 30 m is consistent with provincial policies protecting significant woodlands (MMAH 2017, Beacon 2012). This avoidance measure demonstrates that the Site will have no negative impacts on the values or ecological functions of the significant woodland. Mitigation for potential indirect impacts, such as noise or dust, is described in Section 7.6.

7.3 WETLANDS

The unevaluated wetland complex covers an area of approximately 23 ha between Albion Road, Rideau Road and Bowesville Road, and based on satellite photo interpretation consists primarily of treed swamp. This wetland is outside the Site boundary and is separated from the extraction limit by a 30 m setback. No portion of the wetland will be cleared by the proposed development. As a result, there will be no direct impact to the wetland as a result of proposed aggregate extraction.

Regional mapping indicates that surface water flows are to the west, however there are no connecting surface water features between the Site and the unevaluated wetland. Overland surface runoff from the central high point of the Site (north-south ridge at 117 m AMSL) flows toward the wetland to the west at an elevation 108 m AMSL (Stantec 2019). As such, there will be no reduction in surface flow to the wetland from extraction in Area 1, but some reduction in surface flow after completion of extraction in Area 2.

Overland flow draining west to the wetland will be reduced by approximately 80% for all events in the following extraction and rehabilitation (Stantec 2020). Although this is a large reduction by comparison of peak flows, infiltration volumes account for a large component of runoff volume following storm events given that the majority of the site is sand. The surface runoff is further limited by the extensive forb and graminoid fallow field on the extraction area which slows surface flow and allows for direct infiltration under current conditions. Any reduction in surface water contributions to the wetland will be countered by the increase in groundwater contributions through infiltration across the site meaning the total volume of runoff to the adjacent wetland will remain the same post-extraction and rehabilitation (Stantec 2020). After completion of site rehabilitation, approximately 87% of the site will infiltrate runoff from all rainfall events to the groundwater and contribute to the preservation of wetland functions.

The hydrogeology technical memo also indicates that the wetland and shallow groundwater are likely hydraulically connected, and that flows may mimic surface water flow from east to west (Stantec 2019). The groundwater elevation at the Site reached a peak of 109.3 m AMSL in April 2019 (Stantec 2019), a season of record-setting rainfall and flooding in the City of Ottawa (CBC 2019, CTV 2019). As the proposed Ottawa Site is an above-water operation with a maximum excavation depth of 110.8 m AMSL which is at least 1.5 m above the water table and above the ground surface of the adjacent wetland to the west. Consequently, changes to groundwater flow to the wetland are not anticipated and wetland functions will be maintained.

No fugitive dust emissions resulting from extraction and vehicle traffic will leave the pit. Water quality controls for surface runoff are not necessary as roughly 87% of the Site will be clean water infiltrating and replenishing the groundwater, and flows leaving the perimeter of the Site are not exposed to sources of contamination or disturbance of site soils. Mitigation for potential indirect impacts is described in Section 7.6.

Two open aquatic features are located within the 120 m Study Area to the north and south of the Site. A 15 m extraction setback will be maintained along the northern and southern extraction limits of the pit. In addition to the extraction setback, these aquatic communities are further separated from the proposed licence boundary by greater than 50 m of upland (WOD to the north, MEGM3 to the south), providing in excess of 80 m of separation from the pit.

Upon final rehabilitation, the vegetated buffer will remain intact, and side slopes prepared to a 3:1 ratio. Final rehabilitation will restore the lands to perennial grassland cover, either pasture or hay. This after-use will restore the historic activities that have occurred at this location for many years and is an appropriate land use in the context of the surrounding landscape. There will be no impact on the wetland from the post extraction land use.

7.4 SIGNIFICANT WILDLIFE HABITAT

Significant wildlife habitat within 120 m of the Site is primarily associated with grassland habitat, comprised of vegetation communities OAGM2, MEGM3 and OAGM4. Candidate and confirmed significant wildlife habitat associated with woodland or wetland is located outside the Site boundary, consequently no direct project impacts to habitat for turtle wintering, amphibian breeding and Eastern Wood-Pewee are anticipated. An assessment of potential impacts to significant wildlife habitat and recommended mitigation measures are provided below. Mitigation for potential indirect impacts to significant wildlife habitat are described in Section 7.6.

7.4.1 Grassland Habitat

Candidate significant wildlife habitat for wintering raptors and confirmed significant wildlife habitat for open country breeding birds and grasshopper sparrow (SOCC) is present within the grassland community (OAGM2 and MEGM3) on the Site. The pit operation has been designed to remove no more than 18 ha of grassland at once (see Existing Features and Operational Plan, Sheet 1 of 2, Harrington McAvan 2019). Progressive rehabilitation will return the extracted area to perennial grassland cover (pasture or hay) upon completion of extraction in each area. Consequently, direct habitat impacts will be temporary in nature.

Online bird observation records (eBird) records from airport lands approximately 1 km to the north of the Study Area (between Earl Armstrong Rd and Leitrim Rd) indicate that this area provides significant habitat for raptor wintering and breeding grassland birds. With the availability of nearby, high-quality grassland habitat, and in consideration of the relatively small amount of habitat to be cleared on the Site at one time, as well as proposed grassland compensation on nearby airport lands, the temporary loss of habitat is unlikely to have an effect on any grassland species at the population level.

7.4.2 Turtle Wintering Area

Candidate habitat for turtle overwintering is present in open aquatic (OA) community north of the Site. With the proposed 15 m extraction setback, this feature will be separated from the pit by over 75 m of upland habitat, consequently no direct impacts to the features are anticipated. General mitigation measures to avoid impacts to wildlife, including turtles, is described in Section 7.6.

7.4.3 Bat Maternity Colony

Confirmed habitat for roosting bats is present in the naturalized plantation (FOCM6-1) and deciduous woodland (WODM5-1) west of the Site. This habitat is outside the Site and a minimum of 30 m from the excavation area (see Section 7.1), consequently no direct impacts are anticipated as a result of proposed aggregate extraction.

7.4.4 Amphibian Breeding Habitat

The open aquatic (OA) communities to the north and south of the Site, and swamp forest (SWCM1-1) west of the Site, provide breeding habitat for amphibians as confirmed during field investigations. Species recorded during the amphibian breeding surveys included Spring Peeper, Gray Treefrog, American Toad, Wood Frog and Green Frog. Amphibian movement may occur between the wetland communities and the forested swamp outside the Site boundary and will not be directly impacted by aggregate extraction. Additionally, as there will be no water features on the Site during operations, the potential for the proposed license area to attract amphibians during aggregate operations is negligible. General mitigation measures to avoid impacts to wildlife, including amphibians, is described in Section 7.6.

7.4.5 Habitat for Species of Conservation Concern

Habitat for open country breeding birds and grasshopper sparrow has been addressed in Section 7.4.1, above. Other species of conservation concern for which habitat is present within Study Area are Monarch and Eastern Milksnake in the grassland community (OAGM2) on the Site, Snapping Turtle in the ponds (OA) north and south of the Site, and Eastern Wood-Pewee in the woodland community (WODM5-1) west of the Site.

No direct impacts to habitat of Snapping Turtle or Eastern Wood-Pewee are anticipated as a result of proposed aggregate extraction. The Snapping Turtle occurs throughout southern Ontario in ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms (COSEWIC 2008). Females show strong nest site fidelity and nest in sand or gravel banks at waterway edges in late May or early June (COSEWIC 2008). As noted in Section 7.4.2, above, Snapping Turtle habitat is separated from the proposed pit boundary by over 75 m of upland habitat. The Eastern Wood-Pewee is a forest bird of deciduous and mixed woods. Nest-site selection favors open space near the nest, typically provided by clearings, roadways, water, and forest edges (Cadman et al. 2007). Woodland breeding habitat for Eastern Wood-Pewee is outside the Site and a minimum of 30 m from the excavation area (see Section 7.1).

Although Monarch and Eastern Milksnake were not observed during field investigations, suitable habitat is present within the Site. Eastern Milksnake is a generalist species typically reported in low densities in or around agricultural landscapes, but also found on rocky hillsides and in a wide variety of forest types and often in proximity to water. If Eastern Milksnake is present in the Study Area it is likely to occur at a very low density and consequently impacts can be limited through the implementation of standard mitigation measures for wildlife (Section 7.6.2).

The Monarch is typically found where milkweed and wildflowers (including goldenrods and asters) exist (COSEWIC 2010). Caterpillars are generally dependent on milkweed, whereas adults are more generalized in their habitat preference, feeding on a variety of wildflower nectar (MECP 2014). Habitat can include abandoned farmland, along roadsides, and other open spaces where these plants grow (COSEWIC 2010). As noted in Section 7.4.1, impacts to grassland habitat will be temporary in nature. The pit operation will remove no more than 18 ha of grassland at once (see Existing Features and Operational Plan, Sheet 1 of 2, Harrington McAvan 2019) and progressive rehabilitation will return the extracted area to perennial grassland cover (pasture or hay) upon completion of extraction in each area. Additional mitigation measures specific to Monarch and its habitat are provided below.

7.4.5.1 Mitigation Recommendations for Monarch

- If vegetation clearing will proceed when Monarch larvae may be present (April 1 to September 30), milkweed plants should be inspected for Monarch larvae prior to their removal. If larvae are present, they may be moved to a location that is suitable and safe under the direction of a qualified professional. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted.
- During operation, Common Milkweed (Asclepias syriaca) and nectar producing plants should be planted within the licence boundary but outside the extraction area and where habitat disturbance can be avoided, to provide habitat for Monarch.
- Common Milkweed and nectar producing plants should be incorporated into the rehabilitation seed mix described on the Site Plan (Sheet 2 of 2, Harrington McAvan 2019).

7.5 SPECIES AT RISK

Wood Thrush, Bobolink and Eastern Meadowlark are three federal SAR which were recorded in the Study Area during field investigations. SARA protects both the species and their residences (i.e., occupied nests) from harm or harassment. Although a formal residence description has not been prepared for these species, for other SAR birds (e.g., Hooded Warbler, Henslow's Sparrow) the residence is the nest. Any activity that disturbs a nest, changes the surrounding microclimate or blocks access to the nest could be considered damage or destruction of the residence under SARA. Nests should be protected as a residence during the breeding period (Government of Canada 2006). A permit may be issued by the Minister of Environment for an activity that is otherwise prohibited under SARA, such as harm to the species, their residence and/or critical habitat. Critical habitat has not been defined under SARA for any of these three species.

The Wood Thrush nests in deciduous and mixed forests in southern Ontario, ranging from small and isolated to large and contiguous woodlots. The presence of tall trees and a thick understory are preferred (Cadman et al. 2007). Woodland breeding habitat for Wood Thrush is outside the Site and a minimum of 30 m from the excavation area (see Section 7.1), consequently there is no anticipated risk of harm to Wood Thrush or its residence through aggregate operations.

The Bobolink nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures. Preferred ground cover species include grasses such as Timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC 2010). The Eastern Meadowlark typically occurs in meadows, hayfields and pastures, however, it will utilize a wider range of habitat than most grassland species, including mown lawn (e.g., golf course, parks), wooded city ravines, young conifer plantations and orchards (Peck and James 1983).

There is potential for mortality of Bobolink or Eastern Meadowlark during site clearing in the grassland community prior to extraction (e.g., bird fatalities through nest destruction) if these activities occur during the nesting season (end of March to end of August). Avoidance measures are proposed in Section 7.5.1 in order to reduce the risk of mortality.During pit operation, grassland bird SAR may be at risk of collision with vehicular traffic (truck entrance/exit), however this risk of collision is anticipated to be very low. Generally, during aggregate operations, mobile and processing equipment will be sited in a cleared area that offers very little bird habitat. Furthermore, most vehicular traffic on the site will be a low speeds.

Grassland (OAGM2) within the Site provides habitat for Bobolink and Eastern Meadowlark. In total, 33.8 ha of grassland will be directly removed during site preparation, resulting in the temporary displacement of the residence of Bobolink and Eastern Meadowlark until progressive rehabilitation is undertaken. Consultation with Environment Canada is recommended in order to determine whether a permit is required under SARA Section 73 and, if so, what permit conditions would apply. Proposed avoidance and mitigation measures to reduce the risk of harm to Bobolink and Eastern Meadowlark or their residences are provided below. Patches of Bobolink and Eastern Meadowlark habitat within the Study Area, outside of the Site, are not anticipated to be directly affected by aggregate operations.

7.5.1 Mitigation Measures for Bobolink and Eastern Meadowlark

The following mitigation measures are recommended for implementation in order to minimize the potential effects of direct mortality and avoid contravention of SARA:

- Construction activities with the potential to remove residences of Bobolink or Eastern Meadowlark (e.g., vegetation clearing) should not be undertaken during the breeding season which is April 8 to August 28 in this region (Environment Canada 2014);
- Avoid all unnecessary vegetation clearing outside the extraction footprint and access roads wherever and whenever practicable. Retain natural vegetation outside the proposed licence;

- Demarcate the extraction limit to avoid incidental encroachment into adjacent areas;
- Progressively rehabilitate Area 1 to grassland habitat prior to completion of stripping or site preparation of Area 2 in order to maintain a minimum of 18 ha of grassland at any time;
- Maintain construction and operations equipment in good order (e.g., mufflers);
- Where permissible under safety and navigation requirements, outdoor lights will be shielded to minimize light spillage beyond the required areas; and,
- Provide a mandatory wildlife education program for employees so they can respond appropriately to bird encounters.

7.6 INDIRECT IMPACTS AND MITIGATION

Inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration into natural features are potential indirect impacts from aggregate operations. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction equipment. Additional disturbance may be required to facilitate spill clean-up activities.

7.6.1 Erosion and Sediment Control

The potential indirect impacts associated with the Project are primarily from site clearing and extraction activities. Most of the potential impacts are common to aggregate operations and can be controlled using standard mitigation measures for erosion and sediment control. The primary principles associated with sedimentation and erosion protection measures are to:

- Minimize the duration of soil exposure
- Retain existing vegetation, where feasible
- Encourage re-vegetation
- Divert runoff away from exposed soils
- Keep runoff velocities low
- Trap sediment as close to the source as possible

To address these principles, mitigation measures recommended for implementation during construction are described below. Components of the ESC plan are shown on the Site Plan (Harrington-McAvan 2019).

- Minimize the access and temporary work space to the extent possible to limit destabilization of soils near the work area.
- Silt fencing and/or barriers such as sediment logs could be used along all work zones where there is potential for sedimentation of wetlands, or inadvertent encroachment of construction vehicles into trees or natural areas.

- Dust could be controlled by using water instead of chemical suppressants in dust-sensitive areas such as the mapped natural heritage features.
- No equipment should be permitted to enter natural areas beyond the barrier fencing.
- All exposed soil areas should be stabilized (native seed mixes; sourced locally if possible) and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Equipment should be re-fueled 30 m away from sensitive natural features (e.g., wetlands) to avoid potential impacts if an accidental spill occurs.
- In addition to any specified requirements, additional silt fence and/or silt logs should be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.
- Sediment and erosion controls should be monitored regularly and properly maintained as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected or until cover is re-established.
- The limits of construction adjacent to natural features to be retained will be fenced prior to construction and monitored during operations (along with sediment and erosion control measures) to make sure that the limits are maintained with respect to vehicular traffic and soil or equipment stockpiling.

7.6.2 Avoidance of Wildlife

The following mitigation measures are recommended to avoid impacts to wildlife during Project construction:

- A visual search of the work area will be conducted by construction contractors before work commences each day, particularly for the period when most wildlife is active (generally April 1 to October 31). Visual inspections will locate and avoid snakes, turtles and other ground dwelling wildlife such as small mammals. Visual searches will include inspection of machinery and equipment left in the work area overnight prior to starting equipment.
- If wildlife is encountered, work at that location will stop, and the animal(s) will be permitted reasonable time to leave the work area on their own.
- If there are repeat observations of wildlife in the active pit (e.g., turtle nesting), barrier fencing may be used to direct wildlife away from the active work area(s) and toward natural wetland areas outside the licence boundary. All fencing materials should be wildlife-friendly to prevent accidental entanglement.
- Any observations of species at risk or species of conservation concern should be reported to Environment and Climate Change Canada within 48 hours. Species at risk should not be handled, harassed, or moved in any way, unless they are in immediate danger.

7.6.3 Protection of Migratory Bird Nests

The federal *Migratory Birds Convention Act, 1994* (MBCA) provides legal protection of migratory birds and their nests in Canada (Government of Canada 1994). Construction timing must consider restrictions imposed by the MBCA. To avoid damaging or disturbing bird nests and contravening the MBCA, the timing of any vegetation clearing should occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on Environment Canada's Nesting Calendars and the period for which due diligence mitigation measures are generally recommended). No vegetation removal is permitted during the primary nesting period where SAR are present.

The primary nesting period (PNP) identified for the Study Area is April 8 – August 28, although nesting also infrequently occurs outside of this period (Environment Canada 2014). Vegetation removal during this core nesting period is not recommended; however, if required, a nest survey may be carried out by a qualified person in simple habitats such as an urban park, a vacant lot with few possible nest sites, a previously cleared area, or a structure (Government of Canada 2019). If a migratory bird nest is located within the work area at any time, a no-disturbance buffer will be delineated. This buffer will be maintained for the entire duration of the nest activity, which will be determined using periodic checks by the avian biologist. The radius of the buffer generally varies from 5 m – 60 m depending on the sensitivity of the nesting species. The Project will not resume within the nest buffer until the nest is confirmed to be no longer active.

8.0 ENVIRONMENTAL MONITORING PROGRAM

Compliance and performance monitoring will be undertaken during the operation phases of aggregate extraction when environmental impacts are most likely. Monitoring is recommended during the operations to ensure the following:

- Boundaries of the extraction area are clearly demarcated and monitored to ensure the limits are respected.
- Construction activities remain outside of the recommended protection setbacks (30 m setback to significant woodland) and outside of key wildlife activity windows (bird nesting period).
- Erosion and sediment controls are to be installed and maintained at the edges of the extraction footprint.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 RECOMMENDATIONS

The following recommendations are made to assist in the protection of the natural environment features identified on site. These recommendations are incorporated into the Site Plan (Harrington McAvan 2019):

- Mitigation measures to protect natural heritage features from direct and indirect impacts, described in Section 7.0 of this report) will be implemented by the operator.
- Consultation with Environment Canada is recommended to confirm that a permit under SARA Section 73 is not required for Bobolink and Eastern Meadowlark provided vegetation clearing does not occur while the species is present during the core nesting period.
- A minimum 30 m setback should be established between the extraction footprint and the significant woodland to minimize impacts to wildlife and the forested wetland.
- Prior to stripping and operations in any area, the limits of the woodland buffer should be flagged and clearly marked by a qualified person. The City of Ottawa will be notified, should City staff wish to confirm the boundaries.
- Vegetation planted for progressive and final rehabilitation should be maintained in a healthy vigorous growing condition.
- Silt fencing for internal sediment and erosion control during stripping operations as illustrated on the Site Plan should be installed and maintained.
- Silt barriers and erosion control measures will be monitored and regularly maintained during active operations.
- All excavated material requiring stockpiling should be stored in locations designated on the Site Plan and kept away from sensitive natural features.
- Topsoil and overburden should be stripped and stored separately in bermed stockpiles. Berms and stockpiles of topsoil should be graded to stable slopes and seeded to prevent erosion and minimize dust. Stockpiles shall be maintained in accordance with the Best Management Practices for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario (MNRF 2017).
- Dust control should be implemented as required.
- Fuel storage shall be in accordance with applicable fuel storage laws and standards. Refueling should be carried out in designated locations that are well away from natural features to avoid potential impacts in the event of an accidental spill.
- Rehabilitation will be implemented as specified in the Site Plan (Harrington-McAvan 2019).

The mitigation measures noted above, as well as industry standard management practices have been included in the Site Plan and should be monitored and enforced.

9.2 CONCLUSIONS

Based on the information provided in this Natural Environment Level 1 & 2 Technical Report, and the Site Plans, Stantec has concluded the following:

- Significant natural heritage features within the Site for which direct impacts are anticipated are:
  - Significant Wildlife Habitat (raptor wintering area, open country breeding birds, habitat for SOCC: Monarch and Grasshopper Sparrow)
  - Habitat for SAR (Bobolink and Eastern Meadowlark)

  Mitigation for the removal of grassland habitat is proposed.
- Significant natural heritage features within 120 m of the Site for which no direct impacts are anticipated are:
  - Significant woodland
  - Significant wildlife habitat (turtle wintering, amphibian breeding, bat maternity colony, habitat for SOCC: Eastern Wood-Pewee)
  - Habitat for SAR (Wood Thrush)

  Potential indirect impacts to significant features within 120 m will be mitigated through appropriate measures specified in the Site Plans.

The phased extraction approach and progressive rehabilitation to grassland habitat being proposed by Cavanagh, along with mitigation measures described in this report, will ensure that potential impacts to natural heritage features on and within 120 m of the proposed Ottawa Site will be mitigated. The features and their ecological functions will be maintained over the long-term.

10.0 REFERENCES

Beacon Environmental [Beacon]. 2012. *Ecological Buffer Guideline Review*. Prepared for Credit Valley Conservation. 139 p.

Bird Studies Canada. 2003. *The Marsh Monitoring Program – Training Kit and Instructions for Surveying Marsh Birds, Amphibians and Their Habitats*. 2003 Edition. 40 pages. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S. Environmental Protection Agency. March 2003.

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, A.R. Couturier. 2007. *Atlas of the Breeding Birds of Ontario, 2001-2005*. (eds) Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of natural resources, and Ontario Nature, Toronto, xxii + 706 pp.

[CBC] Canadian Broadcasting Corporation. 2019. *From floods to fires to weird Arctic weather, Environment Canada releases top 10 weather stories of 2019*. December 19, 2019. Electronic document: https://www.cbc.ca/news/technology/top-ten-weather-2019-1.5401490. Last accessed: January 21, 2020.

Chapman, L.G. and D.F. Putnam. 1984. *The Physiography of Southern Ontario*. Ontario: Ministry of Natural Resources.

City of Ottawa. 2003. *Official Plan.* Electronic Document: https://ottawa.ca/en/planning-development-and-construction/official-plan-and-master-plans/official-plan#volume-1-official-plan. Last accessed: January 10, 2020.

City of Ottawa. 2015. *Environmental Impact Statement Guidelines*. 2nd Edition. Electronic Document: https://documents.ottawa.ca/sites/documents/files/documents/eis_guidelines2015_en.pdf. Last accessed: January 10, 2020.

City of Ottawa. 2019. *geoOttawa.* Electronic Document: http://maps.ottawa.ca/geoottawa/. Last accessed: October 29, 2019.

COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/snapping-turtle-2008.html. Last accessed: January 10, 2020.

COSEWIC. 2010. *COSEWIC Assessment and Status Report on the Monarch Danaus plexippus in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Monarch_0810_e1.pdf. Last accessed: January 10, 2020.

CTV. 2019. *Record rainfall soaks Ottawa*. April 13, 2019. Electronic document: https://ottawa.ctvnews.ca/record-rainfall-soaks-ottawa-1.4378804. Last accessed: January 21, 2020.

Dobbyn, J. 1994. *Atlas of the Mammals of Ontario*. Federation of Ontario Naturalists.

ebird Canada. 2019. *eBird Canada*. Electronic Document: http://ebird.org/content/canada/. Last accessed: October 29, 2019.

Eder, D. 2002. *Mammals of Ontario*. Lone Pine Publishing, Edmonton, Alberta. 215 p.

Environment Canada. 2014. *General Nesting Periods of Migratory Birds in Canada.* Electronic Document: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html. Last accessed: January 13, 2020.

Environment Canada. 2019. *Environment Canada Species at Risk Public Registry*. Retrieved October 29, 2019, from http://www.registrelepsararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1

Fishers and Oceans Canada (DFO). *Aquatic Species at Risk Map*. Electronic Document: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html. Last accessed: January 10, 2020.

Google Earth Pro. 2019. City of Ottawa. http://www.google.com/earth/index.htmlLast accessed: November 15, 2019.Gorrell Resource Investigations. 2006. Aggregate Assessment and Resource Management Plan, Ottawa International Airport Holdings. Report No. 05310.

Government of Canada. 1994. *Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22).* Electronic Document: https://laws-lois.justice.gc.ca/eng/acts/m-7.01/. Last accessed: January 10, 2020.

Government of Canada. 2002. *Species at Risk Act (S.C. 2002, c. 29).* Electronic Document: https://laws-lois.justice.gc.ca/eng/acts/s-15.3/. Last accessed: January 10, 2020.

Government of Canada. 2006. Species at Risk Act Public Registry. Residence Descriptions. Description of residence for Henslow's Sparrow (Ammodramus henslowii) in Canada. Electronic Document: http://registrelep-sararegistry.gc.ca/document/default_e.cfm?documentID=1130. Last accessed: January 10, 2020.

Government of Canada. 2019. *General nesting periods of migratory birds.* Electronic Document: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html. Last accessed: January 10, 2010

Government of Ontario. 1990 (last amended 2019). *Conservation Authorities Act, R.S.O. 1990, c.C.27.* Electronic Document: https://www.ontario.ca/laws/statute/90c27. Last accessed: January 10, 2020.

Harrington-McAvan. 2019. *Draft Site Plan for the Ottawa Airport Pit.*

Henson, B.L. and K.E. Brodribb. 2005*. Great Lakes Conservation Blueprint for Terrestrial Biodiversity.* Volume 2: Ecodistrict Summaries. Nature Conservancy of Canada and the Ontario Ministry of Natural Resources.

Houle Chevrier Engineering Ltd. 2014. Resource Investigation OIAA Lands, 2014. Project 14-195. Draft.

Land Information Ontario. 2019. *Land Information Ontario.* Electronic Document: https://www.ontario.ca/page/land-information-ontario. Last accessed: January 10, 2020.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998 (with 2008 ELC code updates). *Ecological Land Classification for Southwestern Ontario: first approximation and its application.* Ontario Ministry of Natural Resources, South Central Region, Science Development and Transfer Branch. Technical Manual ELC-005.

Ministry of Municipal Affairs and Housing [MMAH]. 2014. *Provincial Policy Statement.* Effective April 30, 2014.

Ministry of Natural Resources [MNR]. 2000. *Significant Wildlife Habitat Technical Guide*. Electronic Document: https://docs.ontario.ca/documents/3620/significant-wildlife-habitat-technical-guide.pdf. Last accessed: January 10, 2010.

Ministry of Natural Resources [MNR]. 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Addition. Toronto: Queen's Printer for Ontario. 248 pp.

Ministry of Natural Resources and Forestry [MNRF]. 2011. *Draft Bololink Survey Methodology.*

Ministry of Natural Resources and Forestry [MNRF]. 2014. *Survey Protocol for Eastern Whip-poor-will (Caprimulgus vociferous) in Ontario.*

Ministry of Natural Resources and Forestry [MNRF]. 2015. *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E.* Electronic Document: https://docs.ontario.ca/documents/4775/schedule-6e-jan-2015-access-ver-final-s.pdf. Last accessed: January 10, 2020.

Ministry of Natural Resources and Forestry [MNRF]. 2017. Survey Protocol for Species at Risk Bats within Treed Habitats, Little Brown Myotis, Northern Myotis & Tri-Coloured Bat.

Ministry of Natural Resources and Forestry [NRF]. 2019a. *Species at Risk in Ontario List*. Electronic Document: http://www.ontario.ca/environment-and-energy/species-risk-ontario-list. Last accessed: October 30, 2019.

Ministry of the Environment, Conservation and Parks [MECP]. 2014 (updated 2019). *Monarch*. Electronic Document: https://www.ontario.ca/page/monarch. Last accessed: January 10, 2020.

Natural Heritage Information Centre [NHIC]. 2019. Natural Areas and Species records search. Biodiversity explorer, MNR, Peterborough. Electronic Document: http://nhic.mnr.gov.on.ca. Last accessed: January 10, 2020.

Oldham, M.J. and W.F. Weller. 2000. Ontario Herpetofaunal Atlas internet database. Natural Heritage Information Centre, Ministry of Natural Resources. Retrieved October 29, 2019. http://www.mnr.gov.on.ca/MNR/nhic/herps/ohs.html

Ontario Geological Survey 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV

Ontario Geological Survey. 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release---Data 126-Revision 1. ISBN 978-1- 4435-5704-7 (CD) ISBN 978-1-4435-5705-4.

Ontario Nature. 2020. *Ontario's Reptile and Amphibian Atlas*. Electronic Document: https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/. Last accessed: January 10, 2020.

Peck, George K. and Ross D. James 1983. *Breeding Birds of Ontario Nidiology and Distribution, Volume 2: Passerines*. Toronto: The Royal Ontario Museum.

Rideau Valley Conservation Authority [RVCA]. 2010. *Policies Regarding Development Including the Construction/Reconstruction of Building and Structures, Placing of Fill and Alterations to Waterways under Section 28 of the Conservation Authorities Act of Ontario*. Electronic Document: https://www.rvca.ca/regulations-planning/rvca-permits-section-28/forms-fees-resources/rvca-development-policies. Last accessed: January 10, 2010.

Stantec Consulting Ltd. 2019. *Level 1 Hydrogeological Review, Ottawa Airport Lands – Parcel C, Ottawa, Ontario*. Report on file at Stantec.

Stantec Consulting Ltd. 2020. *Ottawa Airport Lands – Parcel C, Ottawa, Ontario – Stormwater Management (SWM) Analysis*. Report on file at Stantec.

Toronto Entomologists' Association. 2019. *The Ontario Butterfly Atlas Online*. Electronic Document: http://www.ontarioinsects.org/atlas_online.htm. Last accessed: January 10, 2020.

Van Zyll de Jong, C. 1985. *Handbook of Canadian Mammals: Bats*. Ottawa: Canadian Museum of Nature.

APPENDIX A

Figures

Legend

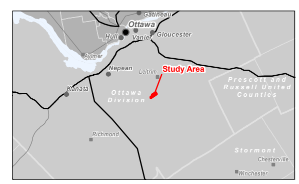
- Study Area (120 m)
- Site Boundary
- Setback Limit
- Watercourse
- Subject Property Boundary
- Wetland, Not evaluated per OWES

0 100 200 metres

1:6,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



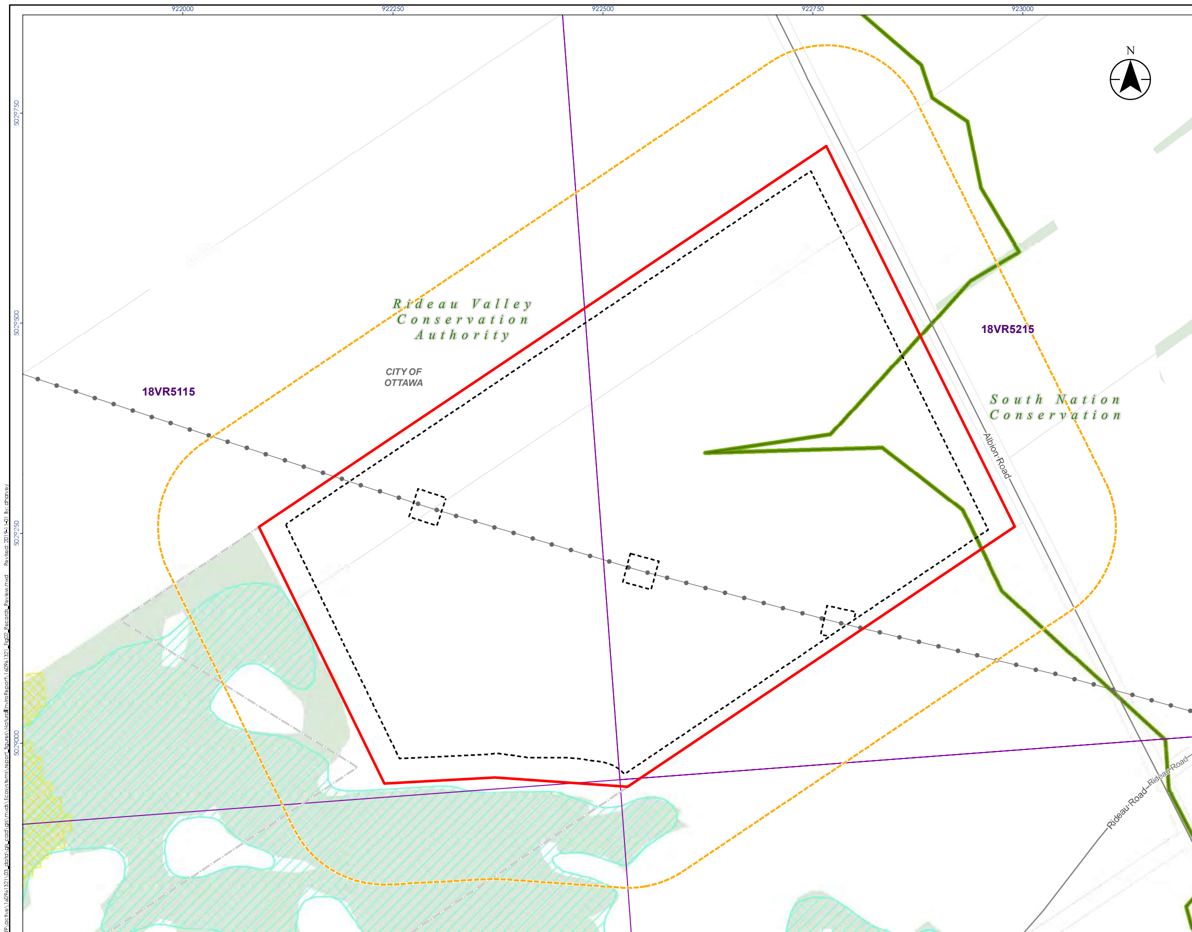
Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2019-11-01
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
1

Title
Study Area



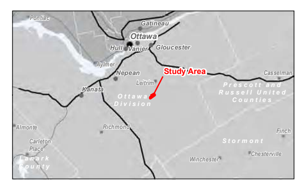
Stantec

Legend
- Study Area (120 m)
- Site Boundary
- Setback Limit
- Hydro Line
- Watercourse (Permanent)
- Conservation Area Administrative
- Lot
- Subject Property Boundary
- Significant Ecological Area
- Wetland, Not evaluated per OWES
- Wooded Area
- 1 km NHIC Grid

0 100 200 m

1:4,500 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.



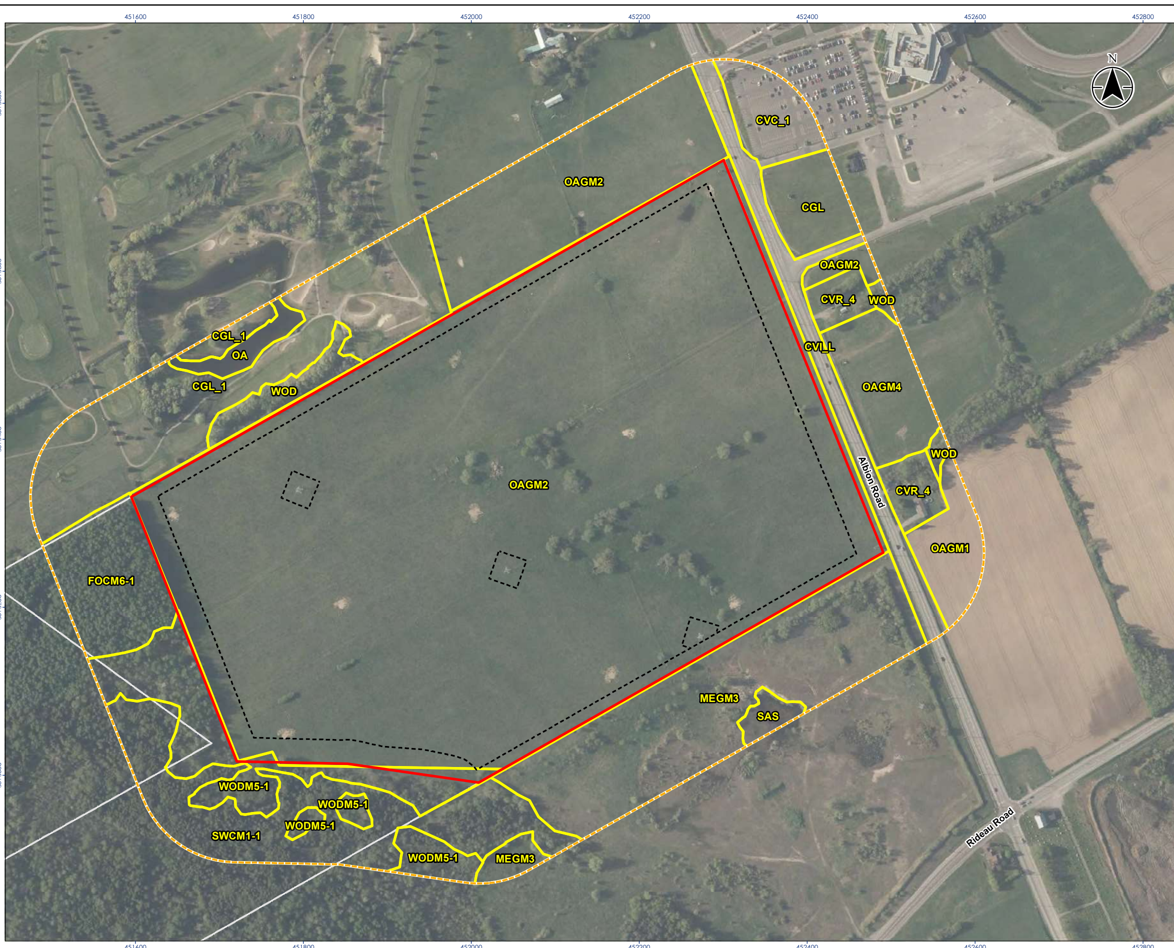
Project Location
City of Ottawa

160961321 REV4
Prepared by DH on 2019-11-01
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
2

Title
LIO Records Review and NHIC Search



Stantec

Legend

- Study Area (120 m)
- Site Boundary
- Setback Limit
- ELC Community Boundary
- Subject Property Boundary

ELC Communities

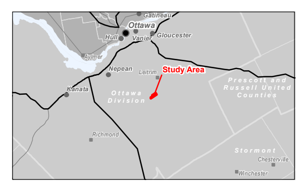
- **CGL-** Green Lands
- **CGL_1-** Golf Course
- **CVC_1-** Business Sector
- **CVI_L-** Transportation
- **CVR_4-** Rural Property
- **FOCM6-1-** Dry - Fresh White Pine Naturalized Coniferous Plantation Type
- **MEGM3**Dry – Fresh Graminoid Meadow Ecosite
- **OA-** Open Aquatic
- **OAGM1-** Annual Row Crops
- **OAGM2-** Perennial Cover Crops
- **OAGM4-** Open Pasture
- **SAS-** Submerged Shallow Aquatic
- **SWCM1-1-** White Cedar Mineral Coniferous Swamp Type
- **WOD-** Deciduous Woodland
- **WODM5-1-** Fresh - Moist Poplar Deciduous Woodland

0 100 200 metres

1:4,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



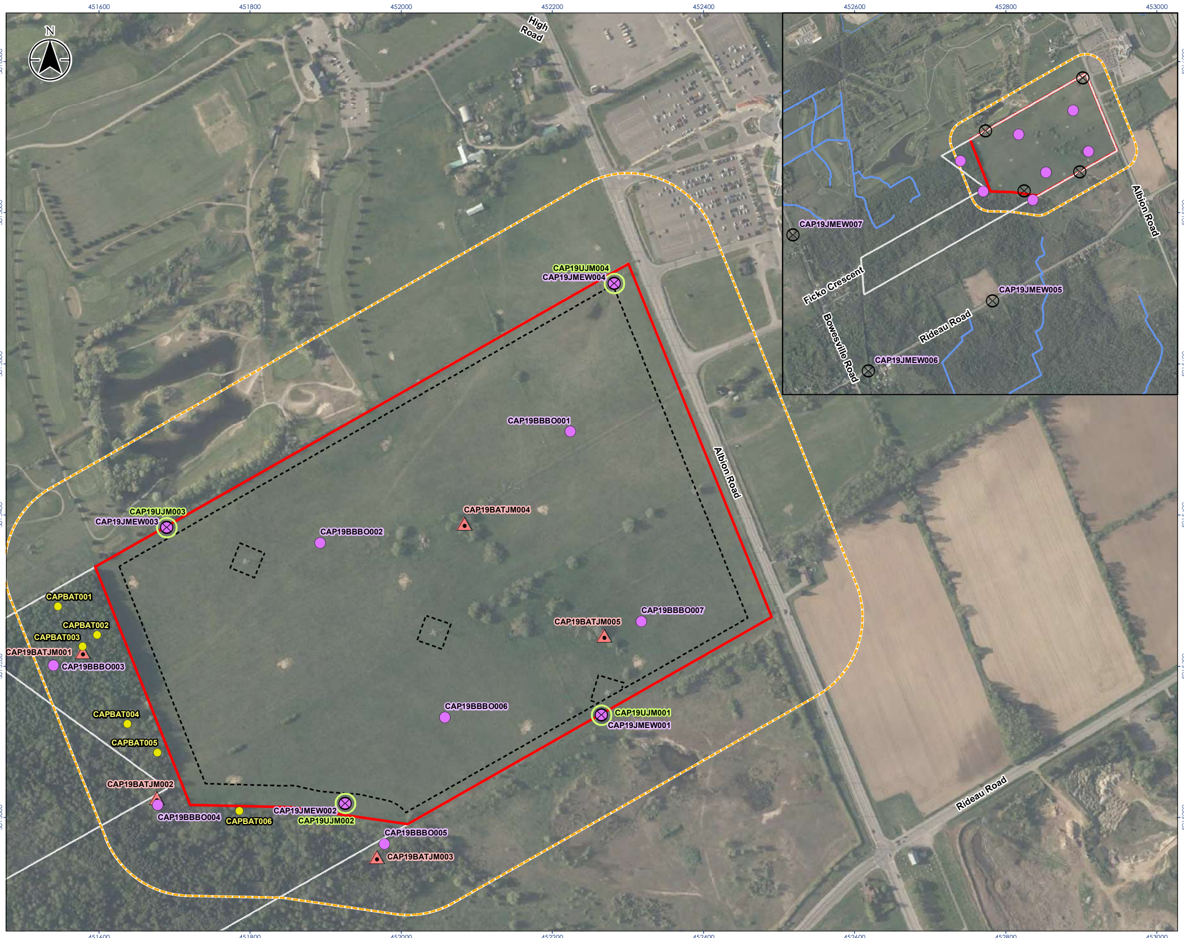
Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2019-11-21
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
3

Title
Ecological Land Classification



Stantec

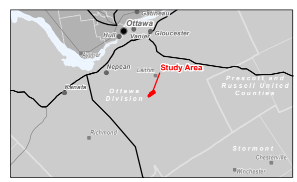
Legend
- Study Area (120 m)
- Site Boundary
- Setback Limit
- Subject Property Boundary

Survey Stations
- Breeding Amphibian Survey Station
- Breeding Bird Survey Station
- Crepuscular Breeding Bird Survey
- SAR Bat Acoustic Monitoring Survey Station
- SAR Bat Maternity Roost Habitat Feature

0 100 200 metres

1:5,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



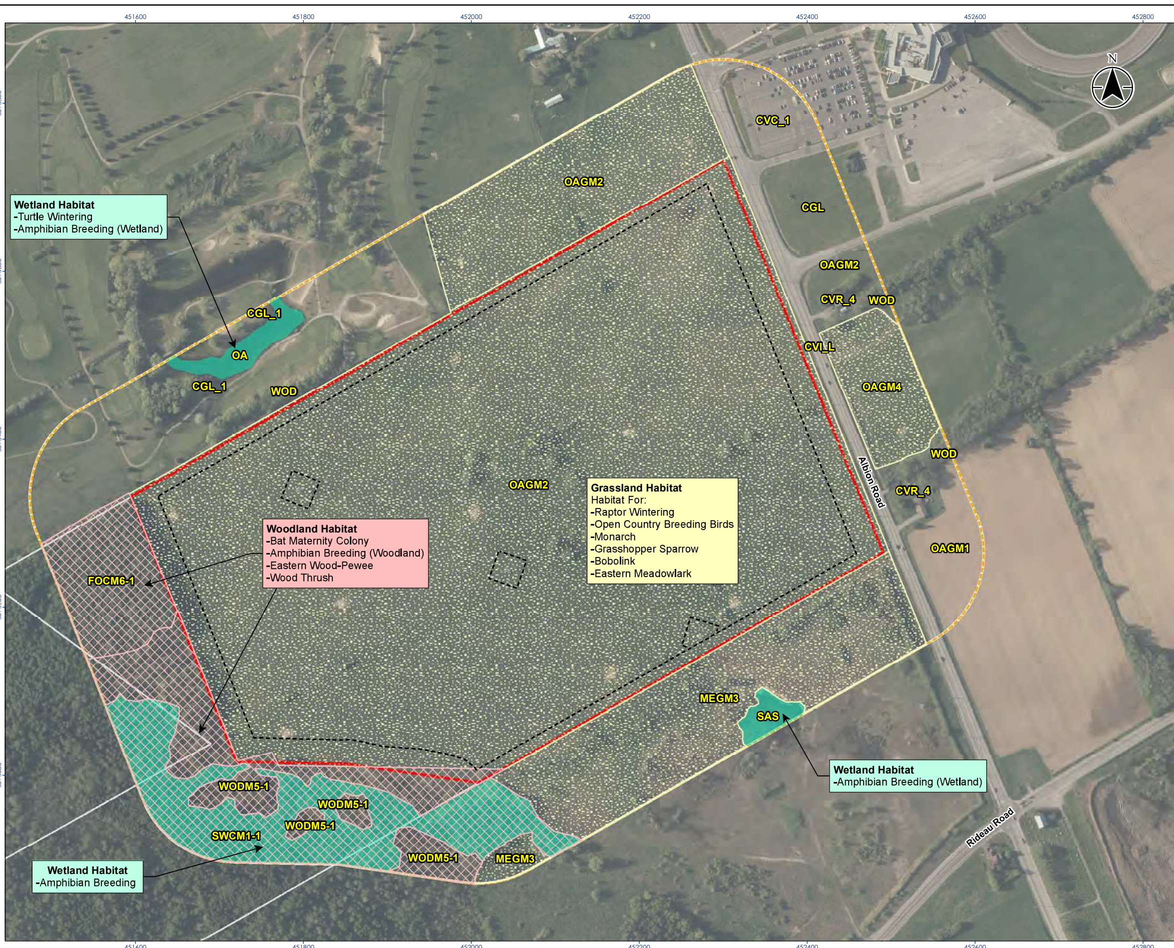
Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2019-11-08
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
4

Title
Survey Locations



Stantec

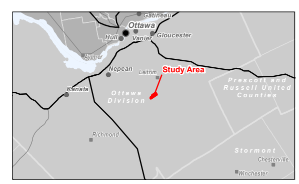
Legend
- Study Area (120 m)
- Site Boundary
- Setback Limit
- Grassland Habitat
- Woodland Habitat
- Wetland Habitat
- Subject Property Boundary

Significant Wildlife Habitat
Seasonal Concentration Areas
-Raptor wintering area (candidate)
-Bat maternity colony (confirmed)
-Turtle wintering area (candidate)
Specialized Habitat
-Amphibian breeding habitat – wetland (confirmed)
-Amphibian breeding habitat – woodland (confirmed)
Species of Conservation Concern
-Open country breeding birds (confirmed)
-Monarch (candidate)
-Eastern Wood-Pewee (confirmed)
-Grasshopper Sparrow (confirmed)

Habitat for Species at Risk
-Bobolink (confirmed)
-Eastern Meadowlark (confirmed)
-Wood Thrush (confirmed)

0 100 200 metres
1:4,500 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2019-11-21
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
5

Title
Significant Wildlife Habitat and SAR Habitat

APPENDIX B
Tables

Table B-1: Wildlife Habitat Assessment for the Ottawa Airport Pit Study Area (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Results of Desktop Habitat Assessment	Results of Field Investigations
SEASONAL CONCENTRATION AREAS				
Waterfowl Stopover and Staging Area (Terrestrial and Aquatic)	Field with evidence of annual spring flooding from meltwater or runoff; aquatic habitats such as ponds, marshes, lakes, bays, and watercourses used during migration, including large marshy wetlands.	ELC surveys, wildlife habitat assessments, and air photo interpretation were used to assess features within the Study Area that may support waterfowl stopover and staging areas.	To be determined during 2019 field investigations.	**Absent**. No flooded fields were observed during spring 2019 field investigations. No concentrations of waterfowl were observed.
Shorebird Migratory Stopover Area	Beaches and un-vegetated shorelines of lakes, rivers, and wetlands.	ELC surveys and air photo interpretation were used to assess features within the Study Area that may support migratory shorebirds.	**Absent**. Natural unvegetated shoreline habitat was absent from the Study Area.	n/a
Raptor Wintering Area	Combination of fields and woodland (>20 ha).	ELC surveys and air photo interpretation were used to assess features within the Study Area that may support wintering raptors.	**Candidate**. The Study Area includes a combination of fields and woodland > 20 ha.	**Candidate.** Winter raptor surveys were not undertaken. Online bird observation records (eBird 2019) records from airport lands approximately 1 km to the north of the Study Area (between Earl Armstrong Rd and Leitrim Rd) indicate that those areas are a significant raptor wintering area. Mitigation for the removal of grassland habitat is proposed.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and karsts.	ELC surveys, wildlife habitat assessments, and air photo interpretation were used to assess features within the Study Area that may support bat hibernacula.	**Absent**. Crevices, caves or abandoned mines Were absent from the Subject Property and Study Area.	n/a
Bat Maternity Colonies	Maternity colonies considered significant wildlife habitat are found in forested ecosites.	ELC surveys, wildlife habitat assessments, and air photo interpretation were used to assess features within the Study Area that may support bat maternity colonies.	To be determined during 2019 field investigations.	**Present.** Forest habitat was present in the Study Area which had suitable characteristics to support bat maternity colonies, and the presence of indicator bat species (Big Brown Bat and Silver-haired Bat) was confirmed. No tree removal is proposed in forest habitat.
Turtle Wintering Areas	Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen. Water has to be deep enough not to freeze and have soft mud substrate.	ELC surveys, wildlife habitat assessments and air photo interpretation were used to assess features within the Study Area that may support areas of permanent standing water but not deep enough to freeze.	**Candidate.** A golf course pond is present in the Study Area, north of the proposed licence area.	**Candidate.** Suitable overwintering habitat for turtles may be present in the golf course pond, however basking surveys were not undertaken on this property. No impacts to an offsite pond are anticipated. General mitigation to avoid impacts to wildlife, including turtles, is proposed.
Reptile Hibernaculum	Rock piles or slopes, stone fences, crumbling foundations.	ELC surveys and wildlife habitat assessments were used to document features that may support snake hibernacula.	To be determined during 2019 field investigations.	**Absent.** Suitable hibernation sites for snakes (e.g. rock piles, riprap along culverts, tree stumps) were not observed during field investigations. General mitigation to avoid impacts to wildlife, including snakes, is proposed.
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, steep slopes, rock faces or piles.	ELC surveys, wildlife habitat assessments, and air photo interpretation were used to assess features within the Study Area that may support colonial bird breeding habitat.	To be determined during 2019 field investigations.	**Absent**. No eroding features, or exposed slopes were observed during field investigations.
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	Dead trees in large marshes and lakes, flooded timber, and shrubs, with nests of colonially nesting heron species.	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support colonial bird breeding habitat (Trees/Shrubs).	**Absent**. Large marshes and lakes were absent from the Study Area.	n/a
Colonial-Nesting Bird Breeding Habitat (Ground)	Rock islands and peninsulas in a lake or large river.	ELC surveys and air photo interpretation were used to assess features within the Study Area that may support colonial bird breeding habitat (Ground).	**Absent**. Large lakes or rivers were absent from the Study Area.	n/a
Migratory Butterfly Stopover Areas	Meadows and forests that are a minimum of 10 ha and are located within 5 km of Lake Ontario.	GIS analysis was used to measure distance from the Lake Ontario shoreline.	**Absent**. The Study area is > 5 km from the Lake Ontario shoreline.	n/a
Landbird Migratory Stopover Areas	Woodlands of a minimum size located within 5 km of Lake Ontario.	GIS analysis was used to measure distance from the Lake Ontario shoreline.	**Absent**. The Study area is > 5 km from the Lake Ontario shoreline.	n/a

Table B-1: Wildlife Habitat Assessment for the Ottawa Airport Pit Study Area (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Results of Desktop Habitat Assessment	Results of Field Investigations
Deer Yarding Areas	Deer yarding areas are mapped by MNRF and species use surveys are not required.	The LIO database and MNRF consultation were used to identify deer yarding areas.	**Absent**. Records of deer yarding areas were not identified by MNRF in the Study Area.	
Deer Winter Congregation Areas	Deer winter congregation's areas are mapped by MNRF and species use surveys are not required.	The LIO database and MNRF consultation were used to identify deer winter congregation areas.	**Absent**. Records of deer winter congregation areas were not identified by MNRF in the Study Area.	n/a
RARE VEGETATION COMMUNITIES				
Sand Barren, Alvar, Cliffs and Talus Slopes	Sand barren, Alvar, Cliff and Talus ELC Community Classes, and other areas of exposed bed rock and patchy soil development, near vertical exposed bedrock and slopes of rock rubble.	ELC surveys and air photo interpretation were used to assess vegetation communities in the Study Area.	**Absent**. These communities were absent from the Study Area.	n/a
Old-growth Forest	Relatively undisturbed, structurally complex; dominant trees > 100 years' old.	ELC surveys and air photo interpretation were used to assess vegetation communities in the Study Area.	To be determined during 2019 field investigations.	**Absent**. Old growth characteristics were not observed within woodlands in the Study Area.
Tallgrass Prairie and Savannah	Open canopy habitats (tree cover < 60%) dominated by prairie species.	ELC surveys and air photo interpretation were used to assess vegetation communities in the Study Area.	To be determined during 2019 field investigations.	**Absent**. Tallgrass Prairie and Savannah communities or indicator plants were not observed during field investigations.
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities listed by the NHIC.	ELC surveys and air photo interpretation were used to assess vegetation communities in the Study Area.	To be determined during 2019 field investigations.	**Absent**. No rare vegetation communities Were observed during field investigations.
SPECIALIZED HABITAT FOR WILDLIFE				
Waterfowl Nesting Area	Upland habitats adjacent to wetlands (within 120 m).	ELC surveys, wildlife habitat assessment, and airphoto interpretation were used to assess features within the Study Area that may support nesting waterfowl.	To be determined during 2019 field investigations.	**Absent**. Wetland communities were limited in the Study Area and no breeding waterfowl were observed during field investigations. The Project has been designed to avoid disturbance to wetlands.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	Treed communities adjacent to rivers, lakes, ponds, and other wetlands with stick nests of Bald Eagle or Osprey.	ELC surveys, air photo interpretation and wildlife habitat assessment were used to assess features within the Study Area that may support nesting, foraging and perching habitat for large raptors.	**Absent**. Suitable large bodies of water were absent from the Study Area.	n/a
Woodland Raptor Nesting Habitat	Forested ELC communities >30 ha with 10 ha of interior habitat.	ELC surveys, wildlife habitat assessment, and GIS analysis were used to assess features within the Study Area that may support nesting habitat for woodland raptors.	**Candidate**. Interior forest habitat is present at the western edge of the Study Area.	**Absent.** Stick nests were not observed during field investigations.
Turtle Nesting Areas	Exposed soil, including sand and gravel in open sunny areas near wetlands.	ELC surveys, wildlife habitat assessment and air photo interpretation were used to assess features within the Study Area that may support turtle nesting areas.	To be determined during 2019 field investigations.	**Absent.** Suitable habitat for turtle nesting is present on the road shoulder and in agricultural fields, however anthropogenic features do not qualify for protection as significant wildlife habitat.
Seeps and Springs	Any forested area with groundwater at surface within the headwaters of a stream or river system.	Evidence of groundwater upwelling, including seeps and springs, was recorded during ELC surveys.	To be determined during 2019 field investigations.	**Absent.** No evidence of groundwater upwelling, seeps or springs was observed during field investigations.
Amphibian Breeding Habitat (Woodland and Wetland)	Treed uplands with vernal pools, and wetland ecosites.	ELC surveys were used to assess features within the Study Area that may support breeding amphibians.	To be determined during 2019 field investigations.	**Present.** Suitable habitat for breeding amphibians is present in wetlands and ponds outside the licence boundary and amphibian breeding in these features was confirmed during targeted field investigations. The Project has been designed to avoid wetlands and no below-water extraction is proposed.
Woodland Area-sensitive Bird Breeding Habitat	Large mature forest stands, woodlots >30 ha and >200 m from the forest edge.	ELC surveys, air photo interpretation, and GIS analysis were used to determine whether woodlots that occurred within the Study Area that Were >30 ha with interior habitat present (>200 m from edge).	**Absent**. No portion of the Study Area is > 200 m from a forest edge.	n/a
HABITAT FOR SPECIES OF CONSERVATION CONCERN				
Marsh Bird Breeding Habitat	Wetlands with shallow water and emergent aquatic vegetation.	ELC surveys and air photo interpretation were used to identify marshes with shallow water and emergent vegetation that may support marsh breeding birds.	**Absent**. Marsh wetlands are absent from the Study Area.	n/a

Table B-1: Wildlife Habitat Assessment for the Ottawa Airport Pit Study Area (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Results of Desktop Habitat Assessment	Results of Field Investigations
Open Country Bird Breeding Habitat	Large grasslands and fields (>30 ha).	ELC surveys, air photo interpretation, and GIS analysis were used to identify grassland communities within the Study Area that may support area-sensitive breeding birds.	**Candidate**. A 38 ha grassland is present in the Study Area.	**Present.** Breeding bird surveys confirmed use of the grassland habitat by three indicator species (Grasshopper Sparrow, Vesper Sparrow and Savannah Sparrow). Mitigation for the removal of grassland breeding bird habitat is proposed.
Shrub/Early Successional Bird Breeding Habitat	Large shrub and thicket habitats (>10 ha).	ELC surveys, air photo interpretation and GIS analysis were used to identify large communities that may support shrub/early successional breeding birds.	**Absent**. Early successional communities > 10 ha were absent from Study Area.	n/a
Terrestrial Crayfish	Wet meadows and edges of shallow marshes.	ELC surveys were used to identify shallow marsh and meadow marsh communities that occurred within the Study Area; searches for crayfish chimneys were conducted during wildlife habitat assessments.	To be determined during 2019 field investigations.	**Absent.** No crayfish chimneys were observed in the Study Area.
SPECIES OF CONSERVATION CONCERN				
Monarch (SARA Special Concern)	Forage and nest in open habitat (i.e., meadows, grasslands and pastures) with various milkweed species (*Asclepias* spp.) and/or wildflowers such as goldenrods (*Solidago* spp.), asters (*Aster* spp.) and yarrow (*Achillea millefolium*) (COSEWIC 2010).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	To be determined during 2019 field investigations.	**Candidate.** Suitable habitat for Monarch is present in the Study Area in meadow communities as well as along the edges of agricultural fields and natural vegetation communities where milkweed plants were observed and nectar-producing wildflowers may be present. However, the species was not observed during 2019 field investigations. Mitigation for removal of milkweed and nectar-producing wildflowers is proposed.
Eastern Milksnake (SARA Special Concern)	Frequently reported in and around buildings, especially old structures, however, it is found in a variety of habitats, including prairies, pastures, hayfields, rocky hillsides and a wide variety of forest types. Two important features of ideal habitat are proximity to water, and suitable locations for basking and egg-laying, nesting sites may include compost or manure piles, stumps, under boards, or in loose soil (COSEWIC 2002a).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	To be determined during 2019 field investigations.	**Candidate.** Suitable habitat is present, however the species was not observed during field investigations. General mitigation to avoid impacts to wildlife, including snakes, is proposed.
Snapping Turtle (SARA Special Concern)	Ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms. Females show strong nest site fidelity and nest in sand or gravel banks at waterway edges in late May or early June (COSEWIC 2008).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	To be determined during 2019 field investigations.	**Candidate.** Suitable habitat is present in the Study Area, outside the proposed licence area in ponds on the Golf Course property, however the species was not observed during field investigations. General mitigation to avoid impacts to wildlife, including turtles, is proposed.
Bald Eagle (SARO Special Concern)	Almost always nests near water. Large stick nests are placed in trees located within mature woodlots. They usually prefer 250 ha of mature forest for breeding, however, along Lake Erie, where the lake provides a valuable food source, the eagles will nest in smaller woodlots or even single trees (Sandilands 2005).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	**Absent.** Suitable large trees near large waterbodies are absent from the Study Area.	n/a
Eastern Wood-Pewee (SARA Special Concern)	Eastern Wood-pewee is found in the mid-canopy layer of deciduous and mixed wood forests with open understories and is commonly associated with edges and clearings (MECP 2014).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	To be determined during 2019 field investigations.	**Present.** The species was observed in suitable habitat in the Study Area, outside the proposed licence area. Mitigation to avoid disturbance to breeding birds is proposed.
Grasshopper Sparrow (SARA Special Concern)	Grasshopper Sparrows prefer short, sparse grass with patches of exposed ground in rough or unimproved pastures and in drier, sparsely vegetated grasslands at least 30 ha in size (Cadman et al. 2007).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	To be determined during 2019 field investigations.	**Present.** The species was observed in suitable habitat in the proposed licence area. Mitigation for the removal of grassland breeding bird habitat is proposed.

Table B-1: Wildlife Habitat Assessment for the Ottawa Airport Pit Study Area (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Results of Desktop Habitat Assessment	Results of Field Investigations
Great Egret (S2B)	Nesting colonies on lakes, ponds, marshes, estuaries, impoundments, and islands (Cadman et al. 2007).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	**Absent.** No lakes, large ponds or marshes are present in the Study Area.	n/a
Peregrine Falcon (SARA Special Concern)	The Peregrine Falcon traditionally prefers rock cliffs, particularly those adjacent to water (MECP 2017). More recently, this species has been released in various urban centres in Ontario where it successfully nests on tall buildings (Cadman et al. 2007; MECP 2017).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	**Absent.** Suitable large cliffs are absent from the Study Area.	n/a
Short-eared Owl (SARA Special Concern)	Open habitats such as agricultural lands, wetlands, and grasslands. This area sensitive species nests on the ground usually in tall vegetation and typically prefers 75 hectares of suitable habitat in order for nesting to occur (Cadman et al. 2007).	ELC surveys, wildlife habitat assessment, botanical inventory and breeding bird surveys were used to assess features within the Study Area that may support species of conservation concern.	To be determined during 2019 field investigations; however, at 38 ha the grassland habitat is smaller than is typically preferred by the species.	**Absent.** Although suitable grassland habitat is present in the Study Area, the species was not observed during crepuscular breeding bird surveys.
ANIMAL MOVEMENT CORRIDORS				
Amphibian Movement Corridor	Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland).	Identified after Amphibian Breeding Habitat - Wetland is confirmed. Movement corridors should be considered when amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat (Wetland).	To be determined during 2019 field investigations.	**Present.** However, as all wetland and woodland habitat has been identified as amphibian breeding habitat, no defined movement corridors have been mapped.
Deer Movement Corridor	Corridors may be found in all forest ecosites. Determined based on identifying significant deer wintering habitat.	Identified after deer wintering habitat is confirmed. Movement corridors should be considered when deer wintering habitat is confirmed as SWH based on MNRF data.	**Absent.** No deer wintering areas were identified in the Study Area.	n/a

REFERENCES

Cadman, M. D., D.A. Sutherland, G.G. Beck, D. Lepage, A.R. Couturier. 2007. *Atlas of the Breeding Birds of Ontario*, 2001-2005. (eds) Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706pp

COSEWIC. 2008. *COSEWIC assessment and status report on the Snapping Turtle Chelydra serpentina in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/snapping-turtle-2008.html. Last accessed: January 10, 2020.

COSEWIC. 2010. *COSEWIC assessment and status report on the monarch danaus plexippus in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Monarch_0810_e1.pdf. Last accessed: January 10, 2020.

COSEWIC. 2014. *COSEWIC assessment and status report on the milksnake Lampropeltis Triangulum in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: http://publications.gc.ca/collections/collection_2014/ec/CW69-14-343-2014-eng.pdf. Last accessed: January 13, 2020.

ebird Canada. 2019. *eBird Canada*. Electronic Document: http://ebird.org/content/canada/. Last accessed: October 29, 2019.

Ministry of the Environment, Conservation and Parks [MECP]. 2017 (last updated 2019). *Peregrine Falcon Evaluation*. Electronic Document: https://www.ontario.ca/page/peregrine-falcon-evaluation#section-0. Last accessed: January 13, 2020.

Ministry of the Environment, Conservation and Parks [MECP]. 2014 (last updated 2019). *Eastern Wood-Pewee*. Electronic Document: https://www.ontario.ca/page/eastern-wood-pewee. Last accessed: January 13, 2020.

Sandilands. Allan. 2005. *Birds of Ontario: Habitat Requirements, Limiting Factors and Status*. Vancouver: UBC Press.

Table B-2: Habitat Potential in the Study Area for Threatened or Endangered Species Identified During Background Review

Species	Habitat Preference	Desktop Assessment of Habitat Potential	Results from Habitat and Species Surveys
PLANTS			
Butternut	Found in a variety of habitats throughout Southern Ontario, including woodlands and hedgerows (Farrar 1995).	Suitable habitat exists for this species in the Study Area within the mixed woodland and open pasture. A botanical inventory was completed to confirm species presence or absence.	**Absent.** No Butternut trees were recorded by Stantec in the Study Area during field investigations.
AMPHIBIANS AND REPTILES			
Western Chorus Frog	Small, ephemeral wetlands disconnected from other water sources for breeding (Environment Canada 2014; COSEWIC 2008). The vegetation composition in breeding ponds is typically herbaceous with the presence of occasional shrubs or partially submerged trees forming a discontinuous or open canopy (Environment Canada 2014).	Suitable habitat for this species may be present in shallow, temporary pools of water. Potential habitat will be identified during field surveys in 2019.	**Absent.** Western Chorus Frog was not detected during amphibian breeding surveys.
Blanding's Turtle	Lakes, ponds, and marshes; prefers shallow water with abundant aquatic vegetation and a soft bottom (MacCulloch 2002).	Suitable open wetland habitat for this species is not present in the Study Area. Although the species may travel up to 2 km between wetlands, there are no records of the species within 5 km of the Study Area.	**Absent.** Suitable habitat for the species was not observed during field investigations.
BIRDS			
Bank Swallow	Bank Swallows excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil, and the sides of sand and gravel pits (Falconer et al. 2016). Any suitable habitat may be present if stockpiles of soil are present or in areas of sand/gravel extraction.	Potential habitat to be identified during field surveys in 2019.	**Absent.** Suitable habitat for the species was not observed during field investigations. The species was not observed during field investigations.
Barn Swallow	Nest on walls or ledges of barns and other human-made structures such as bridges, culverts or other buildings; forages in open areas for flying insects (COSEWIC 2011a).	Suitable nesting habitat is available in barns and old structures; however, no structures are present in the proposed licence area.	**Absent.** The species was observed during field investigations, however no suitable nesting habitat was observed in the Study Area.
Bobolink	Nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures (COSEWIC 2010).	Suitable habitat is present within the Study Area. Habitat use will be determined through breeding bird surveys conducted in June 2019.	**Present.** The species and its habitat were observed during targeted breeding bird surveys. Consultation with ECCC is recommended to avoid impacts to the species.
Chimney Swift	Chimney Swifts primarily use chimneys for roosting and nesting, and only rarely nest in large hollow trees (Fitzgerald et al. 2014; Zanchetta et al. 2014).	There may be suitable chimneys in the Study Area, but no structures are present in the proposed licence area.	**Absent.** Suitable habitat for the species was not observed during field investigations. The species was not observed during field investigations.
Common Nighthawk	Nests on the ground in open habitats with rocky or graveled substrate and will even nest on gravel roofs in the city (Cadman et al. 2007). The regeneration or succession of forest clearings and the destruction of grassland habitats appear to play a major role in this species' decline along with the non-selective spraying for mosquitoes (Cadman et al. 2007).	Suitable habitat may be present within the Study Area. Habitat use will be determined through crepuscular breeding bird surveys conducted in June 2019.	**Absent.** Suitable habitat for the species was not observed during field investigations. The species was observed as a flyover once during the migration period (May 31, 2019) but not during a targeted crepuscular breeding bird survey in June 2019.
Eastern Meadowlark	Meadows, hayfields and pastures; also, other open habitat types including mown lawn (COSEWIC 2011b). Prefers large (~5 ha), low-lying wet grasslands with abundant litter (COSEWIC 2011b).	Suitable habitat is present within the Study Area. Habitat use will be determined through breeding bird surveys conducted in June 2019.	**Present.** The species and its habitat were observed during targeted breeding bird surveys. Consultation with ECCC is recommended to avoid impacts to the species.
Eastern Whip-poor-will	Open woodlands with frequent clearings. Preferred nesting sites contain shaded leaf litter or pine needles and generally occur along wooded edges or in clearings without any herbaceous growth. The species is considered to be area-sensitive, preferring 100 hectares of suitable habitat for breeding (Cadman et al. 2007).	Suitable large, open woodlands are absent from the Study Area.	**Absent.** Suitable habitat for the species was not observed during field investigations.

Table B-2: Habitat Potential in the Study Area for Threatened or Endangered Species Identified During Background Review

Species	Habitat Preference	Desktop Assessment of Habitat Potential	Results from Habitat and Species Surveys
Olive-sided Flycatcher	Natural and man-made openings in coniferous or mixed forests with nearby water or wetlands are preferred and the presence of tall trees or snags for perching and foraging are essential (COSEWIC 2018). Breeds in the boreal forest, where it primarily uses coniferous trees to support its cup-shaped nest (Cadman et al. 2007). Only a handful of Olive-sided flycatchers have been found to breed below the Canadian Shield in Ontario.	Potential habitat to be identified during field surveys.	**Absent.** Suitable habitat for the species was not observed during field investigations. The species was not observed during field investigations.
Wood Thrush	Deciduous and mixed forests with a developed understory and tall trees (MECP 2014). While it prefers large forest tracts, it will utilize smaller forest fragments (MECP 2014). Nests are constructed in shrubs or saplings, typically Sugar Maple or American Beech (MECP 2014).	Potential habitat to be identified during field surveys.	**Present.** The species was observed in suitable woodland habitat in the west of the Study Area during field investigations. A setback of 15 m from the woodland is proposed.
MAMMALS			
Small-footed Myotis	Small-footed myotis hibernate in caves and abandoned mines in winter, and roost under rocks, in rock outcrops, buildings, under bridges, or in caves, mines, or hollow trees in the spring and summer (MNRF 2017).	Suitable roosting habitat may be available in barns and old structures in the Study Area; however, no structures are present in the proposed licence area. Potential habitat to be identified during field surveys.	**Absent.** Habitat for the species is absent in the Study Area.
Little Brown Myotis	Trees, buildings and bridges for roosting; trees for nesting; caves and mines for hibernation (COSEWIC 2013).	Suitable roosting habitat may be available in barns and old structures in the Study Area; however, no structures are present in the proposed licence area. Candidate maternity roost trees may be present within treed ELC communities or individual large trees. Potential habitat to be identified during field surveys.	**Absent.** Six trees providing candidate roost habitat for the species were observed during field investigations, however due to the low number of acoustic detections (5 calls over 30 nights in June) the species is considered absent from the Study Area.
Northern Myotis	Caves provide overwintering habitat (COSEWIC 2013). Rarely uses human-made structures for roosting (COSEWIC 2013).	Suitable roosting habitat may be available in barns and old structures in the Study Area; however, no structures are present in the proposed licence area. Candidate maternity roost trees may be present within treed ELC communities or individual large trees. Potential habitat to be identified during field surveys.	**Absent.** Six trees providing candidate roost habitat for the species were observed during field investigations, however the species was not detected during targeted field investigations.
Tri-colored Bat	Found in a variety of habitats; caves provide overwintering habitat (COSEWIC 2013). Prefers oak and sugar maple trees with clusters of dead leaves (MECP 2019).	Suitable roosting habitat may be available in barns and old structures in the Study Area; however, no structures are present in the proposed licence area. Candidate maternity roost trees may be present within treed ELC communities or individual large trees. Potential habitat to be identified during field surveys.	**Absent.** Suitable oak and sugar maple trees were not observed during field investigations. The species was not detected during targeted field investigations.

References

Cadman, M. D., D.A. Sutherland, G.G. Beck, D. Lepage, A.R. Couturier. 2007. *Atlas of the Breeding Birds of Ontario*, 2001-2005. (eds) Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706pp

COSEWIC. 2008. *COSEWIC assessment and update status report on the Western Chorus Frog Pseudacris triseriata Carolinian population and Great Lakes/St. Lawrence – Canadian Shield population in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_western_chorus_frog_0808_e.pdf. Last accessed: January 13, 2020.

COSEWIC. 2010. *COSEWIC assessment and status report on the Bobolink Dolichonyx oryzivorus in Canada.* Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. Electronic Document: www.registrelep-sararegistry.gc.ca/default_e.cfm. Last accessed: January 13, 2020.

COSEWIC. 2011a. *COSEWIC assessment and status report on the Barn Swallow Hirundo rustica in Canada. Committee on the Status of Endangered Wildlife in Canada.* Ottawa, Ontario. Electronic Document: https://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_barn_swallow_0911_eng.pdf. Last accessed: January 13, 2020.

COSEWIC. 2011b. *COSEWIC assessment and status report on the Eastern Meadowlark Sturnella magna in Canada. Committee on the Status of Endangered Wildlife in Canada.* Ottawa, Ontario. Electronic Document: www.registrelep-sararegistry.gc.ca/default_e.cfm. Last accessed: January 13, 2020.

COSEWIC. 2013. *COSEWIC assessment and status report on the Little Brown Myotis (Myotis lucifugus), Northern Myotis (Myotis septentrionalis), Tri-colored Bat (Perimyotis subflavus) in Canada. Committee on the Status of Endangered Wildlife in Canada.* Ottawa, Ontario. Electronic Document: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Little%20Brown%20Myotis%26Northern%20Myotis%26Tri-colored%20Bat_2013_e.pdf. Last accessed: January 13, 2020.

COSEWIC. 2018. *COSEWIC assessment and status report on the Olive-sided Flycatcher Contopus cooperi in Canada. Committee on the Status of Endangered Wildlife in Canada.* Ottawa, Ontario. Electronic Document: https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/srOlive-sidedFlycatcher2018e.pdf. Last accessed: January 13, 2020.

Environment Canada. 2014. *Recovery Strategy for the Western Chorus Frog (Pseudacris triseriata), Great Lakes/St. Lawrence – Canadian Shield Population, in Canada*. Species at Risk Act Recovery Strategy Series, Environment Canada, Ottawa, Ontario. Electronic Document: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_rainette-fx-grillon-ouest-w-chorus-frog-prop-0614_e.pdf. Last accessed: January 13, 2020.

Falconer, M., K. Richardson, A. Heagy, D. Tozer, B. Stewart, J. McCracken, and R. Reid, 2016. *Recovery Strategy for the Bank Swallow (Riparia riparia) in Ontario.* Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. ix + 70 pp.

Farrar, Joh Laird. 1995. *Trees in Canada.* Markham: Fitzhenry & Whiteside Limited and the Canadian Forest Service. 168 pp.

Fitzgerald, T. M., E. van Stam, J. J. Nocera, and D. S. Badzinski. 2014. Loss of nesting sites is not a primary factor limiting northern Chimney Swift populations. *Population Ecology* 56 (3):507-512. Electronic Document: http://dx.doi.org/10.1007/s10144-014-0433-6. Last accessed: January 13, 2020.

MacCulloch, Ross Douglas. 2002. *The ROM Field Guide to Amphibians and Reptiles of Ontario*. Toronto: McClelland & Stewart. 168 p.

Ministry of the Environment, Conservation and Parks [MECP]. 2014 (last updated 2019). *Wood Thrush*. Electronic Document: https://www.ontario.ca/page/wood-thrush. Last accessed: January 13, 2020.

Ministry of the Environment, Conservation and Parks [MECP]. 2019. *Little Brown Myotis, Northern Myotis, and Tri-coloured Bat in Ontario*. Ontario Recovery Strategy Series. Electronic Document: https://files.ontario.ca/mecp-rs-bats-2019-12-05.pdf. Last accessed: January 13, 2020.

Ministry of Natural Resources and Forestry [MNRF]. 2017. Survey Protocol for Species at Risk Bats within Treed Habitats, Little Brown Myotis, Northern Myotis & Tri-Coloured Bat.

Zanchetta, C., D. C. Tozer, T. M. Fitzgerald, K. Richardson, and D. Badzinski. 2014. Tree cavity use by Chimney Swifts: implications for forestry and population recovery. *Avian Conservation and Ecology* 9(2): 1. http://dx.doi.org/10.5751/ACE-00677-090201. Last accessed: January 13, 2020.

APPENDIX C

Species Lists

Plant List for Ottawa Airport Pit - Parcel C - Stantec, 2019

Vegetation Community				Scientific Name	Common Name	Establishment Means	Coefficient of Conservatism	Wetness Index	Wetland Plant Species	Weediness Index	Provincial Rank	SARO Status	COSEWIC Status
OAGM4	TAGM2-1	SWM	WOD										
		x		*Gymnocarpium dryopteris*	common oak fern	native	7	0	T		S5		
	x			*Pteridium aquilinum latiusculum*	eastern bracken fern	native	2	3			S5		
	x	x		*Dryopteris carthusiana*	spinulose wood fern	native	5	-2	T		S5		
	x			*Equisetum sp.*									
	x	x	x	*Onoclea sensibilis*	sensitive fern	native	4	-3	I		S5		
		x		*Osmunda claytoniana*	interrupted fern	native	7	-1	T		S5		
		x		*Osmunda regalis spectabilis*	royal fern	native	7	-5	I		S5		
	x	x		*Thuja occidentalis*	eastern white cedar	native	4	-3	T		S5		
		x		*Abies balsamea*	balsam fir	native	5	-3	T		S5		
	x			*Pinus strobus*	eastern white pine	native	4	3	T		S5		
		x		*Sambucus racemosa pubens*	red elderberry	native	5	2			S5		
		x		*Toxicodendron radicans radicans*	eastern poison ivy	native	5	-1	T		S5		
x				*Asclepias syriaca*	common milkweed	native	0	5			S5		
		x		*Aralia nudicaulis*	wild sarsaparilla	native	4	3			S5		
x				*Achillea millefolium*	common yarrow	introduced	0	3			SE		
x		x		*Arctium minus*	common burdock	introduced		5		-2	SE5		
x				*Cirsium arvense*	Canada thistle	introduced		3		-1	SE5		
			x	*Euthamia graminifolia*	grass-leaved goldenrod	native	2	-2			S5		
		x		*Oclemena acuminata*	whorled wood aster	native	9	5			S4		
	x			*Pilosella caespitosa*	meadow hawkweed	introduced	-?	-?	-?	-?	SE5		?
			x	*Rudbeckia triloba triloba*	brown-eyed Susan	introduced		1		-1	SE4		
x		x	x	*Solidago canadensis canadensis*	Canada goldenrod	native	1	3			-?	-?	
x				*Tragopogon pratensis*	meadow goatsbeard	introduced		5		-1	SE5		
		x		*Impatiens capensis*	spotted jewelweed	native	4	-3	I		S5		
		x		*Betula alleghaniensis*	yellow birch	native	6	0	T		S5		
x				*Berteroa incana*	hoary alyssum	introduced		5		-3	SE5		
x			x	*Lonicera sp.*									
x				*Silene vulgaris*	bladder campion	introduced		-?			SE5		
x				*Stellaria media*	common chickweed	introduced		3		-1	SE5		
	x		x	*Cornus alternifolia*	alternate-leaved dogwood	native	6	5			S5		
	x			*Pyrola elliptica*	shinleaf	native	5	5			S5		
x				*Lotus corniculatus*	garden bird's-foot trefoil	introduced		1		-2	SE5		
x				*Trifolium pratense*	red clover	introduced		2		-2	SE5		
x				*Vicia cracca*	tufted vetch	introduced		5		-1	SE5		
		x		*Ribes glandulosum*	skunk currant	native	6	-3	I		S5		
x				*Leonurus cardiaca cardiaca*	common motherwort	introduced		5		-2	SE5		
			x	*Lycopus americanus*	American water-horehound	native	4	-5	I		S5		
			x	*Prunella vulgaris vulgaris*	common self-heal	introduced		0		-1	-?	-?	
	x			*Fraxinus pennsylvanica*	red ash	native	3	-3	T		S4		
	x			*Circaea canadensis canadensis*	Canada enchanter's nightshade	native	3	3			S5		
			x	*Plantago major*	common plantain	introduced		-1		-1	S5		
	x	x		*Lysimachia borealis*	northern starflower	native	-?	-?	-?	-?	-?	-?	?
	x		x	*Frangula alnus*	glossy buckthorn	introduced		-1	T	-3	SE5		
	x		x	*Rhamnus cathartica*	European buckthorn	introduced		3	T	-3	SE5		
	x			*Fragaria virginiana virginiana*	wild strawberry	native	2	1			S5		
x				*Malus sp.*									
	x	x	x	*Prunus virginiana virginiana*	chokecherry	native	2	1			S5		
x	x	x	x	*Rubus idaeus idaeus*	red raspberry	introduced		-?			SNA	-?	
			x	*Rubus occidentalis*	black raspberry	native	2	5			S5		
		x		*Rubus pubescens*	dewberry	native	4	-4	I*		S5		
	x			*Galium triflorum*	three-flowered bedstraw	native	4	2			S5		
			x	*Populus alba*	white poplar	introduced		5		-3	SE5		
	x	x	x	*Populus tremuloides*	trembling aspen	native		0	T		S5		
		x		*Salix sp.*									
x			x	*Acer negundo*	Manitoba maple	native	0	-2	T		S5		
		x		*Acer rubrum*	red maple	native	4	0	T		S5		
	x			*Acer saccharinum*	silver maple	native	5	-3	I		S5		
x				*Acer saccharum*	sugar maple	native	4	3			S5		
		x		*Tiarella cordifolia*	heart-leaved foamflower	native	6	1	T		S5		
x				*Verbascum thapsus thapsus*	-?	introduced		5		-2	SE5		
		x		*Solanum dulcamara*	bittersweet nightshade	introduced		0	T	-2	SE5		
	x	x		*Ulmus americana*	white elm	native	3	-2	T		S5		
		x		*Urtica dioica gracilis*	slender stinging nettle	native	2	-1	T		-?	-?	
		x	x	*Parthenocissus quinquefolia*	Virginia creeper	native	6	1			S4?		

Plant List for Ottawa Airport Pit - Parcel C - Stantec, 2019

Vegetation Community				Scientific Name	Common Name	Establishment Means	Coefficient of Conservatism	Wetness Index	Wetland Plant Species	Weediness Index	Provincial Rank	SARO Status	COSEWIC Status
OAGM4	TAGM2-1	SWM	WOD										
	x	x	x	*Vitis riparia*	riverbank grape	native	0	-2			S5		
		x		*Arisaema triphyllum triphyllum*	Jack-in-the-pulpit	native	5	-2	T		S5		
		x		*Maianthemum canadense canadense*	wild lily-of-the-valley	native	5	0			S5		
	x			*Carex arctata*	drooping woodland sedge	native	-?	-?	-?	-?	S5		-?
			x	*Scirpus cyperinus*	common woolly bulrush	native	4	-5	I		S5		
x				*Agrostis gigantea*	redtop	introduced		-3	T		SE5		
x		x	x	*Bromus inermis*	smooth brome	introduced		5		-3	SE5		
x				*Elymus repens*	quackgrass	introduced		3		-3	SE5		
x				*Phalaris arundinacea arundinacea*	reed canarygrass	native	0	-4	T		S5		
x				*Phleum pratense pratense*	common timothy	introduced		3		-1	SE5		

Species Diversity			
Vascular Plants Listed:		**74**	
Identified to species or ssp/var		**70**	
Identified to Genus (not included in calculations below)		**4**	
Provincial Status		**Total Number**	**Percentage**
S1-S3 Species:	*rare in Ontario*	0	0%
S4 Species:	*uncommon in Ontario*	3	4%
S5 Species:	*common in Ontario*	40	57%
Other:		23	33%
Not listed:		0	0%
Not defined ("-?"):		4	6%
Means of Establishment			
Native Species:		45	64%
Introduced Species:		25	36%
Not listed:		0	0%
Not defined ("-?"):		0	0%
Co-efficient of Conservatism (C) and Floristic Quality Index(FQI)			
C 0 to 3	*lowest sensitivity*	15	21%
C 4 to 6	*moderate sensitivity*	24	34%
C 7 to 8	*high sensitivity*	3	4%
C 9 to 10	*highest sensitivity*	1	1%
Not listed:		24	34%
Not defined ("-?"):		3	4%
Average C		***3.9***	
FQI		***49.7***	
Presence of Weedy & Invasive Species			
weediness = 0	*Not invasive*	0	0%
weediness = -1	*low potential invasiveness*	8	11%
weediness = -2	*moderate potential invasivenes*	6	9%
weediness = -3	*high potential invasiveness*	6	9%
Not listed:		47	67%
Not defined ("-?"):		3	4%
Average weediness		***-1.9***	
Wetness Index			
upland	*W of 5*	13	19%
facultative upland	*W of 4, 3 or 2*	15	21%
facultative	*W of 1, 0 or -1*	18	26%
facultative wetland	*W of -2, -3 or -4*	16	23%
obligate wetland	*W of -5*	3	4%
Not listed:		0	0%
Not defined ("-?"):		5	7%
Average wetness value		***0.8***	
Presence of Wetland (W) Species			
Total Wetland Tolerant (T) Plant Species as identified in OWES Manual		21	30%
Total Wetland Indicator (I) Plant Species as identified in OWES Manual		8	11%
Not listed:		38	54%
Not defined ("-?"):		3	4%

Wildlife List for Ottawa Airport Pit - Parcel C - Stantec 2019

COMMON NAME	***SCIENTIFIC NAME***	**ONTARIO RANK**	**GLOBAL RANK**	**SARO**	**SARA**	**COMMENTS**
AMPHIBIANS						
American Toad	*Anaxyrus americanus*	S5	G5			
Tetraploid Gray Treefrog	*Hyla versicolor*	S5	G5			
Spring Peeper	*Pseudacris crucifer*	S5	G5			
Wood Frog	*Lithobates sylvatica*	S5	G5			
BIRDS						
Canada Goose	*Branta canadensis*	S5	G5			
Mallard	*Anas platyrhynchos*	S5	G5			
American Black Duck	*Anas rubripes*	S4	G5			
Wild Turkey	*Meleagris gallopava*	S5	G5			
Mourning Dove	*Zenaida macroura*	S5	G5			
Common Nighthawk	*Chordeiles minor*	S4B	G5	SC	THR	COSEWIC recommended SC, May 2018
Wilson's Snipe	*Gallinago delicata*	S5B	G5			
Ring-billed Gull	*Larus delawarensis*	S5B,S4N	G5			
Double-crested Cormorant	*Phalacrocorax auritus*	S5B	G5	NAR	NAR	
Turkey Vulture	*Cathartes aura*	S5B	G5			
Red-tailed Hawk	*Buteo jamaicensis*	S5	G5	NAR	NAR	
Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B	G5			
Hairy Woodpecker	*Dryobates villosus*	S5	G5			
Eastern Wood-Pewee	*Contopus virens*	S4B	G5	SC	SC	
Alder Flycatcher	*Empidonax alnorum*	S5B	G5			
Least Flycatcher	*Empidonax minimus*	S4B	G5			
Great Crested Flycatcher	*Myiarchus crinitus*	S4B	G5			
Eastern Kingbird	*Tyrannus tyrannus*	S4B	G5			
Warbling Vireo	*Vireo gilvus*	S5B	G5			
Red-eyed Vireo	*Vireo olivaceus*	S5B	G5			
Blue Jay	*Cyanocitta cristata*	S5	G5			
American Crow	*Corvus brachyrhynchos*	S5B	G5			
Common Raven	*Corvus corax*	S5	G5			
Barn Swallow	*Hirundo rustica*	S4B	G5	THR	THR	
Black-capped Chickadee	*Poecile atricapillus*	S5	G5			
White-breasted Nuthatch	*Sitta carolinensis*	S5	G5			
Winter Wren	*Troglodytes hiemalis*	S5B	G5			
Veery	*Catharus fuscescens*	S4B	G5			
Wood Thrush	*Hylocichla mustelina*	S4B	G5	SC	THR	
American Robin	*Turdus migratorius*	S5B	G5			
Gray Catbird	*Dumetella carolinensis*	S4B	G5			
Brown Thrasher	*Toxostoma rufum*	S4B	G5			
European Starling	*Sturnus vulgaris*	SNA	G5			
Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5			
Red Crossbill	*Loxia curvirostra*	S4B	G5			
American Goldfinch	*Spinus tristis*	S5B	G5			
Vesper Sparrow	*Pooecetes gramineus*	S4B	G5			
Savannah Sparrow	*Passerculus sandwichensis*	S4B	G5			
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	G5	SC	SC	
White-throated Sparrow	*Zonotrichia albicollis*	S5B	G5			
Bobolink	*Dolichonyx oryzivorus*	S4B	G5	THR	THR	
Eastern Meadowlark	*Sturnella magna*	S4B	G5	THR	THR	
Baltimore Oriole	*Icterus galbula*	S4B	G5			
Red-winged Blackbird	*Agelaius phoeniceus*	S4	G5			
Common Grackle	*Quiscalus quiscula*	S5B	G5			
Ovenbird	*Seiurus aurocapilla*	S4B	G5			
Northern Waterthrush	*Parkesia noveboracensis*	S5B	G5			
Black-and-white Warbler	*Mniotilta varia*	S5B	G5			
Mourning Warbler	*Geothlypis philadelphia*	S4B	G5			
Common Yellowthroat	*Geothlypis trichas*	S5B	G5			
American Redstart	*Setophaga ruticilla*	S5B	G5			
Yellow Warbler	*Setophaga petechia*	S5B	G5			
Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B	G5			
Yellow-rumped Warbler	*Setophaga coronata*	S5B	G5			
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B	G5			
Indigo Bunting	*Passerina cyanea*	S4B	G5			
MAMMALS						
Red Squirrel	*Tamiasciurus hudsonicus*	S5	G5			

SUMMARY

Total Amphibians:	4
Total Birds:	56
Total Mammals:	1

SIGNIFICANT SPECIES

Global:	0
National:	7
Provincial:	7

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
REGION: Rare in a Site Region
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the province
SX: Presumed extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked
SU: Unrankable—Currently unrankable due to lack of information
SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species
S#B- Breeding status rank
S#N- Non Breeding status rank
?: Indicates uncertainty in the assigned rank
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range
G1G2: Extremely rare to very rare globally
G2: Very rare globally; usually between 5-10 occurrences in the overall range
G2G3: Very rare to uncommon globally
G3: Rare to uncommon globally; usually between 20-100 occurrences
G3G4: Rare to common globally
G4: Common globally; usually more than 100 occurrences in the overall range
G4G5: Common to very common globally
G5: Very common globally; demonstrably secure
GU: Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.
GNR: Unranked—Global rank not yet assessed.
T: Denotes that the rank applies to a subspecies or variety
Q: Denotes that the taxonomic status of the species, subspecies, or variety is **questionable**.
END: Endangered
THR: Threatened
SC: Special Concern
2, 3 or NS after a COSEWIC ranking indicates the species is either on Schedule 2, Schedule 3 or No Schedule of the Species At Risk Act (SARA)
NAR: Not At Risk
IND: Indeterminant, insufficient information to assign status
DD: Data Deficient

LATEST STATUS UPDATE

Odonata: Sept 2019
Butterflies: Jan 2018
Bumble Bees: Sept 2019
Other Arthropods: Sept 2019
Terrestrial Molluscs: Sept 2019
Amphibans: Sept 2019
Reptiles: Sept 2019
Birds: Sept 2019
Mammals: May 2018
S and G ranks and explanations: December 2011

NOTE

All rankings for birds refer to breeding birds unless the ranking is followed by N

REFERENCES

COSSARO Status
Endangered Species Act, 2007 (Bill 184). Species at Risk in Ontario List.

COSEWIC Status
COSEWIC. 2007. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada.

APPENDIX D
Field Notes

Stantec

Stantec Consulting Ltd.
400-1331 Clyde Ave.,
Ottawa, ON K2C 3G4
Tel: (613) 738-0708

Bat Maternity Roost - Bat Maternity Roost Habitat Assessment Data Form

Project Number: 160961321

Project Name: Cavanagh - Ottawa Airport Pit

DATE	TIME (start)	TIME (end)	Field Personnel
May 21/2019	0800hrs	1130hrs	J. Mansell

Weather Conditions:

FEATURE #	TEMP (°C)	WIND	CLOUD	PPT	PPT (in last 24 hrs)
n/a.	9	3-4	50%	spitting rain	0mm.

NOTES ABOUT ENTIRE FEATURE

Age/Maturity:

Dominant tree species:

Feature includes wooded sections within 120m of Study Area.
Individual trees within Study Area surveyed.
∟ White Pine Plantation ∟ Trembling Aspen Swamp
∟ White Cedar Swamp

RECORD DETAILS OF ALL SNAG/CAVITY TREES >10 CM DBH BELOW:

Tree No.	Species	Notes	DBH (cm) (>10cm only)	Tree height (m)	Cavity Height (m)	Photo Number(s)	UTM (Zone:____)	One of tallest trees in community	Exhibits cavities /crevices/scars/woodpe	Largest DBH in community	Cavity or crevice is high up in tree (>10 m)	Within highest density or cluster of cavity trees	Large amount of loose, peeling bark	Open canopy	Early stages of decay (class 1-3)
EX	Sugar maple	-	40	12	9	1, 2	123456 / 1234567	X		X			X		X
	* All data collected on Collector App						/								
	on May 21/2019 *						/								
	Trees COABAT001 - 005.						/								
							/								

Signature: JM [signature]
(Field Personnel)

Quality Control:This form is complete ❑ & legible ❑.

Signature: ________________
(Project Manager)

Stantec

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel (519) 836-6050
Fax (519) 836-2493

Birding Point Counts Survey Observation Form

Project Number: 160961321

Project Name: Cavanaugh Ottawa Airport

Date: June 5, 2019

Field Personnel: Brennan Obermayer

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	12 - 16	1	100	0	Rain

GPS #: T

Station: BBS 01

Feature:

UTM:

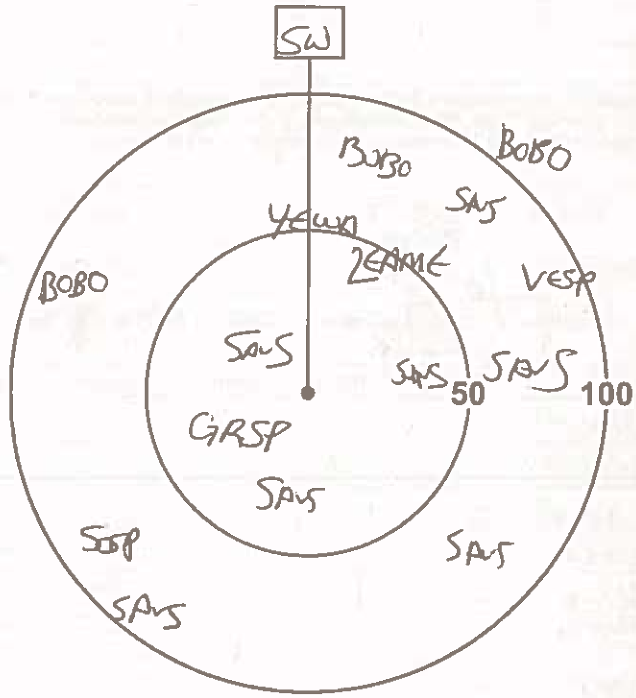
Start Time: 6:04

End Time: 6:14

Habitat: ☐Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

NOISE = 3

Species	<50m	50-100m	>100m	Flyovers	Height*
BOBO	~~2~~	2	1	–	–
SAVS	3	4	–	–	–
YEWA	–	1	–	–	–
EAME	2	–	–	–	–
SOSP	–	1	–	–	–
VESP	–	1	–	–	–
GRSP	1	–	–	–	–



* Height of blade sweep varies from project to project; check with project manager.
O-On ground; A-Below height of blade sweep; B-At height of blade sweep;
C-Above height of blade sweep; D-Well above height of blade sweep

INCIDENTAL: BRTH
COYE
EAKI

Page 1 of 4

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Project Manager)

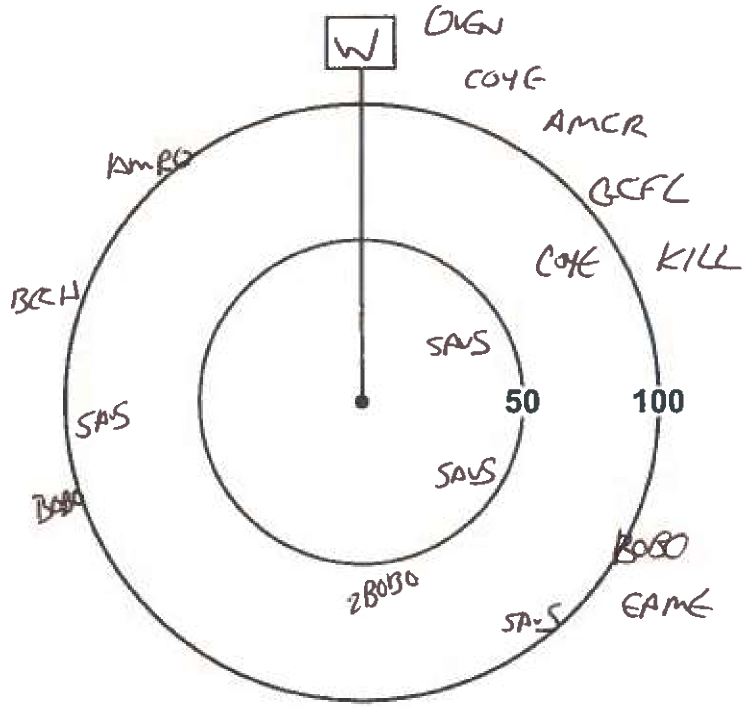
Station: BBS2 Feature: UTM:

Start Time: 6:22 End Time: 6:37

Habitat: ☐Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

Species	<50m	50-100m	>100m	Flyovers	Height*
SAVS	2	2	—	—	—
BOBO	—	2	2	—	—
COYE	—	1	+	—	—
GCFL	—	—	1	—	—
AMCR	—	—	1	—	—
OVEN	—	—	1	—	—
EAME	—	—	1	—	—
AMRO	—	—	1	—	—
BCCH	—	—	1	—	—

** Height of blade sweep will vary from project to project, check with project manager*
O-On ground, A-Below height of blade sweep, B-At height of blade sweep,
C-Above height of blade sweep, D-Well above height of blade sweep



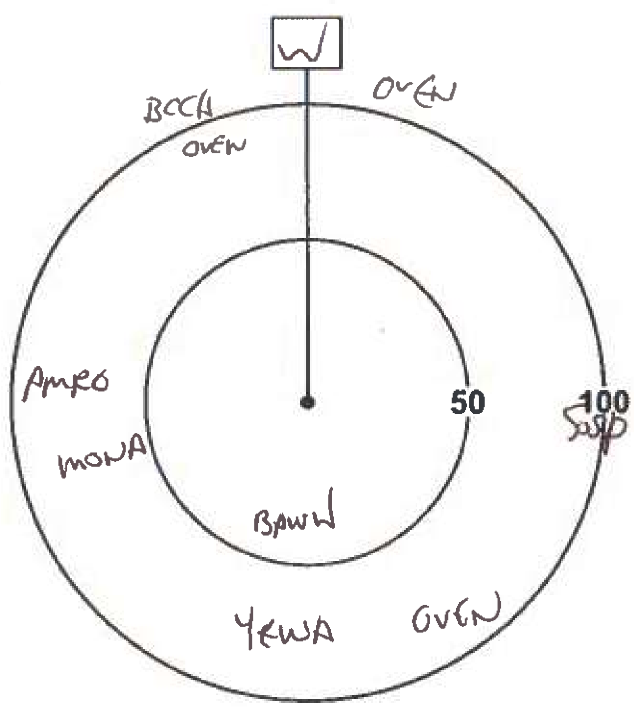
Station: BBS3 Feature: UTM:

Start Time: 6:53 End Time: 7:03

Habitat: ☒Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

Species	<50m	50-100m	>100m	Flyovers	Height*
BAWW	1	—	—	—	—
MOWA	—	1	—	—	—
AMRO	—	1	—	—	—
OVEN	—	2	1	—	—
YEWA	—	1	—	—	—
BCCH	—	—	1	—	—
SOSP	—	1	—	—	—

** Height of blade sweep will vary from project to project; check with project manager*
O-On ground, A-Below height of blade sweep, B-At height of blade sweep,
C-Above height of blade sweep, D-Well above height of blade sweep



Page 2 of 4

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Project Manager)

Station: BBS 5 Feature: UTM:

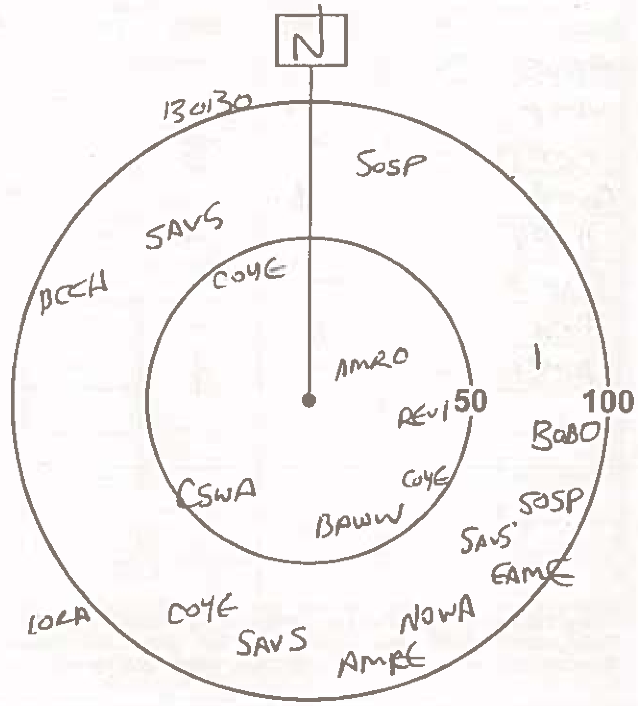
Start Time: 7:30 End Time: 7:40

Habitat: ☒Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

NOISE 3

Species	<50m	50-100m	>100m	Flyovers	Height*
COYE	2	1	—	—	—
AMRO	1 -	—	—	—	—
REVI	1	—	—	—	—
BAWW	1	—	—	—	—
CSWA	1	—	—	—	—
SAVS	—	2	—	—	—
SOSP	—	2	—	—	—
BCCH	—	1	—	—	—
NOWA	—	1	—	—	—
AMRE	—	1	—	—	—
~~SOSP~~	—	~~2~~	—	—	—
BOBO	—	1	1	—	—
EAME	—	1	—	—	—
CORA	—	1	—		—

* Height of blade sweep will vary from project to project; check with project manager.
O-On ground; A-Below height of blade sweep; B-At height of blade sweep;
C-Above height of blade sweep; D-Well above height of blade sweep



Station: BBS4 Feature: UTM:

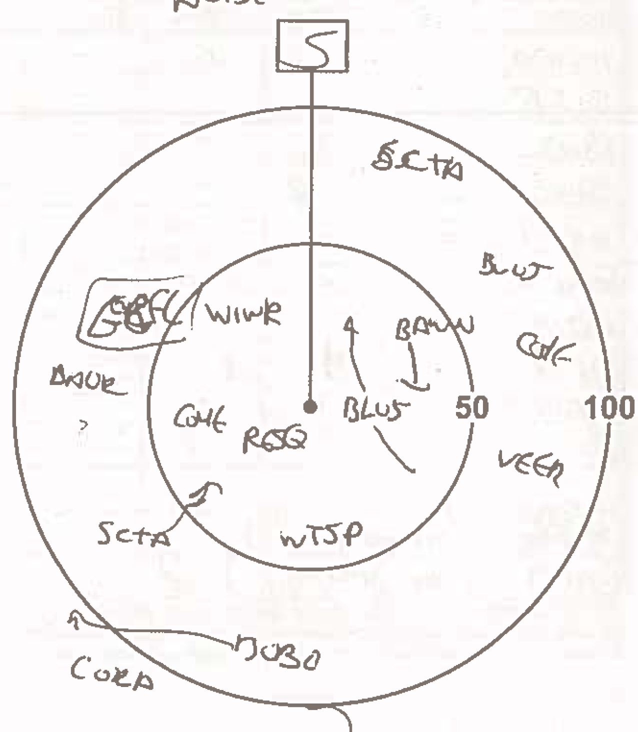
Start Time: ~~BBS~~ 7:10 End Time: 7:20

Habitat: ☒Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

NOISE 3

Species	<50m	50-100m	>100m	Flyovers	Height*
BOBO ~~RESQ~~	—	+	—	1	—
BLUJ	1	1			
BAWW					
COYE	1	1			
WIWR	1	—	—	—	—
WTSP	1	—	—	—	—
SCTA	1	1	—	—	—
GCFL	—	1	—	—	—
BAOR	—	1	—	—	—
VEER	—	1	—	—	—
CORA	—	—	1	—	—
WETU	INCIDENTAL (2)				
WOTH	INCIDENTAL (1)				
RESQ	1	—	—	—	—

* Height of blade sweep will vary from project to project; check with project manager.
O-On ground; A-Below height of blade sweep; B-At height of blade sweep;
C-Above height of blade sweep; D-Well above height of blade sweep



Page 3 of 4

Quality Control This form is complete ☐ & legible ☐

Signature: (Field Personnel)

Signature: (Project Manager)

REV: 2011-05-04 / FORM 020

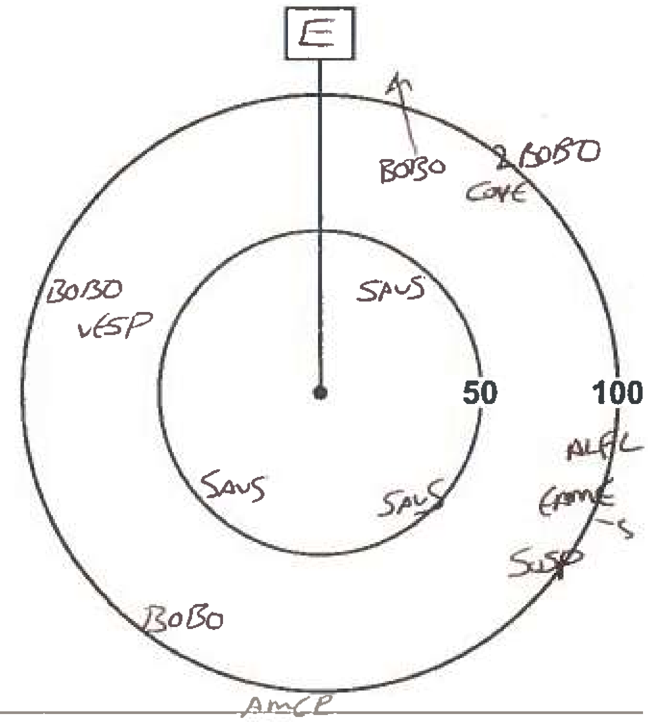
Station: BBS6 Feature: UTM:

Start Time: 7:47 End Time: 7:57

Habitat: ☐Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

Species	<50m	50-100m	>100m	Flyovers	Height*
SAVS	3	–	–	-	–
VESP	–	1	–	–	–
BOBO	–	2	3	–	–
COYE	-	+	–	–	–
ALFL	–	–	1	–	–
GAME	–	–	1	–	–
SOSP	–	1	–	–	–
AMCR	–	–	4	–	–

* *Height of blade sweep will vary from project to project, check with project manager.*
O-On ground, **A**-Below height of blade sweep, **B**-At height of blade sweep,
C-Above height of blade sweep, **D**-Well above height of blade sweep



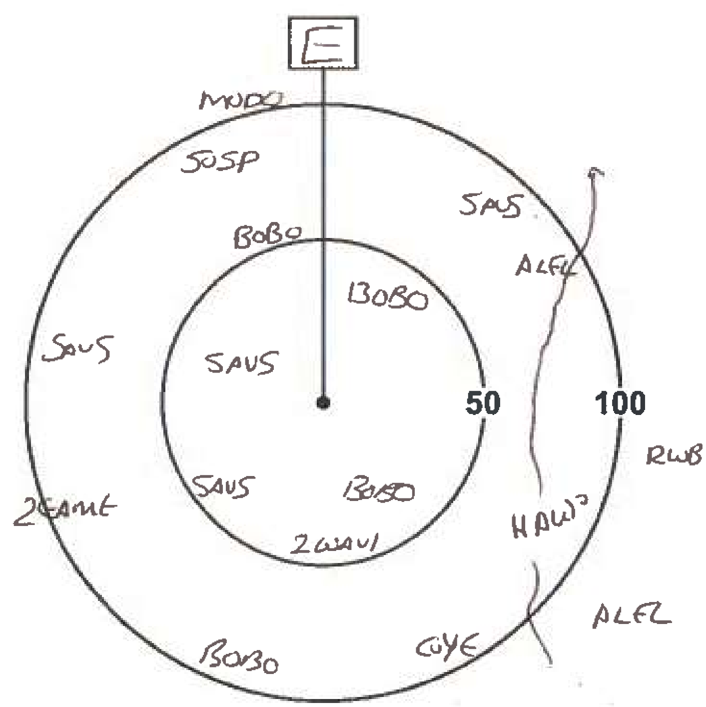
Station: BBS7 Feature: UTM:

Start Time: 8:02 End Time: 8:12

Habitat: ☐Forest / ☐Swamp / ☐Marsh / ☐Hay / ☒Pasture / ☐Crop

Species	<50m	50-100m	>100m	Flyovers	Height*
MODO	–	–	1	-	–
SOSP	-	1	–	–	–
BOBO	2	2	–	–	–
SAVS	2	2	–	–	–
WAVI	2	–	–	–	–
GAME	–	2	–	–	–
COYE	–	1	–	–	–
ALFL	–	+	1	–	–
HAWO	–	1	–	–	–
RWBL	–	–	1	-	–
~~TUVU~~	(incidental)				
EAKI	(INCIDENTAL)		2		

* *Height of blade sweep will vary from project to project, check with project manager.*
O-On ground, **A**-Below height of blade sweep, **B**-At height of blade sweep,
C-Above height of blade sweep, **D**-Well above height of blade sweep



Page 4 of 4 Quality Control: This form is complete ☐ & legible ☐

Signature: [signature] Signature:

(Field Personnel) (Project Manager)

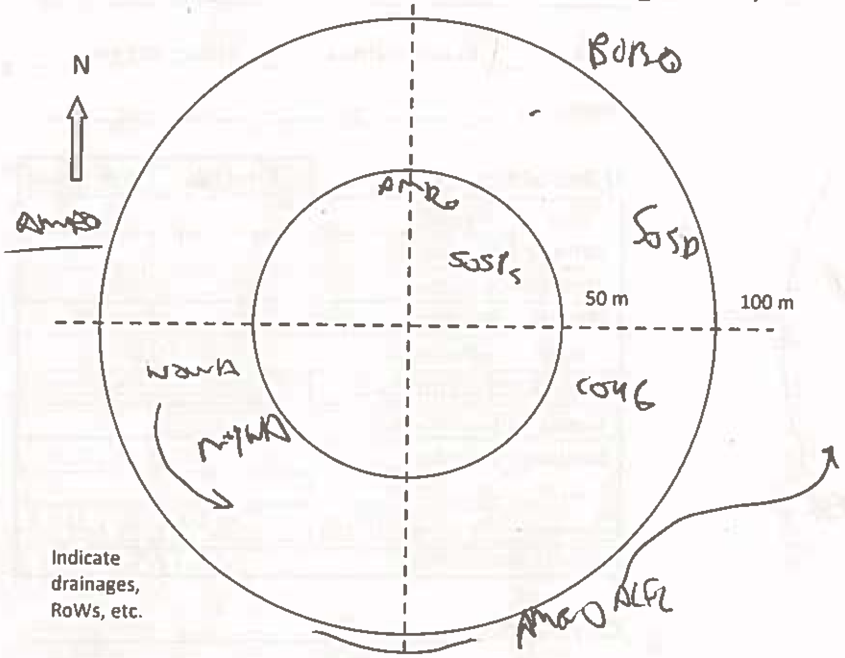
REV: 2011-05-04 / FORM 020

Prairie Breeding Bird Survey

Project Name: Airport Pit **Project Number:** 160961321 **Biologist:** BD **Date:** June 19 ~~BB5005~~

Start time: 6:51 **UTM Zone:** ___ **Easting:** ______ **Northing:** ______ **Waypoint:** BB5005

Temp(°C): 12 **Wind (Beaufort):** 1 **Precipitation:** ______ **Cloud cover:** ______%



Noise level: 1 **LLD:** ______

____% grassland ____% shrub

____% pasture ____% wetland/riparian

____% tilled ____% anthropogenic

____% other (e.g., CWG): ______

Wetlands:

Class: ______ **Inundation:** ______

Cover: ______ **Size:** ______

Plot visible: ____% (50 m) ____% (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
AmRO	1	U	A		Y	100+					
BoBo	1	m	A		Y						
ALFl	1	m	A		Y						
AmGo	1	U	A		Y						
MyWA	1	m	A		Y	50-100					
NOWA	1	m	A		Y						
CoYE	1	m	A		Y						
SOSP	1	m	A		Y						
SOSP	1	U	A	Y	Y	50					
AmRO	1	U	A	Y	Y	50					

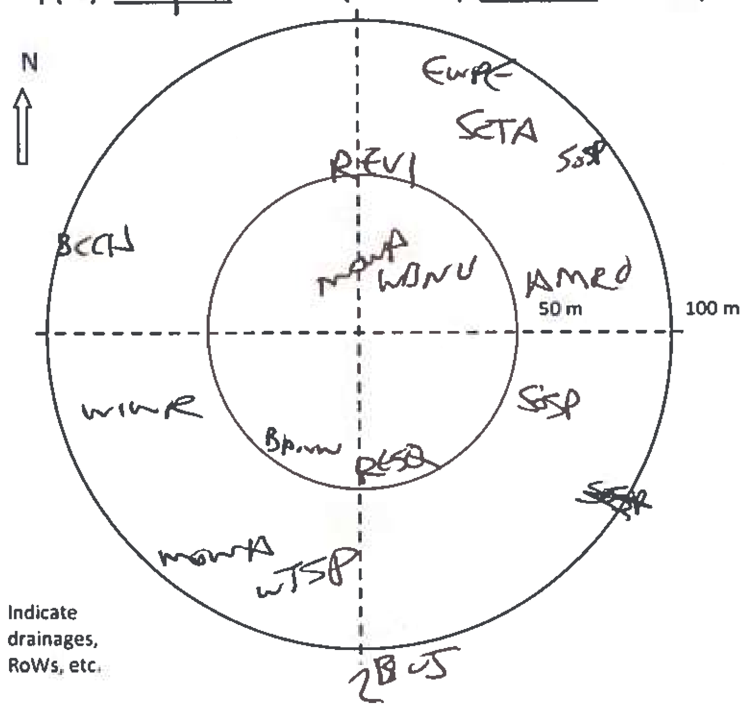
[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point)

Forest Breeding Bird Survey

Project Name: ______ **Project Number:** 16096132 **Biologist:** BO **Date:** June 17, 20

Start time: 7:11 **UTM Zone:** ___ **Easting:** ______ **Northing:** ______ **Waypoint:** BRS04

Temp(°C): 14 **Wind (Beaufort):** — **Precipitation:** — **Cloud cover:** 0 %



Indicate drainages, RoWs, etc.

Noise: 1 **Ecosite Phase:** ___ **Struc. Stage:** ___

Photos: ______

Dominant vegetation:		Species	% of layer
Tree canopy	Primary		
	Secondary		
Total canopy cover			%
Shrub layer	Primary		
	Secondary		
High (>3m) shrub cover			%
Low (<3m) shrub cover			%
Ground cover	Primary		
	Secondary		
Snag density within 100 m		N / L / M / H	
Coarse woody debris		Y / N	

Other notes: ______

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Behaviour / comments
~~EWPE~~										
BLUJ	2	–	A		Y	100+				
EWPE	1		A		Y	50-100				
WTSP	1	U	A		Y	50-100				
MOWA	1	M	A		Y	50-100				
WIWR	1	m	A		Y	50-100				
BCCH	1	U	A			50-100				
SCTA	1	m	A							
SOSP	1									
REVI	1									
MOWA	1	F	A	Y	Y	50				
WBNU	1	m	A		Y	50				
BAWW	1	m	A		Y	50				
RESQ	1					50				

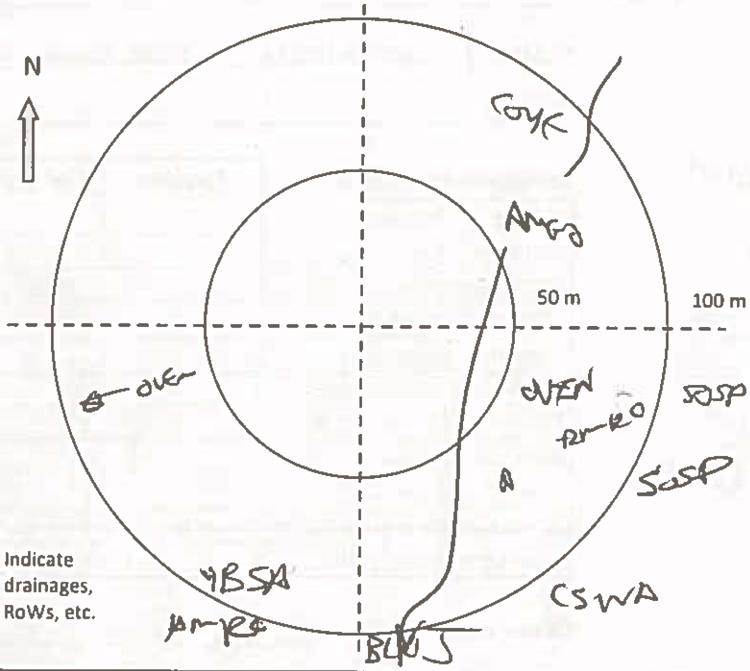
1 – adult (A), juvenile (J), or unknown (U)
2 – only required for species of management concern
3 – check off this column if the observation is an incidental (>100 m from observation point, or before/after the count)

Prairie Breeding Bird Survey

Project Name: Airport Pit Project Number: 160961321 Biologist: Robermayer Date: June 18

Start time: 7:32 UTM Zone: ___ Easting: ________ Northing: ________ Waypoint: BN503

Temp(°C): 13 Wind (Beaufort): 1 Precipitation: — Cloud cover: 0 %



Noise level: ____ LLD: ________

____% grassland ____% shrub

____% pasture ____% wetland/riparian

____% tilled ____% anthropogenic

____% other (e.g., CWG): ________

Wetlands:

Class: ________ Inundation: ________

Cover: ________ Size: ________

Plot visible: ____% (50 m) ____% (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
COYE	1	m	A		y	50-100					
AMGO	1	U	A		y				Y		
OVEN	2	m	A		y						
AMRO	1	U	A		y						
SOSP	2	m	A		y	100+					
CSWA	1	m	A		y	100+					
BLUJ	1	U	A		y	100+					
AMRO	1	U	A		y	100+					
YBSA	1	U	A		y	50					

[1] – adult (A), juvenile (J), or unknown (U)

[2] – only required for species of management concern

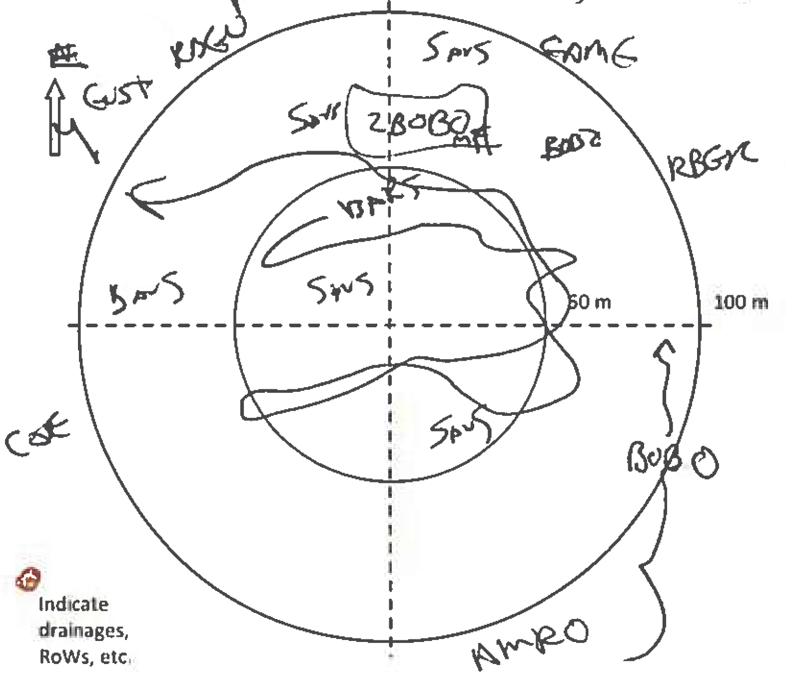
[3] – check off this column if the observation is an incidental (>100 m from observation point)

Forest Breeding Bird Survey

Project Name: Airport Pit **Project Number:** 16961321 **Biologist:** Robernayr **Date:** June 17

Start time: 7:52 **UTM Zone:** ___ **Easting:** ___ **Northing:** ___ **Waypoint:** BB 5008

Temp(°C): 1 **Wind (Beaufort):** 1 **Precipitation:** ___ **Cloud cover:** 0 %



Noise: 1 **Ecosite Phase:** ___ **Struc. Stage:** ___

Photos: ___

Dominant vegetation:		Species	% of layer
Tree canopy	Primary		
	Secondary		
Total canopy cover			%
Shrub layer	Primary		
	Secondary		
High (>3m) shrub cover			%
Low (<3m) shrub cover			%
Ground cover	Primary		
	Secondary		
Snag density within 100 m		N / L / M / H	
Coarse woody debris		Y / N	

Other notes: ___

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Behaviour / comments
GUST	4	U	U		Y	100+				
RBGO	1	U	[illegible]		Y	100+				
COYE	1	m	A		Y	↓				
AMRO	1	U	[illegible]		Y	↓				
RBGR	1	m	A		Y	↓				
GAME	1	U	A		Y					
BOBO	1	m	A		Y	100+				
SAVS	3	U	A	Y	Y	50-100				
BOBO	2	m	A	Y	Y	50-100				
BOBO	1	F	A	Y	~~Y~~ N	↓				
BARS	1	m	A	Y		50				
SAVS	2	U	A	Y	Y	50				

[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point, or before/after the count)

incidental BARS

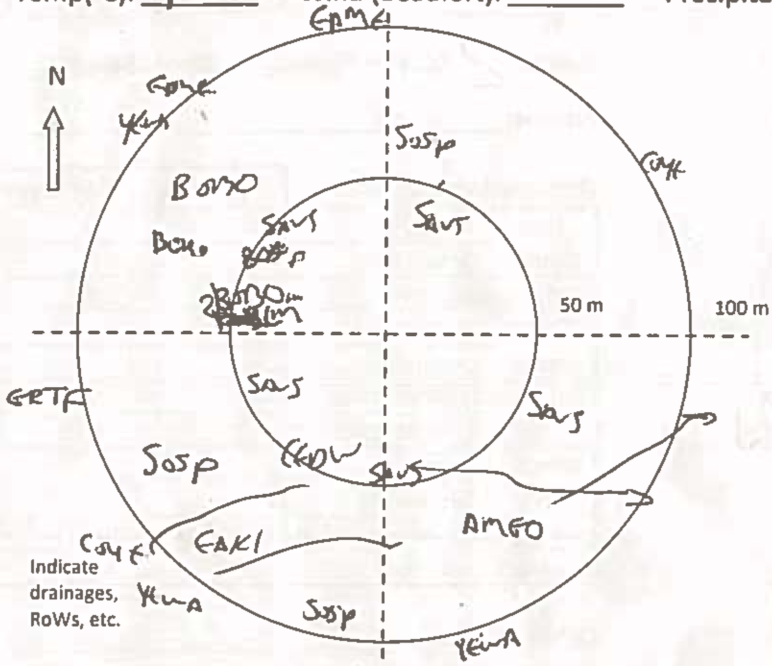
BOBO ~~||||~~ ~~||||~~ ||
GAME |||

Prairie Breeding Bird Survey

Project Name: Airport Pit Project Number: 60961321 Biologist: B OBermeyer Date: June 17

Start time: 06:17 UTM Zone: ___ Easting: ___ Northing: ___ Waypoint: BBS007

Temp(°C): 10 Wind (Beaufort): 1 Precipitation: — Cloud cover: 0 %



Noise level: 2 LLD: ___

___% grassland ___% shrub

___% pasture ___% wetland/riparian

___% tilled ___% anthropogenic

___% other (e.g., CWG): ___

Wetlands:

Class: ___ Inundation: ___

Cover: ___ Size: ___

Plot visible: ___% (50 m) ___% (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
CAMEX	2	U	A	—	Y	100+					
~~[illegible]~~											
YEWA	3	M	A		Y	100+					
COYE	2	M	A		Y	100+					
BOBO	2	M	A		Y	50-100					
BOBO	2	M	A	Y	Y	50					
BOBO	1	F	A	Y	[illegible]	50					
EAKI	1	U	A	Y	—	50-100					
SOSP	3	U	A	W	Y	50-100					
AMGO	1	U	A	N	Y	50-100			Y		
SAVS	1	U	A	N	Y	50-60					
SAVS	4	U	A	[illegible]	Y	50					
CEDW	1	U	A	Y	Y	50			Y		
GRTF											

[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point)

13 PT

SPA 4/32.

BOBO ~~IIII~~ III

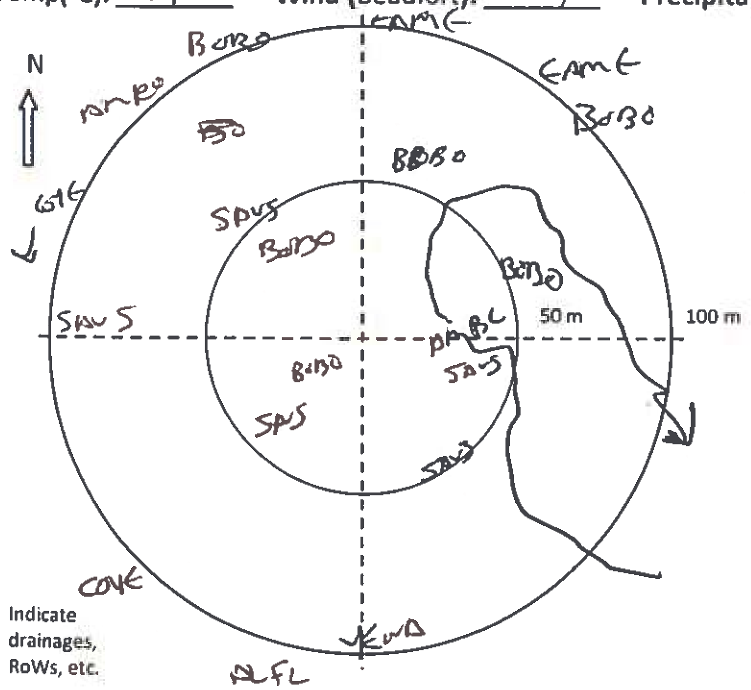
III

Forest Breeding Bird Survey

Project Name: Airport Pit **Project Number:** 160961321 **Biologist:** BO **Date:** June 18, 201

Start time: 6:32 **UTM Zone:** ___ **Easting:** ___ **Northing:** ___ **Waypoint:** BBS006

Temp(°C): 11 **Wind (Beaufort):** 1 **Precipitation:** ___ **Cloud cover:** 0 %



Noise: 2 **Ecosite Phase:** ___ **Struc. Stage:** ___

Photos: ___

Dominant vegetation:		Species	% of layer
Tree canopy	Primary		
	Secondary		
Total canopy cover			%
Shrub layer	Primary		
	Secondary		
High (>3m) shrub cover			%
Low (<3m) shrub cover			%
Ground cover	Primary		
	Secondary		
Snag density within 100 m		N / L / M / H	
Coarse woody debris		Y / N	

Other notes: ___

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Behaviour / comments
BOBO	2	m	A		Y	100+				
CAME	2	U	A		Y	↓				
AMRO	1	M	A		Y					
COYE	2	m	A		Y					
ALFL	1	m	A		Y					
BOBO	2	[illegible]	A	Y	Y	50-100				
YEWA	1	m	A		Y	↓				
SAVS	2	m	A		Y					
BOBO	1	F	A	Y	Y	50				
↓	1	m	A	Y	Y	↓				
AMBL	1	U	A	Y	N					
SAVS	3	U	A	Y	Y					

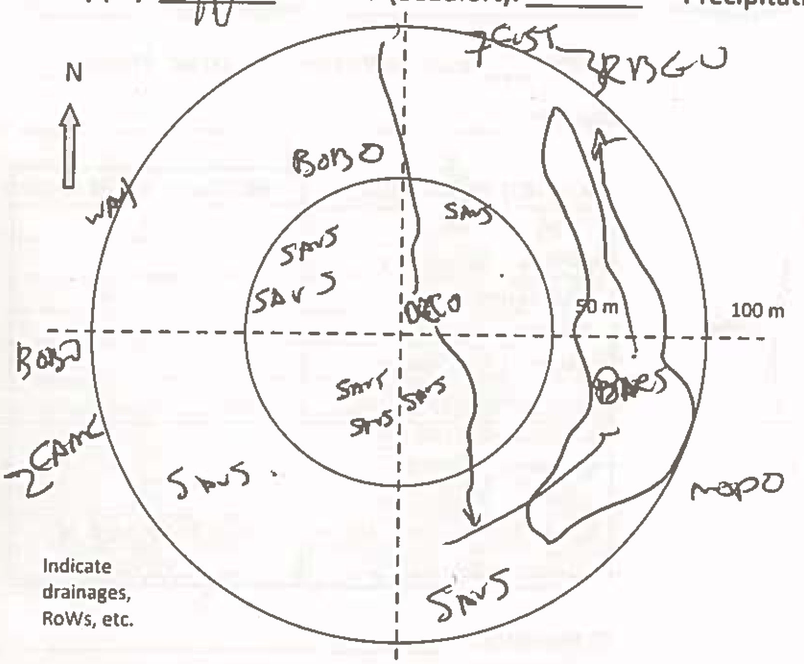
1 – adult (A), juvenile (J), or unknown (U)
2 – only required for species of management concern
3 – check off this column if the observation is an incidental (>100 m from observation point, or before/after the count)

Prairie Breeding Bird Survey

Project Name: Airport Pit **Project Number:** 6096132 **Biologist:** Bobermay **Date:** June 18

Start time: 8:15 **UTM Zone:** ___ **Easting:** ___ **Northing:** ___ **Waypoint:** BRS 001

Temp(°C): 16 **Wind (Beaufort):** ___ **Precipitation:** ___ **Cloud cover:** 0 %



Indicate drainages, RoWs, etc.

Noise level: 2 **LLD:** ___

___% grassland ___% shrub

___% pasture ___% wetland/riparian

___% tilled ___% anthropogenic

___% other (e.g., CWG): ___

Wetlands:

Class: ___ **Inundation:** ___

Cover: ___ **Size:** ___

Plot visible: ___% (50 m) ___% (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
EUST	7	U	U	Y	Y	100+					
RBGU	3	U	U	Y	Y						
MODO	1	U	A		Y						
EAME	2	U	A		Y						
BOBO	1	M	A		Y						
WPUI	1	M	A		Y						
BOBO	1	M	A		Y	50-100					
BARS	1	U	A		Y	50-100					
SAVS	2	U	A	Y	Y	50-100					
SAVS	5	U	A	Y	~~Y~~	50					
DCCO	1	U	A	Y	N	50			Y		

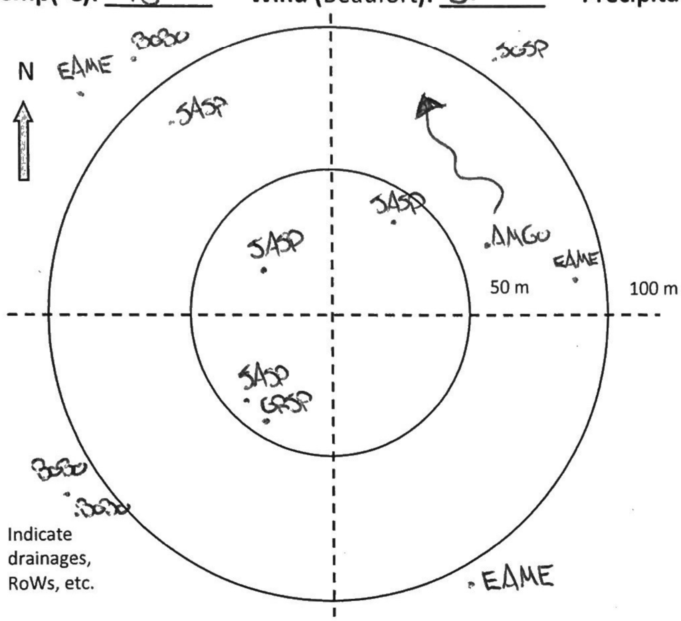
[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point)

Prairie Breeding Bird Survey

Project Name: Cavanagh - Airport Rd. **Project Number:** 160961321 **Biologist:** J Mansell **Date:** July 9/19

Start time: 0535 **UTM Zone:** 18T **Easting:** 452224 **Northing:** 5015510 **Waypoint:** CAP19BBJM001

Temp(°C): 15 **Wind (Beaufort):** 2 **Precipitation:** 0 **Cloud cover:** 0 %



Noise level: 1-2 **LLD:** n/a

100 % grassland / % shrub

/ % pasture / % wetland/riparian

/ % tilled / % anthropogenic

/ % other (e.g., CWG): /

Wetlands: n/a

Class: / **Inundation:** /

Cover: / **Size:** /

Plot visible: 100 % (50 m) 100 % (100 m)

	Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
	SASP	4	-	A	x	x	—	—	—	—	—	Agitated.
*	GRSP	1	-	A	-	x	40	215°	—	—	—	Calling.
	AMGO	2	M/F	A	x	x	-	-	-	x	-	
*	EAME	3	-	A	x	x	—	—	x	—	—	Calling from treetop.
	SOSP	1	—	—	—	—	—	—	x	—	—	
*	BOBO	3	M	A	x	x	—	—	x	—	—	Agitated / Calling.

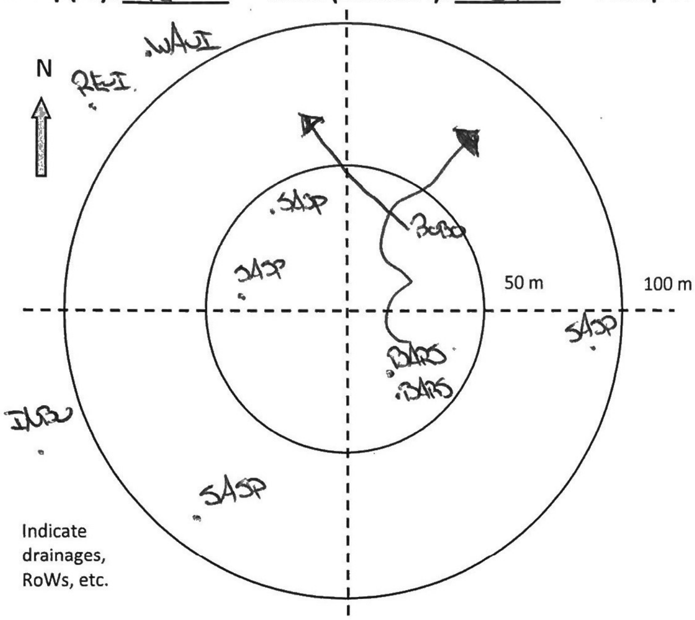
[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point)

Prairie Breeding Bird Survey

Project Name: Cavanaugh - Airport P.I **Project Number:** 160961321 **Biologist:** J. Mansell **Date:** July 9/19

Start time: 0600 **UTM Zone:** 13T **Easting:** 451893 **Northing:** 5045363 **Waypoint:** CAP19BBSJM002

Temp(°C): 16 **Wind (Beaufort):** 2 **Precipitation:** 0 **Cloud cover:** 0 %



Indicate drainages, RoWs, etc.

Noise level: 2-3 **LLD:** n/a

100 % grassland — % shrub

/ % pasture / % wetland/riparian

/ % tilled / % anthropogenic

/ % other (e.g., CWG): /

Wetlands: n/a

Class: / **Inundation:** /

Cover: / **Size:** /

Plot visible: 100 % (50 m) 100 % (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
WAVI	—	—	—	—	x	—	—	x	—	—	/
REVI	—	—	—	—	x	—	—	x	—	—	/
* BOBO	2	M/F	A	x	—	—	—		x	—	/
SASP	4	—	A	x	x	—	—	—	—	—	—
BARS	4	—	A	x	x	—	—		x	—	—
INBU	—	—	A	—	—	—	—	x	—	—	—

[1] – adult (A), juvenile (J), or unknown (U)

[2] – only required for species of management concern

[3] – check off this column if the observation is an incidental (>100 m from observation point)

Transect

* EAME ♀♂ * SASP
* BOBO ♂ * BARS
* GRSP

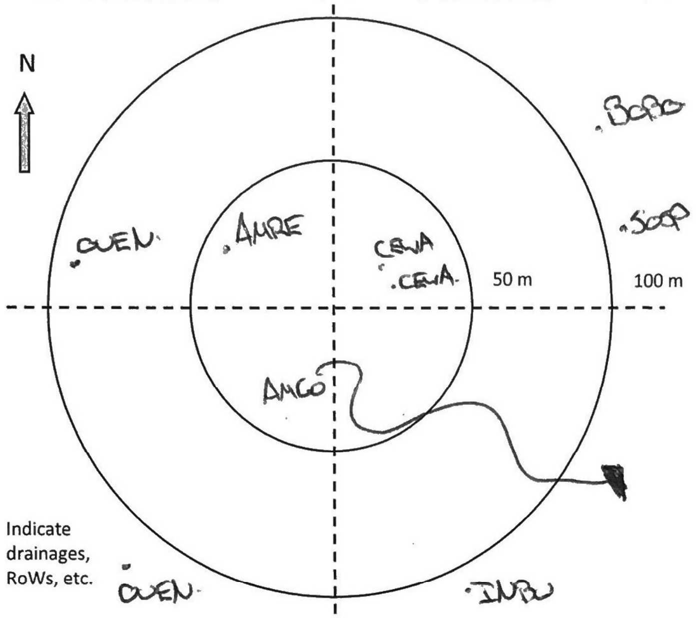
* – SAR

~~Prairie~~ Forest Breeding Bird Survey

Project Name: Cavanagh - Airport Rd **Project Number:** 160961321 **Biologist:** J. Morsell **Date:** July 9/19.

Start time: 0625 **UTM Zone:** 18T **Easting:** 451540 **Northing:** 5015201 **Waypoint:** CAP19BBJM003.

Temp(°C): 17 **Wind (Beaufort):** 1 **Precipitation:** 0 **Cloud cover:** 0 %



Indicate drainages, RoWs, etc.

Noise level: 2 **LLD:** n/a.

___% grassland ___% shrub

___% pasture ___% wetland/riparian

___% tilled ___% anthropogenic

___% other (e.g., CWG): ______

Wetlands: n/a

Class: ______ **Inundation:** ______

Cover: ______ **Size:** ______

Plot visible: ___% (50 m) ___% (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
* BOBO	—		A	—	x	—	—	x	—	—	Calling from field
AMRE	—	—	—	—	—	—	—	—	—	—	"
AMGO	—	—	—	—	—	—	—	—	x	—	"
OVEN	—	—	—	—	—	—	—	x	—	—	"
SOSP	—	—	—	—	—	—	—		—	—	"
INBU	—	—	—	—	—	—	—	x	—	—	"
CEWA	2	—	A	x	—	—	—	—	—	—	"

[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point)

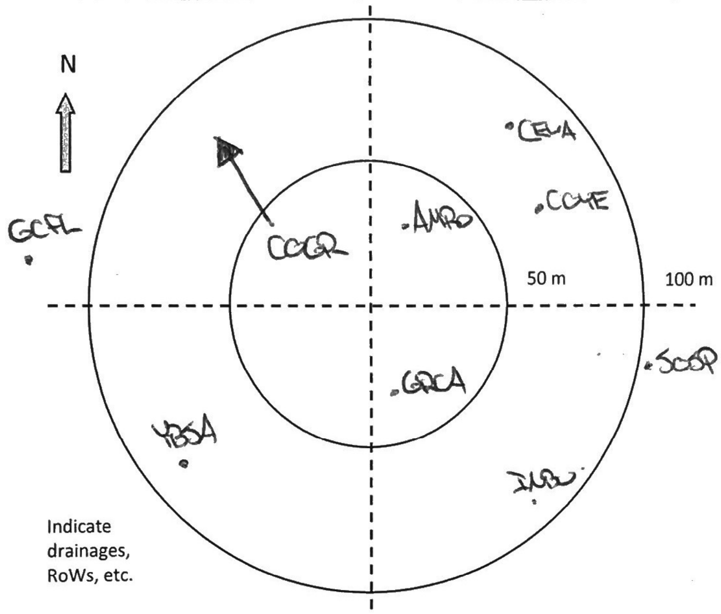
* BOBO juv. observed along woodlot/field interface
  L ~8 individuals obs.
  L ~20 Adults obs. in NW corner of field.

Forest
~~Prairi~~e Breeding Bird Survey

Project Name: Cavanagh - Airport Pit **Project Number:** 16096921 **Biologist:** J. Marsell **Date:** July 9/19

Start time: 0650 **UTM Zone:** 18T **Easting:** 451678 **Northing:** 505016 **Waypoint:** CAP19BBJMC04

Temp(°C): 18 **Wind (Beaufort):** 1-2 **Precipitation:** 0 **Cloud cover:** 0 %



Indicate drainages, RoWs, etc.

Noise level: 1-2 **LLD:** n/a

___% grassland ___% shrub

___% pasture ___% wetland/riparian

___% tilled ___% anthropogenic

___% other (e.g., CWG): ___

Wetlands: n/a

Class: ___ **Inundation:** ___

Cover: ___ **Size:** ___

Plot visible: ___% (50 m) ___% (100 m)

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
COGR	—	—	—	x	—	—	—	—	x	—	—
YBSA	—	—	—	—	x	—	—	—	—	—	—
GRCA	—	—	—	—	x	—	—	—	—	—	—
INBU	—	—	—	—	x	—	—	—	—	—	—
SCSP	—	—	—	—	x	—	—	x	—	—	—
COYE	—	—	—	—	x	—	—	—	—	—	—
CEVA	—	—	—	x	x	—	—	—	—	—	—
AMRO	—	—	—	x	x	—	—	—	—	—	—

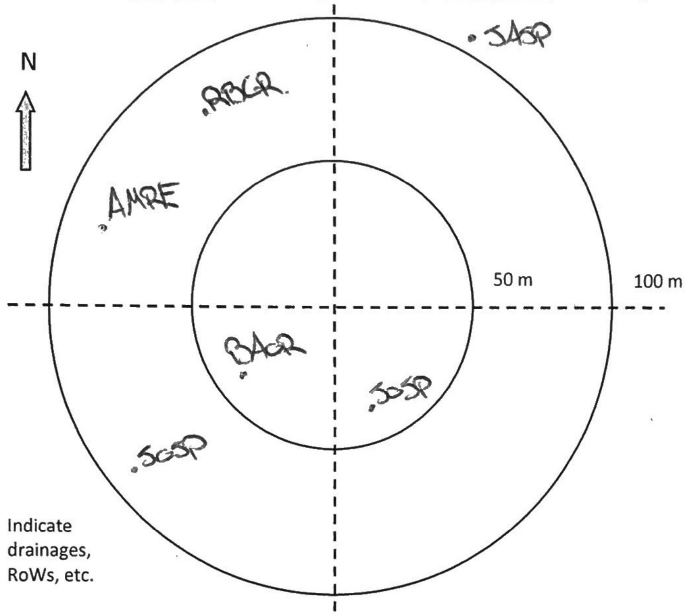
1 – adult (A), juvenile (J), or unknown (U)
2 – only required for species of management concern
3 – check off this column if the observation is an incidental (>100 m from observation point)

~~Prairie~~ Forest Breeding Bird Survey

Project Name: Cavanagh - Airport Pit **Project Number:** 160961321 **Biologist:** J. Mansell **Date:** July 9/19.

Start time: 0735 **UTM Zone:** 18T **Easting:** 451978 **Northing:** 5014965 **Waypoint:** CAP19BBJMC05

Temp(°C): 20 **Wind (Beaufort):** 1 **Precipitation:** 0 **Cloud cover:** 0 %



Noise level: 1-2 **LLD:** n/a

~~____% grassland ____% shrub~~

~~____% pasture ____% wetland/riparian~~

~~____% tilled ____% anthropogenic~~

~~____% other (e.g., CWG): ____~~

Wetlands: n/a

~~**Class:** ____ **Inundation:** ____~~

~~**Cover:** ____ **Size:** ____~~

~~**Plot visible:** ____% (50 m) ____% (100 m)~~

Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Wetland?	Behaviour / comments
SASP											
SOSP											
BAGR											
AMRE											
RBGR											

1 – adult (A), juvenile (J), or unknown (U)
2 – only required for species of management concern
3 – check off this column if the observation is an incidental (>100 m from observation point)

~~Forest~~ Prairie Breeding Bird Survey

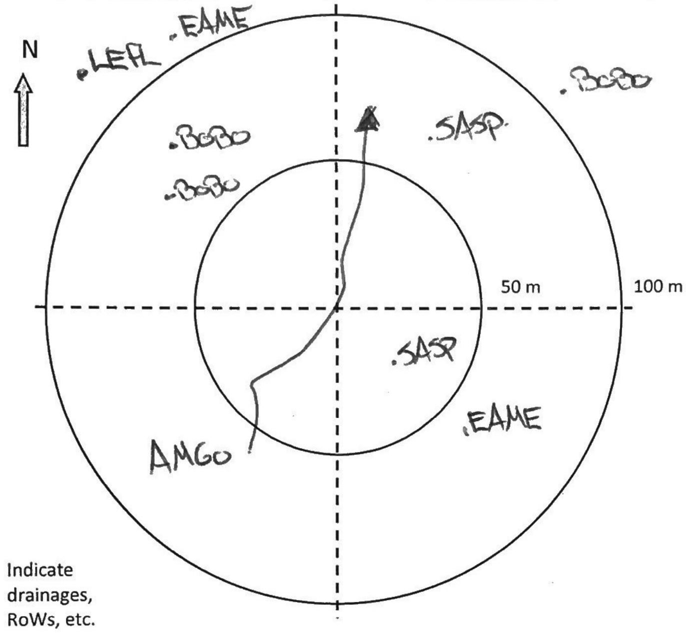
Project Name: Cavanagh - Airport Pit
Project Number: 160961321
Biologist: J. Mansell
Date: July 9/19.

Start time: 0755 UTM Zone: 18T Easting: 505132. Northing: 452058 Waypoint: CAP19BBJM006.

Temp(°C): 22 Wind (Beaufort): 2 Precipitation: 0 Cloud cover: 0 %

Noise: 3 Ecosite Phase: / Struc. Stage: /

Photos: n/a



Indicate drainages, RoWs, etc.

Dominant vegetation:

		Species	% of layer
Tree canopy	Primary	See ELC	
	Secondary		
Total canopy cover			%
Shrub layer	Primary		
	Secondary		
High (>3m) shrub cover			%
Low (<3m) shrub cover			%
Ground cover	Primary		
	Secondary		
Snag density within 100 m		N / L / M / H	
Coarse woody debris		Y / N	

Other notes: n/a.

	Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Behaviour / comments
	LEFL	—	—	—	—	x	—	—	X	—	—
*	EAME	3	M/F	A	x	x	—	—	—	—	—
*	BOBO	3	M	A	x	x	—	—	—	—	—
	AMGO	—	—	—	—	—	—	—	—	x	—
	SASP	2	—	A	—	—	—	—	—	—	—

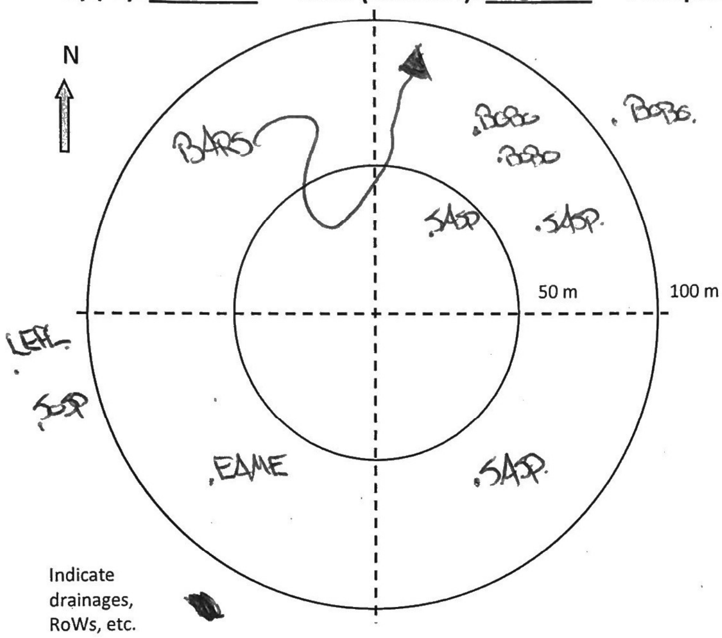
1 – adult (A), juvenile (J), or unknown (U)
2 – only required for species of management concern
3 – check off this column if the observation is an incidental (>100 m from observation point, or before/after the count)

Prairie ~~Fo~~rest Breeding Bird Survey

Project Name: Cavanagh - Airport P.T **Project Number:** 1669621321 **Biologist:** J. Marsell **Date:** July 9/19.

Start time: 0824 **UTM Zone:** 18T **Easting:** 452318 **Northing:** 505259 **Waypoint:** CAP19BBJM007.

Temp(°C): 22 **Wind (Beaufort):** 2 **Precipitation:** 0 **Cloud cover:** 0 %



Indicate drainages, RoWs, etc.

Noise: 1-3 **Ecosite Phase:** – **Struc. Stage:** –

Photos: n/a

Dominant vegetation:		**Species**	**% of layer**
Tree canopy	Primary	See ELC	
	Secondary		
Total canopy cover			%
Shrub layer	Primary		
	Secondary		
High (>3m) shrub cover			%
Low (<3m) shrub cover			%
Ground cover	Primary		
	Secondary		
Snag density within 100 m		N / L / M / H	
Coarse woody debris		Y / N	

Other notes: n/a

	Species	#	Sex	Age[1]	Seen	Heard	Dist. (m)	Bearing[2]	Inc.[3]	Fly-by	Behaviour / comments
*	BARS									X	
	LEFL								X	–	Heard @ CAP19BBJM006.
	SOSP								X	–	
*	BOBO	3	–	A	X	X					
	SASP										
*	EAME										

[1] – adult (A), juvenile (J), or unknown (U)
[2] – only required for species of management concern
[3] – check off this column if the observation is an incidental (>100 m from observation point, or before/after the count)

Stantec

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Bobolink and Eastern Meadowlark Breeding Survey Form

Project Number: 160961321

Project Name: Cavanaugh Ottawa Airport Pit

Date: June 5, 2019

Field Personnel: Brennan Obermayer

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	12-16	1	100	0	RAIN

Please mark transect location on map and indicate areas of species observations on map.

Transect No.: 1

Habitat: Pasture

Start Time: 6:00

End Time: 6:45

Start Point UTM:

End Point UTM:

Species	Tally
Bobolink	~~||||~~ |
Eastern Meadowlark	|||

Transect No.: 2

Habitat: Pasture

Start Time: 7:43

End Time: 8:06

Start Point UTM:

End Point UTM:

Species	Tally
Bobolink	~~||||~~ ||||
Eastern Meadowlark	|||

Pg ___ of ___

Quality Control: This form is complete ☐ & legible ☐

Signature: ____________________ (Field Personnel)

Signature: ____________________ (Project Manager)

Amphibian Breeding Survey

Project Name: Cavanaugh - Airport / Albion P.I **Project Number:** 160961321 **Date:** May 7/2019 **Zone:** 18T

Biologist: Josh Mansell **Waypoint prefix:** CAP19UJM **Moon phase:** Waxing Crescent - 10%

Weather during previous 24 hours (precipitation, temperature range): No precip - 24hr. Range 5 - 23°C.

Survey locations:

Time	Broadcast location			Wetland type	Environment							Notes
	Wpt	Easting	Northing		Temp	Wind	% cloud	Precip	Noise	Moon (Y/N)	Aurora (Y/N)	
0836	001	452265	5015135	MA	13	3	0	0	1-2	Y	N	Former pit.
0847	002	451926	5015016	SW	13	1	0	0	1	Y	N	Can't see feature
0915	003	451690	5015383	SW/Pond	12	1	0	0	1	Y	N	Flooded swamp / Golf course pond
0940	004	452282	5015706	MA	11	2	0	0	2	Y	N	Flooded field.

Detection data:

Wpt	Species	#	Amphib Detect-ability[1]	Detection location		Triangulation location					Notes[4]
				Bearing	Distance	Wpt	Easting	Northing	Bearing	Distance	
001	SPPE	n/a	3	84°	100	n/a					
002	SPPE	n/a	3	180°	150	n/a					
002	AMTO	n/a	3	200°	50	n/a.					
003	SPPE	n/a	3	307°	50	n/a					
003	AMTO	n/a	3	307°	50	n/a.					
003	WOFR	n/a	2	307°	50	n/a					SPPE too loud #
004	SPPE	4	1	250°	5	n/a					

[1] – Amphibian detectability: 1 – calls not overlapping 2 – calls overlapping but distinguishable 3 – full chorus with individuals indistinguishable

[2] – Behaviour: 1 – Vocalizing on arrival at station
2 – Vocalizing after interspecific call
3 – Vocalizing after conspecific call
4 – Flying by after interspecific call
5 – Flying by after conspecific call
6 – Arriving in silence after interspecific call
7 – Arriving in silence after conspecific call
8 – Aggressive response

[3] – Stimulus: last species broadcast prior to response

[4] – Number any additional notes and expand on them in the space below

Additional comments: 001 - Vocalizing on arrival.
002 - Same
003 - Same
004 - Same.

RECR (FO) CAGO
AMRO RWBL SASP
MALL +EAME+
RTHA (FO) 3RTH

Noise 1 - 3 - Albion Rd. = 1
Airplane = 3 > right under Ottawa Airport approach.

001 – former aggregate pit
– appears to be shallow.
– hard-stemmed bulrush riparian.

002 – Mixed Forest swamp
↳ conditions unknown.

003 – Flooded Golf Course + ponds
↳ former swampland
↳ depth unknown

004 – vernal pool within active pasture
↳ ~15cm depth.

 JM

Amphibian Breeding Survey

Project Name: Cavanaugh - Airport Pit **Project Number:** 160961321 **Date:** May 31 2019 **Zone:** 18T

Biologist: J. Mansell **Waypoint prefix:** CAP19JM **Moon phase:** Waning Crescent 9%

Weather during previous 24 hours (precipitation, temperature range): ~1-3mm rain, 6-20°C

Survey locations:

Time	Broadcast location			Wetland type	Environment							Notes
	Wpt	Easting	Northing		Temp	Wind	% cloud	Precip	Noise	Moon (Y/N)	Aurora (Y/N)	
2115	004	452280	5015706	MA	12	2	80	0	1-2	N	N	Feature is drying up.
2130	003	451690	5015383	Pond	12	2	80	0	1-2	N	N	Golf Course Pond
2200	002	451926	5015018	SW	11	1	70	0	1-2	N	N	Can't see feature.
2217	001	452265	5015135	MA	11	1	70	0	1	N	N	Former Agg. pit

Detection data:

Wpt	Species	#	Amphib Detect-ability[1]	Detection location		Triangulation location					Notes[4]
				Bearing	Distance	Wpt	Easting	Northing	Bearing	Distance	
004	SPPE	1	1	255°	50m	n/a	—	—	—	—	At back of Site
003	SPPE	3	1	360°	20m	n/a	—	—	—	—	—
003	GRTR	n/a	3	237°	70m	n/a	—	—	—	—	—
002	SPPE	2	1	191°	75m	n/a	—	—	—	—	—
002	GRTR	n/a	3	191°	70m	n/a	—	—	—	—	—
001	GRTR	n/a	3	124°	100m	n/a	—	—	—	—	—
001	SPPE	2	1	114°	100m	n/a	—	—	—	—	—

[1] – Amphibian detectability: 1 – calls not overlapping 2 – calls overlapping but distinguishable 3 – full chorus with individuals indistinguishable

[2] – Behaviour: 1 – Vocalizing on arrival at station 2 – Vocalizing after interspecific call 3 – Vocalizing after conspecific call 4 – Flying by after interspecific call 5 – Flying by after conspecific call 6 – Arriving in silence after interspecific call 7 – Arriving in silence after conspecific call 8 – Aggressive response

[3] – Stimulus: last species broadcast prior to response

[4] – Number any additional notes and expand on them in the space below

Additional comments:

SPPE - Spring Peeper
GRTR - Gray Treefrog

WISN
* CONI (Fo)
* EAME (Site

JM

Page 1 of 1

Amphibian Breeding Survey

Project Name: Cavanagh - Airport Pit **Project Number:** 160961321 **Date:** June 20/19 **Zone:** 18T

Biologist: J. Mansell **Waypoint prefix:** CAP19UJM **Moon phase:** Full Moon - 91%

Weather during previous 24 hours (precipitation, temperature range): ~1-3mm rain, 14-18°C range.

Survey locations:

Time	Broadcast location			Wetland type	Environment							Notes
	Wpt	Easting	Northing		Temp	Wind	% cloud	Precip	Noise	Moon (Y/N)	Aurora (Y/N)	
2135	001	452265	505135	MA	17	2	20	0	2	N	N	/
2155	002	451926	505018	SW	16	1	30	0	2	N	N	/
2215	003	451690	505389	Pond	16	2	20	0	2	N	N	/
2240	004	452282	505706	MA	16	2	20	0	2	N	N	/

Detection data:

Wpt	Species	#	Amphib Detect-ability[1]	Detection location		Triangulation location					Notes[4]
				Bearing	Distance	Wpt	Easting	Northing	Bearing	Distance	
001	SPPE	1	1	134°	100	n/a	—	—	—	—	Drowned out by GRTR
001	GRTR	3	1	243°	150+	n/a	—	—	—	—	-
002	GRTR	3	1	190°	50	n/a	—	—	—	—	-
003	GRTR	3	1	275°	50	n/a	—	—	—	—	-
004	GRTR	3	1	191°	100	n/a	—	—	—	—	Same as 003
004	GRFR	2	1	45°	50	n/a	—	—	—	—	-

[1] – Amphibian detectability: 1 – calls not overlapping 2 – calls overlapping but distinguishable 3 – full chorus with individuals indistinguishable

[2] – Behaviour: 1 – Vocalizing on arrival at station 2 – Vocalizing after interspecific call 3 – Vocalizing after conspecific call 4 – Flying by after interspecific call 5 – Flying by after conspecific call 6 – Arriving in silence after interspecific call 7 – Arriving in silence after conspecific call 8 – Aggressive response

[3] – Stimulus: last species broadcast prior to response

[4] – Number any additional notes and expand on them in the space below

Additional comments:

Gray Tree frog chorus drown out most other calls.
Under airport approach → loud!!

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE (project no./name): Cavanagh - Airport PA		POLYGON: Pasture / Field
	SURVEYOR(S): J. Mansell	DATE: July 9/2019	PHOTO No.: n/a
	START: 0600 / END: 0800	ZONE & UTM: 18T 452102 5015499	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
■ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ■ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☐ LACUSTRINE ☐ RIVERINE ☐ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ■ TABLELAND ☐ ROLL. UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☐ NATURAL ■ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ■ GRAMINOID ■ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ■ PRAIRIE Pasture ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ☐ PLANTATION
SITE ☐ OPEN WATER ☐ SHALLOW WATER ■ SURFICIAL DEP. ☐ BEDROCK			**COVER** ■ OPEN ☐ SHRUB ☐ TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	–	–	–
2	SUB-CANOPY	3	1	ACENEGU >> ACESACH
3	UNDERSTOREY	4	1	Malus sp. > Red Raspberry
4	GRD. LAYER	5	4	Smooth Brome > Cow Vetch = Timothy = BF Trefoil

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: n/a				BA: n/a
SIZE CLASS ANALYSIS:	<10	10 – 24	25 – 50	>50
STANDING SNAGS:	<10	10 – 24	25 – 50	>50
DEADFALL/LOGS:	<10	10 – 24	25 – 50	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	X PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS: n/a

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	Agriculture	CODE: AG
COMMUNITY SERIES:	Open - AG	CODE: OAG
ECOSITE:	Open Pasture - OAG	CODE: OAGM4
VEGETATION TYPE:	–	CODE: –
INCLUSION	n/a	CODE: n/a
COMPLEX	n/a	CODE: n/a

Notes: (e.g. disturbance, surface water depths, etc.)

Active hayfield + pasture.

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
ACENEGU		O			
ACESACH		R			
Malus sp.			R		
Red Raspberry			R		

SPECIES CODE	LAYER 1	2	3	4	COLL.
Smooth Brome				D	
Cow Vetch				A	
Timothy Grass				A	
BF Trefoil				A	
Goldenrod				O	
Red Clover				O	
Galium sp.				A	
└ smooth? Stellaria media				–	
RC Grass				R	
Yarrow				R	
Canada Thistle				R	
Burdock				R	
Motherwort				R	
Redtop Grass				O	
Cordgrass				R	
Common Milkweed				R	
Bladder Campion				O	
Hoary Alyssum				R	

Page 1 of 2

Print Name: J. Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160961321 Polygon No.: Pasture/Field.

Assessment Type: ☐-Visual; no access/■-Entire; walk through feature/☐-Partial access *(indicate on map)*

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
	19	1-2	0	0	0

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

See BBS results

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment		Photo ID	Map ID	UTM Coordinates Zone	Easting	Northing
ALL SITES							
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)	n/a					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate						
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows						
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size						
WOODLANDS							
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth Sub/emergent veg present Shrubs/logs at edge present Water permanency						
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)							
WETLANDS							
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency						
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature						
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys						

Page 2 of 2

Print Name: J. Marsell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: ______ (Field Notes QA/QC personnel)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE (project no./name): Cavanagh - Airport	POLYGON: Plantation
	SURVEYOR(S): J. Mansell / DATE: July 9 2019	PHOTO No.: n/a
	START: 0730 / END: 0745	ZONE & UTM: 18T

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
■ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ■ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☐ LACUSTRINE ☐ RIVERINE ☐ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ■ TABLELAND ☐ ROLL. UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☐ NATURAL ■ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ■ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ■ PLANTATION
SITE ☐ OPEN WATER ☐ SHALLOW WATER ■ SURFICIAL DEP. ☐ BEDROCK			**COVER** ☐ OPEN ☐ SHRUB ■ TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	PINSTRO >> TREPOPU > ULMAMER
2	SUB-CANOPY	-	-	/
3	UNDERSTOREY	3	2	Alternate Dogwood = Glossy Buckthorn
4	GRD. LAYER	6	3	Shinleaf = Fragrant Bedstraw

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: n/a								BA: n/a
SIZE CLASS ANALYSIS:	R	<10	A	10 – 24	O	25 – 50	N	>50
STANDING SNAGS:	R	<10	R	10 – 24	R	25 – 50	N	>50
DEADFALL/LOGS:	R	<10	R	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	PIONEER	X YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS: n/a

TEXTURE:	DEPTH TO MOTTLES/GLEY	g= /	G= /
MOISTURE:	DEPTH OF ORGANICS:	/	(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:	/	(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	Agriculture	CODE:	AG
COMMUNITY SERIES:	Treed - AG	CODE:	TAG
ECOSITE:	Coniferous - TAG	CODE:	TAGM2
VEGETATION TYPE:	White Pine - TAGM2	CODE:	TAGM2-1
INCLUSION	n/a	CODE:	n/a
COMPLEX	n/a	CODE:	n/a

Notes: (e.g. disturbance, surface water depths, etc.)

Naturalized Plantation

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
PINSTRO	O				
POPTREM	O				
ULMAMER	R				
ACESACH				O	
UTIRIPA			O		
Alternate Dogwood			A		
Glossy Buckthorn			A		
Euro Buckthorn			O		

SPECIES CODE	LAYER 1	2	3	4	COLL.
Shinleaf				A	
Field Hawkweed				O	
Fragrant Bedstraw				A	
Com Strawberry				O	
Equisetophyta sp				R	
ONOSENS				O	
Bracken Fern				R	

Page 1 of 2

Print Name: J. Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160961321 Polygon No.: [illegible]

Assessment Type: ☐-Visual; no access/■-Entire; walk through feature/☐-Partial access *(indicate on map)*

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
	20	1-2	0	0	0

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

See BBS.

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment		Photo ID	Map ID	UTM Coordinates		
					Zone	Easting	Northing
ALL SITES							
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)	n/a - None observed					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate						
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows						
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size						
WOODLANDS							
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth						
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency						
WETLANDS							
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency						
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature						
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys						

Page 2 of 2

Print Name: J. Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: ____________ (Field Notes QA/QC personnel)

REV: 2016-09-07

IMG-1960 - 1970.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE (project no./name): Cavanagh - Airport Rd		POLYGON: SW feature
	SURVEYOR(S): J. Mansell	DATE: August 19/2019	PHOTO No.:
	START: 1100	END: 1400	ZONE & UTM: 18T 451916E, 5014[illegible]N

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
■ TERRESTRIAL	■ ORGANIC	□ LACUSTRINE	□ NATURAL	□ PLANKTON	□ LAKE
□ WETLAND	■ MINERAL SOIL	□ RIVERINE	■ CULTURAL	□ SUBMERGED	□ POND
□ AQUATIC	□ PARENT MIN.	■ BOTTOMLAND		□ FLOATING-LVD.	□ RIVER
	□ ACIDIC BEDRK.	□ TERRACE		□ GRAMINOID	□ STREAM
	□ BASIC BEDRK.	□ VALLEY SLOPE		□ FORB	□ MARSH
	□ CARB. BEDRK.	□ TABLELAND		□ LICHEN	■ SWAMP
		□ ROLL. UPLAND		□ BRYOPHYTE	□ FEN
		□ CLIFF		□ DECIDUOUS	□ BOG
		□ TALUS		■ CONIFEROUS	□ BARREN
SITE		□ CREVICE / CAVE	**COVER**	■ MIXED	□ MEADOW
□ OPEN WATER		□ ALVAR	□ OPEN		□ PRAIRIE
□ SHALLOW WATER		□ ROCKLAND	□ SHRUB		□ THICKET
■ SURFICIAL DEP.		□ BEACH / BAR	■ TREED		□ SAVANNAH
□ BEDROCK		□ SAND DUNE			□ WOODLAND
		□ BLUFF			■ FOREST
					□ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	THUOCCI > ACERUBR > BETALLE > ABIBALS
2	SUB-CANOPY	3	2	THUOCCI > ULMAMER > ACERUBR
3	UNDERSTOREY	4	2	PRUVIRG > PARQUIN > VITRIPA > RUBIDAE
4	GRD. LAYER	5	4	Interrupted Fern = DRYCART > Skunk Currant

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: THUOCCI, ACERUBR, ULMAMER.							BA: n/a	
SIZE CLASS ANALYSIS:	R	<10	O	10 – 24	A	25 – 50	R	>50
STANDING SNAGS:	N	<10	R	10 – 24	R	25 – 50	N	>50
DEADFALL/LOGS:	R	<10	O	10 – 24	O	25 – 50	R	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:		PIONEER		YOUNG		MID-AGE	X	MATURE		OLD GROWTH

SOIL ANALYSIS: n/a

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	Swamp	CODE: SW
COMMUNITY SERIES:	Conifer SW	CODE: SWC
ECOSITE:	White Cedar Mineral	CODE: SWCM1
VEGETATION TYPE:	White Cedar	CODE: SWCM1-1
INCLUSION	n/a	CODE: /
COMPLEX	n/a	CODE: /

Notes: (e.g. disturbance, surface water depths, etc.)

CEWA BLJA

Red Squirrel RWBB.

SOSP BCCH.

*No pooling water (vernal pools) & saturated soils observed

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
ACE~~[illegible]~~ RUR	A	R			
ULMAMER	O	O			
ABIBALS	O				
SALIXSP		R			
POPTREM	O				
BETALLEG	O				
THUOCCI	A	A			
Red Elderberry			R		
VITRIPA			O		
Virginia Creeper			A		
Choke Cherry			A		
Red Raspberry			O		

SPECIES CODE	LAYER 1	2	3	4	COLL.
SOLCANA			O		
Smooth Brome			O		
Spinulose WF			A		
Starflower			A		
Interrupted Fern			A		
RUBI~~DAE~~ PUBE			A		
~~Poplet~~ Skunk ~~Raspberry~~ * Currant			A		
Royal Fern			R		
Sensitive Fern			O		
BS Nightshade			O		
White Trillium			A		
Jack-N-pulpit			O		
~~Northern Beech~~					
Oak Fern			O		
Foam Flower			O		
MAICANA			O		
White Aster			R		
Sarsparilla			O		
Poison Ivy			A		
Jewelweed			R		
Tall Nettle			R		
Burdock			R		
Acrocarpus sp.			O		

Page 1 of 2

Quality Control: This form is complete ❑ & legible ❑

Print Name: J. Mansell (Field Notes Author) Signature: (Field Notes QA/QC personnel)

C:\Users\JMansell\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\TNVT06X4\elc-wildlife-habitat-form-update_rev-02.docx / (DERIVED FROM LEE ET AL., 1998)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160961301 Polygon No.: SWD

Assessment Type: ☐-Visual; no access/☐-Entire; walk through feature/■-Partial access (indicate on map)

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
	26	2-3	20%	0	~1-3mm.

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

Red Squirrel
White-tailed Deer

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment		Photo ID	Map ID	UTM Coordinates: Zone	Easting	Northing
ALL SITES							
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)	None observed					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate						
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows						
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size						
WOODLANDS							
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth	Scattered throughout feature L standing water mostly gone in pools					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency	L saturated soils.					
WETLANDS							
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency	None Observed					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature						
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys						

Print Name: J. Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

REV: 2016-09-07

IMG_1715 - 1722.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE (project no./name): Cavanagh - Airport Rd		POLYGON: Aspen Woodland
	SURVEYOR(S): J. Mansell	DATE: August 19/2019	PHOTO No.:
	START: 1100	END: 1400	ZONE & UTM: 18T 451618E, 5045118

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
■ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ■ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☐ LACUSTRINE ☐ RIVERINE ■ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ☐ TABLELAND ☐ ROLL. UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☐ NATURAL ■ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ■ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ■ WOODLAND ☐ FOREST ☐ PLANTATION
SITE			**COVER**		
☐ OPEN WATER ☐ SHALLOW WATER ■ SURFICIAL DEP. ☐ BEDROCK			☐ OPEN ■ SHRUB ? ■ TREED ?		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	3	POPTREM
2	SUB-CANOPY	3	3	ACENEGU > POPALBA
3	UNDERSTOREY	4	3	Virginia Creeper > RUBOCCI = RUBIDAE
4	GRD. LAYER	6	3	ONOSENS > Common plantain > SOLCANA.

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:	POPTREM >> ACERNEGU > POPALBA	BA: n/a.					
SIZE CLASS ANALYSIS:	A	<10	A	10 – 24	O	25 – 50	N	>50
STANDING SNAGS:	N	<10	R	10 – 24	R	25 – 50	N	>50
DEADFALL/LOGS:	N	<10	R	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	X	PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS: n/a

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	Woodland	CODE:	WO
COMMUNITY SERIES:	Deciduous WO	CODE:	WOD
ECOSITE:	Fresh-Moist WOD	CODE:	WODM5
VEGETATION TYPE:	Poplar	CODE:	WODM5-1
INCLUSION	n/a	CODE:	n/a
COMPLEX	n/a	CODE:	n/a.

Notes: (e.g. disturbance, surface water depths, etc.)

Previously cleared feature. Very moist.
Lots of edge influence. * feature is mostly woodland interspersed w/ thicket.

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
POPTREM	D				
POPALBA		R			
ACENEGU		O			
Black Raspberry		A			
Red Raspberry		A			
Glossy Buckthorn		A			
VITIS RIP		O			
VIRGINIA Bower		A			
VIRGINIA CREEP		D			
PAGODA Dogwood		O			
LONICERA SP		O			

SPECIES CODE	LAYER 1	2	3	4	COLL.
Common Plantain			A		
Brown-Susan			O		
SOLCANA			A		
SL Goldenrod			O		
Sensitive			A		
Heal-all			O		
Evening Primrose			R		
Cut-leave Horehound			O		
Wood-grass			O		

Page 1 of 2

Print Name: J. Mansell (Field Notes/Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160961321 Polygon No.: WODM5-1

Assessment Type: ☐-Visual; no access/☐-Entire; walk through feature/■-Partial access (indicate on map)

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
	27	2-3	0%	0	~1-3mm.

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

None.

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible) None observed					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate					
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth Sub/emergent veg present Shrubs/logs at edge present Water permanency					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)						
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					

Page 2 of 2

Print Name: J. Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: ____ (Field Notes QA/QC personnel)

IMG_1705-1710.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION			
SITE (project no./name): Cavanagh - Airport		POLYGON: TAGM9-1	
SURVEYOR(S): J. Mansell	DATE: August 19/2019		PHOTO No.:
START: 1100	END: 1400	ZONE & UTM: 18T 451594E, 5052481N.	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ☐ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☐ LACUSTRINE ☐ RIVERINE ☐ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ☐ TABLELAND ☐ ROLL. UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☐ NATURAL ☐ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☑ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ☐ PLANTATION
SITE ☐ OPEN WATER ☐ SHALLOW WATER ☐ SURFICIAL DEP. ☐ BEDROCK			**COVER** ☐ OPEN ☐ SHRUB ☐ TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			* See field data sheet from
2	SUB-CANOPY			July 9/2019 *
3	UNDERSTOREY			
4	GRD. LAYER			

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:					BA:
SIZE CLASS ANALYSIS:		<10	10 – 24	25 – 50	>50
STANDING SNAGS:		<10	10 – 24	25 – 50	>50
DEADFALL/LOGS:		<10	10 – 24	25 – 50	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:		CODE:
COMMUNITY SERIES:		CODE:
ECOSITE:		CODE:
VEGETATION TYPE:		CODE:
INCLUSION		CODE:
COMPLEX		CODE:

Notes: (e.g. disturbance, surface water depths, etc.)

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.	SPECIES CODE	LAYER 1	2	3	4	COLL.
PINSTRO	D					Carex Arctata			O		
POPTREM	O					Sensitive Fern			A		
FRAPENN		R				Spinulose Wood Fern			O		
THUOCCI		R									
ACESACC		R				[illegible]			A		
						Starflower			O		
						RUBIDAE			A		
						Enchanters					
						small			R		
						Ground Strawberry			R		
						Fragrant Bedstraw			O		
						Field Hawkweed			R		
Pagoda Dogwood		R									
Choke Cherry		A									
Glossy Buckthorn		O									

Page 1 of 2

Print Name: J. Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160961321 Polygon No.: TAGM2-1

Assessment Type: ☐-Visual; no access/☐-Entire; walk through feature/■-Partial access *(indicate on map)*

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
	27	2-3	100	0	none

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

HAWO BCCH
NOFL
PEWO

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible) — None observed					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate					
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth Sub/emergent veg present Shrubs/logs at edge present Water permanency					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)						
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					

Print Name: J. Marsella (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

REV: 2016-09-07

*Survey locations the same as CAP19WJM - breeding amphibs.

Nocturnal Nightjar Survey

Project Name: Cavanagh - Airport Pit **Project Number:** 160961321 **Province:** ON **UTM Zone:** 18T **Date:** June 20/2019

Biologist: J. Mansell **Waypoint prefix:** CAP19EWJM **Moon phase:** full - 91% illumination. Moonrise = 2305hrs.

Station	Time	Station location		Environment						Habitat			Observation						Notes
		Easting	Northing	Temp.	Wind	% cloud	Precip	Noise	Moon (Y/N)	Ecosite Phase	SS	Dom Tree	Species	#	Dist. (m)	Dir[1]	Type[2]	Sex[3]	
001	2300	452265	5015195	17	1	20	0	1-2	Y	Open	n/a	n/a	n/a	—					–
002	2318	451926	5015018	16	1	20	0	1-2	Y	SWD	n/a	n/a	n/a	—					–
003	2340	451690	5015383	15	1	20	0	1-2	Y	SWD	n/a	n/a	n/a	—					–
004	2356	452282	5015706	15	2	30	0	1-2	Y	AG.	n/a	n/a	n/a	—					–

* After completion of the above stations, the following adjacent roads were driven for EWPW occurrences.

① Rideau Road
② Bowesville Road.

Survey completed at 0145hrs.

* No EWPW observed *

[1] Direction in degrees; [2] Visual (V), Auditory (A), or both (A/V); [3] for CONI, boom from males (M), peent from either sex (U), females not distinguishable unless on nest.

APPENDIX C

Stage 1 and 2 Archaeological Assessment

Stage 1 and 2 Archaeological Assessment: Proposed Ottawa Airport Pit

Part of Lots 23 and 24, Concession 3, Rideau Front, Geographic Township of Gloucester, former Carleton County, now City of Ottawa, Ontario

February 7, 2020

Prepared for:

Thomas Cavanagh Construction Ltd.
9094 Cavanagh Road
Ashton, ON K0A 1B0

Prepared by:

Stantec Consulting Ltd.
400-1331 Clyde Avenue
Ottawa, ON K2C 3G4

Licensee: Patrick Hoskins, MA
License Number: P415
PIF Number: P415-0202-2019
Project Number: 160961321

ORIGINAL REPORT

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Thomas Cavanagh Construction Ltd. (Cavanagh) to complete a Stage 1 and 2 archaeological assessment for the proposed Ottawa airport aggregate pit, located on part of Lots 23 and 24, Concession 3 from Rideau River, Geographic Township of Gloucester, former Carleton County, now City of Ottawa, Ontario.

The Stage 1 archaeological assessment determined that the study area retains potential for the recovery of archaeological resources and should be subject to a Stage 2 archaeological assessment. Stage 2 assessment by pedestrian and test pit survey was completed for the property on October 11, 2019 and October 21, 2019 and resulted in the recovery of archaeological resources at two locations, Ottawa Aggregate Pit (OAP) Location 1 (BhFv-32) and OAP Location 2 (BhFv-33).

OAP Location 1 (BhFv-32)

The Stage 2 assessment of OAP Location 1 (BhFv-32) was conducted using pedestrian and test pit survey methods and resulted in the recovery of 71 Euro-Canadian artifacts over an area of approximately 15 metres by 36 metres in the ploughed field and two positive test pits. The Euro-Canadian assemblage comprises 31 household artifacts, 24 ceramics, 13 structural artifacts, 2 pieces of miscellaneous metal and tools, and 1 miscellaneous artifact. The ceramic assemblage from OAP Location 1 (BhFv-32) is comprised of ironstone (45.83%), recent ceramics (41.67%), and porcelain (12.50%). The ironstone assemblage suggests a mid to late 19th century period of use. The recent ceramics and porcelain assemblages indicate that the site continued to be occupied into the 20th century. The presence of cut nails and wire drawn nails further suggests a mid to late 19th century occupation that continues into the 20th century. A period of use continuing into the 20th century is further supported by the majority of the bottle glass assemblage comprising colourless glass (62.5%). Colourless glass was common in the 20th century. Further to the above, three bottles depict the maker’s mark for the Dominion Glass Company used from 1928 to 1976.

With the identification of less than 20 artifacts dating to a period of use prior to 1900, and the number of artifacts suggesting a period of use in the 20th century, it is determined that OAP Location 1 (BhFv-32) does not retain cultural heritage value or interest. Based on these considerations, OAP Location 1 (BhFv-32) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 Standard 1c of the MHSTCI’ *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Furthermore, based on topographic mapping and land registry it is determined that OAP Location 1 (BhFv-32) is associated with the Spratt house constructed *circa* 1873-1879. Given the presumed date of construction, and thus a *terminus post quem* of 1873, the site would not meet criteria to move to Stage 4 mitigation of development impacts based on Section 3.4.2, Standard 1 of the MHSTCI’s *Standards and Guidelines for Consultant Archaeologists*, as no portion of the time span of the site occupation predates 1870.

OAP Location 1 (BhFv-32) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 of the MHSTCI’ 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The cultural heritage value or interest of OAP Location 1 (BhFv-32) has been sufficiently documented. Therefore, **no further archaeological assessment is recommended for OAP Location 1 (BhFv-32).**

OAP Location 2 (BhFv-33)

The Stage 2 assessment of OAP Location 2 (BhFv-33) was conducted using pedestrian and test pit survey methods and resulted in the recovery of 80 Euro-Canadian artifacts over an area approximately 55 metres by 23 metres and includes three positive test pits. The Euro-Canadian assemblage comprises 39 household artifacts, 26 ceramics, and 14 structural artifacts. The ceramic assemblage from OAP Location 2 (BhFv-33) is comprised of ironstone (65.38%), semi-porcelain (19.23%), porcelain (7.69%), stoneware (3.85%), and recent ceramics (3.85%). The ironstone assemblage suggests a mid to late 19th century period of use. The semi-porcelain assemblage suggests a late 19th century occupation that continues into the 20th century. The recent ceramics and porcelain assemblages also indicate that the site continued to be occupied into the 20th century. A period of use continuing into the 20th century is further supported by half of the bottle glass assemblage (50%) comprising colourless glass.

With the identification of less than 20 artifacts dating to a period of use prior to 1900, and the number of artifacts suggesting a period of use in the 20th century, it is determined that OAP Location 2 (BhFv-33) does not retain cultural heritage value or interest. Based on these considerations, OAP Location 2 (BhFv-33) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 Standard 1c of the MHSTCI' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Furthermore, based on topographic mapping and land registry it is determined that OAP Location 2 (BhFv-33) is associated with the Campbell/Davidson house constructed between 1864 and 1879 and abandoned sometime around 1946. Given the presumed date of construction, and thus a *terminus post quem* of 1864, the site would not meet criteria to move to Stage 4 mitigation of development impacts based on Section 3.4.2, Standard 1 of the MHSTCI's *Standards and Guidelines for Consultant Archaeologists*, as less than 10% of the time span of the site occupation predates 1870.

OAP Location 2 (BhFv-33) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The cultural heritage value or interest of OAP Location 2 (BhFv-33) has been sufficiently documented. Therefore, **no further archaeological assessment is recommended for OAP Location 2 (BhFv-33).**

The MHSTCI is asked to review the results presented and accept this report into the Ontario Public Register of Archaeological Reports.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Project Personnel

Licensed Archaeologist:	Patrick Hoskins, MA (P415)
Project Manager:	Colin Varley, MA, RPA (P002)
Licensed Field Director:	Patrick Hoskins, MA (P415)
Field Technician:	Lisa Sonnenburg, PH.D. (R262) Colin Varley, MA, RPA
Report Writer:	Patrick Hoskins, MA
GIS Analyst:	Dan Harvey, BES (Hons.), CEAM
Quality Review:	Colin Varley, MA, RPA (P002)
Independent Review:	Tracie Carmichael, BA, B.Ed. (R140)

Acknowledgements

Ministry of Heritage, Sport, Tourism and Culture Industries:	Robert von Bitter

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Stantec Consulting Ltd. (Stantec) was retained by Thomas Cavanagh Construction Limited (Cavanagh) to complete a Stage 1 and 2 archaeological assessment for the proposed Ottawa Airport Aggregate Pit, located on part of Lots 23 and 24, Concession 3 from Rideau River, Geographic Township of Gloucester, former Carleton County, now City of Ottawa, Ontario (Figure 1).

The property is approximately 38 hectares (ha) in size and comprises agricultural field and sparsely wooded areas (Figure 2). Cavanagh is preparing an application to have the property licensed for aggregate extraction. The application is being filed under the *Aggregate Resources Act*.

1.1.1 Objectives

For the purposes of the Stage 1-2 archaeological assessment, the Ministry of Heritage, Sport, Tourism and Culture Industries' (MHSTCI) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) were followed. The objectives of the Stage 1 assessment are to:

- provide information about the study area's geography, history, previous archaeological fieldwork and current land conditions;
- evaluate in detail the study area's archaeological potential to support recommendations for Stage 2 survey for all or parts of the property; and
- recommend appropriate strategies for Stage 2 survey.

To meet these objectives Stantec archaeologists employed the following research strategies:

- available relevant archaeological, historical and environmental literature pertaining to the study area was reviewed;
- the land use history of the study area, including pertinent available historic maps, was reviewed;
- the *Ontario Archaeological Sites Database* was reviewed to determine the presence of registered archaeological sites in and around the study area; and
- the *Ontario Public Register of Archaeological Reports* was searched to determine whether previous archaeological assessment had been done on or around the study area.

In compliance with the provincial standards and guidelines set out in the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 2 Property Assessment are to:

- document all archaeological resources within the study area;
- determine whether the study area contains archaeological resources requiring further assessment; and
- recommend appropriate Stage 3 assessment strategies for all archaeological sites identified with further cultural heritage value or interest.

Permission to enter the property to conduct archaeological field assessment and remove artifacts, as necessary, was provided by Phil White of Cavanagh. Mr. White also arranged for the preparation of the property for pedestrian survey with guidance from Stantec archaeological staff.

1.2 HISTORICAL CONTEXT

1.2.1 Post-Contact Indigenous Resources

"Contact" is typically used as a chronological benchmark when discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of contact is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

The Ottawa River and most of its major drainage tributaries were controlled by the various Algonquin bands that occupied the Ottawa River Valley (Day and Trigger 1978; Whiteduck 2002). The Algonquin homeland is traditionally identified as the portion of the Ottawa River drainage between the Long Sault Rapids (or Point d'Orignal) at present day Hawkesbury in the south, and Lake Nipissing in the north (Holmes 1993). Major tributary rivers and their respective drainage basins were occupied and controlled by identified Algonquin bands (Morrison 2005). However, the Rideau and Gatineau rivers appear to have been major exceptions to that generality. While the study area is located closest to the Rideau River, it is situated in an area that provides headwaters for both the Rideau and South Nation rivers, the latter through the North Branch of the Castor River, the headwaters of which are located approximately 4 kilometres to the southeast of the study area . The South Nation River valley is the traditional homeland of the historical Algonquin Weskarini band (Hessel 1993). Also known by an Iroquoian name, the Onontchataronon, the Weskarini were also referred to by the French as the "People of Iroquet" (Hessel 1993; Day and Trigger 1978). They appear to have been an Algonquin band which had adopted and amalgamated a number of Iroquoians who had been driven from their home territory at the Island of Montréal (Trigger 1985; Fox and Pilon 2016). The Rideau River watershed was undoubtedly used in the early Contact period (Fox and Pilon 2016) as Champlain mentions Indigenous use of the river, even though he himself did not travel along it (Bourne and Bourne 2000).

Even before direct contact had been made with Europeans, the Algonquin had been active in the fur trade, acting as intermediaries between Indigenous procurers of furs in the north and west and those Indigenous groups that were in direct contact with European traders (Holmes 1993). This role was one that was already in place before the European fur trade was initiated, given their position along, and control over, a major water transportation route (Morrison 2005). The Huron traded corn, cornmeal, and fishing nets in exchange for dried fish and furs, the latter of which the Algonquin secured from Ojibway and Cree living further north (Morrison 2005). The growing fur trade and the designation of animal skins as money led to changes in economic and social organization patterns. After the initial excursions of Samuel de Champlain into the Algonquin territory in 1613 until 1615 the Algonquin played a major role in the trade between the Huron and the French, and actively worked against Champlain making a trip to the Huron territory (Day and Trigger 1978). When direct trade between the Huron and French eventually occurred, and the Huron and French were permitted to use the Ottawa River as a travel route, they were subject to tolls by the Kichesippirini, who occupied the region around present day Morrison Island and controlled water traffic up and down the river from their position at that narrows in the river (Hessel 1993; Morrison 2005).

Increased trade along the Ottawa River also brought attention from other Iroquois groups from south of the St. Lawrence River. However, the alliance of Algonquin, Huron, and French minimized Iroquois raiding, and various treaties were enacted between the Algonquin and the Mohawk during the 1620s and 1630s (Day and Trigger 1978). In the latter part of the 1630s, however, the Algonquin attempted to trade directly with the Dutch, who had been trading partners with the Mohawk, and this led to a new outbreak of hostilities between Mohawk and Algonquin (Day and Trigger 1978). After 1639, the Mohawk began accumulating English, and then Dutch, firearms that gave them considerable advantage over the Algonquin, whose French trade partners, who had initially determined to trade no firearms, as they would only provide firearms to those who had been baptized (Trigger 1985). Conflict continued to greater and lesser degrees throughout the 1640s, but by the early 1650s most of the Ottawa River Valley Algonquin had either sought refuge in Quebec, such as at Trois Rivières, or had removed themselves to the upper parts of their territory, in present day Algonquin Park (Hessel 1987).

In 1649, the Huron-French fur trade collapsed, and the Five Nations Iroquois raided and destroyed the French Mission at Ste. Marie and several Huron villages. Huronia was abandoned, with the surviving Huron destroying their own remaining villages and moving further inland, now located within the province of Quebec. The Algonkian-speaking communities were briefly dispersed from the Ottawa Valley from 1650 to 1675, and were replaced as middlemen by the Odawa people, who were later in turn replaced by the French *coureur de bois*. Further colonization of eastern Ontario and Quebec led to more changes in the fur trade. However, after the merger of the Northwest Company and Hudson's Bay Company in 1821, the fur trade routes were diverted north to Hudson's Bay (Kennedy 1961:6).

At the turn of the 18th century the French interests in the fur trade had been sufficiently disrupted to a level that a conclusion of a treaty with the Iroquois was required, and Algonquin and Nipissing representatives were on hand in Montreal when that treaty was made (Holmes 1993). While this should have allowed for the resumption of Algonquin occupation of the whole of the Ottawa River again, the protected hostilities with the Iroquois and the effects of the European based disease epidemics had resulted in a population decline that had caused significant changes to social organization (Morrison 2005). During the first part of the 1700s there were Algonquin settlements along the Gatineau River and there were seasonal occupants around Lake of Two Mountains, near Montreal (Holmes 1993). By 1740 a map of Indigenous peoples in the known Canada identified the Nipissings on their namesake lake, Algonquins on the Liéve River in present day Quebec and Algonquins, Nipissings and Mohawks at Lake of Two Mountains (Holmes 1993). No other Indigenous groups, Algonquin or otherwise, were identified as living in the Ottawa River valley (Holmes 1993).

At the conclusion of the Seven Years War in 1763 the sphere of European influence in the Algonquin homeland passed from the French to the British, and they imposed restrictions on travel along the Ottawa River above Carillon (Morrison 2005). Nevertheless, the Algonquin continued to consider the river their territory and claims and petitions to that regard were made to the British colonial government (Holmes 1993).

The land within the current study areas is governed by the Crawford's Purchases, which were enacted on October 9, 1783 (marked "B" and "B1", and "B2": on Figure 3). The first treaty, identified as "B", was made between the Crown and the Iroquois. It included lands "reaching from Point Baudet on the north side of Lake St. Francis, up to the mouth of Gananoque River…includes the Counties of Leeds, Grenville, Dundas, Stormont, and Glengarry, Russell, Prescott, the eastern part of Carleton and the southern part of Lanark" (Morris 1943:16-17). The second treaty, identified as "B1", was made between the Crown and the Mississaugas. It included lands "from the mouth of the Gananoque River to the mouth of the Trent River…includes the southern portions of the Counties of Hastings, Lennox and Addington, and Frontenac" (Morris 1943:16-17). The third treaty, identified as "B2", was made between the Crown and the Mississaugas. It included lands "from the mouth of the Trent River to Toronto Purchase and back from Lake Ontario to Lake Simcoe and Rice Lake…included the County of Northumberland, excepting the northeast corner, Durham, the southern part of Ontario, and the east part of York" (Morris 1943:16-17).

However, there is an outstanding Algonquin land claim for the traditional Algonquin territory within those lands that remain unceded because the Algonquin were not consulted during the treaty negotiations (Anonymous n.d.).

1.2.2 Euro-Canadian Resources

Gloucester Township was first surveyed in 1792 and originally identified as "Township B" (McDonnell 1820b). It was renamed Gloucester Township in 1793 after William Frederick, second Duke of Gloucester and Edinburgh, and nephew of King George III. Originally, Gloucester was part of Dundas County in the Eastern District and did not become part of Carleton County until 1838. The first permanent settlers in Gloucester Township were Bradish Billings and his family, who settled near present-day Billings Bridge along the Rideau River.

Survey records obtained from the Ministry of Natural Resources (MNR) were examined for evidence of Indigenous and early Euro-Canadian settlements. An early survey of Gloucester Township by Duncan McDonnell in 1820 depicts early survey lines, as well as early settlers and Crown and clergy reserve lands (Figure 4) (McDonnell 1820a). When townships in Upper Canada (Ontario) were originally laid out the Crown and the Anglican clergy each received one-seventh of the lots to sell. Unlike Lower Canada (Quebec), where the set asides were typically found in large blocks, Lieutenant-Governor John Graves Simcoe directed that the Crown and clergy lots in Upper Canada be interspersed with other privately-owned lots (Wilson, 1969). However, in the early 1800s the continuing practice of free land grants depressed the sale prices of these lots and a program to lease the lands was established. Originally, leases were for 21 years, renewable every 7 years on new rates (Wilson, 1969). The clergy set aside was a matter of much friction with other Protestant denominations, which also wished to benefit from these lots. By 1840 an act was passed such that one half of the revenues of clergy lot sales were distributed between the Church of England and the Church of Scotland and the remaining half was divided between the remaining denominations, including the Catholic church. Eventually the matter was resolved by secularizing the clergy lots in 1854 so that they reverted back to the Crown, from which they were subsequently distributed (Lee 2004).

Lot 23 was listed as Crown property and Lot 24 listed Godfrey Warner as the landowner (Figure 4). There was no indication of Indigenous settlement on the map or in the notes (McDonnell 1820a, 1820b). The survey map depicts the Rideau and Ottawa rivers, with the majority of the landowners listed in lots adjacent to those rivers.

An 1825 map drawn by William Coffin (Coffin 1825) lists Godfrey Warner as the landowner for Lot 24. No landowner is depicted on Lot 23 (Figure 5). The Coffin map depicts additional watercourses such as the North Castor River and Ramsay Creek. The Coffin map also indicates those survey lines where ground conditions were poorly drained or swampy; the survey line along the east side of the lots have no such indication and would have been considered well drained, unlike many of the nearby lots.

The 1863 Walling map of Carleton County shows that settlement along the road front of present-day Albion Road was well established (Walling 1863). J. Spratt is listed as the landowner for Lot 23 and A. Dowe (north part) and R. Campbell (south part) are listed as the landowners for Lot 24 (Figure 6). Both lots have structures depicted adjacent to Albion Road. The Ottawa and Prescott Railway is shown traversing both lots to the west of the study area.

Between the publication of Walling's map in 1863, and the map of Gloucester Township in the 1879 *Illustrated Historical Atlas of the County of Carleton, Ont.* (Belden and Co. 1879) the settlement of Gloucester Township was for the most part complete (Figure 7). The Belden map shows that all lots within the township are owned. James Spratt is listed as the landowner for Lot 23 and Robert Spratt (north part) and Robert Campbell (south part) are listed as the landowners for Lot 24. One residence/farmstead is illustrated on Lot 23, outside of the study area, and two residences/farmsteads are illustrated on Lot 24, within the limits of the study area.

Topographic mapping from 1906 depicts two structures within the study area, in the same approximate location as those shown on the 1879 Belden map (Figure 8). The structures are depicted in the 1948 topographical map as well (Figure 8). On that map there are also driveways to each indicated on the map.

1.3 ARCHAEOLOGICAL CONTEXT

1.3.1 The Natural Environment

The study area is within the Russell and Prescott Sand Plain physiographic region of southern Ontario (Chapman and Putnam 1984). The Prescott and Russell Sand Plain is a group of large sand plains separated by the clays of the lower Ottawa Valley. The sand plain consists of one belt from Ottawa to Hawkesbury and three large areas to the north of the belt and several small areas (Chapman and Putnam 1984:209). Sand plains are aquatic features and are deposited by higher energy, shallow waters, and are indicative of former bottoms of waterbodies (Karrow and Warner 1990:5).

The study area soils are comprised of Kars gravelly sandy loam. The soil is brown sandy loam over light brown sandy loam over roughly stratified sand and gravel. The soil is useful for farming, pasture, and portions are still within wood lot (Hills et al. 1944). The soils have good to excessive drainage. The topography of the study area is gently undulating with some knolls present along the north edge and in the central part of the property. The property slopes down in a long, steady decline to the west and east from the central high elevation.

The natural drainage of the area has been anthropogenically altered over the last 150 years. However, historical mapping indicates that the closest potable water source to the study area was an unnamed tributary of the Rideau River immediately west of the study area. The headwater of an unnamed tributary of the North Castor River is located 1.3 kilometres to the west. Several other tertiary and seasonal drainages are noted on historical mapping in the general vicinity of the study area.

1.3.2 Pre-Contact Indigenous Resources

Overall, archaeological research in many parts of Eastern Ontario has been fairly limited, at least compared to adjoining areas in Southern Ontario and northern New York State, resulting in only a limited understanding of the cultural processes that occurred in this part of the province. The following summary of the pre-contact occupation of Eastern Ontario (see Table 1 for chronological chart) is based on syntheses in Archaeologix Inc. (2008), Ellis and Ferris (1990), Jacques Whitford (2008), Pilon (1999), St-Pierre (2009), and Wright (1995).

Table 1: Eastern Ontario Cultural Chronology, Years Before Present (BP)

Archaeological Period	Time	Characteristics
Early Palaeo-Indian	11,000–10,400 BP	Caribou and extinct Pleistocene mammal hunters, small camps
Late Palaeo-Indian	10,400–10,000 BP	Smaller but more numerous sites
Early Archaic	10,000-8,000 BP	Slow population growth, emergence of woodworking industry, development of specialized tools
Middle Archaic	8,000–4,500 BP	Environment similar to present, fishing becomes important component of subsistence, wide trade networks for exotic goods
Late Archaic	4,500-3,100 BP	Increasing site size, large chipped lithic tools, introduction of bow hunting
Terminal Archaic	3,100-2,950 BP	Emergence of true cemeteries with inclusion of exotic trade goods
Early Woodland	2,950-2,400 BP	Introduction of pottery, continuation of Terminal Archaic settlement and subsistence patterns
Middle Woodland	2,400-1,400 BP	Increased sedentism, larger settlements in spring and summer, dispersed smaller settlement in fall and winter, some elaborate mortuary ceremonialism
Transitional Woodland	1,400-1,100 BP	Incipient agriculture in some locations, seasonal hunting & gathering
Early Late Woodland	1,100-700 BP	Limited agriculture, development of small village settlement, small communal longhouses
Middle Late Woodland	700-600 BP	Shift to agriculture as major component of subsistence, larger villages with large longhouses, increasing political complexity
Lale Late Woodland	600- 350 BP	Very large villages with smaller houses, politically allied regional populations, increasing trading network

Identifiable human occupation of Ontario begins just after the end of the Wisconsin Glacial period. The first human settlement can be traced back 11,000 years, when this area was settled by Native groups that had been living to the south of the emerging Great Lakes. This initial occupation is referred to as the "Palaeo-Indian" archaeological culture.

Early Palaeo-Indian (EPI) (11,000-10,400 before present (BP)) settlement patterns suggest that small groups, or “bands”, followed a pattern of seasonal mobility extending over large territories. Many (although by no means all) of the EPI sites were located on former beach ridges associated with Lake Algonquin and research/evidence indicates that the vegetative cover of these areas would have consisted of open spruce parkland, given the cool climatic conditions. Sites tend to be located on well-drained loamy soils, and on elevations in the landscape, such as knolls. The fact that assemblages of artifacts recovered from EPI sites are composed exclusively of stone skews our understanding of the general patterns of resource extraction and use. However, the taking of large game, such as caribou, mastodon and mammoth, appears to be of central importance to the sustenance of these early inhabitants. Moreover, EPI site location often appears to be located in areas which would have intersected with migratory caribou herds. In the Ottawa Valley it appears that the palaeo-environment had not recovered sufficiently from the former glaciations to have allowed an EPI occupation. There is, however, some evidence of EPI incursion to the Rideau Lakes area.

The Late Palaeo-Indian (LPI) period (10,400-10,000 BP) is poorly understood compared to the EPI, the result of less research focus than the EPI. As the climate warmed the spruce parkland was gradually replaced and the vegetation of Southern Ontario began to be dominated by closed coniferous forests. As a result, many of the large game species that had been hunted in the EPI period moved north with the more open vegetation or became locally extinct. Like the EPI, LPI peoples covered large territories as they moved around to exploit different resources. Environmental conditions in Eastern Ontario and the Ottawa Valley were sufficient to allow for a Late Palaeo-Indian occupation, although the evidence of such is still very limited. There is some evidence of LPI occupation on Thompson Island, in the St. Lawrence River near the junction of Ontario, Québec and New York State.

The transition from the Palaeo-Indian period to the Archaic archaeological culture of Ontario prehistory is evidenced in the archaeological record by the development of new tool technologies, the result of utilizing an increasing number of resources as compared to peoples from earlier archaeological cultures and developing a broader based series of tools to more intensively exploit those resources. During the Early Archaic period (10,000-8,000 BP), the jack and red pine forests that characterized the LPI environment were replaced by forests dominated by white pine with some associated deciduous elements. Early Archaic projectile points differ from Palaeo-Indian forms most notably by the presence of side and corner notching on their bases. A ground stone tool industry, including celts and axes, also emerges, indicating that woodworking was an important component of the technological development of Archaic peoples. Although there may have been some reduction in the degree of seasonal mobility, it is still likely that population density during the Early Archaic was low, and band territories large.

The development of more diversified tool technology continued into the Middle Archaic period (8,000-4,500 BP). The presence of grooved stone net-sinkers suggests an increase in the importance of fishing in subsistence activities. Another new tool, the bannerstone, also made its first appearance during this period. Bannerstones are ground stone weights that served as counterbalance for "atlatls" or spear-throwers, again indicating the emergence of a new technology. The increased reliance on local, often poor-quality chert resources for chipped stone tools suggests that in the Middle Archaic groups inhabited smaller territories lacking high quality raw materials. In these instances, lower quality materials which had been glacially deposited in local tills and river gravels were used.

This reduction in territory size appears to have been the result of gradual region-wide population growth, which forced a reorganization of subsistence patterns, as a larger population had to be supported from the resources of a smaller area. Stone tools designed specifically for the preparation of wild plant foods suggest that subsistence catchment was being widened and new resources being more intensively exploited. A major development of the later part of the Middle Archaic period was the initiation of long-distance trade. In particular, native copper tools manufactured from sources near Lake Superior were being widely traded. Two of the most notable sites in Ontario are approximately 125 km northwest of the study area along the Ottawa River. What makes these sites notable is the large concentration of copper artifacts that have been recovered. The Morrison's Island and Allumette Island sites have produced over 1,000 copper artifacts. The copper artifacts consisted of fishhooks, awls, gorges, socketed axes, knives, and spear points. The source of the copper has been traced to Lake Superior, approximately 1,000 km away. In addition to the copper artifacts, other lithic sources from over 500 km to the south have been found indicating participation in a large interaction network.

During the late part of the Middle Archaic (5,500-4,500 BP) a distinctive occupation, or tradition, known as the Laurentian Archaic, appears in south-eastern Ontario, western Quebec, northern New York and Vermont. Laurentian Archaic sites are found only within the transitional zone between the deciduous forests to the south and coniferous forests to the north known as the Canadian Biotic Province and are identifiable through the association of certain diagnostic tool types, including ground slate semi-lunar knives (or “ulus”), plummets for use in fishing, ground slate points and knives, and ground stone gouges, adzes and grooved axes. It is thought that there was less reliance on plant foods and a greater reliance on hunting and fishing in this region than for Archaic peoples in southern and south-western Ontario. Laurentian Archaic sites have been found in the middle Ottawa River valley, along the Petawawa River and Trent River watersheds and at Brockville.

The trend towards decreased territory size and a broadening subsistence base continued during the Late Archaic (4,500-2,900 BP). Late Archaic sites are far more numerous than either Early or Middle Archaic sites. It appears that the increase in numbers of sites at least partly represents an increase in population. However, around 4,500 BP water levels in the Great Lakes began to rise, taking their modern form. It is likely that the relative paucity of earlier Archaic sites is due to their being inundated under the rising lake levels.

The appearance of the first true cemeteries occurs during the Late Archaic. Prior to this period, individuals were interred close to the location where they died. However, with the advent of the Late Archaic and local cemeteries individuals who died at a distance from the cemetery would be returned for final burial at the group cemetery often resulting in disarticulated skeletons, occasionally missing minor bone elements (e.g. finger bones). The emergence of local group cemeteries has been interpreted as being a response to both increased population densities and competition between local groups for access to resources, in that cemeteries would have provided symbolic claims over a local territory and its resources.

Increased territoriality and more limited movement are also consistent with the development of distinct local styles of projectile points. The trade networks which began in the Middle Archaic expand during this period and begin to include marine shell artifacts (such as beads and gorgets) from as far away as the Mid-Atlantic coast. These marine shell artifacts and native copper implements show up as grave goods, indicating the value of the items. Other artifacts such as polished stone pipes and slate gorgets also appear on Late Archaic sites. One of the more unusual of the Late Archaic artifacts is the "birdstone", small, bird-like effigies usually manufactured from green banded slate.

The Early Woodland period (2,900-2,200 BP) is distinguished from the Late Archaic period primarily by the addition of ceramic technology. While the introduction of pottery provides a useful demarcation point for archaeologists, it may have made less difference in the lives of the Early Woodland peoples. The first pots were very crudely constructed, thick walled, and friable. It has been suggested that they were used in the processing of nut oils by boiling crushed nut fragments in water and skimming off the oil. These vessels were not easily portable, and individual pots must not have enjoyed a long use life. There have also been numerous Early Woodland sites located at which no pottery was found, suggesting that these poorly constructed, undecorated vessels had yet to assume a central position in the day-to-day lives of Early Woodland peoples.

Other than the introduction of this rather limited ceramic technology, the life-ways of Early Woodland peoples show a great deal of continuity with the preceding Late Archaic period. For instance, birdstones continue to be manufactured, although the Early Woodland varieties have "pop-eyes" which protrude from the sides of their heads. Likewise, the thin, well-made projectile points which were produced during the terminal part of the Archaic period continue in use. However, the Early Woodland variants were side-notched rather than corner-notched, giving them a slightly altered and distinctive appearance. The trade networks which were established in the Middle and Late Archaic also continued to function, although there does not appear to have been as much traffic in marine shell during the Early Woodland period. These trade items were included in increasingly sophisticated burial ceremonies, some of which involved construction of burial mounds.

In terms of settlement and subsistence patterns, the Middle Woodland (2,200 B.C.-1,100 BP) provides a major point of departure from the Archaic and Early Woodland periods and includes an archaeological complex that has been identified as composed of a generalized Algonquin/Cree/Ojibway culture (Holmes 1993). While Middle Woodland peoples still relied on hunting and gathering to meet their subsistence requirements, fish were becoming an even more important part of the diet. Middle Woodland vessels are often heavily decorated with hastily impressed designs covering the entire exterior surface and upper portion of the vessel interior. Consequently, even very small fragments of Middle Woodland vessels are easily identifiable.

It is also at the beginning of the Middle Woodland period that rich, densely occupied sites appear along the margins of major rivers and lakes. While these areas had been utilized by earlier peoples, Middle Woodland sites are significantly different in that the same location was occupied off and on for as long as several hundred years. Because this is the case, rich deposits of artifacts often accumulated. Unlike earlier seasonally utilized locations, these Middle Woodland sites appear to have functioned as base camps, occupied off and on throughout the course of the year. There are also numerous small upland Middle Woodland sites, many of which can be interpreted as special purpose camps from which localized resource patches were exploited. This shift towards a greater degree of sedentism continues the trend witnessed from the Middle Archaic and provides a prelude to the developments that follow during the Late Woodland period.

There are three complexes of Middle Woodland culture in Ontario. The complex specific to eastern Ontario is known as "Point Peninsula" most notably represented by ceramics decorated with a stamped zigzag pattern applied at various angles to the exterior of the vessel, known as "pseudo scallop shell". Another common decorative style is the dentate stamp, a comb-like tool creating square impressions. Middle Woodland components have been identified in Vincent Massey Park along the Rideau River in the City of Ottawa, at the confluence of the Ottawa and Gatineau Rivers at Lac Leamy Park in Gatineau, Quebec and there is evidence for a widespread Woodland occupation along the Rideau River and Rideau Lakes system (Jacques Whitford 2004; Laliberté 1999; Watson 1991, 1992, 1999).

The relatively brief period of the Transitional Woodland period is marked by the acquisition of cultivar plants species, such as maize and squash, from communities living south of the Great Lakes. The appearance of these plants began a transition to food production, which consequently led to a much reduced need to acquire naturally occurring food resources. Sites were thus occupied for longer periods and by larger populations. Transitional Woodland sites have not been discovered in eastern Ontario.

The Late Woodland period in southern Ontario is traditionally associated with societies referred to as the Ontario Iroquois Tradition. This period is often divided into three temporal components; Early, Middle and Late (see Table 1). In eastern Ontario, especially in the Ottawa River Valley, there is considerable overlap of people continuing to practice a hunting and gathering economy and those using limited horticulture as a supplement to gathered plants. For the most part, however, classic Late Woodland sites in eastern Ontario are limited to an area at the east end of Lake Ontario and along the St. Lawrence River valley. Early Late Woodland components have been identified near Pembroke on the Muskrat River; however, there is evidence for only limited use of cultivated plants. Middle Late Woodland sites have not been identified east of the Kingston area.

During the Late Late Woodland period a distinctive material culture emerges at the east end of Lake Ontario and along the St. Lawrence River up to Québec City, known as the St. Lawrence Iroquois (SLI). SLI sites are characterized by large semi-permanent villages and associated satellite settlements. The inhabitants of these villages and satellites practiced horticulture of staple crops which made up the bulk of their diet. Other food resources were hunted, fished and gathered. SLI village sites can be extensive, up to 10 acres or more in size and composed of a number of longhouse structures. Special purpose satellite settlements, such as hunting and fishing camps, are smaller in area and in the number and size of structures within the settlement. While the early contact period descendants of the Late Woodland SLI and Huron used the Ottawa River and its tributaries as transportation routes between the St. Lawrence River and the interior, Late Woodland village sites have not been identified.

In the Late and Terminal Woodland (immediately prior to the early contact period) there are several instances of Late Woodland pottery types typically associated with Iroquoian groups (e.g. the Middle Late

Woodland Middleport archaeological culture and Late Late Woodland/contact period Huron and Onondaga) on what would otherwise be considered Algonquian archaeological sites throughout the Ottawa River valley (cf. Mitchell 1975, 1990, 1996; Saint-Germain 1999; von Gernet 1992, 1993). There has been some debate about what the presence of these purportedly Iroquoian ceramic artifacts in an Algonquin context might indicate. Interpretations include: incursion of Iroquoian peoples into Algonquin territory; ceramics as trade items between Iroquoian and Algonquins; the presence of Iroquoian women in Algonquin societies, either as wives or captives, who continued to manufacture ceramics according to their ethnic traditions; or Algonquin manufacture of ceramics that simulate Iroquoian ceramic types (Pendergast 1999). Each of these possible interpretations suggests a close interaction sphere between Algonquin and Iroquoian peoples, which is further supported by evidence of Iroquoian and Algonquin trade relationships in the early contact period. It has also been suggested that Algonquin and Iroquoian peoples may have "shared in a common Late Woodland cultural stratum" which included common elements such as ceramics (von Gernet 1992). Taking the point further, Fox and Garrad (2004) suggest that Huron and Algonquin shared not only a territory in the southern Georgian Bay area (traditional "Huronia"), but also shared a material culture, and may have cohabited in settlements to a greater degree than as simply visitors.

1.3.3 Previously Identified Archaeological Sites and Surveys

The City of Ottawa maintains an Archaeological Potential GIS layer on its web-based GeoOttawa site (City of Ottawa n.d.). This layer is based on the 1999 Archaeological Resource Potential Mapping Study that was completed for the Regional Municipality of Ottawa-Carleton (now the City of Ottawa) in 1999 (Archaeological Services Inc. 1999). This potential model identifies the study area as having elevated potential for the presence of archaeological resources. As part of the City of Ottawa's Planning policy any proposed Project that contains even a portion of an archaeological potential zone requires the entire Project Area to be subject to archaeological assessment. The study area is located entirely within that archaeological potential layer (Figure 9). The City of Ottawa potential model evaluates archaeological potential for both pre-contact Indigenous and historic period resources.

The National Capital Commission (NCC) created an archaeological potential map for federal lands located in the City of Ottawa. The study area is federal land and is listed as having surficial geological features that have been demonstrated to be attractive for Palaeo-Indian occupation (Laliberté 1998). The area is also noted for having undergone anthropogenic surface disturbance (Laliberté 1998). However, overall the study area is designated as having low potential for the recovery of pre-contact Indigenous archaeological resources (Laliberté 1998). The NCC potential model does not evaluate for historic period archaeological potential.

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MHSTCI who maintain the *Ontario Archaeological Sites Database*. The study area is located within Borden block BhFv.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy* Act (Government of Ontario 1990a). The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MHSTCI will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the Archaeological Sites Database (ASDB) has shown that there seven registered archaeological sites within one kilometre of the study area (Government of Ontario 2019a) (see Table 2). Of these, BhFv-6 and BhFv-7 were identified to be within the study area. These sites are associated with the one previous archaeological report that documents work within the study area. The sites and report are detailed further in Section 1.3.4 (Government of Ontario 2019b).

Table 2: Registered Sites within Eight Kilometres of Study Area

Borden Number	Site Name	Cultural Affiliation	Site Type
BhFv-4	none given	Early Archaic	Beach; campsite
BhFv-5	none given	Early Archaic	Beach; campsite
BhFv-6	none given	Early Archaic	Beach; campsite
BhFv-7	none given	Early Archaic	Beach
BhFv-9	Murray Site	Euro-Canadian	Farmstead
BhFv-10	Finlan-Britt Site	Euro-Canadian	Agricultural; farmstead
BhFv-12	Hardy Farm Site	Euro-Canadian	Agricultural

1.3.4 Previous Archaeological Surveys

Kinickinick Heritage Consultants (Kinickinick) conducted a Stage 1- 2 archaeological assessment for the proposed Albion Road site of the Central Canada Exhibition on part of Lots 24 and 25, Concession 3 on Rideau River, Geographic Township of Gloucester, former Carleton County, now City of Ottawa, Ontario. A portion of the area assessed in that report is located within the current study area. The Stage 2 assessment resulted in the identification of four archaeological sites, BhFv-4, BhFv-5, BhFv-6, and BhFv-7 (Kinickinick 2004).

BhFv-4 was identified through a mix of pedestrian and test pit surveys and resulted in the recovery of 533 lithic artifacts over an area measuring 650 by 300 metres. The lithic assemblage was comprised primarily of banded quartzite sandstone (87.9%). Site BhFv-4 was recommended for Stage 3 archaeological assessment (Kinickinick 2004).

BhFv-5 was identified through test pit survey and resulted in the recovery of seven lithic artifacts over a 50 metre area. The lithic assemblage was comprised of sandstone, banded quartzite sandstone, granite, and quartz. Site BhFv-5 was recommended for Stage 3 archaeological assessment (Kinickinick 2004).

BhFv-6 was identified through test pit survey and resulted in the recovery of 74 lithic artifacts from 24 test pits over a 120 metre by 180 metre area. The lithic assemblage was comprised primarily of sandstone, banded quartz sandstone, and quartzite. Site BhFv-6 was recommended for Stage 3 archaeological assessment (Kinickinick 2004).

BhFv-7 was identified through test pit survey and resulted I the recovery of 48 lithic artifacts from 35 positive test pits over a 160 metre by 220 metre. The lithic assemblage was comprised primarily of banded quartz sandstone, sandstone, quartzite, and quartz. Site BhFv-7 was recommended for Stage 3 archaeological assessment (Kinickinick 2004).

Following review by the MHSTCI, it was determined that the four sites did not retain further cultural heritage value or interest and Stage 3 was not required.

1.4 ARCHAEOLOGICAL POTENTIAL

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by the MHSTCI (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables include proximity to previously identified archaeological sites; distance to various types of water sources; soil texture and drainage; glacial geomorphology; elevated topography; and the general topographic variability of the area. However, it is worth noting that extensive land disturbance can eradicate archaeological potential (Government of Ontario 2011).

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and, considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect site location and type to varying degrees. The MHSTCI categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, creeks;
- Secondary water sources: intermittent streams and creeks, springs, marshes and swamps;
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes; and

- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

As detailed in Section 1.3.1, the closest natural water sources to the study area were tributaries of the Rideau River, located immediately west of the study area, and the North Castor River, located over one kilometre to the southeast. The study area was formerly inundated by the Champlain Sea or the paleo-Ottawa River estuary at the Champlain Sea. The Algonquins of Ontario (AOO) relic shoreline model showed that no documented paleo-shorelines or mapped extents of any post-Champlain Sea recessional waterbodies were located within the study area (AOO 2017).

Soil texture can be an important determinant of past settlement, usually in combination with other factors such as elevated topography. The study area soils are comprised of Kars gravelly sandy loam, which has good drainage. The study area has several knolls located across the property.

The map and notes from the 1820 survey by Duncan McDonnell were examined for any mention of Indigenous settlements in the township. None were identified in the survey (McDonnell 1820a).

For Euro-Canadian sites, archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements, early transportation routes, and properties listed on the municipal register or designated under the *Ontario Heritage Act* (Government Ontario 1990b) or property that local histories or informants have identified with possible historical events. The 1820 survey and 1825 Coffin maps list Godfrey Warner as the landowner for Lot 24. The 1863 Walling and 1879 Belden maps show that the Spratt families were the landowners for Lots 23 and the north part of Lot 24, and that Robert Campbell was the landowner for the south part of Lot 24. The 1879 Belden atlas map shows two residences/farnsteads within the limits of the study area. Twentieth century topographic mapping shows these same structures present in 1906 and 1948.

The City of Ottawa Archaeological Potential GIS layer is based on the 1999 Archaeological Resource Potential Mapping Study that was completed for the Regional Municipality of Ottawa-Carleton (now the City of Ottawa) in 1999 (Archaeological Services Inc 1999). The potential model for pre-contact resources is based primarily on distance to water. The potential model for Euro-Canadian resources is based on the 1863 Walling and 1879 Belden maps of Carleton County. This potential model identifies the study area as having archaeological potential.

In summary, in accordance with Section 1.3 of the MHSTCI’ 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the Stage 1 archaeological assessment determined that the study area retains potential for the recovery of archaeological resources and should be subject to a Stage 2 archaeological assessment.

1.5 EXISTING CONDITIONS

The study area is irregularly shaped and is approximately 38 hectares in size. The study area comprises ploughed agricultural field and sparsely wooded areas, likely remnants from the historic period occupation, and a number of building ruins.

2.0 FIELD METHODS

As discussed in Section 1.5, the study area is approximately 38 hectares in size and consists of ploughed agricultural field and sparse bush lot. The archaeological assessment was conducted under PIF P415-0202-2019 issued to Patrick Hoskins, MA, by the MHSTCI. The Stage 2 survey was carried out on October 11, 2019 and October 21, 2019. During the assessment weather conditions were sunny and cool and at no time were the field or weather conditions detrimental to the recovery of archaeological material. Figure 10 provides an illustration of the assessment methods, as well as photograph locations and directions.

Table 3: Weather and Field Conditions during the Stage 2 Survey

Date	Field Director	Activity	Weather	Ground Conditions
October 11, 2019	Patrick Hoskins (P415)	Pedestrian survey	Sunny, cool	Visibility > 80%
October 21, 2019	Patrick Hoskins (P415)	Pedestrian survey; test pit survey	Sunny, cool	Visibility > 80%; soils dry and friable

Approximately 98.5% of the study area consists of agricultural field which was ploughed and weathered and exhibited ground surface visibility of greater than 80%. The pedestrian survey was conducted in accordance with Section 2.1.1 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The pedestrian survey involved systematically walking the ploughed and weathered agricultural field at five-metre intervals (Photos 1 to 3). Soil in the pedestrian survey area was composed of medium brown sandy loam topsoil over a mix of grey and yellow sandy loam subsoil. When archaeological resources were encountered, the survey interval was reduced to 1 metre and an area of minimum 20 metres by 20 metres around the initial find was surveyed. Artifacts collected during the pedestrian survey included all formal artifact types and diagnostic categories, and all refined ceramic sherds identified as per Section 2.1.1, Standard 8 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Some non-ceramic artifacts were left *in situ* at the identified archaeological locations to allow for relocation of the site if it was determined that further archaeological assessment was required, as per Section 2.1.1, Standard 9 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

Approximately 1.5% of the study area was inaccessible for ploughing and was subject to test pit survey at a five metre interval (Photos 4 and 5) in accordance with Section 2.1.2 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (MHSTCI 2011). Each test pit was approximately 30 centimetres in diameter and excavated five centimetres into sterile subsoil. The soils were then examined for stratigraphy, cultural features, or evidence of fill. Test pits were approximately 25 centimetres deep and soils consisted of brown sand over top of grey and brownish-yellow sand subsoil (Photo 6). All soil was screened through six millimetre hardware cloth to facilitate the recovery of small artifacts and then used to backfill the pit. All test pits were backfilled after excavation. Topsoil in the test pit survey area was composed of medium brown sandy loam and averaged between 19 and 26 cm in depth. Subsoil in the test pit survey area was also a mix of grey and yellow sandy-loam. Where positive test pits were encountered, they were associated with archaeological resources identified during pedestrian survey of adjacent ploughed fields and no reduced interval testing occurred. All artifacts recovered from test pits were retained for further analysis as per Section 2.1.2, Standard 8 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

3.0 RECORD OF FINDS

The Stage 2 archaeological assessment was conducted employing the methods described in Section 2.0. An inventory of the documentary record generated by fieldwork is provided in Table 4 below. Two archaeological resources, Ottawa Aggregate Pit (OAP) OAP Location 1 (BhFv-32) and OAP Location 2 (BhFv-33), were identified during the Stage 2 survey of the study area. The artifacts recovered from Locations 1 and 2 are detailed below. Maps illustrating the exact site locations do not form part of this public report; they may be found in the Supplementary Documentation.

Table 4: Documentary Records

Document Type	Current Location of Document Type	Additional Comments
4 pages of field notes	Stantec office in Ottawa	In original field book and photocopied in project file
1 map provided by client	Stantec office in Ottawa	Hard and digital copies in project file
60 digital photographs	Stantec office in Ottawa	Stored digitally in project file

All the material culture collected during the Stage 2 archaeological survey of the study area is contained in two Bankers boxes, labeled by location number and Borden Number, as applicable. The boxes will be temporarily housed at the Stantec London office until formal arrangements can be made for a transfer to an MHSTCI collections facility. As per Section 5 of the MHSTCI's 2014 *The Archaeology of Rural Historical Farmsteads* bulletin laboratory analysis occurred on all artifacts collected during the field survey (Government of Ontario 2014).

3.1 EURO-CANADIAN ARTIFACT DESCRIPTIONS

3.1.1 Ceramic Artifacts

3.1.1.1 Ironstone

Ironstone, also known as white granite, stone china, and graniteware, is a variety of white earthenware introduced to Canada in the 1820s. It was widely available in the 1840s and became extremely popular in Upper Canada by the 1860s (Collard 1967; Kenyon 1985). Decorated ironstone, including hand painted, transfer printed, sponged, and stamped, generally dates to between 1805 and 1840; undecorated ironstone was most common after 1840 (Miller 1991). By 1897, ironstone was the cheapest dinnerware available and prices charged for moulded patterns were the same as those charged for plain, undecorated types (Sussman 1997).

Ironstone was often decorated with raised moulded designs. The wheat pattern, which resembled the heads of wheat moulded on the rim, was developed in 1858 and remained popular into the 20th century (Adams 1994).

Transfer printed ironstone was completed using tissue paper, which allowed for shading and finer line details, or oil and a sheet of glue were used to create a design with little dots (Stelle 2001). Transfer printing was popular throughout the 19th century. During the 1830s and 40s colours such as brown, black, red, green and purple became popular. Between 1850 and 1890 only blue, black and brown were popular, with a variety of colour becoming popular again in the late 19th century (Adams 1994).

Painted ironstone pieces are typically painted covering the majority of the vessel, with very little white showing through (Stelle 2011).

Flow transfer printing was popular in the late 1840s and 1850s and was later revived in the 1890s. The printing colour – usually blue, but sometimes black – was allowed to bleed into the glaze, giving it a misty appearance (Adams 1994).

3.1.1.2 Semi-Porcelain

Semi-porcelain wares were developed by English potters during the first half of the 19th century in an attempt to replicate imported porcelain. This refined earthenware was relatively thick-bodied, with a hard, opaque paste. In 1850, semi-porcelains were reintroduced, and this vitreous, hard-glazed white earthenware quickly became widespread throughout North America. Decoration with hand-painted lustrous gold overglazes, or “gilding”, became popular in the 1880s and persisted until the 1940s (Hughes 1961).

3.1.1.3 Porcelain

Porcelain wares are produced with very high firing temperatures, which results in a partial vitrification of the paste. Vessel bodies tend to be translucent and can be very thin. Because of its prohibitive cost, porcelain is rare on 19th century sites in Ontario but becomes relatively common by the 20th century as less expensive production techniques were developed in Europe (Kenyon 1980b).

3.1.1.4 Stoneware

Stoneware has a vitrified stone-like paste due to the high temperatures used to fire the pottery. The paste colours vary between white, grey, and tan and are generally quite thick and durable. A common glaze on stoneware is salt-glazed, which is achieved by introducing salt to the kiln during the firing process (Maryland Archaeological Conservation Lab 2012). Stoneware was made in Ontario from 1849 onwards (Adams 1994).

3.1.1.5 Ceramic Form and Function

For Euro-Canadian sites, all ceramic sherds were examined in order to describe the function of the item from which the ceramic sherd originated. However, for those sherds that were too fragmentary for a functional assignment, an attempt was made to at least provide a formal description, such as to which portion of an item the sherd belonged. For example, what used to be a porcelain teacup but now found in an archaeological context could be classified archaeologically in the artifact catalogue in a descending order of specificity depending on preservation and artifact size: a teacup (function), a cup (function), a hollowware (form), or a rim fragment (form). Hollowwares and flatwares were differentiated based on the presence or absence, respectively, of curvature in the ceramic cross-section of each sherd.

The classification system used here is based upon Beaudoin (2013), but teas were differentiated as teacups and tea saucers as necessary. If Beaudoin's classifications could not be applied, then the broader definitions of Voss (2008) were used. Ultimately, if sherds were small enough that even a general functional or formal ware type could not be determined, the sherd was simply classified as either a rim fragment, a non-rim fragment, a base fragment, or indeterminate. Ceramic functions, as many as were able to be determined, are provided in the artifact catalogue for each location.

3.1.2 Non-ceramic Artifacts

3.1.2.1 Household Artifacts

Some bottle glass colours can provide a tentative temporal range for Euro-Canadian domestic sites, although most are temporally non-diagnostic (Lindsey 2016). Sun-coloured amethyst glass occurs when manganese dioxide decolourized glass is exposed to the ultraviolet light in sunlight. Colourless, or clear, glass is relatively uncommon prior to the 1870s but becomes quite widespread in the 1910s after the development of automatic bottle manufacturing (Kendrick 1971; Lindsey 2016).

White glass, also known as milk glass, was produced primarily between the 1870s and the mid-20th century (Lindsey 2018). This type of glass was most commonly used for cosmetic and toiletry bottles, as well as ointments or creams (Lindsey 2018).

3.1.2.2 Structural Artifacts

Window glass can be temporally diagnostic. In the 1850s window glass thickness changed dramatically. This shift occurred as a result of the lifting of the English import tax on window glass in 1850, which taxed glass by weight and encouraged manufacturers to produce thin panes. Thus, most window glass manufactured before 1850 tends to be less than 1.6 mm thick, while later glass is thicker (Adams 1994; Kenyon 1980).

Machine cut nails were cut from a flat sheet of iron and as a result their shanks have a rectangular cross-section. The head is usually rectangular and was often welded into place. Invented in about 1790, cut nails saw common use from the 1830s until the 1890s (Adams 1994). Wire nails are still in widespread use today, with a round cross-section and round head. First developed in the 1850s, they began to replace the cut nail in the 1890s (Adams 1994).

3.2 OAP LOCATION 1 (BHFV-32)

OAP Location 1 (BhFv-32) was identified during a combination of pedestrian and test pit survey. The Stage 2 assemblage comprises 71 Euro-Canadian artifacts over an area approximately 15 metres by 36 metres and includes two positive test pits. The Euro-Canadian assemblage comprises 31 household artifacts, 24 ceramics, 13 structural artifacts, 2 pieces of miscellaneous metal and tools, and 1 miscellaneous artifact. Approximately 200 artifacts were identified on the surface and all formal artifact types and diagnostic categories, and all refined ceramic sherds were collected, as per Section 2.1.1, Standard 8 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).. Artifacts left in the field consisted largely of pieces of machinery, miscellaneous pieces of metal, small sherds of glass, later structural artifacts and recent material. An artifact summary for the Stage 2 archaeological assessment of OAP Location 1 (BhFv-32) is provided in Table 5. A sample of artifacts recovered is illustrated in Plates 1 to 4.

Table 5: OAP Location 1 (BhFv-32) Artifact Summary

Artifact Class	Frequency	%
Household	31	43.66
Ceramic	24	33.80
Structural	13	18.31
Miscellaneous metal and tools	2	2.82
Miscellaneous artifacts	1	1.41
Total	**71**	**100.00**

3.2.1 Non-Ceramic Artifacts

3.2.1.1 Household Artifacts

A total of 31 household artifacts were recovered from OAP Location 1 (BhFv-32), including 21 bottle glass fragments, 3 complete glass bottles, 2 chimney/lamp glass fragments, 1 dish glass fragment, 1 fragment of undetermined glass, 1 white glass fragment, 1 iron, and 1 metal container.

Bottle glass colours present at OAP Location 1 (BhFv-32) include: aqua, dark olive, and colourless. Of the bottle glass assemblage, 15 (62.5%) pieces are colourless. Three of the glass bottles depicted the maker's mark for the Dominion Glass Company. The mark was used from 1928 to 1976. One bottle depicted the maker's mark for Clark's ketchup. Clark's ketchup was sold in the 1920's to 1930's. Four bottle finishes were identified in the assemblage for OAP Location 1 (BhFv-32) (Table 6).

Table 6: Bottle Finishes at OAP Location 1 (BhFv-32)

Cat. #	Finish Type	Frequency	Approximate Dates	Comments
2	Small mouth external thread	1	1890s to present	Food storage jars
16	Small mouth external thread	1	1890s to present	Food storage jars
17	Collared ring	1	Early 20th century	Druggist and prescription bottles
18	Wide mouth external thread	1	1890s to present	Food storage jars

One piece of white glass was recovered from OAP Location 1 (BhFv-32). The glass assemblage dates from the late 19th century into the 20th century.

The remaining household artifacts, including 2 chimney/lamp glass fragments, 1 dish glass fragment, 1 fragment of undetermined glass, 1 iron, and 1 metal container are not narrowly temporally diagnostic.

3.2.1.2 Structural Artifacts

A total of 13 structural artifacts were recovered from OAP Location 1 (BhFv-32), including 7 cut nails, 4 wire drawn nails, and 2 window glass fragments.

The nail assemblage suggests a mid-19th to 20th century period of use.

Both window glass fragments have a thickness greater than 1.6 mm, suggesting a period of manufacture and use post-1850.

3.2.1.3 Miscellaneous Metal and Tools

Two metal staples were recovered from OAP Location 1 (BhFv-32). These are not narrowly temporally diagnostic

3.2.1.4 Miscellaneous Artifacts

One piece of drainage tile was recovered from OAP Location 1 (BhFv-32). Drainage tile is not narrowly temporally diagnostic.

3.2.2 Ceramic Artifacts

A total of 24 ceramics were recovered from OAP Location 1 (BhFv-32). A sample of the ceramic artifacts from OAP Location 1 (BhFv-32) is illustrated in Plate 4. The ceramic assemblage is summarized in Table 7.

Table 7: OAP Location 1 (BhFv-32) Ceramic Assemblage by Ware Type

Ceramic Artifact	Frequency	%
Ironstone	11	45.83
Recent ceramic	10	41.67
Porcelain	3	12.50
Total	**24**	**100.00**

A breakdown of the ceramic assemblage by decorative type is provided in Table 8.

Table 8: OAP Location 1 (BhFv-32) Ceramic Assemblage by Decorative Type

Ceramic Artifact	Frequency	%
Recent ceramics	10	41.67
Ironstone, undecorated	7	29.17
Ironstone, transfer printed	2	8.33
Ironstone, moulded	2	8.33
Porcelain, undecorated	1	4.17
Porcelain, transfer printed	1	4.17
Porcelain, moulded	1	4.17
Total	**24**	**100.00**

3.2.2.1 Ironstone

Of the 11 pieces of ironstone recovered from OAP Location 1 (BhFv-32), 7 (63.64%) are undecorated, 2 (18.18% are transfer printed (one each of blue and teal coloured decoration), and 2 (18.18%) are moulded (Table 9). Undecorated ironstone was most common after 1840 (Miller 1991) and moulded ironstone was manufactured post-1858 (Adams 1994). Blue transfer printing was popular throughout the 19th century; the teal coloured piece likely dates from the later part of the 19th century. Overall the ironstone assemblage is representative of a mid to late 19th century period of occupation.

Table 9: OAP Location 1 (BhFv-32) Ironstone Assemblage

Ceramic Artifact	Motif(s)	Frequency	%
Ironstone, undecorated	None	7	63.64
Ironstone, moulded	Rope band	2	18.18
Ironstone, transfer printed	Blue and teal	2	18.18
	Total	**11**	**100.00**

3.2.2.2 Recent Ceramics

A total of ten pieces of recent ceramics were recovered from OAP Location 1 (BhFv-32). Of the pieces, four had a polychrome glaze and three had a cream-coloured glaze. These ceramics date to the 20th century.

3.2.2.3 Porcelain

Three pieces of porcelain were recovered from OAP Location 1 (BhFv-32), one each of undecorated, transfer printed, and moulded (Table 10). Porcelain become common in the 20th century, suggesting a period of use in the 20th century.

Table 10: OAP Location 1 (BhFv-32) Porcelain Assemblage

Ceramic Artifact	Motif(s)	Frequency	%
Porcelain, undecorated	None	1	33.34
Porcelain, moulded	Scalloped edge	1	33.33
Porcelain, transfer printed	Polychrome floral decal	1	33.33
	Total	**3**	**100.00**

3.2.2.4 Ceramic Form and Function

While many of the ceramic pieces are too fragmentary to discern either form or function, the discernable form and function of the ceramic assemblage from OAP Location 1 (BhFv-32) is summarized in Table 11 and Table 12 respectively.

Table 11: OAP Location 1 (BhFv-32) Ceramic Form

Ceramic	Flatware	Hollowware	Undetermined	Total
Ceramic, recent	2	6	2	**10**
Ironstone, moulded	1	1	0	**2**
Ironstone, transfer printed	0	2	0	**2**
Ironstone, undecorated	1	3	3	**7**
Porcelain, moulded	0	1	0	**1**
Porcelain, transfer printed	0	1	0	**1**
Porcelain, undecorated	1	0	0	**1**
Total	**5**	**14**	**5**	**24**

Table 12: OAP Location 1 (BhFv-32) Ceramic Function

Ceramic	Cup	Plate	Fragment	Total
Ceramic, recent	3	1	6	**10**
Ironstone, undecorated	0	0	7	**7**
Ironstone, moulded	0	0	2	**2**
Ironstone, transfer printed	0	0	2	**2**
Porcelain, moulded	0	0	1	**1**
Porcelain, transfer printed	0	0	1	**1**
Porcelain, undecorated	0	0	1	**1**
Total	**3**	**1**	**20**	**24**

3.2.3 OAP Location 1 (BhFv-32) Artifact Catalogue

The complete catalogue of the Stage 2 artifact assemblage recovered from OAP Location 1 (BhFv-32) is provided in Table 13.

Table 13: OAP Location 1 (BhFv-32) Artifact Catalogue

Cat. #	Subunit or Context	Artifact	Quantity	Form/ Function	Comments
1	test pit 1	metal, staple	1		fencing staple, complete, heavily corroded
2	test pit 1	glass, bottle	11		colourless; 1 small mouth external thread finish (seam to lip), 9 body fragments, 1 base fragment embossed "D" in diamond (Dominion Glass Company - mark first used by Dominion in 1928 and was used until circa 1976)
3	test pit 2	metal, staple	1		fencing staple, complete, heavily corroded
4	surface find	glass, window	2		greater than 1.6mm

5	surface find	glass, undetermined	1		aqua, burnt, small fragment
6	surface find	glass, white	1		thick jar base/body fragment
7	surface find	glass, chimney/lamp	2		colourless; 1 beaded rim fragment, 1 body fragment
8	surface find	glass, dish	1		pink, etched foliage decoration
9	surface find	glass, bottle	7		aqua; 5 body fragments, 2 base fragments
10	surface find	nail, cut	7		Complete
11	surface find	nail, wire drawn	4		Complete
12	surface find	glass, bottle	2		dark olive, base fragments, mending
13	surface find	drainage tile	1		
14	surface find	iron	1		embossed "ASBESTOS SAD IRON", missing cover and handle
15	surface find	glass, bottle	1		colourless, base, embossed "CLARK'S" (Clark's brand ketchup bottle)
16	surface find	glass, bottle complete	1		colourless, small mouth external thread finish (seam to lip), base embossed "LEPAGE'S INC.", with "D" in diamond mark - (Dominion Glass Company - mark first used by Dominion in 1928 and was used until circa 1976)
17	surface find	glass, bottle complete	1		colourless, collared ring finish (seam over lip), embossed graduation markings on front and back, base embossed with "D" in diamond - (Dominion Glass Company - mark first used by Dominion in 1928 and was used until circa 1976)
18	surface find	glass, bottle complete	1		colourless, wide mouth external thread finish (seam to lip), with metal lid intact, printed label on top of lid, "DAIRY FRESH", "…CARAMELs…", "…WHOLESOME…", embossed "CANADA 8 FL.OZ. SIZE" above heel, embossing on base illegible
19	surface find	ironstone, undecorated	3	hollowware / unknown (1 rim, 2 non-rim)	Burnt
20	surface find	ironstone, undecorated	1	flatware / unknown (rim)	

21	surface find	ironstone, undecorated	2	unidentifiable / unknown (1 non-rim, 1 base/body)	
22	surface find	ironstone, undecorated	1	unidentifiable / unknown (non-rim)	partial black transfer printed makers mark, "…CHINA", "…KIN." (likely Aflred Meakin)
23	surface find	ironstone, moulded	1	hollowware / unknown (base/body)	moulded rope band above base
24	surface find	ironstone, moulded	1	flatware / unknown (rim)	small fragment, indeterminate moulded design
25	surface find	ironstone, transfer printed	1	hollowware / unknown (non-rim)	teal, floral and foliage
26	surface find	ironstone, transfer printed	1	hollowware / unknown (rim)	blue, indeterminate scenic view with building and trees on interior
27	surface find	porcelain, undecorated	1	flatware / unknown (non-rim)	
28	surface find	porcelain, transfer printed	1	hollowware / unknown (non-rim)	polychrome floral decal
29	surface find	porcelain, moulded	1	hollowware / unknown (rim)	moulded design below scalloped edge, silver/blue and gold painted bands along rim
30	surface find	ceramic, recent	2	unidentifiable / unknown (non-rim)	cream-coloured glaze, one with partial decal printed makers mark, "…OTT", "…TAFFORDSHIRE", "ENGLAND" (Myott Staffordshire)
31	surface find	ceramic, recent	1	flatware / plate (rim)	cream-coloured/yellow glaze, faded painted band along rim
32	surface find	ceramic, recent	1	hollowware / unknown (lid)	polychrome decal, floral and geometric band
33	surface find	ceramic, recent	2	hollowware / unknown (rim)	polychrome decal, floral and geometric band
34	surface find	ceramic, recent	3	hollowware / cup (2 rim, 1 non-rim)	Undecorated
35	surface find	ceramic, recent	1	flatware / unknown (rim)	polychrome floral decal below rim
36	surface find	metal, container	1		small rim fragment, heavily corroded

3.3 OAP LOCATION 2 (BHFV-33)

OAP Location 2 (BhFv-33) was identified during a combination of pedestrian and test pit survey. The Stage 2 assemblage comprises 80 Euro-Canadian artifacts over an area approximately 55 metres by 23 metres and includes three positive test pits. The Euro-Canadian assemblage comprises 39 household artifacts, 26 ceramics, and 14 structural artifacts. Approximately 200 artifacts were identified on the surface and all formal artifact types and diagnostic categories, and all refined ceramic sherds were collected, as per Section 2.1.1, Standard 8 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Artifacts left in the field consisted largely of pieces of machinery, miscellaneous pieces of metal, small sherds of glass, later structural artifacts and recent material.. An artifact summary for the Stage 2 archaeological assessment of OAP Location 2 (BhFv-33) is provided in Table 14. A sample of artifacts recovered is illustrated in Plates 5 to 7.

Table 14: OAP Location 1 (BhFv-32) Artifact Summary

Artifact Class	Frequency	%
Household	39	48.75
Ceramic	26	32.50
Structural	15	18.75
Total	**80**	**100.00**

3.3.1 Non-Ceramic Artifacts

3.3.1.1 Household Artifacts

A total of 39 household artifacts were recovered from OAP Location 2 (BhFv-33), including 18 pieces of metal container, 14 glass bottle fragments, 3 dish glass fragments, 2 fragments of undetermined glass, 1 faunal remain, and 1 white glass fragment.

Bottle glass colours present at OAP Location 2 (BhFv-33) include: amber, aqua, dark olive, grey-tinted, sun-coloured amethyst, and colourless. Of the bottle glass assemblage, seven (50%) pieces are colourless. One piece of white glass was recovered from OAP Location 2 (BhFv-33). The glass assemblage dates from the late 19th century into the 20th century.

The remaining household artifacts, including 18 pieces of metal container, 3 dish glass fragments, 2 fragments of undetermined glass, and 1 faunal remain. These artifacts are not narrowly temporally diagnostic.

3.3.1.2 Structural Artifacts

A total of 15 structural artifacts were recovered from OAP Location 2 (BhFv-33), including 11 window glass fragments, 3 wire drawn nails, and 1 doorknob.

The nail assemblage, composed entirely of wire drawn nails, suggests a very late 19th or 20th century period of use.

The 11 window glass fragments have a thickness greater than 1.6 mm, indicating a period of manufacture and use post-1850.

The doorknob is not narrowly temporally diagnostic.

3.3.2 Ceramic Artifacts

A total of 26 ceramics were recovered from OAP Location 2 (BhFv-33). A sample of the ceramic artifacts from OAP Location 2 (BhFv-33) is illustrated in Plate 7. The ceramic assemblage is summarized in Table 15.

Table 15: OAP Location 2 (BhFv-33) Ceramic Assemblage by Ware Type

Ceramic Artifact	Frequency	%
Ironstone	17	65.38
Semi-porcelain	5	19.23
Porcelain	2	7.69
Stoneware	1	3.85
Recent ceramic	1	3.85
Total	**26**	**100.00**

A breakdown of the ceramic assemblage by decorative type is provided in Table 16

Table 16: OAP Location 2 (BhFv-33) Ceramic Assemblage by Decorative Type

Ceramic Artifact	Frequency	%
Ironstone, undecorated	7	26.92
Semi-porcelain	5	19.23
Ironstone, transfer printed	4	15.38
Ironstone, moulded	4	15.38
Porcelain, moulded	2	7.69
Ironstone, painted	1	3.85
Ironstone, flow transfer printed	1	3.85
Stoneware	1	3.85
Ceramic, recent	1	3.85
Total	**26**	**100.00**

3.3.2.1 Ironstone

Of the 17 pieces of ironstone recovered from OAP Location 2 (BhFv-33), 7 (41.18%) are undecorated, 4 (23.53%) are transfer printed, 4 (23.53%) are moulded, 1 (5.88%) is painted, and 1 (5.88%) is flow transfer printed (Table 17). Undecorated ironstone was most common after 1840 (Miller 1991) and moulded ironstone was manufactured post-1858 (Adams 1994). Transfer printed decoration was popular throughout the 19th century and flow transfer printed decoration was popular in two periods; in the 1840s and 1850s and in the 1890s. The ironstone assemblage is representative of a mid to late19th century period of occupation.

Table 17: OAP Location 2 (BhFv-33) Ironstone Assemblage

Ceramic Artifact	Motif(s)	Frequency	%
Ironstone, undecorated	None	7	41.18
Ironstone, transfer printed	Blue “Willow” pattern, brown floral pattern, red knot work band	4	23.53
Ironstone, moulded	Foliage band, wheat pattern, scalloped body panels	4	23.53
Ironstone, painted	Black and gold painted band	1	5.88
Ironstone, flow transfer printed	Black	1	5.88
Total		**17**	**100.00**

3.3.2.2 Semi-Porcelain

A total of five semi-porcelain ceramics were recovered from OAP Location 2 (BhFv-33). Four pieces were decorated with a moulded linear design and gold banding below a scalloped edge, and also included a green floral transfer print. The other piece of semi-porcelain had a moulded linear and dot decoration below a scalloped edge. The semi-porcelain assemblage is indicative of an occupation between 1880-1940.

3.3.2.3 Porcelain

Two pieces of porcelain were recovered from OAP Location 2 (BhFv-33), both moulded with scalloped edges. Porcelain became common in the 20th century, and these artifacts indicate a period of use in the 20th century.

3.3.2.4 Stoneware

One piece of stoneware was recovered from OAP Location 2 (BhFv-33). The one piece has a dark brown interior and exterior glaze. Stoneware is indicative of a late 19th century period of use.

3.3.2.5 Recent Ceramics

One piece of recent ceramic was recovered from OAP Location 2 (BhFv-33). The piece has a cream-coloured glaze. These ceramics date to the 20th century.

3.3.2.6 Ceramic Form and Function

While many of the ceramic pieces are too fragmentary to discern either form or function, the discernable form and function of the ceramic assemblage from OAP Location 2 (BhFv-33) is summarized in Table 18 and Table 19 respectively.

Table 18: OAP Location 2 (BhFv-33) Ceramic Form

Ceramic	Flatware	Hollowware	Undetermined	Total
Ironstone, undecorated	4	1	2	**7**
Semi-porcelain	5	0	0	**5**
Ironstone, moulded	2	1	1	**4**
Ironstone, transfer printed	3	1	0	**4**
Porcelain, moulded	1	1	0	**2**
Ceramic, recent	1	0	0	**1**
Ironstone, flow transfer printed	1	0	0	**1**
Ironstone, painted	1	0	0	**1**
Stoneware	0	1	0	**1**
Total	**18**	**5**	**3**	**26**

Table 19: OAP Location 2 (BhFv-33) Ceramic Function

Ceramic	Saucer	Plate	Fragment	Total
Ironstone, undecorated	0	0	7	**7**
Semi-porcelain	0	4	1	**5**
Ironstone, moulded	0	2	2	**4**
Ironstone, transfer printed	0	0	4	**4**
Porcelain, moulded	1	0	1	**2**
Ceramic, recent	0	1	0	**1**
Ironstone, flow transfer printed	0	0	1	**1**
Ironstone, painted	0	1	0	**1**
Stoneware	0	0	1	**1**
Total	**1**	**8**	**17**	**26**

3.3.3 OAP Location 2 (BhFv-33) Artifact Catalogue

The complete catalogue of the Stage 2 artifact assemblage recovered from OAP Location 2 (BhFv-33) is provided in Table 20.

Table 20: OAP Location 2 (BhFv-33) Artifact Catalogue

Cat. #	Subunit or Context	Artifact	Quantity	Form/ Function	Comments
1	test pit 1	glass, window	6		greater than 1.6mm
2	test pit 1	nail, wire drawn	1		Complete

3	test pit 1	glass, bottle	5		colourless; 1 large mouth external thread finish fragment, 4 body fragments
4	test pit 1	glass, bottle	2		amber; 1 body fragment, 1 base fragment
5	test pit 1	ironstone, undecorated	2	flatware / unknown (rim)	Mending
6	test pit 2	glass, window	2		greater than 1.6mm
7	test pit 2	glass, bottle	1		colourless, body fragment
8	test pit 2	glass, undetermined	1		colourless, small fragment
9	test pit 2	nail, wire drawn	1		Complete
10	test pit 2	faunal remains	1		indeterminate medium to large mammal, small fragment
11	test pit 3	metal, container	18		7 rim/seam and body fragments, 11 body fragments
12	surface find	glass, window	3		greater than 1.6mm
13	surface find	nail, wire drawn	1		Complete
14	surface find	glass, bottle	1		aqua, post bottom mould produced bottle base, embossed "T" with "x" through vertical line
15	surface find	glass, bottle	1		grey-tinted, cup bottom mould produced bottle base, embossed "T", "5", embossed "OHIO above heel
16	surface find	glass, bottle	1		sun coloured amethyst, body fragment
17	surface find	glass, white	1		hollowware rim fragment
18	surface find	glass, bottle	2		dark olive; 1 oil finish (applied), 1 base fragment
19	surface find	glass, dish	1		light green base/body fragment, ribbed exterior surface, base embossed "OVEN…"
20	surface find	glass, bottle	1		colourless, body fragment
21	surface find	glass, dish	1		sun coloured amethyst, body fragment, moulded geometric design
22	surface find	glass, undetermined	1		dark red amber, small, thick, flat fragment
23	surface find	door knob	1		porcelain, complete
24	surface find	glass, dish	1		light brown and cream-coloured exterior surface with cream-coloured interior

					surface, lid fragment with moulded design along edge
25	surface find	stoneware	1	hollowware / unknown (non-rim)	dark brown interior and exterior glaze
26	surface find	ironstone, undecorated	2	flatware / unknown (1 rim, 1 non-rim)	
27	surface find	ironstone, undecorated	1	hollowware / unknown (non-rim)	
28	surface find	ironstone, undecorated	2	unidentifiable / unknown (non-rim)	
29	surface find	ironstone, transfer printed	2	flatware / unknown (non-rim)	blue, Willow pattern
30	surface find	ironstone, flow transfer printed	1	flatware / unknown (non-rim)	black, small fragment, indeterminate design
31	surface find	ironstone, transfer printed	1	flatware / unknown (rim)	brown, floral
32	surface find	ironstone, transfer printed	1	hollowware / unknown (rim)	red, knot work band on exterior
33	surface find	ironstone, painted	1	flatware / plate (rim)	thin black and gold painted band below rim
34	surface find	ironstone, moulded	1	unidentifiable / unknown (non-rim)	small fragment, indeterminate design
35	surface find	ironstone, moulded	1	flatware / plate (rim)	foliage band below rim
36	surface find	ironstone, moulded	1	hollowware / unknown (rim)	wheat pattern
37	surface find	ironstone, moulded	1	flatware / plate (rim)	wheat pattern with scalloped body panels
38	surface find	porcelain, moulded	1	flatware / saucer (rim)	moulded design below scalloped edge with polychrome floral decal and gold painted lines
39	surface find	porcelain, moulded	1	hollowware / unknown (lid)	indeterminate moulded design, small lid fragment with finial missing
40	surface find	semi-porcelain	4	flatware / plate (3 rim, 1 non-rim)	moulded linear design below scalloped edge with gold painted line and green transfer printed floral decoration

41	surface find	semi-porcelain	1	flatware / unknown (rim)	moulded linear and dot row below scalloped edge
42	surface find	ceramic, recent	1	flatware / plate (rim)	cream-coloured glaze, moulded rope decoration along scalloped edge, painted orange and green flower

4.0 ANALYSIS AND CONCLUSIONS

The Stage 2 archaeological assessment of the study area identified two new archaeological locations, OAP Location 1 (BhFv-32) and OAP Location 2 (BhFv-33). Maps identifying exact site locations do not form part of this public report; they may be found in the Supplementary Documentation.

4.1 OAP LOCATION 1 (BHFV-32)

The Stage 2 assessment of OAP Location 1 (BhFv-32) was conducted using pedestrian and test pit survey methods and resulted in the recovery of 71 Euro-Canadian artifacts over an area of approximately 15 metres by 36 metres in the ploughed field and two positive test pits. The Euro-Canadian assemblage comprises 31 household artifacts, 24 ceramics, 13 structural artifacts, 2 pieces of miscellaneous metal and tools, and 1 miscellaneous artifact. The ceramic assemblage from OAP Location 1 (BhFv-32) is comprised of ironstone (45.83%), recent ceramics (41.67%), and porcelain (12.50%). The ironstone assemblage suggests a mid to late 19th century period of use. The recent ceramics and porcelain assemblages indicate that the site continued to be occupied into the 20th century. The presence of cut nails and wire drawn nails further suggests a mid to late 19th century occupation that continues into the 20th century. A period of use continuing into the 20th century is further supported by the majority of the bottle glass assemblage comprising colourless glass (62.5%). Colourless glass was common in the 20th century. Further to the above, three bottles depict the maker's mark for the Dominion Glass Company used from 1928 to 1976.

Land registry data indicate that the north half of Lot 24. Concession 3, Rideau Front was patented from the Crown to Henry Mitchell on November 2, 1861, although Mitchell had already sold the property to Alexander Dowie (sic) in November of 1853 (ONLand n.d.:269). This would be the A. Dowe indicated on the 1863 Walling map and on whose property a structure is indicated on that map (Figure 6). Dowe and his family remained on the property until 1873, when they sold their property to Robert Spratt (ONLand n.d.:269)., the landowner shown on the 1879 Belden map (Figure 7). The property remained in the Spratt family, passing though the hands of several Spratt family members and eventually being consolidated by Robert G. Spratt in February 1926, until it was sold to Howard Davidson in November of 1926 (ONLand n.d.:269). Davidson retained most of the property, selling off easements to the Hydro Electric Power Commission (in 1934) and Department of Transportation (in 1950) and smaller portions of the property until they sold their remaining interests in the lot to Unicorn Properties Limited in 1962 (ONLand n.d.:269-271). Based on the land registry data we can assume that the structure indicated on the 1879 Belden map was occupied until approximately 1962.

OAP Location 1 (BhFv-32) is located in part of Lot 24, Concession 3 from the Rideau River, Geographic Township of Gloucester, former Carleton County, now City of Ottawa, Ontario. The 1863 lists A. Dowe and R. Campbell as the landowners of the lot. The 1879 map lists Robert Spratt and Robert Campbell as the landowners of the lot. Both maps illustrate two structures along Albion Road. Topographic maps from the 20th century depict structures set back from Albion Road, these structures appear on maps into the late 1940s. OAP Location 1 (BhFv-32) was identified next to a structure with a poured concrete foundation. A large pile of recent refuse was deposited within and surrounding the structure.

With the identification of less than 20 artifacts dating to a period of use prior to 1900, and the number of artifacts suggesting a period of use in the 20th century, it is determined that OAP Location 1 (BhFv-32) does not retain cultural heritage value or interest. Based on these considerations, OAP Location 1 (BhFv-32) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 Standard 1c of the MHSTCI' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Furthermore, based on topographic mapping and land registry it is determined that OAP Location 1 (BhFv-32) is associated with the Spratt house constructed *circa* 1873-1879. Given the presumed date of construction, and thus a *terminus post quem* of 1873, the site would not meet criteria to move to Stage 4 mitigation of development impacts based on Section 3.4.2, Standard 1 of the MHSTCI' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), as no portion of the time span of the site occupation predates 1870.

4.2 OAP LOCATION 2 (BHFV-33)

The Stage 2 assessment of OAP Location 2 (BhFv-33) was conducted using pedestrian and test pit survey methods and resulted in the recovery of 80 Euro-Canadian artifacts over an area approximately 55 metres by 23 metres and includes three positive test pits. The Euro-Canadian assemblage comprises 39 household artifacts, 26 ceramics, and 14 structural artifacts. The ceramic assemblage from OAP Location 2 (BhFv-33) is comprised of ironstone (65.38%), semi-porcelain (19.23%), porcelain (7.69%), stoneware (3.85%), and recent ceramics (3.85%). The ironstone assemblage suggests a mid to late 19th century period of use. The semi-porcelain assemblage suggests a late 19th century occupation that continues into the 20th century. The recent ceramics and porcelain assemblages also indicate that the site continued to be occupied into the 20th century. A period of use continuing into the 20th century is further supported by half of the bottle glass assemblage (50%) comprising colourless glass.

Land registry data indicate that the south half of Lot 24 to have been patented from the Crown to Robert Campbell, although that instrument was only registered in August of 1884 (ONLand n.d.:276). Prior to that date Campbell had provided the B&P Railway with a quit claim deed to a portion of his property in 1853 (ONLand n.d.:276). Campbell is noted as the landowner of the lot on the 1863 Walling map (Figure 6), although there is no indication that he had a home on the property yet. A homestead belonging to Campbell is indicated on the 1879 Belden map (Figure7). Campbell maintained his interest in the lot until 1884, when he sold his property to Robert Davidson (ONLand n.d.:276). Davidson sold the land in 1946 to the Director of the Veterans' Land Act (ONLand n.d.:276). The Veterans' Land Act was a piece of legislation passed in 1942 to provide veterans returning from the Second World War the opportunity to purchase lands with small down payments (The Canadian Encyclopedia n.d.).

OAP Location 2 (BhFv-33) is located in part of Lot 24, Concession 3 from the Rideau River, Geographic Township of Gloucester, former Carleton County, now City of Ottawa, Ontario. The 1863 lists A. Dowe and R. Campbell as the landowners of the lot. The 1879 map lists Robert Spratt and Robert Campbell as the landowners of the lot. Both maps illustrate two structures along Albion Road. Topographic maps from the 20th century depict structures set back from Albion Road, these structures appear on maps into the 1940s. OAP Location 2 (BhFv-33) was identified within 30 metres of a barn foundation comprised of poured concrete.

With the identification of less than 20 artifacts dating to a period of use prior to 1900, and the number of artifacts suggesting a period of use in the 20th century, it is determined that OAP Location 2 (BhFv-33) does not retain cultural heritage value or interest. Based on these considerations, OAP Location 2 (BhFv-33) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 Standard 1c of the MHSTCI' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Furthermore, based on topographic mapping and land registry it is determined that OAP Location 2 (BhFv-33) is associated with the Campbell/Davidson house constructed between 1864 and 1879 and abandoned sometime around 1946. Given the presumed date of construction, and thus a *terminus post quem* of 1864, the site would not meet criteria to move to Stage 4 mitigation of development impacts based on Section 3.4.2, Standard 1 of the MHSTCI' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), as less than 10% of the time span of the site occupation predates 1870.

5.0 RECOMMENDATIONS

5.1 OAP LOCATION 1 (BHFV-32)

OAP Location 1 (BhFv-32) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The cultural heritage value or interest of OAP Location 1 (BhFv-32) has been sufficiently documented. Therefore, **no further archaeological assessment is recommended for OAP Location 1 (BhFv-32).**

5.2 OAP LOCATION 2 (BHFV-33)

OAP Location 2 (BhFv-33) does not fulfill the criteria for a Stage 3 archaeological investigation as per Section 2.2 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The cultural heritage value or interest of OAP Location 2 (BhFv-33) has been sufficiently documented. Therefore, **no further archaeological assessment is recommended for OAP Location 2 (BhFv-33).**

Please note that as per Section 48(3) of the *Ontario Heritage Act* (Government of Ontario 1990b), no alteration of OAP Location 1 (BhFv-32) or OAP Location 2 (BhFv-33) is permitted by an unlicensed person until the MHSTCI has entered this archaeological assessment report into the *Ontario Public Register of Archaeological Reports*.

The MHSTCI is asked to review the results presented and accept this report into the Ontario Public Register of Archaeological Reports.

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Heritage, Sport, Tourism and Culture Industries as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. O.18 (Government of Ontario 1990b). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection, and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the Ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990b) for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990b).

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b).

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (Government of Ontario 2002) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Government and Consumer Services.

7.0 BIBLIOGRAPHY AND SOURCES

Adams, N. 1994. *Field Manual for Avocational Archaeologists in Ontario*. Ontario Archaeological Society Inc., Archaeological Stewardship Project.

Algonquins of Ontario. 2017. *Relic Shorelines in Algonquin Traditional Territory in Ontario*. Report on file, Algonquins of Ontario Consultation Office, Pembroke, Ontario.

Algonquins of Ontario. 2018. *Conducting Archaeology within the Unceded Algonquins of Ontario Settlement Area: Algonquins of Ontario Enhanced Archaeology Standards and Guidelines for Approval Authorities, Development Proponents and Consultant Archaeologists.* Algonquins of Ontario Consultation Office: Pembroke, Ontario.

Anonymous. N.d. *History of the Algonquins.* Electronic Document: www.tanakiwin.com. Last Accessed: May 24, 2018.

Archaeologix Inc. 2008. *Archaeological Assessment (Stage 1) Shell Proposed Refinery Project, St. Clair Township, Lambton County, Ontario.* Report prepared for Jacques Whitford Limited, Markham, Ontario. (PIF # P084-109-2007).

Archaeological Services Inc. 1999. *The Archaeological Resource Potential Mapping Study of the Regional Municipality of Ottawa-Carleton*. Planning Report submitted to the Regional Municipality of Ottawa-Carleton.

Beaudoin, M. 2013. *De-Essentializing the Past: Deconstructing Colonial Categories in 19th-Century Ontario*. Ph.D. thesis submitted to the University of Western Ontario, London.

Belden, H. & Co. 1879. *Illustrated Historical Atlas of the County of Carleton (including the City of Ottawa), Ont*. Toronto: H. Belden & Co.

Borden, Charles E. 1952. A Uniform Site Designation Scheme for Canada. *Anthropology in British Columbia*, No. 3, 44-48.

Bourne, Annie N. (Translator) and Edward G. Bourne (editor). 2000. *Algonquians, Hurons and Iroquois: Champlain Explores America, 1603-1616.* Dartmouth, NS: Brook House Press.

Chapman, Lyman John and Donald F. Putnam 1984. *The Physiography of Southern Ontario.* 3rd ed. Ontario Geological Survey Special Volume 2. Toronto: Ontario Ministry of Natural Resources.

City of Ottawa. n.d.. GeoOttawa. http://maps.ottawa.ca/geoottawa/. Accessed September 26, 2019.

Coffin, William, 1825. *Plan of the township of Gloucester*. Library and Archives Canada, National Map Collection, H12/430/Gloucester/1825.

Collard, E. 1967. *Nineteenth-century Pottery and Porcelain in Canada*. McGill University Press, Montreal.

Day, Gordon M., and Bruce Trigger. 1978. Algonquin. *Handbook of North American Indians: Volume 15 Northeast.* Washington: Smithsonian Institution, pp. 792-797.

Department of Militia and Defence. 1906. Ottawa, Ontario. Electronic Document: https://ocul.on.ca/topomaps/map-images/HTDP63360K031G05_1906TIFF.jpg. Last Accessed December 13, 2019

Department of National Defence. 1948. *Ottawa, Ontario.* Electronic Document: https://ocul.on.ca/topomaps/map-images/HTDP63360K031G05_1948_UTMTIFF.jpg. Last Accessed December 13, 2019.

Ellis, Chris J., and Neal Ferris (eds.), 1990. *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5.

Fox, William, and Charles Garrad. 2004. Hurons in an Algonquian Land. *Ontario Archaeology.* 77/78:121-134.

Fox, William, and Jean-Luc Pilon. 2016. Evidence for Sixteenth-Century Exchange: The Ottawa and Upper Saint Lawrence Waterways. In *Contact in the 16th Century: Networks among Fishers, Foragers and Farmers*, Brad Loewen and Claude Chapdelaine (eds.), Mercury Series, Archaeology Paper 176. Ottawa: Canadian Museum of History and University of Ottawa Press, pp.199-215.

Government of Ontario. 1990a. *Freedom of Information and Protection of Privacy Act, R.S.O. 1990, c. F.31*. Electronic document: https://www.ontario.ca/laws/statute/90f31. Last accessed January 30, 2018.

Government of Ontario. 1990b. *Ontario Heritage Act, R.S.O. 1990, CHAPTER O.18*. Last amendment: 2009, c. 33, Sched. 11, s. 6. Electronic document: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o18_e.htm. Last accessed January 30, 2018.

Government of Ontario. 2002. *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33.* Electronic document: https://www.ontario.ca/laws/statute/02f33. Last accessed January 30, 2018.

Government of Ontario. 2011. *Standards and Guidelines for Consultant Archaeologists***.** Toronto: Ministry of Heritage, Sport, Tourism and Culture Industries.

Government of Ontario. 2012. *Ministry of Infrastructure Public Work Class Environmental Assessment, 2012 Office Consolidation*. Toronto: Ministry of Infrastructure.

Government of Ontario. 2014. *The Archaeology of Rural Historical Farmsteads: A DRAFT Technical Bulletin for Consultant Archaeologists in Ontario.* Toronto: Ministry of Heritage, Sport, Tourism and Culture Industries.

Government of Ontario. 2019a. Sites within a one Kilometre Radius of the Study Area Provided from the Ontario Archaeological Sites Database.

Government of Ontario. 2019b. Archaeological Assessments Completed with the Study Area or within 50 Metres of the Study Area Provided from the Ontario Public Register of Archaeological Reports.

Hessel, Peter. 1987. *The Algonkin Tribe, The Algonkins of the Ottawa Valley: An Historical Outline.* Arnprior, ON: Kichesippi Books.

Hills, G.A., N.R. Richards and F.F. Morwick, 1944. *Soil Survey of Carleton County. Report No. 7 of the Ontario Soil Survey*. Ottawa: Department of Agriculture.

Holmes, Joan. 1993. Indigenous Use and Occupation of the Ottawa River Watershed. *Algonquins of Golden Lake Claim, Volume 2.* Report on file with the Ontario Native Affairs Secretariat, Ottawa, Ontario.

Hughes, G. B. 1961. *English and Scottish Earthenware 1660-1860.* Abbey Fine Arts, London.

Jacques Whitford. 2004. *Stages 2 and 3 Archaeological Assessment, Proposed Greenbelt Pathway Trailhead Phase 1, Victory Hill, Ottawa, Ontario.* Report prepared for the National Capital Commission, Ottawa, ON. (PIF # P002-007-2005 and P002-013-2005).

Jacques Whitford, 2008. Stage 1 Archaeological Impact Assessment - Interconnecting and Third Party Pipelines. Report prepared for Shell Canada Products, Sarnia, ON. (PIF # P002-128-2007).

Karrow, P.F. and B.G. Warner. 1990. The Geological and Biological Environment for Human Occupation in Southern Ontario. In: Chris J. Ellis and Neal Ferris (eds.) 1990. *The Archaeology of Southern Ontario to A.D. 1650.* Occasional Publication of the London Chapter, OAS Number 5, pp 5-36. London, Ontario: Ontario Archaeological Society

Kendrick, G. 1971. *The Antique Bottle Collector*. Pyramid Books, New York.

Kennedy, William. 1961. *North Bay: Past-Present-Prospective.* Toronto: T.H. Best Printing Company, Ltd.

Kenyon, Ian. 1980a. 19th Century Notes: Window Glass Thickness. *KEWA* (80-2).

Kenyon, Ian. 1980b. 19th Century Notes: Some General Notes on 19th Century Ceramics. *KEWA* (80-3).

Kenyon, I. 1985. *A History of Ceramic Tableware in Ontario, 1840-1870*. Arch Notes 85-5:13-28.

Kinickinick Heritage Consultants. 2004. *Stage 1&2 Archaeological Assessment of Proposed Central Canada Exhibition, Albion Road Site, Part s Lots 24 and 25, Concession 3, Gloucester Township (GEO), City of Ottawa.* CIF P039-34. Report on file with the Ministry of Heritage, Sport, Tourism and Culture Industries.

Konrad, Victor. 1981. An Iroquois Frontier: the North Shore of Lake Ontario During the Late Seventeenth Century. *Journal of Historical Geography*, 7(2):129-144.

Laliberté, Marcel. 1998. *Archaeological Resource Potential, Federal Lands in the National Capital Region.* Report prepared for the National Capital Commission.

Laliberté, Marcel. 1999. The Middle Woodland in the Ottawa Valley. In Pilon 1999, pp. 69-82.

Lee, Robert C., 2004. *The Canada Company and the Huron Tract, 1826-1853.* Toronto: Natural Heritage Books.

Lindsey, B. 2016. Historic Glass Bottle Identification and Information Website. Last accessed on December 15, 2016. Available online at: http://www.sha.org/bottle/index.htm.

Loewen, Brad and Claude Chapdelaine (editors). 2016. Contact in the 16th Century: Networks among Fishers, Foragers and Farmers. Mercury Series Archaeology Paper 176. Ottawa: University of Ottawa Press.

Maryland Archaeological Conservation Lab. 2012. Colonial Ceramics. Last accessed December 15, 2016. Available online at: http://www.jefpat.org/diagnostic/Historic_Ceramic_Web_Page/Historic_Main.htm.

McDonnell, Duncan. 1820a. *Plan of Township of Gloucester*. Original township survey map held at Crown Land Surveys, Office of the Surveyor General, Ministry of Natural Resources and Forestry, Peterborough, Ontario.

McDonnell, Duncan. 1820b. *Field Notes of the Township of Goloucester in the Ottawa District, Commencing June 29th 1820.* Original township survey notes held at Crown Land Surveys, Office of the Surveyor General, Ministry of Natural Resources and Forestry, Peterborough, Ontario.

Miller, G. 1991. *Thoughts Towards a User's Guide to Ceramic Assemblages, Part I: Lumping Sites into Mega-assemblages by Those That Cannot Tell Time*. Council for Northeast Historical Archaeology Newsletter, No. 18.

Mitchell, Barry. 1975. Iroquois or Algonkin Ceramics? *Ontario Archaeology* 25:61-78.

Mitchell, Barry. 1990. Excavation and Reassessment of the Kant Site, Renfrew County. *Annual Archaeological Report Ontario, New Series* 1: 44-45.

Mitchell, Barry. 1996. Archaeology of the Bonnechere River: Wilber Lake Operations, Renfrew County, Ontario: 1995 Field Season. *Annual Archaeological Report Ontario, New Series 7*:107-108.

Morris, J.L. 1943. *Indians of Ontario*. 1964 reprint. Toronto: Department of Lands and Forests, Government of Ontario.

Morrison, James. 2005. Algonquin History in the Ottawa River Watershed. *Background Study for Nomination of the Ottawa River Under the Canadian Heritage River System.* L. Hopkins (ed.). Ipswich, MA: Quebec-Labrador Foundation, pp. 17-32.

ONLand. n.d. *Abstract/Parcel Register Book: Ottawa-Carleton (04), Gloucester, Book 24, Concession 3; Rideau Front; Lot 7 To 30.* Available online at: https://www.onland.ca/ui/4/books/80401/viewer/422642216

Pendergast, James F. 1999. The Ottawa River Algonquin Bands in a St. Lawrence Iroquoian Context. *Canadian Journal of Archaeology*, Volume 23 (1 and 2):63-136.

Pilon, Jean-Luc (editor). 1999. *La préhistoire de l'Outaouis = Ottawa Valley Prehistory*. Hull: Institut d'histoire et de recherches sur l'Outaouis.

Saint-Germain, Claire. 1999. The End of the Pre-Contact Period in the Ottawa Valley – A Look at the Zooarchaeology of the Leamy Lake Park Sites. In Pilon (ed.), 1999, pp. 83-92.

St-Pierre, Christian Gates. 2009. A Critical Revew of the Last Decade of Prehistoric Archaeology in Southern Quebec. In *Painting the Past with a Broad Brush: Papers in Honour of James Valliere Wright*, D. L. Keenlyside and J-L Pilon (eds.). Mercury Series, Archaeology Paper 170. Ottawa: Canadian Museum of Civilization.

Stelle, L. J. 2001. *An Archaeological Guide to Historic Artifacts of the Upper Sangamon Basin, Central Illinois, U.S.A.* Last accessed on August 17, 2018. Available online at: http://virtual.parkland.edu/lstelle1/len/archguide/documents/arcguide.htm.

Sussman, Lynne. 1997. *Mocha, Banded, Cat's Eye, and Other Factory-Made Slipwear*. Studies in Northeast Historical Archaeology. Number 1. Boston: Boston University.

The Canadian Encyclopedia. n.d.. *Veterans' Land Act.* Available online at: https://www.thecanadianencyclopedia.ca/en/article/veterans-land-act

Trigger, Bruce. 1985. *Natives and Newcomers: Canada's "Heroic Age" Reconsidered.* Kingston and Montreal: McGill-Queen's University Press.

Von Gernet, Alexander. 1992. A Possible Matouweskarini Hunting Camp: Excavations at the Highland Lake Site, Renfrew County. Annual Archaeological Report Ontario, New Series 2: 120-124.

Von Gernet, Alexander. 1993. Archaeological Investigations at Highland Lake: 1991 Field Season. Annual Archaeological Report Ontario, New Series 3: 74-79.

Voss, B. L. 2008. *The Archaeology of Ethnogenesis: Race and Sexuality in Colonial San Francisco*. University of California Press, Berkeley.

Walker, Harry, and Olive Walker. 1968. *Carleton Saga.* Ottawa: Carleton County Council and The Runge Press Limited.

Walling, Henry F. 1863. *Map of the County of Carleton, Canada West.* Library and Archives Canada. National Map Collection, H2/420/Carleton/1863.

Watson, Gordon D. 1991. Dating the Woodland Occupations of Sand Island, Lower Rideau Lakes, Leeds County, Ontario. Annual Archaeological Report, Ontario, New Series 2. Toronto: Ontario Heritage Foundation.

Watson, Gordon D. 1992. Dating Eastern Ontario Woodland Ceramics. Annual Archaeological Report, Ontario, New Series 3. Toronto: Ontario Heritage Foundation.

Watson, Gordon D. 1999. The Early Woodland of the Ottawa Valley. In Pilon 1999, pp. 55-68.

Whiteduck, Kirby. 2002. *Algonquin Traditional Culture.* Pikwekanagan, ON: Council of the Algonquins of Pikwekanagan.

Wilson, Alan, 1969. The Clergy Reserves of Upper Canada. Ottawa: The Canadian Historical Association Booklets, No 23.

Wright, J.V. 1995. *A History of the Native People of Canada Volume 1 (10,000 – 1,000 B.C.).* Museum of Civilization, Mercury Series, Archaeology Paper 152. Gatineau: Canadian Museum of Civilization.

8.0 IMAGES

8.1 PHOTOGRAPHS

Photo 1: Ground conditions, facing southwest

Photo 2: Pedestrian survey at five metre intervals, facing southwest

Photo 3: Pedestrian survey at five metre intervals, facing southwest

Photo 4: Intensified survey at OAP Location 1 (BhFv-32), facing northeast

Photo 5: View of OAP Location 1 (BhFv-32), facing south

Photo 6: View of OAP Location 2 (BhFv-33), facing east

Photo 7: Test pit survey at five metre intervals, facing east

Photo 8: Test pit survey at five metre intervals, facing north

Photo 9: Concrete foundation and rubble pile, facing southeast

Photo 10: Concrete barn foundation, facing southeast

Photo 11: Concrete foundation, facing northwest

Photo 12: Concrete foundation, facing northwest

8.2 ARTIFACTS

Plate 1: Sample of household artifacts recovered from OAP Location 1 (BhFv-32)

Plate 2: Complete glass bottles recovered from OAP Location 1 (BhFv-32)

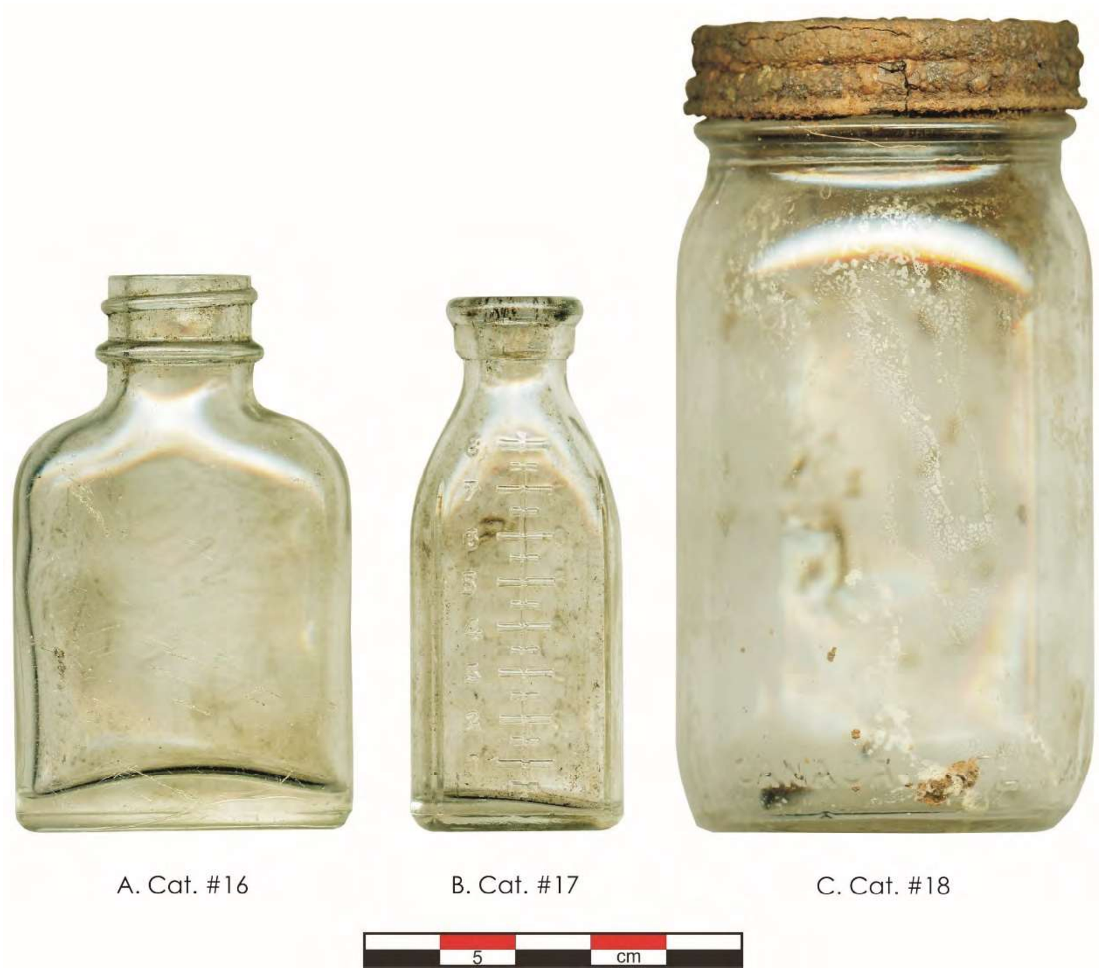


Plate 3: Sample of structural artifacts recovered from OAP Location 1 (BhFv-32)

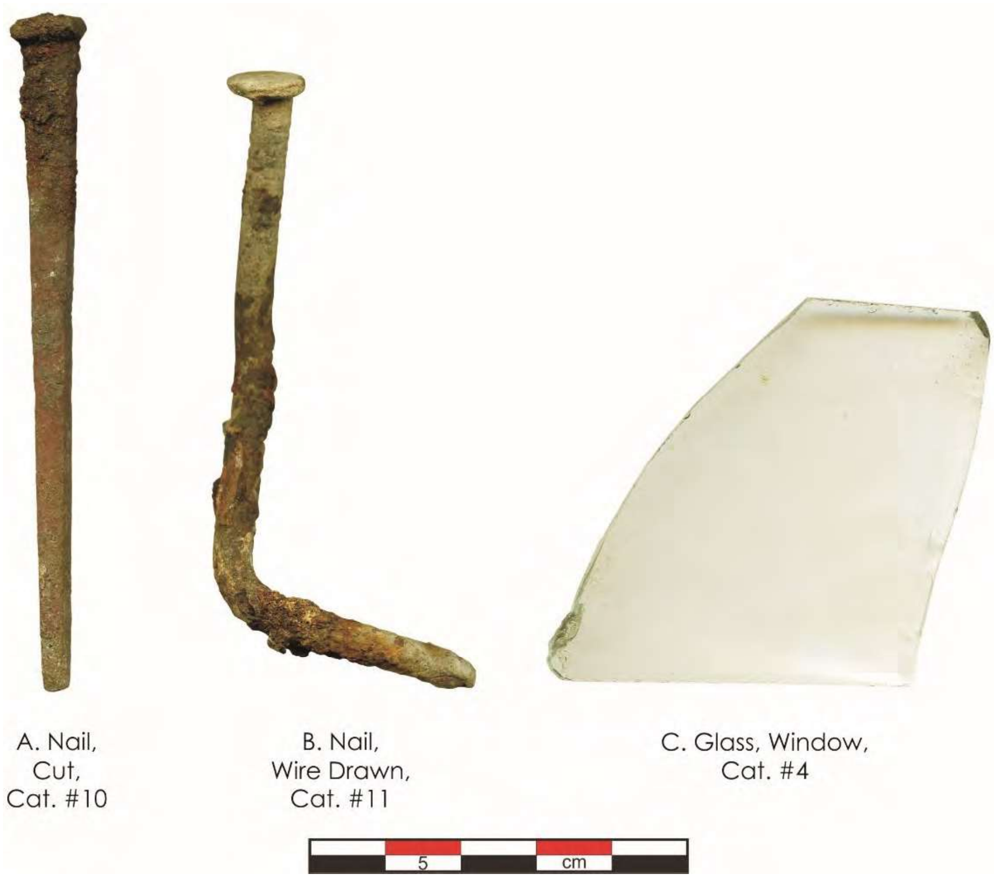


Plate 4: Sample of ceramics recovered from OAP Location 1 (BhFv-32)

Plate 5: Sample of household artifacts recovered from OAP Location 2 (BhFv-33)

Plate 6: Sample of structural artifacts recovered from OAP Location 2 (BhFv-33)

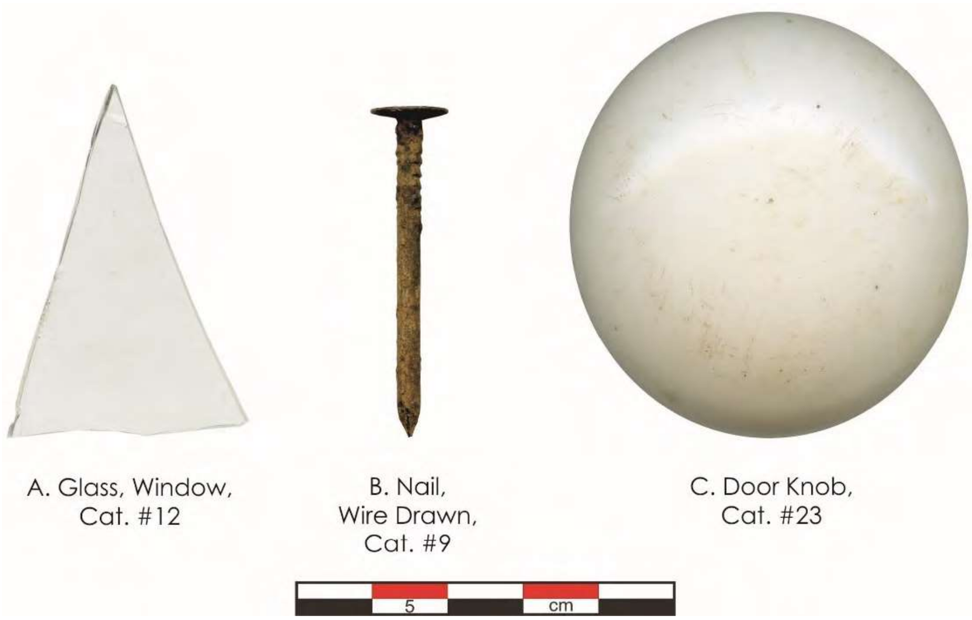
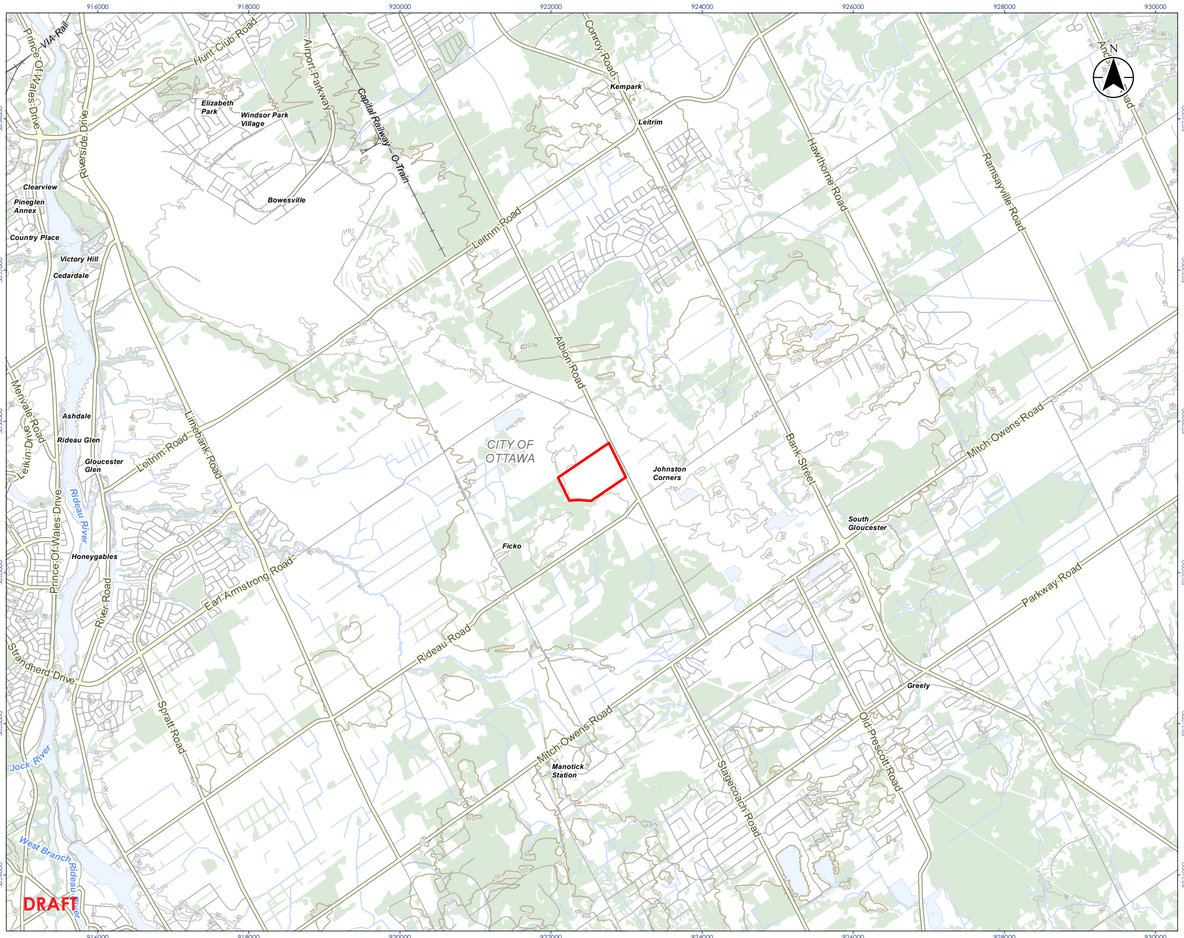


Plate 7: Sample of ceramics recovered from OAP Location 2 (BhFv-33)

9.0 MAPS

All maps will follow on succeeding pages.



Stantec

Legend

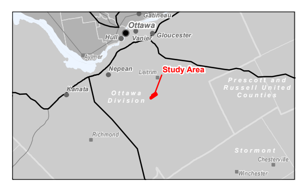
- Study Area
- Contour
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Wooded Area

0 1 2 Kilometers

1:50,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.



Project Location
Municipality of

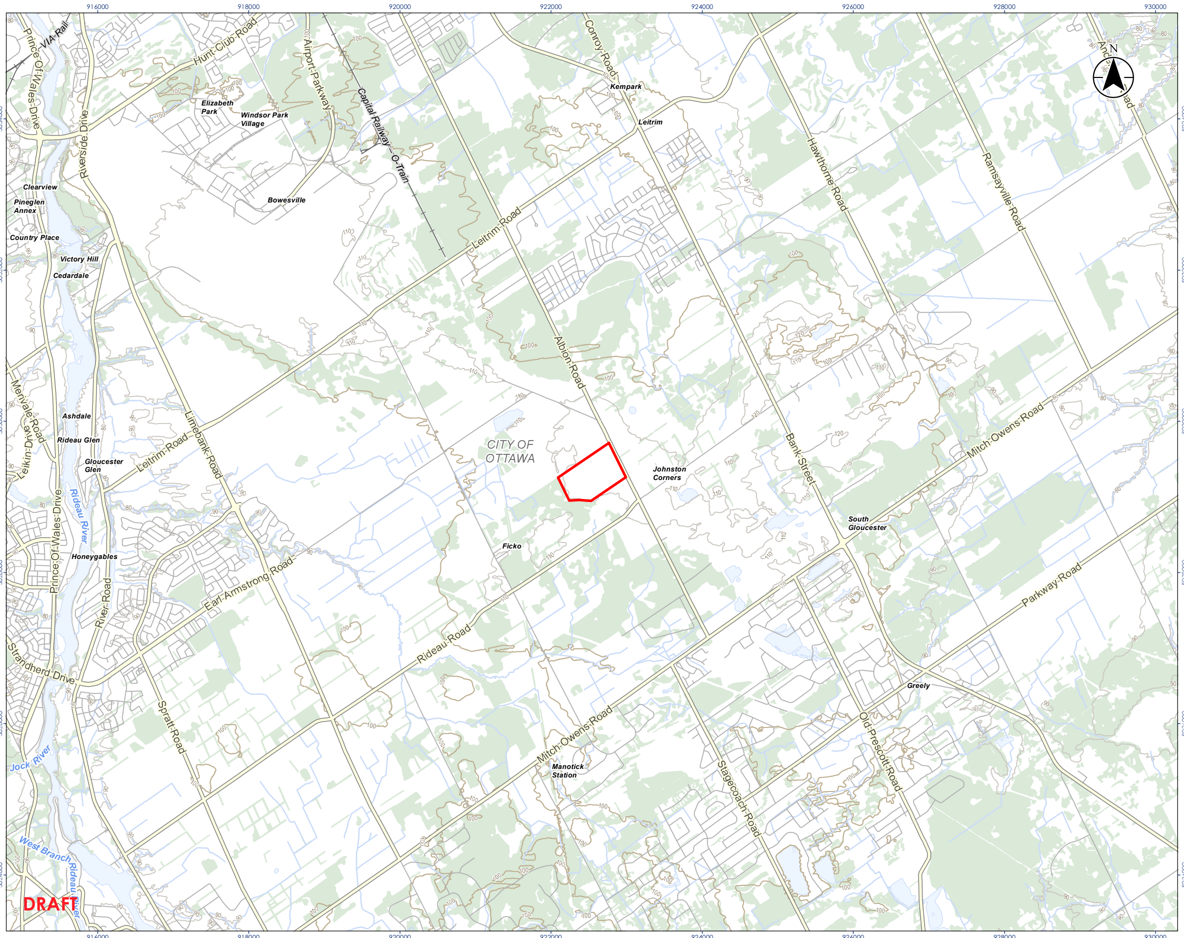
160961321 REVA
Prepared by DH on 2019-12-13
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
1

DRAFT

Title
Location of Study Area



Legend

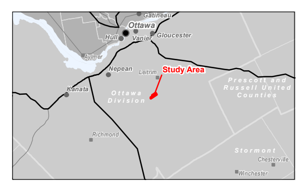
- Study Area
- Contour
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Wooded Area

0 1 2 Kilometers

1:50,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.



Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2019-12-13
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
1

DRAFT

Title
Location of Study Area

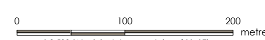
Stantec

Legend

Study Area

Setback Limit

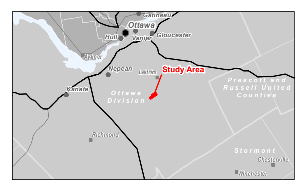
Subject Property Boundary



1:3,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



Project Location
City of Ottawa

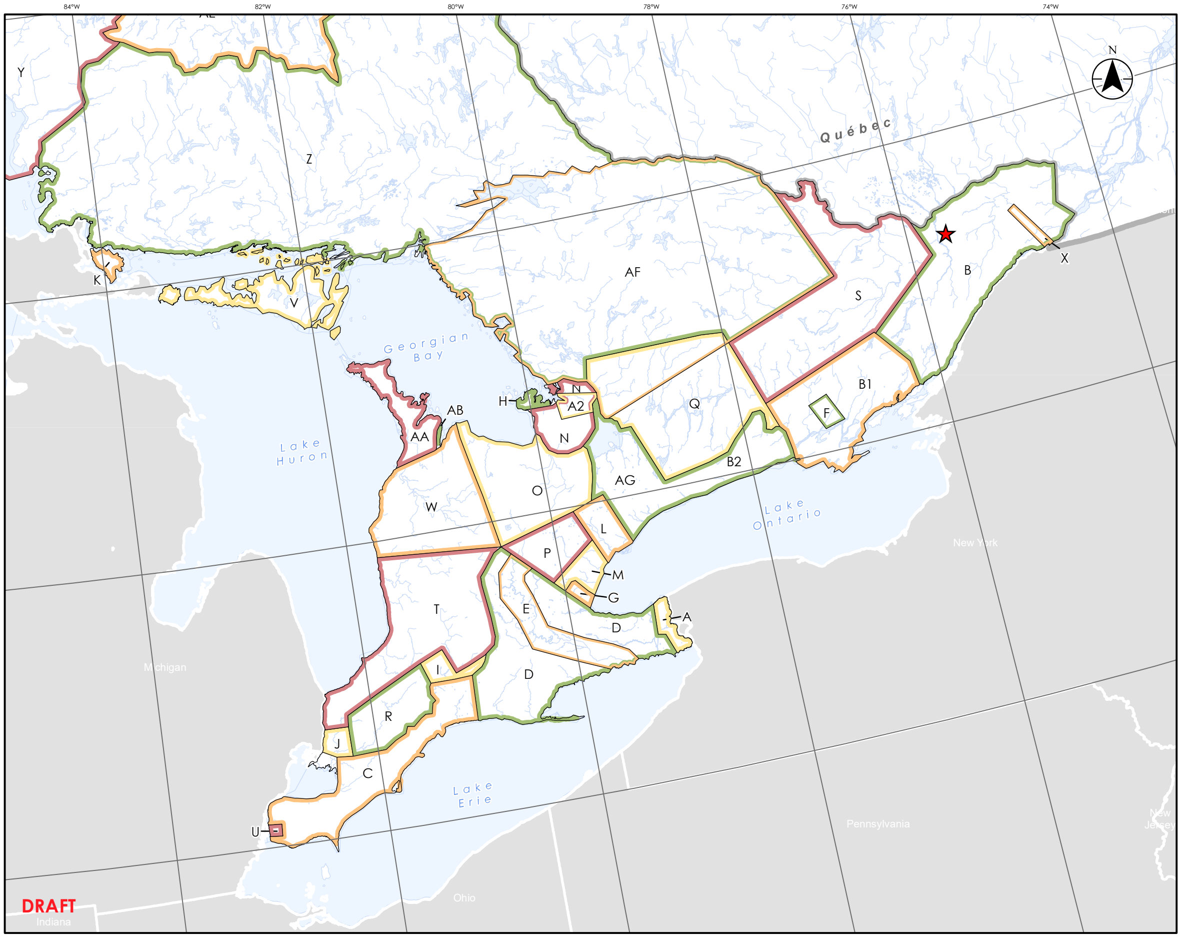
160961321 REVA
Prepared by DH on 2019-12-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
2

DRAFT

Title
Study Area in Detail



Stantec

Legend

Study Area

Waterbody

A Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
AA Treaty No. 72, October 30th, 1854 (Chippewa)
AB Treaty No. 82, February 9th, 1857 (Chippewa)
AE Treaty No. 9, James Bay 1905, 1906 (Ojibway and Cree)
AF Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG Williams Treaty, October 31st, 1923 (Chippewa)
A2 John Collins' Purchase, 1785 (Chippewa)
B Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1 Crawford's Purchase, October 9th, 1783 (Mississauga)
B2 Crawford's Purchase, 1783, 1787, 1788 (Mississauga)
C Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D Treaty No. 3, December 2nd, 1792 (Mississauga)
E Haldimand Tract: from the Crown to the Mohawk, 1793
F Tyendinaga: from the Crown to the Mohawk, 1793
G Treaty No. 3 3/4: from the Crown to Joseph Brant, October 24th, 1795
H Treaty No. 5, May 22nd, 1798 (Chippewa)
I Treaty No. 6, September 7th, 1796 (Chippewa)
J Treaty No. 7, September 7th, 1796 (Chippewa)
K Treaty No. 11, June 30th, 1798 (Chippewa)
L Treaty No. 13, August 1st, 1805 (Mississauga)
M Treaty No. 13A, August 2nd, 1805 (Mississauga)
N Treaty No. 16, November 18th, 1815 (Chippewa)
O Treaty No. 18, October 17th, 1818 (Chippewa)
P Treaty No. 19, October 28th 1818 (Chippewa)
Q Treaty No. 20, November 5th, 1818 (Chippewa)
R Treaty No. 21, March 9th, 1819 (Chippewa)
S Treaty No. 27, May 31st, 1819 (Mississauga)
T Treaty No. 27½, April 25th, 1825 (Ojibwa and
U Treaty No. 35, August 13th, 1833 (Wyandot or
V Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W Treaty No. 45½, August 9th, 1836 (Saugeen)
X Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Y Treaty No. 60, Robinson, Superior, September 7th, 1850 (Ojibwa)
Z Treaty No. 61, Robinson, Huron, September 9th, 1850 (Ojibwa)

0 50 100 Km
1:3,000,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

Project Location
City of Ottawa

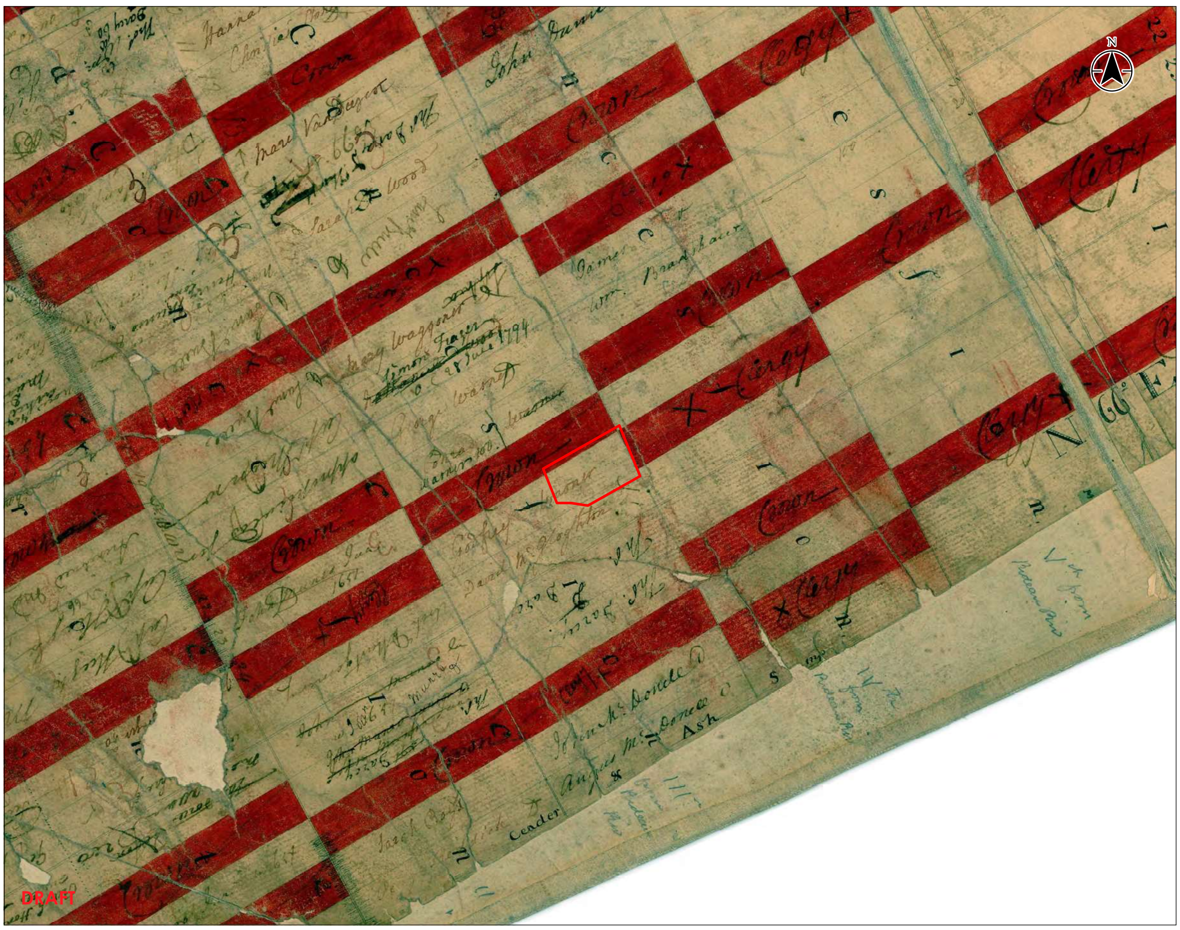
160961321 REVA
Prepared by DH on 2019-12-17
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
3

DRAFT

Title
Treaties and Purchases (Adapted from Morris 1943)



Stantec

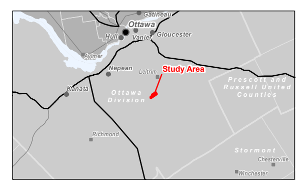
Legend

Study Area

Figure Not to Scale

Notes

1. Historical Map Source: McDonnell, Duncan. 1820a. Plan of Township of Gloucester. Original township survey map held at Crown Land Surveys, Office of the Surveyor General, Ministry of Natural Resources and Forestry, Peterborough, Ontario.



Project Location
City of Ottawa

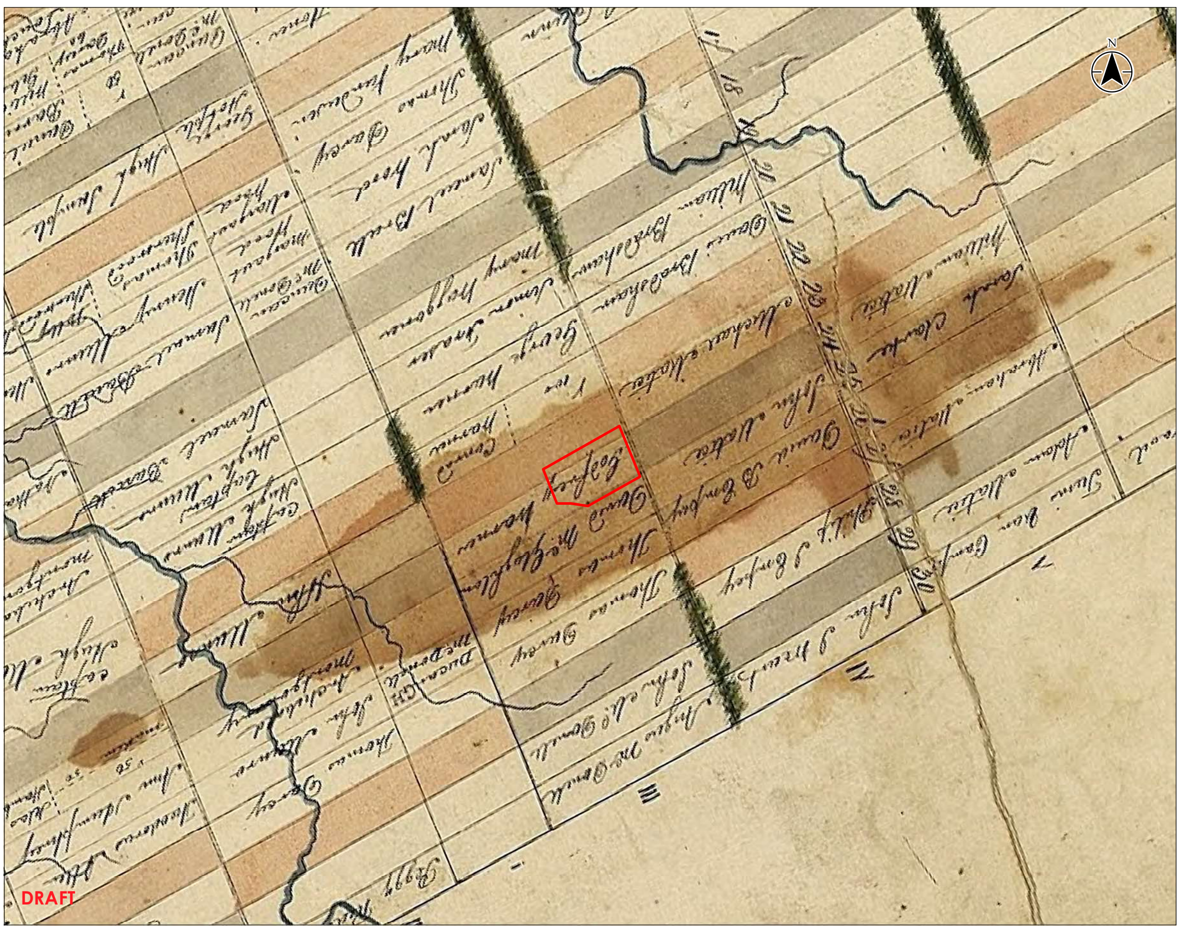
160961321 REVA
Prepared by DH on 2019-12-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
4

DRAFT

Title
1820 Survey Map of Gloucester Township



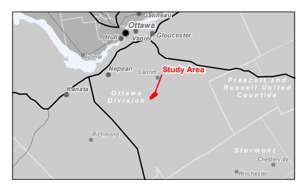
Legend

Study Area

Figure Not to Scale

Notes

1. Historical Map Source: Coffin, William. 1825. Plan of the township of Gloucester. Library and Archives Canada. National Map Collection, H12/430/Gloucester/1825.



Project Location
City of Ottawa

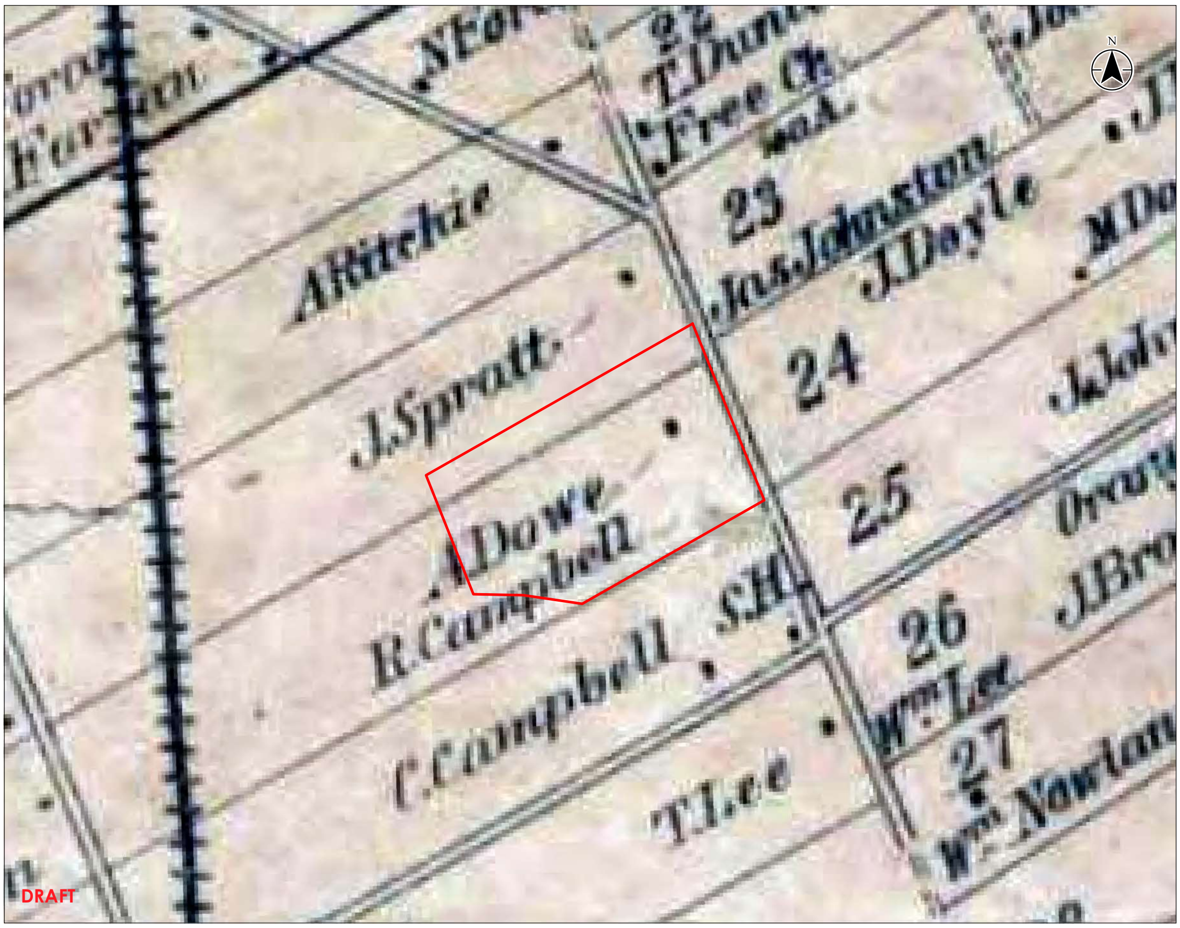
160961321 REVA
Prepared by DH on 2019-12-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL AGGREGATE AT OMCIAA PARCEL C

Figure No.
5

DRAFT

Title
1825 Coffin Map of Gloucester Township



Stantec

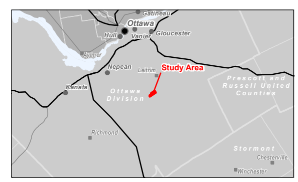
Legend

Study Area

Figure Not to Scale

Notes

1. Historical Map Source: Walling, Henry F. 1863. Map of the County of Carleton, Canada West. Library and Archives Canada. National Map Collection, H2/420/Carleton/1863.



Project Location
City of Ottawa

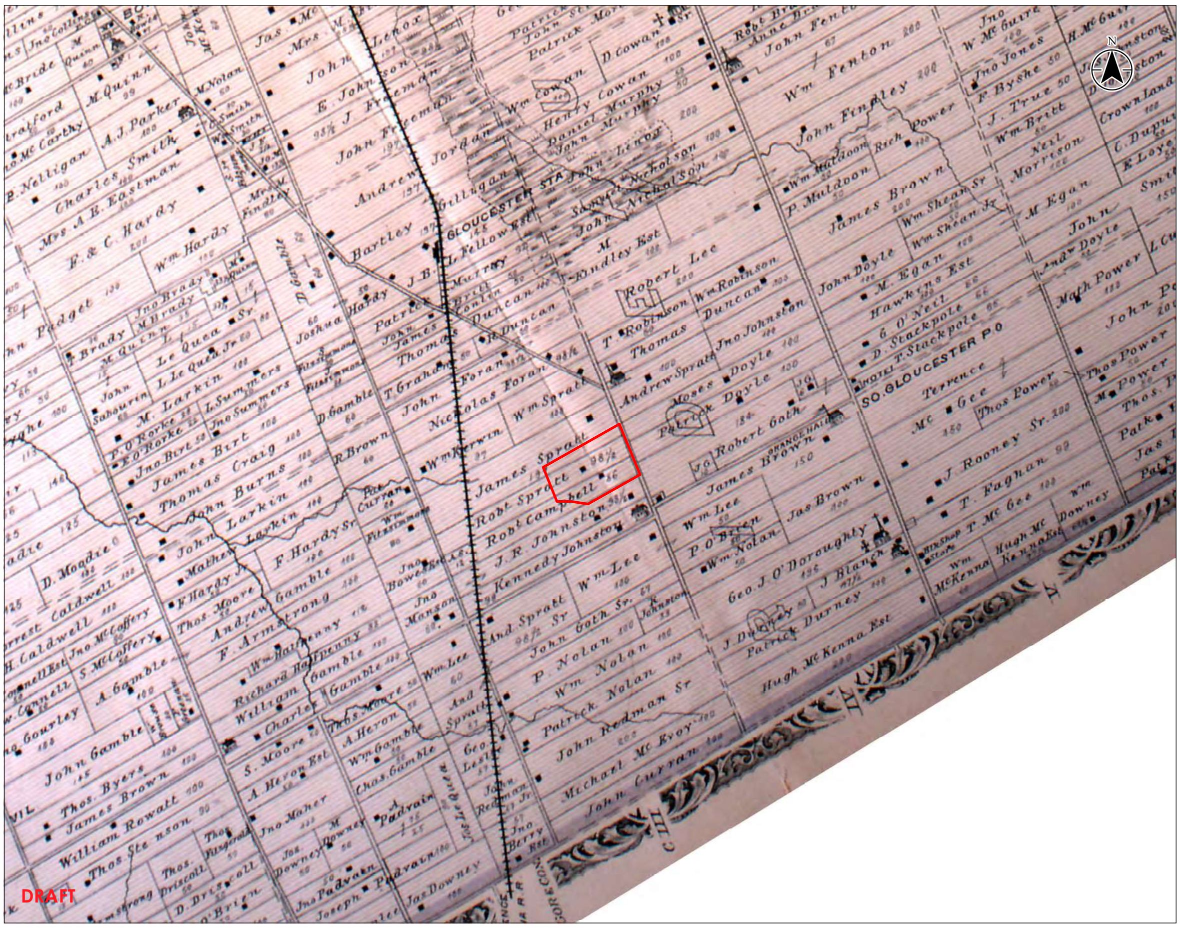
160961321 REVA
Prepared by DH on 2019-12-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
6

DRAFT

Title
1863 Walling Map of Gloucester Township



Stantec

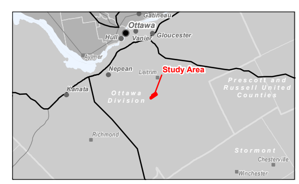
Legend

Study Area

Figure Not to Scale

Notes

1. Historical Map Source: Belden, H. & Co. 1879. Illustrated Historical Atlas of the County of Carleton (including the City of Ottawa), Ont. Toronto: H. Belden & Co.



Project Location
City of Ottawa

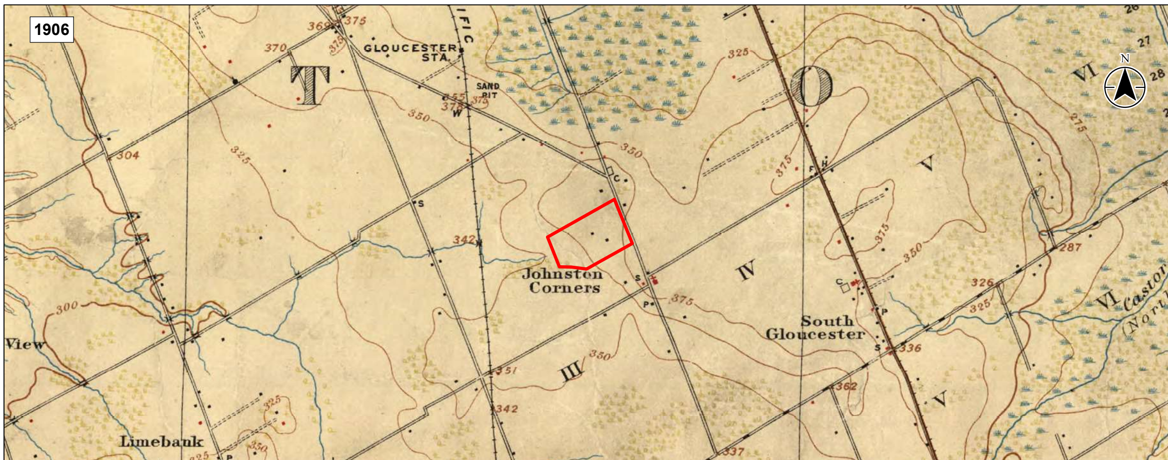
160961321 REVA
Prepared by DH on 2019-12-16
Technical Review by ABC on yyyy-mm-dd

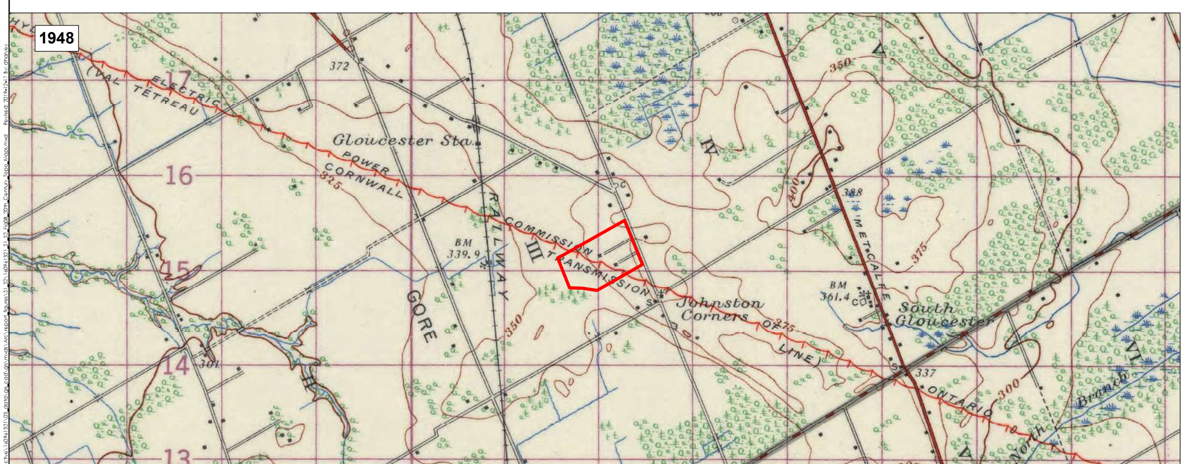
Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
7

DRAFT

Title
1879 Belden Map of Gloucester Township





Stantec

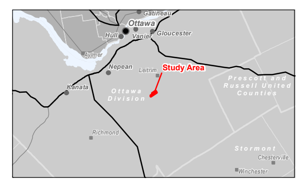
Legend

Study Area

Figure Not to Scale

Notes

1. Topographic Map Source: Department of Militia and Defence. 1906. Ottawa, Ontario. Electronic Document: https://ocul.on.ca/topomaps/map-images/HTDP63360K031G05_1906TIFF.jpg. Last Accessed December 13, 2019 Department of National Defence. 1948. Ottawa, Ontario. Electronic Document: https://ocul.on.ca/topomaps/map-images/HTDP63360K031G05_1948_UTMTIFF.jpg. Last Accessed December 13, 2019.



Project Location
City of Ottawa

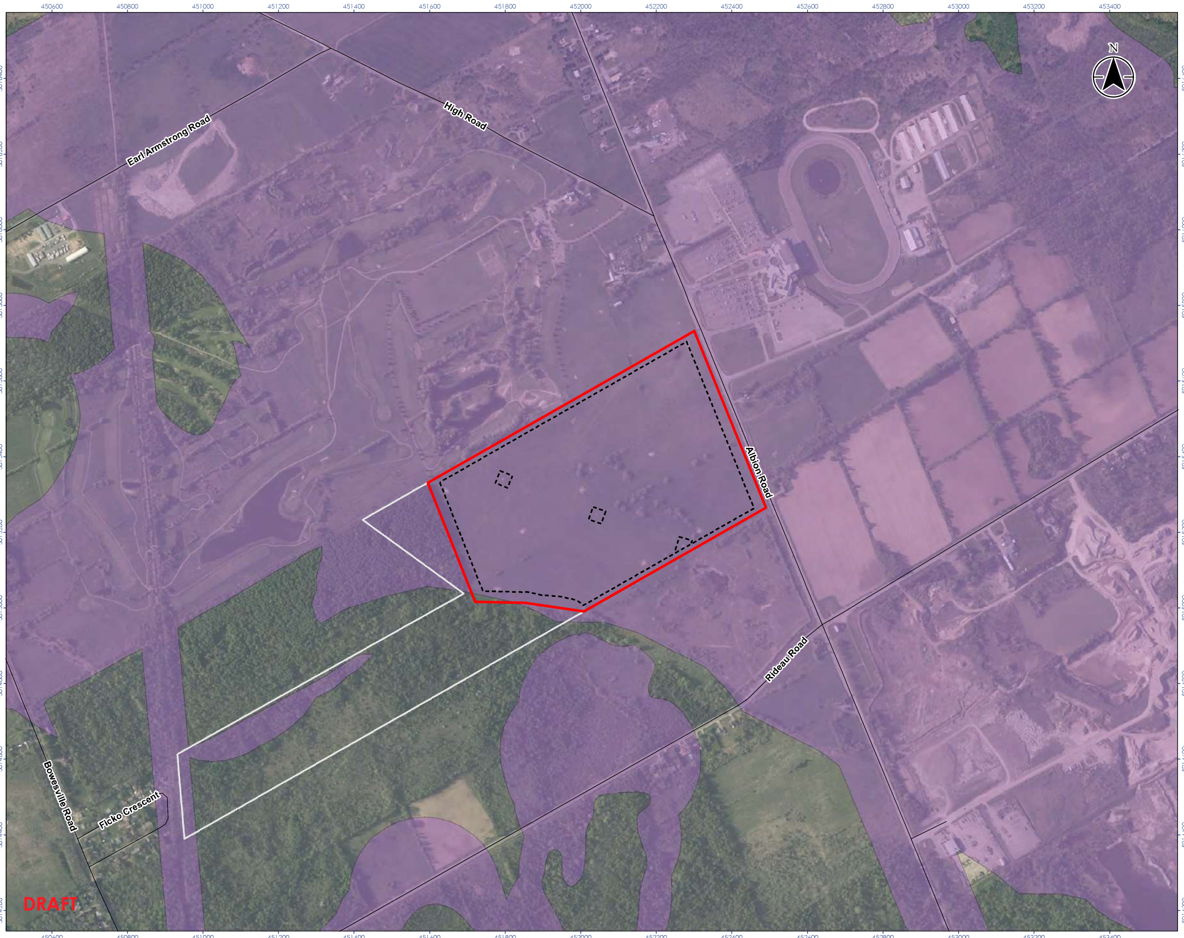
160961321 REVA
Prepared by DH on 2019-12-17
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
8

DRAFT

Title
20th Century Topographic Maps



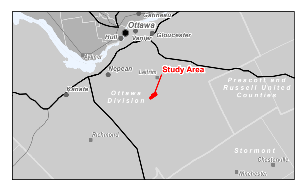
Legend
- Study Area
- Setback Limit
- Subject Property Boundary
- Archaeological Potential (City of Ottawa)

0 250 500 metres

1:10,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.
4. City of Ottawa's Archaeological Potential Mapping, accessed December 17 2019.



Project Location
City of Ottawa

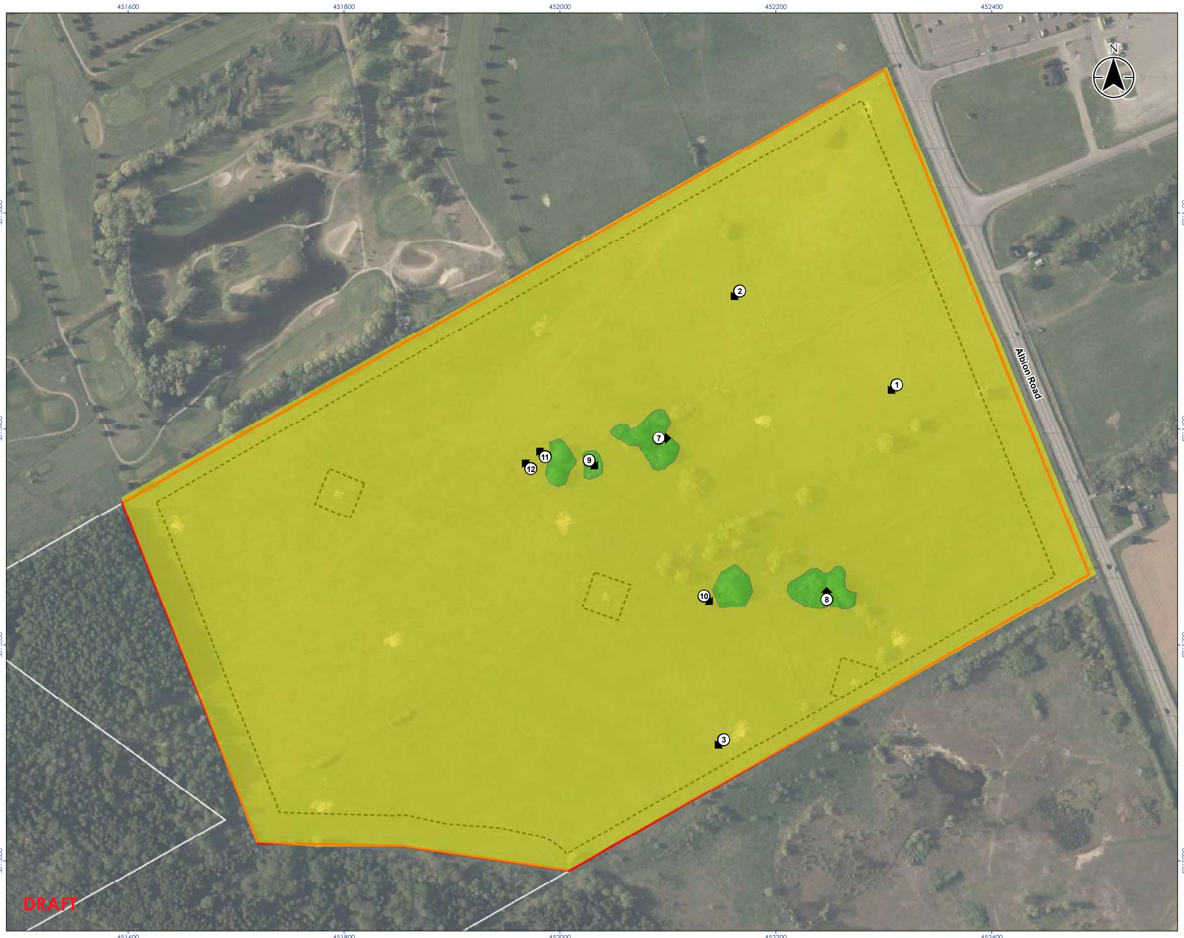
160961321 REVA
Prepared by DH on 2019-12-17
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Tile No.
9

DRAFT

Title
City of Ottawa's Archaeological Potential Mapping



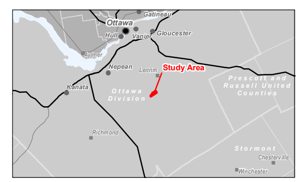
Stantec

Legend
- Study Area
- Setback Limit
- Subject Property Boundary
- Photo Location and Direction

Assessment Method
- Pedestrian Survey, 5 m Intervals
- Test Pit Survey, 5 m Intervals

0 100 200 metres
1:3,500 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2020-01-14
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
10

DRAFT

Title
Stage 2 Results

10.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential archaeological resources associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report. We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Quality Review ____________________________________
(signature)

Colin Varley, Senior Associate, Senior Archaeologist

Independent Review ____________________________________
(signature)

Tracie Carmichael, Managing Principal, Environmental Services

APPENDIX D

Noise Impact Assessment

ACOUSTIC ASSESSMENT REPORT FOR THE CAVANAGH OTTAWA AIRORT PIT

CITY OF OTTAWA

Prepared for

Thomas Cavanagh Construction Limited

Prepared by

Freefield Ltd.

3rd February 2020

Postal Address: PO Box 74056, RPO Beechwood, Ottawa, Ontario, K1M 2H9, Canada
T: (613) 747 0983 | E: info@freefieldacoustics.com | http://www.freefieldacoustics.com

ACOUSTIC ASSESSMENT REPORT FOR THE CAVANAGH OTTAWA AIRORT PIT

Executive Summary

The Ottawa International Airport Authority (OIAA) owns land to the south of the Ottawa International Airport, and, intends to develop various parcels of this land for aggregate extraction. It is proposed that Thomas Cavanagh Construction Limited (Cavanagh) conduct pit operations on the OIAA site shown in Figure 1, with the site to be known as the Cavanagh Ottawa Airport Pit (Pit). In other studies of OIAA land, this site is identified as Parcel C.

Freefield Ltd. has been engaged by Cavanagh to prepare this acoustic assessment report for the proposed operations on the Cavanagh Ottawa Airport Pit. The acoustic assessment report is to be submitted to the OIAA and the City of Ottawa as part of the approval process for the Pit.

This report describes an assessment of the potential impact of noise from operations at as the Cavanagh Ottawa Airport Pit in accordance with City of Ottawa Environmental Noise Control Guidelines[1] (ENCG) and the Ontario Ministry of Environment, Conservation and Parks, MECP, guidelines for noise assessment, NPC-300[2] and NPC-233[3].

Noise impacts have been predicted and compared to the City of Ottawa and MECP sound level limits. Section 7.0 of this report sets out noise mitigation measures such as berms and limits to operations which are designed to ensure all operations are in compliance with the applicable sound level limits.

ACOUSTIC ASSESSMENT REPORT FOR THE CAVANAGH OTTAWA AIRORT PIT

Table of Contents

ACOUSTIC ASSESSMENT REPORT FOR THE CAVANAGH OTTAWA AIRORT PIT

1.0 Introduction

The Ottawa International Airport Authority (OIAA) owns land to the south of the Ottawa International Airport, and, intends to develop various parcels of this land for aggregate extraction. It is proposed that Thomas Cavanagh Construction Limited (Cavanagh) conduct pit operations on the OIAA site shown in Figure 1, with the site to be known as the Cavanagh Ottawa Airport Pit (Pit). In other studies of OIAA land, this site is identified as Parcel C.

Freefield Ltd. has been engaged by Cavanagh to prepare this acoustic assessment report for the proposed operations on the Cavanagh Ottawa Airport Pit. The acoustic assessment report is to be submitted to the OIAA and the City of Ottawa as part of the approval process for the Pit.

This report describes an assessment of the potential impact of noise from operations at as the Cavanagh Ottawa Airport Pit in accordance with City of Ottawa Environmental Noise Control Guidelines[1] (ENCG) and the Ontario Ministry of Environment, Conservation and Parks, MECP, guidelines for noise assessment, NPC-300[2] and NPC-233[3].

This report has been prepared in accordance with the MECP Document NPC-233, *Information to be Submitted for Approval of Stationary Sources of Sound*, October 1995[3]. Noise from the facility is assessed according to MECP Document: NPC-300, *Stationary and Transportation Sources – Approval and Planning*, August 2013[2].

The noise assessment methodology is summarised below.

- Identification of noise sensitive receptors in the vicinity of the Pit. Potential noise sensitive receptors include residences, motels, places of worship, schools, hospitals and land zoned for a potential noise sensitive use.

- Determination of the sound level limits[1,2] which apply at each of the noise sensitive receptors.

- Identification of the sources of noise that will arise from Pit operations. In the current study, the strengths of the various noise sources were obtained from noise measurements of similar Cavanagh operations, and, from noise measurements by Freefield Ltd. of similar aggregate operations in Ontario.

- Based on the strengths of the individual noise sources, noise levels due to Pit operations are predicted at nearby noise sensitive receptors using an ISO prediction procedure[4] which is strongly favoured by the MECP. Compliance is assessed under predictable "worst case" conditions for normal operations.

- Assessment of compliance of the noise due to Pit operations with ENCG and MECP sound level limits. Where appropriate, mitigation measures are recommended such that compliance with the sound level limits is achieved at all receptors.

Surrounding Lands, Acoustic Environment and Critical Receptors

Directions in this report refer to site north as shown in Figure 1.

The proposed Cavanagh Ottawa Airport Pit is located on the west side of Albion Road, approximately 400 m north of the intersection of Albion Road and Rideau Road, see Figure 1. The Rideau Carleton Raceway and Slots is located on the east side of Albion Road, approximately opposite to the proposed Pit.

The legal description of the land occupied by the proposed Cavanagh Ottawa Airport Pit is as follows:

Part of Lots 23 and 24, Concession 3
Rideau River Geographic Township of Gloucester
City of Ottawa, Ontario.

A zoning plan for the area is provided in Figure 2.

The topography of the site and surrounding land is relatively flat with minor changes in elevation.

The land surrounding the proposed Pit is zoned for a mixture of uses including mineral extraction and reserve, zones ME and MR, commercial and industrial, zones RC and RG, parks and open space, zone OA1, and, rural and rural residential, zones RU and RR. The proposed pit and surrounding land are within land designated as Ottawa Airport Operating Influence Zone (AOIZ) or Airport Vicinity Development Zone (AVDZ).

The general area is on the southern fringe of the urbanized area of Ottawa and hence is a relatively busy area. The nearby roads, Albion Road, Rideau Road and Bowesville Road carry significant amounts of road traffic, including passenger, commuter, commercial and industrial vehicles. There are a number of active nearby pits and quarries which generate significant amounts of heavy vehicle traffic. Hence significant road traffic noise is generated in the area, especially during the day. The area also experiences significant aircraft noise from the nearby Ottawa International Airport. Hence the acoustic environment of the area is considered to be urban, see further discussion in Section 5.0.

Points of Reception

This noise study considers the impacts at noise sensitive points of reception potentially including residences, motels, places of worship, schools, hospitals and land zoned for a potential noise sensitive use. Sixteen of the closest points of reception (POR's) to the Pit have been selected for analysis, these being shown in Figure 1 and listed in Table 1. Note that in some cases the selected points of reception are representative of a group of nearby residences. Noise sensitive points of reception which are further from the proposed Pit than those selected for analysis will receive lesser levels of noise and impact from Pit operations.

It is normally required to consider the potential noise impacts on vacant lots which in the future may be developed for noise sensitive uses. In this case, all of the land surrounding the Pit is within land designated as Ottawa Airport Operating Influence Zone (AOIZ) or Airport Vicinity Development Zone (AVDZ). The City of Ottawa does not generally allow any new noise sensitive developments in the AOIZ or the AVDZ, hence no additional points of reception have been considered.

2.0 Detailed Facility Description

The primary product of the proposed Cavanagh Ottawa Airport Pit will be sand. Excavation will be accomplished with loaders and excavators within the limit of extraction of the site, see Figure 3. There will be no rock drilling or blasting.

Material excavated from the Pit will be transported to a screening plant which will separate any larger stones and rocks from the sand. The sand will be stockpiled, then shipped from the site using highway trucks.

The larger stones and rocks which are separated by the screening plant will be moved to a crushing area for later crushing into aggregate. It is anticipated that crushing will occur only occasionally using a portable crushing plant which is brought to site when needed. The aggregate produced will also be loaded onto highway trucks and shipped from the site.

The floor of the Pit is proposed to be approximately 110.7 masl, resulting in excavation depths up to approximately 6 m. Excavation will take place in one lift.

The hours of operation of the Pit will be within daytime hours, 7 a.m. to 7 p.m.

Site preparation and rehabilitation activities will take place only during daytime hours, 7 a.m. to 7 p.m.

Significant noise generating equipment to be used in pit operations will consist of the following.

- One screening plant, with associated conveyors and stackers.
- One portable crushing plant, brought to site occasionally, when required.
- Up to 3 loaders, typically 2 associated with the screening operation and 1 associated with the crushing operation.
- Up to 3 excavators, typically 2 associated with the screening operation and 1 associated with the crushing operation.
- Highway trucks used to ship the product off site.

Under maximum production conditions it is assumed that up to 14 truckloads per hour will be shipped from the site, nominally10 truck loads per hour of sand and 4 truck loads per hour of crushed aggregate.

3.0 Noise Source Summary

The following noise sources and data have been used to model noise generated by operations at the proposed Cavanagh Ottawa Airport Pit. In brackets are the shortened names of the noise sources as used in the acoustic model. The characteristics of these sources, as used in acoustic modelling, are summarized in Table 2.

- Screening Plant (source name in model: Screener)
- Loaders (source name in model: Loader_Ship)
- Excavator (source name in model: Excavator)
- Mobile crushing plant (source name in model: Mobile_Crush)
- Highway Truck Movements (source name in model: Truck_Ship)

The noise modelling considers various scenarios relating to different areas of operation as described in Section 6.0. For each scenario, the locations of the noise sources are selected for worst case noise impacts.

The strengths of the noise sources, i.e. the sound powers shown in Table 2 and, are derived from a database of noise measurements by Freefield Ltd. of similar operations made at other aggregate operations in Ontario.

Sound measurements for the assessment of noise sources have been made by Freefield using Bruel and Kjaer sound level meters, Types 2250 and 2270. These meters are field calibrated using a Bruel and Kjaer Type 4231 Field Calibrator before and after each series of measurements. The field calibration did not vary by more than 0.1 dB over the period of the measurements. In addition, the meters and field calibrators are laboratory calibrated on an annual basis. Copies of the relevant calibration certificates are available on request.

Noise measurement periods have been restricted to times when the meteorological conditions are well suited to noise measurements. In particular, measurements are not taken during rain or when wind speeds exceed 20 km/hour. All measurements were made with microphones mounted on tripods, 1.5 m above the ground and at least 3 m away from any major obstacles.

Noise from the highway trucks, and associated on-site haul routes, are estimated using the moving point source method and modelled as a loop indicating the worst-case on-site truck movements. When operating on-site, highway trucks shall not exceed 30 kph and shall not use compression braking (Jake Brakes).

<u>Insignificant noise sources</u>:

Conveyors, stackers and noise from employee or service vehicles have been assessed as insignificant noise sources in this analysis.

4.0 Point of Reception Summary

A total of sixteen nearby noise sensitive receptors have been selected for detailed noise evaluation, as shown in Figure 1. These residences, including one church, are those closest to the Pit in all directions and represent the worst case noise impacts in comparison to other nearby or more distant noise sensitive receptors.

The sixteen receptors selected for analysis, POR 1 to POR 16, are shown in Figure 1 and listed in Table 1.

As per MECP Guideline NPC-300, two points of reception (POR) have been selected at each receptor for which worst case sound levels have been calculated.

W – Plane of Window points of reception are located on the dwelling or noise sensitive building, typically 2 m above ground for single storey dwellings and 4.5 m above ground for two storey dwellings.

O – Outdoor points of reception, represent an outdoor amenity area on the property of the residence. For large properties, the outdoor point of reception can be up to 30 m from the dwelling at a height of 1.5 m above ground.

Noise prediction results are summarized in Tables 6 by point of reception for each of the 5 operational scenarios described in Section 6.0. Figures 7, 9, 11, 13 and 15 show predicted noise impacts as noise contours for Scenario 1 through 5.

Point of reception noise impacts by noise source are contained in Appendix 1, Table A1.6.1 to A1.6.5.

5.0 Assessment Criteria, Sound Level Limits & Acoustic Environment

Sound level limits, as specified in the City of Ottawa ENCG[1] guidelines and MECP guideline NPC-300[2], depend on the acoustical classification of the area as Class 1, 2, 3 or 4.

Class 1 area 'an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as urban hum.'

Class 2 area 'an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas: sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours); and, low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).'

Class 3 area 'a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as: a small community; agricultural area; a rural resort area such as a cottage or resort area; or, a wilderness area. '

Class 4 area 'an area or specific site that would otherwise be defined as Class 1 or 2 and which: is an area intended for development with new noise sensitive land use(s) that are not yet built; is in proximity to existing, lawfully established stationary source(s); and, has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process. Additionally, areas with existing noise sensitive land use(s) cannot be classified as Class 4 areas.'

Due to the high levels of road traffic on local roads, Albion, Rideau, and Bowesville Roads, the area is subject to significant road traffic noise, particularly during the daytime hours. Hence all receptors are classified as being in a Class 2 Area.

For a Class 2 Area the applicable outdoor sound level limit at a point of reception is the higher of the applicable exclusion limit value, given in Tables 3 and 4, or, the background sound level due to road traffic for each point of reception. Background sound level means the sound level that is present in the environment, produced by noise sources other than the source under assessment. Road traffic noise is the most common source of background sound.

A background noise assessment from road traffic was carried using the MECP methodology[4,5,6] at points of reception in close proximity to the Albion Road and Rideau Road, i.e. POR 1 to POR 9. Appendix 2 contains the details of the analysis of background road traffic noise at points of reception based on the most recently available traffic count data from the City of Ottawa for Albion and Rideau Roads.

The background road traffic assessment indicated elevated sound levels, above the Class 2 area exclusion limits, for POR 1 to POR 9 during the daytime period. For the remainder of the points of reception, POR 10 to POR16, the MECP exclusion limits shown in Tables 3 and 4 are assumed to apply.

The applicable sound level limits for each point of reception are set out in Table 5.

Sound levels are assessed in terms of the 1-hour equivalent sound level, L_{eq}, effectively the average sound level over each hour. All sound levels are A-weighted, A-weighting being a frequency weighting with represents sensitivity of human hearing to sounds of differing frequencies.

6.0 Noise Impact Assessment

Noise levels have been calculated at the selected points of reception for "predictable worst case" operations in the Pit using the ISO sound propagation methodology[7] as implemented in the sound prediction software Cadna-A, Version 2020. The "predictable worst case" is interpreted as meaning the greatest noise impact anticipated under normal operating conditions. The ISO methodology provides a conservative (i.e. high) estimate of the noise level at a receptor taking into account adverse wind and meteorological conditions.

The calculation method includes the following factors:

- Distance attenuation is based on spherical spreading.
- Atmospheric attenuation.
- Ground attenuations, as appropriate.
- Barrier attenuation, as appropriate.

In order to consider cases of worst noise impacts, a number of operational scenarios have been modeled. In general, the worst impacts are those which occur when concurrent operations occur.

The following five worst case scenarios are presented in this report and form the basis for the assessment of compliance. The five Scenarios correspond to extraction taking place in five separate areas of the Pit as shown in Figure 4.

Scenario 1: Excavation in Area A. See Figure 6.

Scenario 2: Excavation in Area B1S. See Figure 8.

Scenario 3: Excavation in Area B1N. See Figure 10.

Scenario 4: Excavation in Area B2S. See Figure 12.

Scenario 5: Excavation in Area B1S. See Figure 14.

It was found that some restrictions in the location of screening and crushing plants were needed in order to achieve compliance with the sound level limits. Also, some barriers/berms were also required to achieve compliance. These restrictions and berms are described in Section 7.0 and illustrated in Figure 5.

Table 6 contains calculated noise levels at the nearest receptors for the worst case for each scenario are compared with the applicable sound level limits. More detailed estimates, for all sources and scenarios are contained in Appendix 1, Tables A1.6.1 to A1.6.5.

Statement of Compliance

It is concluded that, with the recommended mitigation measures, noise impacts from operations at the proposed Cavanagh Ottawa Airport Pit will be in compliance with City of Ottawa and MECP Environmental Noise Guidelines[1,2] for the proposed daytime period of operation 7 am to 7 pm.

7.0 Noise Mitigation Measures

Noise mitigation measures for proposed Cavanagh Ottawa Airport Pit are detailed below.

The predicted noise impacts in Table 6 are based on the implementation of the following mitigation measures:

7.1 Operations at the Pit shall take place only during the daytime period, 7 a.m. to 7 p.m.

7.2 The operation of the screening plant shall comply with the following:

a. The screening plant shall be located on the floor of the Pit.
b. When operating in Area A, there are no restrictions on the location of the screening plant.
c. When operating in Area B, the screening plant shall be at least 150 m west of the eastern site boundary and at least 115 m south of the northern site boundary, see Figure 5.

7.3 The operation of the crushing plant shall comply with the following:

a. The crushing plant shall be located on the floor of the Pit.
b. The crushing plant shall be located within the area indicated in Figure 5.
c. The crushing plant shall be shielded by Berm 4 as described in Table 7 and below.

7.4 Noise barriers or berms are to be provided as follows:

a. Noise barriers or berm are to be provided as per Table 7. Note that Berms 1, 2 and 3 are only required when excavation is taking place in Area B.

b. A noise barrier may be substituted for a berm, and vice versa, provided that the minimum height, minimum extent and location requirements are satisfied.

c. Noise barriers or berms are to be solid, having no gaps, and are to have a surface density of no less than 20 kg/m^2. Examples of suitable barriers or berms are as follows.
   i. Lift face or existing terrain.
   ii. Earth, gravel or aggregate berms or stockpiles.
   iii. Concrete or brick walls.
   iv. Commercial noise barriers.
   v. Shipping containers.

7.5 If a new process is introduced to the site, then this process shall be assessed by a qualified acoustical consultant prior to commissioning. Noise mitigation measures shall be reviewed, and altered if necessary, to ensure that City of Ottawa and MECP sound level limits are met at all points of reception.

8.0 Conclusions

An acoustic assessment of operations at the proposed Cavanagh Ottawa Airport Pit has been conducted according to the City of Ottawa and MECP noise assessment procedures.

Proposed operations at the Pit include extraction with loaders and excavators, screening, crushing and the loading of product onto highway trucks for shipping off site.

It has been found that noise levels from operations, at nearby receptors, will be in compliance with City of Ottawa and MECP sound level limits provided that the noise mitigation measures described in Section 7.0 are followed.

Hugh Williamson, Ph.D., P.Eng.
Member, Canadian Acoustical Society

Michael Wells, B. Architecture (Hons), B.Sc. Arch. Registered Architect of NSW,
Member, Canadian Acoustical Society

References

1. City of Ottawa*, Environmental Noise Control Guidelines*, January 2016. (ENCG)

2. Ministry of Environment, Conservation and Parks, Publication NPC-300, *Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*, August 2013.

3. Ministry of Environment, Conservation and Parks, Publication NPC-233 *Information to be Submitted for Approval of Stationary Sources of Sound,* October 1995.

4. Ministry of Environment, Conservation and Parks Publication NPC-206, *Sound Levels due to Road Traffic,* October 1995.

5. Ministry of Environment, Conservation and Parks, Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT), 1989.

6. Ministry of Environment, Conservation and Parks, STAMSON Software, Version 5.03, 1996. (Software implementation of reference 4).

7. International Standards Organization, *Acoustics - Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation*, ISO 9613-2: 1996(E).

8. RWDI AIR Inc. Publication, *"Typical Hourly Traffic Distribution for Noise Modelling",* Vol. 36 No. 3 (2008).

Tables

Contents:

Table 1: Point of Reception Summary Table

Point of Receptor Symbol	Location (See Figures 1)
POR_1	4897 Albion Road, 2-storey residence
POR_2	4953 Albion Road, 2-storey residence
POR_3	4959 Albion Road, 1-storey residence
POR_4	2594 Rideau Road, 2-storey residence
POR_5	2536 Rudeau Road, Church
POR_6	2530 Rideau Road, 2-storey residence
POR_7*	2422 Rideau Road, 1-storey residence
POR_8*	2414 Rideau Road, 2-storey residence
POR_9*	2380 Rideau Road, 1-storey residence
POR_10	2050 Rideau Road, 2-storey residence, also cottages
POR_11**	5595 Fico Crescent, 2-storey residence
POR _12	4839 Bowesvill Road, 2-storey residence
POR _13	4739 Bowesvill Road, 2-storey residence
POR_14	4600 High Road, 2-storey residence
POR_15	4801 High Road, 2-storey residence
POR_16	4788 Albion Road, 2-storey residence

Notes:
- At each noise sensitive building, two points of reception are considered:
  - Plane of Window (W) points of reception are taken to be at 2 m above ground for 1-storey and 4.5 m above ground for 2-storey residences. E.g. POR_1_W
  - Outdoor (O) points of reception are taken at 1.5 m above ground level. E.g. POR_1_O
- * Representing several residences on this section of Rideau Road
- ** The most affected residence on Fico Crescent. Other residences in Fico Crescent will be less affected.

Table 2: Noise Source Summary Table

Source ID	Source Description	Sound Power (dBA)	Source Location Ht. above ground (m)	Sound Character-istics	Noise Control Measures
Screener	Screening Plant	111.0	3.0	Steady, moving, no significant tonality, non-directional	Refer Section 7.0
Loader_Ship	Loader used for loading trucks or feeding the screener or crusher	107.9	3	Steady, moving, no significant tonality, non-directional	Refer Section 7.0
Excavator	Excavator for extraction or loading the screener or crusher	103.4	3.0 (when excavating) 5.0 (when feeding plant)	Steady, moving, no significant tonality, non-directional	Refer Section 7.0
Mobile_Crush	Mobile Crushing Plant	120.0	3.0	Steady, moving, no significant tonality, non-directional	Refer Section 7.0
Truck_Ship	On-site truck movements for shipping	107.8	3.0	Steady, moving, no significant tonality, non-directional	Refer Section 7.0

Table 3: MECP Exclusion Limit Values for One-Hour Equivalent Sound Level (Leq, dBA) at Outdoor Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

Table 4: MECP Exclusion Limit Values for One-Hour Equivalent Sound Level (Leq, dBA) at Plane of Window of Noise Sensitive Spaces

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

Table 5: Applicable One Hour Sound Level Limits at Points of Reception

Receptor & Point of Reception _W = Plane of Widow _O = Outdoor	Sound Level Limit 1-hour L_{AEQ} dBA (Daytime Period, 07:00 – 19:00)	Sound Level Limit 1-hour L_{AEQ} dBA (Evening Period, 19:00 – 23:00)	Sound Level Limit 1-hour L_{AEQ} dBA (Nightime Period, 23:00 – 07:00)
POR_1_W**	55.0	50.0	45.0
POR_1_O**	55.0	45.0	*
POR_2_W**	55.0	50.0	45.0
POR_2_O**	55.0	45.0	*
POR_3_W**	55.0	50.0	45.0
POR_3_O**	55.0	45.0	*
POR_4_W**	57.5	50.0	45.0
POR_4_O**	57.5	45.0	*
POR_5_W**	65.5	50.0	45.0
POR_5_O**	65.5	45.0	*
POR_6_W**	57.5	50.0	45.0
POR_6_O**	57.5	45.0	*
POR_7_W**	58.5	50.0	45.0
POR_7_O**	58.5	45.0	*
POR_8_W**	58.5	50.0	45.0
POR_8_O**	58.5	45.0	*
POR_9_W**	58.5	50.0	45.0
POR_9_O**	58.5	45.0	*
POR_10_W	50.0	50.0	45.0
POR_10_O	50.0	45.0	*
POR_11_W	50.0	50.0	45.0
POR_11_O	50.0	45.0	*
POR_12_W	50.0	50.0	45.0
POR_12_O	50.0	45.0	*
POR_13_W	50.0	50.0	45.0

Receptor & Point of Reception _W = Plane of Widow _O = Outdoor	Sound Level Limit 1-hour L_{AEQ} dBA (Daytime Period, 07:00 – 19:00)	Sound Level Limit 1-hour L_{AEQ} dBA (Evening Period, 19:00 – 23:00)	Sound Level Limit 1-hour L_{AEQ} dBA (Nightime Period, 23:00 – 07:00)
POR_13_O	50.0	45.0	*
POR_14_W	50.0	50.0	45.0
POR_14_O	50.0	45.0	*
POR_15_W	50.0	50.0	45.0
POR_15_O	50.0	45.0	*
POR_16_W	50.0	50.0	45.0
POR_16_O	50.0	45.0	*

*Nighttime sound level limit not applicable at Outdoor Point of Reception as per NPC-300.

**For POR's 1 to 9, the applicable daytime sound level limits are based on assessment of background noise from road traffic on Albion and Rideau Roads, refer Appendix 2.

Table 6: Acoustic Assessment Summary Table, Worst Case, Daytime Period of Operation, 7 am to 7 pm

Point of Reception ID	POR Description	Location	Scenario 1 Area A Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 2 Area B1 S Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 3 Area B1 N Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 4 Area B2 S Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 5 Area B2 N Estimated Sound Level Daytime Period (Worst Case) (dBA)	Performance Limit* Daytime Period (dBA)	Compliance with Performance Limit (Yes/No)	Verified by Acoustic Audit (Yes/No)
POR 1	Residence	POW	51.8	50.8	51.5	52.6	53.6	55.0	Yes	No
		OPR	50.8	49.6	50.4	51.1	52.3	55.0	Yes	No
POR 2	Residence	POW	50.0	52.4	50.7	54.3	51.8	55.0	Yes	No
		OPR	48.7	51.0	50.1	52.2	51.9	55.0	Yes	No
POR 3	Residence	POW	48.7	51.3	49.8	52.4	50.5	55.0	Yes	No
		OPR	48.3	50.9	49.5	51.9	50.4	55.0	Yes	No
POR 4	Residence	POW	42.5	45.1	43.9	45.6	44.3	57.5	Yes	No
		OPR	41.5	42.6	42.4	43.7	43.0	57.5	Yes	No
POR 5	Place of Worship	POW	46.6	49.7	47.8	49.9	48.1	65.5	Yes	No
		OPR	45.4	48.4	46.5	48.7	46.8	65.5	Yes	No
POR 6	Residence	POW	50.5	52.1	51.1	52.1	51.2	57.5	Yes	No
		OPR	49.0	50.6	49.5	50.7	49.6	57.5	Yes	No
POR 7	Residence	POW	50.9	51.2	50.9	51.2	50.9	58.5	Yes	No
		OPR	50.3	50.7	50.4	50.6	50.4	58.5	Yes	No
POR 8	Residence	POW	51.9	52.1	51.9	52.1	51.9	58.5	Yes	No
		OPR	50.5	50.8	50.5	50.7	50.5	58.5	Yes	No
POR 9	Residence	POW	51.3	51.4	51.2	51.4	51.2	58.5	Yes	No
		OPR	50.5	50.6	50.5	50.6	50.5	58.5	Yes	No
POR 10	Residence	POW	41.8	42.0	41.8	42.0	41.8	50.0	Yes	No
		OPR	37.2	37.5	37.1	37.5	37.1	50.0	Yes	No

Point of Reception ID	POR Description	Location	Scenario 1 Area A Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 2 Area B1 S Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 3 Area B1 N Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 4 Area B2 S Estimated Sound Level Daytime Period (Worst Case) (dBA)	Scenario 5 Area B2 N Estimated Sound Level Daytime Period (Worst Case) (dBA)	Performance Limit* Daytime Period (dBA)	Compliance with Performance Limit (Yes/No)	Verified by Acoustic Audit (Yes/No)
POR 11	Residence	POW	45.2	45.1	45.0	45.1	45.1	50.0	Yes	No
		OPR	43.5	43.3	43.4	43.3	43.4	50.0	Yes	No
POR 12	Residence	POW	43.2	42.9	43.0	42.9	43.0	50.0	Yes	No
		OPR	41.6	41.2	41.4	41.2	41.3	50.0	Yes	No
POR 13	Residence	POW	42.7	42.7	42.4	42.6	42.4	50.0	Yes	No
		OPR	41.2	40.8	40.8	40.8	40.8	50.0	Yes	No
POR 14	Residence	POW	41.6	40.9	41.5	40.9	41.4	50.0	Yes	No
		OPR	40.0	39.3	39.9	39.3	40.0	50.0	Yes	No
POR 15	Residence	POW	43.8	42.2	42.9	42.2	43.0	50.0	Yes	No
		OPR	42.0	41.2	42.0	41.3	42.1	50.0	Yes	No
POR 16	Residence	POW	49.4	48.5	49.2	48.8	49.4	50.0	Yes	No
		OPR	49.0	46.6	48.7	46.7	49.1	50.0	Yes	No

* Performance limits are based on 1-hour equivalent sound levels, Leq.

For POR's 1 to 9, the applicable daytime sound level limits are based on assessment of background noise from road traffic on Albion and Rideau Roads, refer Appendix 2.

Table 7: Recommended Noise Barriers/Berms

Barrier	Source Name	Minimum Height (m)	Minimum Length (m)	Maximum Distance from Source (m)	Location	Receptors	Description
Berm 1	Extraction, processing and shipping operations	5.0	140	-	As per: Figure 5	POR 2, POR 3	Berm or barrier located in the setback
Berm 2	Extraction, processing and shipping operations	5.0	130	-	As per: Figure 5	POR 1	Berm or barrier located in the setback
Berm 3	Extraction, processing and shipping operations	4.0	200	-	As per: Figure 5	POR 16	Berm or barrier located in the setback
Berm 4	Crushing plant	5.0	40	15 m from crushing plant	As per: Figure 5	POR 16	Berm or Barrier oriented to shield POR 16

Figures

Contents:

Figure 1: Scaled Area Location Plan - Showing Receptor Locations (Source: GeoOttawa)

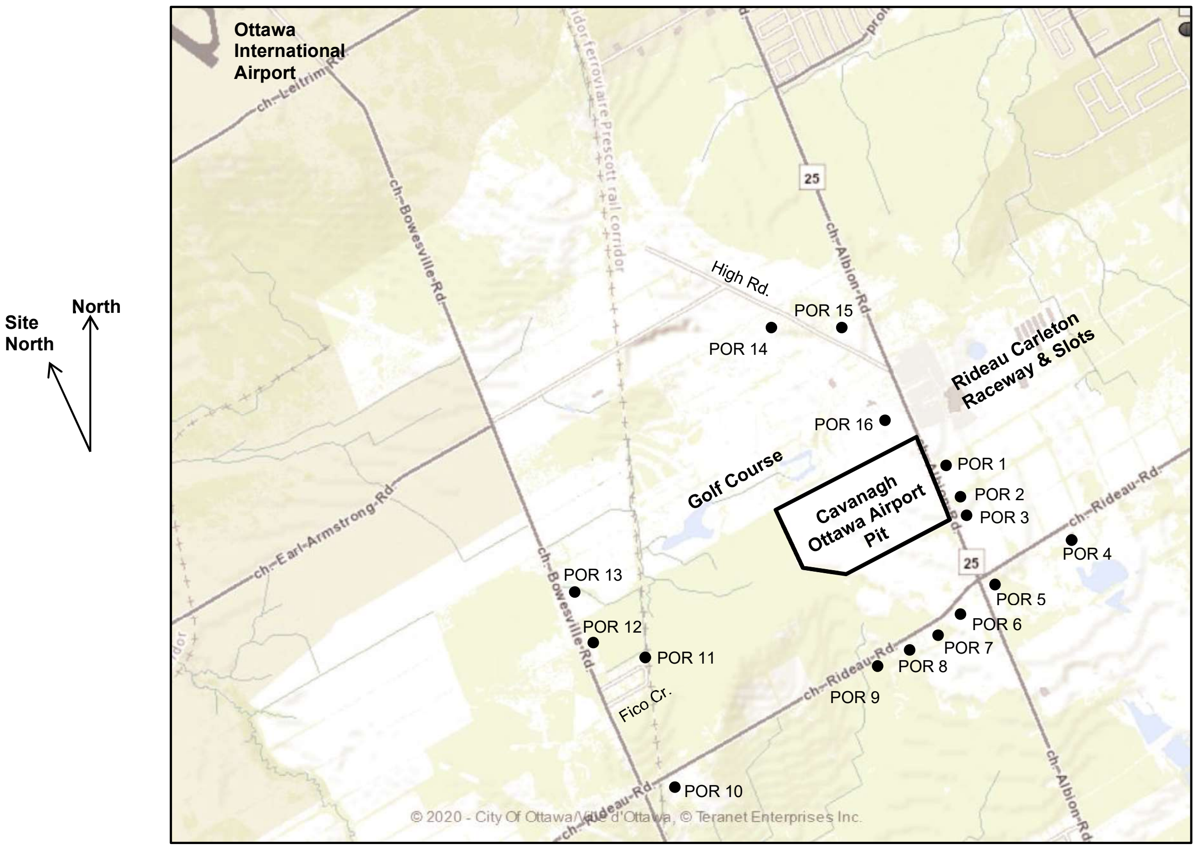
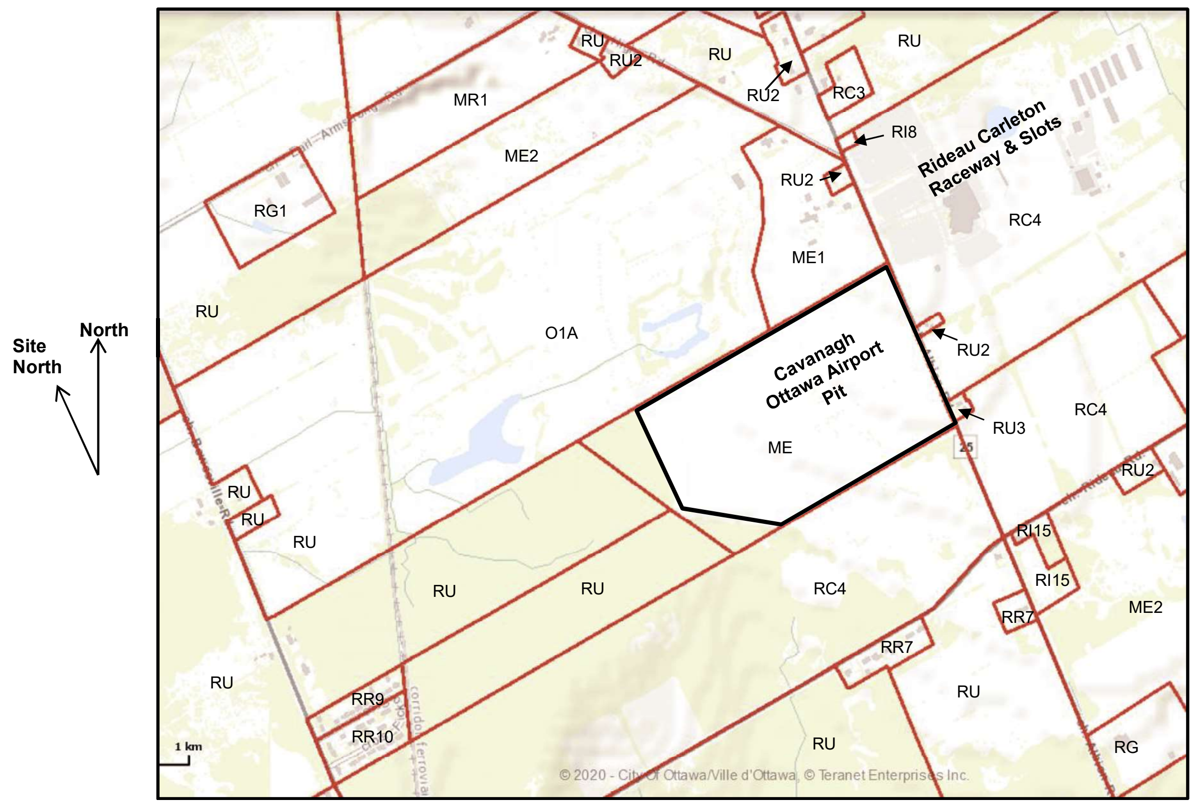


Figure 2: Zoning Plan (Source: GeoOttawa, City of Ottawa)



Legend next page

Figure 2: Zoning Plan – Legend

ME, ME1, ME2	Mineral Extraction Zones
MR1	Mineral Aggregate Reserve Zone
O1A	Parks and Open Space Zone
RC3, RC4	Rural Commercial Zones
RG, RG1	Rural General Industrial Zones
RI8, RI15	Rural Institutional Zone
RR9, RR19	Rural Residential Zones
RU, RU2	Rural Countryside Zones

Figure 3: Site Plan, Proposed Cavanagh Ottawa Airport Pit

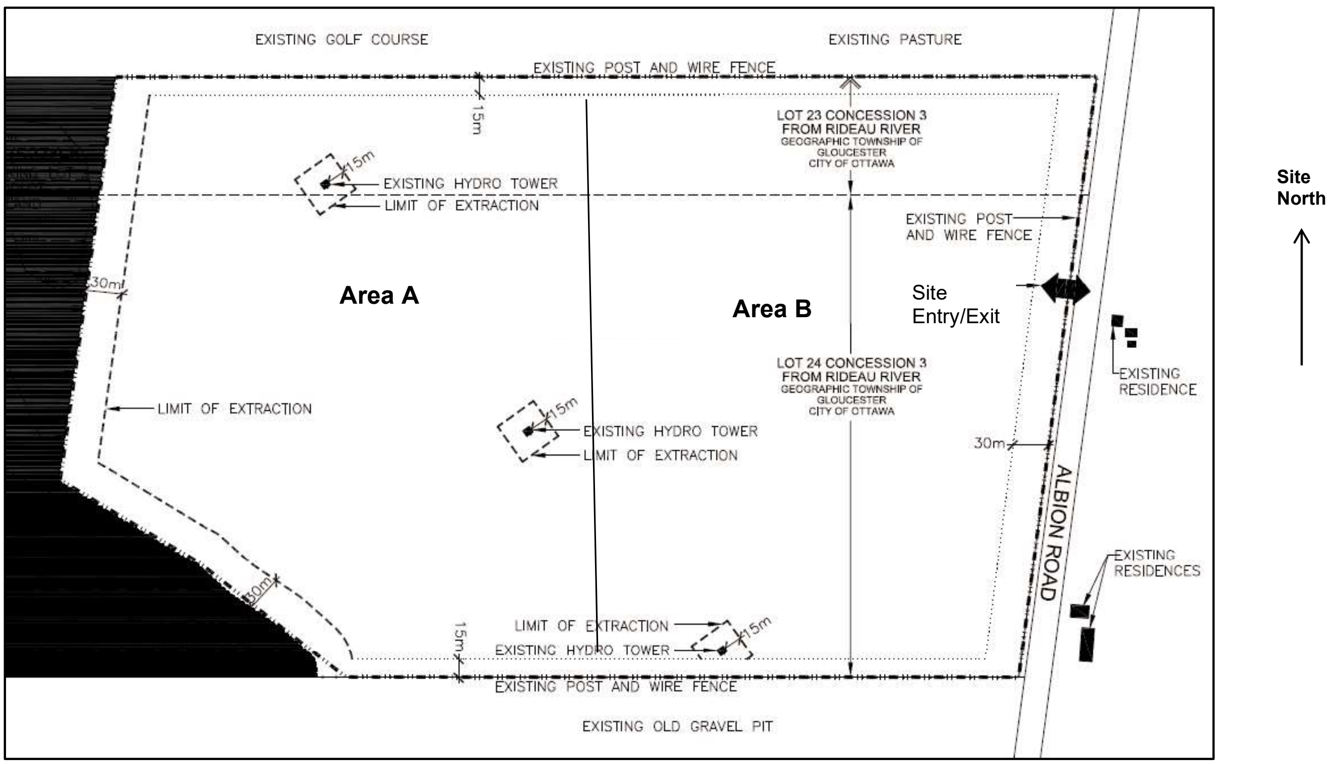


Figure 4: Site Plan Showing Extraction Areas for Noise Analysis (analysis scenarios)

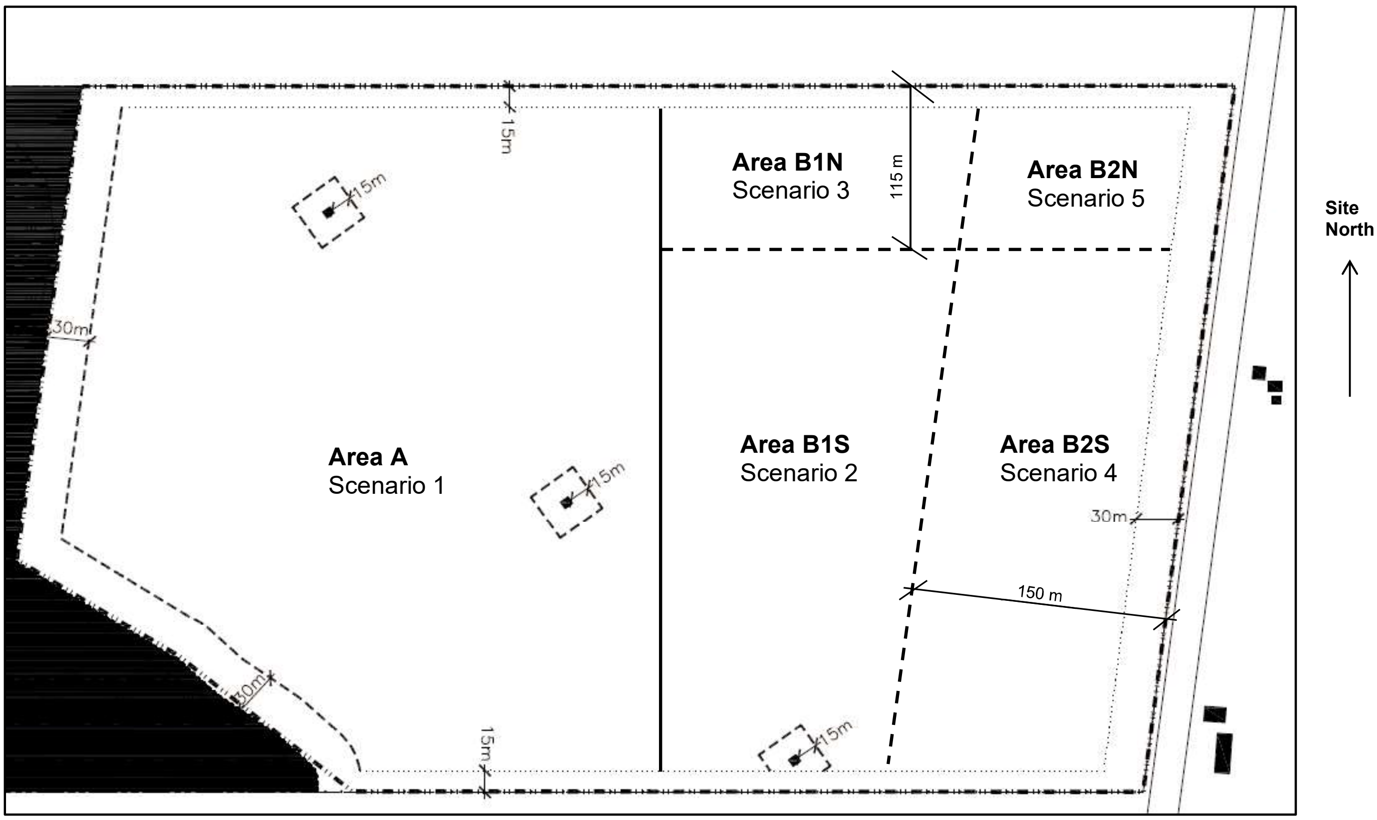


Figure 5: Mitigation Measures: Operational Restrictions and Berms

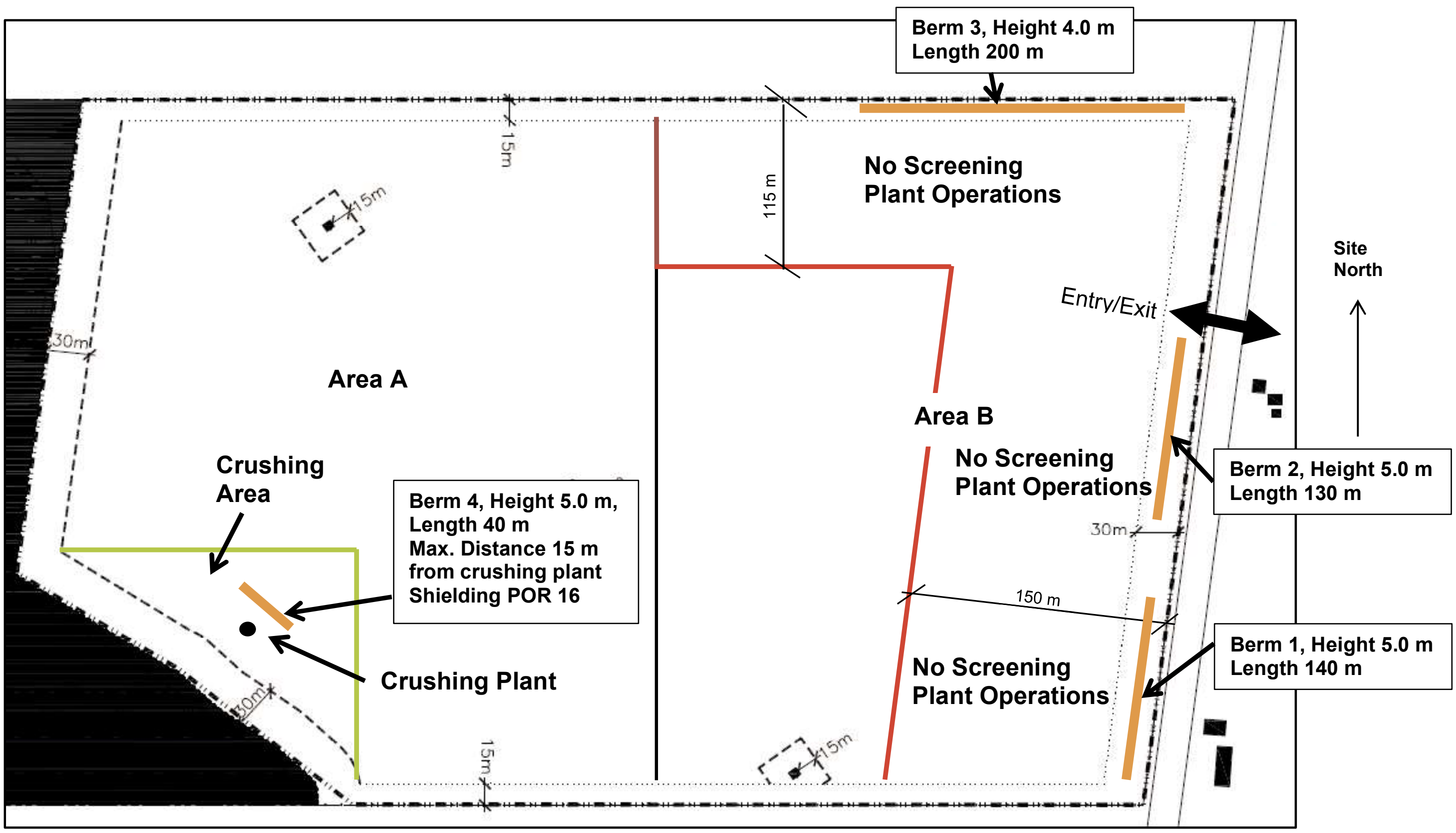


Figure 6: Scenario 1: Excavation of Area A, Worst Case Operations, Daytime

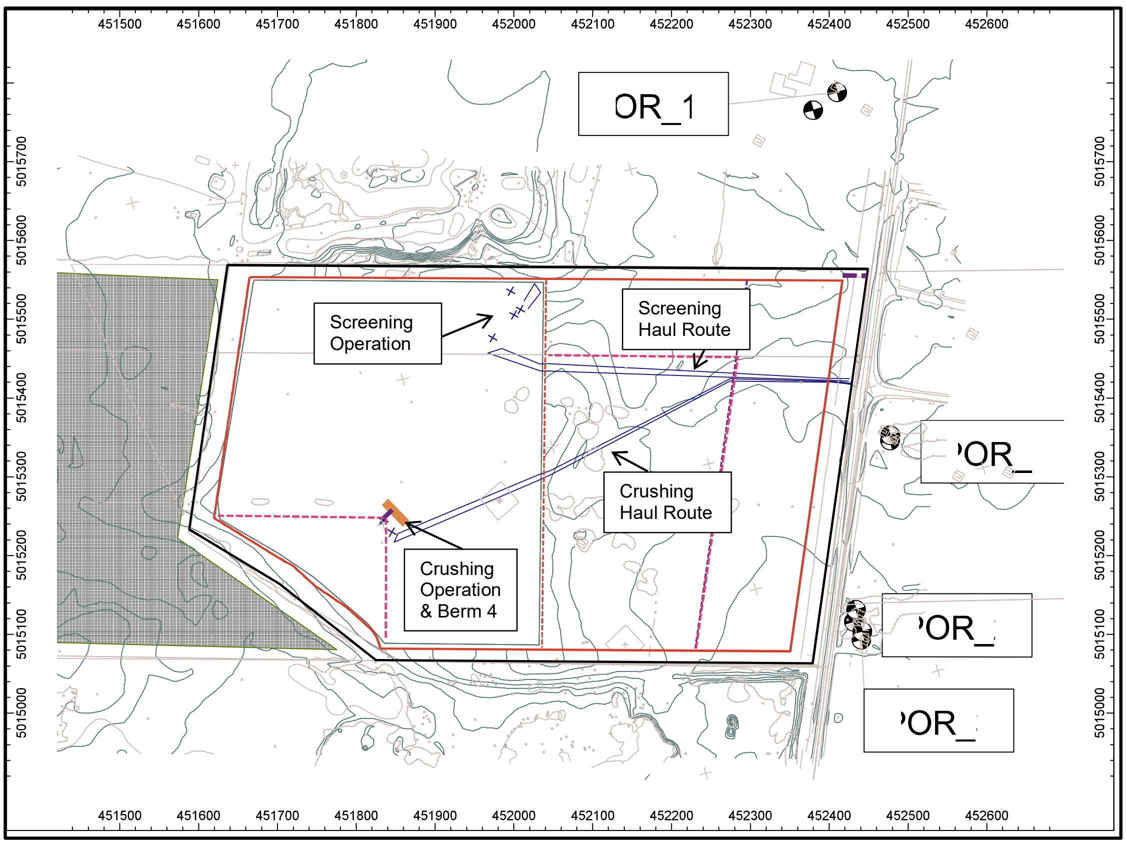
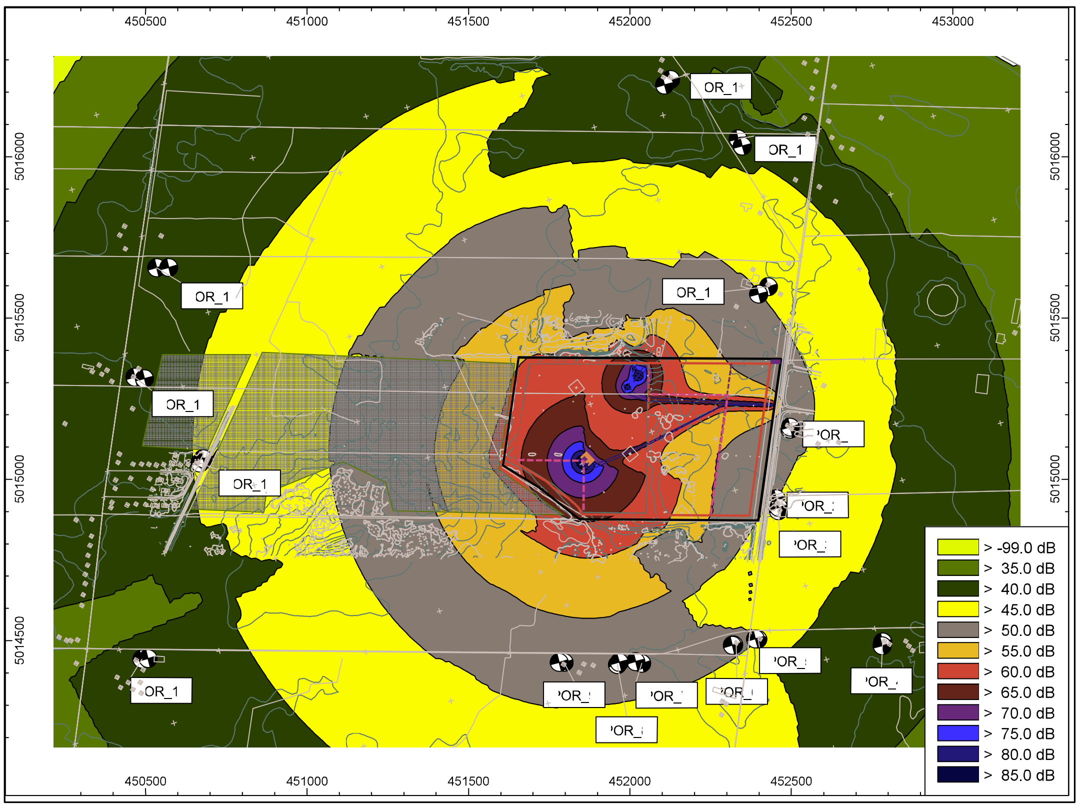


Figure 7: Scenario 1 Noise Contours: Excavation of Area A, Worst Case Operations, Daytime Sound Levels 4.5 m above grade, dBA



Site North

Figure 8: Scenario 2: Excavation of Area B1S, Worst Case Operations, Daytime

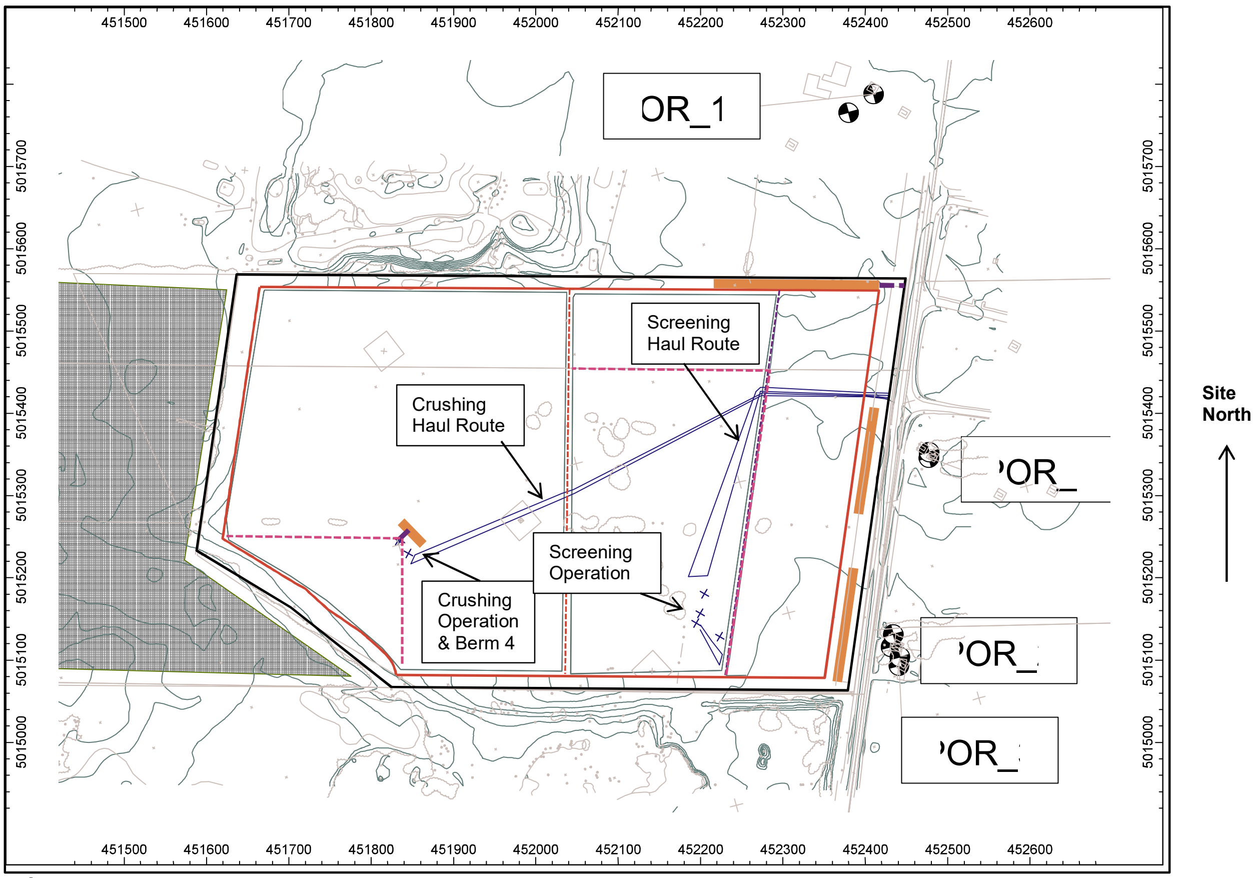


Figure 9: Scenario 2 Noise Contours: Excavation of Area B1S, Worst Case Operations, Daytime Sound Levels 4.5 m above grade, dBA

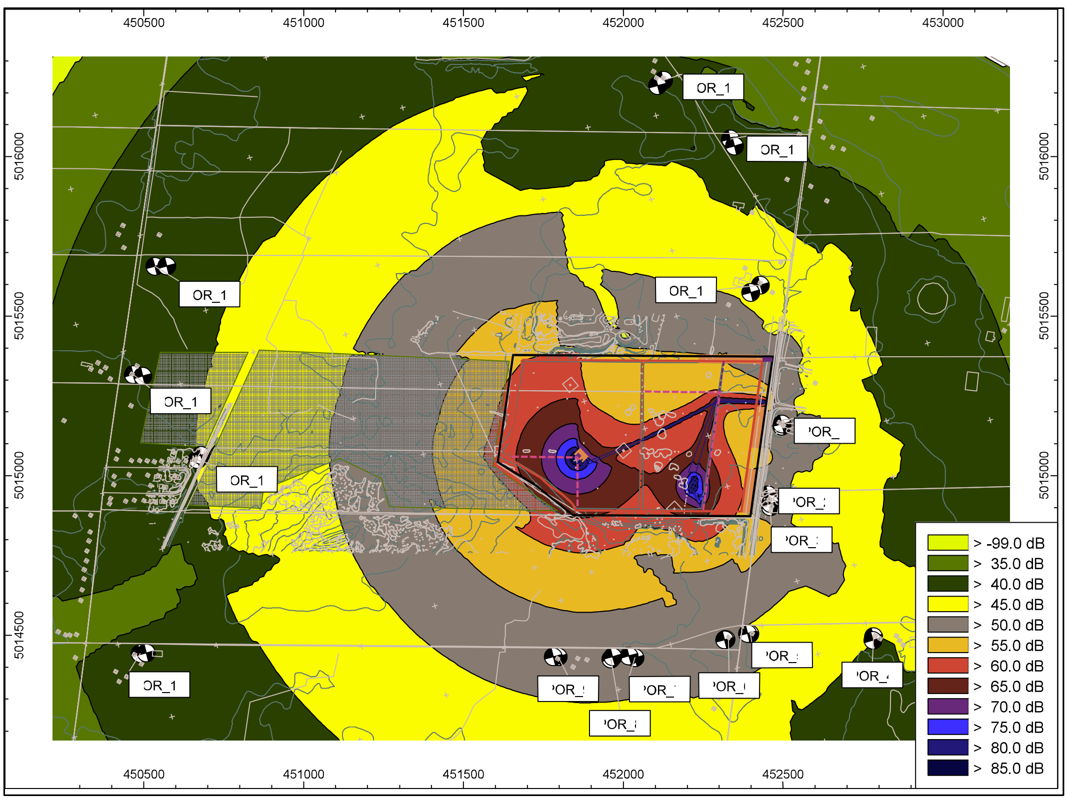


Figure 10: Scenario 3: Excavation of Area B1N, Worst Case Operations, Daytime

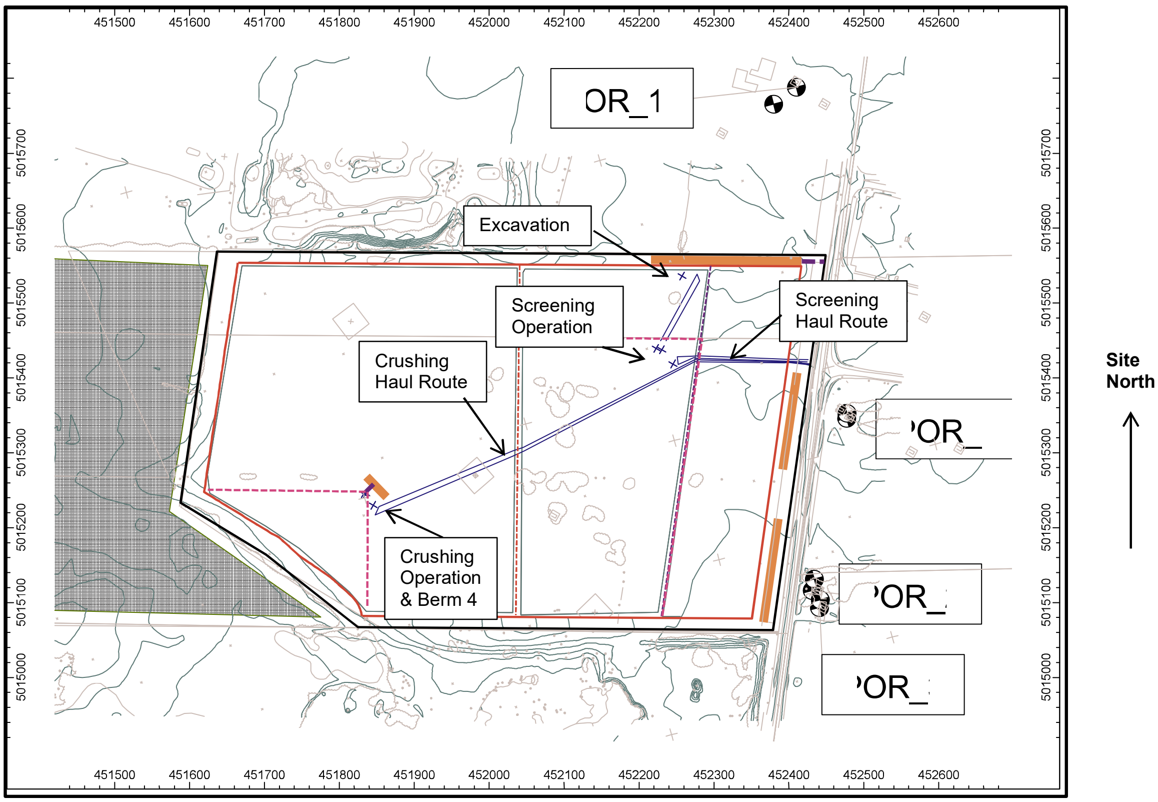


Figure 11: Scenario 3 Noise Contours: Excavation of Area B1N, Worst Case Operations, Daytime Sound Levels 4.5 m above grade, dBA

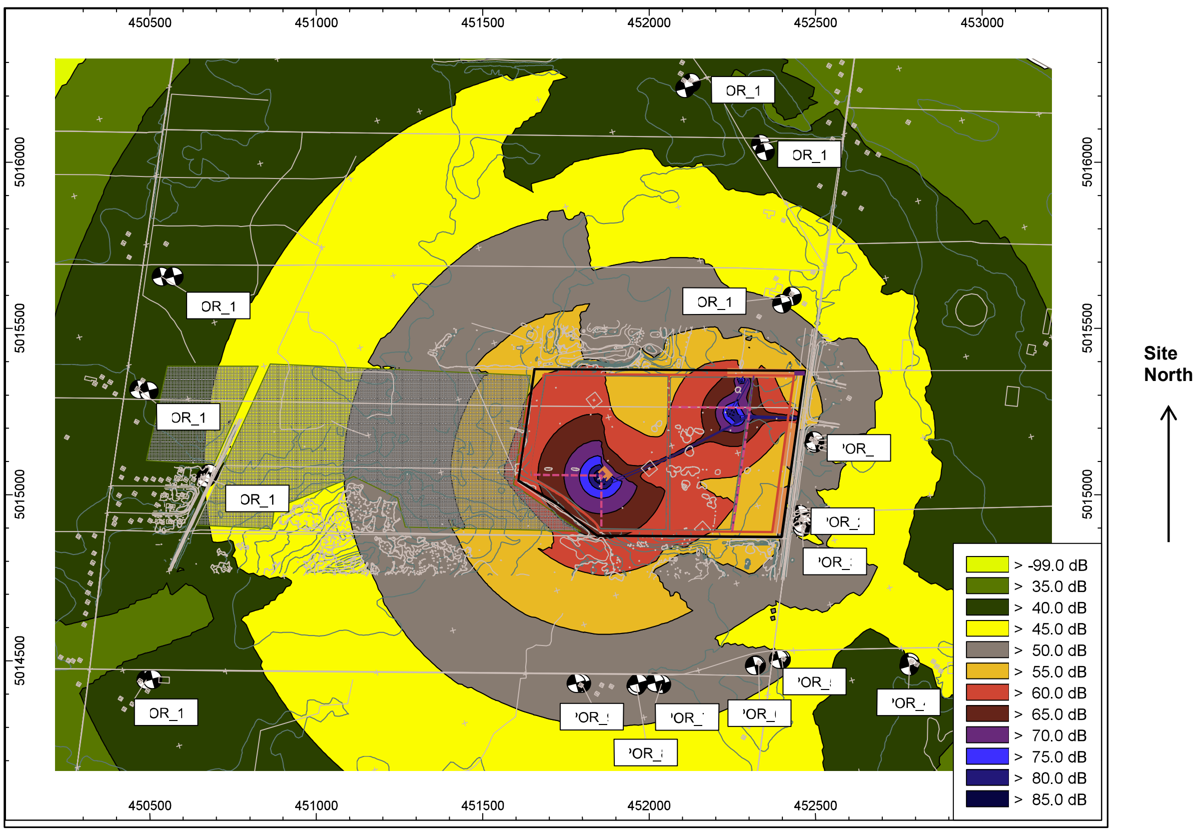


Figure 12: Scenario 4: Excavation of Area B2S, Worst Case Operations, Daytime

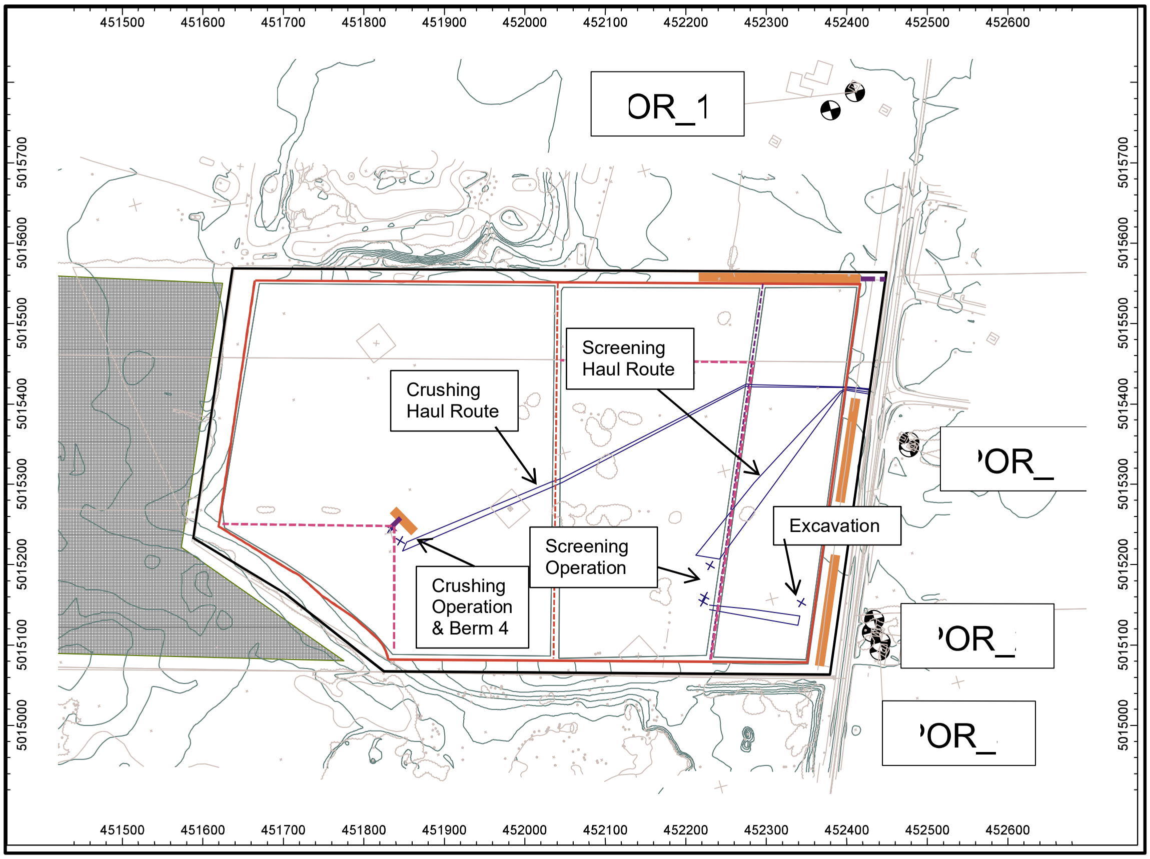


Figure 13: Scenario 4 Noise Contours: Excavation of Area B2S, Worst Case Operations, Daytime Sound Levels 4.5 m above grade, dBA

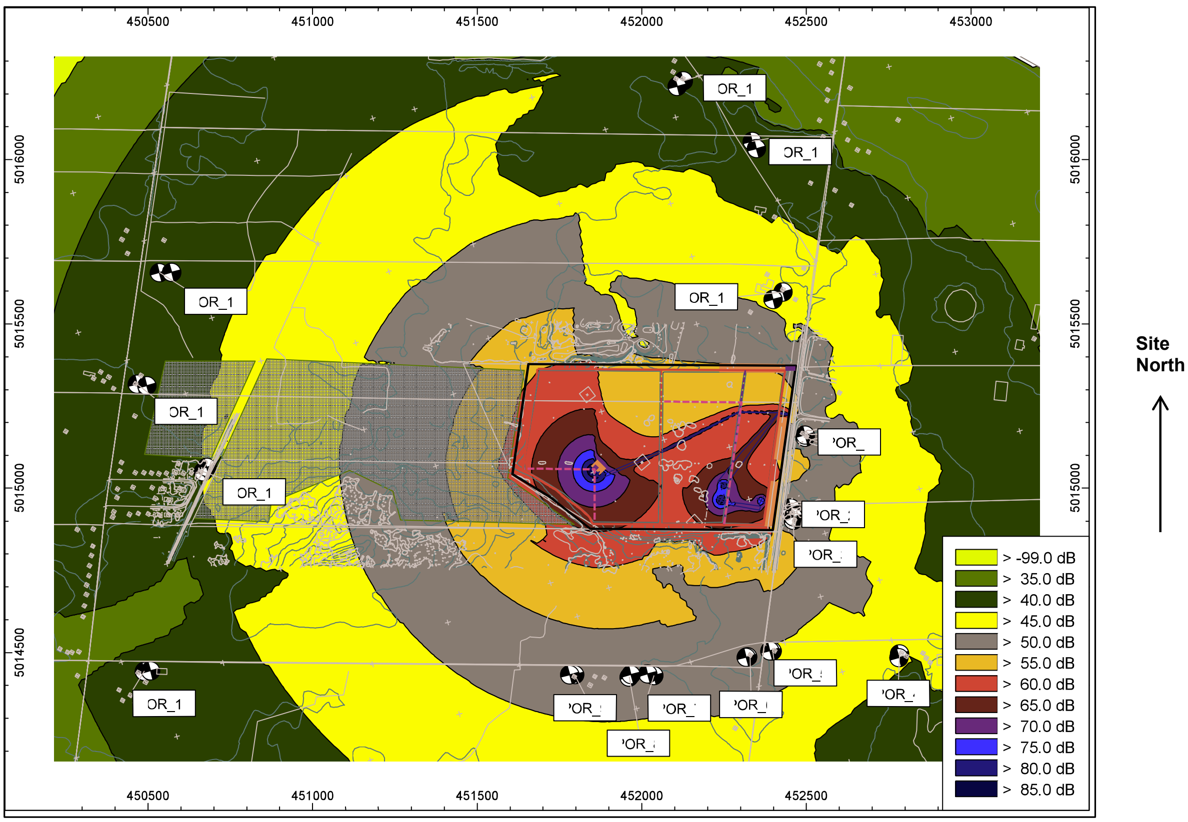


Figure 14: Scenario 5: Excavation of Area B2N, Worst Case Operations, Daytime

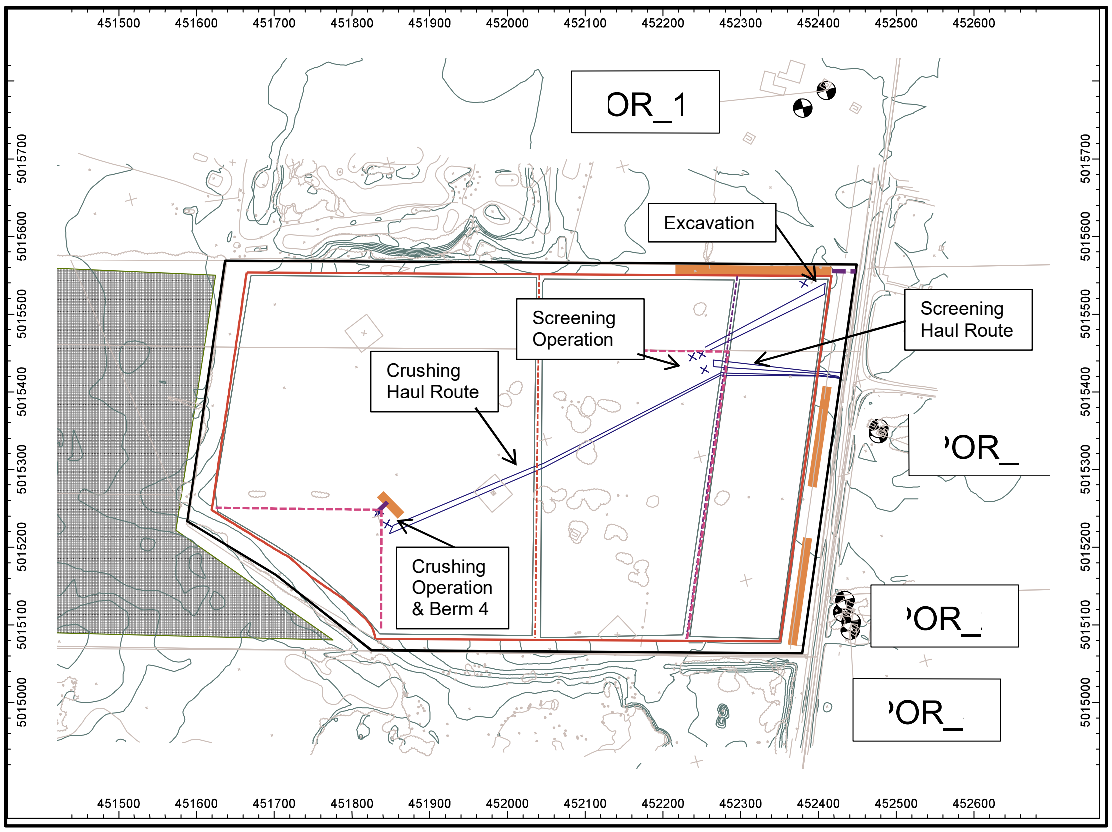
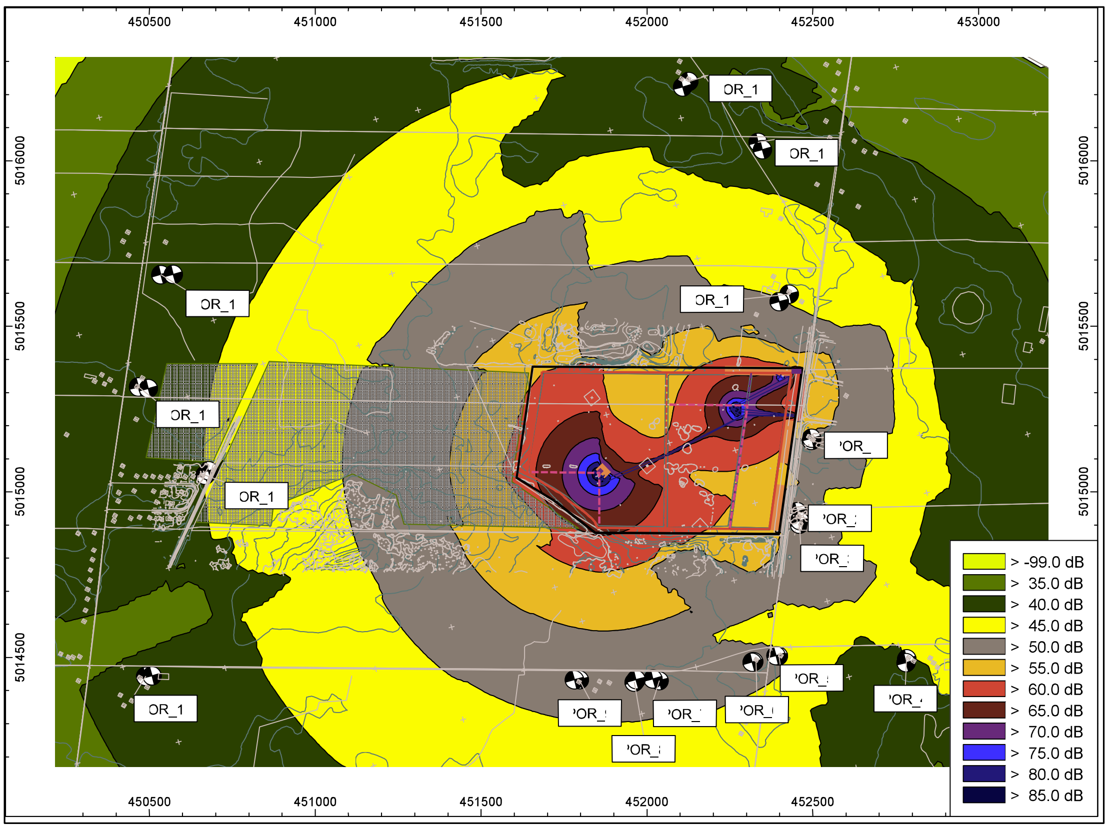


Figure 15: Scenario 5 Noise Contours: Excavation of Area B2N, Worst Case Operations, Daytime Sound Levels 4.5 m above grade, dBA



Appendix 1

Acoustic Modelling Details

Modeling Notes:

1. Acoustic model developed uses Cadna-A software, Version 2020.
2. Sound propagation is modeled according to ISO 9613-2: 1996(E).
3. The whole of the excavated area is modeled as relatively reflective with an absorption coefficient of 0.25, a conservative assumption.
4. MECP favoured conservative modelling assumptions are used, that is, ‘no subtraction of negative ground attenuation’ and ‘no negative path differences’.

Contents:

Table A1.1 Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(null)
Max. Error (dB)	0.00
Max. Search Radius (m)	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (m)	1000.00
Min. Length of Section (m)	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	0
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (°C)	10
rel. Humidity (%)	70
Ground Absorption G	1.00
Wind Speed for Dir. (m/s)	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

Table A1.2 Point of Reception Location Table

Name	Height	Coordinates		
		X	Y	Z
	(m)	(m)	(m)	(m)
POR_1_W	4.5	452434.1	5015558.8	119.0
POR_1_O	1.5	452431.0	5015564.7	116.1
POR_2_W	4.5	452509.5	5015336.4	117.5
POR_2_O	1.5	452504.3	5015351.3	114.5
POR_3_W	2.0	452529.0	5015321.7	115.0
POR_3_O	1.5	452524.9	5015331.3	114.5
POR_4_W	4.5	453012.2	5015131.3	116.3
POR_4_O	1.5	453016.3	5015120.1	113.0
POR_5_W	4.5	452672.8	5014945.2	119.3
POR_5_O	1.5	452666.2	5014942.6	116.4
POR_6_W	4.5	452616.6	5014892.9	119.4
POR_6_O	1.5	452614.2	5014889.8	116.4
POR_7_W	2.0	452398.7	5014700.9	112.0
POR_7_O	1.5	452380.4	5014696.3	111.5
POR_8_W	4.5	452336.2	5014659.5	114.1
POR_8_O	1.5	452336.9	5014668.7	111.2
POR_9_W	2.0	452189.0	5014583.4	110.1
POR_9_O	1.5	452176.5	5014575.3	109.4
POR_10_W	4.5	451051.6	5013938.1	113.6
POR_10_O	1.5	451067.7	5013949.1	110.6
POR_11_W	4.5	450903.0	5014554.0	111.0
POR_11_O	1.5	450905.6	5014571.1	107.6
POR_12_W	4.5	450596.4	5014684.8	109.5
POR_12_O	1.5	450624.3	5014694.9	106.4
POR_13_W	4.5	450484.7	5015011.7	106.5

Name	Height	Coordinates		
		X	Y	Z
	(m)	(m)	(m)	(m)
POR_13_O	1.5	450517.0	5015031.2	103.5
POR_14_W	4.5	451571.6	5016312.6	109.5
POR_14_O	1.5	451564.1	5016288.8	106.5
POR_15_W	4.5	451844.6	5016258.0	114.5
POR_15_O	1.5	451867.1	5016245.5	112.1
POR_16_W	4.5	452154.9	5015908.0	119.2
POR_16_O	1.5	452140.0	5015873.2	116.1

Table A1.3 Point Sources

Name	Result. PWL			Lw / Li	Noise Source	Operating Time			Direct.	Source
	Day	Evening	Night	Type	Library File	Day	Evening	Night		Height
	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)		(m)
Screening Plant	111.0	111.0	111.0	Lw	Powerscreen_Chieft on_1700_Lw	720	0	0	(none)	3.0
Loader for shipping, screening	107.9	107.9	107.9	Lw	SA1_LOADER_1	720	0	0	(none)	3.0
Excavator 1, screening	103.4	103.4	103.4	Lw	Excavator_CAT30D_ LAeq	720	0	0	(none)	5.0
Excavator 2, screening	103.4	103.4	103.4	Lw	Excavator_CAT30D_ LAeq	720	0	0	(none)	3.0
Mobile Crusher	120.0	120.0	120.0	Lw	Crusher_KPI_JCI	720	0	0	(none)	3.0
Excavator for Crusher	103.4	103.4	103.4	Lw	Excavator_CAT30D_ LAeq	720	0	0	(none)	5.0
Loader for shipping. Crushing	107.9	107.9	107.9	Lw	SA1_LOADER_1	720	0	0	(none)	3.0

Table A1.4 Line Sources

Name	Point Source PWL			Numbers of vehicles per hour			Lw / Li	Modelling Type/ Noise Source Lib. File	Speed
	Day	Evening	Night	Day	Evening	Night			
	(dBA)	(dBA)	(dBA)						(km/h)
Trucks, shipping, screener	103.9	-	-	10	0	0	PWL-Pt	ConTruck_Slow_Lw	20
Loader feed to Screener	100.0	-	-	30	0	0	PWL-Pt	SA1_LOADER_1	20
Truck_Ship_Crush	101.8	-	-	4	0	0	PWL-Pt	ConTruck_Slow_Lw	20

Table A1.5 Noise Source Library & Noise Measurement Data

ID	Type	Spectra (dB)											Notes
		31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Powerscreen_Chiefton_1700	Li	66.2	70.0	72.2	69.9	64.1	64.5	64.2	60.3	51.3	70.3	77.0	Measured 21 Oct 2019, Cavanagh Pine Grove Pit
Powerscreen_Chiefton_1700_Lw	Lw	106.9	110.7	112.9	110.6	104.8	105.2	104.9	101.0	92.0	111.0	117.7	Measured 21 Oct 2019, Cavanagh Pine Grove Pit
Meas_SA1_LOADER_1	Li	90.7	96.6	86.7	74.9	75.5	81.5	74.2	66.4	58.4	83.5	98.1	Albion_Pit_30 April 2018 at 6.5m
SA1_LOADER_1	Lw	115.1	121.0	111.1	99.3	99.9	105.9	98.6	90.8	82.8	107.9	122.5	Albion_Pit_30 April 2018 at 6.5m
Meas_Excavator_CAT30D	Li	64.8	78.3	74.5	67.9	68.6	63.0	58.3	55.2	47.1	69.3	80.6	Measured 2nd April 2012 HW @ 20m, Van Dyke Q
Excavator_CAT30D_LAeq	Lw	98.9	112.4	108.6	102.0	102.7	97.1	92.4	89.3	81.2	103.4	114.7	Measured 2nd April 2012 HW @ 20m, Van Dyke Q
Crusher_KPI_JCI_Meas	Li	67.3	77.0	71.3	72.5	65.4	70.0	65.1	57.7	48.1	77.7	85.5	Measured 18 March 2019, KNL Construction Site,50m
Crusher_KPI_JCI	Lw	115.5	123.3	122.3	118.8	114.9	116.5	111.7	105.9	96.4	120.0	127.7	Measured 18 March 2019, KNL Construction Site
ConTruck_Slow_Li	Li	72.9	71.2	71.9	70.3	66.3	76.0	70.3	56.9	55.6	77.7	80.6	McNamee Measurements, 4 March 2016
ConTruck_Slow_Lw	Lw	103.4	102.2	99.8	97.6	94.3	105.7	101.8	86.1	86.1	107.8	110.4	McNamee Measurements, 4 March 2016

* Measured by Freefield Ltd. on Cavanagh site or at a similar aggregate facility in Ontario.

Table A1.6.1 Point of Reception Impacts by Source for Scenario 1

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	42.8	41.5	41.2	36.5	36.1	36.0	29.7	28.4	32.6	31.6	32.9	32.0	33.0	32.7	33.4	32.6
Loader for shipping	41.6	36.6	36.0	35.7	35.5	35.3	29.1	28.6	31.8	31.5	32.1	31.6	32.4	32.2	32.5	32.1
Excavator 1	36.7	34.3	35.3	33.0	33.6	32.5	28.5	25.7	31.2	28.6	31.5	28.8	27.0	26.9	32.4	26.8
Excavator 2	36.5	34.2	35.1	30.4	30.0	30.0	24.3	23.4	26.9	26.2	27.1	26.3	26.7	26.6	27.6	26.5
Mobile Crusher	46.5	45.6	47.3	46.5	46.6	46.3	40.8	39.9	44.7	44.0	49.8	48.2	50.2	49.6	51.2	49.8
Excavator for Crusher	35.1	32.5	35.8	30.4	30.4	30.2	29.8	24.4	33.4	30.8	33.9	31.2	33.6	32.6	35.2	32.7
Loader for shipping. Crushing	35.3	34.9	36.1	35.7	35.7	35.4	29.8	29.3	38.3	33.3	38.8	38.1	39.8	39.5	40.2	39.6
Trucks, shipping, sand	45.8	45.6	39.4	39.1	38.5	38.3	29.1	28.3	31.4	30.8	31.4	30.7	28.0	27.7	27.8	27.4
Loader feed to Screener	31.5	31.0	29.8	25.3	26.2	24.8	18.3	17.9	20.8	20.5	21.0	20.6	21.7	21.5	21.8	21.4
Truck_Ship_Crush	42.3	42.1	36.6	36.4	35.8	35.6	26.3	25.5	29.2	28.5	29.3	28.5	28.4	26.4	28.3	26.3
Total	51.8	50.8	50	48.7	48.7	48.3	42.5	41.5	46.6	45.4	50.5	49	50.9	50.3	51.9	50.5

Continued

Table A1.6.1 Point of Reception Impacts by Source for Scenario 1

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	32.7	32.2	24.9	24.0	32.3	30.1	30.7	28.5	26.5	25.8	31.9	31.0	37.6	32.8	43.1	42.7
Loader for shipping	32.2	31.8	24.3	24.1	31.8	31.2	30.3	29.8	30.4	30.0	30.6	30.4	32.1	31.9	41.4	41.5
Excavator 1	30.7	29.3	20.0	19.3	27.3	24.5	25.9	23.2	25.9	23.3	30.4	25.8	32.0	29.5	36.8	35.2
Excavator 2	26.5	26.2	20.0	19.1	27.3	24.6	25.9	23.3	21.2	20.6	26.2	25.8	27.7	27.3	36.8	35.4
Mobile Crusher	50.6	49.8	41.1	36.0	44.1	42.4	42.0	40.3	41.6	39.9	39.4	37.5	40.6	39.5	44.3	44.0
Excavator for Crusher	34.0	32.7	25.9	23.2	28.8	26.1	26.8	24.2	26.5	24.0	24.2	23.5	25.2	24.4	33.3	31.1
Loader for shipping. Crushing	40.1	39.6	30.3	25.5	33.0	32.4	31.0	30.5	30.7	30.2	28.3	27.4	29.4	29.0	33.9	33.3
Trucks, shipping, sand	25.4	25.1	19.1	15.0	22.8	22.2	21.6	20.7	21.1	20.7	27.0	23.9	30.5	26.4	38.7	39.0
Loader feed to Screener	21.4	21.0	13.8	13.5	21.2	20.6	19.8	19.3	15.2	15.1	20.6	20.6	22.3	22.3	29.9	30.4
Truck_Ship_Crush	25.2	24.8	18.5	15.4	20.7	20.1	19.3	18.4	19.1	18.5	23.0	20.3	26.3	22.6	34.2	34.4
Total	51.3	50.5	41.8	37.2	45.2	43.5	43.2	41.6	42.7	41.2	41.6	40.0	43.8	42.0	49.4	49.0

Table A1.6.2 Point of Reception Impacts by Source for Scenario 2

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	43.5	42.2	46.5	43.9	44.7	44.1	38.6	33.5	43.6	42.2	43.6	42.2	37.3	37.0	37.2	36.6
Loader for shipping	41.6	41.3	44.3	42.6	43.1	42.6	37.6	32.6	41.8	41.2	42.1	41.4	35.9	35.6	35.5	35.2
Excavator 1	36.1	35.9	39.5	38.4	38.6	38.3	33.0	30.3	37.2	34.8	37.3	34.9	34.6	33.4	35.4	33.0
Excavator 2	40.3	38.0	40.6	38.7	39.1	38.7	32.9	28.2	37.3	35.1	37.5	35.2	31.3	31.1	35.3	30.7
Mobile Crusher	44.0	41.3	47.9	47.0	47.2	46.8	40.9	40.0	44.7	44.0	49.8	48.2	50.2	49.6	51.2	49.8
Excavator for Crusher	31.2	30.0	31.9	30.7	30.6	30.5	29.9	27.0	33.4	30.8	33.9	31.2	33.6	32.6	35.2	32.7
Loader for shipping. Crushing	35.9	35.4	36.7	36.1	36.2	35.9	29.9	29.4	38.3	33.3	38.8	38.1	39.8	39.5	40.2	39.6
Trucks, shipping, sand	43.9	43.3	38.7	37.8	37.5	37.3	27.1	26.2	33.6	33.1	33.7	33.1	29.0	28.6	28.8	27.2
Loader feed to Screener	36.6	35.4	36.9	35.0	35.6	35.1	27.0	25.2	34.7	31.3	34.8	31.3	28.5	28.2	27.9	27.8
Truck_Ship_Crush	39.8	39.3	34.6	34.2	33.7	33.5	25.7	23.3	30.2	29.6	30.4	29.6	27.1	26.8	27.2	26.1
Total	50.8	49.6	52.4	51.0	51.3	50.9	45.1	42.6	49.7	48.4	52.1	50.6	51.2	50.7	52.1	50.8

Continued

Table A1.6.2 Point of Reception Impacts by Source for Scenario 2

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	35.5	35.0	24.5	23.6	30.9	28.6	29.2	26.9	29.0	23.9	29.0	28.2	30.9	30.2	40.9	36.3
Loader for shipping	34.1	33.7	28.1	27.6	30.2	29.5	24.0	23.8	28.4	23.7	28.1	27.8	30.0	29.7	40.0	35.5
Excavator 1	32.8	31.4	24.0	21.3	26.0	23.2	24.5	21.8	24.3	21.6	28.1	22.8	25.3	24.6	34.8	29.9
Excavator 2	29.3	28.9	19.5	18.7	25.8	20.5	24.2	21.6	24.0	18.8	23.5	22.7	25.3	24.4	33.9	29.6
Mobile Crusher	50.6	49.8	41.1	36.0	44.1	42.4	42.0	40.3	41.6	39.9	39.4	37.5	40.6	39.5	44.7	44.3
Excavator for Crusher	34.0	32.7	25.9	23.2	28.8	26.1	26.8	24.2	26.5	24.0	24.2	23.5	25.2	24.4	33.7	31.5
Loader for shipping. Crushing	40.1	39.6	30.3	25.5	33.0	32.4	31.0	30.5	30.7	30.2	28.3	27.4	29.4	29.0	34.2	34.2
Trucks, shipping, sand	26.2	25.7	19.6	16.2	22.9	22.1	20.9	20.3	20.0	15.9	23.1	22.8	25.7	25.6	36.5	34.2
Loader feed to Screener	26.4	26.0	15.6	15.3	22.1	17.2	20.5	19.9	20.2	15.5	19.6	19.3	21.4	21.2	30.9	26.4
Truck_Ship_Crush	25.8	25.2	19.1	14.6	21.8	21.1	20.0	19.5	19.8	17.5	21.0	20.7	26.3	23.1	34.2	32.3
Total	51.4	50.6	42.0	37.5	45.1	43.3	42.9	41.2	42.7	40.8	40.9	39.3	42.2	41.2	48.5	46.6

Table A1.6.3 Point of Reception Impacts by Source for Scenario 3

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	45.5	43.7	42.0	42.1	41.1	41.0	36.3	31.1	39.2	37.5	39.3	37.5	33.6	33.2	33.7	32.9
Loader for shipping	43.9	42.7	41.0	41.7	40.3	40.4	35.6	34.8	38.2	37.6	38.2	37.5	32.7	32.4	32.5	32.2
Excavator 1	38.4	37.7	35.3	35.6	34.5	34.6	30.7	26.9	33.4	30.8	33.5	30.8	27.5	27.3	32.5	27.1
Excavator 2	39.5	40.0	38.1	36.0	36.4	35.4	26.3	24.8	32.2	29.6	32.2	29.6	26.4	26.1	27.0	25.9
Mobile Crusher	44.0	41.3	47.9	47.0	47.2	46.8	40.9	40.0	44.7	44.0	49.8	48.2	50.2	49.6	51.2	49.8
Excavator for Crusher	31.2	30.0	31.9	30.7	30.6	30.5	29.9	27.0	33.4	30.8	33.9	31.2	33.6	32.6	35.2	32.7
Loader for shipping. Crushing	35.9	35.4	36.7	36.1	36.2	35.9	29.9	29.4	38.3	33.3	38.8	38.1	39.8	39.5	40.2	39.6
Trucks, shipping, sand	42.7	42.3	35.5	35.5	34.5	34.5	23.6	23.1	28.1	27.1	28.1	27.5	25.7	25.2	25.5	22.1
Loader feed to Screener	38.6	38.8	37.2	33.9	33.4	33.3	25.3	24.8	32.1	29.8	32.1	31.3	26.7	26.4	26.5	26.2
Truck_Ship_Crush	39.8	39.3	34.6	34.2	33.7	33.5	25.7	23.3	30.2	29.6	30.4	29.6	27.1	26.8	27.2	26.1
Total	51.5	50.4	50.7	50.1	49.8	49.5	43.9	42.4	47.8	46.5	51.1	49.5	50.9	50.4	51.9	50.5

Continued

Table A1.6.3 Point of Reception Impacts by Source for Scenario 3

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	32.4	31.9	23.8	23.0	30.8	28.4	29.2	26.9	25.0	24.2	31.6	30.8	33.9	33.4	41.9	42.2
Loader for shipping	31.6	31.2	23.0	22.7	29.9	29.3	28.5	28.0	24.0	23.9	30.2	29.9	32.4	32.3	39.8	40.3
Excavator 1	26.5	26.2	19.0	18.3	25.9	23.1	24.5	21.8	24.6	19.4	30.2	25.2	28.0	27.5	39.7	35.4
Excavator 2	25.4	25.1		17.8	25.5	22.8	24.3	21.6	19.3	18.6	26.0	23.9	28.4	26.0	36.6	36.9
Mobile Crusher	50.6	49.8	41.1	36.0	44.1	42.4	42.0	40.3	41.6	39.9	39.4	37.5	40.6	39.5	44.7	44.3
Excavator for Crusher	34.0	32.7	25.9	23.2	28.8	26.1	26.8	24.2	26.5	24.0	24.2	23.5	25.2	24.4	33.7	31.5
Loader for shipping. Crushing	40.1	39.6	30.3	25.5	33.0	32.4	31.0	30.5	30.7	30.2	28.3	27.4	29.4	29.0	34.2	34.2
Trucks, shipping, sand	20.7	20.2	13.7	13.0	18.2	17.5	16.5	15.9	11.9	11.5	19.6	19.5	22.4	22.6	35.4	32.0
Loader feed to Screener	25.6	25.2	19.3	17.1	24.6	24.0	23.2	22.7	18.7	18.5	25.5	24.9	27.9	27.4	36.2	36.7
Truck_Ship_Crush	25.8	25.2	19.1	14.6	21.8	21.1	20.0	19.5	19.8	17.5	21.0	20.7	26.3	23.1	34.2	32.3
Total	51.2	50.5	41.8	37.1	45.0	43.4	43.0	41.4	42.4	40.8	41.5	39.9	42.9	42.0	49.2	48.7

Table A1.6.4 Point of Reception Impacts by Source for Scenario 4

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	45.9	43.9	48.3	45.2	45.9	45.1	39.6	34.4	43.5	42.2	43.3	42.0	37.2	36.8	37.1	36.4
Loader for shipping	43.5	42.8	45.9	43.5	44.0	43.4	38.3	37.5	41.6	41.1	41.5	40.8	35.5	35.1	35.0	34.8
Excavator 1	37.7	37.3	41.5	39.3	39.6	39.1	33.6	30.9	37.1	34.7	37.0	34.6	34.3	33.1	35.1	32.7
Excavator 2	43.9	41.7	44.6	42.6	41.7	41.5	29.8	29.1	38.1	35.8	37.7	35.3	30.3	30.0	34.6	29.5
Mobile Crusher	44.6	41.6	48.6	47.3	47.5	47.1	40.9	40.0	44.7	44.0	49.8	48.2	50.2	49.6	51.2	49.8
Excavator for Crusher	31.8	30.2	32.5	30.8	30.9	30.6	29.9	27.0	33.4	30.8	33.9	31.2	33.6	32.6	35.2	32.7
Loader for shipping. Crushing	36.4	35.7	37.3	36.4	36.6	36.2	29.9	29.4	38.3	33.3	38.8	38.1	39.8	39.5	40.2	39.6
Trucks, shipping, sand	43.5	42.7	40.5	39.5	38.8	38.5	27.7	27.1	33.8	33.2	33.8	33.1	27.3	26.9	27.1	26.5
Loader feed to Screener	43.3	42.5	43.6	40.4	40.6	40.1	33.6	30.4	38.5	38.0	38.3	37.7	31.2	30.9	30.6	30.4
Truck_Ship_Crush	39.8	39.2	35.7	35.2	34.6	34.4	26.0	23.3	30.6	30.0	30.8	30.0	26.7	26.4	26.7	26.2
Total	52.6	51.1	54.3	52.2	52.4	51.9	45.6	43.7	49.9	48.7	52.1	50.7	51.2	50.6	52.1	50.7

Continued

Table A1.6.4 Point of Reception Impacts by Source for Scenario 4

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	35.3	34.8	24.3	23.4	30.8	28.4	29.1	26.7	28.9	23.8	28.9	28.2	30.9	30.2	41.5	36.6
Loader for shipping	33.7	33.3	28.0	27.4	30.0	29.4	23.9	23.7	28.3	23.5	28.2	27.9	30.2	29.9	40.6	36.1
Excavator 1	32.5	31.1	23.8	21.1	25.9	23.1	24.3	21.6	24.1	21.5	28.2	22.9	25.5	24.7	35.3	30.3
Excavator 2	28.1	27.8	18.7	18.0	25.1	19.7	19.2	18.3	23.4	18.2	23.6	22.7	25.5	24.7	36.1	30.7
Mobile Crusher	50.6	49.8	41.1	36.0	44.1	42.4	42.0	40.3	41.6	39.9	39.4	37.5	40.6	39.5	44.7	44.3
Excavator for Crusher	34.0	32.7	25.9	23.2	28.8	26.1	26.8	24.2	26.5	24.0	24.2	23.5	25.2	24.4	33.7	31.5
Loader for shipping. Crushing	40.1	39.6	30.3	25.5	33.0	32.4	31.0	30.5	30.7	30.2	28.3	27.4	29.4	29.0	34.2	34.2
Trucks, shipping, sand	25.3	24.7	17.9	15.1	21.0	18.2	19.8	16.8	16.8	14.6	21.9	21.4	24.5	24.3	34.4	32.9
Loader feed to Screener	29.1	28.6	18.5	18.3	25.0	20.1	23.4	18.7	20.2	18.5	23.1	22.8	25.1	24.9	35.8	31.1
Truck_Ship_Crush	25.9	25.4	19.2	14.0	21.9	21.3	20.2	19.2	19.7	17.6	21.3	20.9	26.4	23.3	32.8	32.5
Total	51.4	50.6	42.0	37.5	45.1	43.3	42.9	41.2	42.6	40.8	40.9	39.3	42.2	41.3	48.8	46.7

Table A1.6.5 Point of Reception Impacts by Source for Scenario 5

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	46.8	45.1	43.7	46.5	42.2	42.7	36.9	34.9	39.7	38.0	39.6	37.7	33.4	33.0	33.5	32.7
Loader for shipping	45.1	43.5	42.2	43.9	41.3	41.6	36.2	35.4	38.5	37.9	38.5	37.8	32.6	32.2	32.4	32.0
Excavator 1	39.6	38.4	36.2	37.2	35.3	35.4	31.5	28.6	33.8	31.1	33.8	31.0	27.4	27.2	32.4	27.0
Excavator 2	45.1	43.2	35.4	34.8	34.2	34.2	26.4	25.5	30.4	28.7	32.9	30.1	25.9	25.6	26.4	25.4
Mobile Crusher	44.6	41.6	48.6	47.3	47.5	47.1	40.9	40.0	44.7	44.0	49.8	48.2	50.2	49.6	51.2	49.8
Excavator for Crusher	31.8	30.2	32.5	30.8	30.9	30.6	29.9	27.0	33.4	30.8	33.9	31.2	33.6	32.6	35.2	32.7
Loader for shipping. Crushing	36.4	35.7	37.3	36.4	36.6	36.2	29.9	29.4	38.3	33.3	38.8	38.1	39.8	39.5	40.2	39.6
Trucks, shipping, sand	42.6	42.1	36.7	36.6	35.6	35.6	24.4	22.6	29.3	28.7	29.2	28.5	23.4	22.9	23.5	22.6
Loader feed to Screener	46.7	46.3	41.6	40.3	39.1	39.3	28.6	28.1	35.2	34.5	35.1	34.4	28.8	28.5	28.6	28.2
Truck_Ship_Crush	39.8	39.2	35.7	35.2	34.6	34.4	26.0	23.3	30.6	30.0	30.8	30.0	26.7	26.4	26.7	26.2
Total	53.6	52.3	51.8	51.9	50.5	50.4	44.3	43.0	48.1	46.8	51.2	49.6	50.9	50.4	51.9	50.5

Continued

Table A1.6.5 Point of Reception Impacts by Source for Scenario 5

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	32.2	31.7	23.7	22.8	30.6	28.2	29.1	26.8	24.8	24.1	31.6	30.9	34.1	33.6	42.3	42.7
Loader for shipping	31.4	31.0	22.9	22.6	29.9	29.2	28.4	27.9	24.0	23.8	30.2	30.0	32.5	32.4	40.0	40.5
Excavator 1	26.3	26.0	18.9	18.2	25.8	23.0	24.4	21.7	24.5	19.4	27.1	25.2	28.1	27.6	39.9	35.7
Excavator 2	24.8	24.5	22.5	17.1	24.7	22.0	23.5	20.8	18.3	17.7	25.2	22.3	27.5	24.1	36.1	36.1
Mobile Crusher	50.6	49.8	41.1	36.0	44.1	42.4	42.0	40.3	41.6	39.9	39.4	37.5	40.6	39.5	44.7	44.3
Excavator for Crusher	34.0	32.7	25.9	23.2	28.8	26.1	26.8	24.2	26.5	24.0	24.2	23.5	25.2	24.4	33.7	31.5
Loader for shipping. Crushing	40.1	39.6	30.3	25.5	33.0	32.4	31.0	30.5	30.7	30.2	28.3	27.4	29.4	29.0	34.2	34.2
Trucks, shipping, sand	21.2	20.6	15.5	11.3	18.5	17.8	16.8	13.1	12.1	11.7	20.2	19.7	23.0	22.8	33.1	32.5
Loader feed to Screener	27.7	27.3	22.3	19.3	26.4	25.7	25.1	20.4	20.6	20.4	27.7	27.2	30.4	29.7	39.1	39.3
Truck_Ship_Crush	25.9	25.4	19.3	14.3	21.9	21.3	20.2	19.2	19.7	17.6	21.3	20.9	26.4	23.3	32.8	32.5
Total	51.2	50.5	41.8	37.1	45.1	43.4	43.0	41.3	42.4	40.8	41.4	40.0	43.0	42.1	49.4	49.1

Table A1.7.1 Distances, Source to Point of Reception (m) – Scenario 1

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	497	495	580	571	602	596	1119	1126	896	892	884	884	891	886	898	891
Loader for shipping	521	519	583	576	605	599	1118	1125	879	875	864	863	857	851	861	853
Excavator 1	503	501	581	573	603	597	1120	1127	893	890	881	881	885	879	891	883
Excavator 2	517	515	605	596	627	621	1145	1152	922	919	910	910	915	909	921	913
Mobile Crusher	650	651	610	610	624	623	1084	1088	772	766	735	734	651	641	638	632
Excavator for Crusher	652	654	612	612	627	626	1086	1090	774	768	736	735	651	641	638	632
Loader for shipping. Crushing	643	644	597	597	611	610	1067	1071	754	748	716	715	633	623	621	614
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Continued

Table A1.7.1 Distances, Source to Point of Reception (m) – Scenario 1

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	918	923	1772	1754	1386	1373	1560	1531	1530	1494	923	905	796	781	487	449
Loader for shipping	875	879	1723	1706	1345	1332	1525	1495	1504	1468	963	944	843	828	537	499
Excavator 1	909	914	1761	1744	1377	1364	1551	1522	1523	1487	931	912	806	791	498	460
Excavator 2	937	942	1773	1755	1379	1365	1548	1518	1513	1476	902	883	780	765	485	447
Mobile Crusher	624	627	1497	1478	1187	1176	1411	1382	1451	1417	1215	1195	1110	1096	790	753
Excavator for Crusher	624	626	1494	1476	1184	1173	1409	1379	1448	1414	1217	1196	1112	1098	793	755
Loader for shipping. Crushing	609	612	1499	1481	1196	1186	1424	1394	1466	1432	1229	1208	1121	1106	794	757
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Table A1.7.2 Distances, Source to Point of Reception (m) – Scenario 2

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	336	340	235	236	249	248	735	741	494	491	490	490	566	567	599	589
Loader for shipping	319	323	236	235	252	250	746	752	515	512	512	512	590	591	622	613
Excavator 1	347	351	238	240	251	251	731	737	485	482	479	480	553	554	586	577
Excavator 2	334	339	208	211	220	220	698	704	460	456	457	458	548	550	584	575
Mobile Crusher	650	651	610	610	624	623	1084	1088	772	766	735	734	651	641	638	632
Excavator for Crusher	652	654	612	612	627	626	1086	1090	774	768	736	735	651	641	638	632
Loader for shipping. Crushing	643	644	597	597	611	610	1067	1071	754	748	716	715	633	623	621	614
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Continued

Table A1.7.2 Distances, Source to Point of Reception (m) – Scenario 2

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	680	690	1807	1788	1553	1543	1786	1756	1820	1786	1277	1261	1096	1075	665	635
Loader for shipping	702	711	1819	1800	1557	1547	1786	1757	1816	1781	1254	1238	1072	1051	641	611
Excavator 1	668	678	1799	1780	1549	1539	1783	1754	1820	1786	1288	1273	1108	1088	678	647
Excavator 2	673	684	1822	1803	1579	1569	1815	1785	1853	1819	1307	1292	1122	1101	686	656
Mobile Crusher	624	627	1497	1478	1187	1176	1411	1382	1451	1417	1215	1195	1110	1096	790	753
Excavator for Crusher	624	626	1494	1476	1184	1173	1409	1379	1448	1414	1217	1196	1112	1098	793	755
Loader for shipping. Crushing	609	612	1499	1481	1196	1186	1424	1394	1466	1432	1229	1208	1121	1106	794	757
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Table A1.7.3 Distances, Source to Point of Reception (m) – Scenario 3

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	263	261	379	368	403	395	921	929	756	754	763	764	844	844	870	861
Loader for shipping	243	241	355	344	379	371	897	905	735	733	742	744	829	830	857	848
Excavator 1	271	269	385	374	409	401	927	935	760	757	765	766	844	843	870	861
Excavator 2	291	286	455	442	479	470	989	998	849	847	859	860	946	946	972	963
Mobile Crusher	650	651	610	610	624	623	1084	1088	772	766	735	734	651	641	638	632
Excavator for Crusher	652	654	612	612	627	626	1086	1090	774	768	736	735	651	641	638	632
Loader for shipping. Crushing	643	644	597	597	611	610	1067	1071	754	748	716	715	633	623	621	614
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Continued

Table A1.7.3 Distances, Source to Point of Reception (m) – Scenario 3

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	931	939	1935	1917	1594	1581	1783	1754	1763	1727	1000	986	814	793	394	360
Loader for shipping	922	930	1941	1923	1606	1594	1799	1769	1782	1746	1021	1007	831	810	405	372
Excavator 1	929	937	1930	1911	1587	1574	1776	1746	1755	1719	998	983	812	792	396	362
Excavator 2	1030	1038	2002	1984	1635	1622	1809	1780	1769	1732	907	893	713	692	295	260
Mobile Crusher	624	627	1497	1478	1187	1176	1411	1382	1451	1417	1215	1195	1110	1096	790	753
Excavator for Crusher	624	626	1494	1476	1184	1173	1409	1379	1448	1414	1217	1196	1112	1098	793	755
Loader for shipping. Crushing	609	612	1499	1481	1196	1186	1424	1394	1466	1432	1229	1208	1121	1106	794	757
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Table A1.7.4 Distances, Source to Point of Reception (m) – Scenario 4

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	320	324	213	214	227	226	716	722	484	481	482	483	571	572	605	596
Loader for shipping	287	291	217	215	235	232	740	746	524	522	526	527	616	618	650	641
Excavator 1	314	319	212	213	227	226	719	725	490	487	489	489	578	579	612	603
Excavator 2	235	241	95	93	114	110	628	635	459	457	476	478	624	629	670	660
Mobile Crusher	650	651	610	610	624	623	1084	1088	772	766	735	734	651	641	638	632
Excavator for Crusher	652	654	612	612	627	626	1086	1090	774	768	736	735	651	641	638	632
Loader for shipping. Crushing	643	644	597	597	611	610	1067	1071	754	748	716	715	633	623	621	614
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Continued

Table A1.7.4 Distances, Source to Point of Reception (m) – Scenario 4

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	691	702	1827	1808	1575	1565	1808	1778	1842	1807	1282	1267	1097	1076	662	632
Loader for shipping	732	742	1849	1830	1582	1572	1808	1779	1833	1798	1237	1223	1051	1030	616	586
Excavator 1	698	708	1831	1812	1577	1567	1809	1779	1841	1806	1275	1260	1090	1069	655	625
Excavator 2	775	786	1944	1925	1697	1687	1928	1898	1955	1920	1299	1286	1094	1072	639	614
Mobile Crusher	624	627	1497	1478	1187	1176	1411	1382	1451	1417	1215	1195	1110	1096	790	753
Excavator for Crusher	624	626	1494	1476	1184	1173	1409	1379	1448	1414	1217	1196	1112	1098	793	755
Loader for shipping. Crushing	609	612	1499	1481	1196	1186	1424	1394	1466	1432	1229	1208	1121	1106	794	757
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Table A1.7.5 Distances, Source to Point of Reception (m) – Scenario 5

POR	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	250	247	379	367	403	395	919	928	764	762	772	773	859	860	887	878
Loader for shipping	239	237	360	348	384	376	901	909	743	741	752	753	841	842	869	861
Excavator 1	259	257	382	370	406	398	923	931	762	760	769	771	853	853	879	871
Excavator 2	216	210	426	411	450	440	934	944	844	843	865	867	988	990	1022	1013
Mobile Crusher	650	651	610	610	624	623	1084	1088	772	766	735	734	651	641	638	632
Excavator for Crusher	652	654	612	612	627	626	1086	1090	774	768	736	735	651	641	638	632
Loader for shipping. Crushing	643	644	597	597	611	610	1067	1071	754	748	716	715	633	623	621	614
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Continued

Table A1.7.5 Distances, Source to Point of Reception (m) – Scenario 5

POR	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
Window/Outdoor	W	O	W	O	W	O	W	O	W	O	W	O	W	O	W	O
Source																
Screening Plant	950	958	1957	1939	1614	1602	1802	1772	1779	1743	992	978	801	780	376	343
Loader for shipping	935	943	1953	1934	1615	1603	1806	1777	1787	1751	1012	999	820	800	392	360
Excavator 1	941	949	1945	1927	1602	1589	1790	1761	1768	1732	994	980	805	785	384	351
Excavator 2	1097	1106	2115	2097	1758	1745	1933	1904	1891	1854	932	922	710	687	250	226
Mobile Crusher	624	627	1497	1478	1187	1176	1411	1382	1451	1417	1215	1195	1110	1096	790	753
Excavator for Crusher	624	626	1494	1476	1184	1173	1409	1379	1448	1414	1217	1196	1112	1098	793	755
Loader for shipping. Crushing	609	612	1499	1481	1196	1186	1424	1394	1466	1432	1229	1208	1121	1106	794	757
Trucks, shipping, sand	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Loader feed to Screener	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies
Truck_Ship_Crush	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies

Appendix 2

Background Traffic Noise Analysis

This appendix presents the results of an analysis of background noise from road traffic on Albion Road and Rideau Road at receptors in the vicinity of the proposed Cavanagh Ottawa Airport Pit.

Noise generated by road traffic is calculated from traffic data using STAMSON[5,6], a traffic noise model developed by the MECP. STAMSON takes into account such factors as traffic speed, distance from the road, height, nature of the intervening buildings and terrain, ground absorption, and noise barriers, if present.

The results of the background noise level calculations are presented in Tables A2.1 at the relevant points of reception. Samples of the outputs of the STAMSON software are also provided.

Noise calculations are based on the most recently available traffic data for Albion and Rideau Roads provided by the City of Ottawa, attached. Data provided by the City are recent intersection turning movement traffic surveys for the following intersections.

Albion Road at the entry to the Rideau Carleton Raceway and Slots, Tuesday 1 September 2015

Albion Road and Rideau Road, Thursday 4 May 2017

The City data provides peak hour counts, a breakdown of heavy vehicle counts, and an estimate of 24-hour counts (AADT).

In order to consider the lowest background noise occurring during the daytime hours (07:00 to 19:00), hourly traffic volumes were calculated from AADT based on the methodology contained RWDI AIR Inc. Publication, "Typical Hourly Traffic Distribution for Noise Modelling", Vol. 36 No. 3 (2008)[8]. The calculated noise at each point of reception for the hour with the least traffic volume is taken to be the sound level limit for the whole daytime period. Where there are adjacent houses, the lowest sound level limit is assumed to apply to all the adjacent houses.

Contents:

Table A2.1: Background Sound Level at Receptors Impacted by Noise from Road Traffic on Albion Road and Rideau Road

Point of Reception **(applied both to plane of window and outdoor points of reception)**	**Sound Level Limit 1-hour L_{AEQ} dBA (Daytime Period, 07:00 – 19:00)**
POR 1, POR 2 & POR 3 (on Albion Rd. north of Rideau Rd.)	55.0 (see Table A2.4)
POR 4 (on Rideau Road, east of Albion Road)	57.5 (see Table A2.5)
POR 5 (at the intersection of Albion and Rideau, most affected by traffic on Albion Rd. south of Rideau Rd.)	65.5 (see Table A2.6)
POR 6 (on Rideau Road, west of Albion Road)	57.5 (see Table A2.7.1)
POR 7, POR 8 & POR 9 (on Rideau Road, west of Albion Road)	58.5 (see Table A2.7.2)

Table A2.2 Calculation of Road Volumes, Albion @ Rideau Carleton Raceway
Source Data: City of Ottawa, Albion Rd. @ 210 m South of High Rd., Tuesday 1 September 2015
Note: This is a T-intersection
Count Hours: 7 - 10 am, 11:30 am - 1:30 pm, 3 - 6 pm, 8 hours total

Turning Movement Counts	Albion Northbound			Albion Southbound			RCR Eastbound			RCR Westbound		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
8 hr totals, all vehicles	0	2418	139	663	2247	0	0	0	0	107	0	350
8 hr Total, Heavy vehicles	0	133	8	12	147	0	0	0	0	4	0	11
% Heavy Vehicles												
24 hr estimates, all vehicles	0	4403	253	1207	4092	0	0	0	0	195	0	637

Road Volumes	Albion, North of RCR Entrance			Albion, South of RCR Entrance			RCR Entrance, East of Albion			no road		
	N bound	S bound	2-way Tot	N bound	S bound	2-way Tot	E Bound	W Bound	2-way Tot	E Bound	W Bound	2-way Tot
8 hr totals, all vehicles	2768	2910	5678	2557	2354	4911	802	457	1259	0	0	0
8 hr Total, Heavy vehicles	144	159	303	141	151	292	20	15	35	0	0	0
% Heavy Vehicles	5.20	5.46	5.34	5.51	6.41	5.95	2.49	3.28	2.78	#DIV/0!	#DIV/0!	#DIV/0!
24 hr estimates, all vehicles	5040	5299	10339	4656	4287	8943	1460	832	2292	0	0	0

Table A2.3 Calculation of Road Volumes, Albion @ Rideau
Source Data: City of Ottawa, Albion Rd. @ Rideau Rd., Thursday 4 May 2017
Count Hours: 7 - 10 am, 11:30 am - 1:30 pm, 3 - 6 pm, 8 hours total

Turning Movement Counts	Albion Northbound			Albion Southbound			Rideau Eastbound			Rideau Westbound		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
8 hr totals, all vehicles	170	2431	679	337	1935	198	172	801	226	828	1154	380
8 hr Total, Heavy vehicles	19	73	177	15	87	7	5	112	35	174	84	31
% Heavy Vehicles												
24 hr estimates, all vehicles	279	3984	1113	552	3171	324	282	1313	370	1357	1891	623

Road Volumes	Albion, North of Rideau			Albion, South of Rideau			Rideau, East of Albion			Rideau, West of Albion		
	N bound	S bound	2-way Tot	N bound	S bound	2-way Tot	E Bound	W Bound	2-way Tot	E Bound	W Bound	2-way Tot
8 hr totals, all vehicles	2983	2470	5453	3280	2989	6269	1817	2362	4179	1199	1522	2721
8 hr Total, Heavy vehicles	109	109	218	269	296	565	304	289	593	152	110	262
% Heavy Vehicles	3.65	4.41	4.00	8.20	9.90	9.01	16.73	12.24	14.19	12.68	7.23	9.63
24 hr estimates, all vehicles	4889	4047	8936	5376	4898	10274	2978	3871	6849	1965	2494	4459

Table A2.4: Traffic Volumes and Calculated Noise, Albion north of Rideau

Albion Road, immediately north of Rideau Road
Posted Speed Limit: 60 km/h Vehicle Classification based on count data and City Guideline[1]

Hour Beginning	Typical Distribution See Ref. 8 %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification Cars 89%	Medium Trucks 7%	Heavy Trucks 4%	Estimated Noise Levels by STAMSON POR_1_W d = 39 m 0 to 90 deg h = 4.5 m	POR_1_O d = 39 m 0 to 90 deg h = 1.5 m	POR_2_W d = 25 m 0 to 90 deg h = 4.5 m	POR_2_O d = 25 m 0 to 90 deg h = 1.5 m	POR_3_W d = 36 m 0 to 90 deg h = 4.5 m	POR_3_O d = 36 m 0 to 90 deg h = 1.5 m
Midnight	0.87	76.3	67.9	5.3	3.1						
1:00	0.49	43.0	38.2	3.0	1.7						
2:00	0.36	31.6	28.1	2.2	1.3						
3:00	0.30	26.3	23.4	1.8	1.1						
4:00	0.36	31.6	28.1	2.2	1.3						
5:00	0.95	83.3	74.2	5.8	3.3						
6:00	2.75	241.2	214.7	16.9	9.6						
7:00	5.05	442.9	394.2	31.0	17.7	55.78	**55.27**	58.82	58.47	56.32	55.84
8:00	6.55	574.5	511.3	40.2	23.0						
9:00	5.62	492.9	438.7	34.5	19.7	58.79	58.46	61.83	61.48	59.34	60.66
10:00	5.50	482.4	429.3	33.8	19.3						
11:00	6.04	529.8	471.5	37.1	21.2						
12:00	6.48	568.3	505.8	39.8	22.7						
13:00	6.26	549.0	488.7	38.4	22.0						
14:00	6.60	578.9	515.2	40.5	23.2						
15:00	7.41	649.9	578.4	45.5	26.0						
16:00	7.82	685.9	610.4	48.0	27.4						
17:00	7.65	671.0	597.2	47.0	26.8						
18:00	6.27	549.9	489.4	38.5	22.0						
19:00	5.12	449.1	399.7	31.4	18.0						
20:00	4.99	437.7	389.5	30.6	17.5						
21:00	3.41	299.1	266.2	20.9	12.0						
22:00	3.41	299.1	266.2	20.9	12.0						
23:00	1.67	146.5	130.4	10.3	5.9						
Total		**8940**									

Table A2.5: Traffic Volumes and Calculated Noise, Rideau East of Albion

Rideau Road, immediately east of Albion Road, Posted Speed Limit: 80 km/h, Vehicle Classification based on count data and City Guideline[1]

Hour Beginning	Typical Distribution* %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification: Cars 79%	Medium Trucks 7%	Heavy Trucks 14%	Estimated Noise Levels by STAMSON: POR_4_W d = 41 m 0 to 90 deg h = 4.5 m	POR_4_O d = 52 m 0 to 90 deg h = 1.5 m	POR_5_W d = 22 m 0 to 90 deg h = 4.5 m	POR_5_O d = 22 m 0 to 90 deg h = 1.5 m
Midnight	0.87	58.5	46.2	4.1	8.2				
1:00	0.49	32.9	26.0	2.3	4.6				
2:00	0.36	24.2	19.1	1.7	3.4				
3:00	0.30	20.2	15.9	1.4	2.8				
4:00	0.36	24.2	19.1	1.7	3.4				
5:00	0.95	63.8	50.4	4.5	8.9				
6:00	2.75	184.8	146.0	12.9	25.9				
7:00	5.05	339.3	268.1	23.8	47.5	60.00	**57.75**	64.21	63.91
8:00	6.55	440.1	347.7	30.8	61.6				
9:00	5.62	377.6	298.3	26.4	52.9				
10:00	5.50	369.6	292.0	25.9	51.7				
11:00	6.04	405.8	320.6	28.4	56.8				
12:00	6.48	435.4	344.0	30.5	61.0				
13:00	6.26	420.6	332.3	29.4	58.9				
14:00	6.60	443.5	350.3	31.0	62.1				
15:00	7.41	497.9	393.3	34.9	69.7				
16:00	7.82	525.5	415.1	36.8	73.6				
17:00	7.65	514.0	406.1	36.0	72.0				
18:00	6.27	421.3	332.8	29.5	59.0				
19:00	5.12	344.0	271.8	24.1	48.2				
20:00	4.99	335.3	264.9	23.5	46.9				
21:00	3.41	229.1	181.0	16.0	32.1				
22:00	3.41	229.1	181.0	16.0	32.1				
23:00	1.67	112.2	88.6	7.9	15.7				
Total	101.93	**6849**							

Table A2.6: Traffic Volumes and Calculated Noise, Albion South of Rideau

Albion Road, immediately south of Rideau Road, Posted Speed Limit: 80 km/hr, Vehicle Classification based on count data and City Guideline[1]

Hour Beginning	Typical Distribution* %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification Cars 84%	Medium Trucks 7%	Heavy Trucks 9%	Estimated Noise Levels by STAMSON POR_5_W d = 30 m -90,+90 deg h = 4.5 m	POR_5_O d = 22 m -90,+90 deg h = 1.5 m
Midnight	0.87	87.7	73.7	6.1	7.9		
1:00	0.49	49.4	41.5	3.5	4.4		
2:00	0.36	36.3	30.5	2.5	3.3		
3:00	0.30	30.2	25.4	2.1	2.7		
4:00	0.36	36.3	30.5	2.5	3.3		
5:00	0.95	95.8	80.4	6.7	8.6		
6:00	2.75	277.2	232.8	19.4	24.9		
7:00	5.05	509.0	427.6	35.6	45.8	**65.54**	67.34
8:00	6.55	660.2	554.6	46.2	59.4		
9:00	5.62	566.5	475.8	39.7	51.0		
10:00	5.50	554.4	465.7	38.8	49.9		
11:00	6.04	608.8	511.4	42.6	54.8		
12:00	6.48	653.1	548.6	45.7	58.8		
13:00	6.26	631.0	530.0	44.2	56.8		
14:00	6.60	665.2	558.8	46.6	59.9		
15:00	7.41	746.9	627.4	52.3	67.2		
16:00	7.82	788.2	662.1	55.2	70.9		
17:00	7.65	771.1	647.7	54.0	69.4		
18:00	6.27	632.0	530.9	44.2	56.9		
19:00	5.12	516.1	433.5	36.1	46.4		
20:00	4.99	503.0	422.5	35.2	45.3		
21:00	3.41	343.7	288.7	24.1	30.9		
22:00	3.41	343.7	288.7	24.1	30.9		
23:00	1.67	168.3	141.4	11.8	15.1		
Total	101.93	**10274**					

Table A2.7.1: Traffic Volumes and Calculated Noise, Rideau West of Albion (Part 1)

Rideau Road, immediately west of Albion Road, Posted Speed Limit: 80 km/hr, Vehicle Classification based on count data and City Guideline[1]

Hour Beginning	Typical Distribution* %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification: Cars 84%	Medium Trucks 7%	Heavy Trucks 9%	Estimated Noise Levels by STAMSON: POR_6_W d = 33 m 0 to 90 deg h = 4.5 m	POR_6_O d = 33 m 0 to 90 deg h = 1.5 m
Midnight	0.87	38.1	32.0	2.7	3.4		
1:00	0.49	21.4	18.0	1.5	1.9		
2:00	0.36	15.7	13.2	1.1	1.4		
3:00	0.30	13.1	11.0	0.9	1.2		
4:00	0.36	15.7	13.2	1.1	1.4		
5:00	0.95	41.6	34.9	2.9	3.7		
6:00	2.75	120.3	101.1	8.4	10.8		
7:00	5.05	220.9	185.6	15.5	19.9	58.31	**57.85**
8:00	6.55	286.5	240.7	20.1	25.8		
9:00	5.62	245.9	206.5	17.2	22.1		
10:00	5.50	240.6	202.1	16.8	21.7	64.07	63.14
11:00	6.04	264.2	221.9	18.5	23.8		
12:00	6.48	283.5	238.1	19.8	25.5		
13:00	6.26	273.8	230.0	19.2	24.6		
14:00	6.60	288.7	242.5	20.2	26.0		
15:00	7.41	324.2	272.3	22.7	29.2		
16:00	7.82	342.1	287.4	23.9	30.8		
17:00	7.65	334.7	281.1	23.4	30.1		
18:00	6.27	274.3	230.4	19.2	24.7		
19:00	5.12	224.0	188.1	15.7	20.2		
20:00	4.99	218.3	183.4	15.3	19.6		
21:00	3.41	149.2	125.3	10.4	13.4		
22:00	3.41	149.2	125.3	10.4	13.4		
23:00	1.67	73.1	61.4	5.1	6.6		
Total	101.93	**4459**					

Table A2.7.2: Traffic Volumes and Calculated Noise, Rideau West of Albion (Part 2)

Rideau Road, immediately west of Albion Road, Posted Speed Limit: 80 km/hr, Vehicle Classification based on count data and City Guideline[1]

Hour Beginning	Typical Distribution* %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification: Cars 84%	Medium Trucks 7%	Heavy Trucks 9%	POR_7_W d = 24 m 0 to 90 deg h = 4.5 m	POR_7_O d = 21 m 0 to 90 deg h = 1.5 m	POR_8_W d = 31 m 0 to 90 deg h = 4.5 m	POR_8_O d = 23 m 0 to 90 deg h = 1.5 m	POR_9_W d = 24 m 0 to 90 deg h = 4.5 m	POR_9_O d = 24 m 0 to 90 deg h = 1.5 m
Midnight	0.87	38.1	32.0	2.7	3.4						
1:00	0.49	21.4	18.0	1.5	1.9						
2:00	0.36	15.7	13.2	1.1	1.4						
3:00	0.30	13.1	11.0	0.9	1.2						
4:00	0.36	15.7	13.2	1.1	1.4						
5:00	0.95	41.6	34.9	2.9	3.7						
6:00	2.75	120.3	101.1	8.4	10.8						
7:00	5.05	220.9	185.6	15.5	19.9	60.47	61.09	**58.73**	60.44	60.47	60.13
8:00	6.55	286.5	240.7	20.1	25.8						
9:00	5.62	245.9	206.5	17.2	22.1						
10:00	5.50	240.6	202.1	16.8	21.7	63.48	64.10	61.75	63.45	63.48	63.14
11:00	6.04	264.2	221.9	18.5	23.8						
12:00	6.48	283.5	238.1	19.8	25.5						
13:00	6.26	273.8	230.0	19.2	24.6						
14:00	6.60	288.7	242.5	20.2	26.0						
15:00	7.41	324.2	272.3	22.7	29.2						
16:00	7.82	342.1	287.4	23.9	30.8						
17:00	7.65	334.7	281.1	23.4	30.1						
18:00	6.27	274.3	230.4	19.2	24.7						
19:00	5.12	224.0	188.1	15.7	20.2						
20:00	4.99	218.3	183.4	15.3	19.6						
21:00	3.41	149.2	125.3	10.4	13.4						
22:00	3.41	149.2	125.3	10.4	13.4						
23:00	1.67	73.1	61.4	5.1	6.6						
Total	101.93	**4459**									

Samples of Traffic Noise Predictions using STAMSON

STAMSON 5.0 NORMAL REPORT Date: 20-01-2020 12:58:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1_o.te Time Period: 1 hours
Description: POR 1 Outdoor, 7 - 8 AM, Background Traffic

Road data, segment # 1: Albion Road

Car traffic volume : 394 veh/TimePeriod
Medium truck volume : 31 veh/TimePeriod
Heavy truck volume : 18 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Albion Road

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Albion Road

Source height = 1.42 m

ROAD (0.00 + 55.27 + 0.00) = 55.27 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
----
0 90 0.66 66.62 0.00 -6.89 -4.47 0.00 0.00 0.00 55.27

Segment Leq : 55.27 dBA

Total Leq All Segments: 55.27 dBA

TOTAL Leq FROM ALL SOURCES: 55.27

STAMSON 5.0 COMPREHENSIVE REPORT Date: 20-01-2020 10:35:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R4_O.te Time Period: 1 hours
Description: POR 4 Outdoor, 7 - 8 am, Rideau Rd, BG Traffic

Road data, segment # 1: Rideau East

Car traffic volume : 268 veh/TimePeriod
Medium truck volume : 24 veh/TimePeriod
Heavy truck volume : 47 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Rideau East

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 52.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Segment # 1: Rideau East

Source height = 1.93 m

ROAD (0.00 + 57.75 + 0.00) = 57.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.65	71.09	0.00	-8.89	-4.45	0.00	0.00	0.00	57.75

Segment Leq : 57.75 dBA

Total Leq All Segments: 57.75 dBA

TOTAL Leq FROM ALL SOURCES: 57.75

STAMSON 5.0 NORMAL REPORT Date: 20-01-2020
11:02:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE
ASSESSMENT

Filename: R5_W.te Time Period: 1 hours
Description: POR 5 Window, 7 - 8 AM, Albion Rd. BG Traffic

Road data, segment # 1: Albion S

Car traffic volume : 427 veh/TimePeriod
Medium truck volume : 35 veh/TimePeriod
Heavy truck volume : 45 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Albion S

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Albion S

Source height = 1.73 m

ROAD (0.00 + 65.54 + 0.00) = 65.54 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq

-90 90 0.56 71.53 0.00 -4.71 -1.29 0.00 0.00 0.00 65.54

Segment Leq : 65.54 dBA

Total Leq All Segments: 65.54 dBA

STAMSON 5.0 NORMAL REPORT Date: 20-01-2020 12:26:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6_o.te Time Period: 1 hours
Description: POR 6 Outdoor, 7 - 8 AM, Background Traffic

Road data, segment # 1: Rideau West

Car traffic volume : 185 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 20 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Rideau West

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 33.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Rideau West

Source height = 1.74 m

ROAD (0.00 + 57.85 + 0.00) = 57.85 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
----
0 90 0.65 67.96 0.00 -5.66 -4.46 0.00 0.00 0.00 57.85

Segment Leq : 57.85 dBA

Total Leq All Segments: 57.85 dBA

TOTAL Leq FROM ALL SOURCES: 57.85

STAMSON 5.0 NORMAL REPORT Date: 20-01-2020
12:37:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE
ASSESSMENT

Filename: r8_w.te Time Period: 1 hours
Description: POR 8 Window, 7 - 8 AM, Background Traffic

Road data, segment # 1: Rideau West

Car traffic volume : 185 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 20 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Rideau West

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 31.00 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Rideau West

Source height = 1.74 m

ROAD (0.00 + 58.73 + 0.00) = 58.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.56	67.96	0.00	-4.93	-4.30	0.00	0.00	0.00	58.73

Segment Leq : 58.73 dBA

Total Leq All Segments: 58.73 dBA

TOTAL Leq FROM ALL SOURCES: 58.73

Transportation Services - Traffic Services

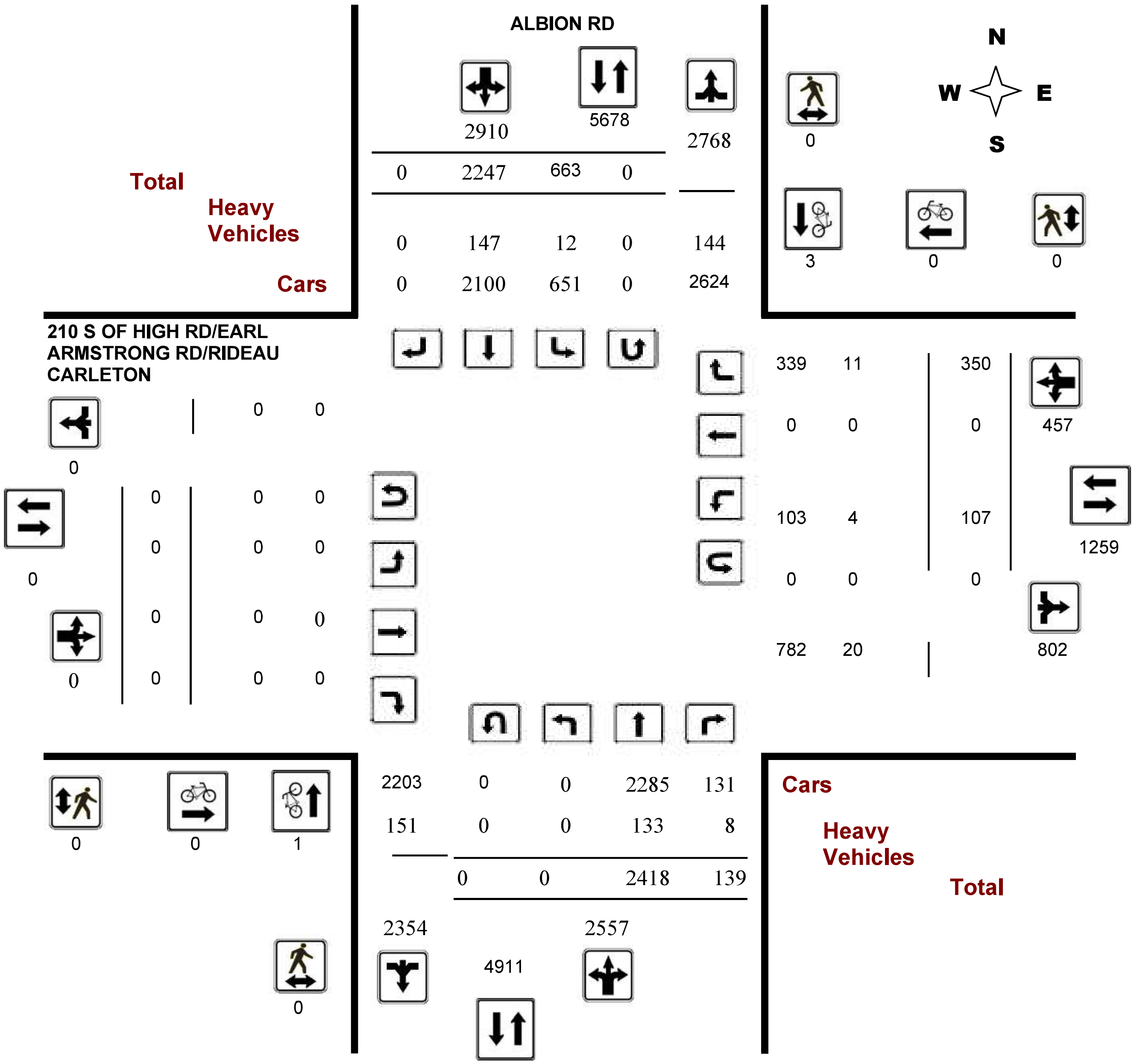
Turning Movement Count - Study Results

ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Survey Date: Tuesday, September 01, 2015 **WO No:** 35342

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Survey Date: Tuesday, September 01, 2015 **WO No:** 35342

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, September 01, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

1.39

ALBION RD | 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON

	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	664	16	**680**	22	153	0	**175**	**855**	0	0	0	**0**	0	0	8	**8**	**8**	**863**
08:00 09:00	0	411	8	**419**	48	150	0	**198**	**617**	0	0	0	**0**	1	0	12	**13**	**13**	**630**
09:00 10:00	0	263	14	**277**	51	155	0	**206**	**483**	0	0	0	**0**	5	0	20	**25**	**25**	**508**
11:30 12:30	0	230	21	**251**	90	195	0	**285**	**536**	0	0	0	**0**	8	0	43	**51**	**51**	**587**
12:30 13:30	0	203	21	**224**	137	219	0	**356**	**580**	0	0	0	**0**	18	0	64	**82**	**82**	**662**
15:00 16:00	0	202	21	**223**	80	461	0	**541**	**764**	0	0	0	**0**	26	0	65	**91**	**91**	**855**
16:00 17:00	0	226	21	**247**	120	484	0	**604**	**851**	0	0	0	**0**	32	0	69	**101**	**101**	**952**
17:00 18:00	0	219	17	**236**	115	430	0	**545**	**781**	0	0	0	**0**	17	0	69	**86**	**86**	**867**
Sub Total	0	2418	139	**2557**	663	2247	0	**2910**	**5467**	0	0	0	**0**	107	0	350	**457**	**457**	**5924**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	2418	139	**2557**	663	2247	0	**2910**	**5467**	0	0	0	**0**	107	0	350	**457**	**457**	**5924**
EQ 12Hr	0	3361	193	**3554**	922	3123	0	**4045**	**7599**	0	0	0	**0**	149	0	486	**635**	**635**	**8234**
AVG 12Hr	0	3361	193	**3554**	922	3123	0	**4045**	**7599**	0	0	0	**0**	149	0	486	**635**	**635**	**8234**
AVG 24Hr	0	4403	253	**4656**	1207	4092	0	**5299**	**9955**	0	0	0	**0**	195	0	637	**832**	**832**	**10787**

Note (EQ 12Hr): These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

Note (AVG 12Hr): These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **1**

Note (AVG 24Hr): These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Survey Date: Tuesday, September 01, 2015 **WO No:** 35342

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

Time Period		Northbound (ALBION RD) LT	ST	RT	N TOT	Southbound LT	ST	RT	S TOT	STR TOT	Eastbound (210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON) LT	ST	RT	E TOT	Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	178	4	182	3	39	0	42	445	0	0	0	0	0	0	4	4	445	228
07:15	07:30	0	173	1	174	6	37	0	43	428	0	0	0	0	0	0	1	1	428	218
07:30	07:45	0	190	8	198	6	35	0	41	467	0	0	0	0	0	0	3	3	467	242
07:45	08:00	0	123	3	126	7	42	0	49	340	0	0	0	0	0	0	0	0	340	175
08:00	08:15	0	120	0	120	6	34	0	40	317	0	0	0	0	1	0	2	3	317	163
08:15	08:30	0	108	2	110	14	33	0	47	301	0	0	0	0	0	0	3	3	301	160
09:15	09:30	0	84	0	84	13	47	0	60	280	0	0	0	0	0	0	5	5	280	149
08:30	08:45	0	92	3	95	10	51	0	61	304	0	0	0	0	0	0	5	5	304	161
08:45	09:00	0	91	3	94	18	32	0	50	269	0	0	0	0	0	0	2	2	269	146
09:00	09:15	0	68	5	73	10	32	0	42	219	0	0	0	0	2	0	2	4	219	119
09:30	09:45	0	55	4	59	17	38	0	55	215	0	0	0	0	1	0	7	8	215	122
09:45	10:00	0	56	5	61	11	38	0	49	212	0	0	0	0	2	0	6	8	212	118
11:30	11:45	0	67	5	72	32	52	0	84	283	0	0	0	0	1	0	7	8	283	164
11:45	12:00	0	57	6	63	23	54	0	77	263	0	0	0	0	3	0	9	12	263	152
12:00	12:15	0	58	3	61	16	40	0	56	230	0	0	0	0	4	0	11	15	230	132
12:15	12:30	0	48	7	55	19	49	0	68	236	0	0	0	0	0	0	16	16	236	139
12:30	12:45	0	63	9	72	25	47	0	72	274	0	0	0	0	6	0	14	20	274	164
12:45	13:00	0	43	4	47	45	62	0	107	275	0	0	0	0	2	0	14	16	275	170
13:00	13:15	0	50	4	54	34	64	0	98	285	0	0	0	0	5	0	14	19	285	171
13:15	13:30	0	47	4	51	33	46	0	79	250	0	0	0	0	5	0	22	27	250	157
15:00	15:15	0	60	5	65	20	91	0	111	359	0	0	0	0	10	0	22	32	359	208
15:15	15:30	0	68	5	73	16	133	0	149	444	0	0	0	0	8	0	13	21	444	243
15:30	15:45	0	31	7	38	22	105	0	127	324	0	0	0	0	5	0	18	23	324	188
15:45	16:00	0	43	4	47	22	132	0	154	391	0	0	0	0	3	0	12	15	391	216
16:00	16:15	0	46	3	49	29	142	0	171	437	0	0	0	0	10	0	19	29	437	249
16:15	16:30	0	61	4	65	19	108	0	127	380	0	0	0	0	6	0	13	19	380	211
16:30	16:45	0	76	9	85	35	127	0	162	479	0	0	0	0	9	0	20	29	479	276
16:45	17:00	0	43	5	48	37	107	0	144	366	0	0	0	0	7	0	17	24	366	216
17:00	17:15	0	66	4	70	26	104	0	130	390	0	0	0	0	6	0	14	20	390	220
17:15	17:30	0	64	3	67	28	113	0	141	413	0	0	0	0	6	0	22	28	413	236
17:30	17:45	0	48	4	52	32	106	0	138	364	0	0	0	0	2	0	18	20	364	210
17:45	18:00	0	41	6	47	29	107	0	136	349	0	0	0	0	3	0	15	18	349	201
Total:		0	2418	139	2557	663	2247	0	2910	10589	0	0	0	0	107	0	350	457	10589	5,924

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD

Survey Date: Tuesday, September 01, 2015 **WO No:** 35342

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		ALBION RD									210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	0	**5**	0	2	0	**5**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
07:15	07:30	0	4	0	**9**	0	5	0	**9**	**18**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
07:30	07:45	0	5	1	**12**	0	6	0	**11**	**23**	0	0	0	**0**	0	0	0	**1**	**1**	**12**
07:45	08:00	0	2	0	**5**	0	3	0	**5**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
08:00	08:15	0	4	0	**9**	0	5	0	**9**	**18**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
08:15	08:30	0	3	0	**8**	0	5	0	**9**	**17**	0	0	0	**0**	0	0	1	**1**	**1**	**9**
09:15	09:30	0	7	0	**17**	1	10	0	**18**	**35**	0	0	0	**0**	0	0	0	**1**	**1**	**18**
08:30	08:45	0	5	1	**15**	0	9	0	**15**	**30**	0	0	0	**0**	0	0	1	**2**	**2**	**16**
08:45	09:00	0	4	0	**7**	3	3	0	**10**	**17**	0	0	0	**0**	0	0	0	**3**	**3**	**10**
09:00	09:15	0	5	1	**10**	0	3	0	**9**	**19**	0	0	0	**0**	1	0	1	**3**	**3**	**11**
09:30	09:45	0	4	0	**11**	3	7	0	**14**	**25**	0	0	0	**0**	0	0	0	**3**	**3**	**14**
09:45	10:00	0	5	0	**9**	0	4	0	**10**	**19**	0	0	0	**0**	0	0	1	**1**	**1**	**10**
11:30	11:45	0	6	0	**11**	0	4	0	**10**	**21**	0	0	0	**0**	1	0	0	**1**	**1**	**11**
11:45	12:00	0	8	0	**15**	1	7	0	**16**	**31**	0	0	0	**0**	0	0	0	**1**	**1**	**16**
12:00	12:15	0	6	0	**8**	0	2	0	**10**	**18**	0	0	0	**0**	0	0	2	**2**	**2**	**10**
12:15	12:30	0	5	4	**14**	0	5	0	**10**	**24**	0	0	0	**0**	0	0	0	**4**	**4**	**14**
12:30	12:45	0	4	0	**11**	0	7	0	**11**	**22**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
12:45	13:00	0	6	0	**15**	1	9	0	**16**	**31**	0	0	0	**0**	0	0	0	**1**	**1**	**16**
13:00	13:15	0	6	0	**13**	0	7	0	**13**	**26**	0	0	0	**0**	0	0	0	**0**	**0**	**13**
13:15	13:30	0	3	0	**8**	0	5	0	**9**	**17**	0	0	0	**0**	0	0	1	**1**	**1**	**9**
15:00	15:15	0	1	0	**5**	0	3	0	**5**	**10**	0	0	0	**0**	1	0	1	**2**	**2**	**6**
15:15	15:30	0	8	0	**14**	0	6	0	**14**	**28**	0	0	0	**0**	0	0	0	**0**	**0**	**14**
15:30	15:45	0	1	0	**3**	0	1	0	**2**	**5**	0	0	0	**0**	1	0	0	**1**	**1**	**3**
15:45	16:00	0	3	0	**10**	1	7	0	**11**	**21**	0	0	0	**0**	0	0	0	**1**	**1**	**11**
16:00	16:15	0	3	0	**8**	0	5	0	**9**	**17**	0	0	0	**0**	0	0	1	**1**	**1**	**9**
16:15	16:30	0	4	0	**7**	0	3	0	**7**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
16:30	16:45	0	6	0	**7**	0	1	0	**7**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
16:45	17:00	0	2	0	**5**	1	3	0	**6**	**11**	0	0	0	**0**	0	0	0	**1**	**1**	**6**
17:00	17:15	0	3	1	**6**	0	2	0	**5**	**11**	0	0	0	**0**	0	0	0	**1**	**1**	**6**
17:15	17:30	0	2	0	**2**	0	0	0	**4**	**6**	0	0	0	**0**	0	0	2	**2**	**2**	**4**
17:30	17:45	0	1	0	**2**	0	1	0	**2**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**2**
17:45	18:00	0	4	0	**11**	1	7	0	**12**	**23**	0	0	0	**0**	0	0	0	**1**	**1**	**12**
Total:	None	0	133	8	**292**	12	147	0	**303**	**595**	0	0	0	**0**	4	0	11	**35**	**35**	**315**

Transportation Services - Traffic Services

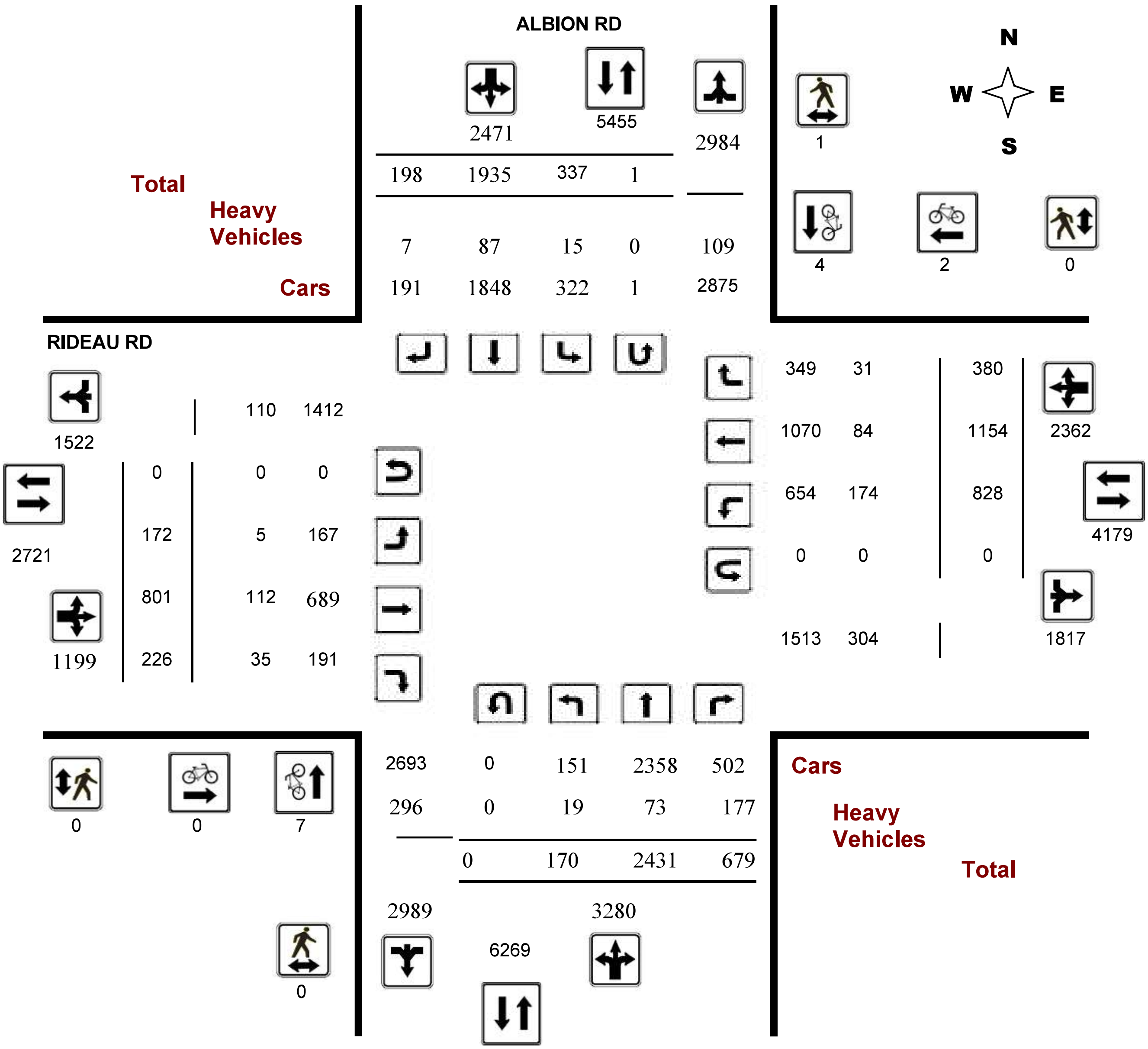
Turning Movement Count - Study Results

ALBION RD @ RIDEAU RD

Survey Date: Thursday, May 04, 2017 **WO No:** 36993

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ALBION RD @ RIDEAU RD

Survey Date: Thursday, May 04, 2017 **WO No:** 36993

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, May 04, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 1

Eastbound: 0 Westbound: 0

AADT Factor

1.25

	ALBION RD									RIDEAU RD										
	Northbound				Southbound					Eastbound				Westbound						
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	37	607	186	**830**	33	117	13	**163**	**993**	28	198	20	**246**	51	93	40	**184**	**430**	**1423**
08:00 09:00	38	450	106	**594**	27	113	10	**150**	**744**	36	131	16	**183**	47	100	53	**200**	**383**	**1127**
09:00 10:00	14	250	85	**349**	30	119	16	**165**	**514**	26	63	13	**102**	54	64	47	**165**	**267**	**781**
11:30 12:30	14	180	56	**250**	40	167	22	**229**	**479**	18	70	15	**103**	66	70	41	**177**	**280**	**759**
12:30 13:30	9	190	63	**262**	37	183	16	**236**	**498**	13	60	20	**93**	81	61	39	**181**	**274**	**772**
15:00 16:00	14	226	53	**293**	61	426	36	**523**	**816**	8	86	39	**133**	132	151	34	**317**	**450**	**1266**
16:00 17:00	24	216	63	**303**	64	421	47	**532**	**835**	23	109	52	**184**	218	325	58	**601**	**785**	**1620**
17:00 18:00	20	312	67	**399**	45	389	38	**472**	**871**	20	84	51	**155**	179	290	68	**537**	**692**	**1563**
Sub Total	170	2431	679	**3280**	337	1935	198	**2470**	**5750**	172	801	226	**1199**	828	1154	380	**2362**	**3561**	**9311**
U Turns				**0**				**1**	**1**				**0**				**0**	**0**	**1**
Total	170	2431	679	**3280**	337	1935	198	**2471**	**5751**	172	801	226	**1199**	828	1154	380	**2362**	**3561**	**9312**
EQ 12Hr	236	3379	944	**4559**	468	2690	275	**3435**	**7994**	239	1113	314	**1667**	1151	1604	528	**3283**	**4950**	**12944**
AVG 12Hr	213	3041	849	**4103**	422	2421	248	**3091**	**7195**	215	1002	283	**1500**	1036	1444	475	**2955**	**4455**	**11650**
AVG 24Hr	279	3984	1113	**5375**	552	3171	324	**4049**	**9424**	282	1313	370	**1965**	1357	1891	623	**3871**	**5836**	**15260**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **0.9**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ALBION RD @ RIDEAU RD

Survey Date: Thursday, May 04, 2017 **WO No:** 36993

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		ALBION RD									RIDEAU RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	7	160	58	225	5	25	2	32	478	4	34	8	46	10	17	14	41	478	344
07:15	07:30	8	155	42	205	5	21	3	29	441	4	46	9	59	12	27	6	45	441	338
07:30	07:45	11	147	49	207	16	43	3	62	493	10	64	1	75	16	21	7	44	493	388
07:45	08:00	11	145	37	193	7	28	5	40	444	10	54	2	66	13	28	13	54	444	353
08:00	08:15	9	128	31	168	6	29	5	40	394	11	39	2	52	4	31	12	47	394	307
08:15	08:30	9	112	30	151	7	27	1	35	372	9	34	5	48	16	25	17	58	372	292
08:30	08:45	14	113	27	154	5	35	2	42	380	10	32	2	44	12	27	12	51	380	291
08:45	09:00	6	97	18	121	9	22	2	33	313	6	26	7	39	15	17	12	44	313	237
09:00	09:15	3	66	20	89	10	33	5	48	269	7	22	5	34	11	13	10	34	269	205
09:15	09:30	4	73	19	96	7	30	3	40	285	7	11	3	21	15	19	21	55	285	212
09:30	09:45	3	63	27	93	7	35	1	43	262	6	12	3	21	12	16	7	35	262	192
09:45	10:00	4	48	19	71	6	21	7	34	207	6	18	2	26	16	16	9	41	207	172
11:30	11:45	2	40	15	57	13	31	5	49	223	8	20	5	33	18	16	15	49	223	188
11:45	12:00	4	48	14	66	5	44	7	56	249	4	15	6	25	15	17	10	42	249	189
12:00	12:15	2	48	15	65	11	55	6	72	272	5	15	3	23	16	16	8	40	272	200
12:15	12:30	6	44	12	62	11	37	4	52	222	1	20	1	22	17	21	8	46	222	182
12:30	12:45	2	61	13	76	13	50	3	66	288	3	10	1	14	20	7	11	38	288	194
12:45	13:00	4	52	18	74	6	37	3	46	243	4	20	4	28	19	16	7	42	243	190
13:00	13:15	1	31	15	47	9	43	4	56	215	0	15	8	23	21	21	9	51	215	177
13:15	13:30	2	46	17	65	9	53	6	68	278	6	15	7	28	21	17	12	50	278	211
15:00	15:15	4	61	13	78	14	83	9	106	380	1	18	10	29	33	32	8	73	380	286
15:15	15:30	3	67	12	82	20	119	8	147	464	1	24	6	31	31	35	11	77	464	337
15:30	15:45	4	50	20	74	10	113	6	129	416	5	23	4	32	34	41	7	82	416	317
15:45	16:00	3	48	8	59	17	111	13	141	421	1	21	19	41	34	43	8	85	421	326
16:00	16:15	7	57	14	78	15	128	14	157	501	3	21	14	38	56	68	8	132	501	405
16:15	16:30	7	50	17	74	20	86	12	118	417	10	46	17	73	48	59	14	121	417	386
16:30	16:45	7	48	24	79	11	106	12	129	457	4	21	11	36	58	98	22	178	457	422
16:45	17:00	3	61	8	72	18	101	9	128	448	6	21	10	37	56	100	14	170	448	407
17:00	17:15	2	67	20	89	13	106	11	130	476	3	25	16	44	49	82	16	147	476	410
17:15	17:30	10	82	20	112	13	94	5	112	488	5	25	15	45	48	101	20	169	488	438
17:30	17:45	3	88	13	104	11	93	12	117	482	5	21	12	38	43	58	19	120	482	379
17:45	18:00	5	75	14	94	8	96	10	114	446	7	13	8	28	39	49	13	101	446	337
Total:		170	2431	679	3280	337	1935	198	2471	11724	172	801	226	1199	828	1154	380	2362	11724	9,312

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ALBION RD @ RIDEAU RD

Survey Date: Thursday, May 04, 2017 **WO No:** 36993

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		ALBION RD										RIDEAU RD								
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	3	**10**	1	2	0	**6**	**16**	0	2	2	**10**	0	6	0	**12**	**22**	**19**
07:15	07:30	3	3	2	**22**	0	5	1	**10**	**32**	0	3	2	**12**	7	3	1	**16**	**28**	**30**
07:30	07:45	2	3	3	**18**	2	5	0	**10**	**28**	0	2	0	**6**	5	2	0	**14**	**20**	**24**
07:45	08:00	3	6	6	**24**	1	1	1	**11**	**35**	0	3	1	**14**	7	6	2	**25**	**39**	**37**
08:00	08:15	1	0	7	**13**	0	3	1	**5**	**18**	0	3	0	**7**	2	2	1	**15**	**22**	**20**
08:15	08:30	0	1	5	**21**	0	4	0	**5**	**26**	0	3	4	**11**	7	4	0	**19**	**30**	**28**
08:30	08:45	2	2	7	**23**	0	3	0	**5**	**28**	0	4	1	**11**	8	4	0	**23**	**34**	**31**
08:45	09:00	0	4	4	**21**	1	2	0	**7**	**28**	0	0	1	**6**	10	5	0	**20**	**26**	**27**
09:00	09:15	0	2	6	**24**	0	9	1	**16**	**40**	2	4	1	**12**	6	4	2	**22**	**34**	**37**
09:15	09:30	0	3	7	**22**	0	1	0	**4**	**26**	0	6	2	**11**	9	3	0	**25**	**36**	**31**
09:30	09:45	0	1	11	**21**	2	7	0	**10**	**31**	0	5	0	**11**	2	6	0	**26**	**37**	**34**
09:45	10:00	0	0	4	**14**	0	3	0	**5**	**19**	0	4	1	**7**	6	2	2	**18**	**25**	**22**
11:30	11:45	0	1	5	**12**	0	0	1	**3**	**15**	0	6	1	**12**	5	4	1	**21**	**33**	**24**
11:45	12:00	0	1	5	**15**	1	3	0	**6**	**21**	0	2	0	**5**	6	3	1	**18**	**23**	**22**
12:00	12:15	1	3	4	**15**	0	2	0	**5**	**20**	0	1	1	**5**	4	2	0	**11**	**16**	**18**
12:15	12:30	0	2	7	**20**	0	5	0	**9**	**29**	0	11	0	**12**	6	1	2	**27**	**39**	**34**
12:30	12:45	0	3	5	**14**	0	2	0	**6**	**20**	0	1	1	**2**	3	0	1	**10**	**12**	**16**
12:45	13:00	0	2	7	**19**	0	3	0	**6**	**25**	0	3	1	**6**	6	2	1	**19**	**25**	**25**
13:00	13:15	0	1	4	**12**	0	2	1	**7**	**19**	0	6	0	**9**	5	2	3	**20**	**29**	**24**
13:15	13:30	0	3	3	**13**	0	1	0	**7**	**20**	1	4	2	**7**	4	0	2	**13**	**20**	**20**
15:00	15:15	1	1	7	**25**	0	3	0	**6**	**31**	1	3	1	**7**	12	1	1	**24**	**31**	**31**
15:15	15:30	1	5	2	**16**	0	3	0	**10**	**26**	0	5	1	**8**	4	1	2	**14**	**22**	**24**
15:30	15:45	0	3	8	**19**	0	1	0	**4**	**23**	0	2	0	**4**	7	2	0	**19**	**23**	**23**
15:45	16:00	2	1	5	**17**	2	2	0	**6**	**23**	0	5	4	**15**	3	4	1	**20**	**35**	**29**
16:00	16:15	2	4	6	**23**	2	3	0	**10**	**33**	0	5	2	**11**	6	2	1	**22**	**33**	**33**
16:15	16:30	1	2	9	**28**	1	4	0	**10**	**38**	1	3	4	**13**	8	4	2	**27**	**40**	**39**
16:30	16:45	0	2	8	**24**	1	2	0	**6**	**30**	0	3	1	**5**	11	1	1	**25**	**30**	**30**
16:45	17:00	0	2	3	**13**	0	3	0	**5**	**18**	0	3	1	**5**	4	1	0	**11**	**16**	**17**
17:00	17:15	0	2	8	**14**	0	0	0	**3**	**17**	0	0	0	**1**	4	1	1	**14**	**15**	**16**
17:15	17:30	0	3	6	**15**	1	2	0	**7**	**22**	0	4	0	**6**	4	2	1	**18**	**24**	**23**
17:30	17:45	0	2	3	**9**	0	1	1	**5**	**14**	0	6	0	**9**	3	2	1	**15**	**24**	**19**
17:45	18:00	0	2	7	**9**	0	0	0	**3**	**12**	0	0	0	**2**	0	2	1	**10**	**12**	**12**
Total:	None	19	73	177	**565**	15	87	7	**218**	**783**	5	112	35	**262**	174	84	31	**593**	**855**	**819**

RESUMÉ: Dr. HUGH WILLIAMSON, P.Eng.

QUALIFICATIONS:

Ph.D. Mechanical Engineering, University of New South Wales, 1972

B.Sc. Mechanical Engineering, (with Distinction), University of Alberta, 1967

Member, Professional Engineers, Ontario

Member, Canadian Acoustical Association

Member, American Society of Heating, Refrigeration and Air-conditioning Engineers

KEY COMPETENCIES:

- Environmental noise and vibration assessments, Environmental Compliance Approval (ECA). Noise assessment for land use planning
- Architectural and building acoustics, acoustics of office spaces, meeting rooms, auditoriums and studios, noise and vibration control of building mechanical services.
- Industrial noise and vibration assessment and control.
- Transportation noise and vibration.

PROFESSIONAL EXPERIENCE:

Hugh Williamson is a professional engineer with many years of experience in the measurement, analysis and control of noise and vibration. Freefield Ltd. was incorporated in 2017 and provides consulting services in architectural, building, industrial, transportation and environmental acoustics and vibration. Clients include architects, engineering firms, industrial firms and government departments. Prior to joining Freefield Ltd. Hugh Williamson founded and directed Hugh Williamson Associates Inc. which specialized in consulting services in architectural, building, industrial, transportation and environmental acoustics and vibration. His career included extensive periods in industry as well as university level research and teaching. He is a former Director of the Acoustics and Vibration Unit at the Australian Defence Force Academy. He has published over 50 engineering and scientific papers and has been an invited speaker on noise and vibration at national and international conferences. He has more than 25 years of experience as a consultant.

CLIENT LIST:

Hugh Williamson has provided consulting services to large and small clients including: National Research Council, R. W. Tomlinson, G. Tackaberry & Sons Construction, Miller Paving, J. L. Richards & Associates, Barry Padolsky Associates, Atkinson Schroeter Design Group and Industry Canada.

RESUMÉ: MICHAEL WELLS

QUALIFICATIONS:	Registered Architect of NSW, Registration Number: 8111 B. Architecture (Hons), University of Sydney, 2002 B.Sc. Architecture, University of Sydney, 1999 Member, Canadian Acoustical Association Associate Member, INCE-USA
KEY COMPETENCIES:	• Environmental noise and vibration assessments, Environmental Compliance Approval (ECA). Noise assessment for land use planning. • Architectural and building acoustics, acoustics of office spaces, meeting rooms, auditoriums and studios, noise and vibration control of building mechanical services. • Industrial noise and vibration assessment and control. • Transportation noise and vibration. • Design services including sketch design, design development (development / permit applications), contract documents, tendering and contract administration.

PROFESSIONAL EXPERIENCE:

Michael Wells is a professional Architect registered in NSW, Australia, with many years of experience in the measurement, analysis and control of noise and vibration. Michael Wells is a founding Director of Freefield Ltd. which was incorporated in 2017, and provides consulting services in architectural, building, industrial, transportation and environmental acoustics and vibration. Clients include architects, engineering firms, industrial firms and government departments. Prior to establishing Freefield Ltd., his career included working for Hugh Williamson Associates Inc. specializing in acoustics, noise and vibration consulting services, and, the founding of Michael Wells Architect in Sydney, Australia, specializing in the design of institutional, commercial and residential projects. He is the former Director of Architectural Workshops Australia and Vision Blue Pty Ltd. He has more than 15 years of experience as a consultant.

CLIENT LIST:

Michael Wells has provided consulting services to large and small clients including: National Research Council, R. W. Tomlinson, G. Tackaberry & Sons Construction, Miller Paving, J. L. Richards & Associates, Barry Padolsky Associates, Atkinson Schroeter Design Group and Industry Canada.

APPENDIX E

Traffic Impact Assessment

4788 Albion Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Prepared for:

Thomas Cavanagh Construction Ltd.
9094 Cavanagh Road.
Ashton, ON, K0A 1B0

Prepared by:

CGH TRANSPORTATION
13 Markham Avenue
Nepean, ON K2G 3Z1

January 2020

PN: 2019-72

Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

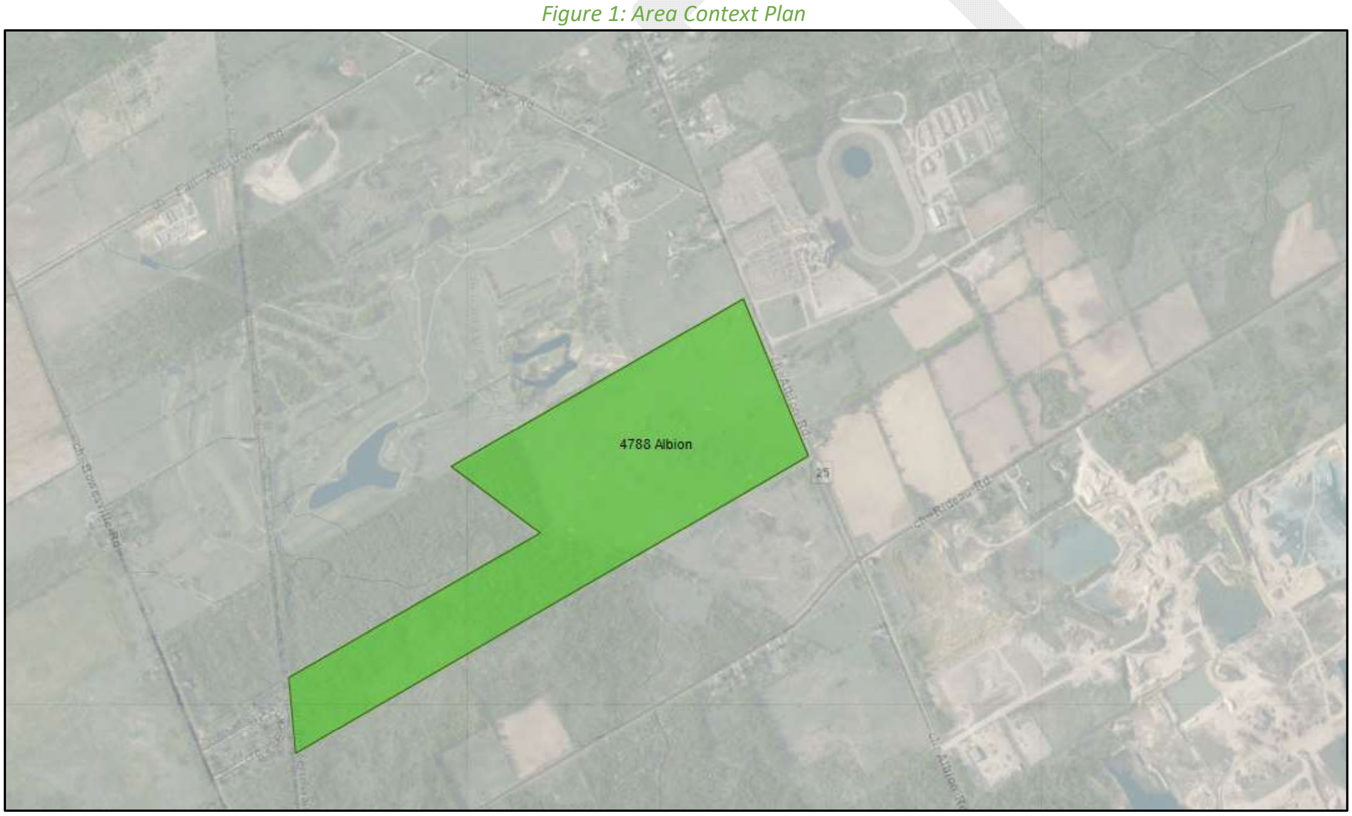
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is warranted due to the Location Trigger as Albion Road is classified as a cycling spine route. This trigger results in the need to produce a Step 2 Scoping Report, however Network Impact Component is not required.

2 Existing and Planned Conditions

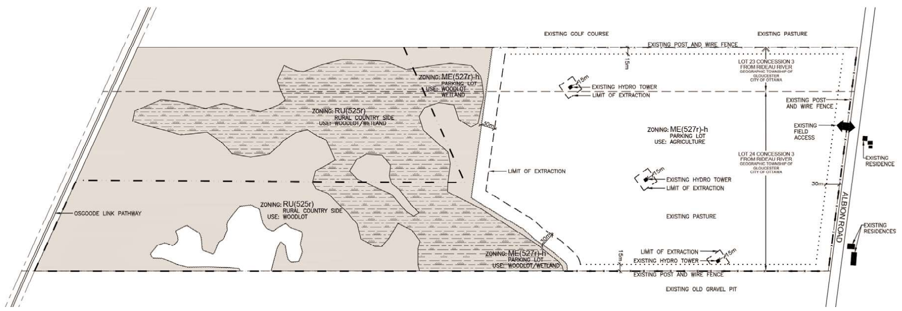
2.1 Proposed Development

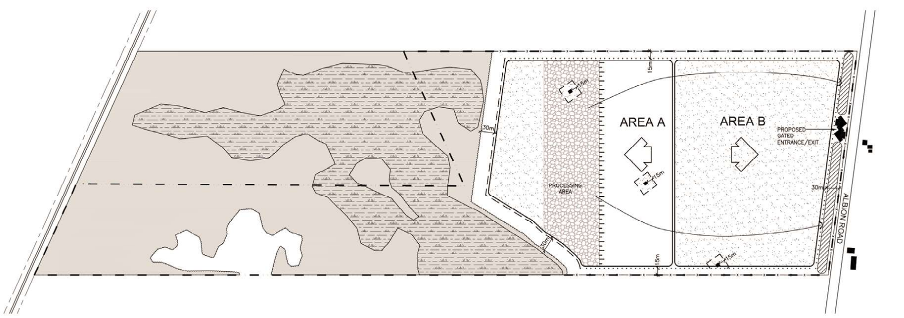
4788 Albion Road is federally owned land zoned as Mineral Extraction (ME) and the proponent is planning to commence operations in 2020. The site is located outside the urban boundary and no City design priority, CDP or secondary plans cover this area. The proposed extraction site will be in operation for approximately 5 to 10 years. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed Concept Plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 22, 2020





PHASE A

PHASE A NOTES

1. ESTABLISH ENTRANCE/EXIT FROM ALBION ROAD WHERE SHOWN ON SITE PLANS, ACCORDING TO MUNICIPAL STANDARDS AND APPROVALS.
2. PRIOR TO EXTRACTION COMMENCING IN AREA A, CONSTRUCT OR UPGRADE THE FENCING ON THE BOUNDARY OF THE LICENCE. ALL FENCING SHALL BE MAINTAINED.
3. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA A AND USE THE MATERIAL TO CONSTRUCT ACOUSTIC BERMS AS SHOWN. EXCESS MATERIAL MAY BE STOCKPILED ON THE PIT FLOOR OR USED TO BEGIN PROGRESSIVE REHABILITATION.
4. BEGIN EXTRACTION IN AREA A IN DIRECTION SHOWN. TEMPORARY STOCKPILES MAY BE LOCATED ON PIT FLOOR NEAR THE PIT FACE DURING EXCAVATION OF AGGREGATE.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE B (NOT SHOWN)

PHASE B NOTES

1. COMPLETE EXTRACTION IN AREA A.
2. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA B AND USE THE MATERIAL TO BEGIN PROGRESSIVE REHABILITATION OF AREA A.
3. COMPLETE REHABILITATION OF AREA A AND EXTRACTION OF AREA B.
4. COMPLETE REHABILITATION IN AREA B USING MATERIAL STORED IN BERMS.
5. REMOVE ALL EQUIPMENT, STRUCTURES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS.

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

ARCHAEOLOGICAL ASSESSMENT - --------- DATED---------
SHOULD DEEPLY BURIED ARCHAEOLOGICAL MATERIAL BE FOUND ON THE PROPERTY DURING DEVELOPMENT ACTIVITIES, THE MINISTRY OF CULTURE SHOULD BE NOTIFIED IMMEDIATELY AT (519) 675-7742. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING EXCAVATION, THE PROPONENT SHOULD IMMEDIATELY CONTACT BOTH THE MINISTRY OF CULTURE AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS, (416) 326-3414."

KEY MAP

LEGEND

BOUNDARY OF AREA TO BE LICENCED
LOT LINE
REGULATORY SETBACK LINE
LIMIT OF EXTRACTION

EXISTING FENCE	EXISTING HYDRO POLE (HP)
225 EXISTING 5m CONTOUR LINE	DIRECTION OF SURFACE WATER DRAINAGE
224 EXISTING 1m CONTOUR LINE	MW1 MONITORING WELLS INSTALLED BY PREVIOUS OWNER DATE - UNKNOWN
× 228.60 EXISTING SPOT ELEVATION	EXISTING ENTRANCE/ EXIT
EXISTING VEGETATION	DIRECTION OF EXTRACTION
EXISTING WETLAND	DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
EXTRACTION FACE	PRODUCT TRANSPORTATION VIA HAUL ROAD
BERM (MIN. HEIGHT AS SHOWN)	296.00 EXISTING ELEVATION / 286.00 PROPOSED ELEVATION
UNDISTURBED AREA	
AREA STRIPPED OF TOPSOIL AND OVERBURDEN	
(A) LOCATION OF CROSS SECTION	

NO.	DATE	REVISIONS	OWNER	HM

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM

Site Plan Amendments

EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF 2 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE CITY OF OTTAWA.
4. APPLICANT:
THOMAS CAVANAGH CONSTRUCTION LTD.
9094 CAVANAGH ROAD,
ASHTON, ONTARIO
K0A 1B0
5. TOTAL AREA TO BE LICENCED: 52.9 ha
TOTAL AREA TO BE EXTRACTED: 33.8 ha
TOTAL AREA TO REHABILITATED: 33.8 ha

BASE INFORMATION

6. PROPERTY BOUNDARY INFORMATION FOR PART OF LOTS 23 AND 24, CONCESSION 3 FROM, FROM RIDEAU RIVER, CITY OF OTTAWA WAS OBTAINED FROM ANNETT, KENNEDY, RIDDELL AND JASON SURVEYING LTD. LEGAL SURVEY, DATED NOVEMBER 24, 1988. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA LEVEL (ASL).

THE SITE WAS FIELD CHECKED BY ----------, --------.

7. ZONING INFORMATION OBTAINED FROM SCHEDULE 'A', MUNICIPALITY OF STRATHROY-CARADOC ZONING BY-LAW NO. 43-08, KEY MAP NO. 29, DATED FEBRUARY 2019

HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY ---------- DATED -----.
9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE AT ±- m ABOVE SEA LEVEL (A.S.L.) BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

TECHNICAL REPORTS

10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY ---------- DATED ---- (REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY ---------- DATED ---- (REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
12. ARCHEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY ---------- DATED ---------- (REFER TO SHEET 1 OF 2 FOR TECHNICAL RECOMMENDATIONS).

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM MNRF.

EXTRACTION/PROCESSING/HAULING INFORMATION

2. TOTAL AREA TO BE EXTRACTED IS 33.8 HECTARES.
3. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS -------- TONNES.

EXTRACTION OF SAND AND GRAVEL WILL TAKE PLACE IN ONE OR TWO BENCHES, WITH A MAXIMUM HEIGHT OF ±6 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± ----- AND ---- ASL (SEE ----- GROUNDWATER SCIENCE CORP.)

OTHER SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION. OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED ON THE PIT FLOOR. MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING, CUSTOM PRODUCTS AND/OR RESALE. THIS MAY INCLUDE AGGREGATE (IN THE PROCESSING AREA AND/OR PEAT AND TOPSOIL (IN AREA 1).

4. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN.

HYDROGEOLOGICAL INFORMATION

5. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ± --- m ABOVE SEA LEVEL (A.S.L.) BASED ON THE ------ HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 2 OF 2.
6. SURFACE DRAINAGE WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

NOISE MITIGATION INFORMATION

7. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
EXCAVATION AND PROCESSING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
SHIPPING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

8. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

9. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

FENCING INFORMATION

10. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 2 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES ADJACENT TO PARKHOUSE DRIVE WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE, EXCEPT WHERE THERE IS A SITE PLAN OVERRIDE, TO COMPLY WITH THE AGGREGATE RESOURCES ACT. UNFENCED BOUNDARIES WILL BE DEMARCATED WITH HIGHLY VISIBLE 1.2m HIGH MARKER POSTS AT CORNERS. SILT/EXCLUSION FENCING WILL BE CONSTRUCTED ONCE STRIPPING OCCURS WITHIN 50m OF THE SETBACKS ADJACENT TO THE NATURAL HERITAGE FEATURES IDENTIFIED ON SITE. ALL FENCING SHALL BE MAINTAINED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

11. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON PIT FLOOR CLOSE TO EXTRACTION FACE.

BERM INFORMATION

14. BERMS SHALL CREATE AN EFFECTIVE VISUAL BARRIER AND BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 2 OF 2. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.

15. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

16. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE PROCESSING AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND USED AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

17. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

IMPORTATION OF FILL INFORMATION

18. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE AGRICULTURAL REHABILITATION.

IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S PARAMETERS UNDER TABLE "1" OF MECP'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT".

SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. A QP SHALL ALSO DESIGN A FILL MONITORING PROGRAM. RANDOM SAMPLING OF ALL IMPORTED MATERIAL SHALL BE CONDUCTED AT THE REQUEST OF MNRF.

THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF OR MECP.

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

CAVANAGH
OTTAWA AIRPORT PIT

PART OF LOTS 23 AND 24, CONCESSION 3 FROM RIDEAU RIVER
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Scale 1:4000 (0 50 100 150m)

North

Stamp: DRAFT

Drawing Status: PRELIMINARY FOR DISCUSSION

Drawn: S.B. | Checked: M.H. | Issue Date:

Drawing Title: EXISTING FEATURES AND OPERATIONAL PLAN

Project Number: 19-27

Drawing Number: 1 OF 2

FILE NAME: 19-27/COMP/1927-1.DWG
PLOT DATE: AUGUST 20, 2019

2.2 Existing Conditions

2.2.1 Area Road Network

Albion Road: Albion Road is a City of Ottawa arterial road with a two-lane rural cross-section with paved shoulders on both sides of the road. The posted speed limit is 60 km/h adjacent to the site and increases to 80 km/h approximately 50 metres south of the site. The existing right-of-way provided varies between 26.0 and 33.0 metres along the frontage of the site. Albion Road is a designated truck route.

Rideau Road: Rideau Road is a City of Ottawa collector road with a two-lane rural cross-section. The posted speed limit is 80 km/h and the existing right-of-way provided is 26.0 metres. Rideau Road is a truck route.

High Road: High Road is a City of Ottawa local road with a two-lane rural cross-section. The posted speed limit is 50 km/h and the existing right-of-way provided is 20.0 metres.

2.2.2 Existing Intersections

The existing area intersections adjacent to the proposed site and signalized intersections within 1.0 km have been summarized below:

Albion Road & High Road	The intersection of Albion Road and High Road is a minor-road-only stop-controlled intersection. The northbound approach consists of a shared left-turn/through lane, and the southbound approach consists of a shared through/right-turn lane. The eastbound approach consists of a shared left-turn/right-turn lane. No turn restrictions are noted.
Albion Road & Hard Rock Main Access	The intersection of Albion Road and the Hard Rock main access is a signalized intersection. The northbound approach consists of a through lane and an auxiliary right-turn lane and the southbound approach consists of an auxiliary left-turn lane and a through lane. The westbound approach consists of a left-turn lane and a right-turn lane. No turn restrictions are noted.
Albion Road & Rideau Road	The intersection of Albion Road and Rideau Road is a signalized intersection. The northbound and southbound approaches have each an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches have each an auxiliary left turn land and a shared through/right-turn lane. No turn restrictions are noted.

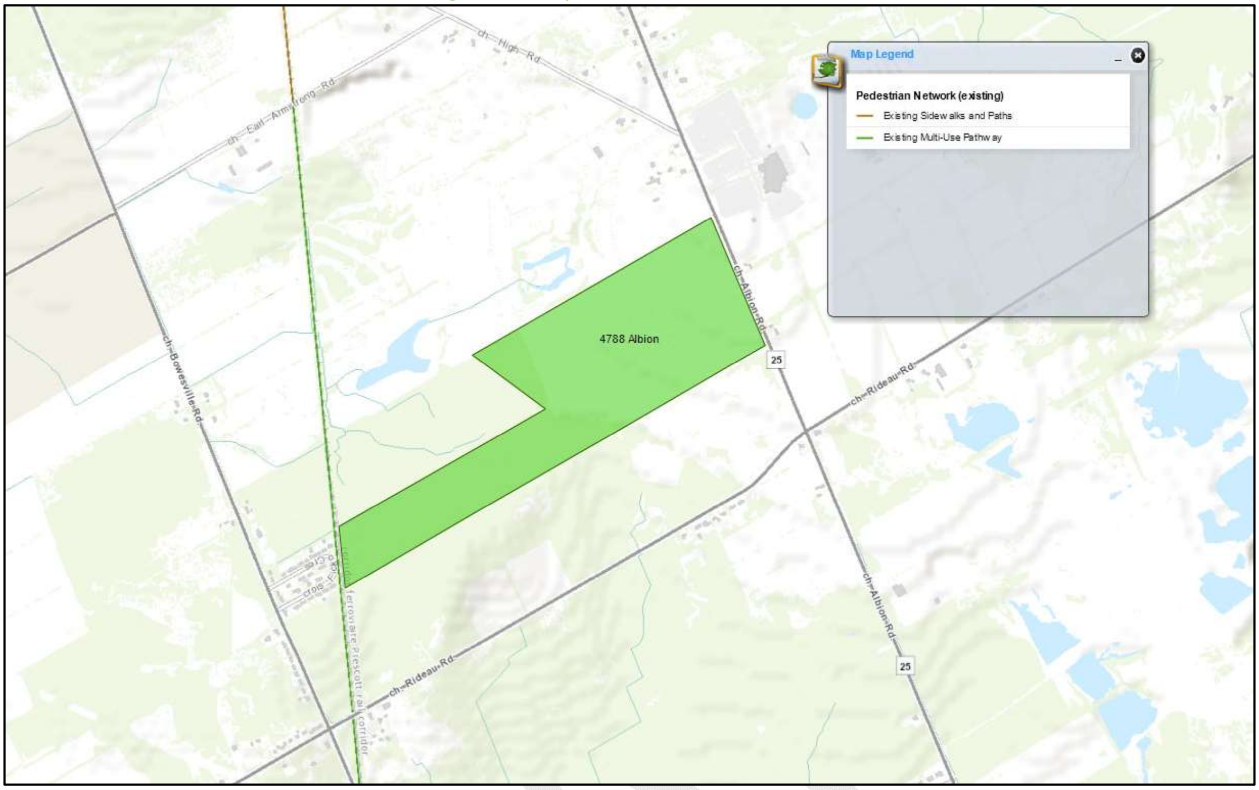
2.2.3 Existing Driveways

Within 200 metres of the proposed site access, there are two additional accesses for the on the east side of Albion Road for the Rideau Carleton Casino/Hard Rock, a private access for the racetrack barn and stables, and three residential driveways.

2.2.4 Cycling and Pedestrian Facilities

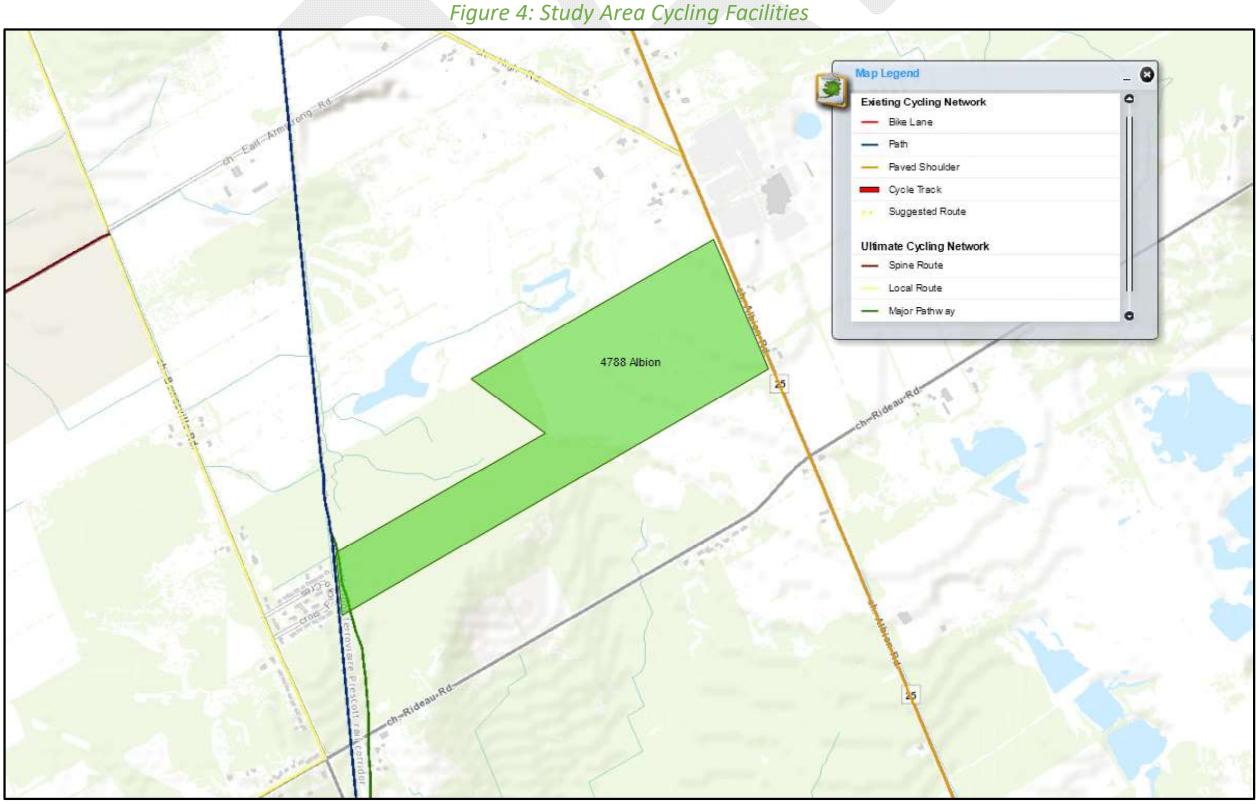
As illustrated in Figure 3, no substantial pedestrian facilities are located within the study area. Figure 4 illustrates the cycling network in the study area, consisting of Albion Road being designated as a spine route and having a paved shoulder, and High Road designated as a local cycling route.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 22, 2020

Figure 4: Study Area Cycling Facilities

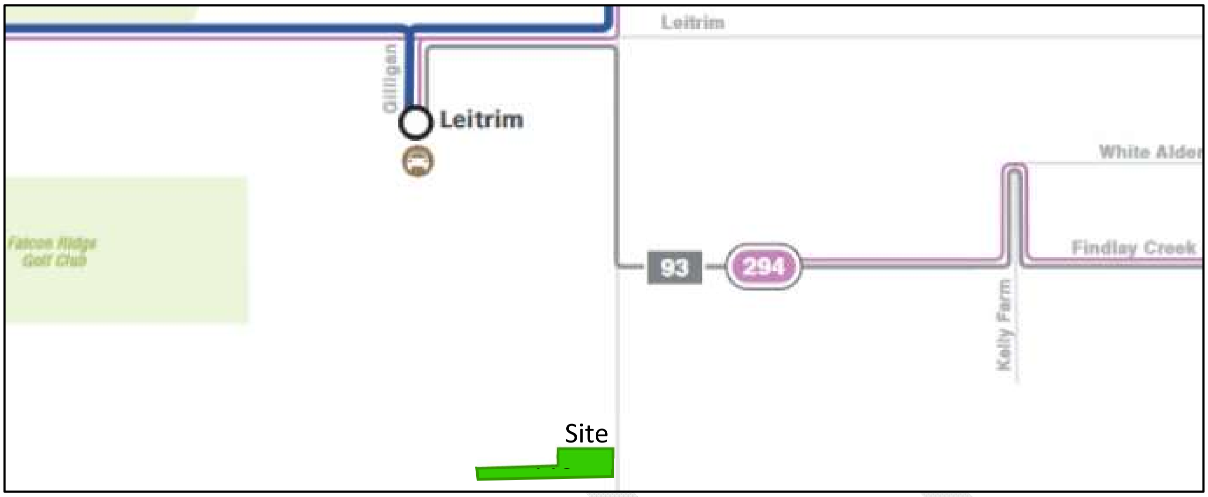


Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 22, 2020

2.2.5 Existing Transit

There is no existing transit service operates within proximity to the site.

Figure 5: Existing Transit Service



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 8, 2020

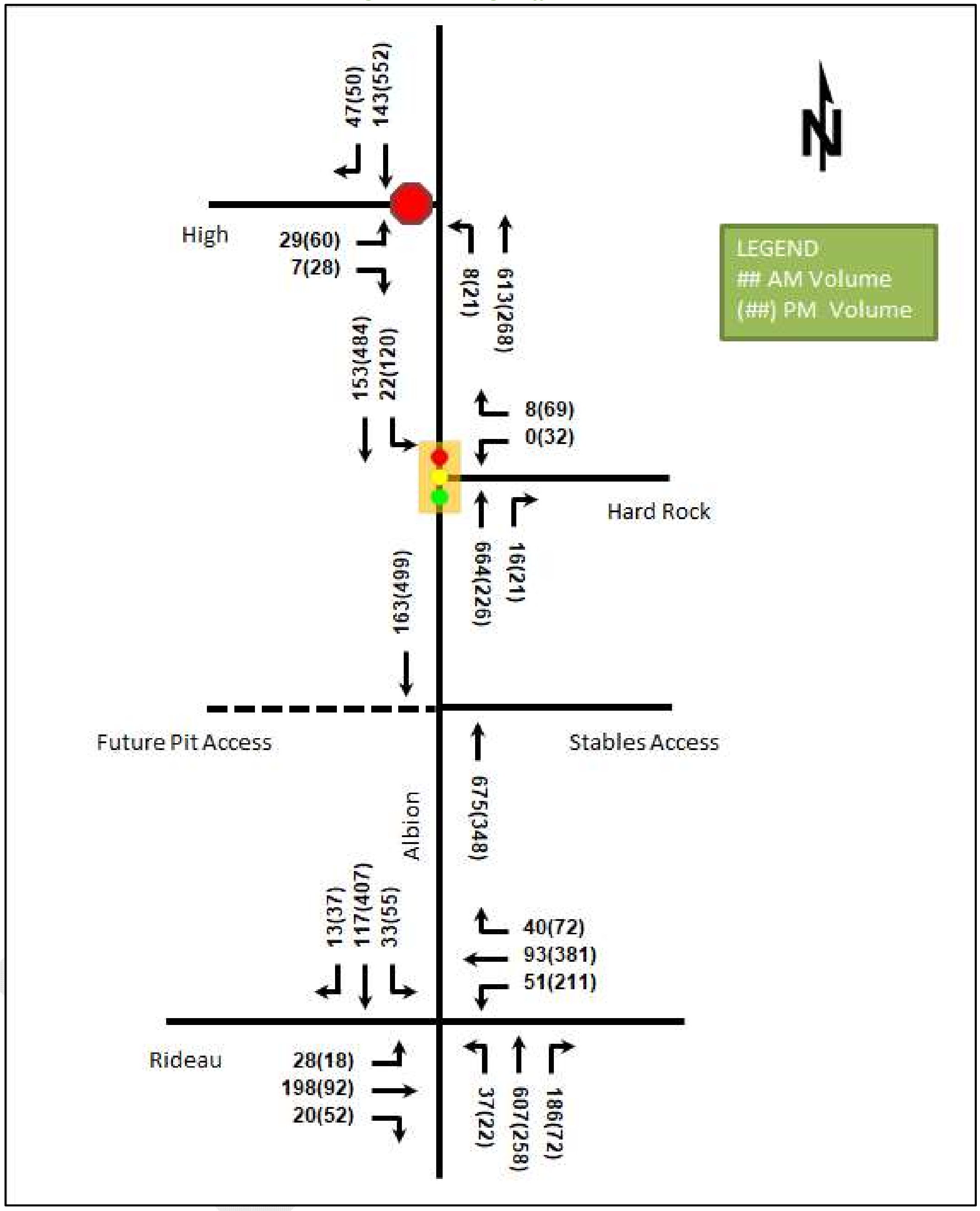
2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts, as summarized in the Parsons (January 2018) and Novatech (November 2019) TIAs for the Hard Rock have been illustrated in Figure 6. The operational analysis on the existing conditions, as reported by Novatech has been provided in Appendix B.

Figure 6: Existing Traffic Counts



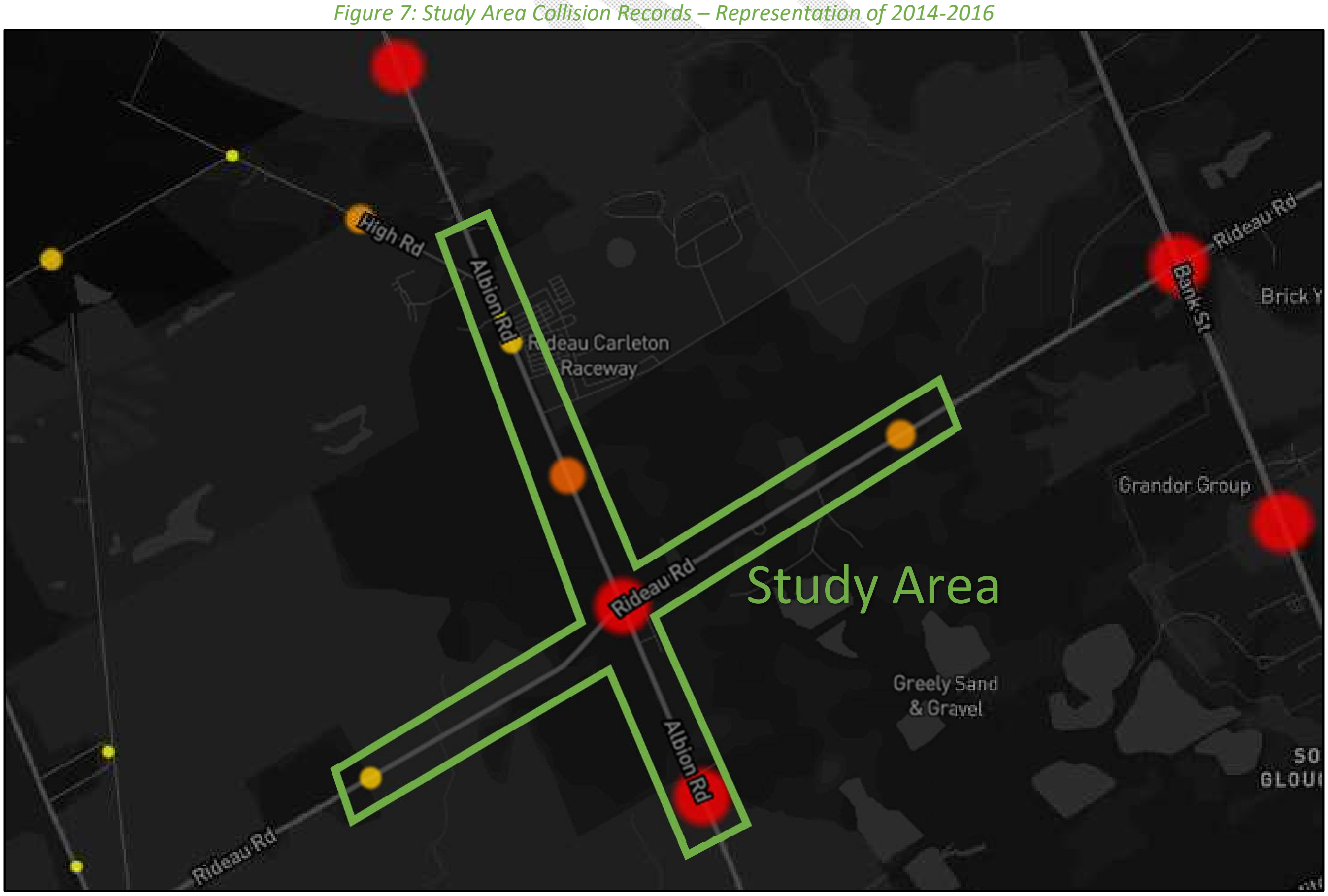
2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding road network. Table 1 summarizes the collision types and conditions in the study area, Figure 7 illustrates the intersections and segments analyzed, and Table 2 summarizes the total collisions for each of these locations. Collision data is included in Appendix C.

Table 1: Study Area Collision Summary, 2014-2018

		Number	%
Total Collisions		**63**	**100%**
Classification	**Fatality**	1	2%
	Non-Fatal Injury	19	30%
	Property Damage Only	43	68%
Initial Impact Type	**Approaching**	3	5%
	Angled	9	14%
	Rear end	9	14%
	Sideswipe	3	5%
	Turning Movement	10	16%
	SMV Unattended	0	0%
	SMV Other	29	46%
	Other	0	0%
Road Surface Condition	**Dry**	36	57%
	Wet	12	19%
	Loose Snow	3	5%
	Slush	3	5%
	Packed Snow	2	3%
	Ice	6	10%
Pedestrian Involved		1	2%
Cyclists Involved		3	5%

Figure 7: Study Area Collision Records – Representation of 2014-2016



Source: https://maps.bikeottawa.ca/collisions/ Accessed: January 8, 2020

Table 2: Summary of Collision Locations, 2014-2018

	Number	%
Intersections / Segments	**82**	**100%**
Albion Rd @ High Rd	5	8%
Albion Rd @ 210 S of High Rd/Earl Armstrong Rd	4	6%
Albion Rd @ Rideau Rd	17	27%
Albion Rd btwn High Rd/Earl Armstrong Rd & 210 S of High Rd/Earl Armstrong Rd	2	3%
Albion Rd btwn 210 S of High Rd/Earl Armstrong Rd/Rideau Carleton Race	9	14%
Albion Rd btwn Rideau Rd & Tullamore St	17	27%
Rideau Rd btwn Bowesville Rd & Albion Rd	6	10%
Rideau Rd btwn Albion Rd & Bank St	3	5%

Within the study area, the intersection of Albion Road and Rideau Road and the road segment of Albion Road between Rideau Road and Tullamore Street were noted to have experienced higher collisions than other intersections. Table 3 and Table 4 summarize the collision types and conditions for there locations.

Table 3: Albion Road and Rideau Road Collision Summary

		Number	%
Total Collisions		**17**	**100%**
Classification	Fatality	0	0%
	Non-Fatal Injury	6	35%
	Property Damage Only	11	65%
Initial Impact Type	Angle	8	47%
	Rear end	5	29%
	Turning Movement	2	12%
	SMV Other	2	12%
Road Surface Condition	Dry	8	47%
	Wet	5	29%
	Loose Snow	1	6%
	Slush	1	6%
	Packed Snow	1	6%
	Ice	1	6%
Pedestrian Involved		0	0%
Cyclists Involved		1	6%

The intersection of Albion Road and Rideau Road had a total of 17 collisions during the 2014-2018 time period with 11 involving property damage only and the remaining six involving non-fatal injuries. Eight of the collisions were angle collisions, five were rear end and the remaining four were split between turning movement and SMV Other. The angled collisions may warrant an adjustment to the signal timing as no sight line obstructions are noted. This modification could provide protected movements to reduce the collisions at the intersection for the auxiliary left-turn lanes already provided. The weather conditions may impact the number of rear end collisions and all occurred around the AM and PM peak hours.

Table 4: Albion Road between Rideau Road and Tullamore Street Collision Summary

		Number	%
Total Collisions		**17**	**100%**
Classification	Fatality	1	6%
	Non-Fatal Injury	3	18%
	Property Damage Only	13	76%
Initial Impact Type	Sideswipe	1	6%
	Approaching	3	18%
	SMV Other	13	76%
Road Surface Condition	Dry	7	41%
	Wet	4	24%
	Loose Snow	1	6%
	Loose Sand or Gravel	1	6%
	Ice	1	6%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

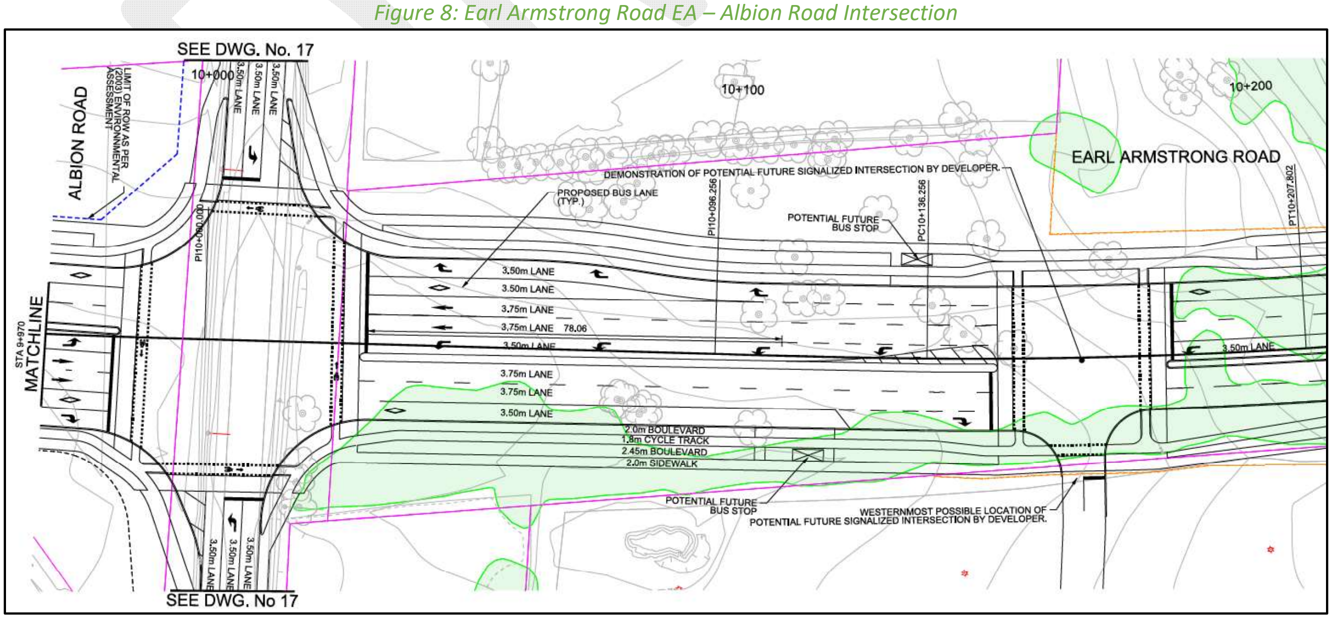
The segment of Albion Road between Rideau Road and Tullamore Street had a total of 17 collisions during the 2014-2018 time period with 13 involving property damage only, three involving non-fatal injuries and one collision involving a fatality. The fatal collision occurred as an approaching collision at 2:07 pm in the afternoon on a Sunday in September in 2015 with dry road conditions. No cyclists or pedestrians were involved in collisions on this road. Thirteen of the collisions were SMV Other collisions and may be the result of animals, weather conditions, and driving on a rural road at night/early morning.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The Earl Armstrong Road Extension EA was completed in 2019 and proposed a 4-lane extension from Albion Road to Hawthorne Road. The new intersection on Albion Road is located north of the existing High Road intersection. Figure 8 illustrates the proposed EA plan. The extension of Earl Armstrong Road is beyond the Affordable 2031 plan within the TMP. No other planned improvements are noted in the study area.

Figure 8: Earl Armstrong Road EA – Albion Road Intersection



2.3.2 Other Study Area Developments

4837 Albion Road

The application includes a site plan for the expansion of the existing casino and the addition of a hotel and a number of restaurants, to be completed in three phases by 2021. Expected to add 41 new AM peak hour two-way auto trips and 308 new PM peak hour two-way auto trips (Novatech 2019).

2610 Rideau Road

The application includes a site plan for the addition of one storey to an existing manufacturing facility, to be built out in two phases, phase one by 2020 and phase two by 2025. This addition is expected to generate 32 two-way AM peak hour trips and 37 two-way PM peak hour trips (Halpenny, 2019)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of Albion Road and High Road, Albion Road and Rideau Carleton Racetrack and Casino, and Albion Road and Rideau Road which are all of the intersections that fall within a one-kilometer radius of the site.

3.2 Time Periods

As the proposed development has a uniform trip generation throughout weekdays, to determine the maximum impact, the weekday AM and PM peak periods will be examined.

3.3 Horizon Years

The anticipated build-out year is 2020. As a result, the full build-out plus five years horizon year is 2025. It is estimated that the site will close by 2030.

4 Exemption Review

Table 5 summarizes the exemptions for this TIA.

Table 5: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Exempt (only 2-4 employees)
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Exempt
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt

Module	Element	Explanation	Exempt/Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

In addition to the above TIA requirements and exemptions, the following exemptions in Table 6 are also recommended for this TIA.

Table 6: Recommended Additional Exemptions

Module	Element	Explanation
Forecasting		
3.1 Development Generated Travel Demand	All Elements	Trip generation trigger was not met, therefore trip and mode share forecasting is not required for the subject site. An estimation of the on-site activity provides a typical operation of 90 two-way trips per day (7:00am and 7:00pm) to a maximum of 130 two-way trips per day for limited time high demand projects. Between 2 and 4 employees are expected to be on site. The resulting peak hour trips would be approximately: • AM Peak: 9-17 inbound trips, 5-13 outbound trips • PM Peak: 5-13 inbound and outbound trips The anticipated trip distribution will be predominantly south to Rideau Road, with only local delivery immediately north of the site requiring trips to travel north.
3.2 Background Network Travel Demand	All Elements	As per the 4837 Albion Road Hard Rock Ottawa TIA, no intersection constraints were noted for the existing volumes and the background growth would continue to be accommodated within the existing transportation network. Please refer to the 4837 Albion Road Hard Rock Ottawa TIA for additional information on background road network and intersection operations.
3.3 Demand Rationalization	All Elements	As per the 4837 Albion Road Hard Rock Ottawa TIA, no network constraints were noted.
Design Review Component		
4.1 Development Design	4.1.1 Design for Sustainable Modes	The rural nature of the site does not provide any pedestrian, cycling, and transit service/facilities. Furthermore, the internal site is a function of the pit requirements and has been prepared to support that operation. Therefore, the need to for a TIA to outline the internal auto parking and pedestrian access to the site office is not required.
4.3 Boundary Street Design	All Elements	Limited opportunity exists to increase the MMLOS of Albion Road due to the rural nature of Albion Road and the presence of existing paved shoulders for bike travel.

Module	Element	Explanation
4.4 Access Intersection Design	All Elements	The access intersection is anticipated to be a typical private approach design, completed as per City standards and operational requirements for site vehicles. Therefore, the need for a TIA to review the access is not required and the access design will be completed as part of the site plan review process within the existing submission.
Network Impact Components		
4.7 Transit	All Elements	No transit service is provided in the area.
4.9 Network Intersections	All Elements	As outlined previously, the low traffic generation will have minimal impact on network intersections and sufficient capacity if currently provided to accommodate an increase in line with background growth. Please refer to the 4837 Albion Road Hard Rock Ottawa TIA for additional information on future road network and intersection operations.

5 Summary and Conclusion

The need for a TIA, as per the Step 1 Screening Form, is identified solely on the classification of Albion Road as a spine cycling route across the frontage of the proposed site. Through the review of the existing conditions in this Step 2 Scoping Report, no items were identified that required additional consideration for the site.

The remaining modules and elements of the TIA Guidelines, outlined in Table 5, are internal to the site and will be reviewed as part of the existing site plan submission without the need for a TIA. The access will be located at the existing intersection for the barn/stables access on Albion Road and the existing painted gore area on the northbound approach allows for a left-turn lane to be located in this space.

Given the above, it is the recommendation of this Scoping Report that the TIA requirements for the proposed mineral extraction site have been met and no further review or assessment of the development is required.

Prepared By:

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Christopher Gordon, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

CGH TRANSPORTATION
13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

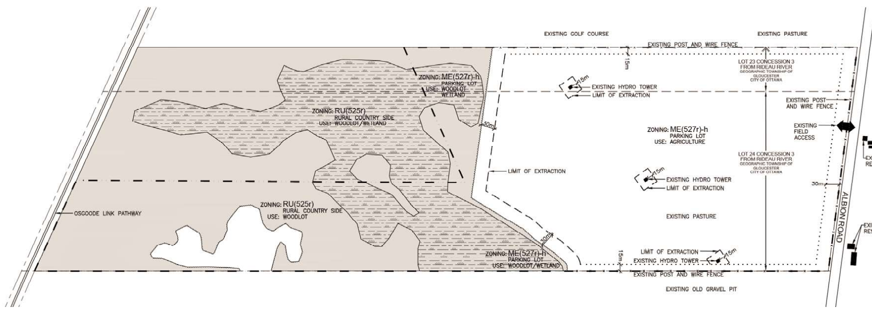
Date:	22-Jan-20
Project Number:	2019-72
Project Reference:	Cavanagh Ottawa Airport Pit

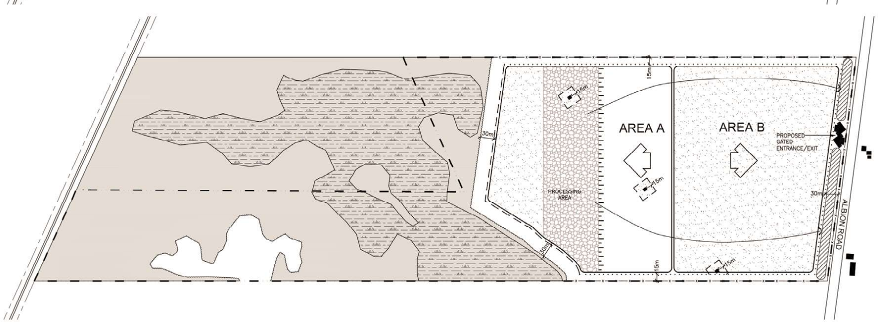
1.1 Description of Proposed Development	
Municipal Address	4788 Albion Road
Description of Location	Pin: 043280158
Land Use Classification	Mineral Extraction (ME[527r]-h)
Development Size	Mineral Extraction Site
Accesses	One to Albion Road
Phase of Development	Single Phase
Buildout Year	2020
TIA Requirement	Design Review Component

1.2 Trip Generation Trigger		
Land Use Type	Mineral Extraction Site	
Development Size	2	Employees
Trip Generation Trigger	No	

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	No





PHASE A

PHASE A NOTES

1. ESTABLISH ENTRANCE/ EXIT FROM ALBION ROAD WHERE SHOWN ON SITE PLANS, ACCORDING TO MUNICIPAL STANDARDS AND APPROVALS.
2. PRIOR TO EXTRACTION COMMENCING IN AREA A, CONSTRUCT OR UPGRADE THE FENCING ON THE BOUNDARY OF THE LICENCE. ALL FENCING SHALL BE MAINTAINED.
3. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA A AND USE THE MATERIAL TO CONSTRUCT ACOUSTIC BERMS AS SHOWN. EXCESS MATERIAL MAY BE STOCKPILED ON THE PIT FLOOR OR USED TO BEGIN PROGRESSIVE REHABILITATION.
4. BEGIN EXTRACTION IN AREA A IN DIRECTION SHOWN. TEMPORARY STOCKPILES MAY BE LOCATED ON PIT FLOOR NEAR THE PIT FACE DURING EXCAVATION OF AGGREGATE.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE B (NOT SHOWN)

PHASE B NOTES

1. COMPLETE EXTRACTION IN AREA A.
2. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA B AND USE THE MATERIAL TO BEGIN PROGRESSIVE REHABILITATION OF AREA A.
3. COMPLETE REHABILITATION OF AREA A AND EXTRACTION OF AREA B.
4. COMPLETE REHABILITATION IN AREA B USING MATERIAL STORED IN BERMS.
5. REMOVE ALL EQUIPMENT, STRUCTURES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS.

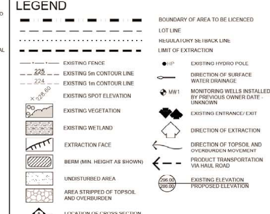
TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

ARCHAEOLOGICAL ASSESSMENT - --------- DATED---------
SHOULD DEEPLY BURIED ARCHAEOLOGICAL MATERIAL BE FOUND ON THE PROPERTY DURING DEVELOPMENT ACTIVITIES, THE MINISTRY OF CULTURE SHOULD BE NOTIFIED IMMEDIATELY AT (519) 675-7742.. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING EXCAVATION, THE PROPONENT SHOULD IMMEDIATELY CONTACT BOTH THE MINISTRY OF CULTURE AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS, (416) 326-3414."

KEY MAP

LEGEND



NO.	DATE	REVISIONS	OWNER	HM

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

CAVANAGH
OTTAWA AIRPORT PIT

PART OF LOTS 23 AND 24, CONCESSION 3 FROM RIDEAU RIVER
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Scale 1.4000
0 50 100 150m

Drawing Status
PRELIMINARY
FOR DISCUSSION

North

Stamp
DRAFT

Drawn S.B.
Checked M.H.
Issue Date

Drawing Title
EXISTING FEATURES
AND
OPERATIONAL PLAN

Project Number
19-27

Drawing Number
1 OF 2

FILE NAME: 19-27/COMP/1927-1.DWG
PLOT DATE: AUGUST 20, 2019

EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF 2 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE CITY OF OTTAWA.
4. APPLICANT:
   THOMAS CAVANAGH CONSTRUCTION LTD.
   9094 CAVANAUGH ROAD,
   ASHTON, ONTARIO
   K0A 1B0
5. TOTAL AREA TO BE LICENCED: 62.9 ha
   TOTAL AREA TO BE EXTRACTED: 33.8 ha
   TOTAL AREA TO REHABILITATED: 33.8 ha

BASE INFORMATION

6. PROPERTY BOUNDARY INFORMATION FOR PART OF LOTS 23 AND 24, CONCESSION 3 FROM, FROM RIDEAU RIVER, CITY OF OTTAWA WAS OBTAINED FROM ARNETT, KENNEDY, RIDDELL AND JASON SURVEYING LTD. LEGAL SURVEY, DATED NOVEMBER 24, 1988. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA LEVEL (ASL).

   THE SITE WAS FIELD CHECKED BY ----------------------------, -----------.

7. ZONING INFORMATION OBTAINED FROM SCHEDULE 'A', MUNICIPALITY OF STRATHROY-CARADOC ZONING BY-LAW NO. 43-08, KEY MAP NO. 29, DATED FEBRUARY 2019.

HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY-------------, DATED -----.
9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE AT ±--m ABOVE SEA LEVEL (A.S.L.) BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

TECHNICAL REPORTS

10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORTY BY --------------- ---------------. DATED -----(REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY ------------ ------------------------- DATED --- (REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
12. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY--------------- DATED -------------- (REFER TO SHEET 1 OF 2 FOR TECHNICAL RECOMMENDATIONS).

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

   EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM MNRF.

EXTRACTION/PROCESSING/HAULING INFORMATION

2. TOTAL AREA TO BE EXTRACTED IS 33.8 HECTARES.
3. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS --------- TONNES.

   EXTRACTION OF SAND AND GRAVEL WILL TAKE PLACE IN ONE OR TWO BENCHES, WITH A MAXIMUM HEIGHT OF ±6 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± ----- AND ---- ASL (SEE ----- GROUNDWATER SCIENCE CORP.)

   OTHER SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION. OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED ON THE PIT FLOOR. MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING, CUSTOM PRODUCTS AND/OR RESALE. THIS MAY INCLUDE AGGREGATE (IN THE PROCESSING AREA AND/OR PEAT AND TOPSOIL (IN AREA 1).

4. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN. .

HYDROGEOLOGICAL INFORMATION

5. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ± ± m ABOVE SEA LEVEL (A.S.L.), BASED ON THE ------- HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 2 OF 2.
6. SURFACE DRAINAGE WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

NOISE MITIGATION INFORMATION

7. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
EXCAVATION AND PROCESSING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
SHIPPING:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

1. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

2. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY. VIGOROUS GROWING CONDITION.

FENCING INFORMATION

3. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 2 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES ADJACENT TO PARKHOUSE DRIVE WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE, EXCEPT WHERE THERE IS A SITE PLAN OVERRIDE, TO COMPLY WITH THE AGGREGATE RESOURCES ACT. UNFENCED BOUNDARIES WILL BE DEMARCATED WITH HIGHLY VISIBLE 1.2m HIGH MARKER POSTS AT CORNERS. SILT/EXCLUSION FENCING WILL BE CONSTRUCTED ONCE STRIPPING OCCURS WITHIN 50m OF THE SETBACKS ADJACENT TO THE NATURAL HERITAGE FEATURES IDENTIFIED ON SITE. ALL FENCING SHALL BE MAINTAINED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

4. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON PIT FLOOR CLOSE TO EXTRACTION FACE.

BERM INFORMATION

14. BERMS SHALL CREATE AN EFFECTIVE VISUAL BARRIER AND BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 2 OF 2. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.
15. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

16. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE PROCESSING AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

17. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

IMPORTATION OF FILL INFORMATION

18. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE AGRICULTURAL REHABILITATION.

    IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S PARAMETERS UNDER TABLE "1" OF MECP'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT".

    SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. A QP SHALL ALSO DESIGN A FILL MONITORING PROGRAM. RANDOM SAMPLING OF ALL IMPORTED MATERIAL SHALL BE CONDUCTED AT THE REQUEST OF MNRF.

    THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF OR MECP.

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering √ or transportation planning ☐.

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

Dated at ___Ottawa___________ this __20__ day of ________September________, 2018.
(City)

Name: ___________Andrew Harte_____________________________
(Please Print)

Professional Title: _________Professional Engineer___________________________

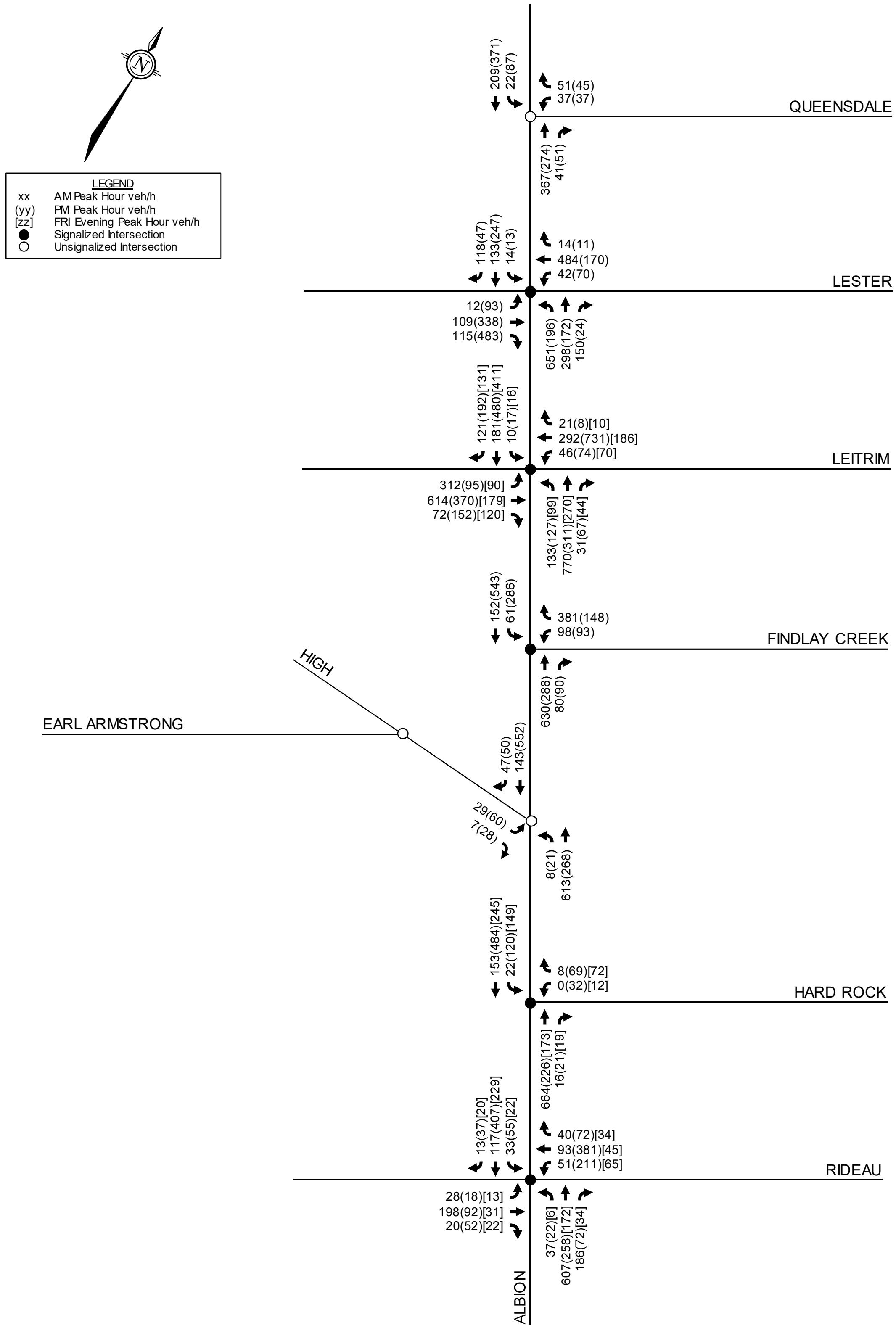
____
Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

Hard Rock Ottawa 4837 Albion Road TIA Existing Study Area Traffic Operations

Figure 2: Existing Traffic Volumes



F during the weekday afternoon peak hour. All other critical movements at all other intersections were shown to operate at an acceptable LOS D or better. The results of the existing analysis from the previous TIA are included in **Table 4**. Detailed Synchro reports prepared by Parsons are included in **Appendix I**.

Table 4: Intersection Capacity Analysis – Existing Traffic

Intersection	Weekday Morning Peak			Weekday Afternoon Peak		
	Max v/c or delay	LOS	Mvmt	Max v/c or delay	LOS	Mvmt
Albion/Queensdale[1]	12.2 sec	B	NBT	14.8 sec	B	SBT
Albion/Lester	**1.07**	**F**	**NBL**	0.72	C	SBT
Albion/Leitrim	**1.00**	**E**	**EBT**	**1.11**	**F**	**WBT**
Albion/Findlay Creek	0.78	C	WBR	0.48	A	WBR
Albion/High[1]	15.6 sec	C	EB	20.0 sec	C	EB
Albion/Hard Rock	0.43	A	NBT	0.35	A	SBT
Albion/Rideau	0.67	B	NBT	0.83	D	WBT

1. Unsignalized intersection

Planned intersection improvements at Albion Road/Lester Road will address the failing level of service. Widening of Leitrim Road is not included in the Affordable Network, however interim improvements at Albion Road/Leitrim Road include additional through and right turn lanes. These interim improvements are planned as part of the Stage 2 LRT project, and are anticipated to be in place by 2021.

6.7.2 2028 Total Intersection Operations

The performance of the study area intersections during the weekday morning, weekday afternoon, and Friday evening peak hours are shown below, and taken from the previous TIA and TIA Addendum. Analysis of the weekday morning peak has remained unchanged since the previous TIA, while analysis of the weekday afternoon peak was updated and analysis of the Friday evening peak was included in the TIA Addendum. As shown in **Table 2**, the additional 30 restaurant seats and 25 hotel rooms since the previous analysis are anticipated to add as many as seven vehicle trips during the peak hours. Therefore, the previous analysis stands.

All ‘new’ site-generated traffic is assumed to use the signalized Hard Rock access to Albion Road, and the planned roadway modifications at the Albion Road/Leitrim Road and Albion Road/Lester Road intersection are assumed to be in place. In addition, the signal timing at Albion Road/Leitrim Road was adjusted to improve the level of service for the critical movement. The results from the previous TIA and TIA Addendum are shown in **Table 5**. Detailed Synchro reports prepared by Parsons and Novatech are included in **Appendix I**.

Appendix C

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-05-06	2014	17:58	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-02-10	2016	15:30	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	02 - Wet
2018-05-03	2018	16:59	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD (0012478)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-05-14	2018	6:18	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD (0012478)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2016-08-16	2016	8:36	ALBION RD @ HIGH RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2018-06-20	2018	7:26	ALBION RD @ HIGH RD (0004208)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-09-13	2018	14:18	ALBION RD @ HIGH RD (0004208)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-12-06	2018	20:06	ALBION RD @ HIGH RD (0004208)	01 - Clear	07 - Dark	02 - Stop sign	02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-08-31	2018	15:50	ALBION RD @ HIGH RD (0004208)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	05 - Turning movement	01 - Dry
2017-08-14	2017	8:17	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-02-09	2017	12:09	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	01 - Dry
2016-05-24	2016	17:45	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2016-11-16	2016	9:51	ALBION RD @ RIDEAU RD	02 - Rain	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	02 - Wet
2015-02-04	2015	13:15	ALBION RD @ RIDEAU RD	03 - Snow	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	05 - Packed snow
2014-01-09	2014	8:44	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2017-06-29	2017	16:43	ALBION RD @ RIDEAU RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2017-01-02	2017	10:29	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2016-08-04	2016	9:22	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2016-02-11	2016	16:16	ALBION RD @ RIDEAU RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	06 - Ice
2016-01-27	2016	0:00	ALBION RD @ RIDEAU RD	03 - Snow	00 - Unknown	01 - Traffic signal	03 - P.D. only	07 - SMV other	02 - Wet
2016-04-11	2016	6:59	ALBION RD @ RIDEAU RD	04 - Freezing Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	04 - Slush
2015-08-06	2015	13:30	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2015-06-01	2015	23:00	ALBION RD @ RIDEAU RD	02 - Rain	07 - Dark	01 - Traffic signal	03 - P.D. only	07 - SMV other	02 - Wet
2015-09-17	2015	18:56	ALBION RD @ RIDEAU RD	01 - Clear	05 - Dusk	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2018-01-02	2018	18:00	ALBION RD @ RIDEAU RD (0009356)	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	02 - Angle	03 - Loose snow
2018-02-12	2018	9:41	ALBION RD @ RIDEAU RD (0009356)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	02 - Wet
2016-04-15	2016	18:17	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2015-02-02	2015	5:44	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	05 - Turning movement	03 - Loose snow
2014-05-25	2014	16:35	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2017-05-08	2017	14:50	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-07-19	2017	20:23	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	05 - Dusk	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-05-07	2014	20:35	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	05 - Dusk	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-01-14	2018	7:31	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE (__3ZA3S0B)	01 - Clear	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	05 - Packed snow
2018-01-23	2018	1:15	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE (__3ZA3S0B)	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	04 - Slush
2018-05-28	2018	18:41	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE (__3ZA3S0B)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-04-23	2016	18:01	ALBION RD btwn HIGH RD/EARL ARMSTRONG RD & 210 S OF HIGH RD/EARL ARMST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-05-05	2017	8:56	ALBION RD btwn HIGH RD/EARL ARMSTRONG RD & 210 S OF HIGH RD/EARL ARMST	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2015-09-06	2015	14:07	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	01 - Fatal injury	01 - Approaching	01 - Dry
2017-03-15	2017	9:30	ALBION RD btwn RIDEAU RD & TULLAMORE ST	03 - Snow	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	03 - Loose snow
2016-12-26	2016	19:06	ALBION RD btwn RIDEAU RD & TULLAMORE ST	04 - Freezing Rain	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	06 - Ice
2017-06-27	2017	14:37	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-04-07	2017	0:24	ALBION RD btwn RIDEAU RD & TULLAMORE ST	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2016-07-18	2016	8:39	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-11-30	2016	23:55	ALBION RD btwn RIDEAU RD & TULLAMORE ST	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2015-04-24	2015	7:57	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-02-04	2015	18:51	ALBION RD btwn RIDEAU RD & TULLAMORE ST	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	06 - Ice
2015-02-05	2015	3:44	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2015-07-20	2015	7:36	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-28	2015	10:36	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-05	2015	4:37	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-27	2015	18:48	ALBION RD btwn RIDEAU RD & TULLAMORE ST	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	02 - Wet
2014-07-14	2014	13:22	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	08 - Loose sand or gravel
2018-02-05	2018	7:01	ALBION RD btwn RIDEAU RD & TULLAMORE ST (__5RGNIJ)	01 - Clear	03 - Dawn	10 - No control	02 - Non-fatal injury	07 - SMV other	06 - Ice
2018-05-20	2018	22:27	ALBION RD btwn RIDEAU RD & TULLAMORE ST (__5RGNIJ)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-04	2015	16:22	RIDEAU RD btwn ALBION RD & BANK ST	01 - Clear	05 - Dusk	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2016-04-26	2016	19:20	RIDEAU RD btwn ALBION RD & BANK ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	01 - Dry
2014-09-07	2014	17:20	RIDEAU RD btwn ALBION RD & BANK ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-11-14	2017	15:00	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-03-07	2017	2:25	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2016-04-06	2016	17:42	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	04 - Slush
2016-11-19	2016	3:33	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-04-17	2018	21:30	RIDEAU RD btwn BOWESVILLE RD & ALBION RD (__3ZBOY3)	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	02 - Wet
2018-02-03	2018	10:32	RIDEAU RD btwn BOWESVILLE RD & ALBION RD (__3ZBOY3)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry

4788 Albion Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Prepared for:

Thomas Cavanagh Construction Ltd.
9094 Cavanagh Road.
Ashton, ON, K0A 1B0

Prepared by:

CGH TRANSPORTATION

13 Markham Avenue
Nepean, ON K2G 3Z1

January 2020

PN: 2019-72

Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

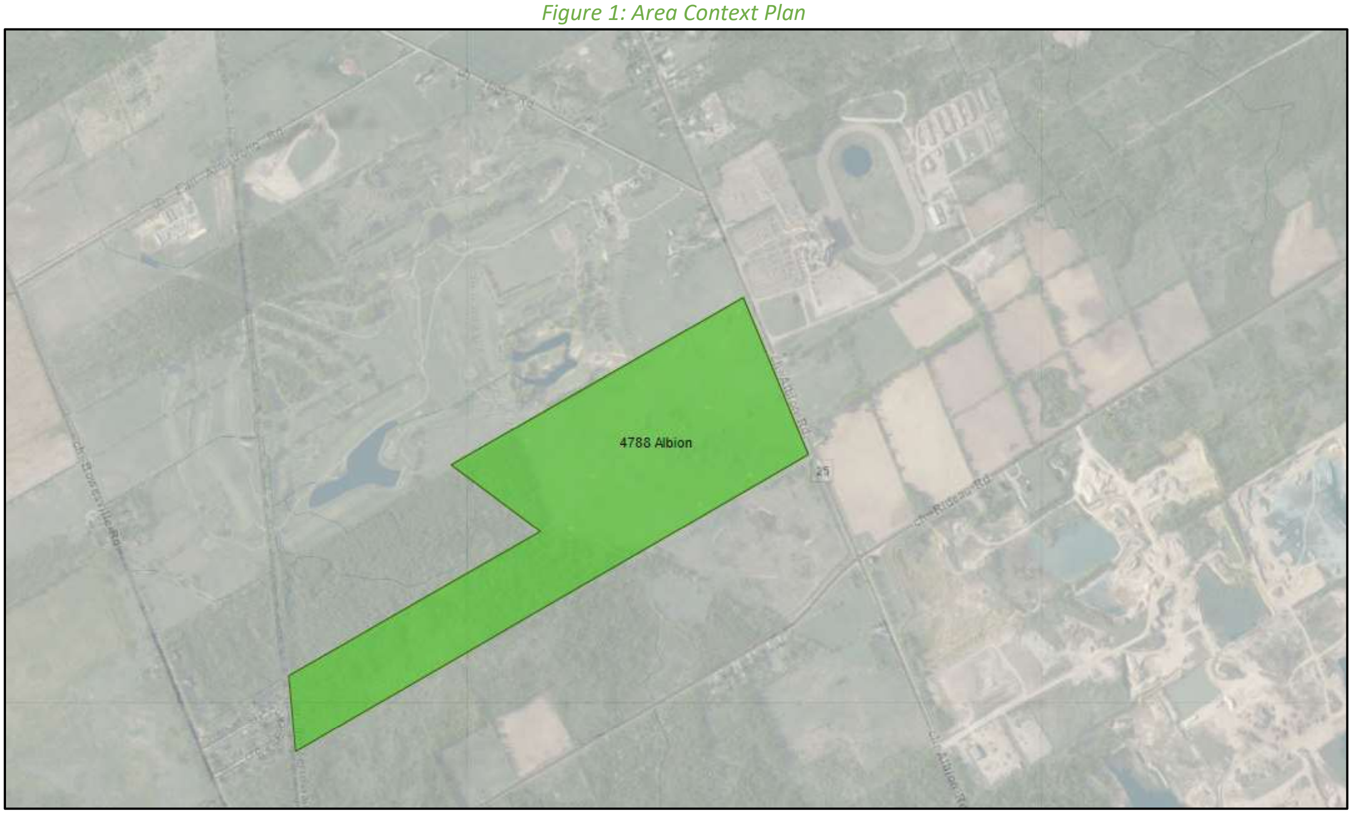
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is warranted due to the Location Trigger as Albion Road is classified as a cycling spine route. This trigger results in the need to produce a Step 2 Scoping Report, however Network Impact Component is not required.

2 Existing and Planned Conditions

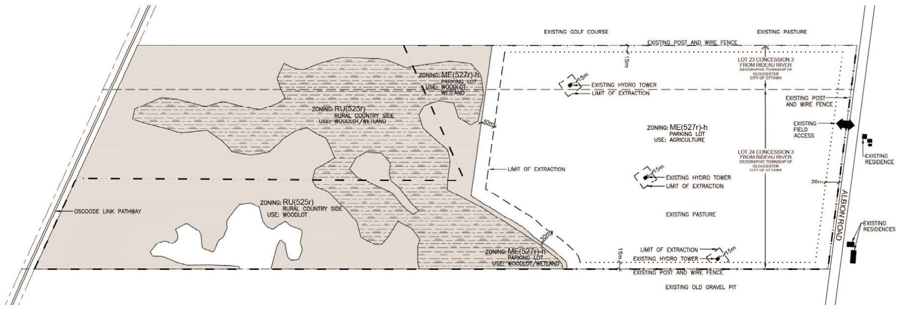
2.1 Proposed Development

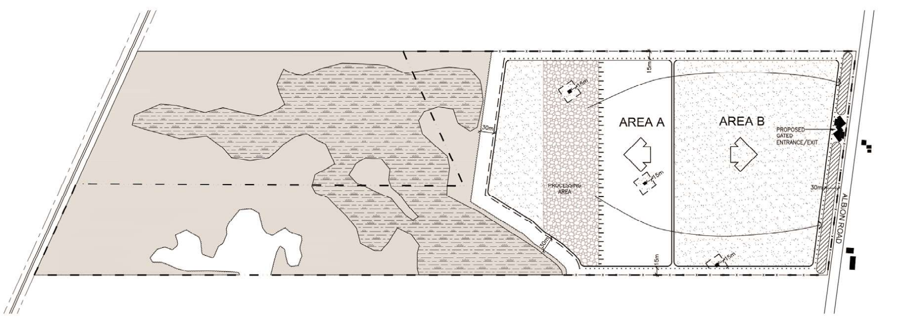
4788 Albion Road is federally owned land zoned as Mineral Extraction (ME) and the proponent is planning to commence operations in 2020. The site is located outside the urban boundary and no City design priority, CDP or secondary plans cover this area. The proposed extraction site will be in operation for approximately 5 to 10 years. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed Concept Plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 22, 2020





PHASE A

PHASE A NOTES

1. ESTABLISH ENTRANCE/ EXIT FROM ALBION ROAD WHERE SHOWN ON SITE PLANS, ACCORDING TO MUNICIPAL STANDARDS AND APPROVALS.
2. PRIOR TO EXTRACTION COMMENCING IN AREA A, CONSTRUCT OR UPGRADE THE FENCING ON THE BOUNDARY OF THE LICENCE. ALL FENCING SHALL BE MAINTAINED.
3. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA A AND USE THE MATERIAL TO CONSTRUCT ACOUSTIC BERMS AS SHOWN. EXCESS MATERIAL MAY BE STOCKPILED ON THE PIT FLOOR OR USED TO BEGIN PROGRESSIVE REHABILITATION.
4. BEGIN EXTRACTION IN AREA A IN DIRECTION SHOWN. TEMPORARY STOCKPILES MAY BE LOCATED ON PIT FLOOR NEAR THE PIT FACE DURING EXCAVATION OF AGGREGATE.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE B (NOT SHOWN)

PHASE B NOTES

1. COMPLETE EXTRACTION IN AREA A.
2. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA B AND USE THE MATERIAL TO BEGIN PROGRESSIVE REHABILITATION OF AREA A.
3. COMPLETE REHABILITATION OF AREA A AND EXTRACTION OF AREA B.
4. COMPLETE REHABILITATION IN AREA B USING MATERIAL STORED IN BERMS.
5. REMOVE ALL EQUIPMENT, STRUCTURES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS.

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

ARCHAEOLOGICAL ASSESSMENT - --------- DATED----------

SHOULD DEEPLY BURIED ARCHAEOLOGICAL MATERIAL BE FOUND ON THE PROPERTY DURING DEVELOPMENT ACTIVITIES, THE MINISTRY OF CULTURE SHOULD BE NOTIFIED IMMEDIATELY AT (519) 675-7742.. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING EXCAVATION, THE PROPONENT SHOULD IMMEDIATELY CONTACT BOTH THE MINISTRY OF CULTURE AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS, (416) 326-3414."

KEY MAP

LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LOT LINE
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- EXISTING FENCE
- 225 EXISTING 5m CONTOUR LINE
- 224 EXISTING 1m CONTOUR LINE
- × 228.60 EXISTING SPOT ELEVATION
- EXISTING VEGETATION
- EXISTING WETLAND
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- UNDISTURBED AREA
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- (A) LOCATION OF CROSS SECTION
- HP EXISTING HYDRO POLE
- DIRECTION OF SURFACE WATER DRAINAGE
- MW1 MONITORING WELLS INSTALLED BY PREVIOUS OWNER DATE - UNKNOWN
- EXISTING ENTRANCE/ EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- 296.00 / 286.00 EXISTING ELEVATION / PROPOSED ELEVATION

NO.	DATE	REVISIONS	OWNER	HM	

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	

Site Plan Amendments

EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF 2 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE CITY OF OTTAWA.
4. APPLICANT:
   THOMAS CAVANAGH CONSTRUCTION LTD.
   9094 CAVANAUGH ROAD,
   ASHTON, ONTARIO
   K0A 1B0
5. TOTAL AREA TO BE LICENCED: 62.9 ha
   TOTAL AREA TO BE EXTRACTED: 33.8 ha
   TOTAL AREA TO REHABILITATED: 33.8 ha

BASE INFORMATION

6. PROPERTY BOUNDARY INFORMATION FOR PART OF LOTS 23 AND 24, CONCESSION 3 FROM, FROM RIDEAU RIVER, CITY OF OTTAWA WAS OBTAINED FROM ARNETT, KENNEDY, RIDDELL AND JASON SURVEYING LTD. LEGAL SURVEY, DATED NOVEMBER 24, 1988. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA LEVEL (ASL).

   THE SITE WAS FIELD CHECKED BY ---------------------------, -----------.

7. ZONING INFORMATION OBTAINED FROM SCHEDULE 'A', MUNICIPALITY OF STRATHROY-CARADOC ZONING BY-LAW NO. 43-08, KEY MAP NO. 29, DATED FEBRUARY 2019.

HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY------------, DATED ----.
9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE AT ±--m ABOVE SEA LEVEL (A.S.L.) BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

TECHNICAL REPORTS

10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORTY BY -------------- --------------. DATED ----(REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY ------------ ----------------------- DATED --- (REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
12. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY------------- DATED ------------ (REFER TO SHEET 1 OF 2 FOR TECHNICAL RECOMMENDATIONS).

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

   EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM MNRF.

EXTRACTION/PROCESSING/HAULING INFORMATION

2. TOTAL AREA TO BE EXTRACTED IS 33.8 HECTARES.
3. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS --------- TONNES.

   EXTRACTION OF SAND AND GRAVEL WILL TAKE PLACE IN ONE OR TWO BENCHES, WITH A MAXIMUM HEIGHT OF ±6 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± ----- AND ---- ASL (SEE ----- GROUNDWATER SCIENCE CORP.)

   OTHER SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION, OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED ON THE PIT FLOOR. MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING, CUSTOM PRODUCTS AND/OR RESALE. THIS MAY INCLUDE AGGREGATE (IN THE PROCESSING AREA AND/OR PEAT AND TOPSOIL (IN AREA 1).
4. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN. .

HYDROGEOLOGICAL INFORMATION

5. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ± ± m ABOVE SEA LEVEL (A.S.L.), BASED ON THE ------- HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 2 OF 2.
6. SURFACE DRAINAGE WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

NOISE MITIGATION INFORMATION

7. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
EXCAVATION AND PROCESSING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
SHIPPING:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

1. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

2. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY. VIGOROUS GROWING CONDITION.

FENCING INFORMATION

3. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 2 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES ADJACENT TO PARKHOUSE DRIVE WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE, EXCEPT WHERE THERE IS A SITE PLAN OVERRIDE, TO COMPLY WITH THE AGGREGATE RESOURCES ACT. UNFENCED BOUNDARIES WILL BE DEMARCATED WITH HIGHLY VISIBLE 1.2m HIGH MARKER POSTS AT CORNERS. SILT/EXCLUSION FENCING WILL BE CONSTRUCTED ONCE STRIPPING OCCURS WITHIN 50m OF THE SETBACKS ADJACENT TO THE NATURAL HERITAGE FEATURES IDENTIFIED ON SITE. ALL FENCING SHALL BE MAINTAINED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

4. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON PIT FLOOR CLOSE TO EXTRACTION FACE.

BERM INFORMATION

14. BERMS SHALL CREATE AN EFFECTIVE VISUAL BARRIER AND BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 2 OF 2. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.
15. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

16. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE PROCESSING AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

17. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

IMPORTATION OF FILL INFORMATION

18. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE AGRICULTURAL REHABILITATION.

    IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S PARAMETERS UNDER TABLE "1" OF MECP'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT".

    SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. A QP SHALL ALSO DESIGN A FILL MONITORING PROGRAM. RANDOM SAMPLING OF ALL IMPORTED MATERIAL SHALL BE CONDUCTED AT THE REQUEST OF MNRF.

    THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF OR MECP.

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

CAVANAGH OTTAWA AIRPORT PIT

PART OF LOTS 23 AND 24, CONCESSION 3 FROM RIDEAU RIVER
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Scale 1.4000

0 50 100 150m

North

Stamp

DRAFT

Drawing Status
PRELIMINARY FOR DISCUSSION

Drawn S.B. | Checked M.H. | Issue Date

Drawing Title

EXISTING FEATURES AND OPERATIONAL PLAN

Project Number 19-27

Drawing Number 1 OF 2

FILE NAME: 19-27/COMP/1927-1.DWG
PLOT DATE: AUGUST 20, 2019

2.2 Existing Conditions

2.2.1 Area Road Network

Albion Road: Albion Road is a City of Ottawa arterial road with a two-lane rural cross-section with paved shoulders on both sides of the road. The posted speed limit is 60 km/h adjacent to the site and increases to 80 km/h approximately 50 metres south of the site. The existing right-of-way provided varies between 26.0 and 33.0 metres along the frontage of the site. Albion Road is a designated truck route.

Rideau Road: Rideau Road is a City of Ottawa collector road with a two-lane rural cross-section. The posted speed limit is 80 km/h and the existing right-of-way provided is 26.0 metres. Rideau Road is a truck route.

High Road: High Road is a City of Ottawa local road with a two-lane rural cross-section. The posted speed limit is 50 km/h and the existing right-of-way provided is 20.0 metres.

2.2.2 Existing Intersections

The existing area intersections adjacent to the proposed site and signalized intersections within 1.0 km have been summarized below:

Albion Road & High Road	The intersection of Albion Road and High Road is a minor-road-only stop-controlled intersection. The northbound approach consists of a shared left-turn/through lane, and the southbound approach consists of a shared through/right-turn lane. The eastbound approach consists of a shared left-turn/right-turn lane. No turn restrictions are noted.
Albion Road & Hard Rock Main Access	The intersection of Albion Road and the Hard Rock main access is a signalized intersection. The northbound approach consists of a through lane and an auxiliary right-turn lane and the southbound approach consists of an auxiliary left-turn lane and a through lane. The westbound approach consists of a left-turn lane and a right-turn lane. No turn restrictions are noted.
Albion Road & Rideau Road	The intersection of Albion Road and Rideau Road is a signalized intersection. The northbound and southbound approaches have each an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches have each an auxiliary left turn land and a shared through/right-turn lane. No turn restrictions are noted.

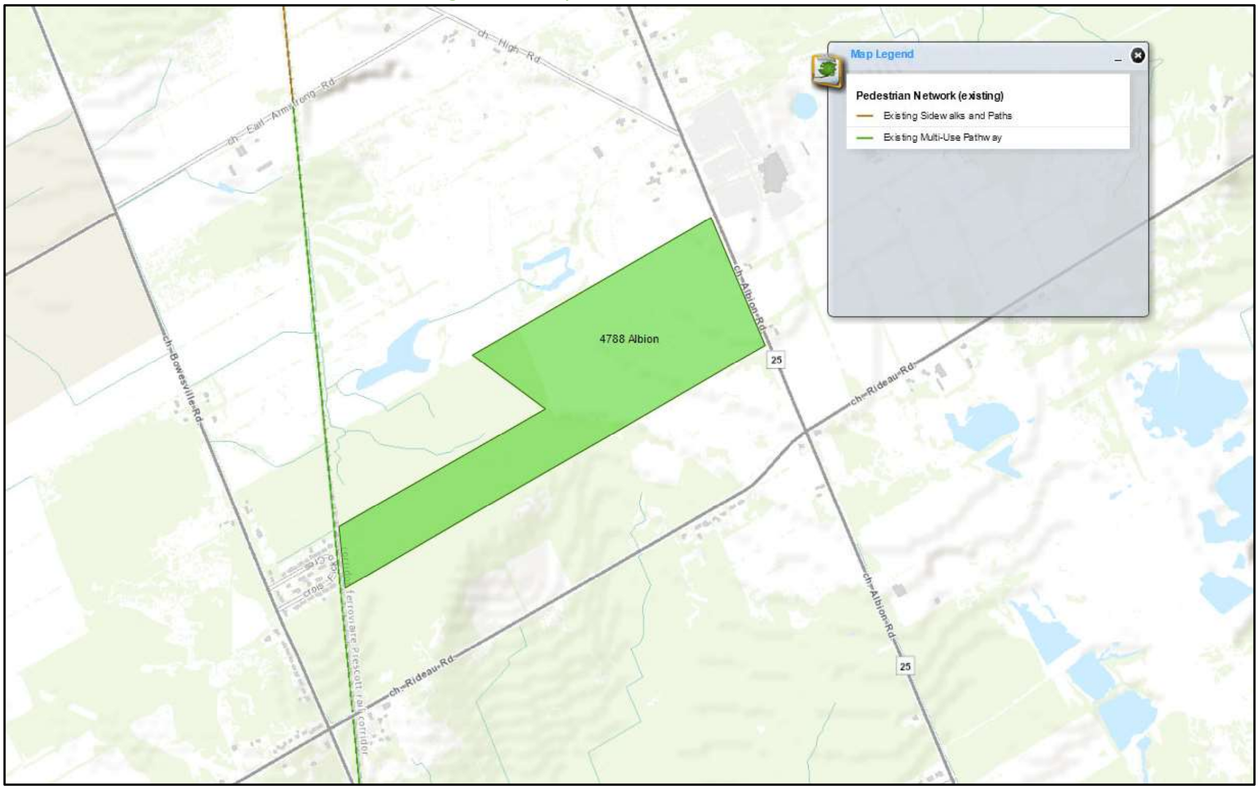
2.2.3 Existing Driveways

Within 200 metres of the proposed site access, there are two additional accesses for the on the east side of Albion Road for the Rideau Carleton Casino/Hard Rock, a private access for the racetrack barn and stables, and three residential driveways.

2.2.4 Cycling and Pedestrian Facilities

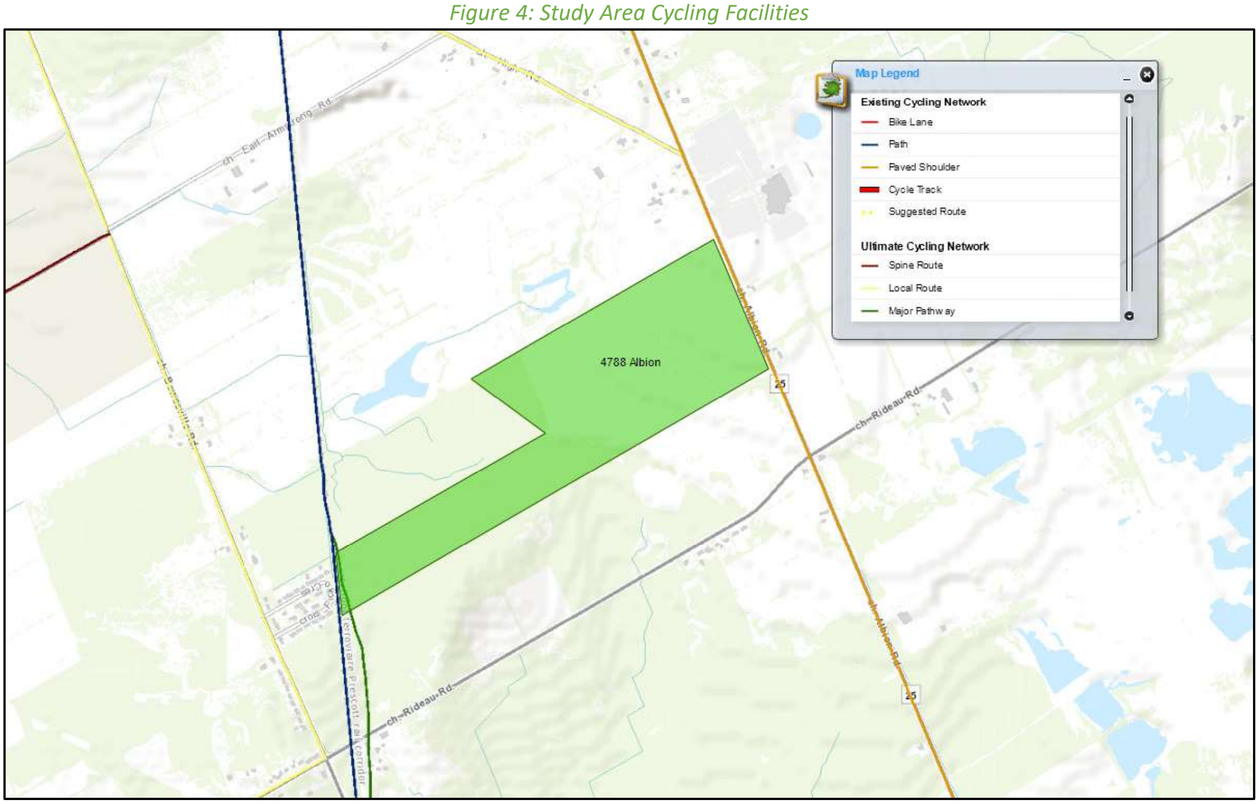
As illustrated in Figure 3, no substantial pedestrian facilities are located within the study area. Figure 4 illustrates the cycling network in the study area, consisting of Albion Road being designated as a spine route and having a paved shoulder, and High Road designated as a local cycling route.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 22, 2020

Figure 4: Study Area Cycling Facilities

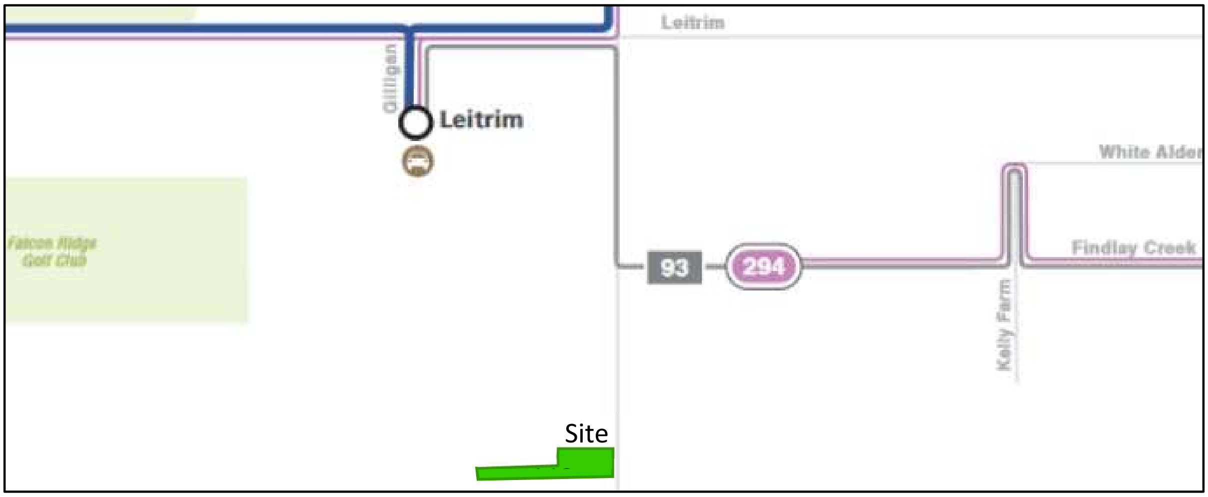


Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 22, 2020

2.2.5 Existing Transit

There is no existing transit service operates within proximity to the site.

Figure 5: Existing Transit Service



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 8, 2020

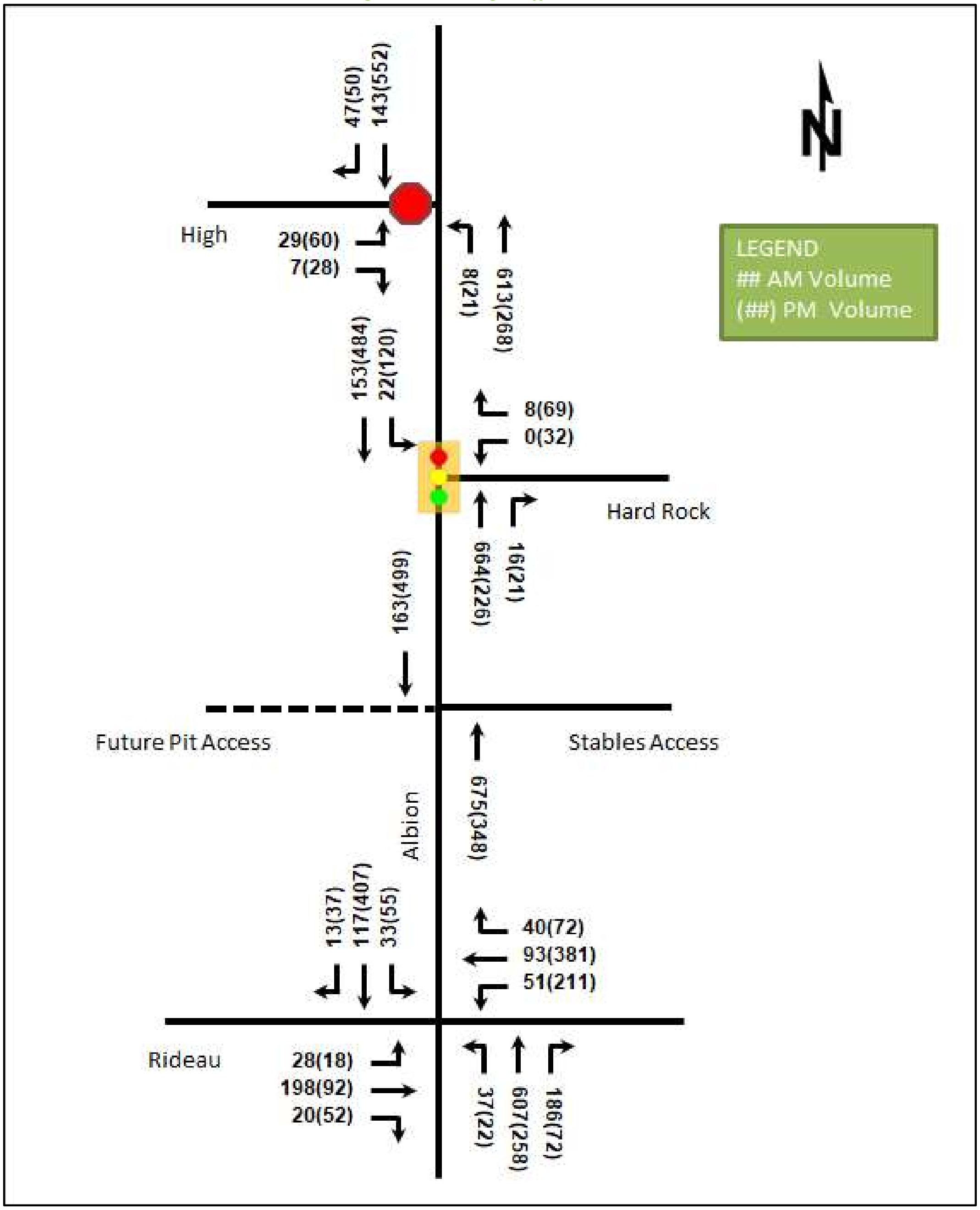
2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts, as summarized in the Parsons (January 2018) and Novatech (November 2019) TIAs for the Hard Rock have been illustrated in Figure 6. The operational analysis on the existing conditions, as reported by Novatech has been provided in Appendix B.

Figure 6: Existing Traffic Counts



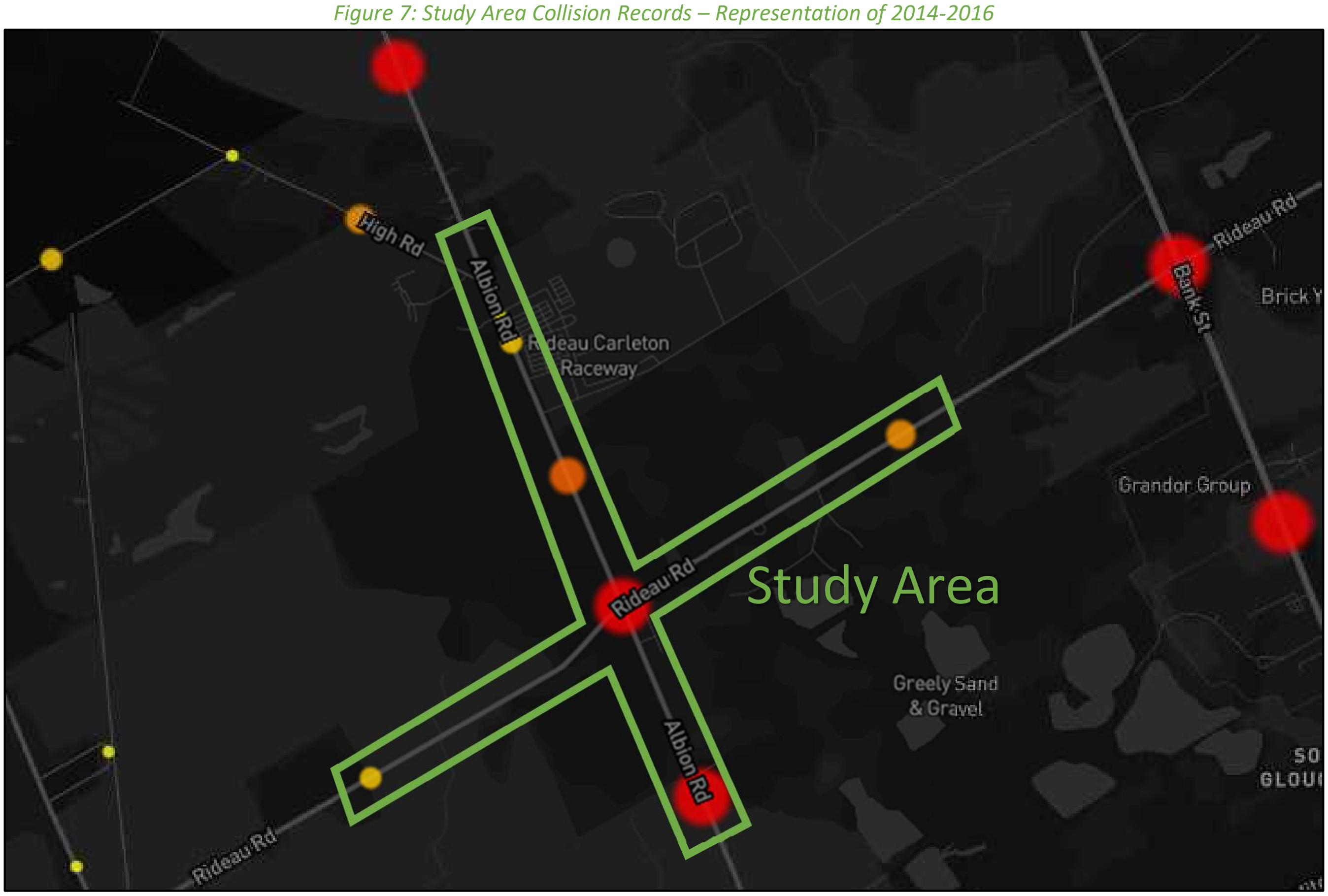
2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding road network. Table 1 summarizes the collision types and conditions in the study area, Figure 7 illustrates the intersections and segments analyzed, and Table 2 summarizes the total collisions for each of these locations. Collision data is included in Appendix C.

Table 1: Study Area Collision Summary, 2014-2018

		Number	%
Total Collisions		**63**	**100%**
Classification	**Fatality**	1	2%
	Non-Fatal Injury	19	30%
	Property Damage Only	43	68%
Initial Impact Type	**Approaching**	3	5%
	Angled	9	14%
	Rear end	9	14%
	Sideswipe	3	5%
	Turning Movement	10	16%
	SMV Unattended	0	0%
	SMV Other	29	46%
	Other	0	0%
Road Surface Condition	**Dry**	36	57%
	Wet	12	19%
	Loose Snow	3	5%
	Slush	3	5%
	Packed Snow	2	3%
	Ice	6	10%
Pedestrian Involved		1	2%
Cyclists Involved		3	5%

Figure 7: Study Area Collision Records – Representation of 2014-2016



Source: https://maps.bikeottawa.ca/collisions/ Accessed: January 8, 2020

Table 2: Summary of Collision Locations, 2014-2018

	Number	%
Intersections / Segments	**82**	**100%**
Albion Rd @ High Rd	5	8%
Albion Rd @ 210 S of High Rd/Earl Armstrong Rd	4	6%
Albion Rd @ Rideau Rd	17	27%
Albion Rd btwn High Rd/Earl Armstrong Rd & 210 S of High Rd/Earl Armstrong Rd	2	3%
Albion Rd btwn 210 S of High Rd/Earl Armstrong Rd/Rideau Carleton Race	9	14%
Albion Rd btwn Rideau Rd & Tullamore St	17	27%
Rideau Rd btwn Bowesville Rd & Albion Rd	6	10%
Rideau Rd btwn Albion Rd & Bank St	3	5%

Within the study area, the intersection of Albion Road and Rideau Road and the road segment of Albion Road between Rideau Road and Tullamore Street were noted to have experienced higher collisions than other intersections. Table 3 and Table 4 summarize the collision types and conditions for there locations.

Table 3: Albion Road and Rideau Road Collision Summary

		Number	%
Total Collisions		**17**	**100%**
Classification	Fatality	0	0%
	Non-Fatal Injury	6	35%
	Property Damage Only	11	65%
Initial Impact Type	Angle	8	47%
	Rear end	5	29%
	Turning Movement	2	12%
	SMV Other	2	12%
Road Surface Condition	Dry	8	47%
	Wet	5	29%
	Loose Snow	1	6%
	Slush	1	6%
	Packed Snow	1	6%
	Ice	1	6%
Pedestrian Involved		0	0%
Cyclists Involved		1	6%

The intersection of Albion Road and Rideau Road had a total of 17 collisions during the 2014-2018 time period with 11 involving property damage only and the remaining six involving non-fatal injuries. Eight of the collisions were angle collisions, five were rear end and the remaining four were split between turning movement and SMV Other. The angled collisions may warrant an adjustment to the signal timing as no sight line obstructions are noted. This modification could provide protected movements to reduce the collisions at the intersection for the auxiliary left-turn lanes already provided. The weather conditions may impact the number of rear end collisions and all occurred around the AM and PM peak hours.

Table 4: Albion Road between Rideau Road and Tullamore Street Collision Summary

		Number	%
Total Collisions		**17**	**100%**
Classification	Fatality	1	6%
	Non-Fatal Injury	3	18%
	Property Damage Only	13	76%
Initial Impact Type	Sideswipe	1	6%
	Approaching	3	18%
	SMV Other	13	76%
Road Surface Condition	Dry	7	41%
	Wet	4	24%
	Loose Snow	1	6%
	Loose Sand or Gravel	1	6%
	Ice	1	6%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

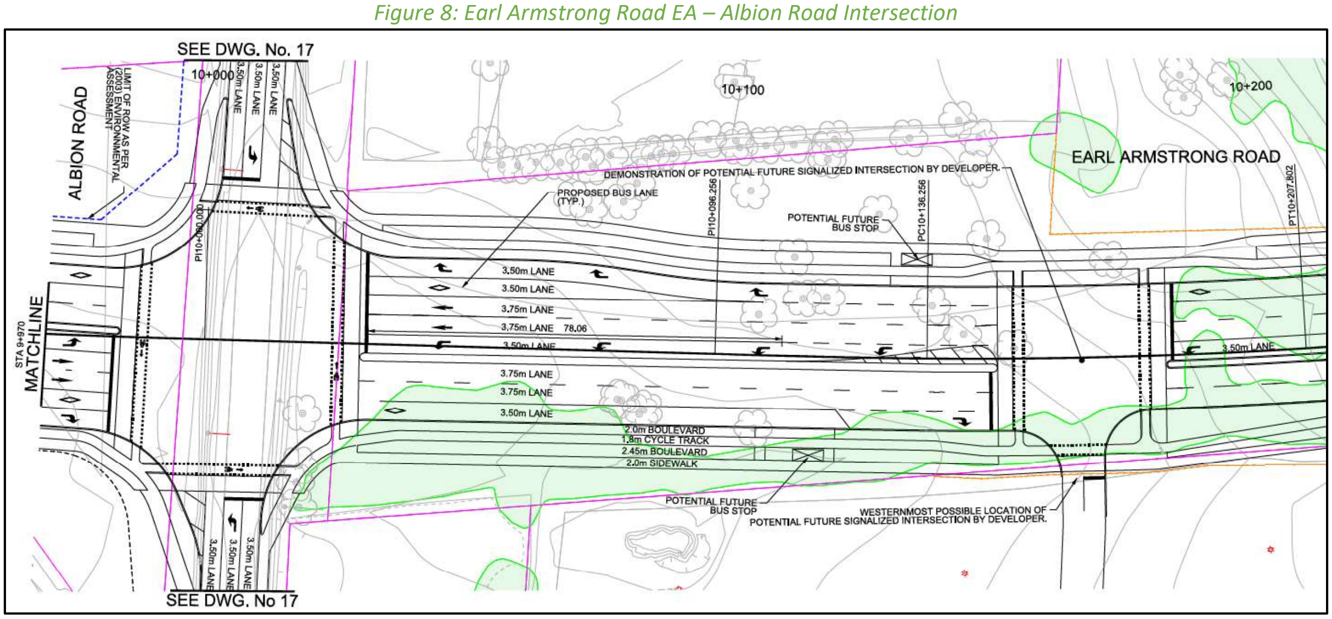
The segment of Albion Road between Rideau Road and Tullamore Street had a total of 17 collisions during the 2014-2018 time period with 13 involving property damage only, three involving non-fatal injuries and one collision involving a fatality. The fatal collision occurred as an approaching collision at 2:07 pm in the afternoon on a Sunday in September in 2015 with dry road conditions. No cyclists or pedestrians were involved in collisions on this road. Thirteen of the collisions were SMV Other collisions and may be the result of animals, weather conditions, and driving on a rural road at night/early morning.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The Earl Armstrong Road Extension EA was completed in 2019 and proposed a 4-lane extension from Albion Road to Hawthorne Road. The new intersection on Albion Road is located north of the existing High Road intersection. Figure 8 illustrates the proposed EA plan. The extension of Earl Armstrong Road is beyond the Affordable 2031 plan within the TMP. No other planned improvements are noted in the study area.

Figure 8: Earl Armstrong Road EA – Albion Road Intersection



2.3.2 Other Study Area Developments

4837 Albion Road

The application includes a site plan for the expansion of the existing casino and the addition of a hotel and a number of restaurants, to be completed in three phases by 2021. Expected to add 41 new AM peak hour two-way auto trips and 308 new PM peak hour two-way auto trips (Novatech 2019).

2610 Rideau Road

The application includes a site plan for the addition of one storey to an existing manufacturing facility, to be built out in two phases, phase one by 2020 and phase two by 2025. This addition is expected to generate 32 two-way AM peak hour trips and 37 two-way PM peak hour trips (Halpenny, 2019)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of Albion Road and High Road, Albion Road and Rideau Carleton Racetrack and Casino, and Albion Road and Rideau Road which are all of the intersections that fall within a one-kilometer radius of the site.

3.2 Time Periods

As the proposed development has a uniform trip generation throughout weekdays, to determine the maximum impact, the weekday AM and PM peak periods will be examined.

3.3 Horizon Years

The anticipated build-out year is 2020. As a result, the full build-out plus five years horizon year is 2025. It is estimated that the site will close by 2030.

4 Exemption Review

Table 5 summarizes the exemptions for this TIA.

Table 5: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Exempt (only 2-4 employees)
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Exempt
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt

Module	Element	Explanation	Exempt/Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

In addition to the above TIA requirements and exemptions, the following exemptions in Table 6 are also recommended for this TIA.

Table 6: Recommended Additional Exemptions

Module	Element	Explanation
Forecasting		
3.1 Development Generated Travel Demand	All Elements	Trip generation trigger was not met, therefore trip and mode share forecasting is not required for the subject site. An estimation of the on-site activity provides a typical operation of 90 two-way trips per day (7:00am and 7:00pm) to a maximum of 130 two-way trips per day for limited time high demand projects. Between 2 and 4 employees are expected to be on site. The resulting peak hour trips would be approximately: • AM Peak: 9-17 inbound trips, 5-13 outbound trips • PM Peak: 5-13 inbound and outbound trips The anticipated trip distribution will be predominantly south to Rideau Road, with only local delivery immediately north of the site requiring trips to travel north.
3.2 Background Network Travel Demand	All Elements	As per the 4837 Albion Road Hard Rock Ottawa TIA, no intersection constraints were noted for the existing volumes and the background growth would continue to be accommodated within the existing transportation network. Please refer to the 4837 Albion Road Hard Rock Ottawa TIA for additional information on background road network and intersection operations.
3.3 Demand Rationalization	All Elements	As per the 4837 Albion Road Hard Rock Ottawa TIA, no network constraints were noted.
Design Review Component		
4.1 Development Design	4.1.1 Design for Sustainable Modes	The rural nature of the site does not provide any pedestrian, cycling, and transit service/facilities. Furthermore, the internal site is a function of the pit requirements and has been prepared to support that operation. Therefore, the need to for a TIA to outline the internal auto parking and pedestrian access to the site office is not required.
4.3 Boundary Street Design	All Elements	Limited opportunity exists to increase the MMLOS of Albion Road due to the rural nature of Albion Road and the presence of existing paved shoulders for bike travel.

Module	Element	Explanation
4.4 Access Intersection Design	All Elements	The access intersection is anticipated to be a typical private approach design, completed as per City standards and operational requirements for site vehicles. Therefore, the need for a TIA to review the access is not required and the access design will be completed as part of the site plan review process within the existing submission.
Network Impact Components		
4.7 Transit	All Elements	No transit service is provided in the area.
4.9 Network Intersections	All Elements	As outlined previously, the low traffic generation will have minimal impact on network intersections and sufficient capacity if currently provided to accommodate an increase in line with background growth. Please refer to the 4837 Albion Road Hard Rock Ottawa TIA for additional information on future road network and intersection operations.

5 Summary and Conclusion

The need for a TIA, as per the Step 1 Screening Form, is identified solely on the classification of Albion Road as a spine cycling route across the frontage of the proposed site. Through the review of the existing conditions in this Step 2 Scoping Report, no items were identified that required additional consideration for the site.

The remaining modules and elements of the TIA Guidelines, outlined in Table 5, are internal to the site and will be reviewed as part of the existing site plan submission without the need for a TIA. The access will be located at the existing intersection for the barn/stables access on Albion Road and the existing painted gore area on the northbound approach allows for a left-turn lane to be located in this space.

Given the above, it is the recommendation of this Scoping Report that the TIA requirements for the proposed mineral extraction site have been met and no further review or assessment of the development is required.

Prepared By:

LICENSED PROFESSIONAL ENGINEER
A. J. HARTE
100149314
Jan. 27 2019
PROVINCE OF ONTARIO

Andrew Harte, P.Eng.
Senior Transportation Engineer

Reviewed By:

Christopher Gordon, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

CGH TRANSPORTATION

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

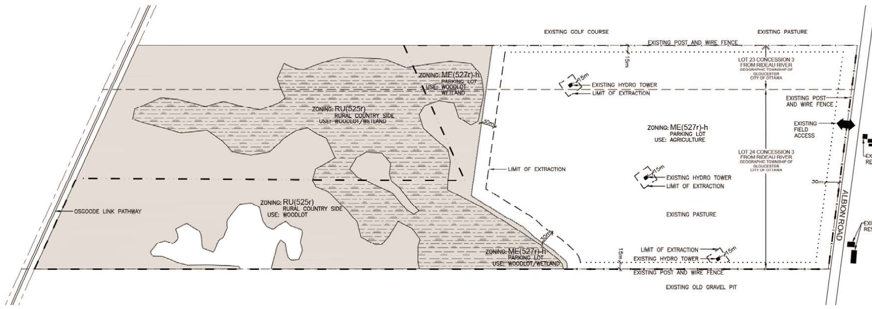
Date:	22-Jan-20
Project Number:	2019-72
Project Reference:	Cavanagh Ottawa Airport Pit

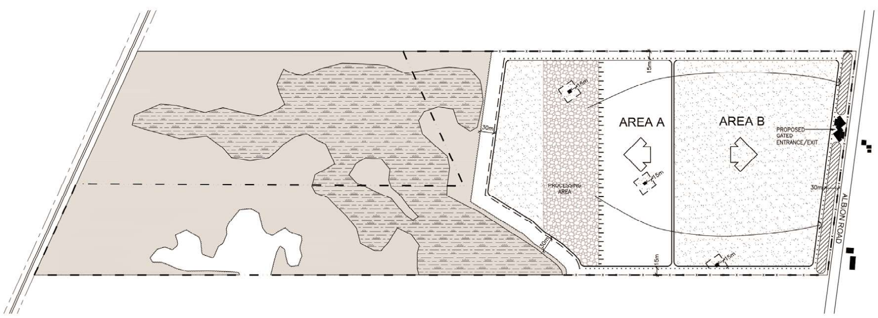
1.1 Description of Proposed Development	
Municipal Address	4788 Albion Road
Description of Location	Pin: 043280158
Land Use Classification	Mineral Extraction (ME[527r]-h)
Development Size	Mineral Extraction Site
Accesses	One to Albion Road
Phase of Development	Single Phase
Buildout Year	2020
TIA Requirement	Design Review Component

1.2 Trip Generation Trigger		
Land Use Type	Mineral Extraction Site	
Development Size	2	Employees
Trip Generation Trigger	No	

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	No





PHASE A

PHASE A NOTES

1. ESTABLISH ENTRANCE/EXIT FROM ALBION ROAD WHERE SHOWN ON SITE PLANS, ACCORDING TO MUNICIPAL STANDARDS AND APPROVALS.
2. PRIOR TO EXTRACTION COMMENCING IN AREA A, CONSTRUCT OR UPGRADE THE FENCING ON THE BOUNDARY OF THE LICENCE. ALL FENCING SHALL BE MAINTAINED.
3. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA A AND USE THE MATERIAL TO CONSTRUCT ACOUSTIC BERMS AS SHOWN. EXCESS MATERIAL MAY BE STOCKPILED ON THE PIT FLOOR OR USED TO BEGIN PROGRESSIVE REHABILITATION.
4. BEGIN EXTRACTION IN AREA A IN DIRECTION SHOWN. TEMPORARY STOCKPILES MAY BE LOCATED ON PIT FLOOR NEAR THE PIT FACE DURING EXCAVATION OF AGGREGATE.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE B (NOT SHOWN)

PHASE B NOTES

1. COMPLETE EXTRACTION IN AREA A.
2. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA B AND USE THE MATERIAL TO BEGIN PROGRESSIVE REHABILITATION OF AREA A.
3. COMPLETE REHABILITATION OF AREA A AND EXTRACTION OF AREA B.
4. COMPLETE REHABILITATION IN AREA B USING MATERIAL STORED IN BERMS.
5. REMOVE ALL EQUIPMENT, STRUCTURES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS.

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

ARCHAEOLOGICAL ASSESSMENT ——— DATED———
SHOULD DEEPLY BURIED ARCHAEOLOGICAL MATERIAL BE FOUND ON THE PROPERTY DURING DEVELOPMENT ACTIVITIES, THE MINISTRY OF CULTURE SHOULD BE NOTIFIED IMMEDIATELY AT (519) 675-7742. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING EXCAVATION, THE PROPONENT SHOULD IMMEDIATELY CONTACT BOTH THE MINISTRY OF CULTURE AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS, (416) 326-3418."

KEY MAP

LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LOT LINE
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- EXISTING FENCE
- EXISTING 5m CONTOUR LINE
- EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- EXISTING VEGETATION
- EXISTING WETLAND
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- UNDISTURBED AREA
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- LOCATION OF CROSS SECTION
- EXISTING HYDRO POLE
- DIRECTION OF SURFACE WATER DRAINAGE
- MONITORING WELLS INSTALLED BY PREVIOUS OWNER DATE - UNKNOWN
- EXISTING ENTRANCE / EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- EXISTING ELEVATION
- PROPOSED ELEVATION

Pre Licence Review

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

CAVANAGH OTTAWA AIRPORT PIT

PART OF LOTS 23 AND 24, CONCESSION 3 FROM RIDEAU RIVER
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Scale 1:4000 (0 50 100 150m)

North

Stamp: DRAFT

Drawing Status: PRELIMINARY FOR DISCUSSION

Drawn S.B. Checked M.H. Issue Date

Drawing Title: EXISTING FEATURES AND OPERATIONAL PLAN

Project Number: 19-27

Drawing Number: 1 OF 2

EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF 2 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE CITY OF OTTAWA.
4. APPLICANT:
   THOMAS CAVANAGH CONSTRUCTION LTD.
   9094 CAVANAUGH ROAD.
   ASHTON, ONTARIO
   K0A 1B0
5. TOTAL AREA TO BE LICENCED: 62.9 ha
   TOTAL AREA TO BE EXTRACTED: 33.8 ha
   TOTAL AREA TO REHABILITATED: 33.8 ha

BASE INFORMATION

6. PROPERTY BOUNDARY INFORMATION FOR PART OF LOTS 23 AND 24, CONCESSION 3 FROM, FROM RIDEAU RIVER, CITY OF OTTAWA WAS OBTAINED FROM ARNETT, KENNEDY, RIDDELL AND JASON SURVEYING LTD. LEGAL SURVEY, DATED NOVEMBER 24, 1988. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA LEVEL (ASL).

   THE SITE WAS FIELD CHECKED BY ——————, ————.

7. ZONING INFORMATION OBTAINED FROM SCHEDULE 'A', MUNICIPALITY OF STRATHROY-CARADOC ZONING BY-LAW NO. 43-08, KEY MAP NO. 29, DATED FEBRUARY 2019.

HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY————, DATED ——.
9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE AT ±–m ABOVE SEA LEVEL (A.S.L.) BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

TECHNICAL REPORTS

10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORTY BY ———— ————. DATED ——(REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY ———— ———— DATED --- (REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
12. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY———— DATED ———— (REFER TO SHEET 1 OF 2 FOR TECHNICAL RECOMMENDATIONS).

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

   EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM MNRF.

EXTRACTION/PROCESSING/HAULING INFORMATION

2. TOTAL AREA TO BE EXTRACTED IS 33.8 HECTARES.
3. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS ———— TONNES.

   EXTRACTION OF SAND AND GRAVEL WILL TAKE PLACE IN ONE OR TWO BENCHES, WITH A MAXIMUM HEIGHT OF ±6 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± —— AND —— ASL (SEE —— GROUNDWATER SCIENCE CORP.)

   OTHER SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION. OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED ON THE PIT FLOOR. MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING, CUSTOM PRODUCTS AND/OR RESALE. THIS MAY INCLUDE AGGREGATE (IN THE PROCESSING AREA AND/OR PEAT AND TOPSOIL (IN AREA 1).

4. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN.

HYDROGEOLOGICAL INFORMATION

5. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ± ± m ABOVE SEA LEVEL (A.S.L.), BASED ON THE —— HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 2 OF 2.
6. SURFACE DRAINAGE WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

NOISE MITIGATION INFORMATION

7. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
EXCAVATION AND PROCESSING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
SHIPPING:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

1. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

2. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

FENCING INFORMATION

3. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 2 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES ADJACENT TO PARKHOUSE DRIVE WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE, EXCEPT WHERE THERE IS A SITE PLAN OVERRIDE. TO COMPLY WITH THE AGGREGATE RESOURCES ACT, UNFENCED BOUNDARIES WILL BE DEMARCATED WITH HIGHLY VISIBLE 1.2m HIGH MARKER POSTS AT CORNERS. SILT/EXCLUSION FENCING WILL BE CONSTRUCTED ONCE STRIPPING OCCURS WITHIN 50m OF THE SETBACKS ADJACENT TO THE NATURAL HERITAGE FEATURES IDENTIFIED ON SITE. ALL FENCING SHALL BE MAINTAINED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

4. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON PIT FLOOR CLOSE TO EXTRACTION FACE.

BERM INFORMATION

14. BERMS SHALL CREATE AN EFFECTIVE VISUAL BARRIER AND BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 2 OF 2. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.
15. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

16. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE PROCESSING AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

17. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARKS CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

IMPORTATION OF FILL INFORMATION

18. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE AGRICULTURAL REHABILITATION.

    IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARKS PARAMETERS UNDER TABLE "1" OF MECP'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT".

    SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. A QP SHALL ALSO DESIGN A FILL MONITORING PROGRAM. RANDOM SAMPLING OF ALL IMPORTED MATERIAL SHALL BE CONDUCTED AT THE REQUEST OF MNRF.

    THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF OR MECP.

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering √ or transportation planning □.

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at ___Ottawa___________ this __20__ day of ________September________, 2018.
(City)

Name: ___________Andrew Harte_____________________________
(Please Print)

Professional Title: _________Professional Engineer___________________________

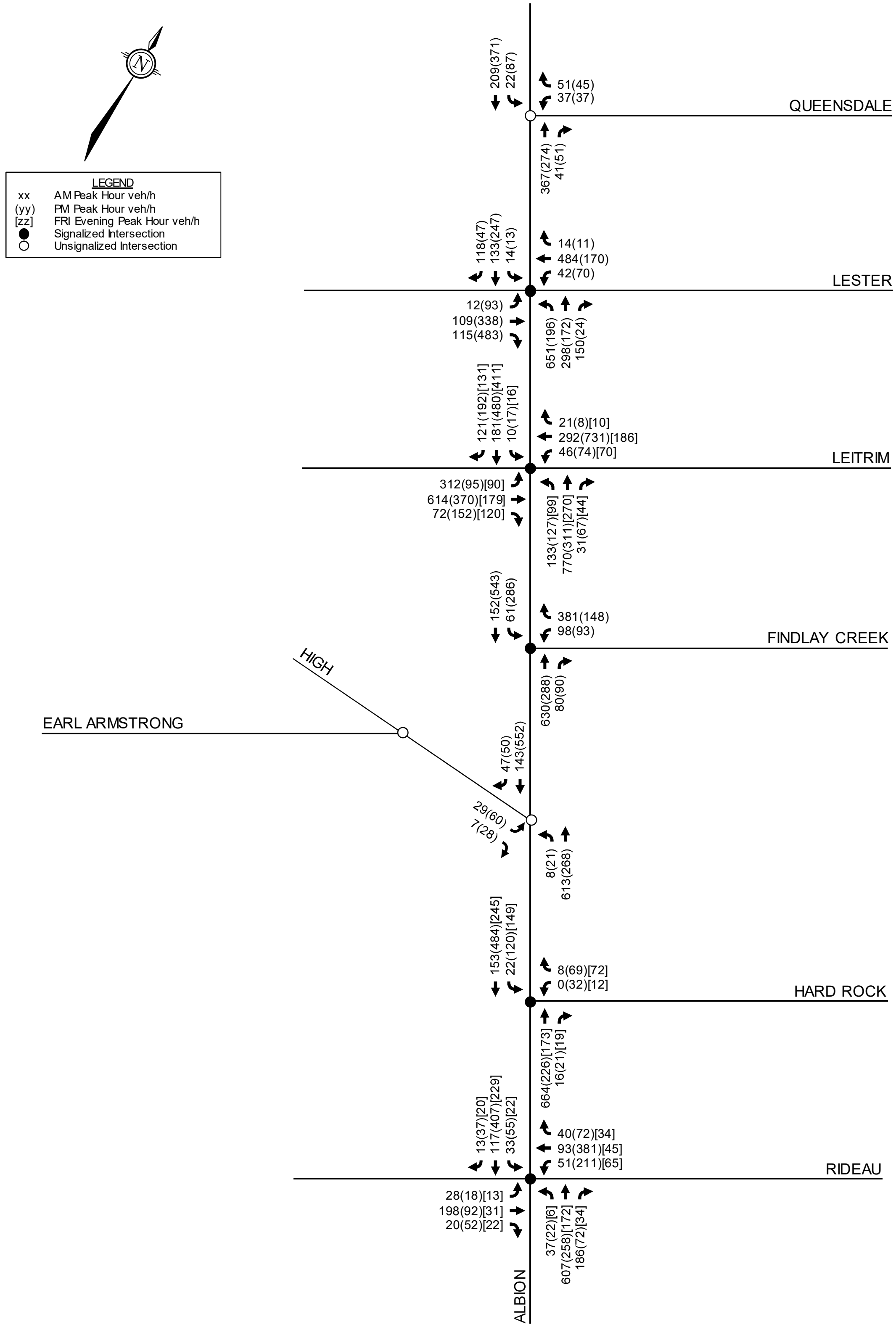
____
Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

Hard Rock Ottawa 4837 Albion Road TIA Existing Study Area Traffic Operations

Figure 2: Existing Traffic Volumes



F during the weekday afternoon peak hour. All other critical movements at all other intersections were shown to operate at an acceptable LOS D or better. The results of the existing analysis from the previous TIA are included in **Table 4**. Detailed Synchro reports prepared by Parsons are included in **Appendix I**.

Table 4: Intersection Capacity Analysis – Existing Traffic

Intersection	Weekday Morning Peak			Weekday Afternoon Peak		
	Max v/c or delay	LOS	Mvmt	Max v/c or delay	LOS	Mvmt
Albion/Queensdale[1]	12.2 sec	B	NBT	14.8 sec	B	SBT
Albion/Lester	**1.07**	**F**	**NBL**	0.72	C	SBT
Albion/Leitrim	**1.00**	**E**	**EBT**	**1.11**	**F**	**WBT**
Albion/Findlay Creek	0.78	C	WBR	0.48	A	WBR
Albion/High[1]	15.6 sec	C	EB	20.0 sec	C	EB
Albion/Hard Rock	0.43	A	NBT	0.35	A	SBT
Albion/Rideau	0.67	B	NBT	0.83	D	WBT

1. Unsignalized intersection

Planned intersection improvements at Albion Road/Lester Road will address the failing level of service. Widening of Leitrim Road is not included in the Affordable Network, however interim improvements at Albion Road/Leitrim Road include additional through and right turn lanes. These interim improvements are planned as part of the Stage 2 LRT project, and are anticipated to be in place by 2021.

6.7.2 2028 Total Intersection Operations

The performance of the study area intersections during the weekday morning, weekday afternoon, and Friday evening peak hours are shown below, and taken from the previous TIA and TIA Addendum. Analysis of the weekday morning peak has remained unchanged since the previous TIA, while analysis of the weekday afternoon peak was updated and analysis of the Friday evening peak was included in the TIA Addendum. As shown in **Table 2**, the additional 30 restaurant seats and 25 hotel rooms since the previous analysis are anticipated to add as many as seven vehicle trips during the peak hours. Therefore, the previous analysis stands.

All 'new' site-generated traffic is assumed to use the signalized Hard Rock access to Albion Road, and the planned roadway modifications at the Albion Road/Leitrim Road and Albion Road/Lester Road intersection are assumed to be in place. In addition, the signal timing at Albion Road/Leitrim Road was adjusted to improve the level of service for the critical movement. The results from the previous TIA and TIA Addendum are shown in **Table 5**. Detailed Synchro reports prepared by Parsons and Novatech are included in **Appendix I**.

Appendix C

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-05-06	2014	17:58	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-02-10	2016	15:30	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	02 - Wet
2018-05-03	2018	16:59	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD (0012478)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-05-14	2018	6:18	ALBION RD @ 210 S OF HIGH RD/EARL ARMSTRONG RD (0012478)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2016-08-16	2016	8:36	ALBION RD @ HIGH RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2018-06-20	2018	7:26	ALBION RD @ HIGH RD (0004208)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-09-13	2018	14:18	ALBION RD @ HIGH RD (0004208)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-12-06	2018	20:06	ALBION RD @ HIGH RD (0004208)	01 - Clear	07 - Dark	02 - Stop sign	02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-08-31	2018	15:50	ALBION RD @ HIGH RD (0004208)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	05 - Turning movement	01 - Dry
2017-08-14	2017	8:17	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-02-09	2017	12:09	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	01 - Dry
2016-05-24	2016	17:45	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2016-11-16	2016	9:51	ALBION RD @ RIDEAU RD	02 - Rain	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	02 - Wet
2015-02-04	2015	13:15	ALBION RD @ RIDEAU RD	03 - Snow	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	05 - Packed snow
2014-01-09	2014	8:44	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2017-06-29	2017	16:43	ALBION RD @ RIDEAU RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2017-01-02	2017	10:29	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2016-08-04	2016	9:22	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2016-02-11	2016	16:16	ALBION RD @ RIDEAU RD	03 - Snow	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	06 - Ice
2016-01-27	2016	0:00	ALBION RD @ RIDEAU RD	03 - Snow	00 - Unknown	01 - Traffic signal	03 - P.D. only	07 - SMV other	02 - Wet
2016-04-11	2016	6:59	ALBION RD @ RIDEAU RD	04 - Freezing Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	04 - Slush
2015-08-06	2015	13:30	ALBION RD @ RIDEAU RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2015-06-01	2015	23:00	ALBION RD @ RIDEAU RD	02 - Rain	07 - Dark	01 - Traffic signal	03 - P.D. only	07 - SMV other	02 - Wet
2015-09-17	2015	18:56	ALBION RD @ RIDEAU RD	01 - Clear	05 - Dusk	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2018-01-02	2018	18:00	ALBION RD @ RIDEAU RD (0009356)	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	02 - Angle	03 - Loose snow
2018-02-12	2018	9:41	ALBION RD @ RIDEAU RD (0009356)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	02 - Wet
2016-04-15	2016	18:17	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2015-02-02	2015	5:44	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	05 - Turning movement	03 - Loose snow
2014-05-25	2014	16:35	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2017-05-08	2017	14:50	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-07-19	2017	20:23	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	05 - Dusk	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2014-05-07	2014	20:35	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE	01 - Clear	05 - Dusk	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-01-14	2018	7:31	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE (__3ZA3S0B)	01 - Clear	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	05 - Packed snow
2018-01-23	2018	1:15	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE (__3ZA3S0B)	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	04 - Slush
2018-05-28	2018	18:41	ALBION RD btwn 210 S OF HIGH RD/EARL ARMSTRONG RD/RIDEAU CARLETON RACE (__3ZA3S0B)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-04-23	2016	18:01	ALBION RD btwn HIGH RD/EARL ARMSTRONG RD & 210 S OF HIGH RD/EARL ARMST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-05-05	2017	8:56	ALBION RD btwn HIGH RD/EARL ARMSTRONG RD & 210 S OF HIGH RD/EARL ARMST	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2015-09-06	2015	14:07	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	01 - Fatal injury	01 - Approaching	01 - Dry
2017-03-15	2017	9:30	ALBION RD btwn RIDEAU RD & TULLAMORE ST	03 - Snow	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	03 - Loose snow
2016-12-26	2016	19:06	ALBION RD btwn RIDEAU RD & TULLAMORE ST	04 - Freezing Rain	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	06 - Ice
2017-06-27	2017	14:37	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-04-07	2017	0:24	ALBION RD btwn RIDEAU RD & TULLAMORE ST	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2016-07-18	2016	8:39	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-11-30	2016	23:55	ALBION RD btwn RIDEAU RD & TULLAMORE ST	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2015-04-24	2015	7:57	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-02-04	2015	18:51	ALBION RD btwn RIDEAU RD & TULLAMORE ST	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	06 - Ice
2015-02-05	2015	3:44	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2015-07-20	2015	7:36	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-28	2015	10:36	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-05	2015	4:37	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-27	2015	18:48	ALBION RD btwn RIDEAU RD & TULLAMORE ST	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	01 - Approaching	02 - Wet
2014-07-14	2014	13:22	ALBION RD btwn RIDEAU RD & TULLAMORE ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	08 - Loose sand or gravel
2018-02-05	2018	7:01	ALBION RD btwn RIDEAU RD & TULLAMORE ST (__5RGNIJ)	01 - Clear	03 - Dawn	10 - No control	02 - Non-fatal injury	07 - SMV other	06 - Ice
2018-05-20	2018	22:27	ALBION RD btwn RIDEAU RD & TULLAMORE ST (__5RGNIJ)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2015-11-04	2015	16:22	RIDEAU RD btwn ALBION RD & BANK ST	01 - Clear	05 - Dusk	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2016-04-26	2016	19:20	RIDEAU RD btwn ALBION RD & BANK ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	01 - Dry
2014-09-07	2014	17:20	RIDEAU RD btwn ALBION RD & BANK ST	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-11-14	2017	15:00	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-03-07	2017	2:25	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2016-04-06	2016	17:42	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	04 - Slush
2016-11-19	2016	3:33	RIDEAU RD btwn BOWESVILLE RD & ALBION RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-04-17	2018	21:30	RIDEAU RD btwn BOWESVILLE RD & ALBION RD (__3ZBOY3)	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	02 - Wet
2018-02-03	2018	10:32	RIDEAU RD btwn BOWESVILLE RD & ALBION RD (__3ZBOY3)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry