MORRISON HERSHFIELD

REPORT

Baseline/Woodroffe Stormwater Management Pond Environmental Assessment

Ottawa, ON

Presented to:

City of Ottawa
June 8, 2017

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Prepared By:	**Reviewed By:**	**Date:**

EXECUTIVE SUMMARY

The City of Ottawa has undertaken a Municipal Class Environmental Assessment (EA) for a proposed stormwater management pond (SWMP) at the northeast corner of Baseline Road and Woodroffe Avenue on property owned by the National Capital Commission (NCC). A stormwater management facility was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (JFSA, 2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (JFSA, 2015).

The Baseline/Woodroffe SWMP will mitigate the impacts of uncontrolled runoff from the highly urbanized subwatershed of Pinecrest Creek. It will contribute to improved water quality, reduce erosion, and lessen the risk of flooding along Pinecrest Creek.

Various stormwater management retrofit opportunities and scenarios for the Pinecrest Creek/Westboro area, including lot level measures, stormwater conveyance systems, and end-of-pipe facilities were considered in the Retrofit Study (JFSA, 2011). Six end-of-pipe locations were evaluated within five alternative retrofit scenarios. The five alternatives included:

- Do Nothing (existing conditions)
- Highest Practical SWM Implementation without End-of-Pipe Facilities
- Highest Practical SWM Implementation with End-of-Pipe Facilities
- Moderate SWM Implementation with End-of-Pipe Facilities
- Public Property Only SWM Implementation with End-of-Pipe Facilities

The preferred SWM alternative was determined to be the Moderate SWM Scenario with End-of-Pipe facilities, which included the proposed site for the Baseline Road and Woodroffe Avenue SWMP (JFSA, 2011).

The facility specifications and requirements for the proposed pond were refined and two conceptual designs (Option 1 and Option 2 (2a and 2b)) developed which were then reviewed by the NCC (JFSA, 2015). Both pond options were designed to maximize water quality and flood control benefits while minimizing negative impacts to the fluvial geomorphic conditions of the creek.

This EA has considered the findings from the 2011 JFSA Retrofit Study and the 2015 JFSA Feasibility Study and has evaluated the environmental impacts of the proposed SWMP. The assessment indicates that with the suggested mitigation measures, the pond will not create any significant negative environmental impacts during pre-construction, construction, or operational phases. Positive impacts to water quality, fluvial geomorphology and flooding conditions within the Pinecrest Creek have been identified.

The EA will be brought to City of Ottawa Council for review and approval of the preferred alternative. Once approved, the EA will be placed on the public record for a public review period. Provided there are no objections from the public, the project may proceed to design and implementation.

ACRONYMS

ANSI	Areas of Natural and Scientific Interest
BMP	Best Management Practice
BRT	Bus Rapid Transit
BRRTC	Baseline Road Rapid Transit Corridor
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
CDS	Continuous Deflection Separation
CIS	Cumulative Impacts Study
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CULP	Capital Urban Lands Plan
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EAA	Environmental Assessment Act
EoP	End-of-Pipe
ESA	Environmental Site Assessment
FLUDA	Federal Land Use and Design Transaction Approval
GIS	Geographic Information System
GMP	Greenspace Master Plan
HLUI	Historical Land Use Information
HP	Highest Practical
HWM	High Water Mark
IMP	Infrastructure Master Plan
JFSA	J.F. Sabourin & Associates Limited
LOS	Level of service
LRT	Light Rail Transit
m.b.g.s.	Metres below ground surface
MCEA	Municipal Class Environmental Assessment
MHL	Morrison Hershfield Limited
MNRF	Ministry of Natural Resources and Forestry
MOE	Ministry of the Environment
MOECC	Ministry of the Environment and Climate Change
MSDS	Material Safety Data Sheet
MTO	Ministry of Transportation
NCC	National Capital Commission
NHIC	Natural Heritage Information Centre
NPA	Navigation Protection Act
OESA	Ontario Endangered Species Act
OLRT	Ottawa Light Rail Transit
OGS	Oil-and-Grit Separators

OP	Official Plan
OPA	Official Plan Amendment
ORAP	Ottawa River Action Plan
PCB	Polychlorinated biphenyl
PFCC	Plan for Canada's Capital
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PTTW	Permit to take Water
P/W Study	Pinecrest Creek/Westboro Stormwater Management Retrofit Study
ROW	Right-of-Way
RVCA	Rideau Valley Conservation Authority
SAR	Species at Risk
SARA	Species at Risk Act
SCS	Soil Conservation Service
SJAMP	Sir John A. MacDonald Parkway
STLA	Sid Thakar Landscape Architects
SWM	Stormwater Management
SWMP	Stormwater Management Pond
TAC	Technical Advisory Committee
TMP	Transportation Master Plan
TP	Total Phosphorous
TS	Transfer Station
TSS	Total Suspended Solids

1. INTRODUCTION AND BACKGROUND

1.1 Project Overview

The City of Ottawa has undertaken a Municipal Class Environmental Assessment (Class EA) for a proposed Stormwater Management Pond (SWMP) at the northeast corner of Baseline Road and Woodroffe Avenue (Figure 1-1). The SWMP was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (JFSA, 2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (JFSA, 2015).

In order to satisfy the requirements of the Class EA process for the proposed Baseline/Woodroffe SWMP, alternatives of the SWMP will be confirmed, assessed and the process documented, with due consideration for the work previously undertaken.

Figure 1-1: Study Area Location

1.2 Background

The Pinecrest Creek/Westboro area – like much of the core of the City – was developed before there was a requirement for municipalities to manage stormwater. For this reason there are few facilities to treat stormwater in this area. Existing erosion, water quality concerns, and degraded health of the creek, stem in whole, or in part, from uncontrolled stormwater runoff.

In response to the on-going erosion in the Pinecrest Creek corridor, the National Capital Commission (NCC), which owns most of the creek corridor lands, commissioned a restoration

plan in 2006 to better accommodate the current flow regime within the creek. The resultant Pinecrest Creek Restoration Plan (JTB Environmental Services et al, 2007) identified and prioritized a number of projects along the length of the creek, some of which were implemented in 2008.

The City has also completed studies related to the impacts of wet weather flows on Westboro Beach and the Ottawa River. The untreated runoff from both Pinecrest Creek, and from storm outfalls discharging directly to the Ottawa River upstream of Westboro Beach, have been identified as contributing factors to frequent beach closures due to elevated bacterial counts in the Ottawa River.

1.2.1 Ottawa River Action Plan (ORAP)

On February 24, 2010, Ottawa City Council adopted the Ottawa River Action Plan (ORAP).

Two key objectives of ORAP are:

- To maintain a healthy aquatic ecosystem, with a focus on addressing challenges presented by existing development and infrastructure; and
- To optimize recreational use and economic development of the Ottawa River, with a focus on reducing beach closures.

To achieve these objectives, ORAP identified 17 separate projects to address the impacts of uncontrolled stormwater runoff.

1.2.2 Pinecrest Creek/Westboro SWM Retrofit Study

Of the 17 separate projects that comprise ORAP, two include the development of stormwater management (SWM) retrofit plans for areas of the City that were developed with little or no SWM. The first of these studies, the Pinecrest Creek/Westboro SWM Retrofit Study (P/W SWM Retrofit Study), has been completed and has identified a long-term plan comprised of a range of retrofit programs/capital projects, monitoring and outreach efforts aimed at reversing or partially reversing the historical impacts of development on the creek and local reach of the Ottawa River.

The P/W SWM Retrofit Study provides a strategy to decrease the impacts of uncontrolled urban runoff on Pinecrest Creek and the local reach of the Ottawa River. This study was endorsed by City Council on October 26, 2011:

http://ottawa.ca/calendar/ottawa/citycouncil/occ/2011/10-26/englishminutes23.htm

The overall purpose of completing the P/W SWM Retrofit Study was to recommend a combination of SWM retrofit measures to apply in the Study Area that would provide the best solution considering a number of economic, environmental and social factors.

One of the preferred solutions identified in the P/W SWM Retrofit Study was a SWMP on National Capital Commission (NCC) property at the northeast corner of Baseline Road and Woodroffe Avenue to treat approximately 435 hectares of primarily urban residential area currently draining directly to Pinecrest Creek.

In addition to the extent of SWM retrofit works recommended, additional City projects and future development anticipated to create potential impacts on the creek include:

- The removal of bus rapid transit (BRT) infrastructure and the extension of light rail transit (LRT) through the Pinecrest Creek corridor (Western LRT/Stage 2)
- LRT bundled projects, including Ministry of Transportation (MTO) Highway 417 widening and Richmond Road Complete Streets design;
- The Baseline Road Rapid Transit Corridor (BRRTC);
- The Southwest Transitway extension (to Hunt Club); and
- Further development/re-development within the subwatershed.

1.2.3 Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue

Additional consultation with NCC staff following completion of the P/W SWM Retrofit Study and in relation to the construction of a new storm outfall for Baseline transit station (now built, to be commissioned in future) led to the preparation of the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (JFSA, 2015). The draft results of this study were presented to NCC staff on March 26, 2013 from which resulted the following requirements for moving forward with the retrofit pond:

- The cumulative effects of all anticipated major projects (listed above in section 1.2.2) on the Pinecrest Creek corridor and adjacent NCC lands are to be investigated and addressed in a comprehensive manner;
- A commitment from the City to proceed with the implementation of retrofit measures beyond the ‘’end-of-pipe’’ that will include retrofits within the right-of-way and at the lot level throughout the Pinecrest Creek subwatershed (as recommended in the P/W SWM Retrofit Study); and
- Demonstration that the proposed pond design will have significant positive environmental, visual and landscaping benefits for the open space corridor and maintain a recreational pathway link through this area.

2. STUDY PROCESS

2.1 Municipal Class Environmental Assessment

The Municipal Class Environmental Assessment (MCEA) is an approved planning and design process developed to ensure the intent of the Ontario *Environmental Assessment Act* (EAA) is met. The MCEA requires project alternatives be assessed, the potential social, economic, and natural environmental effects be identified, mitigation and protection measures be considered, and that the public, agencies, and interest groups be given an opportunity to consult when undertaking certain municipal infrastructure projects.

The MCEA is a Class EA process that has been developed to apply the requirements of the EAA to a group or "class" of municipal projects that are similar in nature, have common characteristics, are frequently reoccurring, have a limited scale, and generally have a predictable range of environmental effects for which mitigation measures can be applied. Projects that do not display these characteristics would not be able to use the planning process and design of the Class EA and must undergo an individual environmental assessment.

The Class EA process is self-directed, whereby municipalities following the process meet the requirements of the EAA. Since projects undertaken by municipalities vary in their environmental impact, they are further classified within the Class EA in terms of Schedules.

- ***Schedule A*** projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities;
- ***Schedule A+*** projects are pre-approved, however, the public is to be advised prior to project implementation. The manner, in which the public is advised, is determined by the proponent;
- ***Schedule B*** projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and relevant review agencies, to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions to existing facilities; and
- ***Schedule C*** projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule C projects require that an Environmental Study Report be prepared and filed for public and agency review. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities.

2.1.1 Master Plans

While the MCEA process addresses the planning and design process by which municipalities may plan municipal works on a project by project basis, it is recognized that in many cases it is beneficial to begin the planning process by

considering a group of related projects, or an overall system. By planning this way, the need and justification for individual projects and the associated broader context are better defined.

Master Plans are long range plans that integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. At a minimum Master Plans address Phases 1 and 2 of the Municipal Class EA process.

The P/W Retrofit Study was undertaken as a Master Plan in accordance with Approach #1 of the Municipal Class EA process. Existing conditions were described, problems, opportunities and a range of solutions were identified, and the various solutions evaluated to arrive at a preferred approach, the recommended Retrofit Plan. Public consultation requirements of the MCEA were also fulfilled as part of the P/W Retrofit Study.

As a Master Plan, the P/W Retrofit Study was completed at a broad level of assessment. More detailed investigations will be required in order to fulfil the MCEA requirements for Schedule B and C projects identified within the recommended Retrofit Plan, including this SWMP project.

2.1.2 Class EA Schedule Determination

This Class EA builds upon the work completed in the P/W Retrofit study, taking into account additional project specific considerations as well as preliminary identification of federal areas of interest, permit requirements and potential concern. The intent of this study is to verify the previous findings and meet the Class EA requirements.

This project is a **Schedule B** Class EA based on the following criteria:

- Establish new stormwater retention/detention ponds and appurtenances or infiltration systems including outfall to receiving water body where additional property is required.

Figure 2-1 schematically shows the Class EA Planning and Design Process for Schedule B Municipal Projects.

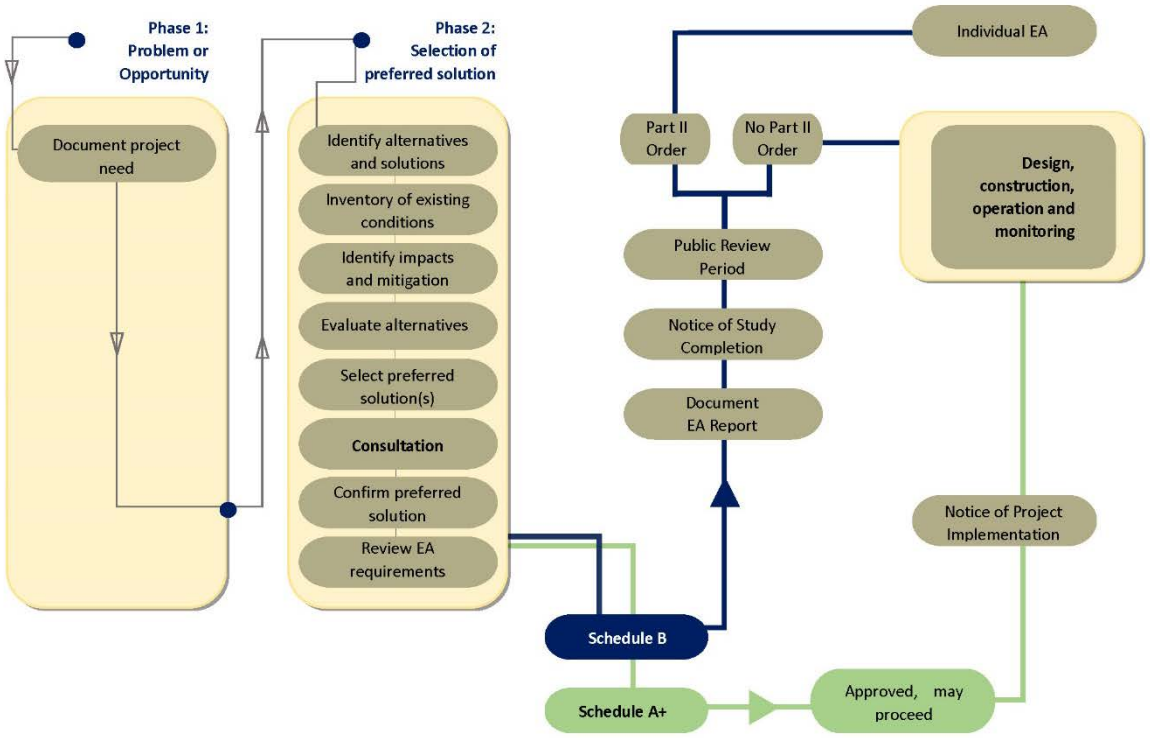


Figure 2-1: Municipal Class Environmental Assessment Planning and Design Process for Schedule B Projects

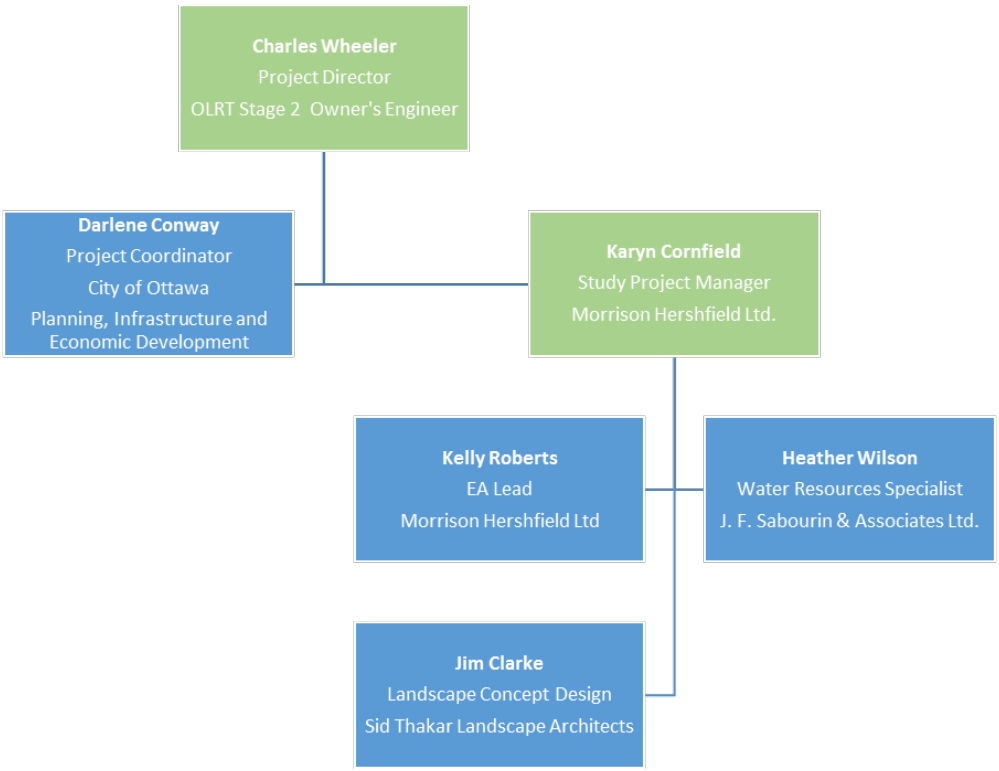
2.2 Canadian Environmental Assessment Act (CEAA)

Under the CEAA 2012, a federal environmental assessment must be completed if the project is listed in the *Regulation Designating Physical Activities* or if there is a ministerial order. The Baseline/Woodroffe SWMP is not a project that is listed as a designated project nor has there been a ministerial order. As such, a federal EA is not required. However, a federal authority must not exercise any power or perform any duty or function conferred on it that could permit a project to be carried out, in whole or in part, on federal lands, unless the authority determines that carrying out of the project is not likely to cause significant adverse environmental effects.

The NCC must ensure compliance with the *Canadian Environmental Assessment Act* which requires an environmental determination for projects or activities by federal authorities. As the SWMP will be located on NCC lands, a Federal Land Use and Design and Transaction Approval will also be required.

2.3 Project Organization

Morrison Hershfield Limited (MHL) was retained by the City of Ottawa as the lead consultant for the Baseline Woodroffe Stormwater Management Pond Class EA, and teamed with J.F. Sabourin and Associates Inc. (JFSA) and Sid Thakar Landscape Architects (STLA). The Class EA is a City-led project, and is being scheduled in accordance with the Western LRT (Stage 2) preliminary engineering schedule. The organization of the team is outlined below:



The multidisciplinary team was assembled to provide expertise in stormwater management, drainage, environmental planning, hydrogeology, and watershed management, particularly as they relate to Pinecrest Creek and its subwatershed.

The EA has been conducted concurrently and in conjunction with a Cumulative Impacts Study (CIS) for Pinecrest Creek, under the same project management structure shown above. The SWMP is one of the impacts being assessed by the CIS, among other City-led and future development projects that may impact Pinecrest Creek.

2.4 Consultation

A key component of the EA process is the coordination and integration of consultation. The planning and coordination of the infrastructure and environmental mitigation requirements for the project, in consultation with the community, stakeholders and review agencies, helps to ensure that the objectives of the City and those consulted are fulfilled.

The purpose of the consultation was to:

- Provide background information on the identification of the problem / opportunity and alternative solutions as identified in the Master Plan;
- Allow stakeholders an opportunity to review potential environmental impacts with stakeholders; and
- Solicit comments regarding the selection of a preferred solution.

Certain elements of the EA study process, including stakeholder consultation, were combined with the CIS. The collaborative study process encompassed a range of stakeholders from both studies. The contact list of potentially affected stakeholder groups and individuals was maintained throughout the study and updated for completeness and

accuracy as required. This list includes government agencies, First Nation representatives, utility companies, public interest groups, and property owners/tenants who may be directly or indirectly affected by the project.

2.4.1 Technical Advisory Committee

A Technical Advisory Committee (TAC), consisting of City and agency staff involved with the Pinecrest Creek CIS and SWMP Class EA, was consulted to obtain input and guidance on the direction of the work.

- The initial TAC meeting introduced the CIS and the EA and presented the overall objectives and schedule for input
- The subsequent TAC meetings and stakeholder meetings were held to discuss key aspects of the CIS and design decisions.

The TAC was comprised of representatives of the following organizations:

- Core Project Team Members;
- National Capital Commission (NCC);
- Ontario Ministry of the Environment and Climate Change (MOECC);
- City of Ottawa Departments, as required; and
- Rideau Valley Conservation Authority (RVCA).

2.4.2 Public

Various forms of communication were used throughout the study.The public was notified of opportunities for input via the City of Ottawa website, newspaper ads, an online consultation and a subsequent public meeting. Further details regarding the public consultation undertaken are provided in Chapter 7.

2.4.3 Government Agencies

Although not part of the TAC, the Ministry of Natural Resources and Forestry (MNRF) was contacted for site specific existing conditions information related to the Study Area. MNRF was previously contacted for information as it related to existing conditions within the broader Stage 2 Ottawa LRT project Study Area, which included the SWMP Study Area. The requests for information and response to date are included in Appendix C.

The Department of Fisheries and Oceans (DFO) will be contacted regarding permitting requirements at the detailed design stage.

2.4.4 Aboriginal Communities

First Nations consultation is an important component of the Class EA process. As part of this project the following First Nations were contacted to provide information on the project and provide opportunities for input:

- Algonquins of Ontario (AOO);
- Algonquins of Pikwàkanagàn;
- Kitigan Zibi Anishinabeg; and
- Métis National in Ontario.

Both Kitigan Zibi Anishinabeg and Algonquins of Pikwakanagan First Nation will be contacted for the co-management of archaeological resources, during subsequent investigations in accordance with their protocol. The AOO will be given the opportunity to participate in the investigations. The two communities and AOO will be informed of the proposed archaeological assessment and will be provided a copy of the final archaeological report. Correspondences with Aboriginal Communities to date are provided in Appendix D.

3. PROBLEM OR OPPORTUNITY

3.1 Project Opportunity and Justification

The introductory section of this Report identified several studies previously undertaken to determine how SWM measures could be implemented in the Pinecrest Creek subwatershed. The studies were conducted to address the lack of SWM within this highly urbanized subwatershed and the resultant conditions in Pinecrest Creek which include degraded water quality, increased erosion, and increased risk of flooding along Pinecrest Creek.

The SWM facility has also been suggested as a “trade-off” to provide off-site water quantity control for a much larger area upstream vs. on-site control for works at Baseline station/the Southwest Transitway. A Feasibility Study (2015) followed the completion of the P/W Retrofit Study (2011) which developed and presented two conceptual design options for the SWM facility, both of which contribute to meeting stormwater management goals for the subwatershed and provide a quantity control solution for the Baseline station/Southwest Transitway works.

A portion of the Confederation West OLRT line is planned to be constructed within NCC lands adjacent to Pinecrest Creek. Baseline station and the runningway approaching the station associated with the OLRT, as well as the extension of the Southwest Transitway BRT will make use of an existing (but as yet uncommissioned) storm sewer outfall to Pinecrest Creek (located north of Baseline Road). These projects are contributing factors that need to be considered within the conclusions and recommendations of the CIS, and the construction of the planned Baseline/Woodroffe SWMP. Implementation of the proposed SWMP is planned to occur in conjunction with the commissioning of the new outfall for Baseline station.

4. STUDY AREA AND EXISTING CONDITIONS

This section of the report documents the studies and investigations undertaken to date on the existing natural and social conditions within the Study Area. It is intended to document the baseline conditions of the area against which the potential environmental effects of the alternatives can be assessed. Overall, the baseline data was collected and analysed for key environmental parameters in order to:

- Provide an understanding of existing conditions;
- Allow for future predictions of how the proposed project may cause these environmental conditions to change;
- Allow for future predictions of how adverse effects can be mitigated and beneficial effects enhanced; and
- Provide a basis for designing monitoring programs.

Investigations were not necessarily confined to the boundary of the Study Area, as some environmental elements extend into adjacent areas. Investigations were conducted in areas that provided an appropriately comprehensive perspective of features in and around the limits of the Study Area.

4.1 Study Area

The general Study Area (Figure 4-1) is at the north-east corner of the Baseline Road and Woodroffe Avenue intersection, extending north to Iris Street and is approximately 16 hectares in size. Pinecrest Creek enters the Study Area from a culvert under Baseline Road, flows west, and exits through culverts under Woodroffe Avenue.

Figure 4-1: Study Area

The spatial boundaries of the Study Area may vary depending on the environmental features being investigated in order to: address environmental effects and operational issues; accommodate coordination with relevant on-going studies and projects; and to identify infrastructure needs and future connections.

4.2 Planning Context

Land use planning is a provincial jurisdiction under the Canadian constitution. Federal jurisdiction in this regard only extends to those properties owned by the Government of Canada. The City of Ottawa's Official Plan (OP) and Transportation Master Plan are the primary planning documents for urban, rural and transportation planning in Ottawa.

4.2.1 Federal

4.2.1.1 Plan for Canada's Capital, 1999

Although under review, the 1999 Plan for Canada's Capital (PFCC) is the federal government's lead policy statement on the physical planning and development of the National Capital Region (or the Capital) over the next fifty years. The key directions proposed in this document include but are not limited to:

- Enhancement and protection of the region's ecosystems and its green image through the designation of a system of natural heritage areas, and protection of valued ecosystem components; and
- The preservation and conservation of the Capital's cultural and natural landscapes, and historical and archaeological resources of Capital interest.

Polices as they relate to Capital Waterways and Shore Lands include but are not limited to:

- Plan and manage Capital waterways to protect their environmental integrity;
- Work with local and provincial government agencies to adopt contemporary planning and management practices on and off federal lands in dealing with stormwater in order to preserve or enhance surface or ground-water resources to make them safe for aquatic life, recreation and other uses;
- Encourage, with local government and provincial agencies, the prevention or reduction of environmental impacts from flooding or erosion (e.g., community disruption, property damage, damage to archaeological resources); and
- Encourage, with local government and provincial agencies, the prevention or reduction of environmental impacts (e.g., pollution) to Waterways and Shore Lands.

4.2.1.2 Capital Urban Lands Plan, 2015

While the PFCC provides a strategic direction for the Capital Region as a whole, the Capital Urban Lands Plan (CULP) applies to federal lands

inside the Greenbelt on the Ontario side of the Ottawa River. The CULP provides detailed direction and guidance for the use and stewardship of federal lands for which the NCC has jurisdiction pursuant to the National Capital Act.

The CULP is a land-use plan providing detailed policy guidance to support the planning and stewardship of the Capital's Urban Lands. The lands encompassing the Study Area are categorized as "Parkland and Greenspace" in the CULP.

The CULP notes that one of the key roles to achieve the mission statement is to "Support the Capital's Urban Green and Blue Space Network" and to, "Contribute to the building of a liveable Capital Region".

The pathway traversing the Study Area is a NCC Recreational Pathway. The CULP notes that varied use of the Capital Pathway Network is encouraged. Authorized uses are to be compatible with the nature and character of each portion of the network. Any development along the pathway edges will comply with the general policies related to sustainable development and design quality, as well as to protect ecologically sensitive areas.

Within the CULP, the NCC has policies specific to Lighting, Urban Tree Protection, and Siting of Public Infrastructure on NCC Property. Specific policies relevant to this project include but are not limited to:

- Proponents must prove that the use of NCC lands is the only reasonably feasible option and that there is no alternative on municipal or private lands;
- Minimize impacts on the landscape, views, visual quality and site ecology by integrating these factors into the analysis of routing options;
- Consider future impacts related to site access for maintenance purposes upon the review of proposals;
- Prohibit, as a general rule, stormwater management facilities (e.g., ponds, surface/subsurface storage, engineered wetlands) serving adjacent nonfederal land-uses on federal property;
- Emphasize lot level approaches that implement modern stormwater management techniques;
- Under exceptional circumstances, where there is no reasonably feasible alternative, and where such a facility would not compromise the Capital function(s) of the site in question, the NCC may authorize a Stormwater Management Facility on a case-specific basis. The following represent appropriate justifications for such a decision:
    - A proposal resulting from a comprehensive stormwater management retrofit study that employs a significant focus on opportunities for lot level, source control measures (applies where an older urban community was constructed without modern SWM infrastructure);

    - A proposed Stormwater Management Facility would improve water quality and significantly lower fluvial risks for a receiving watercourse; and
    - A proposed Stormwater Management Facility could be designed to serve as a recreational, landscape, and ecological amenity.
- If authorized under exceptional circumstances, a proponent must demonstrate that the proposed Stormwater Management Facility and all related infrastructure exceed current standards and incorporate best practices;
- Require proponents of significant undertakings on federal land to provide a SWM report prepared by a qualified engineer. The report shall identify the low-impact, best practice measures required to meet or exceed the applicable regulatory standards for SWM;
- Limit uncontrolled surface drainage in urbanized locations to the extent possible by encouraging the implementation of best practices such as reducing impervious surface area, the integration of stormwater infiltration areas and/or storage basins, and the installation of water quality control devices (e.g., oil and grit separators, etc.), where appropriate;
- Consider actions to enhance watercourse health where subwatershed studies have provided recommendations for improvement;
- Assess and manage the cumulative impacts of stormwater and associated management practices, including the mitigation of hydrological, geotechnical and fluvial geomorphology risks. This approach will involve the use of best management practices (BMP) in the design, development and management of stormwater networks; and
- Prioritize actions that:
    - Limit the introduction of effluents and other substances that cause water quality deterioration;
    - Reduce the risk of shoreline erosion and landslides;
    - Reduce sediment loading caused by uncontrolled runoff;
    - Promote a more naturalized hydrological function for watercourses;
    - Normalize hydrological flow during wet weather for upstream watercourses (e.g., Watts Creek, Leamy Creek, Pinecrest Creek);
    - Enhance a waterway's contribution to ecosystem health through the implementation of engineered and naturalized elements; and

Promote lot level best practices for SWM.

4.2.1.3 Species at Risk Act, 2002

The purposes of the Species at Risk Act (SARA), 2002 are to prevent wildlife species from being extirpated or becoming extinct; to provide

for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and to manage species of special concern to prevent them from becoming endangered or threatened.

Section 32 (1) of the Act states that "no person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species." Section 32 (2) makes further provisions for possession and collection of species and states that "no person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual."

Section 33 of the Act speaks to the protection of species habitat and states that "no person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada."

According to Section 34 of the Act, any individuals of a listed wildlife species that are not an aquatic species or a species of bird that are migratory birds protected by the Migratory Birds Convention Act, 1994, Sections 32 and 33 do not apply in lands in a province that are not federal lands unless an order is made under Subsection (2) to provide that they apply.

As the Study Area is located on Federal Lands (owned by the NCC), SARA, 2002 is applicable to this project.

4.2.1.4 Ottawa MacDonald-Cartier International Airport Zoning Regulations

As outlined in Item 6 "No owner or lessee of land within the limits of the bird hazard zone shall permit any part of that land to be used for activities or uses attracting birds that create a hazard to aviation safety."

The goal of wildlife control on and near an airport is to reduce the risk of an aircraft accident caused by birds and other forms of wildlife (Transport Canada, 2012). The bird hazard risk-assessment process contributes to this goal by describing categories of land-use in the vicinity of the airport in terms of the relative risk of bird strikes to aircraft. The risk-assessment process evaluates the relationship among land-use, bird species and aircraft movements in terms of relative risk to aircraft.

High-risk aircraft flight paths are developed and superimposed over maps of the local area (Figure 4-2).

SWMPs that permanently hold water can attract waterfowl, including Canada Geese and gulls, and present a “potentially moderate” hazard which are not acceptable in Primary Hazard Zones but are acceptable in Secondary and Special Hazard Zones (Transport Canada, 2012). However, it is important to note that risks associated with many land uses can be reduced through appropriate mitigation and monitoring.

As illustrated in Figure 4-2, the proposed SWMP is within the Approach Bird Hazard Zone for the Ottawa International Airport. Using the analysis of the hazardous land-uses as summarized above, the appropriateness of land-use within bird hazard zones and its impacts will be determined in consultation with Transport Canada (sections 8.1.3 and 9).

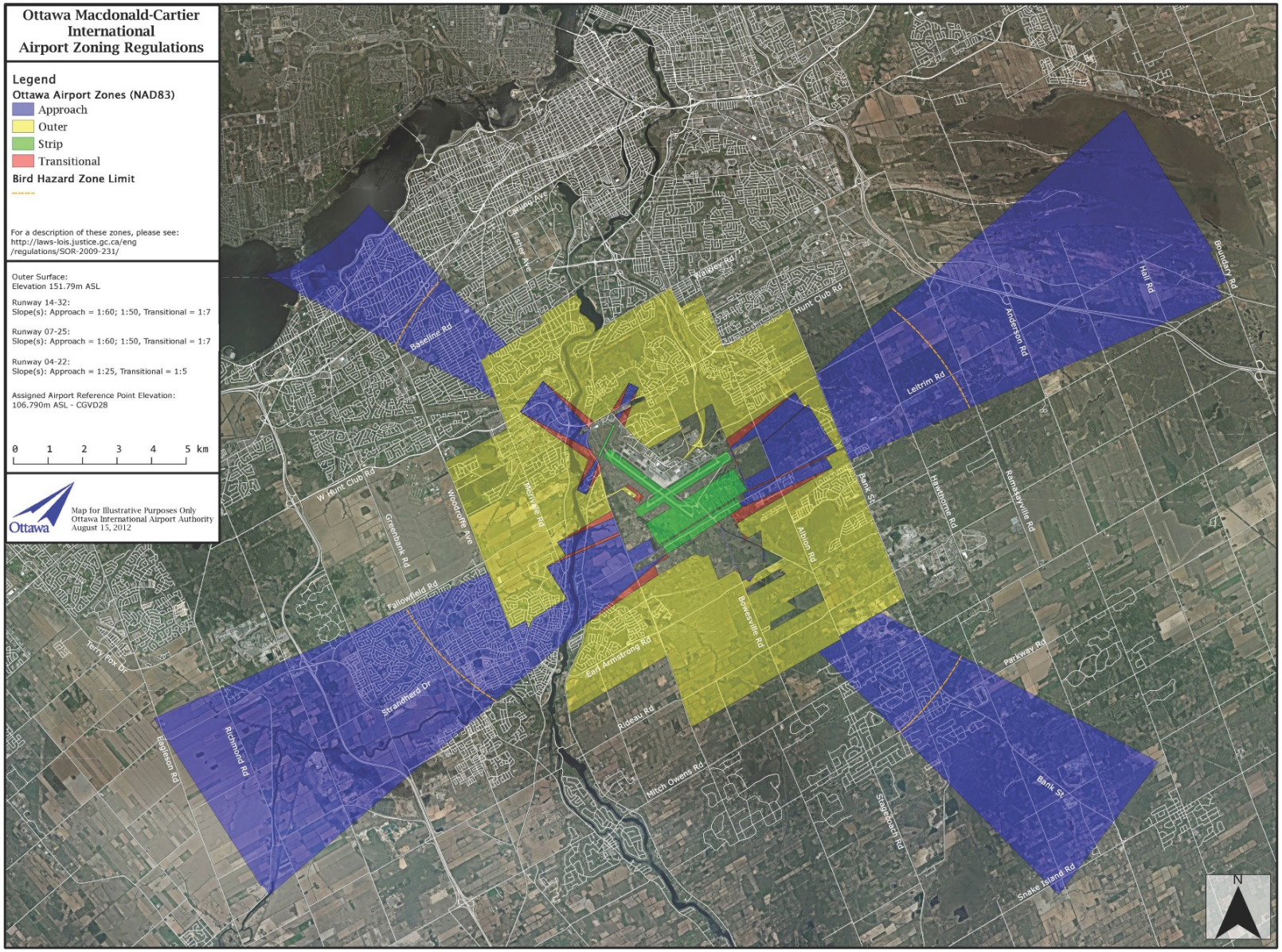


Figure 4-2: Ottawa Airport Bird Hazard Zone Limit (Ottawa International Airport Authority)

4.2.2 Provincial

4.2.2.1 Provincial Policy Statement, 2014

Section 2.2.1 of the 2014 Ontario Provincial Policy Statement (PPS) describes the protection, improvement, and restoration of the quality and quantity of water. It stresses identifying water resource systems and maintaining their linkages and functions, including surface water features, which are necessary for the ecological and hydrological integrity of the watershed. It also aims to ensure that SWM practices minimize stormwater volumes and contaminant loads, as well as maintain and increase the extent of vegetative and pervious surfaces.

Section 1.6.6.7 of the PPS outlines the intentions of planning for SWM, and includes minimizing changes in water balance and erosion, having no net increase of risks to human health, safety, and property, and promoting SWM best practices.

4.2.2.2 Ontario Endangered Species Act, 2007

The Ontario Endangered Species Act (OESA), 2007 provides legal protection for endangered, threatened and extirpated species. The purpose of the OESA is to identify Species at Risk (SAR) based on the best available scientific information, including information obtained from community knowledge and aboriginal traditional knowledge. Additionally, the Act serves to protect species that are at risk and their habitats; promote the recovery of species that are at risk; and promotes stewardship activities to assist in their protection and recovery.

Section 9 (1) of the OESA states that “No person shall kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario as an extirpated, endangered, or threatened species”. Section 10 (1) of the OESA clearly states that no person shall damage or destroy the habitat of a species that is listed on the SAR in Ontario List as an endangered or threatened species”. The MNRF may issue a permit to a person that, with respect to a species specified in the permit, is on the Ontario SAR list as an extirpated, endangered, threatened species, which authorizes the person to engage in an activity specified in the permit that would otherwise be prohibited by Section 9 or 10 of the Act.

4.2.3 Regional

4.2.3.1 Source Water Protection Area

The Study Area is located in the Mississippi-Rideau Source Water Protection Region and within an Intake Protection Zone for the City’s Britannia Water Treatment Plant intake. The Plan includes policies regarding SWM ponds in significant drinking water threat areas which are defined and identified in the Plan. The size of the proposed pond's

drainage area and predominant land use would classify the pond as not being a significant threat. The City's Source Water Protection Risk Management staff were consulted regarding the current source water protection policies and requirements and how they may apply to a new SWM pond proposed as SWM retrofit and no concerns were identified.

4.2.4 Municipal

4.2.4.1 City of Ottawa Official Plan, 2003 as Amended

The City of Ottawa Official Plan Amendment (OPA) #150 was approved by the Minister of Municipal Affairs and Housing in April 2014. Appeals to all and parts of the OPA#150 were received. In considering the appeals of the whole of the Amendment the Ontario Municipal Board determined that the City needed to complete additional reviews related to Employment Areas, the Agricultural Resource Area and the planning timeframe of the Official Plan. Although the track-changes version of the Official Plan is available online, and was used as reference, OPA#150 has not yet been finalized, and as such the 2003 Official Plan (as amended) has been referenced within this EA, unless otherwise noted.

The City of Ottawa is committed to planning on both watershed and subwatershed levels. The requirement for watershed plans, subwatershed plans, and environmental management plans is intended to ensure that appropriate planning for stormwater is undertaken.

- Section 2.3.3 of the OP requires stormwater retrofit planning to address the cumulative impacts of infill and redevelopment in areas of the City that were developed without SWM; and
- Section 4.7.6 requires that in areas of intensification, new development or redevelopment will be encouraged to incorporate on-site SWM and/or retention measures.

4.2.4.2 Greenspace Master Plan – Strategies for Ottawa's Urban Greenspaces, 2006

The purpose of the *Greenspace Master Plan - Strategies for Ottawa's Urban Greenspaces* (2006) is to identify policy on greenspace in the urban area of the City. The Greenspace Master Plan (GMP) describes the lands that can be considered as greenspace and sets strategic directions for managing and extending this supply in order to achieve the community's vision for greenspace. In its simplest form, greenspace is considered in this Plan to be land that serves one of two purposes:

- Provision of recreation and leisure opportunities for the use and benefit of the public; and
- Preservation of the natural environment and environmental systems.

Open space and leisure land can be created in a variety of landscapes and requires human intervention to maintain it for recreational use. Land containing pathways and trails provide for informal relaxation and serve other social and community purposes. As open lands, they contribute to hydrological functions. The public has full access to this land, which in most cases is publicly owned.

The facilities and corridors used for major infrastructure, such as stormwater management ponds, also provide opportunity for greenspaces for recreational use and wildlife movement. Depending on its location, the corridor can provide links for animal movement, plant dispersion, and pathways for walking and cycling. These lands are primarily in government, public and private agency or corporate ownership, and where they are developed and secured for public access, they are included in the plan's assessment of greenspace.

Section 4.1.1 of the GMP notes that the City will design stormwater ponds and utility corridors in such a way that they can also function as greenspace in new communities and redevelopment areas, and will incorporate hazard lands in the overall greenspace plan. These lands will not be considered as part of the public dedication required under the Planning Act, although adjacent, developable lands proposed for paths or parks may be purchased or included in the public dedication.

Section 4.1.3 of the GMP notes that the City will seek opportunities to develop a connected Urban Greenspace Network through the design and location of major infrastructure by designing and locating SWMP so that they contribute to or enhance natural systems within the urban area and form connections with other greenspaces in the community, where feasible and appropriate.

4.2.4.3 City of Ottawa Infrastructure Master Plan, 2013

The purpose of the City of Ottawa's Infrastructure Master Plan (IMP), 2013, is to support the City's OP goals of creating more vibrant, healthy and complete neighbourhoods across the municipality while ensuring long-term affordability for both the City government and residents. Efficient management, responsible operation and judiciously targeted growth of water, wastewater, and stormwater infrastructure play a major role in the pursuit of these goals. The IMP supports the OP by ensuring there is enough infrastructure capacity in the right areas of the municipality. Service levels and timing need to be right to accommodate development and redevelopment until 2031 when the City of Ottawa population is expected to reach 1.14 million.

Section 4.5.3 of the IMP notes that the current Level-of-Service (LOS), provided in areas of the City developed within the last 20 to 30 years, require that storm drainage collection and treatment systems safely convey runoff from both frequent and more extreme events to the nearest watercourse while mitigating the impacts of urbanization on these receivers (flooding, erosion, impaired water quality).

As existing storm sewers reach the end of their life cycle, it is City policy to upgrade to the current LOS where feasible. Flood remediation studies in older areas strive to retrofit dual drainage systems to the extent possible, improving the existing LOS. With respect to receiving watercourses, the City has also started to identify SWM retrofit opportunities in older areas by completing retrofit studies of predominately urban subwatersheds.

As indicated in Section 5.4.1 of the 2013 IMP, the City owns and operates a multitude of decentralized SWM and drainage systems comprised of collection systems, outlet structures, storage and treatment facilities, and a limited number of small stormwater pumping stations. Finally, the stormwater systems also include the local receiving watercourses into which all runoff is eventually discharged. The collection systems capture and convey stormwater runoff. These systems include over 2,600 km of storm sewers and more than 2,500 km of ditches (within the urban and rural areas), as well as approximately 100,500 catchbasins and 51,000 storm sewer maintenance holes.

River and stream corridors form an essential part of the City's drainage systems, eventually receiving and conveying all runoff. Various types of infrastructure are also located within river and stream corridors such as utility crossings, pathways, bridges, sewers, storm outfalls and retaining walls. The stability of river and stream corridors has a direct bearing on the continued operation of the City's drainage systems as well as the condition of infrastructure located within those corridors.

SWM retrofit refers to the insertion of various measures into established, older communities that were originally built without the infrastructure needed to mitigate the impacts of uncontrolled runoff. These impacts include degraded water quality, increased flooding and erosion, and the impairment or destruction of fish habitat. Unlike greenfield development, where SWM measures are incorporated as a matter of course, the challenge of SWM retrofit is to identify effective measures that can be implemented after the fact, when there is limited land available to implement conventional SWM facilities. As noted in the IMP, the City will identify and incorporate stormwater management retrofit measures into City renewal projects where appropriate.

4.2.4.4 City of Ottawa – Ottawa River Action Plan, 2010

The health of the Ottawa River is a priority of the City of Ottawa. Protecting the Ottawa River means maintaining a healthy aquatic ecosystem; ensuring compliance with regulatory requirements; optimizing recreational use and reducing beach closures; and developing a long-term strategy to guide and prioritize actions.

The City is working to reduce the impact of both combined sewage overflows and stormwater on the Ottawa River. The ORAP consists of

17 individual projects aimed at enhancing the health of the Ottawa River and protecting Ottawa's water environment for future generations.

The P/W SWM Retrofit Study is one of the 17 ORAP projects. It defines a long-term plan to improve the health of Pinecrest Creek and the local reach of the Ottawa River, reduce flooding and erosion, and reduce closures at Westboro Beach.

4.3 Bio-Physical Environment

Background information regarding biological and physical components that are exhibited within the Study Area and/or may be affected by the proposed project has been collected and is described below. The following are not found within 1000 m of the Study Area, and therefore have not been considered further:

- Wetlands (including provincially significant wetlands);
- Areas of Natural and Scientific Interest (ANSI); or
- Areas subject to Aboriginal Land Claims.

4.3.1 Subsurface Conditions

In 2015, Golder Associates completed a geotechnical investigation as part of the Feasibility Study (JFSA, 2015). The field work for the geotechnical investigation was carried out in June and July of 2012, where four (4) boreholes and two (2) probeholes were drilled. Monitoring wells were installed at three (3) of the boreholes for groundwater level measurements and hydraulic testing. Unless otherwise indicated, the information discussed below was gathered as part of the Feasibility Study.

In 2017, Morrison Hershfield completed a Phase II Environmental Site Assessment (ESA), where two (2) geo-environmental boreholes were drilled, equipped with monitoring wells.

4.3.1.1 Bedrock

The City of Ottawa GIS database indicates that the bedrock underlying the Study Area is of the Gull River and Rockcliffe Formations (Figure 4-3). The Gull River Formation consists of interbedded silty dolostone, lithographic to fine crystalline limestone, and oolitic limestone. The Rockcliffe formation makes up the majority of the Study Area, and consists of quartz sandstone, shaley limestone, and shale.

The geotechnical investigation from the Feasibility Study inferred that the bedrock surface is at a depth of about 8.2 to 9.3 m below ground surface (mbgs), after auger refusal occurred at depths of about 8.2, 9.3, and 8.8 mbgs closest to Pinecrest Creek. Auger refusal likely indicates the bedrock surface but could also occur on cobbles or boulders in the glacial till.

4.3.1.2 Surficial Geology

The bedrock is immediately overlain with glacial till, followed by silty clay, silty sand and sandy silt, and finally with topsoil at the ground's surface, approximately 200 to 460 mm thick. Glacial till was encountered beneath the silty clay at three (3) boreholes in the southern half of the site and proven to depths of about 8.2 to 10.4 m.

The till is a heterogeneous mixture of gravel, cobbles, and boulders in a matrix of sandy silt or silty sand with a trace to some clay. Testing indicated that the till is compact to very densely packed, alternatively the results may be due to the cobbles and boulders in the deposit, or the borehole encountering the bedrock surface, rather than due to the packing.

Topsoil was found at ground surface at all of the borehole locations at a thickness ranging from approximately 20 to 46 cm. The topsoil is underlain by deposits of either silty sand or sandy silt, with silty clay seams. The thickness of these deposits ranges from about 0.5 to 1.5 m. The silty sand and sandy silt are underlain by a deposit of silty clay. The top 2.4 to 4.3 m of the silty clay have been weathered to a grey brown crust of very stiff to stiff consistency with intermediate plasticity.

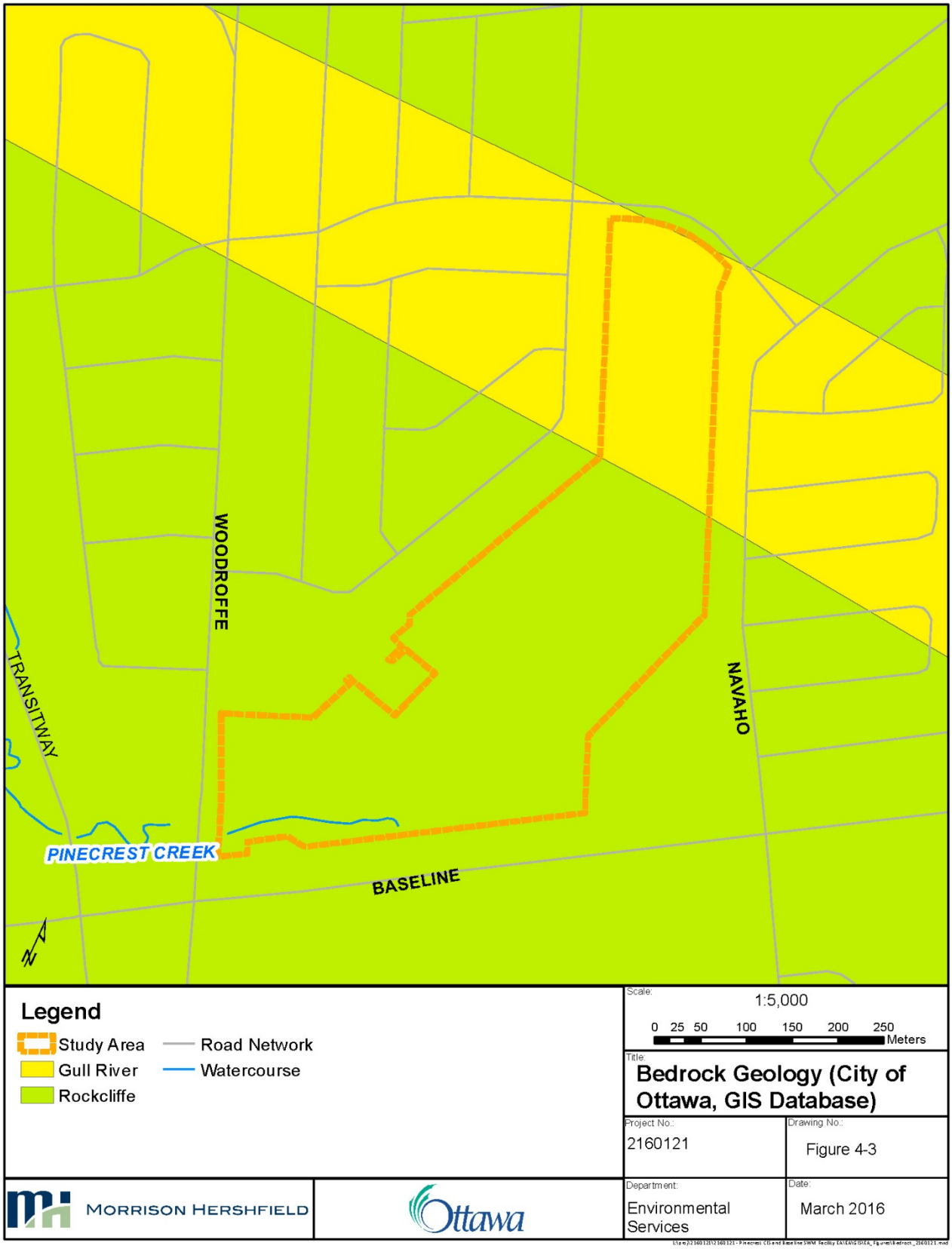


Figure 4-3: Bedrock Geology (City of Ottawa, GIS Database)

The unweathered silty clay was fully penetrated to depths between 6.9 and 9.8 mbgs at the three (3) boreholes in the southern half of the site, and proven to a depth of about 8.7 m in the borehole further north in the site. The silty clay below the depth of weathering is grey in colour and was found to be of firm to stiff consistency and intermediate plasticity.

4.3.2 Groundwater

Table 4-1 highlights the results of the groundwater level measurements (July 5, 2012) and the hydraulic conductivity testing on the monitoring wells, which were installed in three (3) boreholes in the southern half of the site. It is important to note that groundwater levels are expected to fluctuate seasonally and in response to weather conditions.

Table 4-1: Groundwater Level Measurements

Borehole Number	12-1	12-2	12-3
Geological Unit	Glacial Till	Unweathered Silty Clay	Unweathered Silty Clay
Ground Surface Elevation (m)	84.45	84.77	85.37
Water Level Depth (m)	5.39	3.04	3.56
Water Level Elevation (m)	79.06	81.73	81.81
Calculated Hydraulic Conductivity (cm/sec)	1.7×10^{-5}	3.3×10^{-5}	1.5×10^{-5}

The results of the hydraulic conductivity testing indicate that both the unweathered silty clay and glacial till are relatively low permeability soils. Although the silty clay is a much finer grained soil than the glacial till, and would therefore be expected to have a lower hydraulic conductivity, the relative similarity in the measured hydraulic conductivity values may reflect the presence of fissuring in the clay, which is not uncommon. The groundwater levels also indicate a potential hydraulic gradient from the silty clay towards the glacial till.

4.3.3 Environmental Contamination Potential

The City of Ottawa Historic Land Use Inventory (HLUI) Database indicates past and/or present land uses that may increase the likelihood of environmental contamination within the City of Ottawa. This database, however, may not include reference to federal lands. It indicates that land uses such as Laundries and Cleaners and Gas Service Stations are immediately adjacent to the Study Area.

4.3.3.1 Phase I Environmental Site Assessment

At the request of the NCC, Trow Associates completed a Phase I ESA for the site (Property Asset 95594) in 2006 (Trow, 2006). The Phase I ESA indicates that the Study Area has been recreational vacant land since the 1950's, prior to which it was occupied by a farmhouse, barns and associated farmland. A site visit and records review did not indicate any contamination or significant environmental concerns on the site. Although land use to the immediate south of the Study Area was historically gasoline service stations, it was concluded in the Phase I ESA that the potential for adverse impacts to the Study Area is considered low.

The Phase I ESA also indicated that a hydro transformer substation is adjacent to the Study Area in the south west, with evidence of significant staining on the gravel surface within the station and to within 3-4 m of the site boundary. Given that staining is in close proximity to the site boundary of NCC Property Asset 95594 (Study Area) a recommendation was made for further investigation. An Enhanced Phase I ESA completed for the adjacent NCC Property Asset 585 reiterates this recommendation (Trow, 2008).

4.3.3.2 Phase II Environmental Site Assessment

Morrison Hershfield completed a Phase II ESA for the site, which is attached in Appendix E. The ESA considered groundwater and soil contamination potential based on previously identified uses.

Polycyclic aromatic hydrocarbons (PAH), petroleum hydrocarbons (PHC), volatile organic compounds (VOC) and polychlorinated biphenyls (PCB) impacts are not present in the soil or groundwater. In fact, all contaminants within these parameter suites had non-detectable concentrations in both soil and groundwater, except for chloroform, which was present in the groundwater from BWP-1, but at a concentration below MOECC Table 3. Arsenic and chromium were also detected in groundwater from BWP-1 at concentrations above Canadian Council of Ministers of the Environment (CCME) Site Condition Standards, but below MOECC and the City of Ottawa Site Condition Standards. All other dissolved metals which were detected in groundwater were at concentrations below CCME, MOECC, and the City of Ottawa Site Condition Standards. These analytical results coupled with the low to non-existent soil headspace organic vapour readings and lack of field evidence of contamination lead to the conclusion that anthropogenic contamination is not present in the samples collected.

In terms of metals in the soil, no metal impacts were detected in the silty sand topsoil, however, MOECC Table 1 and CCME exceedances of barium, chromium and hexavalent chromium were confirmed in the silty clay present at the Site. These elevated metal concentrations are likely naturally occurring as this contaminant profile has been observed

in other fine grained Champlain Sea deposits that form part of the Ottawa Valley Clay Plain physiographic region. (Morrison Hershfield, 2017).

Given that the metals are naturally occurring and prevalent in clay from the Champlain Sea deposit which is widespread across eastern Ontario, there are no special recommendations for handling or re-use of the material on site. The contractor should be made aware of the elevated metals concentrations and should ensure that all excess materials are managed in accordance with environmental laws. There are options for the beneficial reuse of this material at receiving sites.

It should also be noted that the CCME guidelines are subject to professional judgement and require interpretation. For the chromium exceedances of the CCME SCS, it is noted that values derived in the CCME guidelines are based on protection of soil quality for plant growth (nutrient content and metabolism) and mainly apply to agricultural land use. These CCME SCS are not designed for the protection of human health or ecological receptors and are therefore overly conservative for the current and planned property use.

Additionally, an inquiry made to the City of Ottawa regarding potential contamination within the Site identified an active Ministry of Environment and Climate Change (MOECC) Environmental Compliance Approval (ECA) for an Oxygen Injection System on the property located at 1980 Baseline Road, related to a treatment system for PHCs and chlorinated Volatile Organic Compounds (VOCs.) Based on further review of historical photographs, available documents, and site visit carried out on the treatment system, the following was concluded:

- A former retail fuel outlet is apparent on the 1965, 1976, 1991, and 1999 aerial photos on the geo-Ottawa website. Its location is approximately 50 m south of Baseline Road and 90 m east of Woodroffe Avenue, at the northwest corner of the current Loblaws parking lot.

- A treatment system for petroleum hydrocarbons in groundwater has been operational in the location of this former retail fuel outlet under MOECC ECA No. 2914-66JL7Z from November 9, 2014 to June 23, 2016 and under ECA No. 3878-AB7LHZ from June 23, 2016 to present.

- Based on the likely location of the contaminated soil and/or groundwater, on the far side of Pinecrest Creek from the proposed pond and at least 140 m from the closest area where excavation will occur, and based on the fact the neither PHC F1-F4 nor BTEX were detected in the two installed monitoring wells on-site, no further investigation of this issue is required, and it is not expected to have any impact on the construction, maintenance, or operation of the proposed storm pond.

4.3.4 Watercourses

4.3.4.1 Ottawa River

The cities of Ottawa and Gatineau are located in the upstream portion of the Carillon to Chaudière reach of the Ottawa River. Haxton and Chubbuck (2002) note that there are at least 47 tributaries in this portion of the Ottawa River (26 in Québec and 21 in Ontario). The main tributaries of this section include Rivière Nord, Rivière Rouge, South Nation River, Rivière Petite Nation, Rivière Lièvre, Rivière Gatineau, and Rideau River Falls.

The Ottawa River is listed in the schedule of the Navigation Protection Act (NPA). According to this Act, it is prohibited to construct, place, alter, repair, rebuild, remove or decommission a work in, on, over, under, through or across any navigable water that is listed in the schedule except in accordance with this Act or any other federal Act.

4.3.4.2 Pinecrest Creek

As described in the 2011 P/W Retrofit Study, Pinecrest Creek is a small highly altered stream within an urbanized subwatershed. As an urban watercourse, Pinecrest Creek has been altered from its natural state both directly and indirectly. The creek and its (former) tributaries have been straightened, buried, realigned and its riparian vegetation has been reduced, modified or removed.

The main channel of Pinecrest Creek is approximately four kilometers long, however, only 2.5 km are open with the remaining length culverted or piped. The culvert and piped sections of the creek include the reaches between West Hunt Club Road and Baseline Road and the reaches from just south of Carling Avenue to immediately upstream of the confluence with the Ottawa River where it emerges at the Sir John A. Macdonald Parkway (SJAMP).

The open creek corridor extends from Baseline Road, through the Study Area to just south of Carling Avenue. This open corridor is part of the green corridors and parklands owned by the NCC.

Pinecrest Creek has not been identified in the Schedules under the Navigation Protection Act. Section 4 (1) of the NPA notes that the owner of a work that is constructed or placed, or proposed to be constructed or placed, in, on, over, under, through or across any navigable water, other than any navigable water that is listed in the schedule, may request that this Act be made applicable to the work as if it were a work that is constructed or placed, or proposed to be constructed or placed, in, on, over, under, through or across any navigable water that is listed in the schedule.

4.3.5 Fluvial Geomorphology

Fluvial geomorphic investigations were previously completed for the Feasibility Study (JFSA, 2015). A field component was used to determine the location of sensitive areas along the receiving reach of Pinecrest Creek and to establish the optimal location for discharge of stormwater. A desktop component was used to assess conditions in the creek with respect to varying discharges from the pond and to determine channel parameters which are indicative of erosion potential.

Reach boundaries for Pinecrest Creek are shown in Figure 4-4. The reach used for detailed analysis was Reach 6, as this is the reach within the Study Area limits. Additional analysis was completed on Reach 3. The erosion analysis focused on these reaches, but also included assessment of the entire open channel length of Pinecrest Creek.

Reach 1: Pinecrest Drain to Queensway – 860 m
Reach 2: Queensway to Iris Street – 275 m
Reach 3: Iris Street to Transitway Culvert – 406 m
Reach 4: Transitway Culvert to Transitway Culvert – 260 m
Reach 5: Transitway Culvert to Woodroffe Avenue – 174 m
Reach 6: Woodroffe Avenue to Baseline Road – 202 m

Figure 4-4: Study Reaches on Pinecrest Creek (Step 1, page 6, JFSA, 2015)

4.3.5.1 Erosion Assessment

Erosion on Pinecrest Creek is occurring along the upper end of Reach 6 at the location where the gabion basket wall terminates. Limited to the eastern bank, this erosion extends for a distance of approximately 25 m. The eastern bank along this section is composed of bare banks with exposed clay at a steep angle; the bank is subject to sheetwash erosion and some toe erosion. The steepness of the bank limits

vegetation growth. Erosion at this site was characterized as “high severity” in the Feasibility Study (JFSA, 2015).

The remainder of Reach 6 is stable. The creek is confined in a steep valley; however there is a strong connection with a limited floodplain which is well-vegetated and stable. The depth of the valley decreases as distance downstream toward Baseline Road increases, though there is no widening of the base of the valley in which the creek flows. Photo 1 shows the eroding bank; Photo 2 shows the stable section of the reach.

Photo 1: Eroding east bank downstream of gabion wall (Reach 6). View is looking upstream (JFSA, 2015)

Photo 2: View along stable section of Reach 6. View is looking upstream (JFSA, 2015)

The reach upstream of Iris Street (Reach 3) is relatively stable. Previous unstable sites were rehabilitated in 2008 by the NCC and continue to function as intended. That said, the Feasibility Study (JFSA, 2015) notes that one eroding bank on the west side of the creek (adjacent to the Transitway) is located approximately 90 m upstream of Iris Street, which has been extending for a number of years. This bank is to the point where it is now classified as "high severity" and it will require some intervention in the future.

This site in Reach 3 was used to determine the downstream erosion threshold as it was identified as the most sensitive location downstream of the outlet. It is recognized that pond function may not be a significant contributor at this location due to input distances between the pond and this site.

Photo 3: Eroding bank in Reach 3 that represents the sensitive reach for threshold analysis. (JFSA, 2015)

4.3.5.2 Erosion Thresholds

The Feasibility Study (JFSA, 2015) included a detailed analysis of creek response to flow for 20 cross-sections of Pinecrest Creek (19 in Reach 6 one in Reach 3). Grain size analysis was previously completed and remains representative. Four samples were analyzed for each of the two reaches, details of which can be found in the Feasibility Study (JFSA, 2015) and supporting documentation.

Erosion sensitivity is based on a number of factors including the ability of the section to move sediment through the channel. In Reach 6,

Station 5140 was determined to be the most sensitive based on analysis of the channel parameters. This reach was used to establish the erosion threshold used to inform the SWMP release rate.

Erosion thresholds are based on a given fraction of the bed material particle size distribution, which is determined through bulk sediment analysis. Four bed samples were collected and analyzed for each reach as part of the Pinecrest/Centrepointe Stormwater Management Criteria Study (2010).

The sample used to determine threshold discharge in Reach 6 represents the finer of the grain size samples in the Reach and was selected in light of the stormwater criteria to remove a minimum of 60% of total suspended solids (TSS) from collected runoff. If a larger sample fraction were used, then flushing of all fines from the channel would result and subsequent bank erosion would occur.

Based on the geomorphic analysis prepared in the Feasibility Study (JFSA, 2015), the threshold discharge for stormwater release from the proposed pond delivering to Reach 6 is 0.310 m^3 sec^{-1}.

4.3.6 Fish and Aquatic Habitat

4.3.6.1 Ottawa River

The reach of the Ottawa River into which Pinecrest Creek flows supports a relatively diverse coolwater/warmwater fish community comprised of at least 75 different fish species (Haxton and Chubbuck, 2002). Sport species include Walleye, Sauger, Northern Pike, Muskellunge, Yellow Perch, Smallmouth Bass, Largemouth Bass, Sturgeon, and Black Crappie.

Generally the distribution and abundance of fish varies considerably among locations, with the most diverse fish communities are found in the shallow, littoral areas.

4.3.6.2 Pinecrest Creek

Urbanization throughout the Pinecrest Creek subwatershed has degraded the aquatic habitat conditions in the creek. As a result of urbanization, very little of the rainfall is absorbed into permeable surfaces, and runs quickly downstream into the creek. These flows have caused unstable riffle pool sequences, homogenous habitat, as well as channel downcutting into till and bedrock, reducing the number of refuge pools for fish and benthic invertebrates. There are also instream barriers and migratory obstructions such as a 1.5 km enclosure (Ottawa River Parkway pipe) and a triple CSP arch culvert under the SJAM Parkway near the mouth of the creek.

Pinecrest Creek has been heavily impacted by uncontrolled stormwater runoff and associated impairment of water quality. High peak flows and

volumes of runoff have caused instability and a lack of aquatic habitat diversity. The P/W SWM Retrofit Study noted that Pinecrest Creek is one of the most urbanized subwatersheds in the City of Ottawa, with about 36% of the subwatershed being impervious. RVCA surveys found only four fish species in 1993 and one species, White Sucker, in 2011, upstream of the entombed creek (RVCA, 2011). In addition to the enclosed portion of the creek, major road crossings and gabion reinforced banks result in highly altered conditions.

The City Stream Watch 2006 Annual Report (RVCA, 2006) considered only 19 percent of Pinecrest Creek to be in a natural condition and significant alterations are still present in these sections. The City Stream Watch 2011 Summary (RVCA, 2011) considered 31% of the creek natural, but with some anthropogenic changes. The outlet to the Ottawa River is the least disturbed reach of Pinecrest Creek, with a short delta-like wetland (City of Ottawa, 1998). Meandering and bank stability are much better in this reach, with a wider natural riparian zone. In the 2011 RVCA survey, nine fish species were captured at the outlet.

The banks of Pinecrest Creek range in height from 0.5 to 4 m. In 62 percent of sections sampled by the RVCA in 2006, the stream banks along Pinecrest Creek were identified as being unstable or undercut. The 2011 P/W SWM Retrofit Study notes that this has resulted in vegetation loss, poor aquatic habitat and degraded water quality. The NCC has completed several bank and slope stabilization projects along the creek to mitigate on-going erosion and improve the creek's ability to withstand the impacts of uncontrolled runoff. Since the 2006 survey by the RVCA, the bank stability has improved 4 to 8%.

The amount of instream vegetation increased significantly between 2006 and 2011, however it was still found to be 99% algae, which is indicative of high nutrient enrichment.

4.3.7 Wetlands and Areas of Natural and Scientific Interest (ANSI)

Natural Heritage in the vicinity of the Study Area consists primarily of urban parks, woodlots adjacent to Pinecrest Creek and wetlands.

Mud Lake Wetland (an evaluated Provincially Significant Wetland (PSW)) is part of the Britannia Conservation Area (ANSI) in proximity to the confluence of Pinecrest Creek and the Ottawa River. There are no PSW or ANSI within 1000 m of the Study Area. There are no wetlands within the Study Area.

4.3.8 Natural Terrestrial Vegetation

As part of the 2015 JFSA Feasibility Study, an inventory of the sites' landscape conditions was undertaken by Gruenwoldt/Copeland Associates. This investigation was limited to plant species and vegetation zones. The study was undertaken to better understand the influences on land use including the loss or transition of species and the age of the existing vegetation on the site.

Visually the site retains the characteristics of old farm fields where hay fields have evolved into grassy meadows with woody vegetation seeding in from the surrounding residential developments. The meadows are currently comprised of tall grasses, forbs and seedling woody plants, and there is a large rodent population.

Although subtle, the site can be inventoried as three landscape zones. The zones are identified as: Zone 1) Creek & Channel; Zone 2) Old Fields now described as Meadows; and, Zone 3) Verge along the property lines and the rear of the abutting subdivisions.

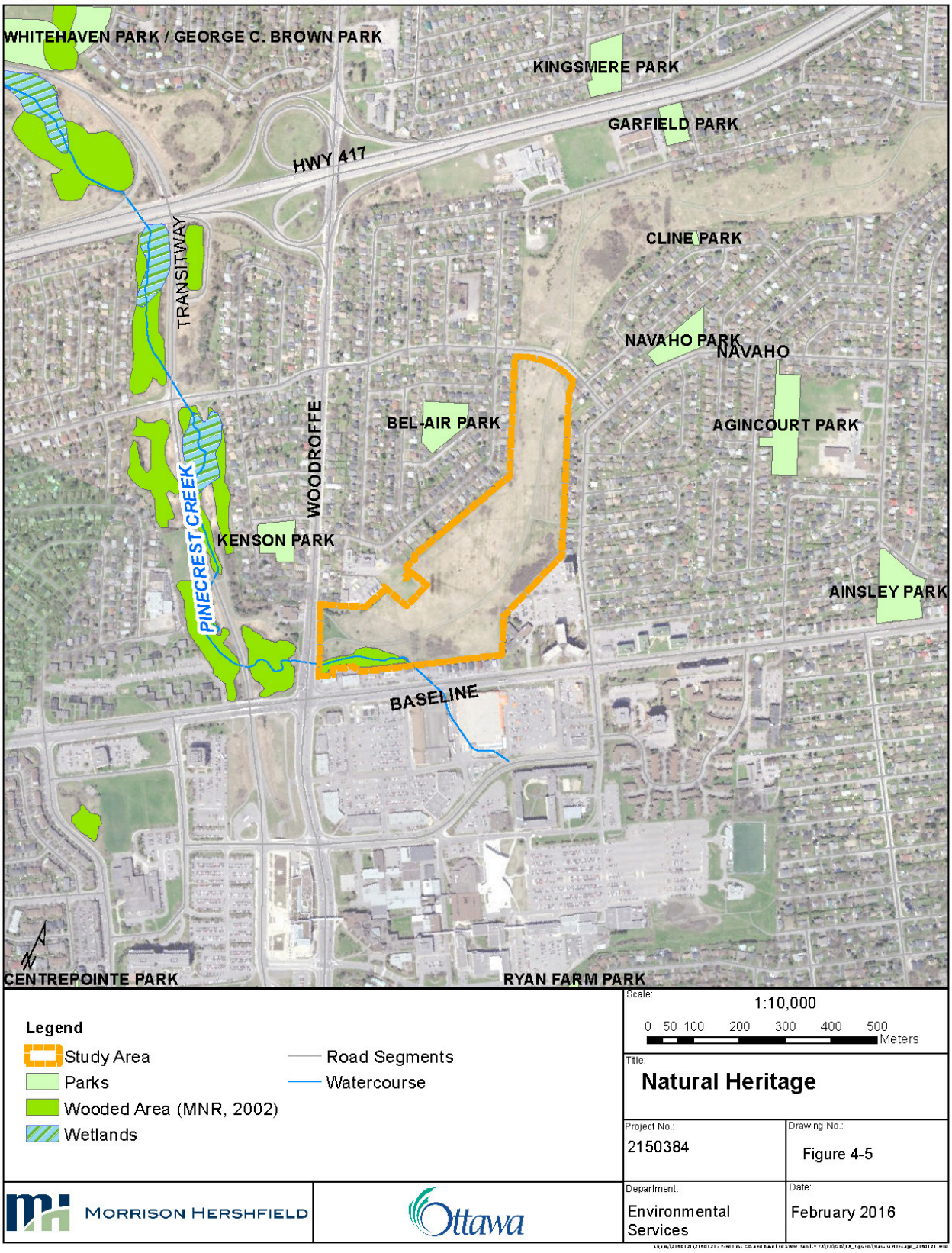


Figure 4-5: Natural Heritage

4.3.8.1 Zone 1 – Creek and Channel

The more mature vegetation along the creek corridor consists of Willow, Poplar, Ash with isolated Elm with an understory of Virginia Creeper, Buckthorn, shade tolerant forbs, sedges, ferns and grasses.

No specimen or 'significant' individual species was encountered in this zone.

Photo 4: Landscape Zone 1 - Bucolic scene along Pinecrest Creek (JFSA, 2015)

4.3.8.2 Zone 2 – Meadows

Plant material within the Meadow is less than 20 years old and described as very 'young'. It consists primarily of pioneer species moving in from Zone 3. Species consist of Chokecherry, Manitoba Maple, Dogwood and some isolated Ash and Elm trees.

Photo 5: Landscape Zone 2 - Old fields transforming into meadows (JFSA, 2015)

4.3.8.3 Zone 3 - "The Verge"

The Verge is identified as "significant" as it provides the nurse crop for seedlings that are slowly regenerating the woody species. Some desirable native trees including Elm, Ash, Black Walnut and Maple have seeded into the site as well as a significant amount of ornamentals. The common Ottawa invasive species (Buckthorn, Honeysuckle, Dog-Strangling Vine, Garlic Mustard) are also gaining a foothold on the site.

Photo 6: Landscape Zone 3 - Verge, drainage swale and hydro line along northern site boundary (JFSA, 2015)

4.3.9 Wildlife and Habitat

The 2011 RVCA stream survey of Pinecrest Creek observed ducks, mallards, a Ring-Necked Gull, crows, a Cardinal, an American Goldfinch, and a Red-Winged Blackbird (RVCA, 2011).

In the 2011 RVCA stream survey of Pinecrest Creek, the only mammals observed were black squirrels (RVCA, 2011).

4.3.10 Species at Risk and Critical Habitat

A preliminary desktop review of Species at Risk (SAR) and Critical Habitat was undertaken using the Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) mapping tool (7 April, 2016).

This preliminary investigation indicated that for the 1 km UTM grid (18VR4022) encompassing the Study Area, pale-bellied frost lichen is the only historically noted SAR. It was observed in 1902, is considered an “Endangered Species”, and grows on the bark of hardwood trees such as White ash, Black walnut, and American elm, and can also be found growing on fence posts and boulders.

Table 4-2 identifies SAR that have been observed within 10 km (18VR42) of the Study Area or along Pinecrest Creek, and which may have the potential to occur within the Study Area due to their compatible habitat characteristics. The

designation of the species from the *Endangered Species Act, 2007* (ESA), the *Species at Risk Act, 2002* (SARA), and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are noted for each species.

Table 4-2: Potential Species at Risk

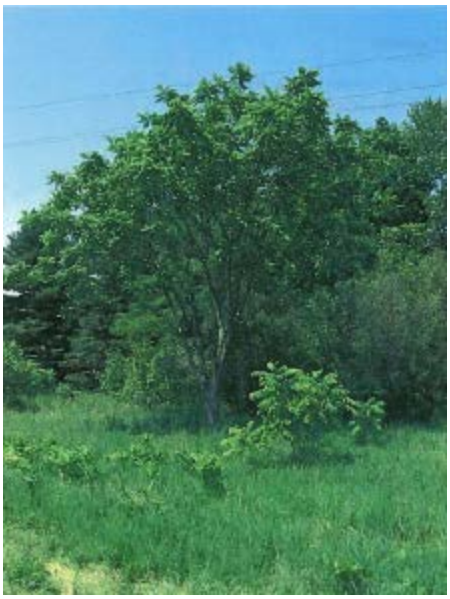
Common Name	Scientific Name	ESA	SARA	COSEWIC	Comment
American Eel	*Anguilla rostrata*	END	No Status	THR	Observed in Pinecrest Creek
Bank Swallow	*Riparia riparia*	THR	No Status	THR	Observed within 10km of the Study Area
Barn Swallow	*Hirundo rustica*	THR	No Status	THR	Observed within 10km of the Study Area
Blanding's Turtle	*Emydoidea blandingii*	THR	Schedule 1, THR	THR	Not observed in Pinecrest Creek
Bobolink	*Dolichonyx oryzivorus*	THR	No Status	THR	Observed within 10km of the Study Area
Butternut	*Juglans cinerea*	END	Schedule 1, END	END	Observed around Pinecrest Creek
Chimney swift	*Chaetura pelagica*	THR	Schedule 1, THR	THR	Observed within 10km of the Study Area
Common nighthawk	*Chordeiles minor*	SC	Schedule 1, THR	THR	Observed within 10km of the Study Area
Eastern Meadowlark	*Sturnella magna*	THR	No Status	THR	Observed within 10km of the Study Area
Eastern Wood-Pewee	*Contopus virens*	SC	Schedule 1, SC	SC	Observed within 10km of the Study Area
Milksnake	*Lampropeltis triangulum*	SC	Schedule 1, SC	SC	Observed in Pinecrest Creek
Pale-bellied Frost Lichen	*Physconia subpallida*	END	No Status	END	Observed within 1km of the Study Area
Wood Thrush	*Hylocichla mustelina*	SC	No Status	THR	Observed within 10km of the Study Area

SC – Special Concern
THR – Threatened
END - Endangered

The Ontario MNRF and the Rideau Valley Conservation Authority (RVCA) were contacted to confirm potential species and habitat within the Study Area. The requests for information are provided in Appendix F. One butternut tree was also

surveyed within the Study Area and as a result additional field investigations for butternut were undertaken.

4.3.10.1 Butternut Trees



Eighty-seven (87) Butternut trees (*Juglans cinerea*) have been verified by field studies to date on the NCC property.

Butternut is endangered under the Ontario *Endangered Species Act, 2007* (ESA); Schedule 1, endangered under the federal *Species at Risk Act, 2002* (SARA); and endangered according to the Committee on the Status of Endangered Species in Canada, 2003 (COSEWIC). Butternut is a medium-sized tree that can reach up to 30 m in height. It belongs to the walnut family and produces edible nuts in the fall. The bark of younger trees is grey and smooth, becoming ridged as it ages.

Photo 7: Butternut Tree

Under the Species At Risk Act (S.C. 2002, c. 29), all Butternuts found on federal property are protected, unless they are determined to be hybrid. Hybridity testing is recommended in order to confirm the genetic status of the 87 specimens found on the subject site.

4.4 Socio-Economic Environment

4.4.1 Aboriginal Land Claims

The negotiators for the Algonquins of Ontario, the Government of Canada and the Government of Ontario released a Preliminary Draft Agreement-in-Principle in December 2012 for public review. This draft document was put forward to the public. Following extensive consultations which took place in 2013, revisions to this document were negotiated by Canada, Ontario and the AOO. These revisions were reflected in the proposed Agreement-in-Principle which was announced and made available to the public in June 2015.

In February and March 2016, the AOO held a vote on the proposed Agreement-in-Principle and announced their vote results on March 17, 2016. Following approval by all three parties, the AOO, Canada and Ontario signed this non-binding Agreement-in-Principle on October 18, 2016. With the signing of the Agreement-in-Principle, negotiations toward a Final Agreement can begin. It is noted that private property will not be expropriated to settle this claim, and the rights of private land owners to make use of and access their land will be maintained. The documentation available to date does not identify the Study Area or adjacent lands as proposed Algonquin settlement lands.

4.4.2 Cultural Heritage

4.4.2.1 Archaeological Potential and Resources

The City of Ottawa GIS database identifies the entire Study Area as having archaeological potential (Figure 4-6).

4.4.3 Public Land Ownership

The NCC owns the Pinecrest Creek corridor (Figure 4-7), including the Study Area. The Pinecrest Creek corridor is connected to the Sir John A. Macdonald Parkway and forms an important linkage to the recreational trail network in the City of Ottawa.

4.4.4 Existing Land Use

Current use of the site is primarily open greenspace with a NCC recreational pathway traversing the site in an east-west orientation. This pathway is the eastern end of the 8 km Experimental Farm Pathway that continues as the Pinecrest Pathway on the west side of Woodroffe Avenue. The pathway network connects the site with pathways from Parliament Hill, along the Rideau Canal and the Ottawa River.

Surrounding land use is shown on Figure 4-7. Residential development, predominantly single detached residential, borders the site on the northwest (Bel Air Park) and east (Bel Air Heights). Saint Daniel Elementary School and Ottawa Hydro's Woodroffe Transformer Station are located adjacent to the northwest comer of the site. A 193-bed long-term care home (Extendicare Medex) is located at the southeast border along with a 270 unit nine-storey apartment building (Meadowbrook Place).

A mixture of low rise retail stores and offices along Baseline Road skirt the southern boundary of the site. The City's Centrepointe property is kitty comer to the site across the Baseline/Woodroffe intersection. A regional shopping centre is located immediately across from the site on the south side of Baseline Road.

Figure 4-6: Archaeological Potential

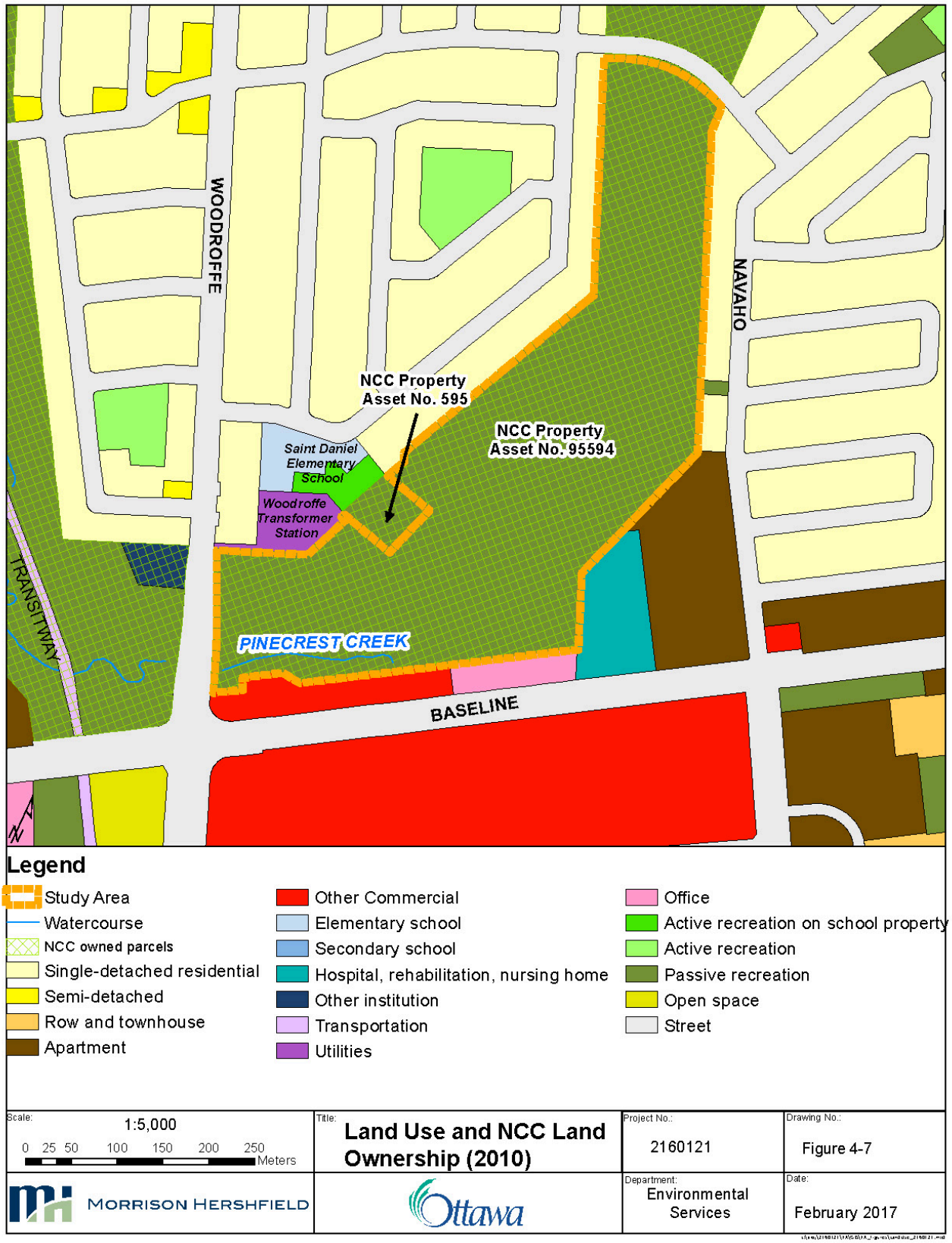


Figure 4-7: Land Use and NCC Land Ownership (2010)

4.4.4.1 Easements and Leaseholds

In addition to the open space and pathway corridor, the Feasibility Study identifies a number of easements and leaseholds within the site including an above ground electrical line which passes along the area's northwestern boundary (Figure 4-8).

- There are two (2) Hydro One high voltage transmission systems entering and leaving the Woodroffe Transfer Station (Woodroffe TS);
- There are two (2) NCC easements for Hydro Ottawa within the site;
- A drainage Right-of-Way (ROW) easement is located between the commercial property at Baseline Road and Woodroffe Avenue;
- NCC records show a "Sewer, Culvers, Mains" easement located behind the commercial property on Baseline Road; and
- A 0.4 ha school playing field fenced off in the northwestern part of the area which is leased to the Ottawa Catholic School Board.

4.5 Transportation Routes

4.5.1 Road Network

The road network surrounding the Study Area is indicative of the highly urbanized environment in which it is situated. Baseline Road and Woodroffe Avenue are Arterial Roads and form the southern border and western boundaries of the Study Area, respectively. The northern and eastern extents of the Study Area are adjacent to Iris Street and Navaho Drive, respectively.

Figure 4-8: Easements and Leaseholds within the Study Area

4.5.2 Transit

4.5.2.1 Western LRT

Stage 2 of Ottawa's LRT is scheduled to be operating by 2023, where the west extension will run from Tunney's Pasture to Baseline Station, with an extension from Lincoln Fields to Bayshore Shopping Centre. The Baseline Station extension is planned to extend from Lincoln Fields along the existing Bus Rapid Transit (BRT) route that runs through the Pinecrest Creek corridor. LRT will run with twin tracks in a north-south direction to the west of the Study Area. The tracks will be grade-separated from the road and pass under Baseline Road. Until its construction, BRT will continue to run in the same location through the Pinecrest Creek corridor between Lincoln Fields and Baseline Road to the west of the Study Area (Figure 4-9).

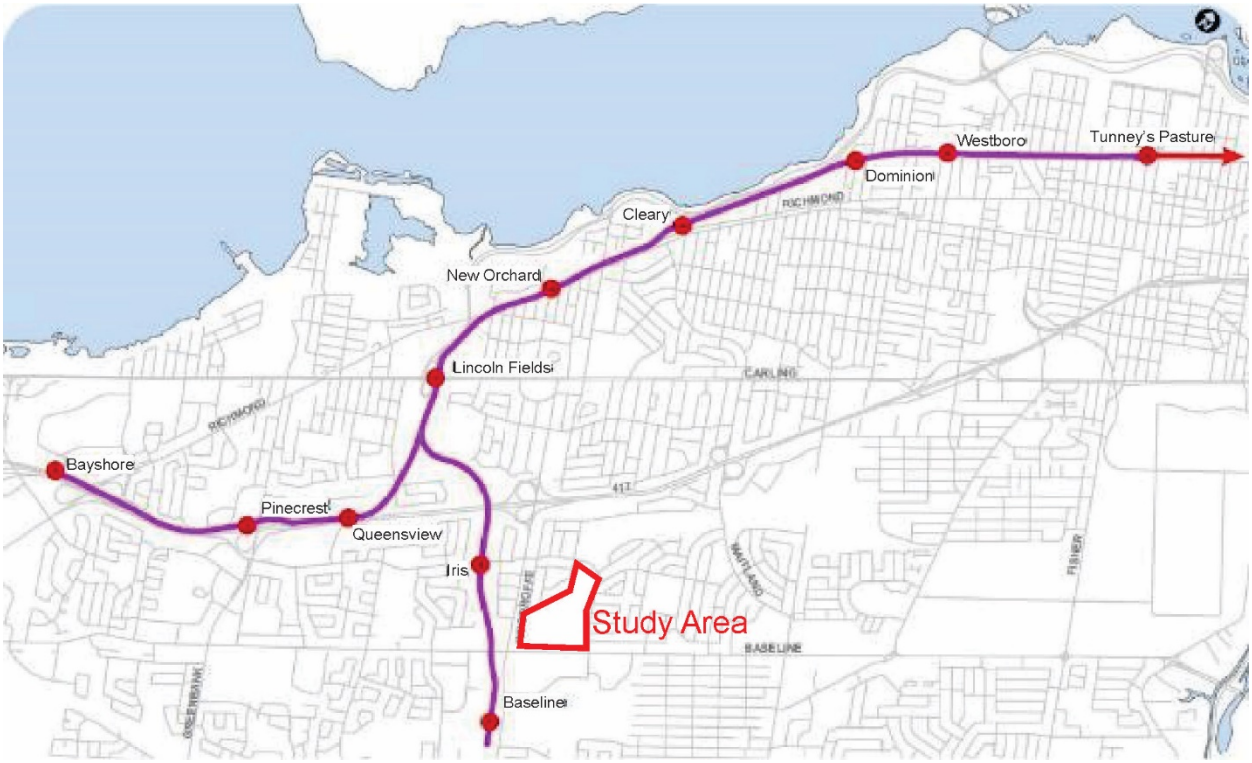


Figure 4-9: Ottawa LRT Stage 2 Confederation West Extension and Station Locations (City of Ottawa)

4.5.2.2 Baseline Road Bus Rapid Transit

As indicated on the City of Ottawa website, an EA is currently being completed for the Baseline Road Rapid Transit Corridor (Bayshore Station to Billings Bridge Station), which is intended for an at-grade BRT to run east-west from Bayshore Station, along Baseline Road to Baseline Station, and east along Baseline Road to Billings Bridge Station. The City of Ottawa's 2013 Transportation Master Plan (TMP)

identifies Baseline Road as an "at-grade Bus Rapid Transit" corridor, with Baseline Station to Billings Bridge Station to be implemented within the planning horizon to 2031, subject to funding; and the Baseline Station to Bayshore Station to be implemented post-2031.

The alignment of the proposed BRT corridor runs the length of Baseline Road, with the exception of where it enters Baseline Station. The corridor returns to Baseline Road to the east and west of the Study Area (Figure 4-10).

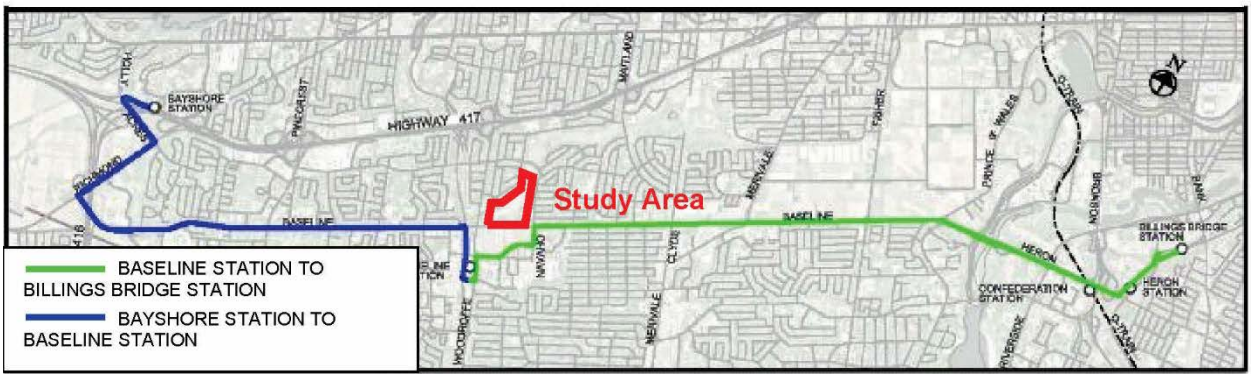


Figure 4-10: Baseline Road Rapid Transit Corridor Pre- and Post-2031 (City of Ottawa)

4.5.3 Recreation & Pedestrian/Cycling Routes

As previously mentioned in Section 4.4.4, the Study Area is traversed by the NCC's Experimental Farm Pathway. The pathway forms part of an extensive pedestrian and cycling network within the City (Figure 4-11).

4.6 Utilities and Infrastructure

4.6.1 Drainage Infrastructure

As previously mentioned, a drainage ROW easement is located between the commercial property at Baseline Road and Woodroffe Avenue. The site was formerly occupied by Tony Graham Motors Ltd. and the easement records received still have that company as the client (JFSA, 2015). It is assumed that there is a drainage pipe to the creek located in this easement carrying runoff from the commercial property to discharge to the creek.

The Baseline outfall is located north of Baseline road and approximately 210 m east of Woodroffe Avenue. The catchment area for the Baseline outfall has a minor system drainage area of 420 ha and major system drainage area of 460 ha. It is bordered to the west by Woodroffe Avenue, to the south by an existing railway corridor north of Medhurst Drive, to the east by Merivale Road, to the north by Baseline Road, and extends in the north-east to the Experimental Farm Pathway between Maitland and Clyde Avenues. Approximately 60% of the catchment area is serviced by storm sewers with the remaining 40%, in the south and east, draining through ditches and eventually connecting to the storm sewer network.

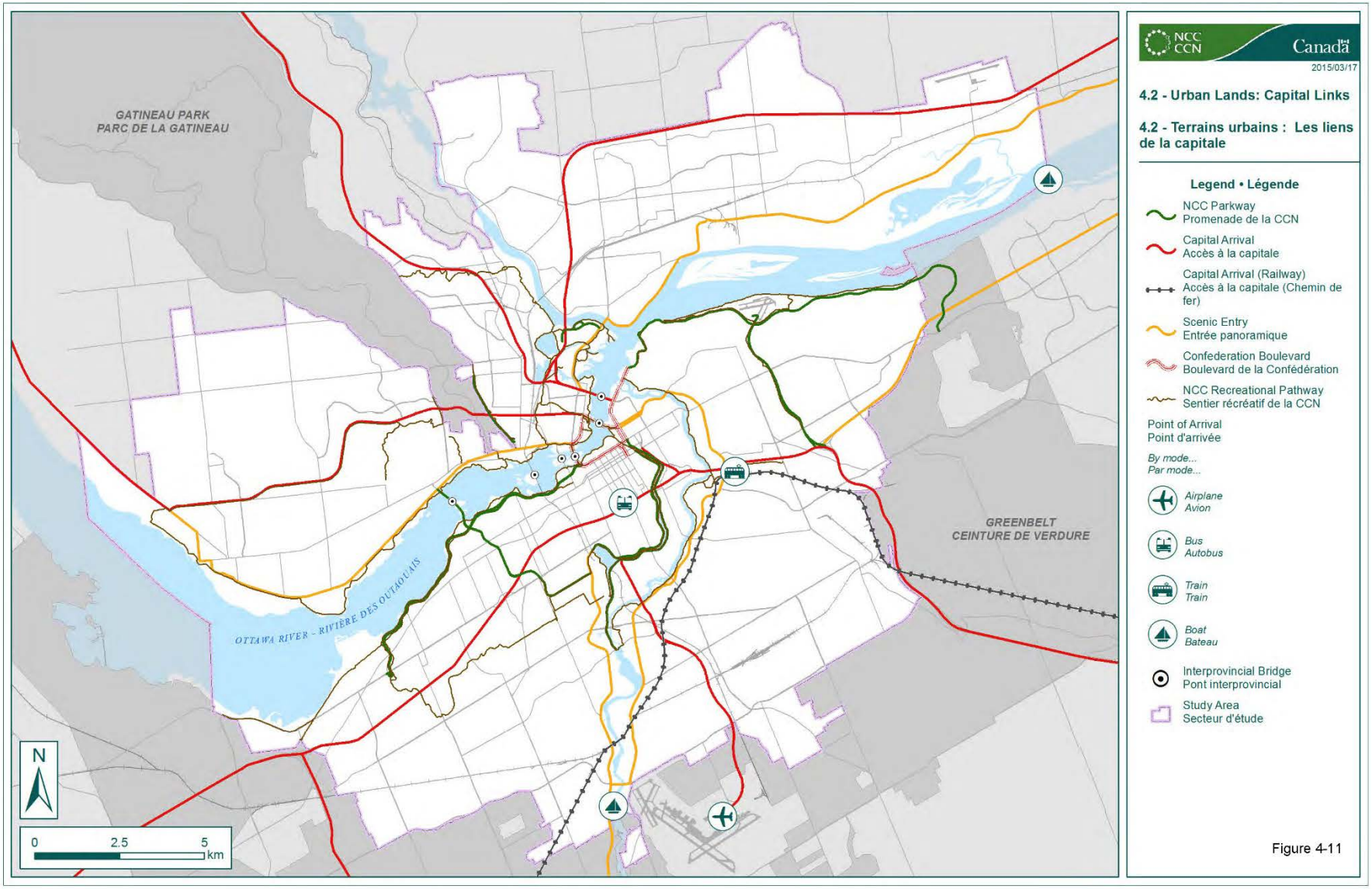


Figure 4-11: Capital Links (NCC, 2015)

There are existing gabion walls at the Baseline outfall into Pinecrest Creek. Upon visual inspection, Golder (JFSA, 2015) noted that the gabion wall along the north bank of the creek is fairly short in height and shows no signs of collapse or instability. The Feasibility Report does, however, note that it appears to have been poorly constructed (i.e., some of the gabion baskets are deformed and sagging) and that it has been partially damaged by vandalism.

The much higher gabion wall that forms a wing wall along the west side of the outlet (box culvert) appears to be bulging/deforming. If the gabion wall is to be maintained as part of the pond design, a structural evaluation of its condition should be carried out.

4.6.1.1 Drainage Easement

The Feasibility Study notes that there is a "Sewer, Culverts, Mains" easement located behind the commercial property on Baseline Road. The easement is in the name of Scotts Restaurant which is/was a restaurant (presently a KFC) located immediately east of where the easement is located. The easement site is occupied by a parking lot bordered by a wall immediately above the creek valley. The easement may have been established during the re-alignment of the Pinecrest Creek outlet and the removal of the previous corrugated box culvert.

4.6.2 Sanitary and Storm Sewers

As illustrated in Figure 4-12, sanitary and storm sewers are located adjacent to the Study Area, but none have been identified within the study boundaries. There are no combined sewers identified adjacent to the site, and sanitary and storm infrastructure is primarily located within the road ROW.

Based on the City's field survey, the invert of the 3000 mm x 1800 mm box trunk sewer that would be serviced by the proposed SWM pond is at an elevation of 79.01 m. The culvert crossing Woodroffe Avenue downstream of the proposed facility has an upstream invert elevation of 77.70 m. It is noted that this trunk sewer has two main lines, one that runs east to west along Baseline Road from Merivale Road to the outlet and one that runs south to north through the Algonquin College campus. The trunk sewer collects drainage from the southern portion of Copeland Park, St. Claire Gardens and Meadowlands/Crestview.

4.6.3 Watermains

Similar to the sanitary and storm infrastructure, the water distribution network is located adjacent to the Study Area with watermains located within the road ROW. There are no watermains located within the Study Area (Figure 4-13).

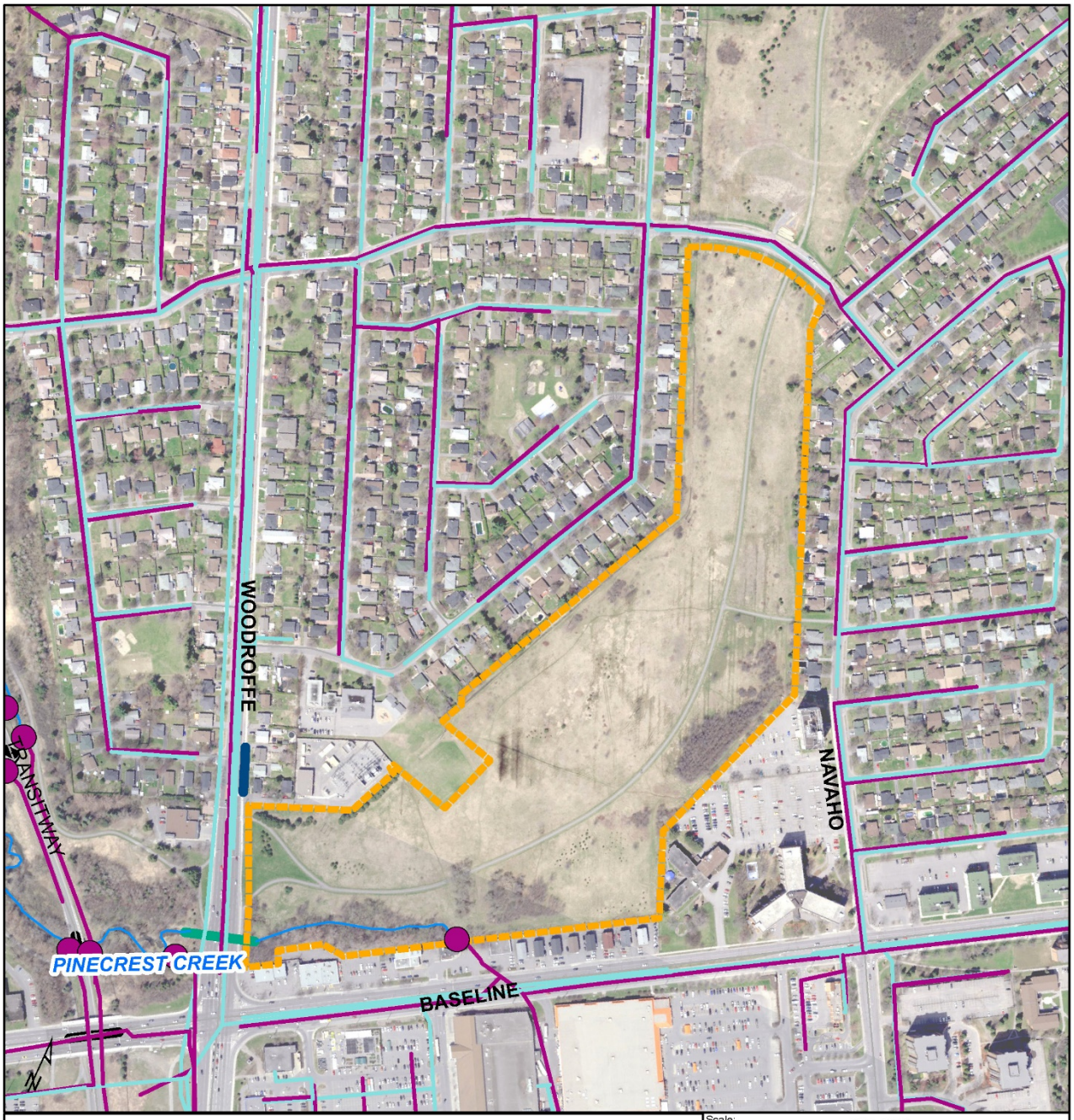
4.6.4 Hydro One

One easement (narrow yellow cross-hatched line on Figure 4-14) is located along the site's northern boundary just east of Woodroffe Avenue. This is for a Hydro

One underground 115 kV transmission cable exiting the Woodroffe TS and heading westwards, then northwards behind the properties on Adirondack Drive.

The second easement (broad yellow cross-hatched line on Figure 4-14) is for corridor lands for a set of Hydro One overhead 115 kV transmission lines, poles and supports. This easement corridor crosses Woodroffe Ave, skirts the Woodroffe TS, and heads northeast along the site's north boundary behind the properties on Field Street. The City's Surveys and Mapping information shows the easement as 30.48 m wide and lists the property Instrument No. as CRS70628.

Hydro One's requirements for access to these corridors are: a 6 m wide clear access route along the transmission line to each structure; 15 m clear radius around each structure for maintenance set-up; positive drainage on the corridor; and no increase in elevation of ground surface.



Legend

- Study Area
- Sanitary Pipe
- Storm Pipe
- Storm Outlet
- Bridge
- Culvert Medium
- Retaining Wall
- Watercourse

Scale: 1:5,000

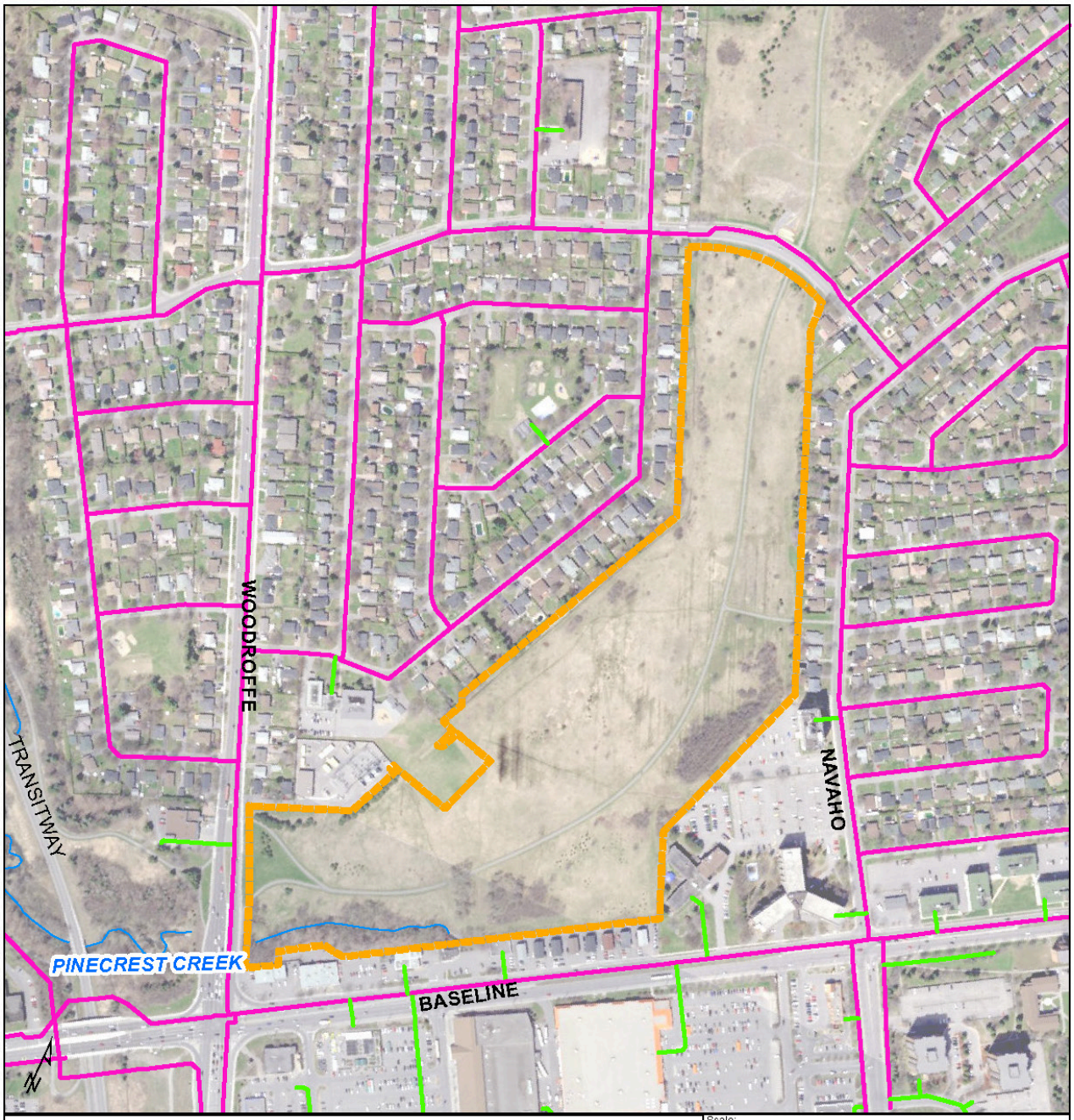
0 25 50 100 150 200 250 Meters

Title: **Drainage Features and Structures**

Project No.:	Drawing No.:
2160121	Figure 4-12

		Department:	Date:
MORRISON HERSHFIELD	Ottawa	Environmental Services	March 2016

Figure 4-12: Drainage Features and Structures



Legend

- Study Area
- Watermain
- Water Service Pipe
- Watercourse

Scale: 1:5,000

0 25 50 100 150 200 250 Meters

Title: **Water Distribution Network**

Project No.:	Drawing No.:
2160121	Figure 4-13

		Department:	Date:
MORRISON HERSHFIELD	Ottawa	Environmental Services	March 2016

Figure 4-13: Water Distribution Network

4.6.5 Hydro Ottawa

As noted, there are two (2) NCC easements in favour of Hydro Ottawa within the site. One easement runs along the western boundary of the site parallel to Woodroffe Avenue from Baseline Road to the site's northern boundary. This easement is for 13kV and 4kV overhead distribution lines.

The second easement runs east-west across the site and is for two (2) direct buried 13 kV cables, which are reported to be at most 1.5 m below grade. The City's Surveys and Mapping information shows the easement as 3.66 wide.

4.7 Constraints and Opportunities

4.7.1 Constraints

The 2015 Feasibility Study identified a large number of constraints within the Study Area to be taken into consideration in the development of potential alternatives. Existing and proposed major infrastructure, as well as specific natural features, were considered important to protect and/or conserve. Table 4-3 describes these constraints, while Figure 4-14 displays them.

Table 4-3: Site Constraints

Feature	Constraint
Geotechnical	**Pond side slopes:** Stability analysis indicate that the pond side slopes should have a factor of safety of 1.5 against long term instability if inclined at 3 horizontal to 1 vertical (3H:1V), or flatter.
	Pond excavation: The floor of the excavation will consist of silty clay and glacial till below the groundwater level. These materials are sensitive to disturbance by construction traffic and ponded water. Excavation of the pond in one bench, with the equipment working from existing ground surface and not travelling within the excavation, may be necessary. This may affect the construction footprint.
	Pond floor: The bottom of the pond will consist of silty clay and glacial till. These materials are sensitive to disturbance by construction traffic and ponded water. If the pond floor needs to be trafficable, the bottom of the pond should be lined with a material such as rip-rap, a synthetic geocell erosion layer, or interlocking concrete blocks to minimize disturbance to the subgrade etc. A geotextile may also be required in addition to the materials mentioned above. This will affect the cost and excavation level.
	Margin between pond and surrounding buildings and structures: Edge of the pond should be located at least 50 m away from the nearest structures to minimize the impacts of the groundwater level lowering on the performance of these structures. 15 m margin is definite; and 15-50 m may be required.

Feature	Constraint
	Limited Capacity to firm silty clay deposit on site to accept additional load from outlet structure, pedestrian bridges without undergoing significant settlement. In case of bridges, it is possible that flatter pond side slopes would be required, which in turn would result in a longer bridge and higher foundation loads.
	Limited capacity of underlying unweathered silty clay to accept additional load from the weight of fill without undergoing significant consolidation settlement. Therefore, if settlement-sensitive buried services or other structures are present or proposed in the area of stockpiled material, the height of the stockpile will need to be limited in order to control the amount of settlement of the silty clay. A limit of about 2.8 m above existing ground surface where settlement is a concern has been identified.
	The soils at this site are highly frost susceptible and the foundations for the structure should therefore be provided with a minimum of 1.5 m of earth cover for frost protection purposes.
	Concerns about the status quo on south slope of the creek: the gabion wall, which forms a wing wall along the west side of the outlet, appears to be bulging/deforming. If the gabion wall is to be maintained as part of the pond design, a structural evaluation of its condition should be undertaken. The condition of the retaining walls and the condition of parking lot directly above the slope also brought to the City's attention. The drainage ROW is on this side of the reach.
Landscape and SAR	**National Interest Land and part of the City-wide pathway use designation:** Importance of maintaining the recreational pathway corridor.
	Rodent population: is a concern for reforestation. It will be important to maintain swales as rodent and fire breaks around the perimeter.
	Species at Risk: One Butternut tree is present along the northern border of the site. If it is naturally occurring, and a retainable tree it will be protected under the OESA and SARA.
	Tree Removals: removal of mature trees may be of concern to the users of the green corridor, which provides a pleasant contrast to surrounding commercial and residential development.
	Heavy soils making the selection of appropriate plant species an important task.

Feature	Constraint
Property Use and Easements	**Hydro Ottawa and Hydro One easements** occupy a considerable part of the site. Overhead lines are on the perimeter and do remove useable space from the site. However, because they are on the perimeter they do not appear to be as much of a constraint as the Hydro Ottawa buried, 13 kV east-west cables, which cross the middle of the site. Hydro Ottawa has indicated that grade changes in the vicinity of these cables would be highly restricted. Hydro Ottawa has provided rough estimates for an entire relocation (2012 dollars). All easement rights would need to be transferred to the new location at the property owners expense.
	Leased school play field extends into the area of interest: Communications with the school board in 2012 indicate that the school board would object to a loss of use of the property or encroachment of the pond on to the play field. Design will need to accommodate this land use.
Fluvial Geomorphic	**Connection channel poses a significant constraint to the design:** It is preferred to have the connection channel between the pond and Pinecrest Creek as an open watercourse feature; however the location of the connection will have an impact on the overall footprint of the pond. Considering the preliminary connection channel configuration to carry the threshold discharge (1.5 m bottom width, depth 0.33 m, top width 2.17 m and gradient 0.002 m/m), with an appropriate floodplain of 2 m on each side of the channel, the minimum width required would be 6.17 m. From the floodplain elevation to the top of ground elevation would require side slopes of 3:1 for safety reasons; this means that for every metre the floodplain is below the elevation of the surrounding ground (top of slope), an additional 6 m is required in corridor width. If the connection is made close to the existing creek outlet, a corridor with a top width of 33.5 m would be required; if the connection were made lower down the system near Baseline Road, a corridor with a top width of approximately 18.2 m is needed. Connection at a point approximately half way along the reach would require a corridor with a top width of approximately 28 m.
Stormwater Management	**Pinecrest Creek Outlet Elevation:** Based on the City's field survey, the invert of the 3000 mm x 1800 mm box trunk sewer that would be serviced by the proposed facility is at an elevation of 79.01 m to avoid permanent backup into the trunk sewer.
	Elevation of culvert crossing Woodroffe Avenue (downstream of the proposed facility): This culvert crossing elevation of 77.70 m will control the elevation to the lowest potential outlet invert for the facility.

Feature	Constraint
	Storm sewer configurations servicing the lands upstream of the proposed SWM pond: The Southwest Transitway Extension is located west of Woodroffe Avenue and south of Baseline Road. This area is serviced by the Woodroffe Trunk sewer, or by a dedicated system in the case of the Southwest Transitway Extension, which outlets to Pinecrest Creek downstream of the proposed pond. **Controlling stormwater from the existing residential developments, upstream of the proposed pond will provide a partial trade-off, of the flows from the future Baseline LRT/BRT and South West Transitway Extension to discharge uncontrolled downstream of Baseline Road.*.

*** NOTE:** The text in Table 4-3 has been updated from the 2015 JFSA original report for clarification

4.7.2 Opportunities

Just as the 2015 Feasibility Study identified a large number of constraints at the Study Area, it also identified opportunities to enhance some of the bio-physical and social components of the site. Table 4-4 describes these opportunities.

Table 4-4: Site Opportunities

Feature	Opportunity
Geotechnical	**Pond Construction: It is not considered necessary to line the pond.** This is due to the relatively limited rate of groundwater inflow into the pond (over long term once the groundwater level in the silty clay has been lowered to the permanent pool elevation of 79.0 m) and minimal loss of water from the pond through the native soils (due to relatively low hydraulic conductivities of sediments and the proposed permanent pool elevation relative to groundwater levels).
Landscape and SAR	**Evolving landscape and invasive species:** Realignment of the creek and the construction of the SWM pond could provide the stimulus for a redesign of the Western Corridor into a more interesting and usable property. The removal of invasive species and the use of native material in reforestation techniques would continue the philosophy of "ecological restoration" from the Pinecrest Creek Corridor projects.
	Potential for Interesting Site Design: Environmental restoration and additional recreational opportunities may be benefits of design. Wetland zones along the creek could provide habitat for additional bird species.
	Excavation material could be used on-site to create berms that would define more "intimate" areas for recreational activities such as picnic areas.
Property Use and Easements	**Enhancement of the site's contribution to the "Western Corridor"** in the NCC Urban Lands and the City's Open Space and Leisure Lands and City-wise Pathway.
Fluvial Geomorphic	**Maintain active channel length and low flows in Reach 6** (refer to SWM opportunities presented below)
Stormwater Management	**Maintain daylighted Reach 6:** In an off-line facility design, if the inlet and outlet pipes are located as close together along the creek as possible, this could minimize the length of channel that would be dry under low-flow conditions. An on-line facility would eliminate this concern, but would result in removal of a greater quantity of trees.
	Diversion of low flow amount to the existing upstream limit of the creek, allowing that flow to be conveyed downstream and meet the stormwater flow connection point.

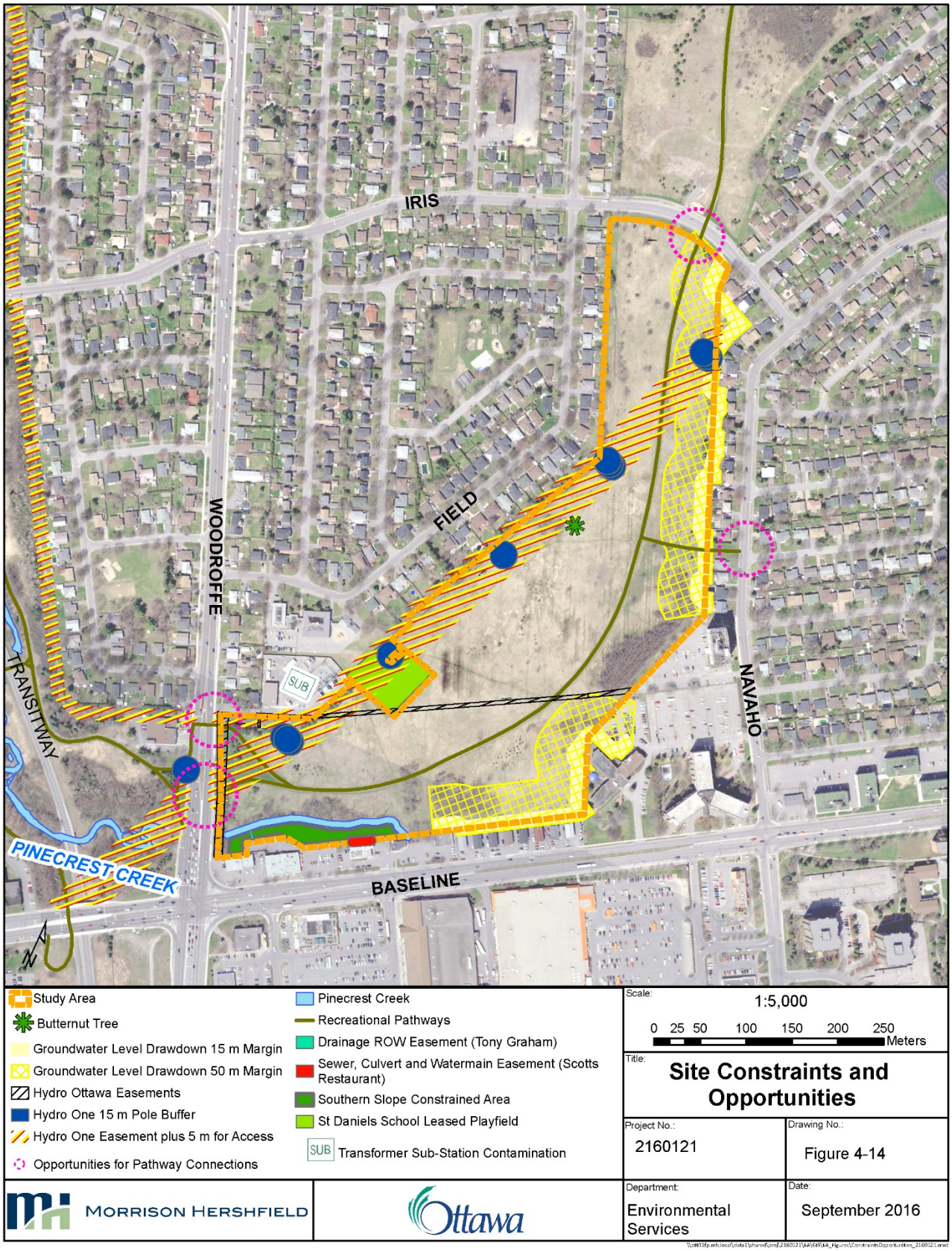


Figure 4-14: Site Constraints and Opportunities

5. ALTERNATIVE SOLUTIONS

The P/W SWM Retrofit Study (JFSA, 2011) provided a description of various SWM retrofit opportunities and retrofit plan scenarios for the Pinecrest Creek/Westboro Study Area (summarized below).

Lot level measures are SWM practices situated closer to the source of the stormwater runoff. Lot level/source controls can prevent pollutants from being picked up by runoff and can minimize the amount of off-site drainage. Though each lot (public or private) may be relatively small in size, the use of lot level practices on the sheer number of lots and properties in urbanized areas can combine to provide a powerful and effective means of controlling both the quantity and quality of water moving through an urbanized watershed. Examples of lot level measures for private and public lots include downspout disconnection/redirection, rain barrels and cisterns, rain gardens (bio-retention), and porous and permeable pavement/concrete.

Stormwater conveyance systems are the means by which stormwater is directed or conveyed from one location to another. Conveyance measures include drainage ditches and swales, and storm sewers. SWM measures along the conveyance route can include stormwater exfiltration systems, grassed swales, and pervious catch basins.

End-of-pipe facilities, the third line of protection (after lot level and conveyance measures), are larger scale SWM practices typically implanted within open spaces and greenways. Such areas have often been the venue for implementation of more conventional SWM methods such as settling ponds and detention basins. More recently, this has been expanded to include methods such as constructed wetlands and large sub-surface water retention structures. End-of-pipe facilities may include oil-and-grit separators (OGS), screening action types of OGS (Continuous Deflection Separation System) and wet-ponds.

5.1 Development of Alternatives

Definition of the lot level and conveyance SWM retrofit approaches was completed in the 2011 P/W SWM Retrofit Study (JFSA) by first selecting the most suitable and effective measures from a wide range of SWM lot level and conveyance controls. Suitability refers to the potential to implement the SWM measure throughout the SWM Retrofit Study Area and over the long-term, on both public and/or private lands. The end-of-pipe facilities considered included wet SWM ponds and oil-and-grit separators.

Selection of the potential retrofit scenarios (comprised of varying combinations of measures) was based on the feasibility of retrofitting the measures into the Study Area's various land uses and development types to get widespread application of the measures on public and private property.

The P/W SWM Retrofit Study (JFSA, 2011) completed an extensive screening process for end-of-pipe facilities (EoPs) to select potential locations, with a long list of 18 locations assessed. The locations were chosen across the Study Area, spanning a number of the main outfall contributors to both Pinecrest Creek and the Ottawa River. Locations were originally selected based on space availability, drainage area, and minimal nearby infrastructure. The long-list was then screened based on a number of factors including drainage inverts, space limitations, mature vegetation impacts, existing servicing conflicts and location access. Following the screening process, the P/W SWM Retrofit Study

determined six (6) locations within the Pinecrest Creek subwatershed and Westboro catchments could be considered potential locations for EoPs. Further details can be found in the Appendices of the P/W SWM Retrofit Study (JFSA, 2011).

Of the six (6) selected EoPs, five (5) are located on NCC lands within the creek corridor and along the shoreline of the Ottawa River. The NCC lands within the P/W Study Area are typically located at the main outfall locations of interest. NCC was consulted during the study to arrive at the six selected EoP locations, however, this short-list is subject to NCC approval and additional study prior to Implementation.

Figure 5-1 highlights the location of short-listed EoP potential locations (including the current Study Area as EoP16).

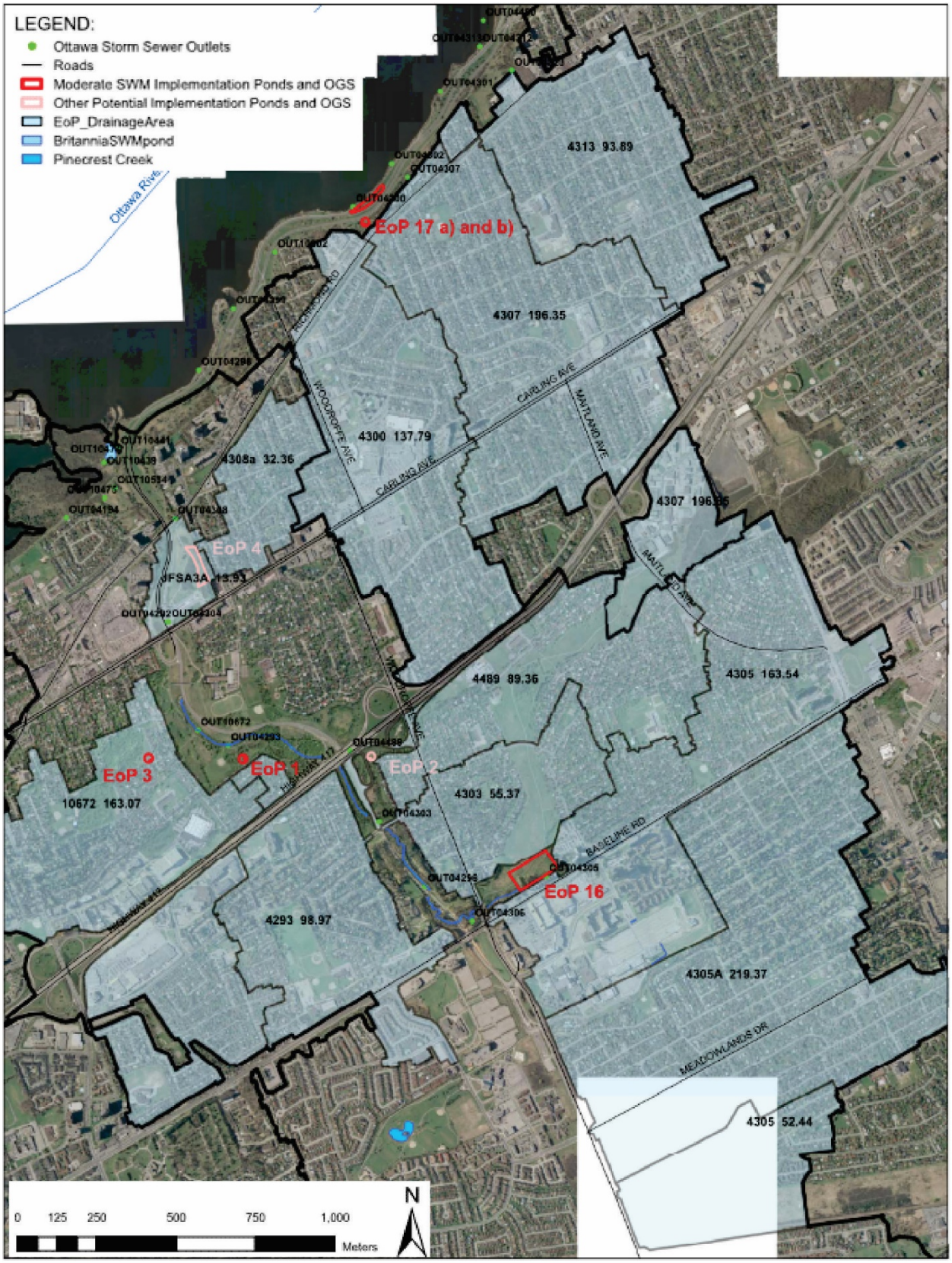


Figure 5-1: Short-Listed EoP Facility Locations

The selected SWM Measures, lot level, conveyance, and EoP facilities were used in various combinations to determine the alternative SWM Retrofit scenarios.

5.2 Description of Alternatives

Five (5) SWM retrofit scenarios were developed by JFSA (2011) to encompass a range of potential implementation levels for SWM measures within the study area. A primary consideration was the degree of "uptake" or the extent of implementation that can be expected. The uptake depends on a number of factors including acceptance (i.e., by private and public landowners), and feasibility.

The five SWM Retrofit Alternatives included:

1. Do Nothing (Existing Conditions)
2. Highest Practical (HP) SWM Implementation without End-of-Pipe Facilities
3. Highest Practical (HP) SWM Implementation with End-of-Pipe Facilities
4. Moderate SWM Implementation with End-of-Pipe Facilities
5. Public Property Only SWM Implementation with End-of-Pipe Facilities

5.2.1 Do Nothing (Existing Conditions)

The Do-Nothing Scenario was based on 2011 land use and storm drainage conditions, which included the very limited SWM that exists in the Study Area. Information on existing conditions was derived from City of Ottawa land use and infrastructure data and a series of lot level inventories was undertaken (JFSA, 2011). The Existing Conditions form the Study Area's baseline scenario, and reflects the impact of current practices. This scenario was used to determine areas where retrofit measures could be implemented for overall SWM improvements.

5.2.2 Highest Practical SWM Implementation without End-of-Pipe Facilities

The Highest Practical Implementation Scenario was composed of 2011 land use with the implementation of all the study's selected lot level and conveyance measures, but excluding the EoP facilities. "Highest Practical" indicates the highest level of implementation presumed to be feasible. This scenario provided an indication of the improvements achieved by implementation of lot level and conveyance measures only.

5.2.3 Highest Practical SWM Implementation with End-of-Pipe Facilities

The Highest Practical Implementation Scenario was composed of 2011 land use with the implementation of all the study's selected measures. "Highest Practical" indicates the highest level of implementation presumed to be feasible for lot level, conveyance and EoP facilities. The level of implementation of the EoPs, including OGSs and wet ponds was determined by the screening of possible EoP sites. As previously described, the sites were screened for space limitations, servicing conflicts, aesthetics, natural features and property ownership. Six (6) EoP sites were selected. The OGS were included for their water quality benefits and for their below ground installation, which allows for other uses of the ground surface.

5.2.4 Moderate SWM Implementation with End-of-Pipe Facilities

The Moderate Implementation Scenario was comprised of the same types of measures and EoPs as the Highest Practical with EoP Scenario, however, the extent of the implementation was at a "moderate" rather than "high" level. The Moderate Scenario implementation percentages were based on a 5-30% reduction from the Highest Practical Percentages. Four (4) of the six EoPs were selected for this scenario – one wet pond and one OGS less than the Highest Practical with EoP Scenario. The OGS were included for the benefits noted above.

5.2.5 Public Property Only SWM Implementation with End-of-Pipe Facilities

The Public Property Only Scenario include only measures located on publicly-owned lands. Public lands were defined as municipal, federal, provincial and local institutional (school board and school) lands. All EoPs are located on public lands; all the EoPs included in the Highest Practical Scenario are included in the Public Property Only Scenario. The implementation percentages used in this scenario were the same as those used in the Highest Practical Scenario. This provided an indication of the improvements that can be achieved without requiring participation from private landowners and individual homeowners. The OGS were included for the benefits noted above.

Table 5-1 summarizes the alternative SWM retrofit scenarios considered:

Table 5-1: Summary of SWM Measure Retrofit Alternatives (JFSA, 2011)

SWM Measures	Scenario: Highest Practical SWM no EoP	Scenario: Highest Practical SWM with EoP	Scenario: Moderate SWM with EoP	Scenario: Public Property Only with EoP
Lot Level Public	All Included	All Included	Some Included	All Included
Lot Level Private	All Included	All Included	Some Included	None Included
Conveyance	All Included	All Included	Some Included	All Included
End-of-Pipe (EoP)	None Included	6 Included: 3 OGS and 3 Wet Ponds	4 Included: 2 OGS and 2 Wet Ponds	4 Included: 2 OGS and 2 Wet Ponds

5.3 Evaluation Criteria

The evaluation process used by JFSA (2011) in the P/W Retrofit Study was developed to determine the preferred SWM Retrofit Alternative (Scenario). The evaluation included scoring and ranking the alternatives using the results of water quality, quantity and fluvial geomorphologic modelling, and the predicted ability of each alternative to reduce flood

risk, erosion impacts, runoff volumes and peak flows and pollutant concentrations and loads.

5.3.1 Water Quality Assessment

Water quality modelling was used to predict the relative effectiveness of each of the SWM Alternatives in mitigating the impacts of runoff on water quality within Pinecrest Creek, and at various storm sewer outfalls to the Ottawa River. The WinSLAMM water quality software program was used, with additional modelling completed to determine the relative impact of the SWM Alternatives on peak *E.coli* counts at Westboro Beach on the Ottawa River.

5.3.2 Water Quantity Assessment

Hydrologic modelling was used to predict the relative effectiveness of each Alternative in mitigating the impacts of runoff volumes and peak flows discharging to Pinecrest Creek (JFSA, 2011). SWMHYMO software was used for this modelling with each of the five scenarios being run for the 1:2 year to 1:100 year single events for the City of Ottawa and four (4) hour Chicago and twenty-four (24) hour Soil Conservation Service (SCS) design storm distributions.

Results from the hydrologic modelling (Table 5-2) were used by JFSA (2011) to determine the potential effects of the Alternatives on the creek geomorphology, the existing flooding concerns and the hydrologic cycle within Pinecrest Creek. Peak flows from the full range of design storms were used in the hydraulic modelling to determine the maximum water surface elevations and the associated flood risk along Pinecrest Creek.

Table 5-2: Hydrologic Cycle Indicator Results within Pinecrest Creek (JFSA, 2011)

Targets	Scenario: Do Nothing - Maintain Existing Conditions	Scenario : Highest Practical no EoP	Scenario: Highest Practical with EoP	Scenario: Moderate with EoP	Scenario : Public Property Only with EoP
Volume of the first 10 mm of runoff that is retained[1]	7.67 mm	8.22 mm	8.22 mm	7.86 mm	7.78 mm
Volume of the first 10 mm of runoff that is retained (x1000 m^3)	180 x 1000 m^3	194 x 1000 m^3	194 x 1000 m^3	185 x 1000 m^3	182 x 1000 m^3
Percent of First 10 mm that is retained	76%	82%	82%	78%	77%

Targets	Scenario: Do Nothing - Maintain Existing Conditions	Scenario : Highest Practical no EoP	Scenario: Highest Practical with EoP	Scenario: Moderate with EoP	Scenario : Public Property Only with EoP
Percent Improvement in retaining the first 10 mm of runoff compared to the Existing Conditions Scenario	0%	8%	8%	3%	1%
Percentage of Drainage Area over which the next 15 mm of runoff is detained[2]	0%	0%	25%	23%	25%
Decrease in Effective Impervious Area[3]	0 ha	124 ha	124 ha	55 ha	34 ha
Total Percent Impervious[4]	35%	32%	32%	33%	34%
Total Effective Percent Impervious[4]	28%	22%	22%	25%	26%

Note 1: The SWMHYMO results for total runoff volume from the 10 mm design storm event have been used.
Note 2: Only those drainage areas which are treated by wet ponds meet this criterion.
Note 3: Porous Pavement, downspout redirection and street narrowing decrease effective imperviousness,
Note 4: Replacing a pervious surface with a wet pond increases effective imperviousness.
The total percent imperviousness and effective percent impervious values are for both Pinecrest Creek only.

HEC-RAS software was used to generate water levels and determine the flood risk along the creek corridor (JFSA, 2011). All proposed Alternatives produce peak flows lower than the existing conditions. A wet pond that provides some level of quantity storage was included in three (3) of the proposed scenarios. As such, the

level of service (LoS[1]) provided by the Sir John A. Macdonald Parkway pipe is improved for some of the proposed alternatives.

Table 5-3 summarizes the resulting LoS provided by the SJAMP pipe for each Retrofit Alternative.

Table 5-3: Level of Service (LoS) of the Sir John A. Macdonald Parkway Pipe (JFSA, 2011)

Retrofit Scenario	LOS (Return Period)
Existing Conditions	2 year
HP SWM without EoP	2 year
HP SWM with EoP	10 year
Moderate SWM with EoP	10 year
Public Property Only with EoP	5 year

5.3.3 Fluvial Geomorphology Modelling

As outlined in the P/W Retrofit Study, the main assessment criteria for the physical functioning of Pinecrest Creek are related to erosion impacts (JFSA, 2011). This connection is important because under conditions of no stormwater management, rapid delivery of surface runoff to creeks via piped flow is a major contributor to erosion. In Pinecrest Creek, the lack of stormwater management has, over time, created an evolutionary cycle where the creek has responded to the delivery of stormwater with significant erosion.

Over the fullness of time, erosion in the creek has decreased in magnitude and extent as the creek has adjusted to flows incident upon it; however there are still erosion areas that have not completed the adjustment cycle, so the creek, while it remains in a state of flux, is not showing uncontrolled response to flows through erosion at this time.

Indicators of erosion assessed for the purposes of this study were:

- Sediment Regime and Size;
- Channel Stability;
- Erosion Potential; and
- Aquatic Habitat.

In terms of targets in the analysis, the following scoring criteria were used:

- Alternatives which have potential to improve habitat and increase fishery potential were scored high;
- Those which maintain existing conditions were scored medium; and
- Those alternatives which decrease habitat and fishery potential were scored low.

[1] Level of Service (LoS) defined as the highest return period a pipe can convey without resulting in flooding upstream

A methodology was developed to determine the potential impacts of the retrofit Alternatives based on the indicators (JFSA, 2011). The method involved:

1. Point-of-discharge for SWM flows directly to Pinecrest Creek;
2. Determination of runoff hydrographs for specific storm events;
3. Determination of representative cross-sections for analysis;
4. Grain size analysis of bed materials along Pinecrest Creek; and
5. Calculating change in indicators according to targets outlined above through direct quantification with respect to cross-sections and flows.

Calculations were completed on the following parameters as part of the overall analysis (JFSA, 2011):

- **Discharge:** Average, minimum and maximum discharge results were determined from the hydrographs to interpret change in peak flows and average flows. Peak flow change affects impact forces and sediment transport, while average discharge over the course of the hydrograph indicates change to cross-sectional area (wetted flow area) for the storm event.
- **Velocity**: Average, minimum and maximum velocity was determined from the flows at each cross-section. Peaks and average conditions affect sediment transport and erosion potential.
- **Depth**: Average, minimum and maximum depths for each cross-section was assessed to determine change in cross-sectional area. Depth is the actual depth of flow during each flow event.
- **Boundary Shear Stress**: Average, minimum and maximum shear for the cross-sections was analyzed; this is a factor in erosion potential, channel stability and sediment regime and size. Critical shear stresses for entrainment were also determined for the representative grain sizes indicated above.
- **Erosion Potential**: Average, minimum and maximum erosion potential for each of the representative grain sizes was determined to assess transport function and deposition of material in the sections. Erosion potential is the product of velocity and the relationship between boundary shear stress and critical shear stress for entrainment.
- **Exceedance of Critical Velocity**: Average, minimum and maximum for each of the representative grain sizes indicated above was determined to assess transport function and deposition of material in the sections. Exceedance is the product of critical velocity for entrainment (according to the Komar equation) and the modeled velocity in the channel at the cross-sections.

Analysis was completed for each of the representative cross-sections for hydrographs representing each of the flow Alternatives (JFSA, 2011) and a summary is provided herein.

By virtue of the fact that the upstream catchment contained a SWMP (EoP 16) in the model and that pond is responsible for significantly attenuating frequent peak event flows, the impact of that pond on flows at the upper end of the creek is significant (JFSA, 2011). Additionally, the impact is also a function of the specific storm event (JFSA, 2011).

Results from *upstream sections* can be summarized as follows. For the 10 mm storm:

1. Peak discharge decreases from existing by values ranging from 40% (HP SWM) to 96% (HP SWM with EoP), while average discharge over the entire hydrograph decreases by between 77% to 82%;
2. In-channel velocities decrease by 30% to 33% for the average hydrograph condition and to between 11% to 22% for peak discharges;
3. Depth of flow decreases by approximately 45% for all Alternatives under the average discharge condition, and decreases by between 16% and 78% for the peak discharge condition;
4. Decrease in shear stress under the average discharge condition is relatively consistent at approximately 46%, while under the peak discharge condition decreases range from 16% to 78%;
5. Erosion potential decreases significantly under all Alternatives by about 60%; and
6. Exceedance of critical velocity decreases under all Alternatives, indicating a potential depositional environment for all grain sizes prevails under these flow conditions.

For the 25 mm storm, each of these patterns is repeated, though there is a slight difference in the magnitude of decrease.

As distance from the upstream SWM pond increases, the magnitude of effect from that pond decreases, though the impact of other measures becomes apparent in the results.

As a means of comparison, the same storm results are presented for a representative *downstream section*. Summary results for the 10mm storm show:

1. Decrease in average discharge is on the order of approximately 80% from existing and between approximately 40% and 60% for peak discharge;
2. Velocity actually increases under two Alternatives (Moderate and Public Only) as more flow is contained in the channel cross-section and access to floodplain roughness is limited;
3. Decreases in flow depth are significant and support the result in item 2 above;
4. Boundary shear stress decreases by about 50% to 60% under average flow conditions and between 17% and 35% under peak flow conditions;
5. Erosion potential decreases for all grain sizes in the analysis; and
6. Critical velocity decreases in all cases except under the Moderate and Public Only Alternatives.

As with the upstream section, the pattern of results is consistent at the 25 mm flow event.

Analysis of the full range of results indicates that there are impacts created by the implementation of the proposed SWM measures extending from the upstream limit of the exposed channel to the downstream culvert at the Sir John A. Macdonald Parkway (JFSA, 2011).

5.4 Evaluation of Alternatives

The Evaluation of Alternative Scenarios completed by JFSA (2011) addressed five main considerations including:

1. Project Objectives and Targets
2. Social and Cultural
3. Natural Environment
4. Timing and Ease of Implementation
5. Costing

Each consideration was covered by a group of criteria and indicators. An overall scoring method was established to best capture the benefits and/or limitations of each alternative (JFSA, 2011). The scores used for the individual indicators are listed in order of the scores for the most beneficial to the least beneficial results: high (=3), medium (=2), low (=1) or none (=0).

The 2011 JFSA evaluation was divided into two steps: a numerical scoring, followed by a comparison of the Timing & Ease of Implementation and Costing. The criteria groups, individual criteria, indicators, indicator rationale and explanation of the scoring used for each indicator are outlined in Table 5-4. Weighting per category is listed in Table 5-5.

Table 5-4: Criteria and Scoring used for Alternative Evaluations (adapted from JFSA, 2011)

Category	Criteria	Indicators	Rationale	Scoring
Project Objectives	1) Flood Risk	Flood risk	With potential infill and redevelopment, there is a need to ensure flood risk to public health and safety and to property is not increased.	Scenarios that have the potential to reduce flood risk along the creek corridor are scored high; scenarios which result in no change to the flood risk along the creek corridor are scored medium; and scenarios which increase the flood risk along the creek corridor are scored low.
		Floodplain storage	Floodplain storage attenuates peak flows as the flood wave moves downstream through the system; maintaining this feature of the floodplain is important to avoid peak flow increases from future potential works within the corridor.	Scenarios which increase riparian storage volumes for 2 to 100 year events are scored high; scenarios which maintain existing conditions are scored medium; and scenarios which decrease riparian storage are scored low.
	2) Erosion Impacts	Sediment regime and size	Sediment sources and sediment transport need to be maintained in dynamic equilibrium to control loadings to reaches.	Scenarios that result in either an increase or decrease in sediment transport/mobility of 10 percent from existing are scored high, those that result in an increase or decrease between 10 and 20 percent from existing are scored medium, those that result in an increase or decrease of greater than 20 percent from existing are scored low.
		Channel stability	Channel stability is a function of time series flows and sediment regime, stabilizing bank features (e.g. woody vegetation, artificial hardening).	Scenarios that result in estimated change in cross-sectional area from existing of plus or minus 10% are scored high, those that result in estimated change in cross-sectional area from existing of plus or minus 20% are scored medium, and those that result in estimated change in cross-sectional area from existing of greater than 20% are scored low.
		Erosion potential	Erosion potential needs to be reduced to more natural levels to stabilize and reduce erosion damage and loss of riparian/floodplain lands. Maintain channel stability to protect municipal and NCC infrastructure, to reduce annual maintenance costs and increase longevity of infrastructure.	Scenarios that reduce erosion potential, damage, and loss of riparian/floodplain lands are scored high, those that maintain channel conditions are scored medium, and those that increase erosion potential, damage, and loss of riparian/floodplain lands are scored low.
		Aquatic habitat	Improve the quality and quantity of in-stream aquatic habitat. Improving the potential for a sustainable fishery is a longer term objective.	Scenarios which have potential to improve habitat and increase fishery potential are scored high; those which maintain existing conditions are scored medium; and those scenarios which decrease habitat and fishery potential are scored low.
	3) More Natural Hydrologic Cycle	Peak flows and runoff volumes for the 10 mm and next 15 mm storms	Reduce flashiness of runoff from the watershed. An increase in the "flashiness" represents the loss of water storage capability of soils and vegetation due to urbanization.[1] Retaining the first 10 mm storm and detaining the next 15 mm, will results in lower peak flows and runoff volumes.	Scenarios with the greatest retention and detention of runoff from first 10 mm and next 15 mm respectively are scored high; scenarios that retain and detain some runoff from first 10 mm and next 15 mm respectively are scored medium; scenarios that retain and/or detain the least amount of runoff from first 10 mm and next 15 mm respectively are scored low.
		Effective imperviousness (EI)	The degree of effective imperviousness can greatly impact the timing and amount of flows and pollutants entering the receiving watercourse.	Scenarios with the greatest decrease in effective impervious area from existing conditions are scored high; scenarios with some decrease are scored medium; those with little decrease in effective imperviousness are scored low; and those with no decrease are scored as none.
	4) Water Quality	TSS, TP	Targets are linked to achieving fish community targets, aesthetics and non-eutrophic conditions and avoiding the creation of in-situ contaminant concerns.	Scenarios that reduce TSS by 25mg/L or more from existing conditions, attain a TP concentration of 0.03 mg/L and reduce the total yield of both TSS and TP are scored high; scenarios that attain two of those three targets are scored medium; scenarios that attain one target are scored low; and scenarios that achieve zero targets are scored as none.

Category	Criteria	Indicators	Rationale	Scoring
	5) Runoff impacts on Westboro Beach	Instream *E.coli* (Ottawa River at Westboro Beach)	Setting targets to approach swimming beach PWQO in non-beach areas ensures that risks of contracting disease from incidental exposure to recreational waters are reduced (e.g. boating, water skiing, dock swimming)	Scenarios which result in at least 40% reduction in E. coli concentrations at Westboro Beach, or higher, are scored high; scenarios which result in at least 20% reduction in E. coli concentrations at Westboro Beach are scored medium; scenarios with less than a 20% but more than 0% reduction in *E.coli* concentrations at Westboro Beach are scored low; and scenarios with 0% reduction are scored as none.
	6) Natural Features	Riparian vegetation	The Enviro. Canada Habitat Guideline recommends natural vegetation within 30 m of a watercourse be retained or re-established on both banks for 75% of its overall length. (Target was developed at a watershed level and may not be appropriate to or achievable within an urban subwatershed.)	Scenarios that increase riparian vegetation are scored high, those that maintain the existing vegetation are scored medium, and those that reduce the existing features are scored low.
		Tree Canopy	Increased tree canopy in urban areas can reduce runoff volume by intercepting rainfall, particularly for small events.	Scenarios that increase tree canopy are scored high; scenarios that maintain canopy are scored medium; and scenarios that reduce it are scored low.
	7) Public Awareness	Increased public awareness	Increased public awareness will lead to greater success and uptake of SWM Retrofit Plan recommendations.	Scenarios that involve a high level of public awareness are scored high; scenarios that involve a moderate level are scored medium; and scenarios that involve a low level are scored low.
		Increased public involvement	Increased public involvement required for successful implementation of SWM retrofit.	Scenarios that involve a high level of public involvement are scored high; scenarios that involve a moderate level are scored medium; and scenarios that involve a low level are scored low.
Social / Cultural	Open Space / Parks	Adverse effects on parks and open space	Potential to have adverse effect on parks and open space.	Scenarios which have no adverse effects on parks and open space are scored as high; scenarios which have minimal adverse effects on parks and open space are scored medium; and scenarios which have the most adverse effects or remove parks and open space are ranked low.
Natural Environment	Terrestrial Systems	Impact on terrestrial habitat	Potential to impact terrestrial habitats or systems, including possible impacts on wildlife (including mammals, reptiles, birds) and terrestrial features/functions (including but not limited to designated features). This factor is intended to capture direct positive and negative impacts on natural terrestrial features, for example, by maintenance, physically building or habitat disturbances	Scenarios which Improve or have no impact on terrestrial habitats or systems are scored high; scenarios which have minimal impacts are scored medium; and those scenarios which have the most impacts on terrestrial habitats or systems are scored low.
	Aquatic Systems	Impact on aquatic habitat	Potential to impact aquatic habitats or systems, including possible impacts on aquatic life, features, and functions. This factor is intended to capture direct negative impacts through, for example, maintenance, physically building in or disturbing stream habitats, or wetlands.	Scenarios which improve or have no impact on aquatic habitats or systems are scored high; scenarios which have minimal impacts are scored medium; and scenarios which have the most impacts are scored low.
Timing / Ease of Implementation	Timing to Implement	Estimated implementation time	Length of time it will take until recommended retrofit strategy is implemented and operational.	Estimated time to implement shown per scenario.
	Degree of Control	Degree of implementation in public realm	Degree that the implementation of the scenario rests within the public realm in terms of: being maintained over time; authority to proceed.	Estimated time to implement shown per scenario.
Economic	Cost to Municipality and other Agency Landowners	Relative total cost	Total present value life cycle costs, which include operation and maintenance.	Estimated costs shown per scenario.

Category	Criteria	Indicators	Rationale	Scoring
	Cost to Private Landowners	Relative total cost of lot level component	Total present value life cycle costs for implementation of lot level measures	Estimated costs shown per scenario.

Table 5-5: Weight per Category

Category	Weight
Project Objectives	75
Social / Cultural	10
Natural Environment	15
Timing / Ease of Implementation	n/a
Economic	n/a
Total	*100*

5.4.1 Costing of Alternatives

In order to compare the costs of the Alternatives, a 50 year lifecycle cost analysis was undertaken (JFSA, 2011). For the purposes of the lifecycle cost exercise, a discount rate of 5% was applied for the lifespan of the SWM measure or installation. This value was chosen by JFSA to provide an estimate of lifecycle costs for the various Alternatives and is not an indicator of what the average discount rate over the next 50 years will be.

For this cost analysis, the capital cost, replacement costs and maintenance costs of all lot level, conveyance and end-of-pipe facilities were taken into account. A summary of the 50 year lifecycle costs for each Alternative is presented in Table 5-6 (JFSA, 2011).

Table 5-6: Summary of Total Scenario Costs for a 50 year Lifecycle (2010 dollars) (JFSA, 2011)

	Highest Practical SWM with EoP Facilities	Highest Practical SWM without EoP Facilities	Moderate SWM	Public Property Only
Present Value : Total Cost	$63,997,000	$49,312,000	$42,900,000	$30,739,000
Present Value : Maintenance Cost	$8,965,000	$7,379,000	$6,157,000	$4,362,000
Amortized : Maintenance Cost	$491,000	$404,000	$337,000	$239,000
Present Value : Capital Cost	$55,033,000	$41,933,000	$36,743,000	$26,317,000
Amortized : Capital Cost	$3,015,000	$2,297,000	$2,013,000	$1,442,000

5.4.2 Scoring and Ranking of Scenarios

Weighting of the evaluation criteria was applied to the scoring of the Alternatives (JFSA, 2011). In total, the project objectives comprised 75% of the weighting due to the scope of the environmental concerns and social factors addressed by those objectives. Weighting within project objectives was based on the relative significance of the criteria and indicators with respect to achieving the desired target or outcome and the impact that the Alternatives could potentially have with respect to that indicator. For example, producing a more natural hydrologic cycle within Pinecrest Creek was a salient objective for the SWM retrofit plan (JFSA, 2011). The parameters indicative of a more natural hydrologic cycle were assigned a relatively high weighting. While flood risk is very important from the public safety point of view, none of the Alternatives are predicted to have any potential to increase flood risk, so less weight is assigned for flood risk than other criteria that are directly addressed by each Alternative. The remaining Social/Cultural and Natural Environment criteria comprise 25% of the weighting.

The weighted scores for each indicator were calculated as follows:

(weighted score) = (indicator score) x (weight)

The total score for each Alternative is the sum of the Alternative's weighted scores for each indicator, where High = 3, Medium = 2, Low = 1, and None = 0. The highest total score is the highest rank.

5.4.3 Results of Scenario Scoring and Selection of Preferred SWM Scenario

The results of the Alternative numerical scoring are presented in Table 5-7 (adapted from JFSA, 2011). The modelling and assessment results upon which the indicator scores are based are also included in Table 5-7. The Alternative scores and ranking are presented in Table 5-8 (JFSA, 2011).

Table 5-7: Scenario Evaluation (Adapted from JFSA, 2011)

Category	Criteria	Indicators	Do Nothing - Maintain Existing Conditions: Result	*Score*	Highest Practical: Result	*Score*	Highest Practical with EoP: Result	*Score*	Moderate: Result	*Score*	Public Only: Result	*Score*	Weighting
Project Objectives	1) Flood Risk	Flood Risk	No Change in Flood Risk	2	No Change in Flood Risk	2	Potential to Decrease Flood Risk	3	Potential to Decrease Flood Risk	3	Potential to Decrease Flood Risk	3	5
		Flood Plain Storage	Maintains Flood Storage	2	Maintains Flood Storage	2	Maintains Flood Storage	2	Maintains Flood Storage	2	Maintains Flood Storage	2	
	2) Erosion Impacts	Sediment Regime and Size	Maintains Existing Conditions	3	Significant Decrease	1	Significant Decrease	1	Significant Decrease	1	Significant Decrease	1	3
		Channel Stability	Maintains Existing Conditions	2	Significant Decrease	1	Significant Decrease	1	Significant Decrease	1	Significant Decrease	1	5
		Erosion Potential	Maintains Existing Conditions	2	Significant Decrease	3	Significant Decrease	3	Significant Decrease	3	Significant Decrease	3	5
		Aquatic Habitat	Maintains habitat	2	Maintains habitat	2	Maintains habitat	2	Maintains habitat	2	Maintains habitat	2	2
	3) More Natural Hydrologic Cycle	Peak Flows and Runoff Volumes for the 10 mm and next 15 mm storms	10 mm Retention = 76 %, 15 mm Detention = 0 %	1	10 mm Retention = 82 %, 15 mm Detention = 0 %	2	10 mm Retention = 82 %, 15 mm Detention = 25 %	3	10 mm Retention = 78 %, 15 mm Detention = 23 %	3	10 mm Retention = 77 %, 15 mm Detention = 25 %	3	15
		Effective Imperviousness (EI)	Change = 0 ha	0	Change = -124 ha	3	Change = -124 ha	3	Change = -55 ha	2	Change = -34 ha	1	
	4) Water Quality	Total Suspended Solids (TSS)† and Total Phosphorus (TP)†	Change TSS = 0 %, Change TP = 0 %	0	Change TSS = -12%, Change TP = 13 %	1	Change TSS = -44 %, Change TP = -32 %	2	Change TSS = -37 %, Change TP= -26 %	2	Change TSS = -39 %, Change TP = -25 %	2	15
	5) Runoff impacts	Instream *E.Coli* (Ottawa River at Westboro Beach)	145 cts / 100mL (Change = 0%)	0	113 cts / 100mL (Change = -22%)	2	83 cts / 100mL (Change = -43%)	3	92 cts / 100mL (Change = -37%)	2	97 cts / 100mL (Change = -33%)	2	15
	6) Natural Features	Riparian Vegetation	No Change in Vegetation	2	No Change in Vegetation	2	No Change in Vegetation	2	No Change in Vegetation	2	No Change in Vegetation	2	5
		Tree Canopy	No Change in Canopy	2	No Change in Canopy	2	No Change in Canopy	2	No Change in Canopy	2	No Change in Canopy	2	
	7) Public Awareness	Increased Public Awareness	Low Level	1	High Level	3	High Level	3	High Level	3	Low Level	1	5

Category	Criteria	Indicators	Do Nothing - Maintain Existing Conditions: Result	*Score*	Highest Practical: Result	*Score*	Highest Practical with EoP: Result	*Score*	Moderate: Result	*Score*	Public Only: Result	*Score*	Weighting
		Increased Public Involvement	Low Level	1	High Level	3	High Level	3	Moderate Level	2	Low Level	1	
Social / Cultural	Open Space / Parks	Adverse effects on parks and open space	Minimal adverse effects	2	Minimal adverse effects	2	Most adverse effects	1	Most adverse effects	1	Most adverse effects	1	10
Natural Environment	Terrestrial Systems	Impact on terrestrial habitat	Minimal Impact	2	Minimal Impact	2	Most Impact	1	Most Impact	1	Most Impact	1	7.5
	Aquatic Systems	Impact on aquatic habitat	Minimal Impact	2	Minimal Impact	2	Minimal Impact	2	Minimal Impact	2	Minimal Impact	2	7.5
Timing / Ease of Implementation	Timing to Implement	Estimated implementation time	N/A	N/A	Significant Time Required	N/A	Significant Time Required	N/A	Moderate Time Required	N/A	Moderate Time Required	N/A	N/A
	Degree of Control	N/A	Completely in Public Domain	N/A	Slightly in Public Domain	N/A	Moderately in Public Domain	N/A	Moderately in Public Domain	N/A	Completely in Public Domain	N/A	N/A
Economic	Cost for works on public property (City, NCC, public institutions)	Total present value lifecycle costs	Costs (tangible and intangible) associated with existing water quality, flooding, erosion problems and beach closures.	N/A	$16,000,000	N/A	$31,000,000	N/A	$21,000,000	N/A	$31,000,000	N/A	N/A
	Cost for works on private property (residential and non-residential)	Total present value lifecycle costs	No cost	N/A	$33,000,000	N/A	$33,000,000	N/A	$22,000,000	N/A	No cost	N/A	N/A

† The values shown for existing conditions are the total yields (and percent change) of suspended solids and total phosphorus.

Table 5-8: Alternative Numerical Scores and Ranking (JFSA, 2011)

Scenario	Overall Score	Rank	50 Year Lifecycle Cost
Do Nothing - Maintain Existing Conditions	116	5	N/A
Highest Practical SWM without EoP	195	2	$49 M
Highest Practical SWM with EoP	217	1	$64 M
Moderate SWM with EoP	192	3	$43 M
Public Property Only with EoP	177	4	$31 M

As would be expected, Highest Practical SWM with EoP Facilities has the highest numerical score and the Do Nothing option the lowest numerical score. Based on these scores, the Do Nothing Alternative was eliminated as it does not meet most objectives and targets.

The assessment and scoring process also revealed that with the full implementation of the remaining Alternatives there is a potential for adverse impacts on the Pinecrest Creek channel stability and the sediment regime.

The predicted impacts on Pinecrest Creek are based on the results of modelling the SWM ponds, including EoP16 (Baseline/Woodroffe SWMP), to optimize water quality benefits (JFSA, 2011). It was concluded that in order to address the potential creek impacts, the final configuration of the pond and its outflow will be designed to balance the water quality with the need to avoid destabilizing the creek (JFSA, 2011). However, in order to realize the greater water quality benefits, the EoP facilities would need to be part of the SWM retrofit implementation. Therefore, the preferred Alternative would be selected from the Highest Practical SWM with EoP, the Moderate and the Public Property Only Alternatives. This eliminated the Highest Practical without EoP Alternative.

Of the three Alternatives with EoP, the Public Property Only Alternative was eliminated based on its lower score and ranking.

The Timing & Ease of Implementation and Costing criteria were then considered for the selection of the Preferred Retrofit Alternative from the two remaining Alternatives: the Highest Practical SWM with EoP and the Moderate (JFSA, 2011).

- Timing to Implement: A more moderate amount of time is required for implementation of the Moderate Alternative as compared to the significant time of implementation required for the Highest Practical SWM with EoP Alternative.

- Degree of Control: The degree of control is comparable between the two Alternatives.
- Costing: The Highest Practical SWM with EoP Alternative has much higher projected costs than the Moderate SWM Alternative. In addition, the Moderate SWM Alternative has the potential of being more cost effective than the Highest Practical SWM with EoP Alternative based on the results versus targets achieved.

To determine the relative cost versus benefit ratio for each Alternative, the total costs were converted to a unit cost per kg, number of bacteria or m^3 of pollutant (TSS, Total Phosphorous (TP), E.coli, and Runoff Volume) removed (JFSA, 2011). Based on this analysis, the Moderate SWM Alternative is more cost effective than the Highest Practical SWM with EoP.

Based on the results of this second step of the alternative evaluation, the Moderate SWM Alternative was selected as the preferred SWM Retrofit Scenario for the Pinecrest Creek/Westboro Study Area (JFSA, 2011).

6. PREFERRED ALTERNATIVE

The Preferred SWM Retrofit Plan was determined to be the "Moderate SWM Scenario" (JFSA, 2011). The 2011 P/W SWM Retrofit Study identified EoP facilities at 4 locations. The proposed SWMP was identified as EoP 16 and as a wet pond at outlet 4305, where Pinecrest Creek starts to daylight north of Baseline Road. JFSA completed a Feasibility Study for the preferred Moderate SWM Alternative as detailed below (JFSA, 2015).

6.1 Southwest Transitway Design (2011)

JFSA (2015) describes an overview and brief analysis of the results presented by the Southwest Transitway design team in the winter of 2011. The SWM option for the Transitway was comprised of underground storage tanks to contain and release 4,000 m^3 of runoff from the Southwest Transitway Extension project (Baseline to Norice) under the north section of Transitway from Baseline Road to Navaho Drive (JFSA, 2015). The volume of water to be stored was calculated using the design criteria of the Pinecrest/Centrepointe Stormwater Management Criteria Study (JFSA, 2010).

JFSA determined that although the storage tanks would meet the design criteria, there were concerns regarding the estimated capital costs and about accessing and maintaining the tanks under an active Transitway (JFSA, 2015). A SWMP in the proposed location (Class EA Study Area) would provide a more suitable SWM solution for the Southwest Transitway Extension, and would provide more benefits for Pinecrest Creek (JFSA, 2015).

6.2 Requirements and Specifications

The SWMP specifications have been determined by JFSA as part of the 2015 Feasibility Study. These specifications have been dictated in part by the hydrology of the tributary area, existing sewershed infrastructure and by the SWM objectives the facility is to meet. This includes standard SWMP specifications set out by Ontario's Ministry of the Environment and Climate Change (MOECC) (formerly the Ministry of the Environment) and the results of the fluvial geomorphic analyses. The main components outlined are the wet pond requirements, the pond inlet and outlets, the forebay, the active storage characteristics, and maintenance and operations.

Additionally, the requirements for in-stream works and a description of how the interface between the proposed SWMP and the existing creek will look is provided (JFSA, 2015). This description from the 2015 Feasibility Study considers the physical and fluvial geomorphological characteristics of Pinecrest Creek given it is the receiving watercourse from the proposed pond. Refer to Appendix G for details.

6.3 Feasibility of the Preferred Alternative (JFSA, 2015)

The 2015 Feasibility Study completed background information and field investigations; analysis and impact assessment; concept designs; and costing. The analysis and assessment as well as the alternatives, as developed by JFSA for the Study Area, are presented below. The site information and constraints identified in Section 4, were taken into account in this work (JFSA, 2015).

6.3.1 Modelling Quantity and Quality Control

The analysis and impact assessments included modelling to assess the potential quantity and quality control that could be provided by the proposed SWMP and to assist in the assessment of the fluvial geomorphic impacts of the proposed pond. A set of scenarios (Existing Conditions; Southwest Transitway Extension with on-site Controls and no pond; Southwest Transitway Extension with no on-site controls and with the pond, etc.) were used for the assessments. The Southwest Transitway Extension drainage area modelled represented the ultimate extension to Hunt Club so as to provide a more conservative approach for the analysis.

The results of the modelling analysis and assessment (hydrologic and hydraulic) indicated that a surface SWMP constructed at the subject site, according to noted specifications, could meet the technical objectives, including:

- Receive runoff and provide a level of control for all storm events up to the 100-year, considering the interactions with Pinecrest Creek;
- Remove in excess of 60%, potentially close to 80%, of the suspended sediments from the collected runoff;
- Provide sufficient 100-year peak flow attenuation to provide a net peak flow reduction compared to the proposed underground tanks below the Southwest Transitway Extension; and
- Provide a reduction in erosion potential along Pinecrest Creek.

Therefore, it would be feasible to construct a surface SWMP at the subject site to meet these hydrologic and hydraulic objectives.

It was also noted in the fluvial geomorphic impact analysis that:

- Implementing the SWMP as proposed will create a minimal construction impact and that impact is mitigable at the inlet and outlet sites and may at this high level of assessment, result in some sedimentation upstream of the Iris Street culvert.
- The Iris Street culvert, the first main culvert crossing downstream of the proposed SWMP, is oversized for flows and also experiencing sedimentation under existing flows and sediment transport regimes. Removal of the fine sediment through operation of the pond will theoretically decrease the amount of in-channel sediment moving through the system and depositing at the culvert; however Pinecrest Creek continues to be a highly-erosive system with considerable adjustments to past flows, which have not stabilized. The decrease in flow energy through operation of the pond will lessen the existing erosion potential along the creek to a certain extent but it will not halt the erosion. Therefore, it is anticipated that during the initial operation of the pond there will be a corresponding decrease in sediment available for deposition at the Iris Street culvert, however the sediment that is removed from the system by the pond will eventually be picked up again from the bed and banks and a return to sedimentation conditions will occur at the culvert. That said, the decrease in flows will cut the in-channel erosion that will occur due to the loss of sediment in

the pond, and sedimentation at the culvert at Iris Street will be less than currently occurs.

The Pond discharge location and release rates should be revisited during detailed design based on updated modelling of the erosion thresholds in the creek t (JFSA, 2015).

6.4 SWMP Conceptual Design Options (JFSA, 2015)

JFSA produced two concept options for the SWMP, referred to as Option 1 and Option 2 (2a and 2b). Both options meet the appended requirements and specifications and accommodate the constraints identified in Section 4.7.1. The wet pond facility outletting to Pinecrest Creek has been designed to maximize water quality and flood control benefits while minimizing negative impacts to the fluvial geomorphic conditions of the creek.

6.4.1 Conceptual Design Option 1

Option 1 consists of one pond that contains the various SWMP components; inlet, forebay (cell 1), permanent pool, active storage area and outlets. An internal diversion berm located in the middle of the pond, along the pond's long axis, would provide separation to prevent the short-circuiting of water movement in the pond. Another berm would be located at the downstream end of the forebay.

There is one (1) inlet to the pond from the creek. The inlet is located approximately 10 m downstream of the Baseline Trunk Sewer outfall as prescribed. There are two (2) outlets: the low flow/quality control outlet and the quantity control outlet.

The elevation and approximate dimensions of Conceptual Design Option 1 pond features are outlined in Table 6-1.

Table 6-1: Elevation and Approximate Dimensions of Conceptual Design Option 1

Feature	Dimensions (Approximate)	Elevation
Forebay	Bottom: 150 m long and 25 m wide Maximum depth: 3 m	-
Permanent Pool	Area: 2 ha Volume: 34,000 m^3 Maximum depth: 1.5 m, 3 m in forebay	78.90 masl
Diversion Berm	-	79.75 masl
Forebay Berm	-	Top: 78.70 masl

Feature	Dimensions (Approximate)	Elevation
Active Storage	When at 80.15 m, volume 27,500 m^3	Fluctuates between 78.90 to 80.15 masl
Inlet	Equivalent to: 5 m x 1 m box culvert Length: 34 m	Invert elevation: 79.00 masl
Low Flow/Quality Control Outlet Pipe	Equivalent to: 315 mm dia, circular orifice and a 450 mm diameter, 60 m long pipe	Invert elevation: 78.90 masl
Quantity Control Outlet Box Culvert	Equivalent to: 2.4 m x 1.2 m box culvert Length: 75 m	Invert elevation: 79.61 m

A maintenance route is included in the concept design.

The landscape features incorporated in Concept 1 include:

- **Landscaped areas around pond**: areas of meadow and mown grass, reforestation planting, large tree planting and shrub planting. Some of the existing vegetation is incorporated into the plan. The site would be re-graded, 1) to reduce the need for costly exporting of excavated materials from the site and, 2) to provide landforms used to screen surrounding commercial and residential development.
- **Realignment of recreation pathways**: Pathways will circumvent the pond and may provide for viewing across the pond and access to informal “activity” areas occur along the recreational path.
- **Pond**: edge of pond treatment includes placement of boulders at the edge of the water, geotextile and stabilization planting. Bioengineering techniques would be used to provide additional stabilization of the slopes.
- **Maintenance**: a maintenance plan would be developed to ensure the on-going sustainability of the landscape.

Concept Option 1 also addresses the site constraints and uses the opportunities identified in Section 4.7.

6.4.1.1 Cost Estimate for Conceptual Design Option 1

Estimates of the capital costs (in 2012 dollars) to construct the Conceptual Design Option 1 SWMPincluding excavation costs, outlet and inlet construction, creek alterations costs and a budget estimate for landscape elements are identified in Table 6-2.

Table 6-2: Cost Estimate for Conceptual Design Option 1

SWM Facility Component	Cost Estimate (2012 Dollars)
Pond Excavation and Construction	$4,640,000
Edge of Pond Treatment	$152,000
Landscaping of Surrounding Area	$2,308,000
Relocation of Hydro Ottawa 13 kV for Option 1	$760,000
Inlet to Pond from Creek	$284,000
Quality / Low Flows Control Outlet	$74,000
Quantity Control Outlet	$184,000
Estimated Costs for Concept Option 1	**$8,402,000**
25% Contingency	$2,100,000
Total Estimated Cost with 25% Contingency	**$10,502,000**

A major cost associated with Option 1 is the relocation of Hydro Ottawa's buried 13 kV cables (2) to circumvent the pond.

Figure 6-1: Landscape Concept - Option 1 (JFSA, 2015)

6.4.2 Conceptual Design Option 2 (2a and 2b)

In Conceptual Design Option 2 (2a and 2b) the SWMP is divided into three (3) cells. The cells are organized to form the various SWMP components as follows: cell 1 is the forebay and part of the permanent pool, and cells 2 and 3 form the remainder of the permanent pool.

In Option 2a, cells 1 and 3 are connected to cell 2 by two (2) large buried culverts. In Option 2b the cells are connected by two (2) open channels with a recreational pathway bridge crossing over the channels. The buried Hydro Ottawa cables are accommodated through this separation of the three (3) pond cells. In Option 2a the connection culverts pass several metres below the cables.

The dimensions and elevations of Options 2a and 2b are presented in Table 6-3.

Table 6-3: Elevation and Approximate Dimensions of Conceptual Design Options 2a and 2b

Feature	Dimensions (Approximate)	Elevation
Forebay	Bottom: 150 m long and 25 m wide Maximum depth: 3 m	-
Permanent Pool	Area: 2 ha Volume: 33,000 m^3 Maximum depth: 1.5 m, 3 m in forebay	78.90 masl
Diversion Berm	-	79.75 masl
Forebay Berm	-	Top: 78.70 masl
Active Storage	When at 80.15 m, volume 27,500 m^3	Fluctuates between 78.90 to 80.15 masl
Option 2a Only: Buried Culverts Connecting Cells 1, 2 and 3	Equivalent to: two 975 mm dia. circular Length: 30 m	-
Option 2b Only: Bridge Over Open Channels Connecting Cells 1, 2, and 3	Span: 20 m	-
Inlet	Equivalent to: 5 m x 1 m box culvert Length: 34 m	Invert elevation: 79.00 masl
Low flow/quality control outlet pipe	Equivalent to: 315 mm dia, circular orifice and a 450 mm diameter, 35 m long pipe	Invert elevation: 78.90 masl
Quantity control outlet box culvert	Equivalent to: 2.4 m x 1.2 m box culvert Length: 60 m	Invert elevation: 79.61 m

A maintenance route is included in the concept design.

The landscape features incorporated in Concept 2 (2a and 2b) include:

- **Landscaped Area Around Pond**: Areas of meadow and mown grass, reforestation planting, large tree planting and shrub planting. Some of the existing vegetation is incorporated into the plan. The site would be re-graded, 1) to reduce the need for costly exporting of excavated materials from the site and, 2) to provide landforms used to screen surrounding commercial and residential development.
- **Realignment of Recreation Pathways**: Pathways pass in between the cells either across the causeway over the buried culverts (Option 2a) or across a bridge (Option 2b). Vistas are provided for viewing across the pond and informal "activity" areas occur along the recreation path.
- **Pond**: Edge of pond treatment includes placement of boulders at the edge of the water, geotextile and stabilization planting. Bioengineering techniques would be used to provide additional stabilization of the slopes.
- **Maintenance:** A maintenance plan would be developed to ensure the on-going sustainability of the landscape.

Options 2a and 2b also address the site constraints and uses the opportunities identified in Section 4.7.

6.4.2.1 Cost Estimate for Conceptual Design Option 2 (2a and 2b)

Estimates of the capital costs (2012 dollars) to construct Conceptual Design Option 2a or 2b SWMP including excavation costs, outlet and inlet construction, creek alterations costs and a budget estimate for landscape elements are outlined in Table 6-4.

Table 6-4: Cost Estimate for Conceptual Design Option 2 (2a and 2b)

SWM FACILITY COMPONENT	COST ESTIMATE (2012 DOLLARS)
Pond Excavation and Construction	$4,311,000
Edge of Pond Treatment	$152,000
Landscaping of Surrounding Area	$2,316,000
CONNECTION BETWEEN CELLS 1 AND 3 AND CELL 2	
Option 2a – Buried Culvert Connection between Cells 1 and 3 and Cell 2	$191,000
Option 2b – Open Channel Connection with Bridge between Cells 1, 3 and 2	$380,000

SWM FACILITY COMPONENT	COST ESTIMATE (2012 DOLLARS)
Inlet to Pond from Creek	$284,000
Quality / Low Flows Control Outlet	$69,000
Quantity Control Outlet	$155,000
Estimated Costs for Concept Option 2a (buried culverts as cell connection)	**$7,478,000**
25% Contingency	$1,870,000
Total Estimated Cost for Option 2a with 25% Contingency	**$9,348,000**
Estimated Costs for Concept Option 2b (open channels with bridge)	**$7,667,000**
25% Contingency	$1,917,000
Total Estimated Cost for Option 2b with 25% Contingency	**$9,584,000**

The major cost differences between Options 2a and 2b are due to the bridge over the open channels and the rerouting of Hydro Ottawa's buried 13 kV cables (2) through the bridge, both required for Option 2b.

Hydro Ottawa has noted that taking the cable into the bridge would present security, maintenance and access issues, and therefore Hydro Ottawa does not consider that aspect of Option 2b to be feasible (JFSA, 2015).

Figure 6-2: Landscape Concept - Option 2

6.4.3 Stormwater Inlet and Outlet Connections to Pinecrest Creek

Connecting the proposed SWMP to Pinecrest Creek requires specific design elements. Flow exiting the quality and quantity pipes will undergo flow expansion at relatively high velocities during pond drawdown in response to storm events.

The existing "flashy" nature of of the Pinecrest Creek subwatershed's runoff response will be buffered to a certain extent by the pond. This means that as the pond drains, there will be less flow in the creek to diminish outlet velocities through mixing with creek flow. As a consequence, erosion of the outlet connection and local banks at the discharge points needs to be addressed.

Erosion is addressed through the nature of the connection relative to creek flow as well as through lining the outlet channel with stable stone material to limit/entrainment/erosion.

6.4.3.1 Pond Outlets and Connection to Pinecrest Creek

The connection between the quality control outlet pipe and Pinecrest Creek will be made across a rock-lined channel segment which is blended into the existing banks of the creek. The width of the segment will be 1.0 m wide centered on the centerline of the culvert, with 0.275 m overlap on each side. This allows for protection from recirculation scour under conditions where the culvert is flowing at capacity. Where the outlet channel meets the creek the stone will be knitted into the existing bank and will make a smooth transition to the bed of the creek in order to minimize the potential for knickpoint development.

Based on the substrate sizing criteria for the quality control, the outlet channel should be comprised of rounded riverstone with a D_{50} of 35 mm and a maximum diameter of 50 mm.

The connection between the quantity control outlet pipe and Pinecrest Creek will be made across a rock-lined channel segment which is blended into the existing banks of the creek. The width of the segment will be 4.80 m wide centered on the centerline of the culvert, with a 1.2 m overlap on each side. This allows for protection from recirculation scour under conditions where the culvert is flowing at capacity. Where the outlet channel meets the creek the stone will be knitted into the existing bank and will make a smooth transition to the bed of the creek in order to minimize the potential for knickpoint development.

Based on the substrate sizing criteria for the quantity control, the outlet channel should be lined with rounded riverstone with a D_{50} of 160 mm and a maximum diameter of 175 mm.

Connection of the quantity and quality control outlet channels should be between 30 and 60 degrees to the flow so that the outlet flow is entering the channel in the downstream direction.

Figure 6-3 illustrates a schematic showing the general orientation of the outlet channel connections with Pinecrest Creek.

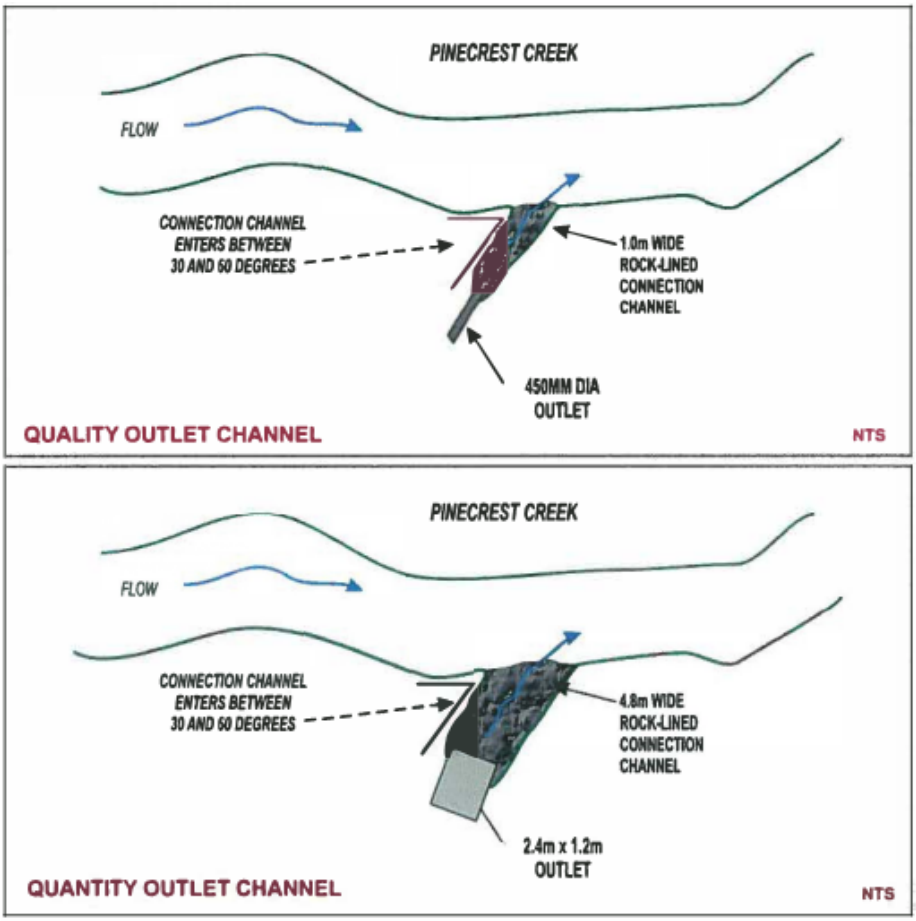


Figure 6-3: General Orientation of the Outlet Channel Connections with Pinecrest Creek (JFSA, 2015)

6.4.3.2 Rehabilitation of Creek Reach

All of the concept options require that the existing gabion basket wall on the east side of Pinecrest Creek be removed and the banks regraded to a natural configuration. This eliminates the long-term maintenance cost of the gabions and naturalizes the bank, removing the vertical drop between the top of the baskets and the bed of the creek.

7. PUBLIC CONSULTATION

7.1 Online Information Session

The first public consultation introduced the project, the EA process, existing conditions and constraints of the site, the pond options, and the next steps. This consultation was in the form of an online information session, where participants could read information about the project and provide feedback through a questionnaire. The session was available for viewing and feedback from November 3, 2016 until January 16, 2017.

The online information session material is provided in Appendix B and includes the notices and questionnaire.

7.1.1 Notification

Notice of the online information session was circulated through several forms of media, including:

- Email from the City of Ottawa project manager to those on the email list
  - *November 3, 2016*
- Project website
  - Ottawa.ca/baselinewoodroffepond
- City of Ottawa Planning and Development e-newsletter
  - *November 16, 2016*
- Local Newspapers:
  - Le Droit
    - *November 3, 2016*
    - *November 10, 2016*
  - Nepean-Barrhaven News
    - *November 3, 2016*
    - *November 10, 2016*

7.1.2 Participation

There were 98 responses to the online questionnaire, of which 55 noted their address. Figure 7-1 illustrates the distribution of participants and indicates that the majority of people who responded to the questionnaire and noted their address live in close proximity to the project area.

Figure 7-1: Online Information Session Participant Distribution

7.1.3 Comments and Questions

Viewers were provided the opportunity to fill out an online questionnaire at the end of reading the project information. As mentioned, there were 98 responses to the questionnaire. Figure 7-2 and Table 7-1 summarize the comments, concerns and values identified by participants. An “As We Heard It” report was generated which summarized the feedback received from the questionnaire and public meeting. This was posted on the project website and provided to all on the study mailing list.

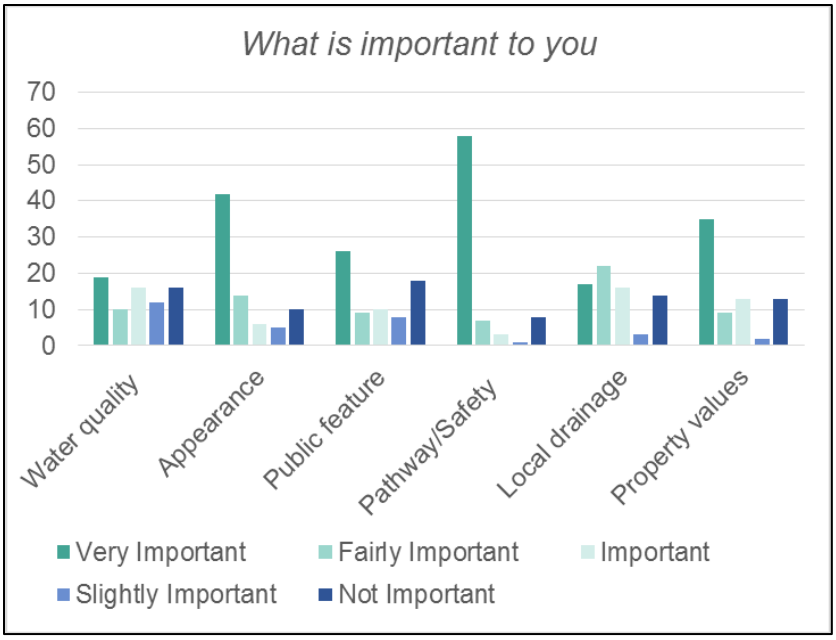


Figure 7-2: Findings from What Is Important To You Survey in Questionnaire

Table 7-1: Summary of Comments and Responses from the Online Information Session

Comments and Concerns	Response
Background Information and Decision Making Process Justification for the pond and its proposed location	This project is following through on the recommendations from the SWM Retrofit Study (2011) and Feasibility Study (2015), which describe the purpose, the stormwater management alternatives, and the evaluation of the alternatives, and are available for review at this link: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
Consultation and Notification Insufficient and inadequate notification to date	In response to the comments received from the Online Consultation, this public meeting is being held to provide additional information and respond further to comments and concerns. All those on the study mailing list and all properties directly abutting the proposed site of the pond were directly notified in addition to ads placed in local newspapers.
Recreation Protection and enhancement of pathways for pedestrians and cyclists Opportunity for complementary community uses	When completed, pedestrian pathways will be incorporated and connected to City of Ottawa pathway and NCC Capital Pathway networks. Complementary community uses may be considered at the detailed design stage.

Comments and Concerns	Response
Natural Environment and Creek Health Enhance the natural habitat for native wildlife and vegetation	The proposed options have taken into account the protection and enhancement of the creek. Landscaping will incorporate native species and provide natural greenspace and habitat.
Safety, Human Health and Comfort Undesirable byproducts of stagnant water Risks associated with an unsupervised body of water and the proximity to vulnerable populations	The pond will provide sufficient water movement (due to wind activity as well as continuous flow from a large inlet storm sewer) to discourage mosquitoes and avoid excessive odours. Safety must always be addressed in any stormwater management pond that the City constructs. Typical approaches include clear signage at key locations regarding the function of the pond and the use of plantings to actively discourage access to the open water. Ponds are also provided with “gentle” side slopes near and below the water surface. In a worst case scenario, if someone does slip and fall into the water, the flatness of the slope and the shallow water depths near the edge of the pond ensure one can readily climb out.
Pond Operation and Drainage Concern that existing drainage issues will worsen Maintenance of pond	The site will be re-graded and drainage will not negatively impact adjacent properties. The City will be responsible for regularly maintaining the facility and ensuring that it functions properly.
Property and Residences Decreased property values Concern that litter will worsen	Based upon experience with SWM ponds throughout the City, the environmental, aesthetic, and recreational benefits of these types of facilities have made them valued community assets.

7.2 Public Meeting # 1

The second public consultation introduced the same concepts as the online information session, as well as a discussion of the concerns raised by the public to that point. This consultation was in the form of a public meeting which allowed attendees to learn about the project by circulating to view exhibits, listen to and view a presentation, speak with project team members one-on-one, and ask questions to the project team as a panel. Copies of the online questionnaire were available for attendees to complete and return to the project team.

The public meeting was held in the Council Chambers at Ben Franklin Place on January 9, 2017.

The public meeting material is provided in Appendix B, and includes the notices, PowerPoint presentation, project information bulletin, display boards, and questionnaire.

7.2.1 Notification

Notice of the public meeting was circulated through several forms of media, including

- Email from the City of Ottawa project manager to those on the email list
  - *December 15, 2016*
- Direct mail-out to all properties abutting the site of the proposed pond
- Project website
  - Ottawa.ca/baselinewoodroffepond
- City of Ottawa Planning and Development e-newsletter
  - *December 19, 2016*
- Local Newspapers:
  - Le Droit
    - *December 15, 2016*
    - *January 5, 2017*
  - Nepean-Barrhaven News
    - *December 15, 2016*
    - *January 5, 2017*

When asked in a follow-up survey how they had heard about the public meeting, 8 attendees responded. The majority of the attendees who responded to the survey indicated that they were notified by direct mail out (see Figure 7-3).

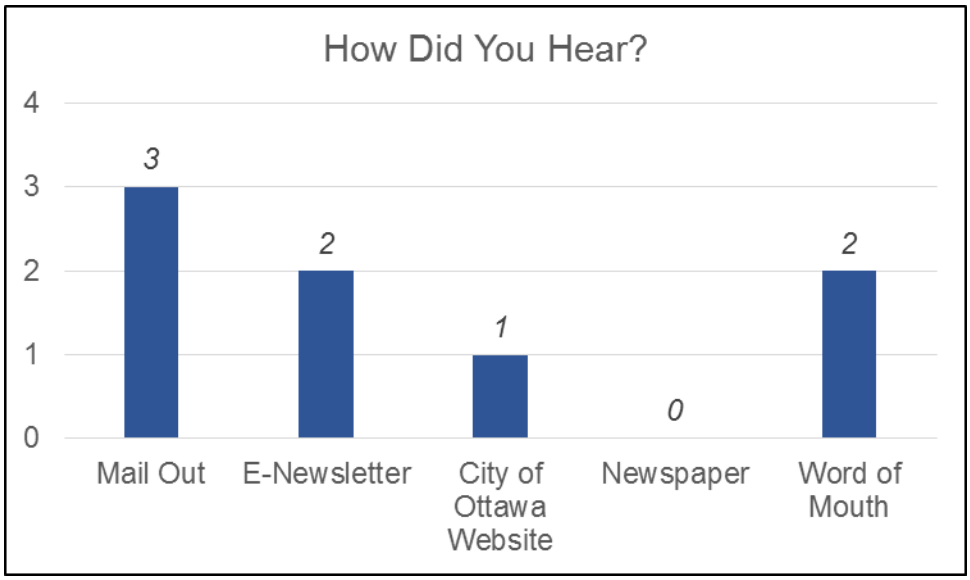


Figure 7-3: Methods of Notification for Public Meeting

7.2.2 Participation

There were 49 people who signed in at the public meeting. Figure 7-4 illustrates the distribution of attendees and indicates that the majority of people who attended the public meeting live in close proximity to the project area.

Figure 7-4: Public Meeting Attendee Distribution

7.2.3 Public Meeting Format

The format of the public meeting allowed for informal circulation to view a total of 9 display boards exhibiting information about the study. Members of the project team were available to respond to questions, comments, and concerns on a one-on-one basis. The following is a list of display boards that were available for viewing (boards are provided in Appendix B):

- Welcome
- The Project
- Process
- Drainage Area
- Site Constraints and Opportunities
- Pond Option 1
- Pond Option 2
- Next Steps

All display boards were posted on the project website for viewing in advance of the public meeting.

A project information bulletin was also available to each attendee that summarized the information being presented and discussed at the public meeting. The bulletin is provided in Appendix B.

A PowerPoint presentation was presented to the public by both the Study Team Project Coordinator, Karyn Cornfield, and the City of Ottawa Project Coordinator, Darlene Conway. The presentation is provided in Appendix B.

Following the presentation, the public was invited to ask questions to the project team panel, which included:

- Darlene Conway, P. Eng. – City of Ottawa Project Coordinator
- Eva Spal, P. Eng. – City of Ottawa Stormwater Infrastructure Operations
- Karyn Cornfield, P. Eng. – Morrison Hershfield Study Team Project Coordinator
- Kelly Roberts, HBSc. – Morrison Hershfield Environmental Planner
- Heather Wilson, P. Geo. – J. F. Sabourin and Assoc. Project Technical Lead: Hydrogeology
- Colin Brennan, P. Eng. – J. F. Sabourin and Assoc. Project Technical Lead: Water Resources

7.2.4 Comments and Questions

A hard copy of the online questionnaire was available to attendees, who were asked to submit completed questionnaires before January 16, 2017 in conjunction with the online questionnaire submission deadline. The questionnaire is provided in Appendix B.

An As We Heard It summary report was posted on the project website following the public meeting and was provided to all on the study mailing list. This document summarized the questionnaire results, the question and answer period of the public meeting (provided in Appendix B) and additional questions and comments forwarded to the City after the public meeting.

A summary of the Question and Answer period and the comments received at and after the public meeting is provided in Table 7-2.

Table 7-2: Summary of Key Comments and Responses from Public Meeting

Comments and Concerns	Response
Safety and Health	The pond will provide sufficient water movement (due to wind activity as well continuous flow from a large inlet storm sewer) to discourage mosquitoes and avoid excessive odours. While stormwater management ponds are designed to minimize habitat that is conducive to mosquitoes, it cannot be completely eliminated, particularly at the shallower edges of ponds. The City's experience to date with 100+ other wet ponds indicates excessive mosquitoes (over and above what is currently experienced on the Baseline/Woodroffe site) should not result. However, the application of larvicide to the pond would be undertaken if necessary to respond to this issue over the life of the pond. Safety must always be addressed in any stormwater management pond that the City constructs. Typical approaches include clear signage at key locations regarding the function of the pond and the use of plantings to actively discourage access to the open water. Ponds are also provided with flatter side slopes near and below the water's edge. The flatness of the slope near the pond edge provides that a person can navigate the slope should there be a need to. The City has considerable experience with these facilities in urban areas and is committed to providing a safe environment around the pond through proper design and maintenance. The proposed pond and associated landscaping will be designed to expressly discourage waterfowl from frequenting the site.

Comments and Concerns	Response
Alternatives to Pond	This project is following through on the recommendations of the SWM Retrofit Study (2011) and Feasibility Study (2015), which describe the purpose, the stormwater management alternatives, and the evaluation of the alternatives. These studies are available at this link: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html Private properties were screened out. Only public properties were considered due to high costs associated with acquiring private property. A wet pond was the only type of pond considered, because it is most effective at improving water quality. Dry ponds can re-suspend sediments that have settled out from previous storm events. The proposed pond is only one part of a longer-term solution for the whole of the Pinecrest Creek subwatershed and adjacent Westboro area. The City is also taking steps to implement other approaches to mitigate the impacts of urban runoff on receiving streams. Pilot projects implementing bioretention (or “rain gardens”) have recently been implemented on Sunnyside Avenue in old Ottawa South and Stewart Street in Sandy Hill. Further efforts within the Pinecrest Creek subwatershed include: Hemmingwood Way: A number of bioretention features are proposed in conjunction with forthcoming area traffic management measures. These are now in design and will be constructed in 2018. Outreach: A further initiative is being launched this spring/early summer that will focus on outreach efforts to educate residents about stormwater management and encourage homeowners to take action to reduce runoff from their properties.
Purpose of the Pond	The pond will mitigate the on-going impacts to Pinecrest Creek of urban development that occurred for many decades prior to the requirement to implement stormwater management. The primary purpose of the pond is to improve the water quality of runoff from the catchment area and reduce erosion downstream by storing and releasing this runoff more slowly. There are also flooding concerns in the creek, particularly where the creek was enclosed (piped) just south of Carling Avenue. This piping occurred during the 1960s and has resulted in a relatively high flood risk to the Sir John A. MacDonald Parkway (SJAMP). While the pond cannot be made large enough to eliminate the flood risk to the SJAMP at this location, it will provide some benefit in reducing the extent of flooding during major storm events.

Comments and Concerns	Response
Damage to private property	The proposed pond will not result in increased flood risk to adjacent properties under current or future climate conditions. Existing homes that abut the site of the proposed pond are well above the maximum (100yr) water level in the pond of 80.15m. For example, as shown on the cross-sections of the pond option drawings (refer to the Feasibility Report, 2015), the existing elevation at the rear property line of Field Street homes is about 85.0m. Conservatively assuming no further increase in grade of the house, the basements of these homes would not be below 82.0m - still well above the maximum pond level of 80.15m. Also, the design of the inlet to the pond will preclude the maximum water level from rising any higher, as excess flows will bypass the pond and continue downstream.
Wildlife and Habitat	The City and the NCC will work together to ensure that this project is not likely to cause significant adverse effects to all listed species under the federal Species at Risk Act. Mitigation measures to arrive at that result will be determined through the environmental review of this project under section 67 of the *Canadian Environmental Assessment Act*, 2012.
Pond Design and Details	The permanent water depth will be a maximum of 3m (in the pond "forebay"), and 1.5m for the rest of the pond. During a 100 year storm event, the water level would rise up to 1.25m above the permanent water level and would cover the peninsula shown in Option 1 During more frequent storm events, the peninsula would also be inundated. The design of the inlet to the pond will preclude the maximum water level from rising any higher than about 1.5m above the permanent water levels as excess flows will bypass the pond and continue downstream. Given the size of the drainage area to the pond (400+ha), it is anticipated there will be continuous flow to the pond, The preliminary geotechnical assessment included boreholes and measured the groundwater level. The Feasibility Study deemed a pond liner unnecessary but this will be confirmed during detailed design based upon further geotechnical work. The remaining existing storm sewer outlets downstream of the pond will continue to discharge to the creek. Additional SWM retrofit measures recommended by the Retrofit Study (2011) will be implemented over time to address the uncontrolled runoff from these outlets.
Pathway Connections	When completed, pedestrian pathways will be incorporated and connected to the City of Ottawa pathway and NCC Capital Pathway networks.

Comments and Concerns	Response
Lack of Sufficient Consultation	In hindsight, residents abutting the proposed pond location should have received greater notice in 2009/2010 when the Retrofit Study (2011) was being completed. Unfortunately, newspaper ads, Open Houses and other efforts completed were the typical public consultation approach at the time. The 2015 Feasibility Study did not include public consultation as it was not yet certain whether NCC, as the owner of the property, would ultimately permit the construction of the SWM pond. If NCC were to object, there would have been no need to pursue the pond further. Once NCC confirmed their acceptance of the pond based upon the concept provided in the Feasibility Study, the City was able to proceed with a Class Environmental Assessment, including public consultation. Given the feedback received from the November 2016 Online Consultation, a Public Meeting was arranged for January 9, 2016 and the original deadline for comments extended to January 16, 2017. Public meeting notices were mailed to all properties abutting the proposed pond site. St. Daniel's school and the Ottawa Carleton School Board (OCSB) were consulted during the Feasibility Study and did not object to the proposed pond. They were also notified of the Online Consultation and subsequent public meeting, The OCSB has provided comments to the City.
Pond maintenance (dredging)	All stormwater management facilities owned and operated by the City (100+ wet ponds) are subject to regular maintenance to ensure continued performance and address concerns as they arise. Each pond requires an Environmental Compliance Approval (ECA) from the provincial Ministry of Environment and Climate Change which has conditions requiring regular inspection and maintenance. The pond will require dredging approximately once every 10 years. This work will be undertaken during winter months.

7.3 Public Meeting # 2

A second public meeting was held to expand upon the response presented at Public Meeting #1 and to present refinements made based on the comments received. This consultation was in the form of a public meeting which allowed attendees to learn about the project by circulating to view exhibits, listen to and view a presentation, speak with project team members one-on-one, and ask questions to the project team as a panel. A questionnaire was available for attendees to complete and return to the project team.

The public meeting was held at St. Paul High School (2675 Draper Avenue) on May 17, 2017.

The public meeting material is provided in Appendix B, and includes the notices, PowerPoint presentation, display boards, and questionnaire. The As We Heard It report from Public Meeting #1 was also available in hard copy for attendees.

7.3.1 Notification

Notice of the public meeting was circulated through several forms of media, including

- Email from the City of Ottawa project manager to those on the public and stakeholder email lists
  - *May 4, 2017*
  - *May 15, 2017*
- Direct mail-out flyer to all properties abutting the site of the proposed pond
  - *Week of May 8, 2017*
- Project website
  - Ottawa.ca/baselinewoodroffepond
- Local Newspapers:
  - Le Droit
    - *May 11, 2017*
  - Nepean-Barrhaven News
    - *May 11, 2017*

When asked in a follow-up survey how they had heard about the public meeting, the majority of the attendees who responded to the survey indicated that they were notified by email from the City project manager (see Figure 7-5).

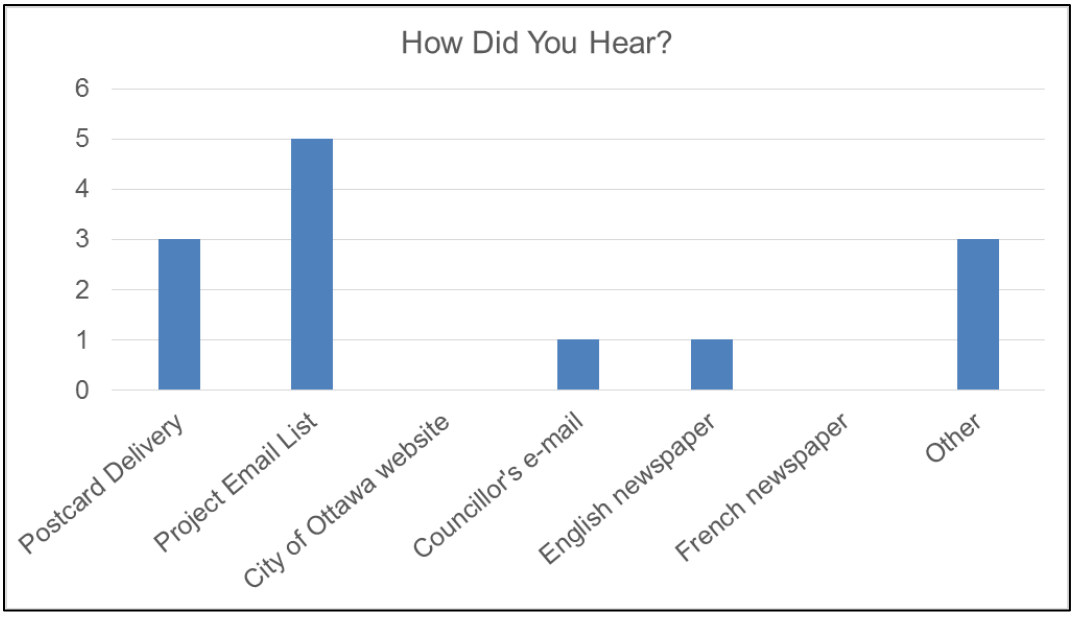


Figure 7-5: Methods of Notification for Public Meeting #2

7.3.2 Participation

There were 34 people who signed in at the public meeting. Figure 7-6 illustrates the distribution of attendees and indicates that the majority of people who attended the public meeting live in close proximity to the project area.

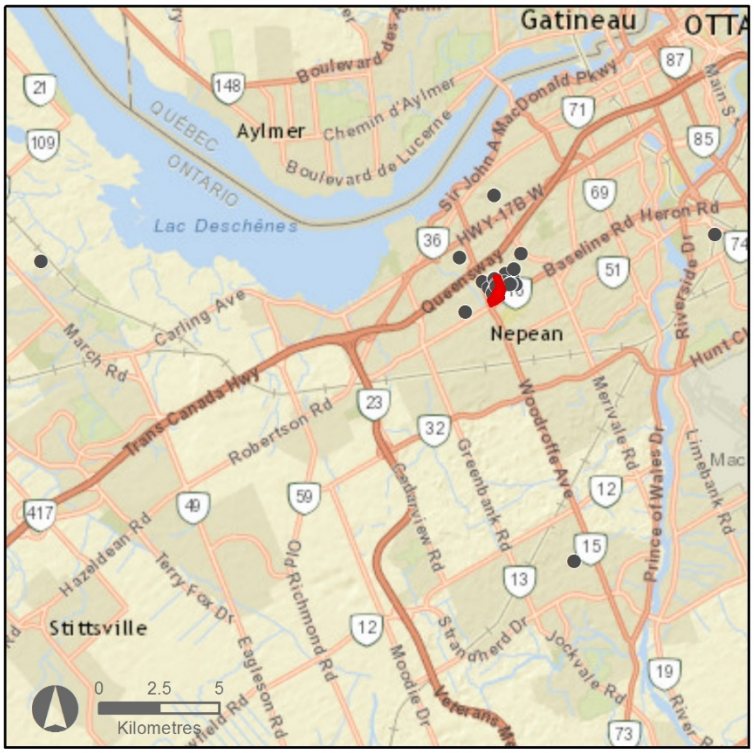


Figure 7-6: Public Meeting #2 Attendee Distribution

7.3.3 Public Meeting Format

The format of the public meeting allowed for informal circulation to view a total of 18 display boards exhibiting information about the study. Members of the project team were available to respond to questions, comments, and concerns on a one-on-one basis. The following is a list of display boards that were available for viewing (boards are provided in Appendix B):

- Welcome
- Process
- Need for a SWM Pond
- A Must-Have Project
- Drainage Area
- Site Constraints and Opportunities
- Pond Option 1
- Pond Option 2
- Comments and Responses (English and French board)
- Refinements
- Pond Modifications

- Preliminary Revised Concept
- Cross Section – Offsets from Basements and Properties
- Airport Zoning Regulations
- Transport Canada
- Design Features to Mitigate Bird Risks
- Next Steps

A PowerPoint presentation was presented to the public by Charles Wheeler, the Deputy Program Manager for the Confederation Line Extension of the Stage 2 LRT Project. The presentation is provided in Appendix B.

Following the presentation, the public was invited to ask questions to the project team panel, which included:

- Darlene Conway, P. Eng. – City of Ottawa Project Coordinator
- Karyn Cornfield, P. Eng. – Morrison Hershfield Study Team Project Coordinator
- James Fookes, P. Eng. – Morrison Hershfield Lead Designer
- Kelly Roberts, HBSc. – Morrison Hershfield Environmental Planner
- Heather Wilson, P. Geo. – J. F. Sabourin and Assoc. Project Technical Lead: Hydrogeology
- Sheri Edwards – CSW Landscape Architects Limited

7.3.4 Comments and Questions

A hard copy of a City of Ottawa comment sheet was available to attendees.

A summary of the Question and Answer period and the comments received at and after the public meeting is provided in Table 7-3.

Table 7-3: Summary of Key Comments and Responses from Public Meeting

Comments and Concerns	Response
Pond Performance	The pond is required to improve water quality, reduce erosion and flooding in Pinecrest Creek from existing development upstream of Baseline and to mitigate the runoff impacts of the future Baseline LRT Station. Incremental benefits may also be realized downstream at the Ottawa River. The pond is anticipated to achieve 70% to 80% TSS removal.
Public Safety	An East-West pathway connection will cross the pond providing a safe, direct and clearly defined route across the site. Although the existing pathways are not cleared of snow in the winter, a request was made to maintain the pedestrian crossing of the pond in winter so that pedestrians would be clearly directed to cross in this location. Signage and thick dense plantings, around the pond will help discourage anyone from accessing the pond. A submerged, shallow aquatic bench will be provided around the perimeter of the pond to reduce the risk of falling into deep water. A request was made to provide a safety barrier/fence to “funnel” or direct pedestrians/school children to the crossing and further discourage crossing the frozen pond surface in winter.
Bird Hazards	In response to the risk that the project could attract geese/gulls to areas within the Airport’s bird hazard zone, the City retained a wildlife management expert to assess the risk and provide design recommendations to discourage geese/gulls. The risk assessment indicates no significant increase in risk given the pond location and relative elevation of birds and airplanes at this location. Design features include long linear pond, tall and dense plantings, and minimal manicured areas. Monitoring will be ongoing, and contingencies such as egg oiling/addling implemented if necessary. Clear signage will help deter the public from feeding the birds.
Mosquitoes	The pond will have sufficient wind and water movement over much of the pond surface that will help limit mosquitoes. An increase in mosquitoes is not anticipated based on the experience with many other wet ponds in the City. However, should mosquitoes become a concern, larvicide would be applied. A concern was raised that local residents might have to pay for the application of larvacide but it was confirmed there would not be additional charge to local residents.

Comments and Concerns	Response
Maintenance	Approximately once every 10 years the sediment in the forebay will be dredged in winter. The sediment will be stored on site to dry and then either trucked away for disposal or regraded and reseeded. Odours should not an issue in winter due to frozen conditions. The anticipated sediment loading and accumulation was requested by one resident and these numbers will be provided.
Underground Storage	A number of attendees inquired about switching from a wet pond to underground storage. This was not an option given the cost to construct an underground tank to achieve the same benefits as the wet pond would be $10's of millions more than the cost of the wet pond.
Location of Meeting	It was commented that the meeting location was too far outside the community and closer locations (St. Daniel's school) should have been considered. Lack of other available sites was the reason for having the meeting at St. Paul's school, which is approximately 3km from the proposed pond location.

8. REFINEMENT OF THE PREFERRED ALTERNATIVE

8.1 Refinements

Options 1 and 2 were presented to the public and Option 1 was identified as the preliminary preferred alternative based on input received from key stakeholders during previous consultations. Key considerations were:

- more natural design
- less expensive (avoids relocation of hydro)
- single pathway alignment and would require less pathway maintenance.
- longer travel length for water quality settlement

Input received subsequently from stakeholders and the public has resulted in modifications and refinements as outlined below.

8.1.1 Connectivity

The public expressed concern regarding a pathway on a single side of the facility. Existing desire lines bisect the site and children cross from Baseline Road to the back of the school. The request from the neighbourhood to have the ability to cross the facility resulted in a reconsideration of Option 2.

Due to concerns raised by residents about the privacy of pathways in Option 2, the eastern-most pathway has been shifted west to provide an increased setback from residential properties.

8.1.2 Species at Risk

One butternut tree was originally identified in the previous study. Additional confirmatory studies were completed and fifty six (56) Butternut trees (*Juglans cinerea*) were further identified in the area. Under the Species At Risk Act (S.C. 2002, c. 29), all Butternuts found on federal property are protected, unless they are determined to be hybrid. Hybridity testing will be undertaken when field conditions permit, to confirm the genetic status of the trees.

As a precautionary approach, a 50m buffer has been applied to the single mature butternut (not a hybrid) on the site, and an appropriate buffer will be applied to all other true butternuts on site. The landscaping and pathway relocation that was originally proposed on the eastern portion of the site has been substantially reduced to avoid butternut tree impacts. However, the relocated pathway and the pond grading may encroach on some of these buffers. Appropriate mitigation techniques will be applied to reduce impacts to these individual trees.

The Monarch is protected under the federal *Species at Risk Act* (SARA).It's status was elevated by COSEWIC to Threatened Species in December 2016 but is still currently listed as Special Concern under the federal *Species at Risk Act*. The landscaping plan will include plants which have breeding and nectaring habitat opportunities such as milkweed.

8.1.3 Bird Hazard

An assessment of the potential bird hazard and risk to aircraft operating at Ottawa MacDonald Cartier International Airport (the Airport) with respect to a proposed stormwater management pond was completed by Beacon Environmental and is summarized below (Appendix H).

The following provides an assessment of the potential bird hazard and risk associated with the location and design of the SWM pond, as well as comments on design elements that can be incorporated to mitigate the use of the facility by birds. For a wildlife risk assessment, a hazard can be of two general categories:

- A 'wildlife hazard' refers to the one or more birds or mammals that might be struck by an aircraft
- A 'habitat hazard' refers to the land-use that attracts birds or mammals to areas through which aircraft operate. It is an antecedent condition of a wildlife hazard. Habitat hazards have a direct effect on the exposure of aircraft to birds or mammals.

The risk for bird-aircraft interactions, a bird strike, increases when the birds occur in airspace that is frequently used by aircraft operating to and from the Airport. The greatest risk occurs when birds occur on airside lands at the Airport, particularly within the area of the runways. Movements of local breeding geese tend to be short transit flights below 500' Above Ground Level (AGL), and are infrequent.

Though the SWM Pond is located within the airports Primary Bird Hazard Zone (PBHZ), it is located significantly distant from Runway 14-32 so that aircraft operating at this runway would be above 1,000' AGL when over the location the SWM Pond, an airspace that is not frequently inhabited by local movements of birds. Therefore, the likelihood or risk of a bird strike with birds at the SWM Pond is significantly reduced. The SWM Pond in this location does not pose a ***significant*** increase in the risk of a bird strike occurring for aircraft operating at the airport.

With respect to the number of birds that can occur at the new SWM Pond, generally the larger the surface water area of a facility the greater number of birds can be expected to occur. SWM Ponds that have a pond surface area of 5 or more hectares can support hundreds of roosting gulls and geese. Numbers of breeding pairs of geese that can be associated with a SWM Pond depends on two factors, the area of adjacent open space that can be used as nesting and feeding sites, and the surface area of shallow water associated with a pond. Most SWM Ponds that support a 2-3 ha permanent pond can support up to 10 breeding pairs of geese, with 50 to 60 juvenile birds in the late summer/early fall. Ponds with a permanent surface area below 2 ha are preferred by Transport Canada as they generally support fewer birds.

To mitigate the potential for increased risk, it is necessary to design the pond such that it avoids creating a SWM Pond that functions as a highly attractive feeding and breeding site for gulls and geese. The following design mitigation measures have been incorporated into the proposed SWM Pond.

- Maintaining a permanent depth of water (a wet pond) is a required design feature for achieving the water quality goals of the facility. Therefore a dry pond design is not feasible so the surface area of the permanent pond has been made as small as possible, and as narrow and linear as possible
- To reduce feeding habitat deep standing water is better than shallow water, and steep, deep shorelines
- A shoreline depth of 1 m or greater is recommended to reduce the growth of submergent and emergent aquatic vegetation as this can make a SWM Pond less attractive to gulls and geese. However, it is our understanding that this SWM Pond design must provide a shoreline aquatic bench of 0.3 m and/or flatter sloping above and below the permanent water level which is required by the City and the MOECC for public safety purposes.
- In-pond berms and dykes are highly attractive as nesting sites for Canada Geese and are used as loafing sites by both geese and gulls. Where an in-water berm is required to address water flow requirements through a pond, as is the case with this design, the physical makeup of the berm has been designed to be less attractive with dense planting with shrubs on the berm.
- A nearshore landscape design has been incorporated around the pond edge. This area should be comprised of a dense planting of shrubs to prevent birds from walking into the pond (ex. Common Blackberry (*Rubus allegheniensis*) and Smooth Wild Rose (*Rosa blanda*).
- The SWM pond is proposed within a relatively large open space area, over 10 ha, through which the Experimental Farm pathway currently runs. Due to public use of the lands the current landscaping design for the open space is to create a natural park like area with the plantings of trees, shrubs and grass meadows. Both geese and gulls are highly attracted to maintained park lawns for feeding and loafing. Therefore the area of maintained lawn will be limited to the 1.5 m mow strips along the pathway.

The refinements that resulted from the bird hazard risk assessment were presented to Transport Canada at a meeting with the Project Team on May 2, 2017. Final meeting minutes will be provided once finalized, and Transport Canada will prepare a response to the proposed design.

8.2 Preferred Alternative

The preferred alternative (Figure 8-1) includes the following key features

- Landscaped Area Around Pond: Areas of meadow, reforestation planting, large tree planting and shrub planting. Some of the existing vegetation is incorporated into the plan for both aesthetics and wildlife management.
- Realignment of Recreation Pathways: A pathway (causeway) crosses the pond over the buried culverts. Vistas are provided for viewing across the pond and informal “activity” areas occur along the recreation path. Connections are made to existing desire lines with connections to the school.
- Pond: Edge of pond treatment includes placement of boulders at the edge of the water, geotextile and stabilization planting. Bioengineering techniques would be used to provide additional stabilization of the slopes and deter waterfowl access.

- Maintenance: A maintenance route is included in the concept design that is integral with the pathway system. A maintenance plan would be developed to ensure the growth of new plantings.
- Design/Operating Elements: Table 8-1 identifies the key design elements.

Table 8-1: Key Design Elements

Feature	Dimensions (minimum required MOE 2003)
Forebay	Min L:W = 2:1 Min. depth: 1m Cleanout frequency: +/- 10yrs
Permanent Pool	Max Depth: 3m 70% TSS removal Volume = 25,223 m^3 80% TSS removal Volume = 51,907 m^3 Goal: Provide as much permanent storage as is feasible given space constraints.
Extended Detention	Extended detention volume (40m^3/ha * 446.04 ha): 17,842 m^3
Forebay berm	Between 0.15 m and 0.3 m below permanent pool
Active (flood control) storage	Project goal: Provide as much active storage as is feasible given space and hydraulic constraints.
Inlet	Minimum diameter: 450 mm (to avoid freezing)
Low flow / quality control outlet pipe	Minimum diameter: 150mm (reverse sloped) Minimum diameter: 75mm for orifice control
Quantity control outlet box culvert	Minimum diameter: 450 mm (to avoid freezing)

Figure 8-1: Preferred Alternative

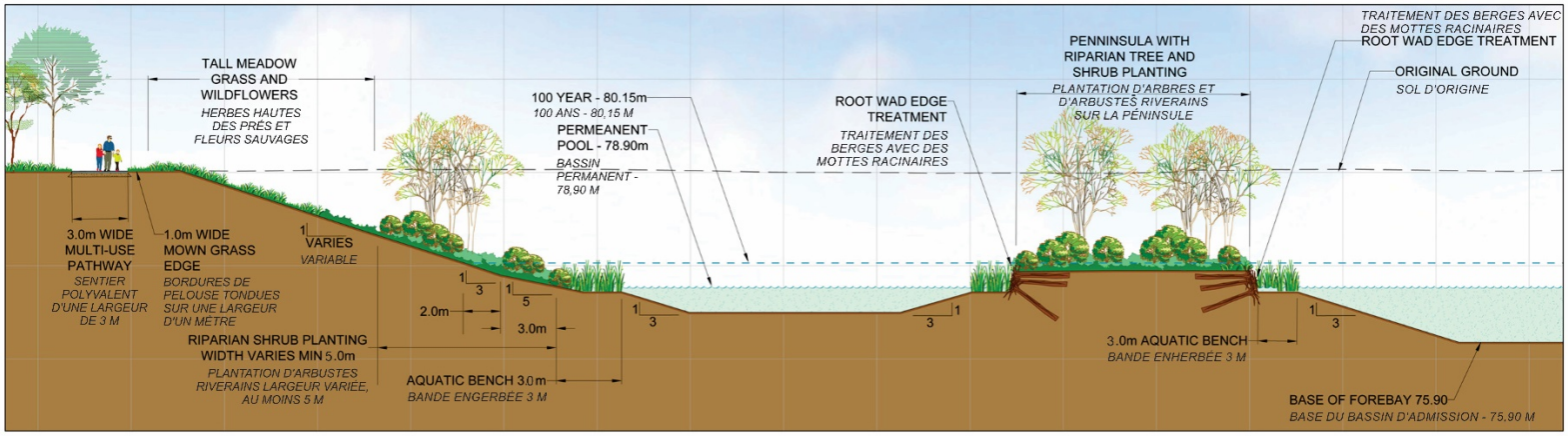


Figure 8-2: Cross Section A-A' (Preferred Alternative)

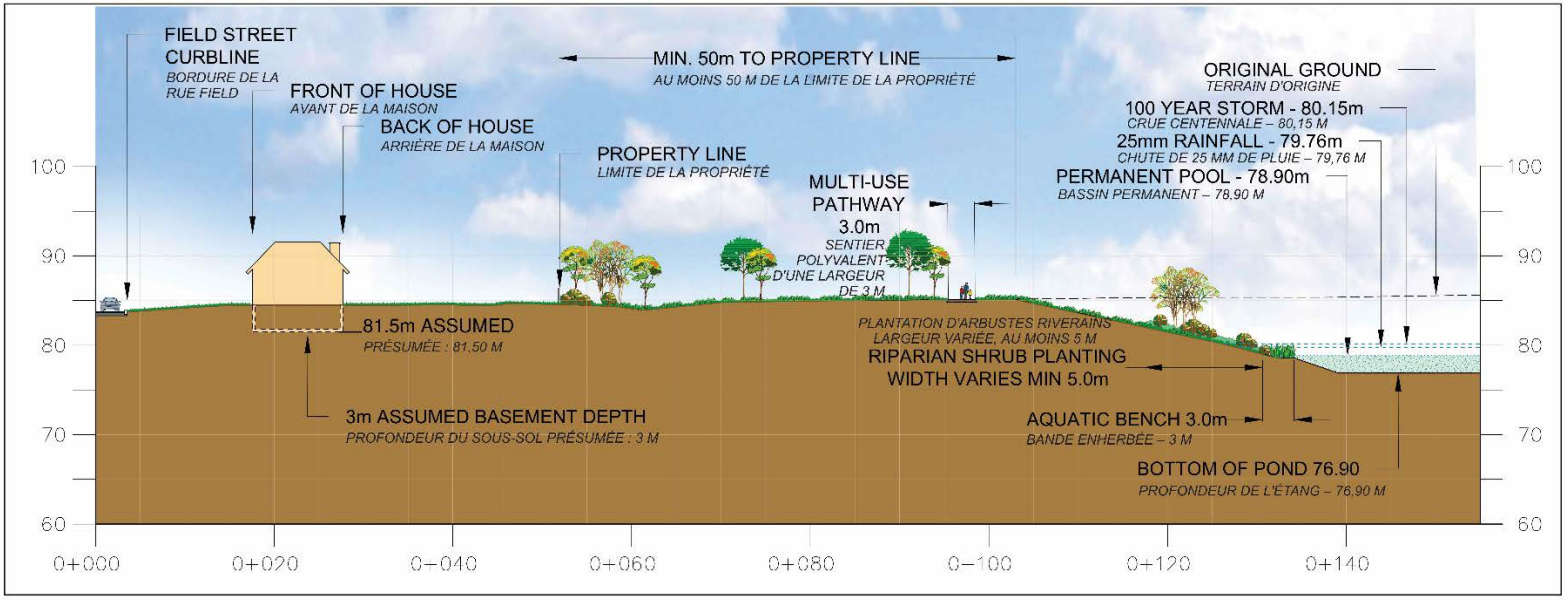


Figure 8-3: Cross Section B-B' (Preferred Alternative)

9. IMPACTS, MITIGATION MEASURES AND MONITORING

9.1 Assessment and Evaluation Approach

The preliminary impact analysis of alternatives went only so far as to be able to determine which alternative was preferred for the Study Area. If the resulting effects for a particular criterion were the same for each alternative, or if no residual effects were predicted, the results were not used to compare alternatives. These features, however, were still considered during the impact assessment for the preferred alternative. This section describes the comprehensive analysis/assessment of all the identified impacts associated with implementing the preferred alternative.

The values and conditions identified in the documentation of existing conditions were used as the basis for assessing the effects of the preferred alternative on the transportation, social, and natural environments. The impact analysis involved applying the following steps, as presented in Table 9-1.

Table 9-1: Impact Assessment Approach

	Assessment Approach
Step 1	Identify and analyze instances where the project, as discussed in Section 6, may interact with existing environmental conditions, as described in Section 4.
Step 2	Acknowledge predetermined project activities that act as *built-in mitigation measures*.
Step 3	Identify the *residual* environmental effects, if any.
Step 4	Identify opportunities for further *mitigation of residual effects*, if possible/practical.
Step 5	Determine the *significance of the residual* environmental effects, after further mitigation.

9.2 Interactions

In order to understand the project interactions with the environment it is necessary to consider all phases of the project: pre-construction/design; construction; and operation. The following tables highlight the key activities associated with each phase and identify areas of potential interaction.

Table 9-2: Project-Environment Interactions

Phase	Activity	Environmental Interaction
Pre-Construction	Field Investigations	Subsurface Conditions Environmental Contamination Potential Surface water Fish and Aquatic Habitat Species at Risk and Critical Habitat Archaeological Potential
	Completion of detailed design and contract drawings	None anticipated
	Acquisition of land required for infrastructure	Land Use Land Ownership City Budgeting
Construction	Relocating hydro, telephone, and utilities	Surface Water Fish and Aquatic Habitat Wildlife and Habitat Terrestrial Vegetation Recreation and Multi-Use Pathways Utilities and Infrastructure Noise Air Quality
	Clearing and grubbing trees and vegetation within the grading limits	Surface Water Fish and Aquatic Habitat Wildlife and Habitat Terrestrial Vegetation Species at Risk and Critical Habitat Recreation and Multi-Use Pathways Noise Air Quality

Phase	Activity	Environmental Interaction
	Excavation of new SWMP and trenching for associated infrastructure	Subsurface Conditions Environmental Contamination Potential Surface Water Fish and Aquatic Habitat Archaeological Potential and Resources Recreation and Multi-Use Pathways Noise Air Quality
	Connection of the new SWMP to Pinecrest Creek	Surface Water Fish and Aquatic Habitat
	Installing remaining landscape features such as sodding or hydra-seeding, tree and shrub plantings	Aquatic Habitat Terrestrial Vegetation Recreation and Multi-Use Pathways
Operation	Operation of the new SWMP, including landscaped areas surrounding the pond.	Surface Water Fluvial Geomorphology Fish and Aquatic Habitat Wildlife and Habitat Terrestrial Vegetation Species at Risk and Critical Habitat Existing Land Use Recreation and Multi-Use Pathways

9.3 Climate Change

The MOECC has developed Codes of Practice to provide guidance regarding the Consideration of Climate Change in EAs (MOECC 2016). The consideration should include:

- alternative methods to reduce a projects greenhouse gas emissions and negative effects on carbon sinks; and
- resiliency to future changes in climate to helps maintain the ecological integrity of the local environment

The Provincial Policy Statement (PPS 2014) also notes that “Infrastructure...shall be provided in a coordinated, efficient and cost-effective manner that considers impacts from climate change”.

Climate change is likely to affect stormwater infrastructure due to increased frequencies and intensities of extreme weather events (IPCC, 2007). There is significant uncertainty however in the quantification of potential changes to the local climate change scale in

southern Ontario due to limitations of current climate modelling and projection tools (TRCA, 2009). Long term infrastructure design changes are being proposed at many levels to incorporate climate change mitigation and adaptation into stormwater pond design. These changes will take time to develop and approve. In the interim, the following general considerations are made:

- The Ottawa River Action Plan (ORAP) recommended this SWMP as one of several measures. The overall Plan includes both source control (lot, neighbourhood) and conventional stormwater management.
- Maintenance of Existing Stormwater Management Infrastructure: Additional maintenance of existing infrastructure may be necessary should the rainfall regime over the service life of the structure become more severe than that for which the structure was designed. For both quantity and quality control type storage structures, modest increases in rainfall severity (e.g. 15%) may force more frequent maintenance. Ongoing City monitoring programs will make the determinations regarding the frequency of maintenance requirements
- Increased erosion and loss of habitat along water courses can also be an impact of increased frequency and intensity of extreme weather events. Pinecrest Creek, which is the receiving body for the SWMP, will benefit from a restoration which will serve to reduce existing erosion potential and the SWMP will assist in reducing the flashiness of stormwater flows which enter the Creek.
- The SWMP will be naturalized with an increase in the diversity and quantity of plantings in the area. This will serve to:
    - support biodiversity
    - increased carbon sequestration and decreased greenhouse gas emissions
    - reduced maintenance compared to the cost of maintaining sod
    - appropriate plants that respond to a site's range of environmental gradients and hydraulic conditions

9.4 Built-in Mitigation Measures

In this assessment, "built-in mitigation" is defined as actions and design features incorporated in the pre-construction, construction and operational phases, which have the specific objective of lessening the significance of severity of environmental effects which may be caused by the project. They include standard construction practices and Best Management Practices (BMPs).

The SWMP will be designed and implemented with the benefit of contemporary planning, engineering, and environmental management practices. Regard shall be had for the legislation, policies, regulations, guidelines, and best practices of the day. Where possible, mitigation measures will be prescribed in construction contracts and specifications. Examples of practices that should be employed, based on current standards, are described below. These measures can be "built-into" the preferred design as described in Section 6. These mitigation measures will be updated and refined during the pre-construction, construction and operation phases of the project.

9.4.1 Emergency Response Plan

The preparation of an *Emergency Response Plan* to be used by the contractor will be included to allow full access to/of emergency services during the construction

period so that at any given time there is a method to access the site and all adjacent land uses.

The plan should include provisions for providing temporary services to end users in the event of a construction related service outage or other service disruption.

9.4.2 Environmental Protection Plan

It will be the responsibility of the contractor to ensure that no contamination, waste, or other substances, which may be detrimental to aquatic life or water quality, will enter a watercourse as either a direct or indirect result of construction. In this regard, any floating debris resulting from construction which accumulates on watercourse beds and watercourse banks is to be immediately cleaned up and disposed of. Any spills or contamination, waste or other substances which may be detrimental to aquatic life or water quality will also be immediately cleaned up.

Any construction works which will cause or be the cause of discharge to the watercourse are to be prohibited unless appropriate approvals are granted by governing authorities.

At all times, construction activities are to be controlled in a manner that will prevent entry of deleterious materials to watercourses. In particular, construction material, excess material, construction debris and empty containers are to be stored away from watercourses and the banks of watercourses.

9.4.3 Erosion and Sediment Control Plan

The purpose of the *Erosion and Sediment Control Plan* is to determine the degree of erosion and sedimentation that would occur under normally anticipated weather conditions during the life of the project, and to develop and implement mitigation strategies to control any unforeseen areas determined to have a pre-disposition to the problem.

During construction, the Contractor shall inspect and record the status and effectiveness of the erosion and sediment control measures regularly. The Contractor will make all necessary repairs if any damage occurs. The Contractor will ensure that effective erosion and sediment control measures are maintained until revegetation of disturbed areas is achieved.

Erosion and sediment control measures are to remain in place until the site of the project is re-stabilized following construction.

This plan includes the identification of planting and slope rounding specifications within the contract tender; identifying and specifying seeding and sodding locations; identifying areas requiring slope benching or retaining structures in the detailed design process; and construction and post-construction monitoring and mitigation practices.

9.4.4 In-Water Works BMPs

The proponent and contractor will work collaboratively with DFO to determine if the requirements for a Fisheries Compensation Plan, approval and/or letter of advice are needed for the modifications within the high-water-mark (HWM) of Pinecrest Creek. Any in-water works will require consultation with all regulatory agencies (RVCA, NCC etc.).

Any works within the watercourse will respect identified timing-windows and work restrictions outlined by governing authorities.

Ensure at all times the free flow of water and a water supply sufficient to maintain fish habitat functions downstream of the work area. Take the necessary measures to avoid impacts upstream and downstream of the work area.

9.4.5 Management of Contaminated Materials

The MOE, NCC and Construction Manager are to be notified immediately upon discovery of any contaminated material encountered within the construction area. If contaminated materials or contaminated groundwater are encountered within the construction limits, these are to be removed and disposed of in accordance with all applicable Acts and Regulations. Treatment and discharge of contaminated groundwater is also to be in accordance with applicable legislation and regulations.

9.4.6 Noise, Air Quality and Vibration

Varied construction activities within the Study Area are expected to create isolated and short term noise, air quality and vibration impacts on the environment. The construction manager will be required to develop a strategy for mitigating the effects according to good practices intended to satisfy, as feasible, the fugitive dust limits specified in O.Reg. 419, the noise limits specified in MOE NPC-115 and NPC-118 and the City of Ottawa By-laws for Noise. If applicable the plan will include good practices intended to satisfy, as feasible MOE NPC-119 and NPC-207 for ground vibrations. A list of common mitigation strategies adapted to the current project includes, but is not limited to the following:

Air emissions BMPs:

- Monitor wind conditions and plan operations to take advantage of calm wind periods;
- Minimize site storage of granular material in height and extent;
- Locate storage piles in sheltered areas that can be covered;
- Provide movable wind breaks;
- Use water spray and suppression techniques to control fugitive dust; and
- Cover haul trucks and keep access route to the construction site clean of debris.

Noise and vibration BMPs:

- Limit speeds of heavy vehicles within and approaching the site;
- Provide compacted smooth surfaces, avoiding abrupt steps and ditches;
- Install movable noise barriers or temporary enclosures if required;

- Keep equipment properly maintained and functioning as intended by the manufacturer; and
- If required, implement a blast design program prepared by a blast design engineer.

9.4.7 Public Communications Plan

The purpose of the *Public Communications Plan* is to keep the public informed about the work in progress and the end results of the construction activities. Residents and stakeholders must be kept aware of any scheduled service or pathway interruptions ahead of time so that their activities can be planned with minimum disruption. The plans should detail how to communicate the information to the public, what information should be disseminated, and in which project stages the communications should take place.

9.4.8 Species at Risk Update

The SARA is updated annually. SARA should be reviewed and an update of the potential species present and their associated habitat should be completed prior to construction.

Protection afforded to any species shall be in accordance with appropriate federal/provincial jurisdiction.

If a SAR is observed during construction, in the construction zone, the MNRF, NCC and Environment Canada are to be contracted immediately and operations modified to avoid any negative impacts to the species or their habitat until further direction is provided by the governing authority.

If necessary, permits will be obtained under SARA.

9.4.9 Spills Response and Action Plan

A *Spills Response and Action Plan* will highlight spills response and reporting procedures. Spills or discharges of pollutants or contaminants will be reported immediately to the land owner (NCC) and any regulatory authorities (i.e., RVCA, MNRF, MOECC, DFO, etc.).

Clean up of any spills shall be initiated quickly to ensure the protection of the environment to the extent possible. An adequate supply of clean-up materials is to be kept on-site with a work crew that is fully trained to prevent and respond to accidental spills.

Proper spill control equipment/items (spill kits, MSDSs, absorbents, containers, caution signs/tape, etc.) will be readily available in areas where large quantities of hazardous materials may be stored.

Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

9.4.10 Traffic Management, Access and Pedestrian Control Plan

A *Traffic Management, Access and Pedestrian Control Plan* will be developed to manage transportation functions for all travel modes including equipment and material deliverables at various times during the construction period.

The intent of this plan is to ensure continued use of the NCC Experimental Farm Multi-Use Pathway system during construction. This plan is to be developed during the detailed design/pre-construction phase and implemented in the construction phase. Any pedestrian/cycling detours, traffic detours and/or lane reductions associated with the project will be identified. The Contractor will be required to develop the *Traffic Management, Access and Pedestrian Control Plan* for all detours, which will be monitored by the City.

9.4.11 Unexpected Discovery of Archaeological Resources

In the event that previously undocumented archaeological resources and/or human remains are uncovered, the proponent or the person discovering the archaeological recourses must cease alteration to the site immediately and engage a licensed consultant archaeologist to carry out field work, in compliance with Section 48 (1) of the Ontario Heritage Act.

Should deeply buried deposits be found on this property during any construction activities, the Ontario Ministry of Tourism, Culture and Sport shall be notified immediately (416-314-7178).

In the event that human remains are encountered during construction activities, local law enforcement authorities and/or the coroner will be notified immediately, followed by the Ministry of Tourism, Culture and Sport, and the Registrar of Cemeteries at the Ministry of Consumer Services (416-326-8393).

The NCC, as federal land owner, shall be notified immediately upon any discoveries.

9.4.12 Waste Management Plan

During construction there will be some excess materials that must be disposed of away from the project site. These may include concrete rubble, asphalt, waste steel/metal structural components, earth, and pathway appurtenances such as signs.

During detailed design, a Waste Management Plan will be developed to ensure that surplus material is recycled wherever practical and to describe the methods to be used by the contractor for disposal of all other surplus material in accordance with federal, provincial or local municipal practices and guidelines.

9.5 Site Specific Mitigation Measures

9.5.1 Landscape and Site Restoration Plan

The Landscape and Site Restoration Plan will be sensitive to physical and cultural heritage resources and adjacent land use. Where appropriate, existing landforms and vegetation will be preserved and incorporated into the Plan. Native plant material will be used where appropriate. Plant material or fencing to direct pedestrians to the crossing in winter to be provided in detailed design.

Native plant species which may be incorporated into the Landscape Design may include but not limited to:

Trees (Deciduous and Coniferous)

- Black Locust
- Common Hackberry
- Sugar Maple
- Silver Maple
- Red Maple
- Eastern Cottonwood
- Balsam Poplar
- Bur Oak
- White Cedar
- Common Larch
- White Spruce
- Balsam Fir

Medium Trees

- Serviceberry
- Pagoda Dogwood
- Flowering Dogwood (south-facing slopes only)
- Hawthorn
- Laurel Willow
- Ironwood
- Staghorn Sumac

Shrubs

- Common witch-hazel
- Arctic Willow
- Gray Dogwood
- Red-Osier Dogwood
- Grow-low Sumac
- Forsythia
- Meadow Rose (pond side slopes)
- Carolina Rose

Perennials

- Coneflower
- Blackeyed Susan
- Milkweed
- Tickseed
- Smooth Penstemon
- Stiff Goldenrod
- Cardinal Flower
- Meadowsweet
- Switchgrass
- Big Bluestem
- Waterlily
- Sneezeweed

9.5.2 Bird Hazard Risk Management

Table 9-3 summarizes the design recommendations to mitigate the potential for increased risk of birds being attracted to the area and how the pond option has been modified to incorporate these requirements.

Table 9-3: Design Features to Mitigate Bird Hazard Risks

Preferred Pond Design Features (Beacon Environmental)	Rationale for Design Feature	Initial preferred pond concept ("Option 1")	Revised preferred pond concept and detailed design direction ("Modified Option 2")
Narrow and linear pond; length to width ratio of 3:1 or greater	Geese prefer open water areas that provide sufficient physical distance from potential predators (circular or square in shape)	Meets criteria	Meets criteria
Permanent water surface area less than 2ha	Permanent water surface area of less than 2ha will generally support fewer birds	Permanent water surface area 2.7ha	Permanent water surface area to be reduced to less than 2.7 hectares (while still meeting other SWM objectives); area to be confirmed during detailed design
Permanent pool depth of 2m or greater	To avoid creating feeding habitat	Forebay: 3m depth Cells 1 and 2: 1.5m depth	Cells 1 and 2 to be increased to 2m depth
Minimum 5m width of dense shrub planting around pond edge	To prevent geese from walking into pond; to prevent nesting opportunities along shoreline; to skew site lines of geese if they are within pond (making them feel less safe)	Mix of riparian plantings, tall grasses and rushes around pond edge	Continuous minimum 5m-wide band of riparian shrub planting to be provided
Permanent depth of 1m or greater at water's edge	To limit growth of emergent and submergent vegetation attractive to geese	3.5m wide flat bench around perimeter of pond with maximum permanent water depth of 0.3m	3.0m wide flat bench with maximum permanent water depth of 0.3m; mandatory to address public safety concerns; continuous 5m band of dense riparian shrub planting to mitigate lack of 1m water depth at pond edge
Minimize use of in-water berms; where required, use high steep banks with dense shrub planting on the berm	In-water berms are attractive to geese as nesting sites	Wide peninsula with mix of riparian planting and tall grasses and rushes	Peninsula narrowed to 6-15m; "root wad" edge treatment added to create steep banks; dense riparian tree and shrub plantings on peninsula

Preferred Pond Design Features (Beacon Environmental)	Rationale for Design Feature	Initial preferred pond concept ("Option 1")	Revised preferred pond concept and detailed design direction ("Modified Option 2")
No manicured areas on site (save for 1.5m mow strips along pathways)	Manicured area highly attractive to geese and gulls for feeding and "loafing"	Meets preferred criteria: all areas except mow strips will be reforested, meadow (tall grasses, wildflowers) or replanted with dense shrubs	Meets preferred criteria: all areas except mow strips will be reforested, meadow (tall grasses/wildflowers) or replanted with dense shrubs

9.6 Monitoring

Monitoring is important to verify the accuracy of effects predictions. Monitoring measures have been recommended to determine what effects actually occurred with project implementation, and may result in the modification of mitigation measures to improve their effectiveness.

9.7 Assessment and Evaluation Results

As described in the methodology, an environmental effect requires consideration of the interaction of the project (i.e., project activities) with the environment. Pre-construction, construction, and operational activities were assessed.

Professional judgement and experience formed the basis for identifying environmental effects and mitigation measures. The analysis was based primarily on comparing the existing environment with the anticipated future environment, during and after construction. Consideration was given to:

- The magnitude, spatial extent, and duration of effects;
- The proportion of a species population of the number of people affected;
- Direct or indirect effects;
- The degree to which the effect responds to mitigation; and
- The level of uncertainty about the possible effect.

In this assessment, "residual" environmental effects are defined as changes to the environment caused by the project, and vice versa, when compared to existing conditions and taking into account all mitigation measures. Potential residual environmental effects are assessed as to their significance, including spatial and temporal considerations, and are categorized according to the following definitions:

"Negligible" means an effect that may exhibit one or more of the following characteristics:

- Nearly-zero or hardly discernible effect; or
- Affecting a population or a specific group of individuals at a localized area and/or over a short period of time.

"Insignificant" means an effect that may exhibit one or more of the following characteristics:

- Not widespread;
- Temporary or short-term duration (i.e. only during the construction phase);
- Recurring effect lasting for short periods of time during or after project implementation;
- Affecting a specific group of individuals in a population or community at a localized area or over a short period; or
- Not permanent, so that after the stimulus (i.e. project activity) is removed, the integrity of the environmental component would be resumed.

"Significant" means an effect that may exhibit one or more of the following characteristics:

- Widespread;
- Permanent transcendence or contravention of legislation, standards, or environmental guidelines or objectives;
- Permanent reduction in species diversity or population of a species;
- Permanent alteration to groundwater flow direction or available groundwater quantity and quality;
- Permanent loss of critical/productive habitat;
- Permanent loss of important community archaeological/heritage resources; or
- Permanent alteration to community characteristics or services, established land use patterns, which is severe and undesirable to the community as a whole.

The above definitions of significance were adopted for use in this assessment because many of the impacts cannot be quantified in absolute terms, although changes and trends can be predicted. The definitions provide guidance and are intended to minimize personal bias.

Study boundaries serve to focus the scope of the assessment such that a meaningful analysis of potential impacts arising from the proposed project can be made. Project boundaries are defined by the spatial and temporal limits of the proposed project activities, and their zones of influence.

Spatial: The physical area which may be disturbed (directly or indirectly) by construction activities on the property and directly adjacent lands. Consideration was given to the areas downstream of the works that may be impacted before, during and/or after construction.

Temporal: The duration of the active construction phase of the project, scheduled to occur over a number of months and is not anticipated to take longer than two years. The completed project is considered to be permanent infrastructure, which will operate as constructed for the life span of the facility as determined by transportation needs in the City.

Table 9-4 describes the potential effects, mitigation, residual effects and their significance, and monitoring recommendations for the preferred alternative.

Project phases are identified as follows:

P – Pre-construction/design; **C** – Construction; **O** - Operation

Once potential effects were predicted, mitigation measures were identified. Often these mitigation measures were sufficient to reduce potential negative effects to an insignificant or negligible status. Mitigation includes environmental rehabilitation and replacement. Proposed mitigation measures are summarized in Table 9-4.

Table 9-4: Assessment of Environmental Effects

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
Subsurface/Surface Conditions	Pond floor/bottom materials are sensitive to disturbance by construction traffic and ponded water.	Additional investigation and geotechnical design input will be required at the detailed design stage to determine site-appropriate construction techniques, particularly with regards to the limited load bearing capacity of the silty clay on site. The additional investigation should include hydrogeologic testing of the bedrock and further delineation of its surface profile. If the pond floor needs to be trafficable, the bottom of the pond should be lined with a material such as rip-rap, a synthetic geocell erosion layer, or interlocking concrete blocks to minimize disturbance to the subgrade etc. A geotextile may also be required in addition to the materials mentioned above. At the detailed design stage, the stability of the proposed pond slopes should be evaluated for seismic or rapid draw down conditions.	None anticipated	Negligible	None
	Stockpiling materials has the potential to impact settlement-sensitive buried services. Increased potential of sedimentation/stock-piled material to enter the watercourse and fugitive dust emissions.	Additional investigation and geotechnical design input will be required at the detailed design stage to determine site-appropriate construction techniques, particularly with regards to the limited load bearing capacity of the silty clay on site. If settlement-sensitive buried services or other structures are present or proposed in the area of stockpiled material, the height of the stockpile may be limited in order to control the amount of settlement of the silty clay. A limit of about 2.8 m above existing ground surface where settlement is a concern has been identified. Erosion and Sediment Control Plan Environmental Protection Plan Construction Waste Management Plan Management of Contaminated Materials Plan Air Quality BMPs	Reduced likelihood of material entering the watercourse or of contaminated materials stockpiling.	Insignificant	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
	Potential for ground settlement due to groundwater lowering associated with groundwater removals during construction/excavations.	Additional investigation and geotechnical design input will be required at the detailed design stage to determine site-appropriate construction techniques, particularly with regards to the limited load bearing capacity of the silty clay on site. Edge of the pond should be located at least 50 m away from the nearest structures to minimize the impacts of the groundwater level lowering on the performance of these structures. 15 m margin is definite; and 15-50 m may be required. A Permit-to-Take-Water (PTTW) is required from the MOECC for rates of groundwater inflow in excess of 50,000 L/day. Removal of groundwater by well filtered sumps in the excavations.	Potential for localized settlement on-site.	Insignificant	None
Environmental Contamination Potential	Potential to encounter contaminated sites during ground disturbance procedures such as excavations and trenching.	A Phase II Environmental Site Assessment (i.e. soil and groundwater sampling) has been recommended to address potential environmental concern related to significant staining on the gravel surface within the hydro transformer sub-station located immediately to the north of the western part of the site (Trow, 2006). Mitigation in accordance with results of Phase II ESA Management of Contaminated Materials Plan	Potential for disruption of un-identified localized contaminated soils.	Negligible	None
	A spill or leak from equipment on-site during construction could result in the contamination of soils, surface or groundwater, or pose a health and safety hazard.	To avoid the release of any deleterious substances during the construction phase, the Project Manager must ensure that: • The operations of refueling and maintenance with the use of toxic materials is performed off-site; • Stabilize any waste materials removed from the worksite, upland to prevent them from entering the watercourse (Pinecrest Creek). Spills Response and Action Plan Environmental Protection Plan	Potential for localized soil contamination resulting from an unexpected leak/spill.	Insignificant	None
Surface Water	Current source water protection policies and requirements may be applicable to the new SWMP.	City's Source Water Protection Risk Management Staff have confirmed the pond does not pose a risk in accordance with the guidelines.	None anticipated	None anticipated	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
	Increased contamination potential in Pinecrest Creek to unforeseen fuel spills resulting from the use and storage of construction machinery near a watercourse.	Storage of equipment will not occur within 30 m of the watercourse. Design temporary infrastructure to accommodate expected and unexpended high flows of water during the construction period. Avoid soil disturbance during unusually wet, rainy or winter thaw conditions. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks and encourage the use of vegetable based oils. Protect entrances at machinery access points and establish singe site entry and exit. Installation, use, and proper maintenance of erosion and sedimentation control measures. Shores, beds of waterbodies, and floodplains should be protected to minimize the impact on water flow and to prevent degradation and erosion. Store all oils, lubricants, fuels and chemicals in secure areas, on impermeable pads and away from aquatic habitats and waterbodies.	Temporary localized potential for contamination from unexpected leaks or spills	Insignificant	None
	Increased sedimentation potential in Pinecrest Creek while ground surfaces are exposed and disturbed. Ground surface exposure may result from clearing and grubbing and excavation activities.	Erosion and Sediment Control Plan Environmental Protection Plan Landscape and Site Restoration Plan	Temporary and localized potential for unexpected sedimentation in the watercourse	Insignificant	In accordance with Erosion and Sedimentation Monitoring Plan
	Potential for short-term influx of sedimentation when the new SWMP is connected to Pinecrest Creek.	Clean stone/rock will be used during construction of outlets to minimize sediment release during connection.	Potential for short-term localized influx of sedimentation upon connection.	Insignificant	None
	Removal of gabion baskets and slope restoration to more natural conditions may release sedimentation and other materials into the watercourse during construction.	Works will be completed such that they do not restrict the normal flow of the creek. Materials will be placed along the embankment. Minimize the extent (vertical and horizontal) of materials through careful placement of materials and observe placement, and not dumping/slinging. Erosion and Sediment Control Plan Environmental Protection Plan Landscape and Site Restoration Plan	Temporary and localized potential for unexpected sedimentation and debris (gabion materials) to enter the watercourse.	Insignificant	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
	Improvements to stormwater discharge characteristics/ quality and slope stability associated with operation of the SWMP.	None required	Positive residual effect on the Pinecrest Creek sub-watershed and for the Westboro Beach on the Ottawa River.	Positive	Watershed monitoring in accordance with P/W SWMRetrofit Plan
Fluvial Geomorphology	Reduced erosion potential in Pinecrest Creek due to operation of the new SWMP.	None required	Positive residual effect on Pinecrest Creek.	Positive	Watershed monitoring in accordance with P/W SWM Retrofit Plan
Fish and Aquatic Habitat	Increased potential for sedimentation to enter aquatic habitat while ground surface is disturbed during construction.	Erosion and Sedimentation Plan In-Water Works BMPs Complete as much work as possible off-line before connecting the SWMP to Pinecrest Creek. Design temporary infrastructure to accommodate expected and unexpended high flows of water during the construction period. Avoid soil disturbance during unusually wet, rainy or winter thaw conditions. Shores, beds of waterbodies, and floodplains should be protected to minimize the impact on water flow and to prevent degradation and erosion.	No residual harm to fish or aquatic habitat is anticipated with the implementation of effective mitigation measures and best management practices.	Insignificant	In accordance with Erosion and Sedimentation Monitoring Plan
	Increased contamination potential to fish and aquatic habitat due to unforeseen fuel spills as a result of construction machinery on-site and in proximity to Pinecrest Creek.	Storage of equipment will not occur within 30 m of the watercourse. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks and encourage the use of vegetable based oils. Protect entrances at machinery access points and establish singe site entry and exit. Store all oils, lubricants, fuels and chemicals in secure areas, on impermeable pads and away from aquatic habitats and waterbodies. Environmental Protection Plan Spills Response and Action Plan	No residual harm to fish or aquatic habitat are anticipated with the implementation of effective mitigation measure and best management practices.	Insignificant	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
	Construction of the riffle-pool sequence will occur “in the dry” within Pinecrest Creek. Works in the watercourse have the potential to negatively affect aquatic habitat and fish on-site and downstream.	Any works within the high-water mark (HWM) will require consultation with regulatory agencies (RVCA, NCC, DFO etc.). The materials to be used for the construction of the pool/riffle sequence must be clean. Ensure the banks and any temporary structures are stabilized. The working end of machinery will be clean and maintained free of fluid leaks. If oils are to be used, they will be vegetable based oils. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks and encourage the use of vegetable based oils. Installation, use, and proper maintenance of erosion and sediment control measures including turbidity curtains, cofferdams, etc. should be employed. Cofferdams should be sufficiently high to prevent overtopping in the event of sudden increases in water levels. Cofferdams are to be constructed using clean, approved materials and are to be removed as soon as possible following construction within the watercourse. Cofferdams should be removed from the watercourse when no longer required, and when in-stream works areas have been fully stabilized. Silt or debris that accumulates around a temporary cofferdam must be removed prior to withdrawal of the cofferdam. To prevent silt and sedimentation from entering the watercourse, a pump shall be used to remove the silted water from the work area inside the cofferdams. This silted water shall be treated by discharging into settling basins, vegetated areas or sediment traps prior to release back into the watercourse. In-Water Works BMPs	Potential for short-term localized disruptions to fish and aquatic habitat.	Insignificant	None
	Potential for downstream and on-site sedimentation during restoration works which may temporarily degrade fish habitat.	Ecological Site Assessment Environmental Protection Plan Erosion and Sediment Control Plan In-Water Works BMPs Landscape and Site Restoration Plan The potential of the site to host or provide habitat for a variety of species at risk is to be determined prior to construction.	No residual harm to fish or aquatic habitat are anticipated with the implementation of effective mitigation measure and best management practices.	Insignificant	In accordance with Erosion and Sediment Control Plan

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
	Improved water quality for fish and aquatic habitat during operation of the SWMP.	None required	Positive residual effect on fish and aquatic habitat downstream of the new SWMP	Positive	None
Terrestrial Vegetation	Loss of vegetation to accommodate new SWMP (such as clearing and grubbing).	Minimize vegetation removals to the extent possible. Consultation with the NCC for tree replacement policies and requirements. Landscape and Site Restoration Plan Tree Compensation Plan	Minor localized vegetation loss to accommodate SWMP footprint.	Insignificant	None
	Restoration of vegetation on-site following construction including landscaped features.	Minimize vegetation removals to the extent possible. Where appropriate, restore the area with fast-growing, low maintenance, diverse native species adapted to the project area to enhance the local plant community. Erosion and Sediment Control Plan Landscape and Site Restoration Plan Tree Compensation Plan	None anticipated	Insignificant	None
Wildlife and Habitat	Clearing and grubbing may result in temporary, localized avoidance of the Study Area by urban wildlife due to noise and potential destruction of habitat.	An Ecological Site Assessment should be carried out to more thoroughly determine the presence of habitat and species requirements. If removal of the existing vegetation is to occur during the breeding bird season (May 1st to August 15th), investigate the area for any nests or dens prior to demolition/removals. If active migratory bird nests are discovered, removals should be further postponed to give young birds time to fledge. All waste and litter must be collected and removed from the work site on a daily basis, or stored in secure containers to prevent scavenging by birds and wildlife.	Localized and temporary disturbance and loss of habitat.	Insignificant	None
	Loss of localized field habitat due to construction of the new SWMP.	Minimize vegetation removals to the extent possible. Where appropriate, restore the area with fast-growing, low maintenance, diverse native species adapted to the project area to enhance the local plant community. Landscape and Site Restoration Plan Tree Compensation Plan	Permanent loss of field habitat to accommodate new SWMP	Insignificant	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
	Bird Attraction	Minimize suitability/attractiveness of pond to birds to avoid interference with airplane flight paths: • Strategy to be developed in consultation with Ottawa MacDonald-Cartier International Airport Authority and confirmed with Transport Canada		Insignificant	Monitor effectiveness of preventative measures
Species at Risk and Critical Habitat	Potential disruption of Species at Risk (snakes, turtles, birds) due to general construction activities.	An Ecological Site Assessment should be carried out to more thoroughly determine the presence of natural heritage features, and SAR and their habitat located on the site. SAR BMPs	Temporary localized disruption of potential SAR habitat.	Insignificant	If required under OESA and SARA permitting.
	Butternut trees on-site may be impacted by general construction and construction related activities.	Butternut Health Assessments will be required for those specimen Butternuts which occur within 25 m of proposed pond. If the trees are deemed healthy and retainable, exclusionary fencing/drip line protection around the identified trees will ensure construction activities do not impact the trees. If required, a detailed mitigation plan in consultation with the NCC and Environment Canada.	Protection of the existing butternut trees (dependent on health assessment)	Insignificant	None
Cultural Heritage Resources	Unknown archaeological potential on-site may be affected by ground disturbance during construction.	Stage 2 Archaeological Assessments are required prior to soil disturbance on the site. Consult with the Aboriginal Groups regarding the scope and results of Archaeological Assessments.	Potential disturbance of archaeological resources during construction.	Insignificant	As per Archaeological Assessments
Existing Land Uses and Ownership	School playfield use of the property may be affected during construction.	Where possible schedule construction activities that may disrupt use of the playfield to occur when school is not in session. Communications with the school board regarding any use of the leased lands. Traffic Management, Access and Pedestrian Control Plan	None anticipated	Negligible	None
	NCC lands are required for the construction and operation of the SWMP.	Negotiations and Agreements to be made between the City of Ottawa and the NCC.	None anticipated	Negligible	None
Recreation and Multi-Use Pathways	Detours and general work activities during construction will be an inconvenience to Experimental Farm Pathway users.	Construction phasing to minimize effects on traffic and pathway users. Noise, Vibration and Air Quality BMPs Public Communications Plan Traffic Management, Access and Pedestrian Control Plan	Temporary localized disruption to the Experimental Farm Pathway network.	Insignificant	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
Recreation and Multi-Use Pathways	Landscaping will provide additional features not currently associated with the site.	Implement measures to control and direct the safe and secure movement of pathway users in and around the new SWMP infrastructure. Landscape and Site Restoration Plan	Potential for enhanced pathway user experience.	Positive	None
Noise and Vibration	Potential disruption or disturbance of adjacent land uses during construction.	Contractor to ensure that City By-laws (2004-253) are not contravened, equipment is well tuned, the lubrication of moving parts, and unnecessary idling will be restricted. Noise and Vibration BMPs	Noise may be a temporary, localized irritant to adjacent land owners and pathway users.	Insignificant	None
Air Quality	Potential isolated and minor increases in dust and equipment exhausts.	Air Quality BMPs	Dust may be a temporary, localized irritant to adjacent land owners and pathway users.	Insignificant	None
Road Network	Potential delays to traffic due to heavy equipment entering and leaving the site during construction.	Construction timing/deliveries to minimize effects to traffic. Traffic Management, Access and Pedestrian Control Plan	Potential for short and sporadic traffic delays during construction.	Insignificant	None
Transit Network	Potential transit delays due to heavy equipment entering and leaving the site during construction.	Construction timing/deliveries to minimize effects to traffic. Traffic Management, Access and Pedestrian Control Plan	Potential for short and sporadic delays to the transit network during construction.	Insignificant	None
All utilities and infrastructure	Potential to interrupt utilities and infrastructure during relocations/connections.	Confirm and update easement information (e.g., name, conditions, and structures in the easement) prior to construction. Hydro One has general requirements for access to the corridor, and has requested the proposed concept plan be circulated for their review. They will provide more site specific comments during their review. Coordinate the timing of infrastructure construction to increase efficiencies and ensure appropriate timing of services.	Construction coordination of infrastructure	Negligible	None

Factors/Sub-Factors	Environmental Effects (Positive or Negative & Opportunities)	Mitigation Measures *Built-in Mitigation Measures*	Potential Residual Effect	Significance After Mitigation	Monitoring Requirements
Drainage and SWM Infrastructure	Improvements to water quality and reduced erosion potential in Pinecrest Creek.	A structural evaluation of the condition of the gabion wall (which forms a wing wall along the west side of the outlet) is recommended if it is to be maintained as part of the pond design.	Long-term benefits to water quality and stability of Pinecrest Creek.	Positive	None
Climate Change	The nature of the design is such that extreme events will not result in higher risk of failure.	Design overflows to existing outlets	Overall improved control of peak flows	Positive	N/A

9.8 Monitoring and Adaptive Management

9.8.1 Proposed Monitoring Program - Operational

Monitoring requirements for the P/W SWM Retrofit Study are outlined in Section 5 of the 2011 report (JFSA, 2011). The proposed monitoring is based on a Condition-Street-Response framework. It uses specific indicators to assess watershed health, watershed stressors and management response.

Table 9-5 highlights the proposed facility and sewershed monitoring program as outlined in the P/W SWM Retrofit Study (JFSA, 2011). The facility and sewershed monitoring in key locations can be carried out to assess the effectiveness of lot level, conveyance and EoP measures as they are implemented over time.

Table 9-5: Proposed Facility and Sewershed Monitoring Program (JFSA, 2011)

Parameters	Monitoring Locations and Details	Recommended Frequency
Flow and Water Levels	**Pinecrest Creek flow and water level monitoring** – *Refer to Section 5.1.4: streamflow monitoring undertaken for the general monitoring program (JFSA, 2011).*	
	Outfall monitoring – monitoring EoP discharge	April to October (Continuous for all events)
	Sewershed flow monitoring – it is recommended that flow be monitored at an outflow point in the sewershed by installing continuous flow gauges within the sewer at a maintenance hole location	April to October (Continuous for all events)
Precipitation	**Precipitation monitoring** collected at a local gauge which may be one of the gauges installed for the general monitoring program	April to October (Continuous)

Parameters	Monitoring Locations and Details	Recommended Frequency
Water Quality Monitoring	**Outfall monitoring** – monitoring EoP discharge using automated sampler triggered by flow levels	April to October (5 to 7 Events)
TSS, Total phosphorus and *E.coli*	**Sewershed monitoring** – at same location(s) used for the sewershed flow monitoring with an automated sampler that can be triggered by flow levels	
Creek Corridor Stability Monitoring	Implementation of the SWMP will require monitoring from the connection node downstream to the SJAMP culvert (the limit of the open channel portion of Pinecrest Creek.[2]	The frequency of cross-section monitoring should be as follows: Prior to implementation, reaches, sections and velocity/sediment sampling should occur to establish the pre-construction conditions (baseline data); surveying and analysis should then occur a minimum of 2 times per year for a period of three years.2

The monitoring results should be used to confirm and/or adjust future actions. Implementation of the Retrofit Plan and the anticipated watershed response will occur over an extended period of time.

9.8.2 Proposed Monitoring – Bird Hazard

Monitoring (Appendix H): To confirm low use of the pond by gulls and geese, a two to three year monitoring program should be established. Baseline data for the project location is being collected in the 2017 breeding season and will also occur in the summer and fall prior to the pond being constructed. Following commissioning of the facility, monitoring will commence. The monitoring will need to establish bird numbers during the spring and fall migration period as well as summer breeding/feeding/loafing numbers, in comparison to the pre-pond condition.

[2] *Refer to Section 5.1.2: Erosion and Deposition Impacts and Channel Stability in Pinecrest Creek Corridor undertaken for the general monitoring program (JFSA, 2011)*

Contingencies: In the event that the hazard level and associated risk to aircraft associated with the pond reaches an unsatisfactory level (i.e., there is hazardous bird activity reported in the vicinity of the pond by a pilot/airport personnel or a bird strike or near miss occurs in proximity to the pond), a number of contingency measures can be considered for implementation including:

Design:

- Additional landscape hardening of pond shore in specific areas
- Specific alternate landscape planting to reduce use of specific areas by geese and gulls
- Over-wiring of the pond

Wildlife control:

- Egg oiling
- Capture-Release
- Harassment (effigies/dogs, etc.).

10. NEXT STEPS

10.1 Property Use Agreement

The Stage 2 OLRT Project Agreement Lands Schedule will describe the process for property acquisition. This project will be subject to National Capital Commission standard terms and conditions for licenses of occupation during construction.

10.2 Approvals

The approvals outlined below provide an overview of the agency approvals and permits that are likely to be required for the completion of this project. In all cases, it is the proponent's responsibility to identify all permitting requirements and to ensure that any additional requirements from other federal, provincial and municipal jurisdictions are followed.

10.2.1 Federal Land Use and Design Transaction Approval

All individual and federal organizations need NCC approval before undertaking projects on federal lands in Canada's Capital Region (*National Capital Act*). As such a Federal Land Use and Design Transaction Approval (FLUDTA) will be required. The NCC has participated in this study's consultation process and had representatives on the TAC.

10.2.1.1 Federal Environmental Effects Evaluation

Under the CEAA 2012, a federal environmental assessment must be completed if the project is listed in the *Regulation Designating Physical Activities* or if there is a ministerial order. The B/W SWMP is not a project that is listed as a designated project nor has there been a ministerial order.

However, under Section 67 of the CEAA a federal authority must not exercise any power or perform any duty or function conferred on it that could permit a project to be carried out, in whole or in part, on federal lands, unless the authority determines that the carrying out of the project is not likely to cause significant adverse environmental effects.

The NCC will require an Environmental Effects Evaluation to ensure that the project will not cause significant adverse environmental effects before a Federal Land Use and Design Transaction Approval (FLUDA) will be issued.

10.2.2 Fisheries Act Approval

Under Section 35(1) of the *Fisheries Act* no person shall carry out work, an undertaking or an activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. Exceptions to this law include receiving authorization from the Minister, performing

the work in accordance with prescribed conditions authorized by a prescribed person or entity, or if the work is carried out in accordance with the regulations.

The deposit of deleterious substances is prohibited under the Regulations, where deleterious substances refers to any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water. This includes adding any water that contains substances in such quantity or concentration, or that has been treated, processed or changed, by heat or other means, from a natural state, that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.

A Self-Assessment will be required under the Fisheries Act. Following the self-assessment, the proponent will contact the DFO for authorization if:

- Construction of the new land-based SWMP will require works occurring below the HWM of a nearby waterbody;
- Construction of a new storm outfall results in a temporary or permanent increase in existing footprint below the HWM or where new temporary or permanent fill is placed below the HWM; and
- Bank stabilization using rock protection, plantings or bioengineering that results in temporary or permanent increases to the existing footprint below the HWM or if new temporary or permanent fill is placed below the HWM.
- Any restoration projects including riparian plantings, shoreline/bank stabilizations that will include the placement of temporary or permanent fill below the HWM.

It is recommended that the contractor/proponent seek advice from a qualified environmental professional following detailed design if there is any uncertainty about whether the project requires a review by DFO and to ensure compliance with the *Species at Risk Act* and the pollution prevention provisions of the *Fisheries Act*

10.2.3 Environmental Compliance Approval

An Environmental Compliance Approval per the *Ontario Water Resources Act* will be required. The MOECC has been consulted during this study and was represented on the TAC.

10.2.4 Species at Risk Act

The SARA provides automatic protection to species classified as endangered, threatened, or extirpated on federal lands. Butternut trees are endangered and protected under this Act, unless determined to be hybrid. Hybridity testing is recommended on all Butternut trees within the site.

10.2.5 Development, Interference with Wetlands, and Alternations to Shorelines and Watercourses Permit

Pinecrest Creek subwatershed and the Westboro area are within the jurisdiction of the Rideau Valley Conservation Authority. The RVCA has participated in this study's consultation process and has representatives on the project's TAC. As part of its mandate, the RVCA reviews development proposals within or adjacent to natural areas including wetlands, shorelines and waterways (*Ontario Regulation 174/06)*. The RVCA oversees permits for development and ensures that fish habitat is protected and not harmfully altered. NCC typically works with the RVCA review and comment as a matter of policy.

10.3 Notice of Completion

The Notice of Completion is issued to complete the screening requirements for this Schedule B project. The review period associated with the Notice of Completion is 30 calendar days, although the proponent may to choose to set a longer period under special circumstances such as the intervention of public holidays. The Notice of Completion clearly states the review period and the date by which all submissions or requests for an order are to be received. If no request is received within the review period specified in the Notice, the proponent may proceed to design and construction of the project.

11. SUMMARY AND CONCLUSIONS

The Pinecrest Creek/Westboro SWM Retrofit Study (2011) was completed to fulfill one of the seventeen ORAP project recommendations, and resulted in the recommendation of a SWMP at the northeast corner of Baseline Road and Woodroffe Avenue as a solution. The feasibility of this SWMP was confirmed in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).

The purpose of this EA was to investigate the SWMP alternatives and predict the potential impacts of the preferred alternative on the bio-physical, socio-economic, transportation, and infrastructure environments, as well as to recommend mitigation measures to deal with any impacts.

Construction of the pond will impose minimal general disturbances related to the pond floor material, stockpiling material and mass, sedimentation, unanticipated spills or leaks from equipment, species at risk and species habitat, detouring of recreational pathways, transit and traffic delays, and the potential uncovering of unknown archaeological potential. During the operational life of the pond, however, it will receive runoff and provide a level of control for storm events up to the 100-year storm, provide over 60% TSS removal, provide a reduction in erosion potential along Pinecrest Creek, will improve water quality, and will ultimately decrease the amount of in-channel sediment moving through the system and depositing at the Iris Street culvert (the first main culvert downstream of the proposed pond).

The environmental impacts will be mitigated through built-in mitigation measures and site specific mitigation measures. The mitigation measures recommended are considered sufficient to reduce potential negative effects to an insignificant or negligible status.

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13. APPENDICES

FOR INFORMATION ON APPENDICES A, B, C, D and E PLEASE CONTACT:

Darlene Conway, P. Eng.

Senior Project Manager, Infrastructure Planning

Asset Management Branch

Planning, Infrastructure and Economic Development Department

City of Ottawa

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Appendix A: Technical Advisory Committee and NCC Consultation Material

TAC Meeting #1 February 25, 2016

- Agenda
- Meeting Minutes
- Milestones and Schedule
- Presentation – Cumulative Impacts Study and Municipal Class EA

NCC Correspondence

- Questions from Public re: NCC involvement and approvals, December 20, 2016

NCC Meeting #1 December 7, 2015

- Meeting Notes

NCC Meeting #2 June 28, 2016

- Agenda
- Meeting Minutes
- Presentation – Cumulative Impact Study and Municipal Class EA
- Responses to NCC Internal Design Review Committee
- Correspondence with NCC re: Potential sediment disposal site north of Iris

AGENDA

MORRISON HERSHFIELD

Project: Pinecrest Creek Cumulative Impacts Study and Baseline/Woodroffe SWM Pond Municipal Class EA

Place: 180 Elgin, 6th floor (Trillium Boardroom)

Date: Thursday February 25, 2016

Time: 9am-12pm

Participants: NCC, MOE, RVCA, City of Ottawa

Conference Call Details:

→ Join Skype Meeting

1-877-495-4202 (North America) **English (United States)**
1-613-212-5081 (North America) **English (United States)**
Conference ID: 3980127
PIN: 90210

Background:

The outcome of this study is required to inform the preliminary engineering of Stage 2 LRT through the Pinecrest Creek corridor, assist in securing NCC approvals for Stage 2, and to fulfill the Class EA requirements/ confirm the functional design for the proposed retrofit pond at the northeast corner of Baseline and Woodroffe. Work will also be completed to further identify/model the effects of projected retrofits (conveyance and lot level) over the next 20 years+/-.

ITEM	BY	DURATION
Welcome/Introductions/Background	Darlene Conway, City of Ottawa	15 min
Project Overview	Karyn Cornfield, Morrison Hershfield	15 min
- Purpose of Study - Project Team & Status (Work Completed to Date) - Stakeholder/Agency Involvement		
Baseline/Woodroffe Pond EA	Kelly Roberts, Morrison Hershfield	15-30 min
- Discussion of EA objectives, process, issues - Confirmation of preferred pond option		
Pinecrest Creek CIS	Heather Wilson, JF Sabourin & Associates John Beebe, GeoProcess Research Associates	15-30 min
- Discussion of CIS purpose, process, steps and tasks - Confirmation of footprints of future projects and development		
Key Milestones	Karyn Cornfield, Morrison Hershfield	10 min

MINUTES

MORRISON HERSHFIELD

Pinecrest Creek Cumulative Impacts Study and Baseline/Woodroffe Retrofit Pond Class EA
Technical Advisory Committee (TAC) Meeting #1

Project:	Pinecrest Creek Cumulative Impacts Study and Baseline/Woodroffe SWM Retrofit Pond Class EA	
Place:	180 Elgin, Trillium Boardroom, Ste. 601	
Date:	Thursday February 25, 2016	
Time:	9:00 - 11:15am	
Present:	Martin Barakengera (MB)	NCC
	Julie Mulligan (JM)	NCC
	David Malkin (DM)	NCC
	Bina Chakraburtty (BC)	NCC
	Juan Galindez (JG)	NCC
	Jocelyn Chandler (JC)	RVCA
	Charles Goulet (CG)	MOECC
	Ben Strang (BS)	City of Ottawa
	Eric Tousignant (ET)	City of Ottawa
	Eva Spal (ES)	City of Ottawa
	Carolyn Newcombe (for E. Murphy)	City of Ottawa
	Darlene Conway (DC)	City of Ottawa – City Coordinator
	Laurent Jolliet (LJ)	City of Ottawa
	Jabbar Siddique (JS)	City of Ottawa
	Heather Wilson (HW) – via telecom	JFSA – CIS Lead
	Colin Brennan (CB)	JFSA – CIS
	Charles Wheeler (CW)	CTP2 - Stage 2 LRT
	Elie Dagher (ED)	CTP2 - Stage 2 LRT
	Marc Magierowicz (MM)	CTP2 - Stage 2 LRT
	John Beebe (JB)	GeoProcess Research
	Karyn Cornfield (KC)	MH – CIS & EA PM
	Kelly Roberts (KR)	MH – EA Lead
	Sarah MacKelvie (SM)	MH – EA
	Ved Proag (VP)	MH – Stage 2 LRT
	Karine Bertrand (KB) – via telecom	MH – Stage 2 LRT

Regrets:	Eric Emery (EE)	MH – Stage 2 LRT
	Ryan Polkinghorne (RP)	City of Ottawa
	Elizabeth Murphy (EM)	City of Ottawa
	Julia Robinson (JR)	City of Ottawa
	Susan O'Connor (SO)	City of Ottawa
	Chris Rogers (CR)	City of Ottawa
	Arto Keklikian (AK)	NCC
	Michael Muir (MM)	NCC
	Greg Kehoe (GK)	NCC
	Ferdous Ahmed (FA)	RVCA
Acronyms	CIS – Cumulative Impacts Study	
	CTP2 – Capital Transit Partners (Stage 2)	
	EA – Environmental Assessment	
	GPRA – GeoProcess Research Associates	
	JFSA – J.F. Sabourin and Associates	
	LRT – Light Rail Transit	
	MOECC – Ministry of Environment and Climate Change	
	MSF – Maintenance Storage Facility	
	MH – Morrison Hershfield	
	NCC – National Capital Commission	
	PE – Preliminary Engineering (LRT)	
	PSOS – Project Specific Output Specification	
	RVCA – Rideau Valley Conservation Authority	

Agenda:

1. Welcome/Introductions/Background (Darlene Conway, City of Ottawa)
2. Overview (Karyn Cornfield, Morrison Hershfield)
   - 2.1. Purpose of Study
   - 2.2. Project Team & Status of Work
   - 2.3. Schedule of Milestones
   - 2.4. Stakeholder/Agency Involvement
3. Baseline/Woodroffe SWM Retrofit Pond Class EA (Kelly Roberts, Morrison Hershfield)
   - 3.1. EA objectives, process, issues
   - 3.2. Confirmation of preferred pond option
4. Pinecrest Creek CIS (Heather Wilson, J.F. Sabourin and Associates)
   - 4.1. CIS purpose, process, steps and tasks
   - 4.2. Confirmation of footprints of future projects and development
   - 4.3. Fluvial Geomorphology (John Beebe, GeoProcess Research Associates)
5. Key Milestones & Next Steps (Karyn Cornfield, Morrison Hershfield)

Presentation Materials:

The PowerPoint presentation delivered during this meeting is attached to these minutes.

ITEM	MINUTES	ACTION BY
1.	**Welcome/Introductions/Background (Darlene Conway, City)** City (DC) introduced the study, providing background on previous studies completed by the City and the NCC within the Pinecrest Creek watershed and the genesis of the request from NCC to complete a Cumulative Impact Study (CIS) for Pinecrest Creek. CTP2 (CW) briefly explained the correlation between this study and Stage 2 of the LRT, noting that the results of the CIS are required to inform the LRT preliminary engineering deliverable, namely, the PSOS (Project Specific Output Specification), which needs to be completed by December 2016, in order to avoid the need for a large addendum during the Open Market period (February - December 2017) prior to award of contract in 2018. For this reason, the City has directed CTP2 to undertake the study to ensure that it is completed in a timeline that supports the Stage 2 LRT deadlines. NCC (DM): Does the LRT affect scope of the CIS and EA work? CTP2 (CW): LRT only drives the schedule and does not influence scope (i.e., LRT is one of a number of projects/impacts for which cumulative impacts will be assessed.)	
2.	**Overview (Karyn Cornfield, Morrison Hershfield)** 2.1. Purpose of Study 2.2. Project Team & Status (Work Completed to Date) 2.3. Stakeholder/Agency Involvement Refer to the Presentation Material for details on the above topics.	

3.	**Baseline/Woodroffe Pond EA (Kelly Roberts, Morrison Hershfield)** Refer to Presentation Material. **3.1. Discussion of EA objectives, process, issues** MH (KR): The Class EA falls under Schedule B due to property acquisition requirements associated with the pond. Therefore, the EA will include a public review component. NCC (DM): What is the final product of the CIS (plan or program)? Is it subject to a Strategic EA? Will the study recommend an implementation program for mitigation measures? Is there a plan for land use? City (DC): Each City project has its own EA and mitigation recommendations. The CIS will assess the cumulative impacts on Pinecrest Creek of all these projects and recommend additional mitigation measures, if required; this level of assessment could not be achieved by considering the separate provincial EA's. The recommendations and proposed implementation schedule coming out of the CIS will be presented to City Council for endorsement and to demonstrate City commitment to moving forward with SWM retrofits. MH (KR) – A Strategic EA should not be required as there is not a federal program or policy being implemented. NCC (JM): Is approval of the Baseline/Woodroffe pond being sought in advance of completion of the CIS? City (DC): No – approval of pond functional design is being sought fully in parallel with CIS. **3.2. Confirmation of Preferred Pond Option (1 or 2)** NCC (JM): NCC preference for Option 1, as per the report "Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue" (JFSA, 2015), is subject to technical requirements that need to be satisfied with any pond on NCC lands. NCC can revisit its decision if they are presented with additional constraints that may affect their preference. NCC has consistently preferred Option 1 while Option 2 would require significant changes. City (DC): To move forward with modeling work to assess cumulative impacts the study team needs confirmation from the NCC of the preferred option. Any outstanding technical issues or requirements can continue to be addressed within the context of confirming the final functional design.	

	RVCA (JC): The RVCA does not have a preference for either pond option as both options perform similarly (hydraulically). The RVCA will be more interested in the technical details (e.g. pond connections to the watercourse) rather than the aesthetics and will be more involved during the detailed design stage. City (ES): Operations Group would be most concerned about access to the inlet and outlet structures for maintenance purposes. JFSA (CB): The inlet and outlet locations and configurations proposed for the two options are identical and thereby the maintenance requirements would likely be the same for both options. NCC (BC): Why are TSS Removal rates “almost 80%”? JFSA (CB): The results of the hydrologic/hydraulic analyses for the pond indicate that a small portion of the flow from a 25 mm storm event would flow directly over the grade control riffle. Therefore the pond may not function precisely as assumed in the MOECC SWM Manual in terms of TSS removal (e.g. for 80% TSS removal). However, as the facility captures the majority of the 25 mm storm runoff, a TSS removal rate in excess of 60% would be achieved and likely very close to 80%. Through the detailed design stage it may be possible to confirm whether this rate actually reaches 80% TSS removal. GPRA (JB): The flow over the grade riffle (as described above) is due to the ponds proposed inlet/grade riffle/outlet configuration, which provides for some runoff from those events to flow through the reach between the riffle and the outlets – had to let some water through for those events. CW asked at what level of the NCC is the decision re: the preferred option made? NCC (DM): This decision would be at the staff level. NCC (BC): Requested that greater than the 100yr event be assessed. City (DC): Yes, a larger event will be modeled.	

4.	**Pinecrest Creek CIS (Heather Wilson, JFSA; John Beebe, GPRA)** **4.1. CIS purpose, process, steps and tasks** Refer to Presentation Material. **4.2. Confirmation of footprints of future projects and development** CW provided the following context on LRT and related projects: • LRT footprint to be constructed by 2023 ends at Baseline Station. Timing of works beyond Baseline Station, including Tallwood Station and Maintenance Storage Facility, is unknown, although the Preliminary Engineering (PE) for this section is currently included with the PE of Stage 2. • A half-up, half-down solution at the Iris crossing was recommended in the EA in order to maintain grade separation. This arrangement will be carried forward for PE. The EA recommends a realignment of the Pinecrest Creek and new culverts just downstream of Iris. • Baseline Station will accommodate storage of four trains in the interim (prior to or instead of long term Woodroffe MSF). • Existing Queensview station will be decommissioned. **4.3. Fluvial Geomorphology** Refer to Presentation Material. Pinecrest Creek has two areas with erosion risk that may require work; one is located upstream of Iris and the other is located downstream of the Queensway just below a small pedestrian bridge. The erosion area at Iris may require a relatively simple solution while the Queensway location will be more difficult /costly to address. A monitoring effort may be required in the future. The timing of project implementation, and if the Creek can live with what is being “asked” if there is a lag in implementation, has always been a concern. NCC (JM): Will the CIS include the uncommissioned outfall for SW Transitway? DC responded that the outfall would be included.	

5.	**Key Milestones & Next Steps (Karyn Cornfield, MH)** CTP2 will invite NCC, City, and RVCA to attend a workshop regarding potential solutions for LRT issues regarding Pinecrest Creek (primarily dealing with the floodplain and the Pinecrest Creek Enclosure). CTP2 will organize this workshop when solutions are identified and confirmed as feasible (end of March). Agency feedback will be required on this issue in order for CTP2 to complete the Preliminary Engineering for Stage 2 LRT and provide input back into the CIS. Technical memos and reports will be circulated to the TAC for review. Three memos (March, April, May) for the CIS and an Interim Report on the EA (April) will be circulated prior to TAC 2 (June) and then additional memos and report will follow. ***Post meeting note****: Given the tight timeline for the study to support Stage 2, there will be limited time to provide comments on some critical path items such as detailed hydrologic/hydraulic modeling. The City will be undertaking a detailed review of the modeling.* An NCC pond design review meeting is currently planned for September however it may be better to schedule this meeting earlier. NCC (JM): Minimal landscape changes are expected from NCC for Option 1. RVCA (JC) requested a copy of the schedule and the list of documents to be reviewed by the RVCA. MH (KC) confirmed that a list of milestones will be provided attached with the minutes. NCC (MB) does not see any mention in the project milestones of NCC approval of pond and requested a clarification of the project's incorporation of the required approvals. City (DC) explained that a letter of endorsement subject to detailed design of the pond would be requested from the NCC. City (DC) further mentioned that the procurement approach for the future detailed design and construction of the pond have not been decided to date. NCC(JM): Would the SWM pond be built as part of the LRT? CTP2 (CW): Decision on pond detailed design/construction and whether it will be "bundled" with Stage 2 LRT has not been made City (MM): A letter from Chris Swail will be issued shortly to the NCC stating that the Stage 2 LRT is "not a designated project under CEAA within the regulations".	**CW/KC**

Pinecrest Creek Cumulative Impacts Study and Baseline/Woodroffe Pond Class EA – Schedule Summary for the Technical Advisory Committee

Milestone	Timing	Baseline/Woodroffe SWM Facility - Class EA	Pinecrest Creek CIS
TAC Meeting 1	February 25, 2016	Discussion of EA objectives, process, issues, consultation, and required input from Agencies. Confirm pond footprint with NCC.	Discussion of CIS objectives, process, and issues. Confirmation of future development & footprints for major projects.
Tech Memo 1A	March 31, 2016		Hydrologic/Hydraulic Model Results for Existing Conditions (2015 SWS Update). Circulate to TAC.
Tech Memo 1B	April 15, 2016		Existing Conditions: Results (Fluvial G, Water Quality). Circulate to TAC.
Tech Memo 2	June 1, 2016		Modelling Results: Future Ultimate Conditions (Controlled & Uncontrolled). Circulate to TAC.
Interim EA Report	May 1, 2016	Interim EA Report: Phase 1 and Phase 2 (Existing Conditions)	
TAC Meeting 2	June 2016	Confirm evaluation and preferred alternative. Present interim EA report with work done to date.	Presentation of modelling results for Future Conditions (Controlled & Uncontrolled). Confirmation of Interim Scenario.
Technical Memo 3	July 2016		Modelling Results for Interim Scenario and Cumulative Impacts (comparison of existing conditions with future – ultimate condition with interim scenario). Circulate to TAC.
Technical Memo 4 Provisional	August 2016		Confirmation of Cumulative Impacts Assessment and optimal combination of proposed mitigation measures/trade-off projects/in-stream works (conceptual design & cost estimate). Circulate to TAC.
Pond Design Meeting with NCC	Sept 2016	Presentation of functional design and landscape concept plan	
On-Line Open House	Sept 2016	Presentation of the EA project and the proposed pond configuration.	
TAC Meeting 3	Sept 2016 (or earlier depending on need for Mitigation)	Present Draft EA report	Presentation of Interim Scenario result and Cumulative Impacts Assessment. Identification of optimal combination of SWM/SWM retrofits/mitigation measures/trade-off projects and additional in-stream works. Include conceptual design/ cost estimate for in-stream works and assignment of responsibility for these works.
Draft CIS Report	Sept 2016		Incorporate comments on Tech Memos. Circulate to TAC.
Draft EA Report	Oct 2016	Incorporate comments from open house and circulate to TAC	
Final EA Report	Nov 2016	For public review	
Final CIS Report	Nov 2016	Circulate to TAC	Circulate to TAC

Pinecrest Creek Cumulative Impacts Study and Baseline/Woodroffe SWM Pond Municipal Class EA

Technical Advisory Committee
Meeting #1 February 25, 2016

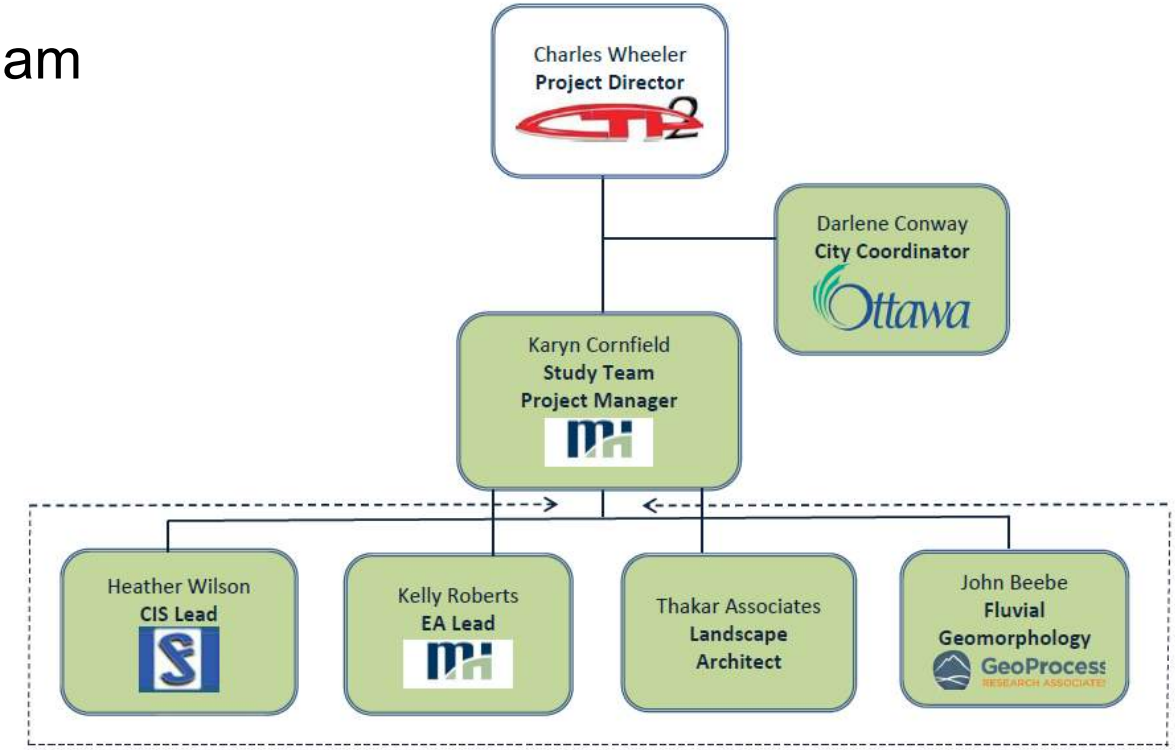
MORRISON HERSHFIELD

Agenda

- Welcome/Introductions/Background (Darlene Conway, City of Ottawa)
- Project Overview (Karyn Cornfield, Morrison Hershfield)
  - Project Scope, Team, Status, Schedule
  - Stakeholders/Agency Involvement
- Baseline/Woodroffe Pond EA (Kelly Roberts, Morrison Hershfield)
  - EA objectives, process and issues
  - Confirmation of pond option
- Pinecrest Creek CIS
  - CIS purpose and process
  - Footprints of future projects and development
- Milestones & Next Steps

Introductions

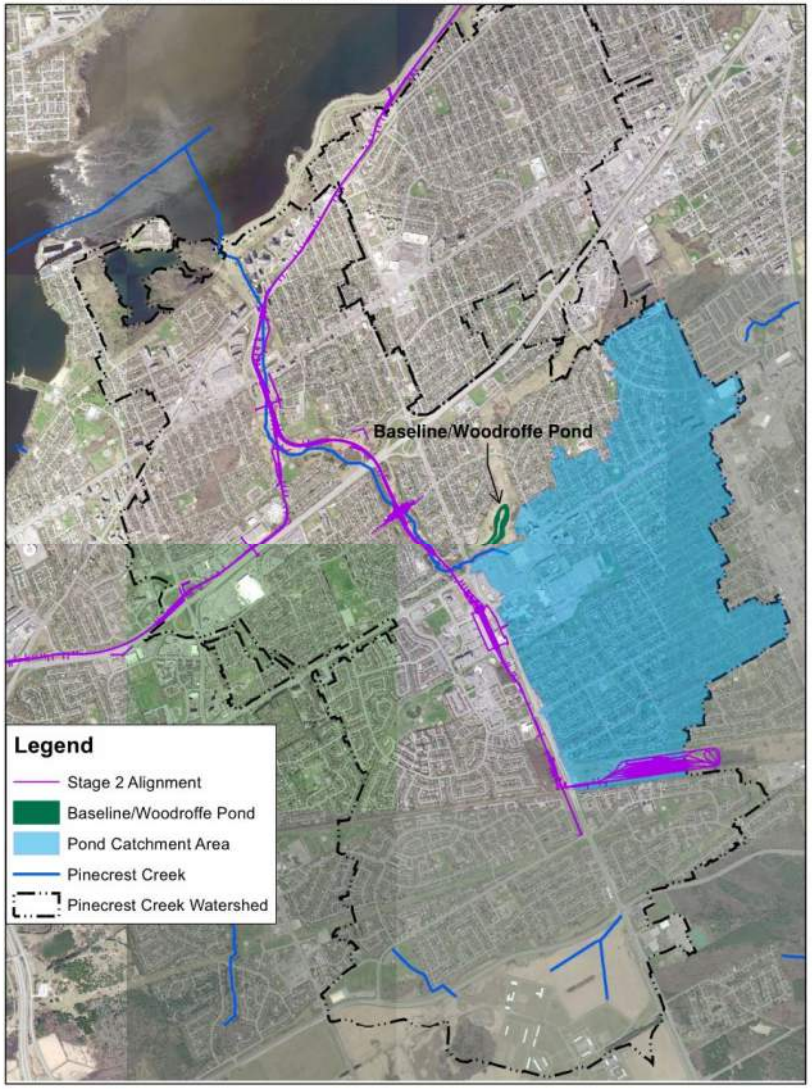
- Project Team



MORRISON HERSHFIELD

Project Overview

Baseline/Woodroffe SWM Facility within Pinecrest Creek Watershed



Project Overview

- Class EA: Baseline Woodroffe SWM Retrofit Pond
  - Functional design completed by JFSA in 2015 to be confirmed through this study
  - Provincial Class EA requirements will be addressed herein - and to the extent possible the federal EA requirements (to inform detailed design)

- CIS: Pinecrest Creek Cumulative Impacts Study
  - To identify and recommend mitigation for cumulative impacts on Pinecrest Creek due to 'Future Projects' including Baseline/Woodroffe SWM Pond, Western LRT, and other projects & infill development; and also effects of proposed SWM retrofits (lot level/ conveyance) over the next 20 years +/-
  - CIS will also inform the Preliminary Engineering for LRT

Project Status

- Pond EA: Existing Conditions
  - Background materials being reviewed
  - Building on previous reports/studies
- Creek CIS: Hydrologic/hydraulic Model
  - Existing conditions model currently being updated to reflect current SWS conditions
- TAC Meeting 1 focus
  - To introduce the EA & CIS
  - To confirm preferred pond option with NCC
  - To confirm footprints of major projects to inform the CIS

Schedule

- CIS and LRT inputs
  - LRT Preliminary Engineering (30% design) finish date July 29, 2016
  - LRT PSOS (Project Specific Output Specification) finish date December 13, 2016
  - CIS (& EA) will be completed by November 2016
  - Water level modelling results from CIS are required to inform LRT

Stakeholders/Agency Involvement

- Provincial
- First Nations
- Federal
- Utilities

Schedule

Milestone	Timing	SWM Pond EA	Pinecrest Creek CIS
TAC 1	**Feb 25**	**Introduce EA, confirm pond footprint**	**Introduce CIS, confirm major projects**
Tech Memos to City	March-May		Modelling results
Interim EA Report	May	Phase 1 & 2 (Existing Conditions)	
TAC 2	June	Interim EA work	Future condition results. Confirm Interim Scenario
Tech Memo to City	July		Interim & Cumulative Impacts
NCC Pond Design Meeting	September	Functional design & landscape concept	
Open House	September	Present EA project and pond design	
TAC 3	September (or earlier depending on need for mitigation)	Draft EA report	Interim Scenarios/Impacts Assessment (provisional: mitigation)
Draft CIS & EA Reports	Sept-October		
Final CIS & EA Reports	November		

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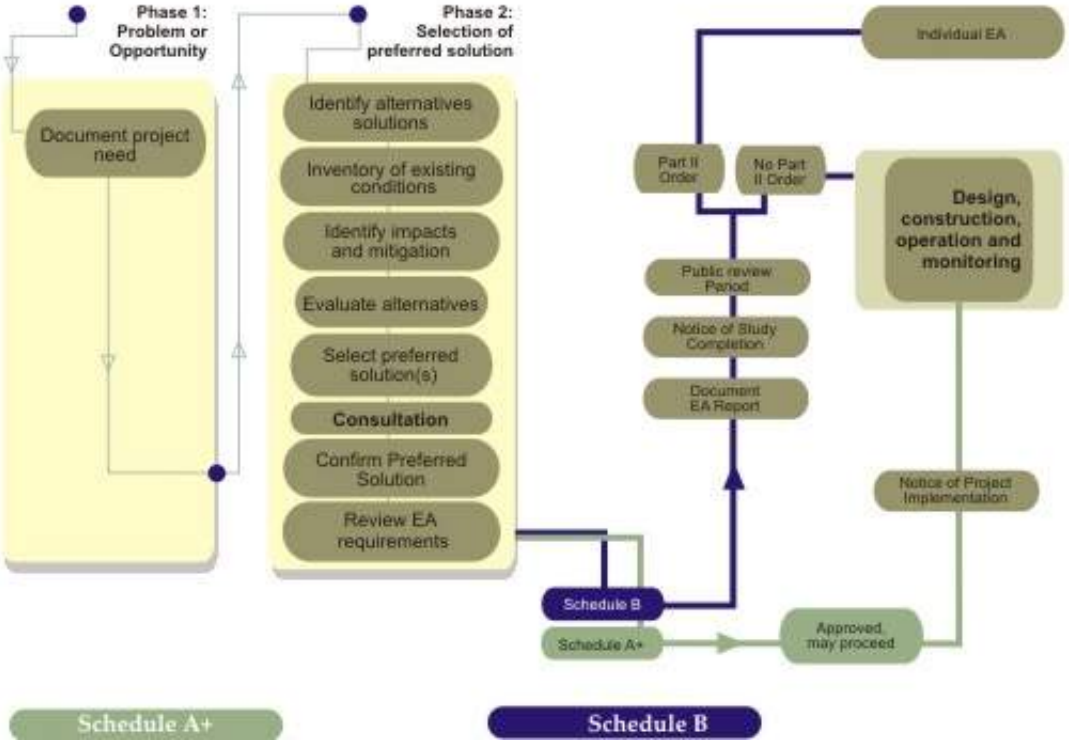
Baseline/Woodroffe SWM Pond Municipal Class EA

Objectives

- Problem: *Managing the historical impacts of development on Pinecrest Creek*
- Review previous work
  - February 2010 Ottawa River Action Plan (ORAP)
  - October 2011 Pinecrest Creek/Westboro SWM Retrofit Study (P/W study)
  - June 2015, Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (Feasibility Study)
- Recognize NCC interests
  - Land owner
  - Compliance with CEAA in co-ordination with CIS

Class EA Process



MORRISON HERSHFIELD

Issues

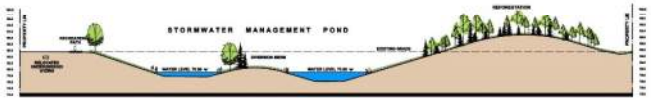
- Recognition of previous work
  - Avoid duplication
  - Provincial EA context
  - CEAA EA determination
- Public stakeholders
  - Government
  - Public
- Integration with CIS
  - Synergies
  - Divergences

Confirmation

- Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue
  - Revised/update functional design per the Class EA to determine a preferred design
  - Confirm pond footprint option (1 or 2)
  - Pond sizing

Pond Option 1

SECTION A



SECTION B

LEGEND

PROPOSED

- STORMWATER RETENTION POND
- MEADOW
- MOWN GRASS
- REFORESTATION PLANTING
- LARGE TREE PLANTING
- SHRUB PLANTING
- 3m ASPHALT RECREATIONAL PATH
- CONTOURS (1.0m INTERVALS)
- 50m DRAW DOWN LIMIT

EXISTING

- CONTOURS (.5m INTERVALS)
- HYDRO POLE / LINE
- VEGETATION TO REMAIN

POND FEATURES / COMPONENTS

- A POND INLET
- B RIFFLE OVERFLOW 79.61
- C FLOW DIVERSION BERM
- D FOREBAY
- E FOREBAY OUTLET BERM
- F QUANTITY OUTLET
- G QUALITY LOW FLOW OUTLET
- H MAINTENANCE ACCESS ROAD
- I PINECREST CREEK

Pond Option 2

Preference

- NCC Preference Option 1
- Performance of both similar
  - Sizing
  - Achieve close to 80% TSS removal
  - Flood attenuation

Pinecrest Creek Cumulative Impacts Study

MORRISON HERSHFIELD

Pinecrest Creek Cumulative Impacts Study

Purpose of Cumulative Impact Study

- To identify the cumulative impacts on Pinecrest Creek of:
  - specific projects proposed for development within Creek corridor
  - future development within the subwatershed

- To identify appropriate measures to mitigate those (negative) cumulative impacts

Purpose of Cumulative Impact Study

To identify the cumulative impacts of these projects:

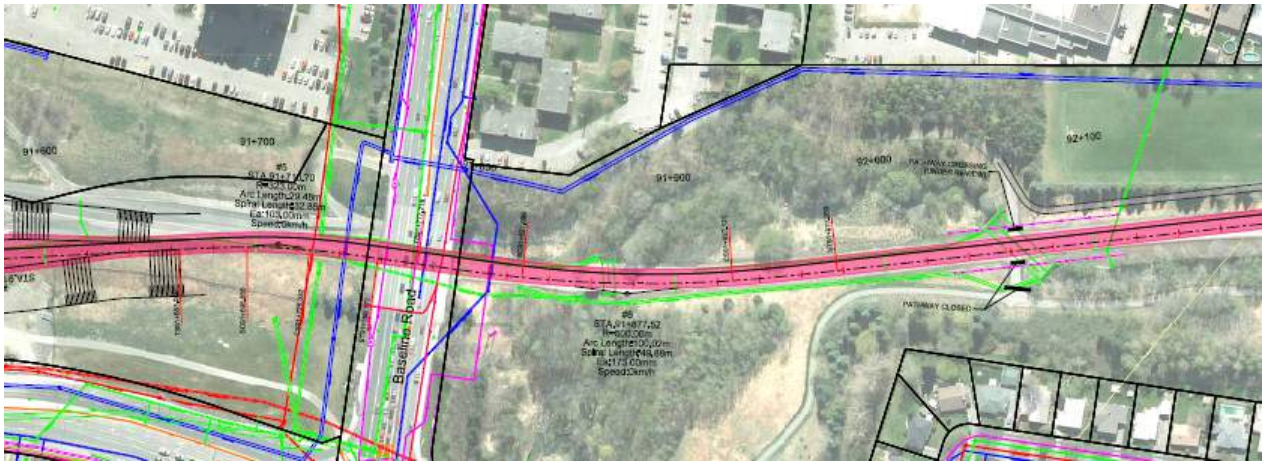
- Baseline/Woodroffe SWM retrofit pond

Purpose of Cumulative Impact Study

- anticipated SWM retrofits throughout subwatershed

Purpose of Cumulative Impact Study

- Western LRT and associated projects (e.g. Hwy 417 widening, Richmond Road Complete Streets)
- Baseline Road Bus Rapid Transit



Purpose of Cumulative Impact Study

- SW Transitway extension to Hunt Club
- projected development / redevelopment to 2031 OP horizon

Process - Steps and Tasks

1. Background documents and data
2. Preparation of models for flow, water level and water quality simulations of the following scenarios:
   - Existing conditions
   - Future conditions:
     - Uncontrolled
     - With SWM controls and retrofits (20 years +/-)
     - Interim scenario (10 years +/-)

Process - Steps and Tasks

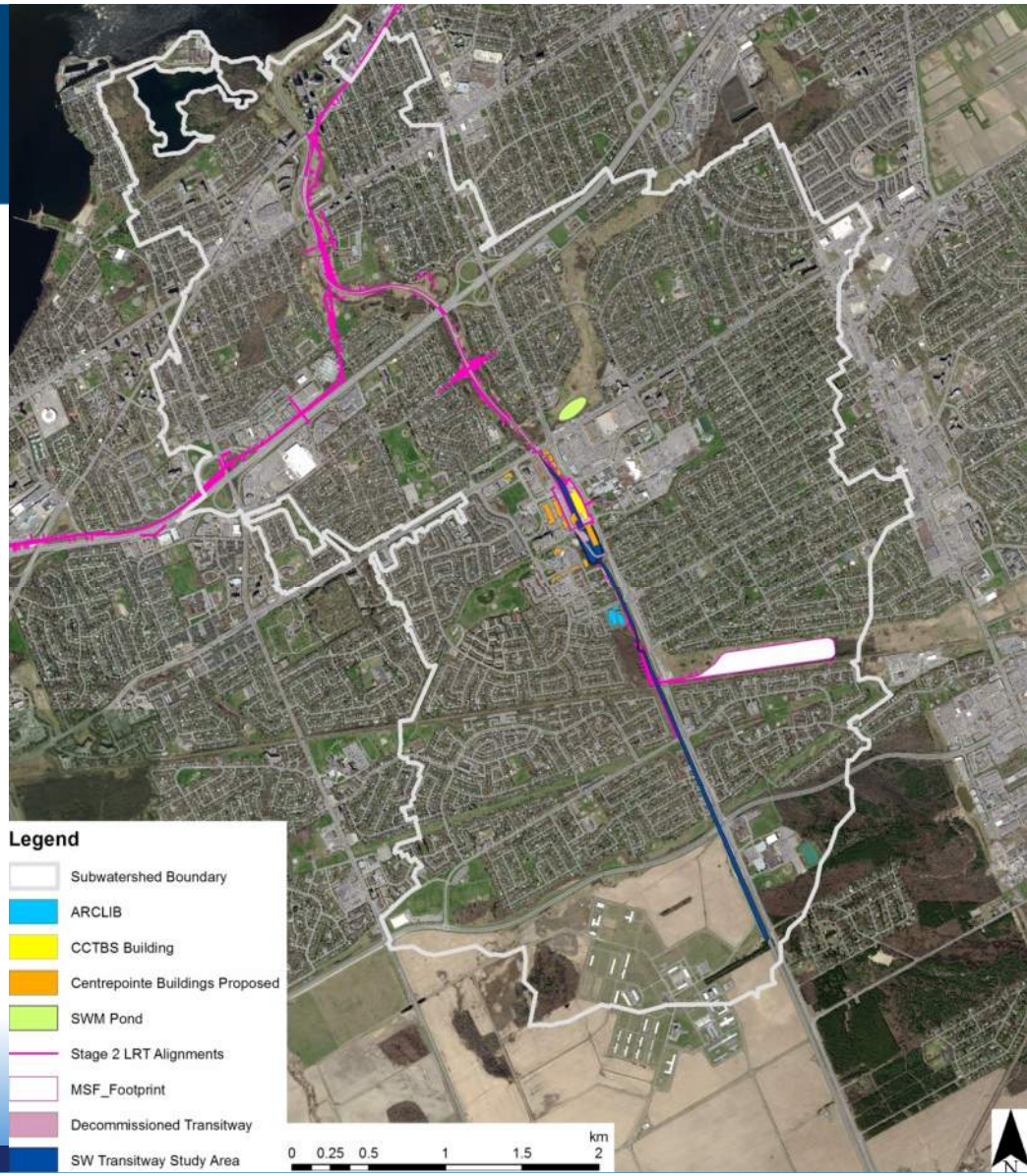
3. Assessment of cumulative impacts on:
   - Peak flows, flooding, and overall subwatershed response
   - Water quality
   - Erosion rates, channel form and function, existing infrastructure
   - Future daylighting potential
   - Area identified for use by Sir John A. Macdonald linear park

Process - Steps and Tasks

4. Mitigation
   - combined SWM controls
   - potential trade-off projects
   - in-stream works

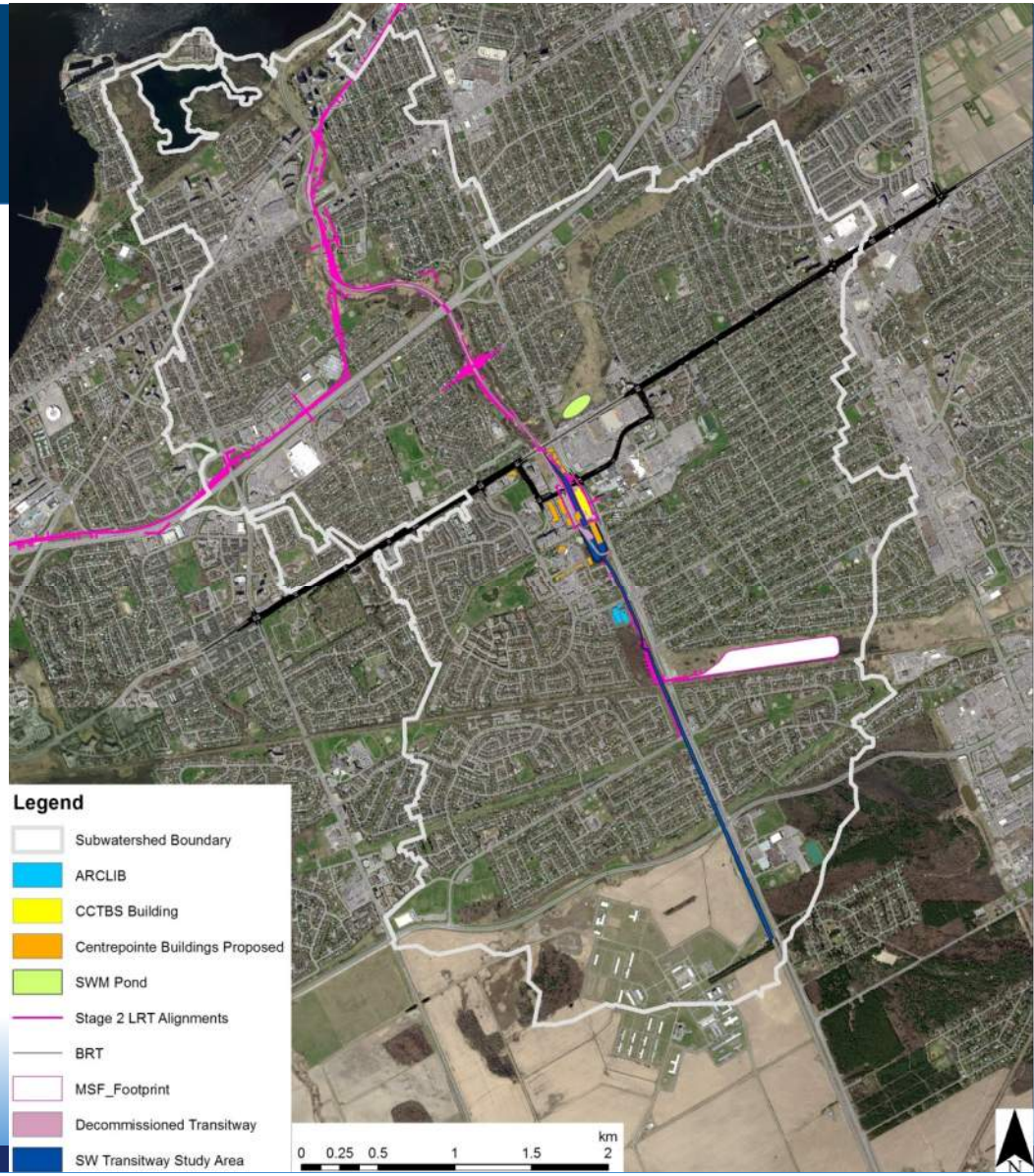
Footprints of Future Projects

- Future projects



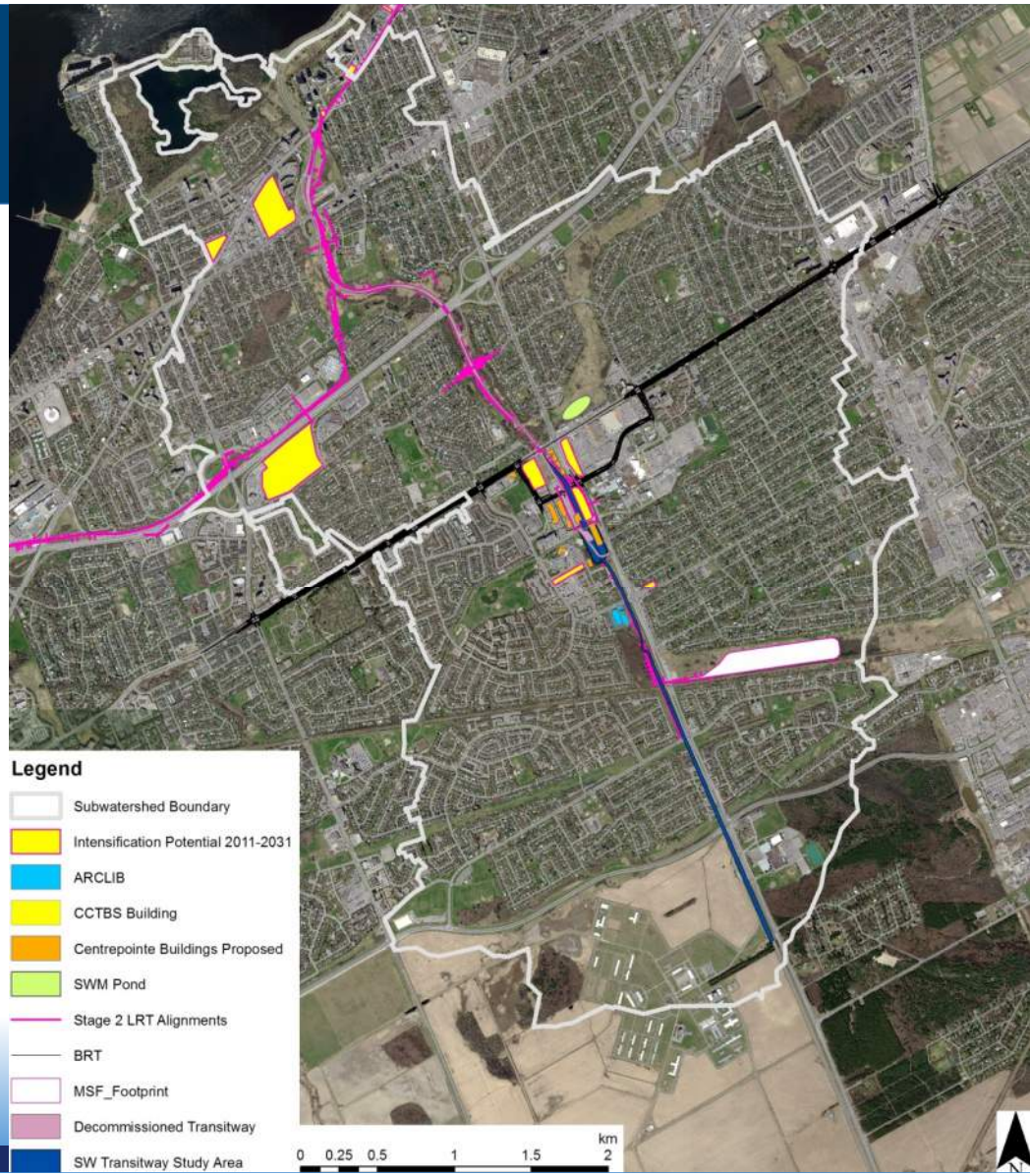
Footprints of Future Projects

- Future projects
  with
- Baseline Road Bus Rapid Transit



Footprints of Future Projects and Development

- Footprints of future projects with
- Baseline Road Bus Rapid Transit and
- Intensification to 2031



Pinecrest Creek Cumulative Impacts Study
- Fluvial Geomorphology

GeoProcess
RESEARCH ASSOCIATES

MORRISON HERSHFIELD

Evolution of Erosion Sensitivity : 2006-2012-2016

Existing Conditions Update

- Studied since 2006
- Restoration Plans completed
- Some areas are adjusting
- Some areas still at risk

- Field work will update the stability mapping to point to areas for monitoring

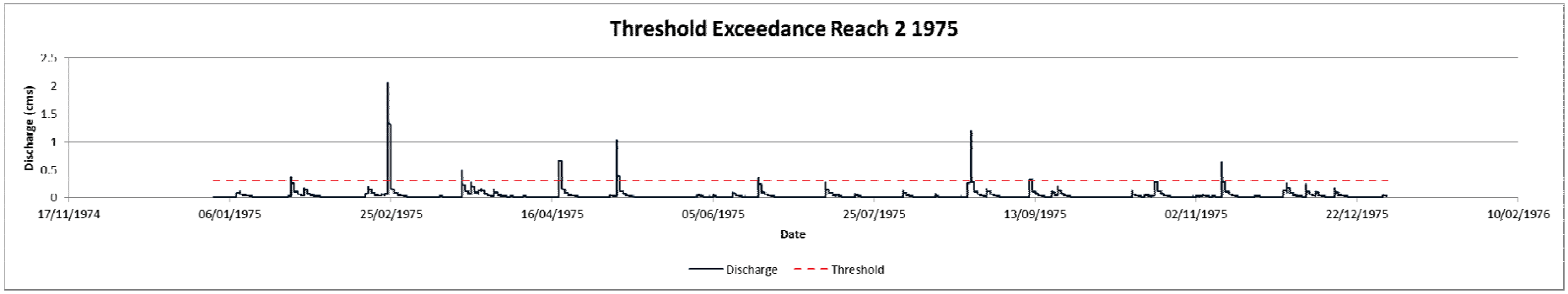
2006

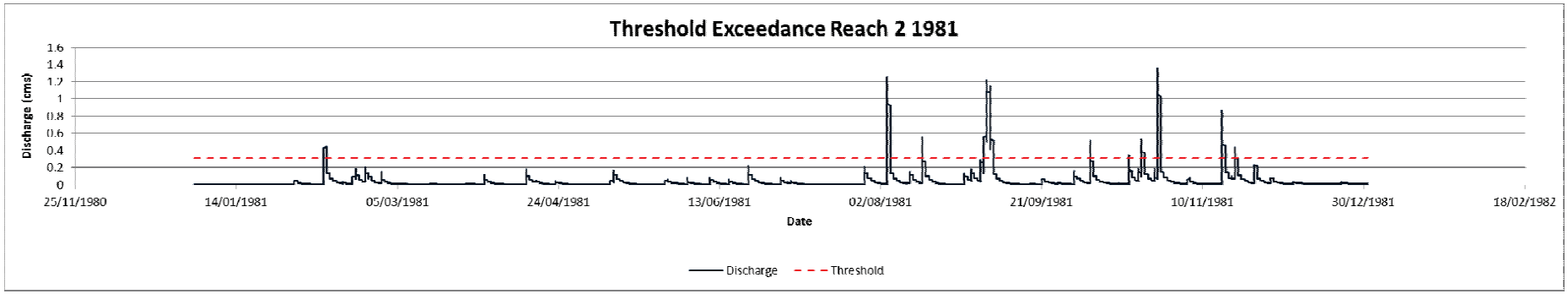
Reach 5: Transitway Culvert to Woodroffe Culvert						
Station	Easting	Northing	Factor	Severity	Stability	Priority Class
4+275	362405	5023778	Human			
4+295	362417	5023792	Redirection			
4+313	362423	5023808	Natural			
4+335	362442	5023805	Human			
4+346	362450	5023798	Human			
4+355	362459	5023797	Natural			
4+373	362475	5023804	Human			
4+390	362472	5023811	Natural			
4+405	362466	5023822	Human			
4+420	362478	5023829	Human			
4+434	362491	5023833	Human			

2012

Reach 5: Transitway Culvert to Woodroffe Culvert						
Station	Easting	Northing	Factor	Severity	Stability	Priority Class
4+275	362405	5023778	Human			
4+295	362417	5023792	Redirection			
4+313	362423	5023808	Natural			
4+335	362442	5023805	Human			
4+346	362450	5023798	Human			
4+355	362459	5023797	Natural			
4+373	362475	5023804	Human			
4+390	362472	5023811	Natural			
4+405	362466	5023822	Human			
4+420	362478	5023829	Human			
4+434	362491	5023833	Human			

Erosion Threshold Exceedance at Critical Nodes





GeoProcess
RESEARCH ASSOCIATES

Geomorphology Results

- Comparison of the existing, interim and future conditions results
  - What, if any, interventions may be required
  - Potential for in-stream works
  - Monitoring areas of concern instead to see if they repair themselves

- Particular interest is being paid to the interim condition and the length of time this situation may be in place.
  - Potential for temporary measures

Milestones

Milestone	Timing	SWM Pond EA	Pinecrest Creek CIS
TAC 1	**Feb 25**	**Introduce EA, confirm pond footprint**	**Introduce CIS, confirm major projects**
Tech Memos to City	March-May		Modelling results
Interim EA Report	May	Phase 1 & 2 (Existing Conditions)	
TAC 2	June	Interim EA work	Future condition results. Confirm Interim Scenario
Tech Memo to City	July		Interim & Cumulative Impacts
NCC Pond Design Meeting	September	Functional design & landscape concept	
Open House	September	Present EA project and pond design	
TAC 3	September (or earlier depending on need for mitigation)	Draft EA report	Interim Scenarios/Impacts Assessment (provisional: mitigation)
Draft CIS & EA Reports	Sept-October		
Final CIS & EA Reports	November		

MORRISON HERSHFIELD

Next Steps

- CIS
  - Existing Conditions (Tech Memos to City - April)
  - Future Conditions Modelling Results (Tech Memo to City – May)
  - TAC 2 (June)
    - Presentation of Future Conditions Model and Confirmation of Interim Scenario
- EA
  - Filing of Notice of Commencement
  - Completion of Phase 1 and Phase 2 (Existing Conditions)
  - Interim EA Report (May)

Questions or Comments?

From: Barakengera, Martin [mailto:martin.barakengera@ncc-ccn.ca]
Sent: Tuesday, December 20, 2016 4:57 PM
To: 'Conway, Darlene' <Darlene.Conway@ottawa.ca>
Cc: [redacted]
Subject: RE: Baseline/Woodroffe pond - questions from public re: NCC involvement and approvals

Hi Darlene,

Apologies for my delayed response. Answers are provided in red next to each question.

Regards,

Martin Barakengera MCIP RPP PMP
Senior Land Use Planner - Planificateur principal, utilisation du sol
Capital Planning - Aménagement de la capitale
National Capital Commission - Commission de la capitale nationale
202 - 40 Elgin, Ottawa, ON CANADA, K1P 1C7
tel: 613-239-5678 ext. 5196
www.ncc-ccn.gc.ca

From: Conway, Darlene [mailto:Darlene.Conway@ottawa.ca]
Sent: Friday, December 16, 2016 12:37 PM
To: Barakengera, Martin
Cc: [redacted]
Subject: Baseline/Woodroffe pond - questions from public re: NCC involvement and approvals

Hello, Martin. I have recently received questions from the public regarding NCC's involvement with the pond and provide them here:

re: NCC:
I am assuming that your submission is under review in Capital Planning Branch, Federal Approvals and Environment and that Mr. Mike Muir has been involved from the onset (he is copied on the

2010 letter). Yes

Questions: Can you provide specific details of the review program and decision timing? What role is Mr. Muir playing in this approval process? The pond is going through a Level 2 design review. Level 2 design approval projects are reviewed by a cross functional work group of NCC staff, then presented to an Internal Design Review Committee (IDRC) – which has been done, and finally once the design has been revised and finalized to staff's satisfaction, the project is sent to an executive committee of the NCC Board for approval, via an E-vote. After the Board approves the project, the executive director of the Capital Planning Branch signs the approval. Mike Muir is generally consulted on all approvals on NCC lands within his land management area.

Board members [of the Bel Air Community Association] expressed disappointment that Mr. Muir did not disclose any information on the City's plans when he attended a meeting six months ago to discuss potential improvements to the same green space. Noted

Charles has advised that NCC will not be attending the January 9th public meeting. Anticipating that these and similar questions will be asked, do you have a preference as to how such questions are to be directed and/or addressed? It may be helpful to meet to discuss prior to the public meeting.

Regards.

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

City of Ottawa Ville d'Ottawa
613.580.2424 ext./poste 27611
ottawa.ca/planning ottawa.ca/urbanisme

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Baseline/Woodroffe pond Class EA and Pinecrest Creek Cumulative impacts study

Meeting with NCC

December 7, 2015
1:00pm – 2:30pm
NCC – Room 509

Present:

Darlene Conway (DEC)	City of Ottawa, Infrastructure Policy Unit
David Malkin (DM)	NCC, Capital Planning Branch
Julie Mulligan (JM)	NCC, Capital Planning Branch

Regrets:

Michael Muir	NCC, Capital Stewardship Branch

Meeting Notes

1. Overview and general discussion:
DEC provided an overview of the work completed to date to arrive at the draft Terms of Reference (ToR) for the study. The proposed pond was a recommendation of the Pinecrest Creek/Westboro SWM Study (2011). Its implementation was moved forward in conjunction with the construction of a new (but uncommissioned) storm outfall for Baseline transit station. Based upon previous consultations with NCC, this cumulative impacts study (CIS) is required to assess the cumulative impacts of the pond/other identified projects/future retrofits/projected developmentwithin the subwatershed.

2. Review pf NCC comments on draft Terms of Reference:
DEC noted most comments/track changes accepted and ToR revised accordingly.

With respect to the following comments:

> *3.1 Existing Conditions:*
> *v) Assessment of existing conditions of the Landscape character and ecological integrity of the Pinecrest Creek corridor*
> *vii) Assessment of the recreational attributes of the corridor*
> *3.3 Assessment of Cumulative Impacts:*
> *Assessment of any potential effects on the landscape character and ecological integrity of the Pinecrest Creek corridor*
> *Assessment of any effects on the viability a recreational corridor:*

DEC noted that the effects of the pond, including the immediate landscape, will be explicitly addressed by the CIS but indicated that, for the remainder of the creek corridor, landscape/recreational aspects would be best addressed via the preliminary engineering (PE) for the Western LRT with the understanding that the outcomes of the CIS (hydrologic/hydraulic/water quality/stream function impacts) would be used to inform that work.

JM noted concerns re: landscape impacts and pathway continuity (recreational issues) but concurred these items do not have to be addressed via the CIS as long as they are recognized as key issues to be addressed via the PE process. She also noted the committee structure that the PE team had previously

presented to NCC staff, indicating she expected that integration between the CIS and the overall PE would be allowed for via that structure.

DM asked how the CIS would address EA requirements for the proposed pond. DEC noted CEEA requirements could not be fully met by this study at it will not include detailed design of the facility. However, the study will aim to provide sufficient information to facilitate the required approvals for the subsequent detailed design.

JM expressed outstanding concerns with respect to the fluvial impacts of the "trade-off" proposed in the pond Feasibility Study. DEC noted that the fluvial-g work completed for that study indicated this should not be a concern but this will be re-confirmed.

JM noted the proposed Maintenance Storage Facility and DEC confirmed this would be accounted for in the CIS.

With respect to the comment re: "*the need to acknowledge that any works in the lower reach, at the Ottawa River, are to be proposed within the context of NCC plans for an enhanced linear park experience along the SJAM Parkway corridor*," JM noted that NCC was considering a boardwalk in this location and that Baird Associates had prepared a feasibility report for NCC. *[Post-meeting note: NCC has provided a copy of the (still internal) Baird report on condition of its use for this project only and no further distribution.]*

With respect to the comment that: "*the ToR explicitly state that 100 year flooding needs to be addressed relative to the WLRT, since this has potential to have a significant impact on the corridor landscape,"* DEC noted that this would also be best addressed via the PE exercise with input from the CIS.

JM asked whether climate change would be taken in to account for the 100 year event? DEC indicated that the CIS would include sensitivity analyses (a range of events).

JM asked whether expanding the floodplain (via excavation) upstream of the creek enclosure south of Carling would assist in lowering 100 yr water levels. DEC indicated that, while this may benefit stream resilience (for high frequency events), it would not have much if any impact on the 100yr water level given the magnitude of peak flows and existing hydraulic constraints at this location relative to the storage that could be provided.

JM noted that a key goal of NCC's for Pinecrest Creek is a viable resident fishery (regardless of the barrier to fish movement up from the Ottawa at the enclosure inlet); with the "flashy" hydrology, there is a need for refuge areas/floodplain pools.

DM requested how future retrofits will be accounted for. DEC noted that the ToR identifies a number of scenarios to be assessed (interim/ultimate depending on the projected timing of various works and retrofits) and this will also include an "uncontrolled" scenario. JM requested that a sensitivity analysis (per the 100yr event noted above) be undertaken for the "uncontrolled" scenario also.

3. Clarifications re: NCC e-mail of September 25, 2014 from Edith Lavallee:
With respect to NCC's preferred pond option (per the 2015 JFSA Feasibility Study), JM confirmed Option 1 was preferred over Option 2.

With respect to the comment: "*The NCC views the 100 year peak flow attenuation and enhanced 80% total suspended solids (TSS) as the appropriate quantity and quality benchmarks in all cases:"* DEC advised that it appears feasible to achieve close to 80% TSS removal (per the 2015 JFSA Feasibility Study) but this will ultimately be governed by the available footprint, depth and maximum water level elevations, etc. For similar reasons, it has also been confirmed that the pond will not significantly reduce the 100 yr peak flow at the inlet to the creek enclosure south of Carling.

DM Malkin noted it will be important for the CIS study to be very clear about any proposed trade-offs and/or targets re: water quality and quantity.

With respect to the comment that "*A SWM retrofit that would provide an opportunity to remove the gabion baskets is viewed as positive,"* JM confirmed that this was in reference to the existing gabion baskets along the north bank of the creek downstream of the storm outlet under Baseline and that they be removed to the extent feasible (i.e., not in reference to the higher gabion basket retaining wall along the rear of commercial properties on Baseline, although, the geotechnical assessment completed for the pond feasibility study flagged signs of potential instability*).[Post-meeting note: the proposed pond location does not require changes to/should not impact the gabion wall along the rear of Baseline properties. Recommendations from the geotechnical assessment have been forwarded to Asset Management Branch.]*

With respect to the comment: "*The NCC would need to have a commitment from the City that it will proceed with implementation of SWM retrofit measures beyond ''end-of-pipe'' that will include retrofits in the right-of-way and at the lot level or conveyance methods of SW controls througoht the entire watershed and not only on federal lands (as identified in the Pinecrest Creek/Westboro SWM Retrofit Study). The NCC would need to see concrete examples of implementation of the objectives of the Pinecrest Creek/Westboro SWM Retrofit Study will be realized:"* DEC asked for clarification regarding what would be required to demonstrate this commitment from the City. JM indicated NCC would expect that some retrofit works (lot level/conveyance)would proceed in advance of or concurrently with the proposed Baseline/Woodroffe pond.

DEC advised that the City has been working on identifying a number of lot level and conveyance retrofit candidates (on City properties/ROWs) to proceed in the near future. A final report will be available by the end of January 2016 and this information along with projected implementation dates will be forwarded to NCC shortly thereafter.

Meeting notes prepared by Darlene Conway, P. Eng.

MINUTES

MORRISON HERSHFIELD

Baseline/Woodroffe Retrofit Pond Class EA
NCC Meeting

Project:	**City of Ottawa Pinecrest Creek CIS and Baseline/Woodroffe SWM Pond Class EA** *Review of Comments and Questions from NCC Internal Design Review Committee*
Place:	180 Elgin, Trillium Boardroom, Ste. 601
Date:	June 28, 2016
Time:	2pm-4pm
Present:	Martin Barakengera (MB) — NCC Juan Galindez (JG) — NCC Julie Mulligan (JM) — NCC Binitha Chakraburtty (BC) — NCC Juan Galindez (JG) — NCC Darlene Conway (DC) — City of Ottawa Heather Wilson (HW) — JFSA Colin Brennan (CB) — JFSA Jim Clark (JC) — Thakar & Associates Sid Thakar (ST) — Thakar & Associates Charles Wheeler (CW) — CTP2 - Stage 2 LRT Elie Dagher (ED) — CTP2 - Stage 2 LRT Marc Magierowicz (MM) — CTP2 - Stage 2 LRT Karyn Cornfield (KC) — MH – PM (CIS & EA) Kelly Roberts (KR) — MH – EA Lead
Acronyms	CTP2 – Capital Transit Partners (Stage 2) EA – Environmental Assessment JFSA – J.F. Sabourin and Associates MOECC – Ministry of Environment and Climate Change MHL – Morrison Hershfield Limited NCC – National Capital Commission

Purpose:

The purpose of this meeting was to review comments and questions provided by the NCC Internal Design Review Committee (March 19, 2016) and to confirm the functional design for the proposed retrofit stormwater management pond at the northeast corner of Baseline and Woodroffe within the Pinecrest Creek corridor.

Agenda

Welcome/Introductions Background	Darlene Conway, City of Ottawa	10 min
Status of Pond Class EA	Kelly Roberts, Morrison Hershfield	10 min
Status of Pinecrest Creek CIS	Karyn Cornfield, Morrison Hershfield	10 min
NCC Design Review Committee - Comments & Questions	All	90 min
Next Steps	Karyn Cornfield/Darlene Conway	10 min

Attachments:

Presentation Materials - The PowerPoint slides presented during this meeting are attached.

Response to NCC Design Review - Responses to comments and questions from the NCC internal design review committee (March 9, 2016) were updated based on discussions during the meeting. The updated responses are attached.

Email from Martin Barakengera, Dec. 6, 2016 - Regarding the potential sediment disposal site north of Iris.

Summary of Discussion:

- NCC suggested that the City might use the NCC land immediately north of Iris as a potential sediment disposal site. It was agreed that the feasibility of accessing and storing sediment on that site will be evaluated and compared to the alternative of trucking the sediment off-site during detailed design. A landscape concept sketch will be required.

Post-meeting note: Sediment removal will be addressed more specifically prior to the first sediment removal cycle. Potential options will be included in the Class EA documentation.

- NCC requires post-construction monitoring of non-performance-based physical aspects (e.g., inlet/outlet pipes, peninsula, in-stream grade control riffle, plantings/landscaping, etc.)

to ensure continued functioning of the facility as designed. A monitoring plan will be developed in consultation with the NCC during detailed design.

- The safety of the peninsula will be addressed during detailed design though grading of side slopes, signage, and deterrent plantings along the pond.

- NCC requires minimal signage for this site

- NCC expressed concern regarding the potential increase of mosquitoes due to open water. The City responded that the pond size and design should preclude this (large drainage area providing continuous flow, surface disturbance from wind, natural predation of larva, etc.). Ponds are also monitored regularly for mosquitoes by the City and actions taken (larvicide) if required.

- NCC asked about implications of bundling the project with Stage 2 OLRT and expressed concerns regarding quality control during detailed design. NCC requested that the design be guaranteed before releasing it to open market.

- Martin Barakengera will replace David Malkin on this file.

Post-meeting note: The landscape concept was originally intended to be refined and reviewed with NCC during the Class EA however refinements to the landscape concept will not be required to satisfy the EA nor were any requests received from NCC to date to complete further refinements at this stage. The detailed landscaping plan will be completed with detailed design of the pond and vetted through NCC at that time.

Post-meeting note: Communication from NCC (attached email from Martin Barakengera, Dec. 6, 2016) provided further direction regarding the potential sediment disposal site north of Iris.

City of Ottawa

Pinecrest Creek Cumulative Impacts Study

Baseline/Woodroffe SWM Pond Municipal Class EA

Responses to Comments & Questions NCC Internal Design Review Comments (March 19, 2016) Baseline/Woodroffe SWM Retrofit Pond

June 28, 2016

THAKAR ASSOCIATES
DESIGN CONSULTANTS
Landscape Architecture
Environmental Planning
Urban Design

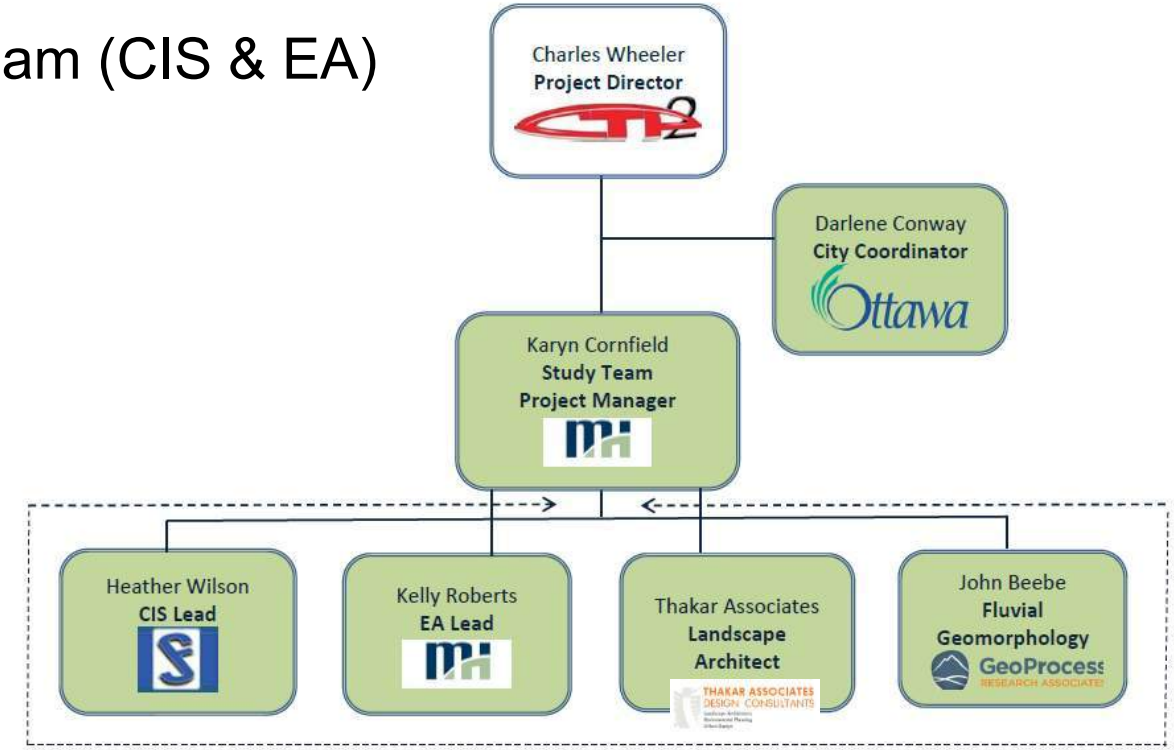
MORRISON HERSHFIELD

Agenda

- Welcome/Introductions/Background
- Status of Baseline/Woodroffe Pond EA & Pinecrest Creek CIS
- Responses to Comments & Questions from the *NCC Internal Design Review Committee (March 19, 2016)*
- Next Steps

Introductions

- Project Team (CIS & EA)



Purpose of Meeting

- Review comments and questions provided by *NCC Internal Design Review Committee (March 9, 2016)* regarding the proposed City of Ottawa retrofit SWM pond at Baseline/Woodroffe in Pinecrest Creek corridor
- Responses provided by Class EA team (*Morrison Hershfield, Thakar Associates and JFSA)* with contributions from City of Ottawa staff
- Intent is to clarify concerns from NCC and to confirm how these concerns will be addressed to the satisfaction of NCC and documented in Class EA
- Landscape concept will be refined and reviewed with NCC prior to completion of Class EA
- No significant changes to the functional design are anticipated

Project Overview

- Class EA: Baseline Woodroffe SWM Retrofit Pond
  - Conceptual design completed by JFSA in 2015 - to be confirmed through this study
  - Provincial Class EA requirements will be addressed herein - and to the extent possible the federal EA requirements (to inform detailed design)

- CIS: Pinecrest Creek Cumulative Impacts Study
  - To identify cumulative impacts on Pinecrest Creek due to future projects including the proposed SWM Pond, LRT and future development; and also effects of proposed SWM retrofits (lot level/ conveyance) over the next 20 years +/-
  - To identify appropriate measures to mitigate any cumulative (negative) impacts
  - CIS will also inform the Preliminary Engineering for LRT

Project Status

- Pond EA
  - NOC posted by City (May 25)
  - Interim Report (Existing Conditions) submitted to City (June 1)
  - Building on previous reports/studies
  - Options evaluation TBD
  - Landscape concept plan to be refined given NCC input

- Creek CIS
  - Existing conditions update:
    - hydrologic/hydraulic model completed by JF Sabourin
    - water quality model completed by JF Sabourin
  - Fluvial geomorphology in progress (John Beebe)
  - Future conditions model – TBD (pending inputs from LRT)

Schedule

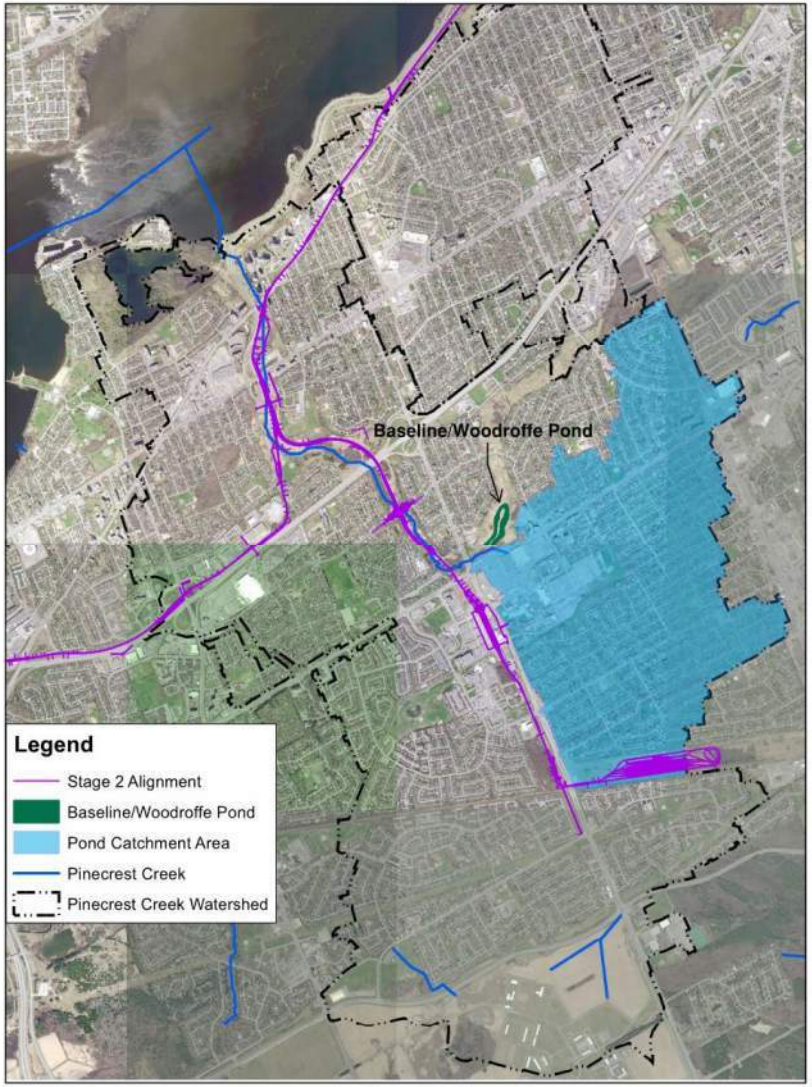
- Pond Class EA
  - *NCC pond design review meeting – June 28, 2016*
  - Landscape refinement – summer 2016
  - On-line open house – September 2016
  - Draft & final reports – fall 2016

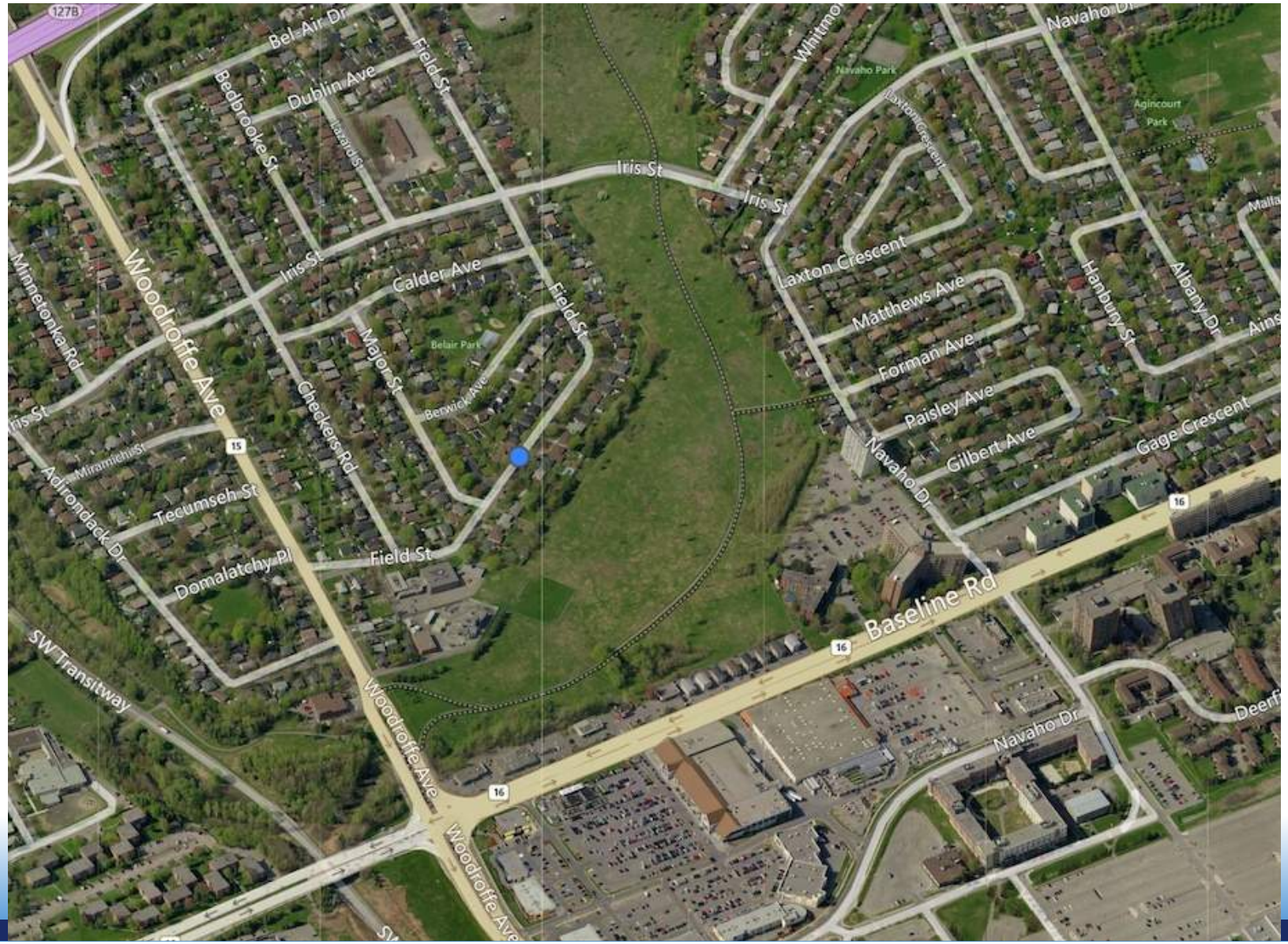
- CIS
  - Inputs from LRT preliminary engineering - finish date July 29, 2016
  - Future conditions modelling/impacts assessment/mitigation step – summer/fall
  - CIS reports will be completed by early 2017

Comments and Questions from *NCC Internal Design Review Committee (March 19, 2016)*

Responses from Pond EA Team (Morrison Hershfield, Thakar Associates, JFSA) with contributions from City of Ottawa staff

Baseline/Woodroffe SWM Facility within Pinecrest Creek Watershed




127B
Bel-Air Dr
Bedbrooke St
Dublin Ave
Field St
Iris St
Calder Ave
Major St
Checkers Rd
Belair Park
Beowick Ave
Minnetonka Rd
Woodroffe Ave
Miramichi St
Adirondack Dr
Tecumseh St
Domalatchy Pl
SW Transitway
Whitmore
Navaho Park
Laxton Crescent
Agincourt Park
Matthews Ave
Forman Ave
Paisley Ave
Gilbert Ave
Hanbury St
Albany Dr
Gage Crescent
Navaho Dr
Baseline Rd
Deerfield
15
16

1. The end result was that the committee agreed that Option 1 is the preferred NCC option for a proposed SWM pond on NCC lands for the following reasons:

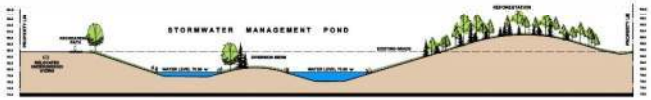
- **Option 1 is more natural.**
- **Option 2 is too finicky in design. The buried hydro cable should not drive the design or the choice of option.**
- **Option 1 does not result in a divided pathway alignment and would require less pathway maintenance.**
- **Option 1 is a better resolved design.**
- **Option 1 provides a longer length for water quality settlement.**

- Performance of both similar
  - Sizing
  - Achieve close to 80% TSS removal
  - Flood attenuation

- NCC preference for Option 1 was also confirmed at TAC 1 (Feb 25)

Pond Option 1

SECTION A



SECTION B

LEGEND

PROPOSED

- STORMWATER RETENTION POND
- MEADOW
- MOWN GRASS
- REFORESTATION PLANTING
- LARGE TREE PLANTING
- SHRUB PLANTING
- 3m ASPHALT RECREATIONAL PATH
- CONTOURS (1.0m INTERVALS)
- 50m DRAW DOWN LIMIT

EXISTING

- CONTOURS (.5m INTERVALS)
- HYDRO POLE / LINE
- VEGETATION TO REMAIN

POND FEATURES / COMPONENTS

- A POND INLET
- B RIFFLE OVERFLOW 79.61
- C FLOW DIVERSION BERM
- D FOREBAY
- E FOREBAY OUTLET BERM
- F QUANTITY OUTLET
- G QUALITY LOW FLOW OUTLET
- H MAINTENANCE ACCESS ROAD
- I PINECREST CREEK

THAKAR ASSOCIATES
DESIGN CONSULTANTS
Landscape Architecture
Environmental Planning

Pond Option 2

THAKAR ASSOCIATES
DESIGN CONSULTANTS
Landscape Architecture
Environmental Planning

2. More thinking regarding the recreational opportunities around the SWM pond was encouraged. A suggestion was made to add a second bridge at the end of the peninsula to ensure pedestrians could exit at either end. As part of this reflection, Interpretative & Educational opportunities as well as any necessary wayfinding should be explored at the detailed design stage. The NCC expects a high quality landscape design for the pond area based on natural design principles, preferably using native species.

Recreational Opportunities

- nature-oriented, low-impact and unstructured recreation
- pathway system and some of the pockets of open space
- interpretive signage related to watershed and plants and wildlife

THAKAR ASSOCIATES
DESIGN CONSULTANTS
Landscape Architecture
Environmental Planning

Pathway looking east

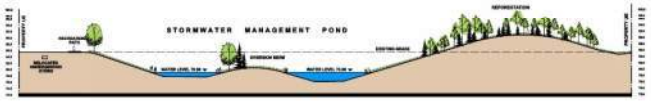
MORRISON HERSHFIELD

Authorized vehicles only
Réservé aux véhicules autorisés
EXPERIMENTAL FARM
FERME EXPERIMENTALE
minimum
100

High Quality Landscape Design

- Plantings will support and enhance SWM function; functional; self-sustaining
- Native plantings; seasonal colour; key viewlines
- Planting zone guidelines will be applied on water levels as per the City of Ottawa Stormwater Pond Design Guidelines (Figure 8.1).

SECTION A



SECTION B

LEGEND

PROPOSED

- STORMWATER RETENTION POND
- MEADOW
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- REFORESTATION PLANTING
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- SHRUB PLANTING
- 3m ASPHALT RECREATIONAL PATH
- CONTOURS (1.0m INTERVALS)
- 50m DRAW DOWN LIMIT

EXISTING

- CONTOURS (.5m INTERVALS)
- HYDRO POLE / LINE
- VEGETATION TO REMAIN

POND FEATURES / COMPONENTS

- A POND INLET
- B RIFFLE OVERFLOW 79.61
- C FLOW DIVERSION BERM
- D FOREBAY
- E FOREBAY OUTLET BERM
- F QUANTITY OUTLET
- G QUALITY LOW FLOW OUTLET
- H MAINTENANCE ACCESS ROAD
- I PINECREST CREEK

Ottawa

City of Ottawa, Infrastructure Services Department, Design & Construction (Municipal) West Branch

SCALE 1 : 1250

0 10 50 100m

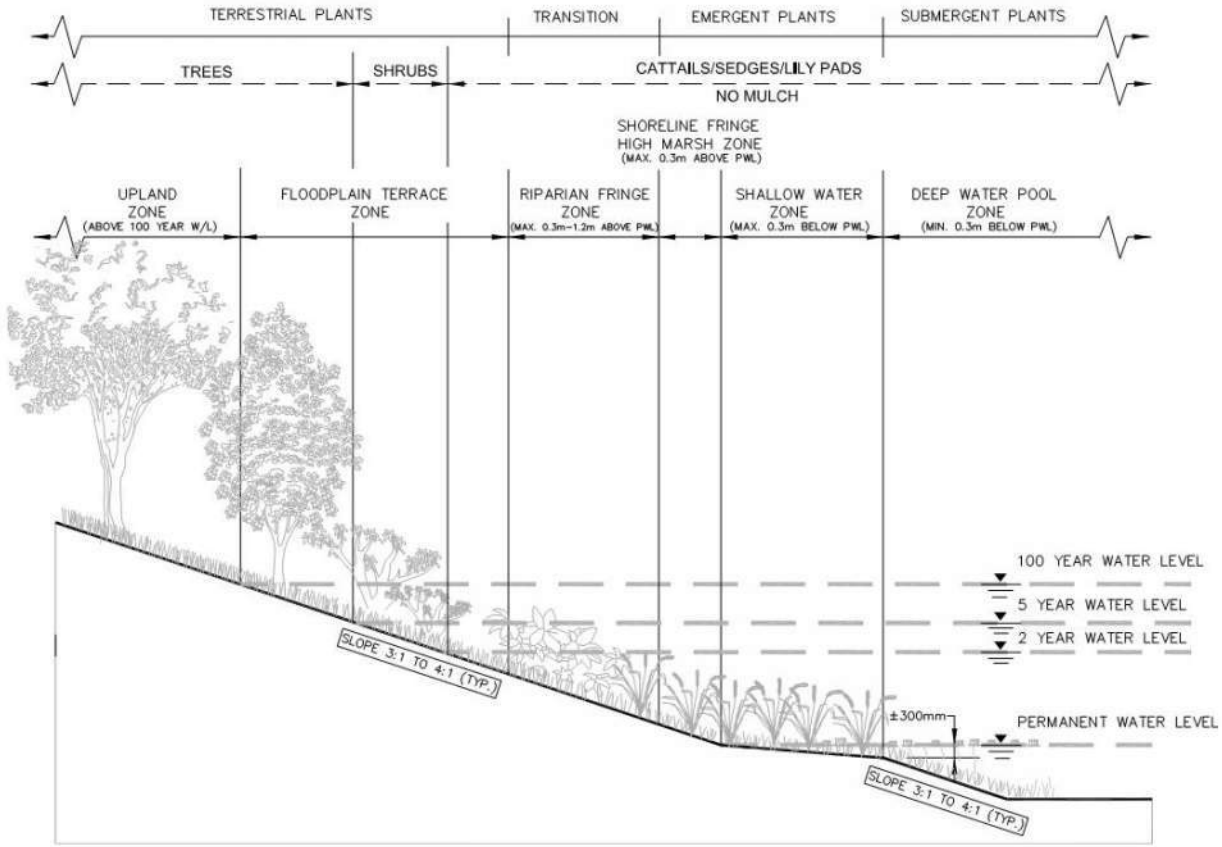
JFSA

JTB Environmental Systems Inc.

PINECREST CREEK STORM WATER MANAGEMENT POND FEASIBILITY STUDY

LANDSCAPE CONCEPT

OPTION 1



Ottawa

STORMWATER MANAGEMENT FACILITY DESIGN GUIDELINES

Dwg. No.

FIGURE 8.1

Drawing Title

PLANTING ZONES

Scale:

N.T.S.

J:\BI Engineering\CCL\D-CAD\cad\Water\11778\current\11778-010.dwg Layout Name: $(getvar "ctab")

Maravista Pond

Photos courtesy of Thakar Associates

THAKAR ASSOCIATES
DESIGN CONSULTANTS
Landscape Architecture
Environmental Planning

MORRISON HERSHFIELD

Wayfinding and Signage:

- The City's protocols for signage around SWM ponds will govern the selection, placement and content of signs, while the NCC's wayfinding and signage protocols will govern the Experimental Farm Pathway signage placement.
- Overall site programming and required signage needs to be confirmed with the City as it relates to the larger scale network (National Capital Pathway System).
- 3 types: information, safety & regulatory, and interpretive

23.62 in

35.43 in

Ottawa

Stormwater Facility

CAUTION

Potential drowning hazard. Water depth varies.
No swimming, fishing or vehicles, including

Pond water is unsafe for drinking.
Ice thickness unstable in winter.
PLEASE KEEP OFF.

Installation de traitement des eaux pluviales

MISE EN GARDE

Risque de noyade. La profondeur de l'eau varie.
Baignade, pêche et véhicules
(y compris VTT et motoneiges) interdits.
Eau stagnante impropre à la consommation.
L'épaisseur de la glace varie en hiver.
NE PASSEZ PAS SUR LA GLACE.

3-1-1 **ottawa.ca**

33"

18"

Ottawa

Please Don't Feed the Birds

Veuillez ne pas nourrir les oiseaux

3. The safety of the dead end peninsula, especially during inundation, needs to be addressed. Perhaps a pedestrian bridge connection at the end would provide added security.

- Peninsula is an important operations feature and is not intended to be a public pathway; it is proposed to explicitly discourage the public from accessing this area for safety reasons
- Limited capacity to accept additional load from pedestrian bridge due to firm silty clay deposit on the site without undergoing significant settlement (Golder 2015)

- Continued on next slide

- Conceptual design of the pond includes 7h:1v side slopes for a distance of 3 m on either side of the permanent pool level and slopes of 3h:1v elsewhere; provides a relatively flat area near permanent water level from a safety perspective

- Signage to discourage access (shown previously)

4. It is very important to assess the impact of maintenance requirements, particularly the proposed sediment drying area estimated to consist of the equivalent of 23 dump truck loads per year. Where will the sediment be taken?

- accumulated sediment depth monitored by City
- forebay cleanout required once every 10 years (and 20-50 years entire pond)
- pond cleanouts during winter when ground is frozen
- where space permits, excavated sediment is typically allowed to dry on site (permanently); drying area is then graded and re-seeded
- in other cases, excavated sediments are disposed of off-site (landfill)
- *Note: Executive Summary should read 29 dump truck loads per year (not 23)*

5. There are concerns about the maintenance of the low flow outlet in both options.

- low flow/water quality outlet will consist of a 315 mm diameter orifice (this is well within the minimum MOE guideline - 100mm)
- granular base over inlet/outlet pipes will support impact of any maintenance vehicles
- City inspections for blockage after major rainfall

6. There will very likely be a significant requirement for post construction monitoring of this facility with reporting at 1, 5 and 8 year intervals.

- Monitoring requirements will be accompanied with future ECA (Environmental Compliance Approval) from MOECC
- Scope of additional requirements will be confirmed with NCC during detailed design

7. What is the potential for improved aquatic habitat?

- SWM pond will contribute to overall improved water quality downstream and provide some attenuation of peak flows; will increase the potential for healthier aquatic habitat in the creek

- not intended to provide aquatic habitat within the pond itself

8. How often do the greater than 25mm events occur?

- 5 exceedances per year would be expected

9. Will there be fencing? If so it should neither create a barrier to movement nor be a negative visual intrusion in the landscape.

- Fencing is not typically installed around SWM ponds.

- Pond grading (side sloping) will be inherently safe (max 3:1 plus terracing) so that if someone slips and falls in he/she can easily climb out.

School fencing (existing)

10. Will the pond create a mosquito problem or any public health concerns such as the West Nile virus?

- not typically a problem in SWM ponds in the City
- sufficient water movement (due to wind and flowing water / baseflows)
- natural predators (frogs and dragonflies)
- monitored by City – problems mitigated with larvacide spray

Next Steps

Milestone	Timing	SWM Pond EA	Pinecrest Creek CIS
TAC 1	Feb 25	Introduce EA, confirm pond footprint	Introduce CIS, confirm major projects
CIS Tech Memos to City	March – present		Modelling results (Existing Conditions)
Interim EA Report	May	Phase 1 & 2 (Existing Conditions)	
NCC Pond Design Meeting	**June 28, 2016**	**Comments from *NCC Internal Design Review***	
TAC 2	**early fall**	**Updated landscape concept. Interim EA work**	**Future condition results Confirm Interim Scenario**
CIS Tech Memo to City	Early fall		Future Conditions
Online Open House	**Early fall**	**EA project and pond design**	
CIS Tech Memo to City	Early-late fall		Interim Scenario & Cumulative Impacts
TAC 3	**late fall**	**Draft EA report**	**Interim Scenarios/Impacts Assessment (provisional: mitigation)**
EA Reports	Late fall		
CIS Reports	Early 2017		

Next Steps

- Pond:
  - Refinement of landscape plan
  - Presentation of landscape plan and on-line open house materials to TAC

Questions or Comments?

MEMORANDUM

MORRISON HERSHFIELD

TO:	Darlene Conway, P. Eng.	ACTION BY:	
FROM:	Karyn Cornfield, P. Eng.	FOR INFO OF:	
RE:	Baseline/Woodroffe Pond Class EA	DATE:	April 6, 2017

This memo contains the comments and questions from the *NCC Internal Design Review Committee* (March 9, 2016) regarding the proposed City of Ottawa Baseline/Woodroffe retrofit SWM pond. Responses to these comments and questions are provided from the Class EA team (*Morrison Hershfield Ltd, Thakar Associates, and JF Sabourin and Associates Inc.)* with contributions from City of Ottawa staff. *Responses have been updated based on feedback from the NCC during a meeting on June 28, 2016.*

At this stage the intent is to clarify any concerns from the NCC and to confirm how these concerns will be addressed to the satisfaction of NCC and documented in the Class EA.

No significant revisions to the current functional design are anticipated at this stage. The detailed landscape plan will be undertaken and reviewed with NCC during detailed design.

NCC comments and questions are shown in **bold** below. Responses are shown below each comment.

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1. The end result was that the committee agreed that Option 1 is the preferred NCC option for a proposed SWM pond on NCC lands for the following reasons:

- **Option 1 is more natural.**
- **Option 2 is too finicky in design. The buried hydro cable should not drive the design or the choice of option.**
- **Option 1 does not result in a divided pathway alignment and would require less pathway maintenance.**
- **Option 1 is a better resolved design.**
- **Option 1 provides a longer length for water quality settlement.**

No response required.

---

2. More thinking regarding the recreational opportunities around the SWM pond was encouraged. A suggestion was made to add a second bridge at the end of the peninsula to ensure pedestrians could exit at either end. As part of this reflection, Interpretative & Educational opportunities as well as any necessary wayfinding should be explored at the detailed design stage. The NCC expects a high quality landscape design for the pond area based on natural design principles, preferably using native species.

<u>Recreational Opportunities:</u> Various opportunities for nature-oriented, low-impact and unstructured recreation are possible around the SWM Pond. Recreation activities will revolve around the pathway system and some of the pockets of open space that will be created as a result of the landforming and reforestation.

In this respect, opportunities for activities such as fitness loops, power walking, cross country skiing, snowshoeing, birdwatching, etc., could be explored when designing the pathway system. Interpretive signage and display panels that provide an illustrative overview of the watershed and the place of Pinecrest Creek within it, its natural functions and the rationale for the SWM Pond project, as well as related matters (such as the role of plants and wildlife) that can enhance the public's knowledge of their urban infrastructure can be integrated into the pathway system both in the vicinity of the pond and at key locations within the corridor. Refer to item 3 regarding additional bridge opportunities.

High Quality Landscape Design: In general, the landscape of the SWM Pond corridor will be designed to support and enhance the function of the pond, and create a functional, self-sustaining greenspace that is embraced by the community as a major environmental asset and open space amenity. Key features of the SWM Pond landscape design would include the use of predominantly native plantings of trees, shrubs, perennials, grasses and groundcovers with the emphasis on seasonal colour and interest, as well as to attract birdlife and provide habitat. These plantings would be designed to shape the visual experience and define different zones of the site as the user moved through the landscape, whether on foot or on bicycle. For example groups of trees could be used to frame long views across the water, or masses of shrubs with colourful branching, foliage or flowers could be used to draw the eye along key viewlines, or a shady grove of trees organized to create an enclosure could create an inviting picnic area. Organizing these landscape elements in 'organic' layouts and groupings that reflect natural patterns would enhance the spaces and volumes created by the new landforms and water surface that anchor the SWM Pond open space.

Where possible native plants obtained from local nurseries will be sourced and specified in the planting plans. All plants will be selected for local hardiness and low maintenance characteristics, grouped in beds that facilitate unhampered grass maintenance operations by standard gang reel equipment. Along the side slopes shrub groupings will be strategically placed to minimize gully erosion, and appropriate screen planting using shrubs and perennials will be used to screen to the extent possible the storm inlets/outlets. In general, to reduce maintenance, the extent of grass areas will be reduced and replaced by extensive beds of low maintenance 'meadows' of native perennials. These perennial beds provide optimal growing conditions for trees so most tree groupings will be placed within these meadows. Landscape plantings on berm side slopes will be selected both in terms of their slope stabilization properties but also to withstand the dry conditions that are common on these slopes. The berms themselves will have a minimum 200mm thickness of topsoil that will support grass growth, and hardy, low-maintenance varieties of grasses/seed mixtures will be selected in consultation with the City's Surface Operations and Forestry staff to ensure long-term viability.

Planting zone guidelines will be applied to account for varying frequencies of inundation as per Figure 8.1 in the City of Ottawa Stormwater Pond Design Guidelines.

Wayfinding and Signage: The City's protocols for signage around SWM ponds will govern the selection, placement and content of signs, while the NCC's wayfinding and signage protocols will govern the Experimental Farm Pathway signage placement.

There are three main components to the wayfinding system: information signage, safety and regulatory signage, and interpretive signage. Information signage can identify the main site components such as the pond and pathway system, entry points, dog-walking areas, picnic areas, etc. Safety and regulatory signage could focus on restrictions to access, high water levels, and hazard areas; Stoop & Scoop signage, "please do not feed the birds" signage, etc. Interpretive signage can consist of illustrative display panels communicating interpretive and educational information about the SWM pond in the

context of the creek and efforts to improve its health. A master wayfinding layout for the site, combined with a schedule of required signage in the three categories could be prepared as part of the overall site design.

Overall site programming and required signage needs to be confirmed with the City and NCC as it relates to the larger scale network (National Capital Pathway System). Minimal wayfinding signage requirements are anticipated by NCC.

3. The safety of the dead end peninsula, especially during inundation, needs to be addressed. Perhaps a pedestrian bridge connection at the end would provide added security.

The peninsula is an essential design feature of Option 1. Its function is to preclude the "short-circuiting" of inflows and provide the desired flow length/retention time needed for water quality improvements. The crest of the peninsula has been set to match the peak simulated water level from the 25mm design storm (79.75m). For larger events (in the order of 25mm or greater), the peninsula will be submerged. For the 100yr event, the resulting pond elevation of 80.15m would result in 0.4m depth of water over the peninsula.

While an important design feature, the peninsula is not intended to be a pathway and it is proposed to explicitly discourage the public from accessing this area.

From a safety perspective, the current design of the pond includes 7h:1v side slopes for a distance of 3m on either side of the permanent pool level and slopes of 3h:1v elsewhere. This relatively flat area near the permanent water level will allow anyone who did fall in to readily climb out.

The following is a list of further potential design features to address safety concerns associated with the peninsula:

- "unfriendly" plantings near pond edge and along top of peninsula to discourage access
- signage to discourage public access (saying "This area is subject to periodic inundation and flooding during major rain events. Access at your own risk.")
- raising the peninsula or ramping/grading the peninsula such that the tip is lowest and floods first and the bottom end floods last (both options subject to geotechnical investigation and both will result in some loss of active and wet storage volume)

The suggested pedestrian bridge is problematic for the following reasons:

- a bridge at the end of the peninsula would send the "wrong" message by encouraging access
- preliminary geotechnical information suggests it may be challenging to install a bridge in this location due to the potential for significant settlement: From the Pond Feasibility Study, Appendix I p2 *"There is limited capacity to accept additional load from pedestrian bridges due to firm silty clay deposit on the site without undergoing significant settlement. In the case of bridges, flatter pond side slopes would be required, which would result in a longer bridge and higher foundation loads."*

4. It is very important to assess the impact of maintenance requirements, particularly the proposed sediment drying area estimated to consist of the equivalent of 23 dump truck loads per year. Where will the sediment be taken?

Accumulated sediment depth will be monitored regularly by the City. Depending on sediment depths measures, forebay cleanout will be required on average about once every 10 years (larger facility cleanouts would be anticipated once every 20 to 50 years). Typically the cleanouts are completed during the winter when the ground is frozen. In cases where there is sufficient space within the pond block, excavated sediment remains on site permanently. The sediment stockpiled in the designated sediment storage area, is permitted to dry out and then graded and seeded. In other cases, excavated sediments are trucked off-site for disposal (typically landfill).

Maintenance vehicles require service roads either on both sides of the pond including the peninsula, or on one side of the pond with a ramp down into the pond, to clean out sediments from the bottom of pond by working from the side and within the reach of the excavator.

The approach to sediment removal will be confirmed prior to the first clean-out cycle (approximately 10 years from construction). The feasibility of accessing and disposing sediment on NCC land north of Iris will be evaluated and compared to the alternative of trucking the sediment off-site. Refer to NCC requirements for locating sediment storage north of Iris in e-mail dated December 6, 2016 from Martin Barakengera.

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5. There are concerns about the maintenance of the low flow outlet in both options.

The proposed low flow/water quality outlet will consist of a 315 mm diameter orifice (or equivalent), which is well above the minimum orifice size (100mm) recommended in the SWM Planning and Design Manual (MOE, 2003). This size of orifice is not atypical for existing SWM ponds throughout the City. Regular inspections of the facility will be undertaken following major storm events. This size of orifice is not anticipated to present any additional maintenance concerns with respect to blockage,

A maintenance access over the inlet/outlet pipes will be designed to support required maintenance vehicles. This will be addressed during detailed design.

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6. There will very likely be a significant requirement for post construction monitoring of this facility with reporting at 1, 5 and 8 year intervals.

It is anticipated that MOECC's future approval of the facility will identify monitoring requirements (via the required Environmental Compliance Approval). The City will advise NCC of those requirements when available. Monitoring of non-performance based physical aspects (e.g. inlet/outlet pipes, peninsula, in-stream grade control riffle, etc.) is required to ensure continued functioning of the facility as designed. A monitoring plan will be developed during detailed design for review/approval by NCC.

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7. What is the potential for improved aquatic habitat?

The SWM pond is one element of a long-term comprehensive watershed solution with the aim of mitigating the impacts of uncontrolled urban runoff on Pinecrest Creek. The SWM Pond will contribute to improved water quality downstream and provide some attenuation of frequent peak flows. In combination with other retrofits over time (e.g., lot level and conveyance measures), the resulting improvements (improved water quality and less “flashy” hydrology) will contribute to healthier aquatic habitat in the creek.

While the pond will be “naturalized" in appearance, it is not intended to provide aquatic habitat within the facility itself, given the need to regularly maintain the facility (e.g., periodic sediment removal).

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8. How often do the greater than 25mm events occur?

Based on rainfall statistics and the total volume (25 mm), just over 5 exceedances (events with volumes greater than 25 mm) per year would be expected (based on a 1:7 week return period and a 36 week rainfall season April 1 to Nov 30).

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9. Will there be fencing? If so it should neither create a barrier to movement nor be a negative visual intrusion in the landscape.

Fencing is not typically installed around SWM ponds. Pond grading (side sloping) needs to be inherently safe (max 3:1 plus terracing) so that if someone slips and falls in he/she can easily climb out.

---

10. Will the pond create a mosquito problem or any public health concerns such as the West Nile virus?

In general, a healthy pond environment where there is sufficient water movement (due both to wind activity and flowing water/baseflows) should present poor habitat for mosquitoes and discourage seasonal algal blooms from becoming a problem. The use of pond plantings such as native lilies is an option to create shade to discourage algae growth. Once the pondside vegetation is established it will attract various species of wildlife such as frogs and dragonflies that will feed on mosquito larvae and algae. The use of native landscape plants that attract beneficial insects such as dragonflies that feed on mosquito larvae will be considered.

Trees will be protected during the first two or three years of establishment with rodent collars to prevent a surge in mouse populations over the winter months, but in general there is little likelihood of any single species of wildlife or plant overwhelming or dominating the landscape.

Mosquitoes are not typically a concern in SWM ponds for the reasons noted above. The City regularly inspects ponds. If mosquitoes do become a nuisance, then treatment with a larvicide is undertaken. Further, since 2006, the City has been working with the NCC, the Federal Public Works Department, and the Department of National Defence and agreed that Ottawa Public Health oversee the delivery of a West Nile Virus Control program on federal lands located within the City of Ottawa resulting in a cohesive West Nile Virus control program being conducted on municipal and federal lands.

Karyn Cornfield

From: Barakengera, Martin <martin.barakengera@ncc-ccn.ca>
Sent: Tuesday, December 06, 2016 4:57 PM
To: Karyn Cornfield
Cc: Conway, Darlene; Bédard, Valérie; Chakraburtty, Bina; Muir, Michael; Fisher, Susan
Subject: RE: Potential Sediment Disposal Site - North of Iris

Hi Karyn,

We discussed the proposed sediment disposal site and concluded that it is a potential suitable location to assess further, subject to the following:

- City to demonstrate there will be no additional impact to soil and water quality
- City to provide NCC with final design characteristics of site
- City must be prepared to pay fair market value (as negotiated with NCC's Real Estate Transactions and Development division) for the necessary easement

Team members expressed concerns about a likely opposition to sediment disposal at the proposed site from residents north of Iris at the time of sediment disposal. To mitigate this risk, it was suggested that the City examine the possibility of modifying the design of the stormwater pond to create space for the sediment disposal site on the pond site. That would eliminate the potential perception by residents that the pond is creeping onto adjacent lands across the street. I understand that the idea of integrating the pond and the sediment disposal site was discussed earlier on but was abandoned for lack of NCC support. If that was the case at that time, our circumstances have evolved and we would now be prepared to support such facility integration.

If the same-site concept is not feasible, then NCC will need to be satisfied that the surrounding residential communities have been duly consulted and are not opposed to the proposed sediment disposal site across Iris Street.

Regards,

Martin Barakengera MCIP RPP PMP
Senior Land Use Planner - Planificateur principal, utilisation du sol
Capital Planning - Aménagement de la capitale
National Capital Commission - Commission de la capitale nationale
202 - 40 Elgin, Ottawa, ON CANADA, K1P 1C7
tel: 613-239-5678 ext. 5196
www.ncc-ccn.gc.ca

From: Karyn Cornfield [mailto:KCornfield@morrisonhershfield.com]
Sent: Friday, December 02, 2016 3:05 PM
To: Barakengera, Martin
Cc: Conway, Darlene
Subject: RE: Potential Sediment Disposal Site - North of Iris

Hi Martin – Attached is a nicer figure showing the potential disposal site within the full extent of the property

---

From: Barakengera, Martin [mailto:martin.barakengera@ncc-ccn.ca]
Sent: Thursday, December 01, 2016 3:25 PM
To: Karyn Cornfield <KCornfield@morrisonhershfield.com>

Cc: Conway, Darlene <Darlene.Conway@ottawa.ca>
Subject: RE: Potential Sediment Disposal Site - North of Iris

Hello Karyn,

Thank you for your candid description of this takeaway question. We will discuss the matter at our regular weekly meeting on Tuesday December 6th. Following that meeting, I will confirm whether the location is worthy of further consideration.

Martin

Martin Barakengera MCIP RPP PMP
Senior Land Use Planner - Planificateur principal, utilisation du sol
Capital Planning - Aménagement de la capitale
National Capital Commission - Commission de la capitale nationale
202 - 40 Elgin, Ottawa, ON CANADA, K1P 1C7
tel: 613-239-5678 ext. 5196
www.ncc-ccn.gc.ca

From: Karyn Cornfield [mailto:KCornfield@morrisonhershfield.com]
Sent: Thursday, December 01, 2016 3:09 PM
To: Barakengera, Martin
Cc: Conway, Darlene
Subject: Potential Sediment Disposal Site - North of Iris
Importance: High

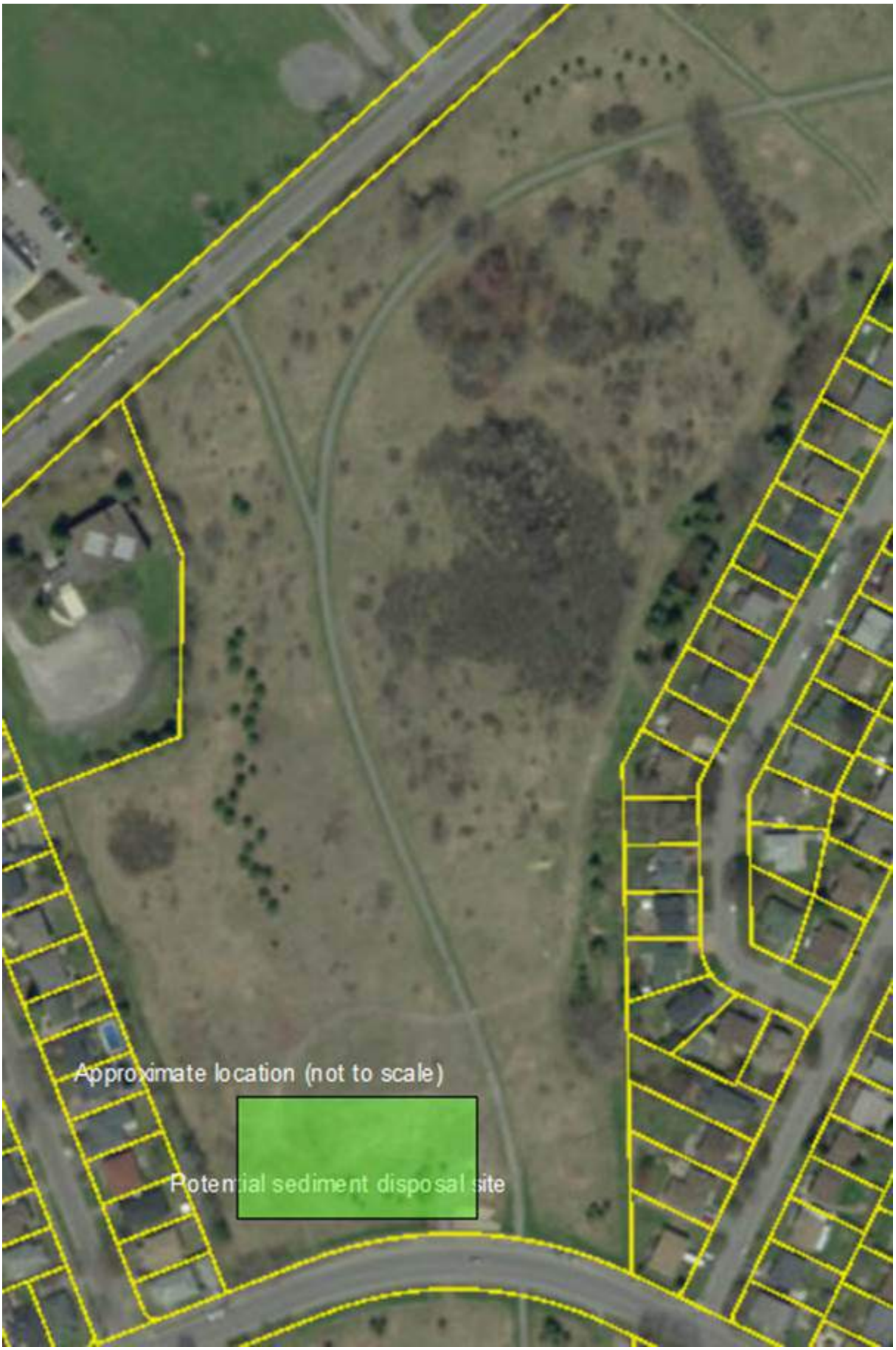
Good afternoon Martin,

When we met with NCC in June to discuss comments from the NCC design review regarding the Baseline/Woodroffe Stormwater Pond the NCC suggested using the lands north of Iris as a "potential sediment disposal site" and agreed that the feasibility of this location would be considered during the detailed design. The exact location of the disposal site on the property was not identified at the time. The property that extends all the way to Maitland (PIN 039890430) so I'd like to confirm a preferred location to direct a borehole investigation. Based on a desktop review the area I'd like to suggest the area *(shown below)* immediately north of Iris and west of the pathway as an ideal location for proximity to the pond, ease of access (small parking lot off Iris), and minimal number of trees relative to the remaining property. Is this a suitable location to assess in further detail?

Note: The aforementioned meeting was held June 28 at Stage 2 office and attended by yourself, Juan Galindez, Bina Chakraburtty, Christopher Meek, and Julie Mulligan.

Thank you,

Karyn Cornfield, M.Sc.Eng., P.Eng.
Stormwater Management and Drainage
Owner's Engineer Stage 2 LRT
Reception: 613 739-2910
Direct: 613 739 9886 ext. 10-222-03
Mobile: 613 884 5584
KCornfield@morrisonhershfield.com


Approximate location (not to scale)
Potential sediment disposal site

Appendix B: Public Consultation Material

Online Information Session

- Notice of Online Information Session
  - Le Droit
    - *Published November 3, 2016*
    - *Published November 10, 2016*
  - Nepean-Barrhaven News
    - *Published November 3, 2016*
    - *Published November 10, 2016*
  - City of Ottawa Planning and Development e-newsletter
    - *Sent November 16, 2016*

Public Meeting #1

- Notice of Public Meeting
  - Le Droit
    - *Published December 15, 2016*
    - *Published January 5, 2017*
  - Nepean-Barrhaven News
    - *Published December 15, 2016*
    - *Published January 5, 2017*
  - City of Ottawa Planning and Development e-newsletter
    - December 19, 2016
  - Email from the City of Ottawa project manager to those on the email list
    - December 15, 2016
  - Direct mail-out to all properties abutting the site of the proposed pond
- Powerpoint Presentation (English and French)
- Project Information Bulletin (English and French)
- Display boards (Bilingual)
- As We Heard It Report (English and French)

Questionnaire *(available during the online information session and at the public meeting)*

Public Meeting #2

- Notice of Public Meeting
  - Le Droit
    - *Published May 11, 2017*
  - Nepean-Barrhaven News
    - *Published May 11, 2017*
  - Email from the City of Ottawa project manager to those on the public and stakeholder email list

        - May 4, 2017
        - May 15, 2017
    - Direct mail-out flyer to all properties abutting the site of the proposed pond
    - Project Website and City of Ottawa public consultation website
- Powerpoint Presentation (English and French)
- Display Boards (Bilingual)

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Ottawa

ottawa.ca
3-1-1
ATS 613-580-2401

Avis de séance d'information en ligne
Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe
Évaluation environnementale de portée générale et étude de conception fonctionnelle
Du 3 novembre 2016 au 21 novembre 2016

ottawa.ca/ bassinderetentionbaselinewoodroffe

La Ville d'Ottawa a entrepris une évaluation environnementale de portée générale concernant l'aménagement d'un bassin de rétention des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude de modernisation de la gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015).

Le bassin proposé assurera le traitement et la régulation des eaux de ruissellement provenant de quelque 435 hectares qui s'écoulent actuellement d'une manière incontrôlée vers le ruisseau Pinecrest.

L'étude d'aménagement du bassin, qui est effectuée en vertu de l'annexe B de l'évaluation environnementale municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

Nous vous invitons à une séance d'information en ligne dans le cadre de laquelle vous pourrez examiner et commenter les conditions actuelles et les options proposées pour le bassin. Consultez le site Web sur **ottawa.ca/ bassinderetentionbaselinewoodroffe** et remplir le questionnaire d'ici le 21 novembre 2016. L'équipe de l'étude examinera tous les commentaires reçus et répondra aux préoccupations et questions soulevées avant que le rapport d'évaluation environnementale de portée générale ne soit terminé.

Pour obtenir de plus amples renseignements ou faire ajouter votre nom à la liste d'envoi, veuillez communiquer avec :

Darlene Conway, P. Eng.
Gestionnaire principale de projet
Ville d'Ottawa
Tél. : 613-580-2424, poste 27611
Courriel : Darlene.Conway@ottawa.ca

Nº 2016-507-S_Baseline-Woodroffe Stormwater_03112016

Centre of excellence would create 'huge business opportunity'

Continued from page 42

QNX driver-assist software can be found in more than 60 per cent of cars coming off production lines worldwide, said Barrie Kirk, a Kanata Lakes residents and autonomous vehicle consultant.

"It shows that we can as a city, as a province, sell technology products to the automobile sector worldwide," he said. "We want to raise the flag here."

Kirk is the founder of the Canadian Automated Vehicles Centre of Excellence and works with clients worldwide on understanding and establishing autonomous transportation.

Kirk said locating a centre of excellence in Ottawa would create "a huge business opportunity for local technology companies," estimating the global mobility market at about $10 trillion US.

"There's a lot of capability," he said. "The more we as a city focus on that, it will help the companies in the tech park and the broader Ottawa area to get into and get a good share of the global market."

> Self-driving cars are going to have a huge impact on the city of Ottawa.
>
> BARRIE KIRK
> FOUNDER OF THE CANADIAN AUTOMATED VEHICLES CENTRE OF EXCELLENCE

Kirk added that autonomous vehicles will change the future of transportation.

"Self-driving cars are going to have a huge impact on the city of Ottawa," he said. "If you look back 100 years ago, Model T Fords were coming off the production line. You know how they changed lives.

"Self-driving cars are going to change everything all over again – a huge impact. We have an opportunity to redesign the city of Ottawa."

Autonomous vehicles will also make roads safer, he said.

"Computers don't get tired or distracted or drunk or fall asleep," said Kirk. "My hope and my prayer is that we can save about 80 per cent of collisions, deaths and injuries on the road each year."

City council approved a motion to research and submit a plan to the province to allow autonomous vehicle testing on public roads, beginning in the Kanata North Business Park.

PHOTO ILLUSTRATION BY JESSICA CUNHA/METROLAND

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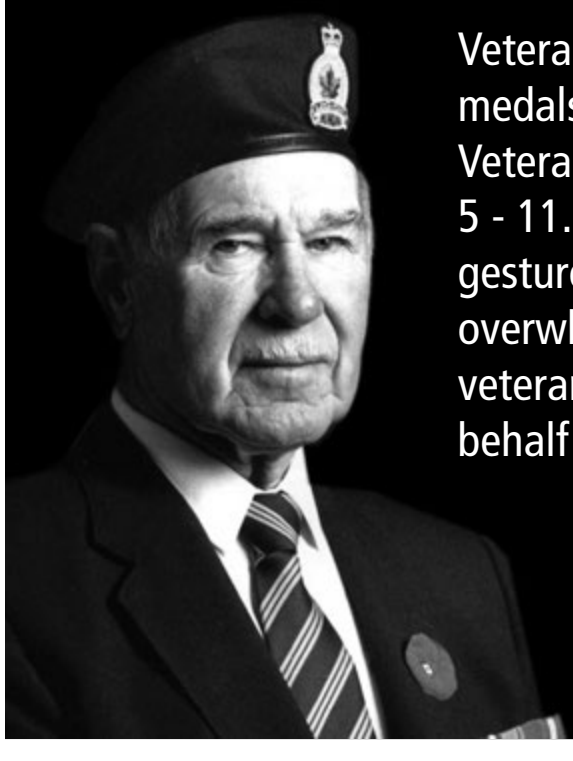
It is our honour to recognize your valour.



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Online Information Session
Baseline/Woodroffe Stormwater Management Pond
Municipal Class Environmental Assessment and Functional Design
November 3, 2016 to November 21, 2016

ottawa.ca/baselinewoodroffepond

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed Stormwater Management Pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).

The proposed pond will provide treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The pond is being planned under Schedule B of the Municipal Class Environmental Assessment and will identify a preferred alternative and functional design for the pond.

You are invited to an Online Information Session to review and comment on the existing conditions and pond alternatives. Please visit **Ottawa.ca/baselinewoodroffepond** and fill out the questionnaire by November 21, 2016. The study team will review all comments and respond to any concerns or questions before the Class EA report is completed.

For more information, or if you wish to have your name added to the mailing list, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
Tel: 613-580-2424, ext. 27611
Email: Darlene.Conway@ottawa.ca

Ad # 2016-507-S_Baseline-Woodroffe Stormwater_03112016

Ontario PC Party officials refuse to disclose vote breakdown

Continued from page 23

in the riding of Niagara West-Glanbrook – over Ontario PC Party president Rick Dykstra, as proof that the party doesn't meddle in the local nomination process.

But it would seem many aren't convinced.

"It's understandable that, as leader, Patrick Brown has full authority under the rules of the party to impose that decision unilaterally, and after the shocking upset in Niagara West-Glanbrook last week, he likely feels compelled to limit opposition to his favoured candidates," Tysick said in a statement sent to Metroland Media. "That said, if he cares at all about democracy, he should open the process to all and let people have their say."

Among the chief concerns addressed by several conservatives who spoke with Metroland Media were the size of the venue where the election of the riding executive was carried out in August and where the candidate nomination meeting will be held on Nov. 5. There was also little to no communication about key dates and application deadlines, insiders say.

It would seem the deck was stacked in favour of Ghamari, according to the picture former city councillor Doug Thompson painted of the founding meeting of the executive on Aug. 31 at the Alfred Taylor Centre in North Gower.

"There was no guideline for the meeting itself; there was no oversight," he said, adding people were lined up at Ghamari's table thinking it was the general registration table, and Ghamari's people were handing out papers bearing certain names for executive roles in the riding association.

"People were just copying her list right onto the ballot," Thompson said. "I think they hold better elections in Somalia."

On Ghamari's website, it says there was a strong showing at the founding meeting.

"In fact, we were successful and elected 100 (per cent) of the board members endorsed by Goldie and her team," her website reads.

Liz MacKinnon, the Carleton PC riding association president, said the executive has just been following party guidelines.

"The only role I had was to select the venue," she said.

Ghamari echoed the sentiment of the association, saying the party determines the rules, but didn't respond to multiple requests for comment about member concerns or Tysick's disqualification.

NOT ENOUGH ROOM

The nomination of a PC candidate will be held at the Alfred Taylor Centre on Nov. 5, but many people expect problems because of the size of the room.

"There have been some concerns about the venue," said Purcell. "We held the founding meeting there with 350 members and it was at capacity."

According to a representative with the Alfred Taylor Centre, the space can hold between 250 and 400 people, depending on the type of event.

Purcell said the riding executive will have to find a way to compromise.

"Not allowing people to vote would be against the party's constitution," he said.

A notice sent to Conservatives by the PC constituency association of Carleton said party members must be in the building to register by 10 a.m. in order to be eligible to vote.

Purcell estimated 1,000 memberships had been sold up to a week before the nomination meeting.

It's estimated that 300 people cast a ballot.

Tysick said 818 memberships had been sold in total before he was disqualified. His team estimates confirmed support from 400 members. Those numbers have not been confirmed by the riding association.

Osgoode resident and conservative Rob Brewster won't be attending the meeting because of his concerns over the way the August event unfolded.

"I walked away," he said of the voting process for the association's executive. "In my mind it's not legit."

Brewster and another long-time conservative, David Presley, said that a barbecue stationed beside an RV outside of the centre was completely inappropriate.

"It didn't take me long to realize it was just Goldie's people," said Presley, a Manotick resident. "It was a founding meeting of a new riding association and I thought we were there to do an election, not to have a barbecue."

Presley said he's not sure if the barbecue breaks any rules, but added the optics are questionable.

"I would think of that as the same as having some kind of inducement at a poll," he said.

Brewster agreed, saying, "On election day, you're not even allowed to have one of your signs outside a polling station."

Conservative Bob Cook, who helped Thompson sell memberships during his campaign, said the candidates seeking an executive position weren't even introduced to the crowd.

"Mickey Mouse would have been proud," said Cook, who lives in Carsonby, just outside North Gower. "This was kids-in-the-playground type stuff."

Aside from the venue, several people expressed concern over the timing of the upcoming nomination meeting. Originally, the vote wasn't expected until spring 2017, but the date has been moved up a couple of times, insiders say.

Thompson said November isn't great timing since it's deer-hunting season.

Former longtime Ottawa CFRA radio host Nick Vandergragt has also weighed in.

"What's the rush?" Vandergragt said of the timing. "There are a lot more than 300 people in that riding that would have wanted to vote. And they only make room for 300? Something stinks in Denmark."

Vandergragt isn't a resident of the riding, but says he's a small "c" conservative and has been keeping an eye on the race. He hosts an online radio show broadcast from Greely.

Like Tysick, Vandergragt seems convinced the party's upper echelon is hand-picking candidates.

"I think these kinds of things that are going on under Patrick Brown are provincewide, not just in Carleton," he said, adding traditional conservatives are going to stay home on Nov. 5 and not cast a ballot.

Cook echoed the sentiment, saying the perceived behind-the-scenes meddling could cost the party the riding.

"Something like this is not good for the riding and not good for the people in it," he said.

Thompson went to so far as to say the Ontario PC party is putting the new riding on a platter for the Liberals.

"They're alienating a lot of people, not just in Carleton, in other areas," Thompson said. "If I was a Liberal in this area, I would be licking my chops, saying, 'This could be the one that we would be willing to put up a big fight to wrestle it from the PCs.'"

Presley and his wife Lyn are big supporters of the party and current MPP Lisa MacLeod – whose riding of Nepean-Carleton is being split due to population growth to form the new Nepean and Carleton ridings.

"Quite frankly, I would wonder if … it's a good idea for a party that can't even run a founding meeting properly, how are they ever going to run a government properly?" Presley said. "I would have to hold my nose to vote Conservative this time, and I hate not to. I would just not vote probably."

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Senior Project Manager / Asset Management
City of Ottawa
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Ad # 2016-507-S_Baseline-Woodroffe Stormwater_03112016

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Planning and Development E-newsletter - November 2016

City of Ottawa <planning@ottawa.ca> Wed, Nov 16, 2016 at 9:06 AM

[redacted]

View in browser

Planning and Development

Announcing Registration for the Planning Primer Elective: Committee of Adjustment

November 19 and 21, 2016 (Offered in English)

Location:
City Hall, 110 Laurier Avenue West
Festival Control Room, First Floor
9 a.m. to noon

November 28, 2016 (Offered in French)

Location:
City Hall, 110 Laurier Avenue West
Richmond Room, Second Floor
9 a.m. to noon

You can register for the course online until November 18, 2016. Seating is limited to 40 residents per session.

The Planning, Infrastructure and Economic Development department offers the Planning Primer Program to help residents become more aware of, and more involved in, the land-use planning process. The program is a series of half-day courses. Please see our schedule for other Primer courses.

Please send your questions to primer@ottawa.ca

Land Evaluation and Area Review (LEAR) Update

Public Meeting (at Planning Committee)
Tuesday, November 22, 2016
9:30 a.m. Champlain Room
Heritage Building, 2nd floor

Ottawa City Hall

The Ottawa-Carleton LEAR System, originally developed in 1997, is now updated to incorporate current soil and land use information. A number of the new LEAR factors have also been updated. The Ottawa Land Evaluation and Area Review for Agriculture (LEAR) report has two volumes:

• LEAR Volume 1 contains a description of the LEAR system and how properties are scored.

• LEAR Volume 2 contains LEAR data for each scored property.

Land owners may use the LEAR map to easily search for their property and see the new LEAR scoring or you can download a printable Map (PDF)

For more information, contact bruce.finlay@ottawa.ca

R4 (Residential Fourth Density) Zoning Review

Ottawa continues to see urban intensification and a continued interest in urban living. Ottawa's intensification policies have largely been successful in directing and realizing changes within areas targeted for intensification such as within mixed use centres and along mainstreets.

However, established communities continue to face challenges in ensuring that change and intensification is compatible with the existing fabric and character. The R4 Zoning Review follows several recent zoning studies aimed at ensuring more compatible infill and intensification in established low-rise neighborhoods in the urban area.

Read our discussion paper. Please send us your comments and questions by Friday, December 16, 2016.

Canada Day 2017 - Temporary Campgrounds at City Facilities

A zoning by-law amendment proposal is being considered by the Planning, Infrastructure and Economic Development Department at the City of Ottawa. The zoning amendment proposal affects certain lands throughout the City of Ottawa.

The proposed amendment will permit campgrounds at the following City-owned facilities, for a temporary period of six (6) days from June 29 to July 4 2017, in order to accommodate visitors to the city on and around Canada Day weekend 2017:

Urban Area Sites (to be considered by Planning Committee):

- Bob Macquarie Recreation Complex (1490 Youville Drive)
- Ray Friel Recreation Complex (1585 Tenth Line Road)
- Richelieu-Vanier Community Centre (300 Des Pères-Blancs Avenue)
- St. Laurent Recreation Complex (525 Coté Street)
- Nepean Sportsplex (1701 Woodroffe Avenue)
- Earl Armstrong Arena & Trillium Park (2020 Ogilvie Road)
- Kanata Leisure Centre (70 Aird Place)
- Jim Durrell Recreation Centre (1265 Walkley Road)
- Tom Brown Arena (141 Bayview Road)

Rural Area Sites (to be considered by Agriculture and Rural Affairs Committee)

- Cumberland Village Heritage Museum (2830 and 2940 Old Montreal Road)

For more information contact tim.moerman@ottawa.ca

Density Index – Phase One Zoning Strategy Now Available

Changes have been made to the proposed Density Index zoning amendment to simplify how density rates are calculated and to introduce the new requirements in two Phases. Phase one is now available for review and comment.

The purpose of the Density Index project is to create minimum required densities for all lands, within the designated intensification areas of the Official Plan. These include:

•Central Area
•Arterial Mainstreets
•Town Centres
•Mixed-Use Centres

Need more information? contact elizabeth.desmarais@ottawa.ca

Baseline and W oodroffe Stormwater Management Pond

You are invited to an online Information Session to review and comment on the existing conditions and pond alternatives. Visit ottawa.ca/baselinewoodroffepond and fill out the questionnaire by November 21, 2016.

The study team will review all comments and respond to any concerns or questions before the Class EA report is completed.

For more information, or if you wish to have your name added to the mailing list, please contact darlene.conway@ottawa.ca

Register Now for a W ebinar on Sustainable Neighbourhood Development

Register now for the Federation of Canadian Municipalities free webinar sessions on November 24 and December 1 and learn how to get started with creating sustainable, livable neighbourhoods.

Participate in discussions with leading sustainability experts and municipal representatives who have successfully developed sustainable communities.

Session 1: English
Date: Thursday, November 24, 2016
Time: 2 – 3:30 p.m. EST

This session offers practical solutions to six common challenges of sustainable neighbourhood development from an expert in sustainable neighbourhood development and three innovative Ontario municipalities that successfully implemented sustainable neighbourhood plans.

Speakers:
Peter Whitelaw, Principal, Modus Planning, Design & Engagement Inc.
Adriana Gomez, Senior Project Manager, Sustainable Neighbourhoods, Toronto and Region Conservation Authority
Amy Burke, Senior Planner, Municipality of Clarington, ON
Graham Seaman, Director of Sustainability, City of Markham, ON

Session 2: French
Date: Thursday, December 1, 2016
Time: 2 – 3:30 p.m. EST

The session will present best practices for developing sustainable neighbourhoods, as well as details on a Quebec municipality that has put these practices into action.

Speakers:
David Paradis, Director, Research, Training and Coaching at Vivre en Ville
Michel Larue, Director, Sustainable Planning Department at City of Terrebonne, QC

Get Involved at an Upcoming Event

November 21, 2016
Urban Forest Management Plan (UFMP): Phase 2 consultation
City Hall - Council Chambers, Jean Pigott & Festival Control Boardroom
1 to 4 p.m. and 6 to 9 p.m.

November 22, 2016
Urban Forest Management Plan (UFMP): Phase 2 consultation
City Hall - Council Chambers, Jean Pigott, Colonel by, Richmond & Honeywell Boardrooms
6 to 9 p.m.

More info:
martha.copestake@ottawa.ca

December 6, 2016
Bank Street Renewal - Between Riverside Drive North and Ledbury Avenue
6 to 8:30 p.m.
Presentation at 7 p.m.
Jim Durrell Recreation Centre - Ellwood Hall
1265 Walkley Road
OC Transpo routes 1,8, 41, 87 and 146

More info:
ann.selfe@ottawa.ca

What's Trending

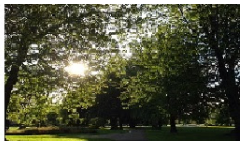
Fees Related to Planning Applications

O'Connor Street Bikeway

Identifying and Protecting Heritage Properties

Heritage Conservation Districts

Land Evaluation and Area Review



Urban Forest Management Plan

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RÉUNIONS PUBLIQUES

Sauf avis contraire, toutes les réunions publiques se tiendront à l'hôtel de ville d'Ottawa, 110, avenue Laurier Ouest. Pour obtenir un ordre du jour complet et les mises à jour, inscrivez-vous aux alertes par courriel ou consultez ottawa.ca/ordresdujour, ou appelez le 3-1-1.

Le lundi 19 décembre
Commission de services policiers d'Ottawa
16 h, salle Champlain

Le mardi 20 décembre
Séance de planification stratégique de mi-mandat du Conseil de santé d'Ottawa
9 h, le Nepean Sailing Club 3259, avenue Carling

Saviez-vous que vous pouvez recevoir des avis par courriel concernant les réunions? Inscrivez-vous dès aujourd'hui à ottawa.ca/cyberabonnements.

Nº Pub 2016-501-S_Council_16122016

AVIS DE RÉUNION PUBLIQUE
Bassin de rétention des eaux pluviales à l'angle du chemin Baseline et de l'avenue Woodroffe
Évaluation environnementale municipale de portée générale et conception fonctionnelle

Le 9 janvier 2017
De 18 h 30 à 20 h 30 – Présentation à 19 h
Place-Ben-Franklin
101, promenade Centrepointe

La Ville d'Ottawa a entrepris une évaluation environnementale municipale de portée générale concernant l'aménagement d'un bassin de rétention des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude sur la rénovation de l'installation de gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015). Le bassin proposé assurera le traitement et la régulation des eaux de ruissellement provenant de quelque 435 hectares qui s'écoulent actuellement d'une manière incontrôlée vers le ruisseau Pinecrest.

L'étude sur l'aménagement du bassin, conformément à l'annexe B de l'évaluation environnementale municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

Une présentation sur le contexte du projet, l'état actuel du site, les autres bassins envisageables et la solution privilégiée de façon préliminaire sera faite lors de la réunion. Le personnel de la Ville et l'équipe chargée de l'étude seront sur place pour répondre à vos questions et recueillir vos commentaires.

Pour en savoir plus sur le projet, visitez ottawa.ca/bassinderetentionbaselinewoodroffe.

Si vous souhaitez que votre nom soit ajouté à la liste d'envoi, ou si vous avez d'autres questions, communiquez avec la personne-ressource suivante.

Darlene Conway, P. Eng.
Gestionnaire principale de projet, Gestion des biens
Ville d'Ottawa
Tél. : 613-580-2424, poste 27611
Courriel : Darlene.Conway@ottawa.ca

Nº Pub 2016-507-S_Baseline Woodroffe Stormwater_15122016

Under the age of 16? Adult supervision required

BRYNNA LESLIE

Capital Muse

In recent conversations with my dad, I heard some great stories about his childhood. On summer mornings in the '50s, he and his little brother were booted out the door and basically told not to come back until sundown. They often rode nearly 10 kilometres across and then down "the Hamilton Mountain" into Stoney Creek on the highway. No helmets; no parents; once, not even a set of working brakes. My dad was seven-years-old.

At the same age, I was an after school latchkey kid and routinely sent to the store two city blocks away to buy milk. At 11, I was a full-time babysitter for a summer.

Fast forward a few decades and I think parents would find themselves in some pretty hot water if it was discovered a seven-year-old was shut out of the house on a summer day or sent on errands, but not necessarily legal hot water. Cultural norms may dictate that a seven-year-old nowadays can barely sneeze without a parent at hand to offer a tissue, but the law is ambiguous at best.

I routinely hear parents wax about 11 or 12 as a legal minimum for children to be left alone. In fact only three provinces actually have laws dictating the minimum age at which a child can be unsupervised. In New Brunswick and Manitoba, kids have to be 12 before they can stay home alone. Quebec and others have no such law.

In Ontario, the minimum age is 16. It's kind of funny, actually, because kids can babysit at 11, acquire a snowmobile licence at 12 and get a job at 14. But they can't be left alone until driving age?

It's true. Ontario's Child and Family Services Act states that a child under the age of 16 may not be left unattended "without making provision for his or her supervision and care that is reasonable in the circumstances."

I think most of us would be hard-pressed to find a high school kid attending an after school daycare program or heading home to nanny care, however. That's because "reasonable in the circumstances" is largely left open to interpretation under the law.

I've attempted to take a balanced approach with my own children. My eldest, on the cusp of turning 12 has routinely asked if I'll drop him off at the mall with a friend. We haven't done that yet. But we're training him up.

He's stayed home for an hour or two on his own, taken transit limited distances and supervised his younger sister in the backyard for short periods while I'm making dinner. I've sent the two eldest, now 10 and 11, on walking errands to the store or to their piano lesson at the end of the block. In a group of kids, I'm comfortable with kids that age going to the park in daylight hours, providing there's no wandering about the neighbourhood – mostly fearful of their inattention to traffic, rather than strangers.

Sadly, even responsible parents who attempt to interpret the law are subject to policing by others. Recently, a Facebook acquaintance announced she'd called the Children's Aid Society and police after discovering a pair of 10-year-olds wandering around in a small town Wal-mart for an hour. She received many congratulations from others on Facebook, calling the parents of the children irresponsible, disgusting and unfit. It's not an uncommon scenario.

We parents put ourselves on the line when we attempt to give our kids some freedoms on their journey toward independence. But it's worth noting that limiting a child's exposure at a reasonable age to time without adults may do them more harm than good. For one thing, kids often live up to responsibility. Armed with the right tools, they will better learn to trust themselves and problem solve on their own, given the opportunity to do so without a nagging adult in the vicinity

Our collective fear of strangers is also inadvertently limiting kids' exposure to exercise and nature. In practice, by not allowing children of a reasonable age to play outdoors, kids are stuck on their parents' time clock. No surprise, then, that fewer than 10 per cent of Canadian kids are getting enough exercise. What parent has time to frolic and play on a child's schedule?

As my eldest kids enter the tween stage, I'm challenged to navigate the muddy waters. One thing I know for sure, however? It's probably a good idea to let them have some unsupervised time before I give them the keys to the car.

I routinely hear parents wax about 11 or 12 as a legal minimum for children to be left alone

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Notice of Public Meeting

Baseline/Woodroffe Stormwater Management Pond
Municipal Class Environmental Assessment and Functional Design

January 9, 2017
6:30 to 8:30 p.m. – Presentation at 7 p.m.
Ben Franklin Place
101 Centrepointe Drive

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The study process is following the requirements of a Schedule B project under the Municipal Class and will identify a preferred alternative and functional design for the proposed pond.

At the meeting, a presentation will be provided covering the background to the project, existing conditions on the site, pond alternatives, and the preliminary preferred alternative. City staff and the study team will be on hand to answer questions and receive comments.

More information about the project can be viewed at: Ottawa.ca/baselinewoodroffepond

If you wish to have your name added to the mailing list or, have further questions, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
Tel: 613-580-2424, ext. 27611
Email: Darlene.Conway@ottawa.ca

Ad # 2016-507-S_307 Richmond Road_24112016

Megan DeLaire/Metroland

A collision involving a tractor trailer and two other vehicles on Highway 416 near West Hunt Club Road sent three people to hospital with non-life threatening injuries and resulted in the closure of a northbound lane of the highway on Dec. 6.

Three injured in collision with tractor-trailer on Highway 416

MEGAN DELAIRE
mdelaire@metroland.com

Three people were taken to hospital with non-life threatening injuries after a collision involving a tractor-trailer and two cars on Highway 416 on Dec. 6.

The crash took place shortly before 11 a.m. in the northbound lanes near West Hunt Club Road, with a silver sedan and the cab of the tractor-trailer coming to rest in the median.

OPP are investigating the cause of the collision. One northbound lane was closed as a result of the crash and remained closed as of 12:30 p.m.

Although police, paramedics and firefighters responded, none of the drivers required extrication. According to paramedics, three patients from the two cars were treated and transported to hospital with minor injuries. One patient, a woman in her 70s, was also treated for a suspected head injury.

The driver of the tractor-trailer was not injured.

Paramedic spokesman JP Trottier pointed out that the collision could very easily have been tragic.

On Dec. 4, Brian and Mary Ward, a couple from Ottawa, were killed in a collision with a tractor-trailer on Highway 7, near Kaladar, Ont.

"Whenever a vehicle gets into a collision with a tractor-trailer, the injuries can be fatal very easily," Trottier said. "Nowadays with airbags people can be very well protected, but still, when you're colliding with a tractor-trailer – especially at the speeds they go at highways – it can instantly become a fatal collision.

"So it's certainly good to hear these were just bumps and bruises for the most part."

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PUBLIC MEETINGS

All public meetings will be held at Ottawa City Hall, 110 Laurier Avenue West, unless otherwise noted. For a complete agenda and updates, please sign up for email alerts or visit ottawa.ca/agendas, or call 3-1-1.

Monday, December 19
Ottawa Police Services Board
4 p.m., Champlain Room

Tuesday, December 20
Ottawa Board of Health Mid-Term Strategic Planning Session
9 a.m., Nepean Sailing Club

Did you know you can receive e-mail alerts regarding upcoming meetings? Sign up today at ottawa.ca/subscriptions.

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Ben Franklin Place
101 Centrepointe Drive

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed storm water management pond at the northeast corner of Baseline Road and Woodroffe Avenue. A storm water management pond was initially recommended in the Pinecrest Creek/Westboro Storm water Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Storm water Management Facility at Baseline Road and Woodroffe Avenue (2015). The proposed pond will provide water quality treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The study process is following the requirements of a Schedule B project under the Municipal Class and will identify a preferred alternative and functional design for the proposed pond.

At the meeting, a presentation will be provided covering the background to the project, existing conditions on the site, pond alternatives, and the preliminary preferred alternative. City staff and the study team will be on hand to answer questions and receive comments.

More information about the project can be viewed at: Ottawa.ca/baselinewoodroffepond

If you wish to have your name added to the mailing list or, have further questions, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
Tel: 613-580-2424, ext. 27611
Email: Darlene.Conway@ottawa.ca

Ad # 2016-507-S_307 Richmond Road_24112016

[redacted]

Planning and Development E-newsletter - December 2016

City of Ottawa <planning@ottawa.ca> Mon, Dec 19, 2016 at 3:33 PM

[redacted]

View in browser

Planning and Development

Chair Harder's Y ear End Message

It has been a very productive year for everyone, thanks to the hard work of the Committee Members and staff in 2016. I look forward to more in 2017. A few highlights:

- New regulations for detached secondary dwelling units, known as coach houses. Following changes to the Planning Act in 2012, the Government of Ontario required municipalities to allow this form of residence as a means to encourage discreet intensification and more affordable housing in established neighbourhoods. The proposed regulation meets the provincial requirement, with rules that ensure these secondary units are not too large.

- The Ontario Municipal Board recommended that Ottawa use 2036 as a planning horizon for its Official Plan. Two major studies – the Employment Land Review and the Land Evaluation and Area Review for Agriculture update – were completed, using this new planning horizon. These studies inform the growth projections, policies, and changes to land use designations and mapping as part of a comprehensive Official Plan review.

- A feasibility study for a tunnel from the Macdonald-Cartier Bridge to Highway 417 with Transportation Committee concluding that a tunnel for mixed traffic is technically possible. The next step will seek funding from our federal and provincial partners for an environmental assessment study.

- A review of its Permanent Signs on Private Property By-law to address a number of issues, including new forms of electronic signs and messaging boards. The new by-law strikes a balance between the need to identify places and businesses against the goals of reducing clutter and distracted driving and respecting the landscape of the city's heritage and natural areas.

- A new Community Design Plan for Kanata North and an updated plan for Riverside South, both of which integrate provisions of the Building Better and Smarter Suburbs project. The Kanata North plan will see commercial development along a widened March Road, four schools and four parks, plus a park-and-ride and pathway network for pedestrians and cyclists. The Riverside South plan features a more efficient community core, more shared public facilities and better connections for pedestrians and cyclists.

- Following the first comprehensive parking review for the inner-urban area since the 1960s, the City has

reduced or eliminated minimum parking requirements near rapid transit stations (particularly LRT), as well as along mainstreets and transit priority corridors.

- Woodlands – which include treed areas, woodlots or forested areas – vary in their level of significance based on features like size, ecological function, tree species, and economic and social value. The Official Plan is now amended to ensure a consistent approach to identifying significant woodlands, bringing it in line with provincial requirements. The staff report is attached to the City Council agenda for December 14, 2016.

- An exciting proposal to redevelop the site at Beechwood Avenue and St. Charles Street including the repurposing of the former St. Charles Church, a treasured heritage building in the neighbourhood. Residents in this and in nearby communities will benefit from the vibrant mix of planned uses proposed, which include a 55-unit residential building, retail space, restaurants and public open space, all centred on a large site.

- An environmental assessment study for the widening of the Airport Parkway and Lester Road to meet the transportation demands of the growing southern communities of Riverside South, Findlay Creek and Leitrim, as well as development at the Ottawa Macdonald-Cartier International Airport.

Did You See the Sign?

The Planning and Development section of the City's website has been renewed. The new site features the following areas:

- Planning Ottawa
- Developing Ottawa
- Developer Information
- Development Information for Residents
- Get Involved
- Events
- Constructing Ottawa

The Planning Ottawa section is new and provides information on the planning process, how the Official Plan and Master Plans influence changes throughout the city and outlines the challenges faced by our growing city. Included in this section is a quick video introduction to planning – I Saw the Sign. Beginning with the development application signs displayed on potential development sites, the video provides a simple introduction to the planning process and how residents can get involved.

The Developing Ottawa section has two streams – developers and residents. Included in the residents stream is the All About Your Property section that provides answers to many common inquiries. In the Get Involved section you will find information on the Planning Primer courses, Development Application Search Tool and Public Consultations. Awards programs are featured in the Events category and you will find information on construction and infrastructure as well as major City projects in Constructing Ottawa.

How to Plan Y our Coach House

Secondary dwelling units in accessory structures, termed coach houses in the City of Ottawa, were

approved by Council on October 26, 2016.

The City has created a document, titled: How to Plan Your Coach House in Ottawa [PDF 6.1 MB]. This document helps to understand the process and costs associated with building a coach house. This guide also provides answers to many questions associated with constructing a coach house.

Visit our coach house booth at the Ottawa Home & Remodelling Show:

EY Centre, 4899 Uplands Drive
January 19 and 20, 12 to 9 p.m.
January 21, 10 a.m. to 7 p.m.
January 22, 10 a.m. to 5 p.m.

Density Index - Permitting Higher Density Mix-Use Developments

The purpose of the Density Index project is to create minimum required densities for all lands, within the designated intensification areas of the Official Plan. These include:

- Central Area
- Arterial Mainstreets
- Town Centres
- Mixed-Use Centres

These are identified as areas that are subject to required minimum densities because they are intended to promote land uses that attract large numbers of people, including residents, as well as employees and customers from both within and outside the neighbourhood. The intent is to permit and promote higher-density mixed use developments in areas which are easily accessed by the transportation system, including the forthcoming rapid transit network.

The Planning Committee meeting, at which this study's Official Plan and Zoning By-law Amendments will be heard, has been rescheduled to February 2017.

Need more information? Visit the project's website.

Land Evaluation and Area Review (LEAR) Update

Using the parcel scoring of the Ottawa LEAR, City staff recommended changes to the Agricultural Resource area designation in draft Official Plan Amendment Update - 2016 at the City Council meeting on December 14, 2016.

The Ottawa-Carleton LEAR System, originally developed in 1997, is now updated to incorporate current soil and land use information. A number of the new LEAR factors have also been updated. The Ottawa Land Evaluation and Area Review for Agriculture (LEAR) report has two volumes:

• LEAR Volume 1 contains a description of the LEAR system and how properties are scored.
• LEAR Volume 2 contains LEAR data for each scored property.

Why did the City update the LEAR?

New soils mapping and changes in land use and the size and nature of

farms over the last 20 years warranted re-examining and updating the existing LEAR system. The Ontario Municipal Board also directed the City to complete the LEAR update as part of its consideration of appeals to Official Plan Amendment #150.

Committee Approves Budget for 2017 and Canada Summer Games Bid

The City's Finance and Economic Development Committee approved a report recommending that the City confirm its bid to host the 2021 Canada Summer Games, including a financial commitment of $10.5 million, through in-kind City services and capital improvements to recreation and athletic facilities, and by showing strong community support for the event. These games, held in the last week of July and first two weeks of August, are the largest multi-sport event in Canada for young athletes and a training ground for Olympic athletes.

Ottawa Art Gallery (OAG) and Arts Court Redevelopment

Construction of a new Ottawa Art Gallery and redevelopment of the Arts Court site is underway. Things continue to move along on the construction site. On the site for the new building, the concrete work for the public sector on all floor levels, the Concourse to the fourth floor, plus the roof were completed in September, 2016. The contractor now continues to work on mechanical and electrical for the new OAG, has finished pouring concrete for the hotel and is now pouring the first floors of the condominium tower.

Arts Court is still in session – take a look at the calendar of events, and check out a theatre or dance production.

Visit the OAG and Arts Court web pages for information on exhibitions, programs, and events, and for links to resident arts and culture groups as well as the Cultural Engineering project.

Get Involved at an Upcoming Event

January 9, 2017
Claridge's community pre-application consultation: East LeBreton Flats (near 301 Lett Street)
Bronson Community Centre (Community Hall – 211 Bronson Ave.)
3:00 p.m.-8:00 p.m.

More Info:
Andrew.McCreight@ottawa.ca

January 9, 2017
Baseline/Woodroffe Stormwater Management Pond Open House
Ben Franklin Place
101 Centrepointe Drive
6:30 to 8:30 p.m. – Presentation at 7 p.m.

More Info:
Darlene.Conway@ottawa.ca

January 11, 2017
Elgin Street and Hawthorne Avenue Functional Design Study Open house
Seating for the presentation is limited, please register by Friday, January 6

Council Chambers & Jean Pigott Hall, Ottawa City Hall
110 Laurier Avenue West
5 to 7:30 p.m., presentation at 5:30 p.m.

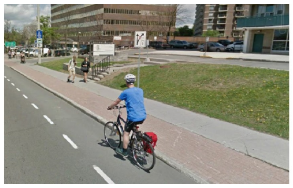
More Info:
Vanessa.Black@ottawa.ca

January 19-22, 2017
Visit our coach house booth at the Ottawa Home & Remodelling Show
EY Centre, 4899 Uplands Drive
January 19 and 20, noon to 9 p.m.
January 21, 10 a.m. to 7 p.m.
January 22, 10 a.m. to 5 p.m.

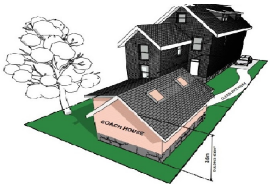
More Info:
Emily.Davies@ottawa.ca

What's Trending

Baseline and Woodroffe Stormwater Management Pond



Bank Street Renewal



How to Plan Your Coach House

This email was sent by the City of Ottawa to [redacted] because you subscribed to Planning and Development

City of Ottawa, 110 Laurier Ave. W., Ottawa, Ontario K1P 1J1, Canada

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ottawa.ca | 3-1-1

TTY 613-580-2401

Visit the city's social media streams

From:	Conway, Darlene
Subject:	FW: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: January 9, 2017 / Bassin de rétention des eaux pluviales à l"intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 9 janvier 2017
Date:	Friday, January 06, 2017 4:35:14 PM
Attachments:	image001.jpg image002.gif BW pond POH flyer_bil.pdf BWpond bassin.pdf

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Hello/Bonjour,

The display boards for the public meeting on January 9th can now be viewed at:
Ottawa.ca/baselinewoodroffepond
Ottawa.ca/bassinderetentionbaselinewoodroffe

Regards/Salutations,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27611
ottawa.ca/planning / ottawa.ca/urbanisme

From: Conway, Darlene
Sent: Monday, December 19, 2016 11:43 AM
Subject: FW: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Public Meeting: January 9, 2017

Hello/Bonjour,

This is to confirm that the deadline for responding to the online questionnaire at: Ottawa.ca/baselinewoodroffepond has been extended to **January 16, 2017.**

La présente est pour confirmer que la date limite pour répondre au questionnaire en ligne (Ottawa.ca/bassinderetentionbaselinewoodroffe) a été reportée au **16 janvier 2017**.

Regards/Salutations,

DEC

Darlene Conway, P. Eng.

Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27611
ottawa.ca/planning / ottawa.ca/urbanisme

From: Conway, Darlene
Sent: Thursday, December 15, 2016 2:22 PM
Subject: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Public Meeting: January 9, 2017

Hello/Bonjour,

Thanks to all who have provided comments to date about the proposed pond.

A public meeting will be held on **January 9, 2017 from 6:30pm to 8:30pm at Ben Franklin Centre** (see attached for further details). A presentation about the proposed pond will be provided at 7pm, followed by a Question and Answer session.

More information about the project can be viewed at: Ottawa.ca/baselinewoodroffepond
Two background studies can be viewed at: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

In the mean time, if you have any additional comments or concerns, please do not hesitate to contact me.

Merci à tous ceux qui nous ont fait part de leurs commentaires concernant le bassin de gestion des eaux pluviales de Baseline et Woodroffe.

Une séance publique sera tenue **le 9 janvier 2017, de 18h30 à 20h30 au centre Ben Franklin** (voir ci-joint pour plus de détails). Une présentation concernant le bassin de rétention aura lieu à 19h, suivi d'une période de question et réponse.

Pour en savoir plus sur le projet, visitez: Ottawa.ca/bassinderetentionbaselinewoodroffe
Deux études de fond peuvent être consultées en cliquant sur le lien suivant:
http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

Dans l'intervalle, n'hésitez pas à me contacter si vous avez des questions ou quelconque préoccupation.

Regards/Salutations,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

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ottawa.ca/planning / ottawa.ca/urbanisme

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Notice of Public Meeting

Baseline/Woodroffe Stormwater Management Pond Municipal Class Environmental Assessment and Functional Design

January 9, 2017
6:30 to 8:30 p.m. – Presentation at 7 p.m.
Ben Franklin Place
101 Centrepointe Drive

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed stormwater management pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).The proposed pond will provide water quality treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The study process is following the requirements of a Schedule B project under the Municipal Class and will identify a preferred alternative and functional design for the proposed pond.

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If you wish to have your name added to the mailing list or have further questions, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
Email: Darlene.Conway@ottawa.ca
613-580-2424 ext. 27611

Avis de séance publique

Bassin de rétention des eaux pluviales à l'angle du chemin Baseline et de l'avenue Woodroffe
Évaluation environnementale municipale de portée générale et conception fonctionnelle

Le 9 janvier 2017
De 18 h 30 à 20 h 30 – Présentation à 19 h
Place-Ben-Franklin
101, promenade Centrepointe

La Ville d'Ottawa a entrepris une évaluation environnementale municipale de portée générale concernant l'aménagement d'un bassin de rétention des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude sur la rénovation de l'installation de gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015). Le bassin proposé assurera le traitement et la régulation des eaux de ruissellement provenant de quelque 435 hectares qui s'écoulent actuellement d'une manière incontrôlée vers le ruisseau Pinecrest.

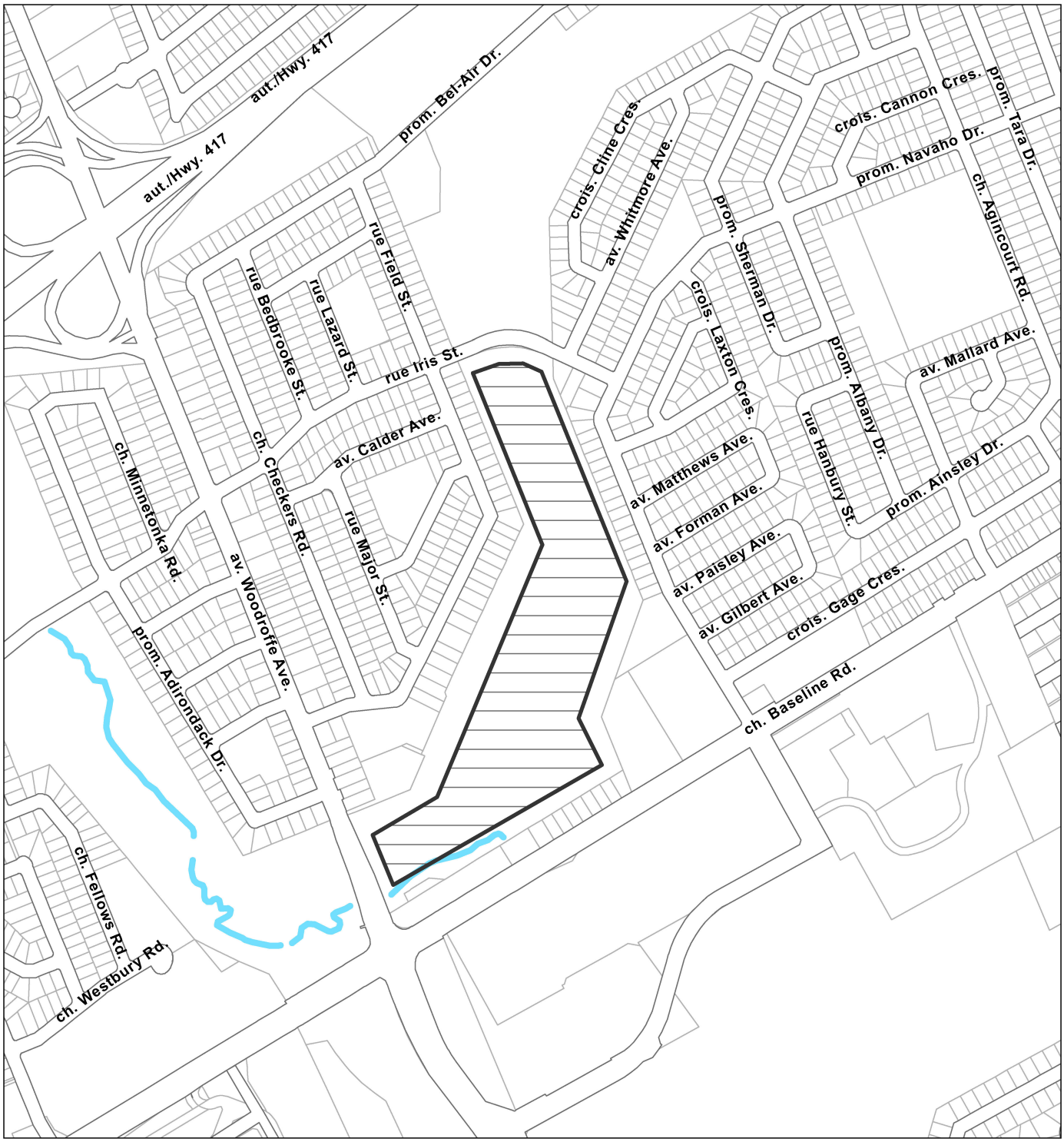
L'étude sur l'aménagement du bassin, conformément à l'annexe B de l'évaluation environnementale municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

Une présentation sur le contexte du projet, l'état actuel du site, les autres bassins envisageables et la solution privilégiée de façon préliminaire sera faite lors de la réunion. Le personnel de la Ville et l'équipe chargée de l'étude seront sur place pour répondre à vos questions et recueillir vos commentaires.

Pour en savoir plus sur le projet, visitez ottawa.ca/bassinderetentionbaselinewoodroffe.

Si vous souhaitez que votre nom soit ajouté à la liste d'envoi, ou si vous avez d'autres questions, communiquez avec la personne-ressource suivante.

Darlene Conway, P. Eng.
Gestionnaire principale de projet, Gestion des biens
Ville d'Ottawa
Courriel : Darlene.Conway@ottawa.ca
Téléphone : 613-580-2424, poste 27611



Ottawa PLANNING AND GROWTH MANAGEMENT URBANISME ET GESTION DE LA CROISSANCE

	16-0941-B

I:\CO\2016\ Location \BAselineWoodroffePond

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REVISION / RÉVISION - 2016 / 07 /05

LOCATION MAP / PLAN DE LOCALISATION

Ruisseau Pinecrest Creek

Location of proposed stormwater management pond
Emplacement du bassin de gestion des eaux pluviales proposé

NOT TO SCALE

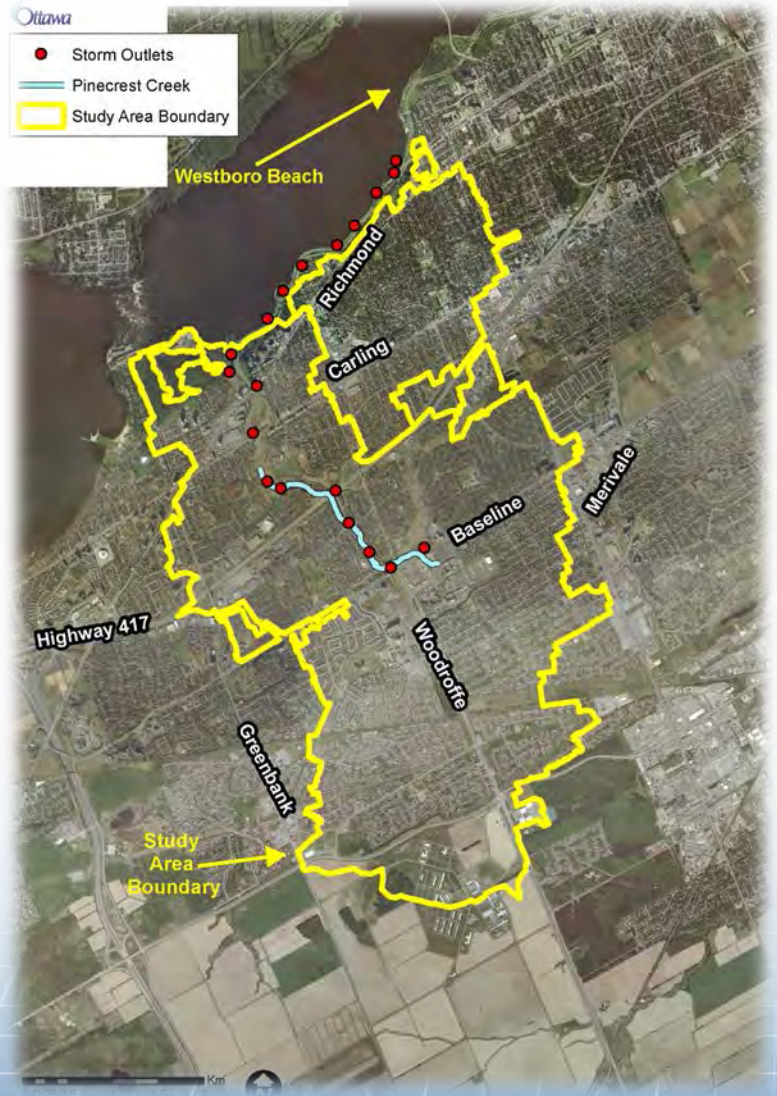
Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment Study

Public Meeting
January 9, 2017

Agenda

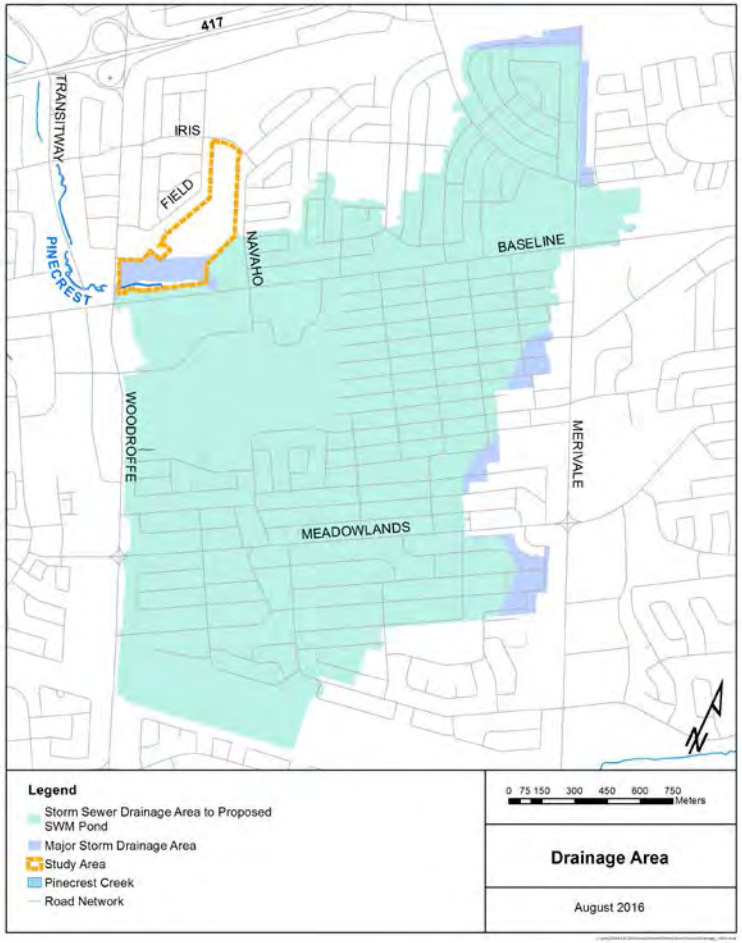
- Background
- Class Environmental Assessment Process
- Existing Conditions and Constraints
- Pond Options
- Overview of Comments Received to Date
- Next Steps

Background



- Pond initially recommended in the *Pinecrest Creek SWM Retrofit Study* (2011) as part of a Master Plan for the Pinecrest Creek subwatershed
- Further study undertaken in the *Feasibility Study for a Surface SWM Facility at Baseline Road and Woodroffe Avenue* (2015) to confirm preliminary National Capital Commission (NCC) support
- Pond is on NCC lands

Class Environmental Assessment (EA) Process

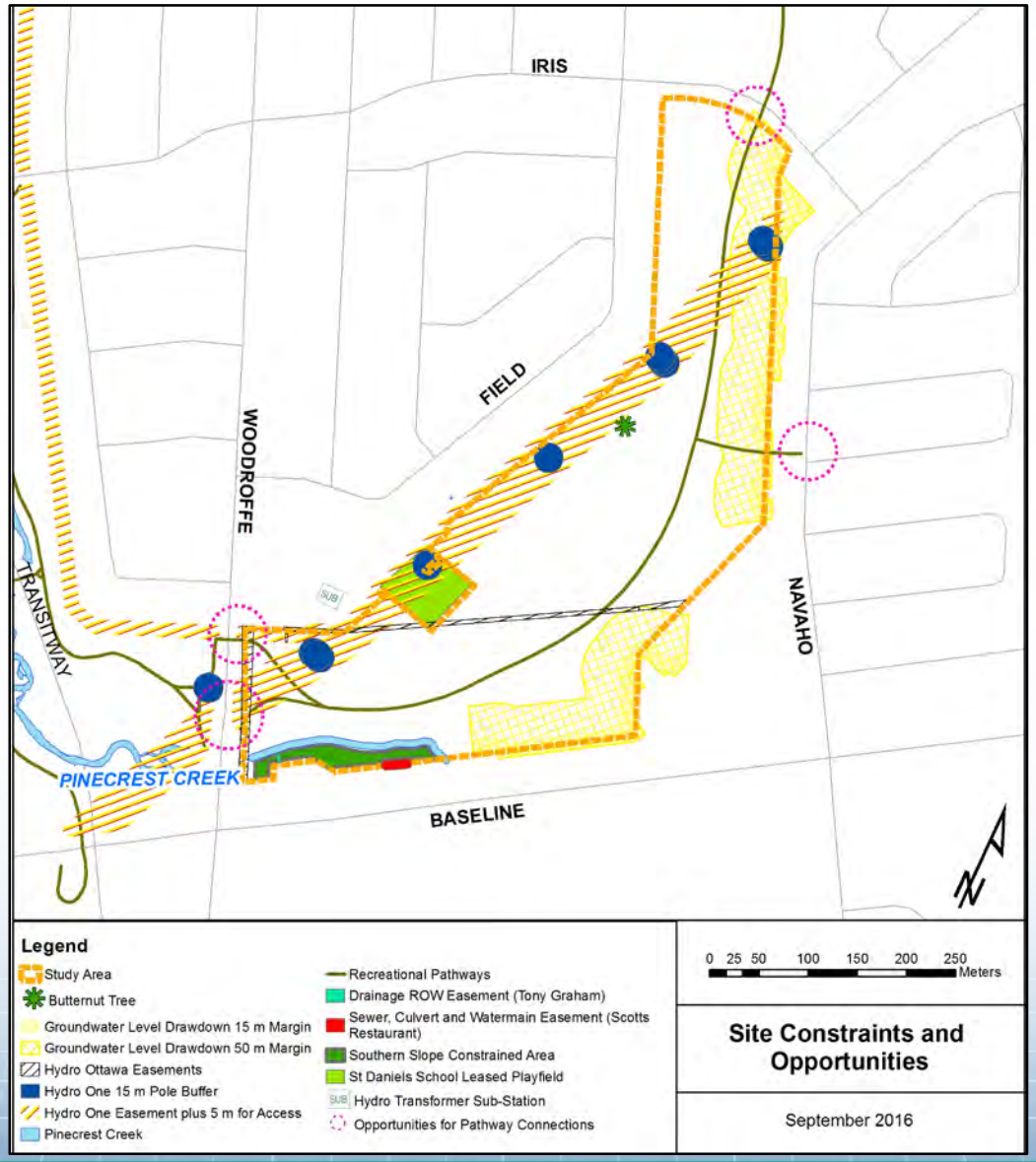


- Schedule B Class Environmental Assessment (Class EA) is now underway, requiring:
  - Identification of the existing conditions and constraints
  - Consideration of previous studies
  - Confirmation and assessment of the options for the SWM pond
  - Documentation of the process
- Class EA will identify a preferred option for the proposed pond

Existing Conditions and Constraints

- Subsurface conditions
- Environmental contamination
- Fish and aquatic habitat
- Watercourses and wetlands
- Terrestrial vegetation
- Wildlife and habitat
- Species at Risk
- Aboriginal Land Claims
- Cultural heritage / archaeology
- Public land ownership
- Existing land use
- Infrastructure networks
- Recreation and pedestrian/cycling routes

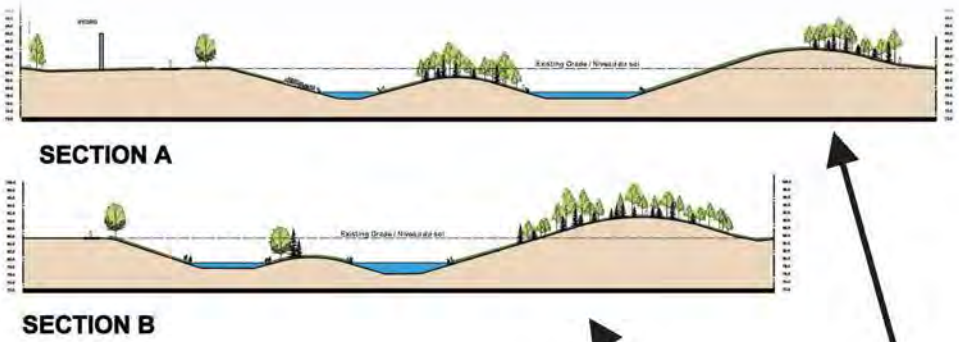
Site Constraints



Pond Options

- 2015 feasibility study developed 2 options to further detail how the pond could fit within the study area
- Both options:
  - Maximize water quality and flood control benefits
  - Reduce frequent flow impacts (erosion) on Pinecrest Creek
  - Integrate existing pathways
  - Provide for significant landscaping improvements
  - Are on NCC lands

Option 1



Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
Plantation de gros arbres	Large Tree Planting
Plantation d'arbustes	Shrub Planting
Sentier récréatif asphalté de 3 m	3 m Asphalt Recreational Path
Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
Limite de rabattement de 50 m	50 m Draw Down Limit

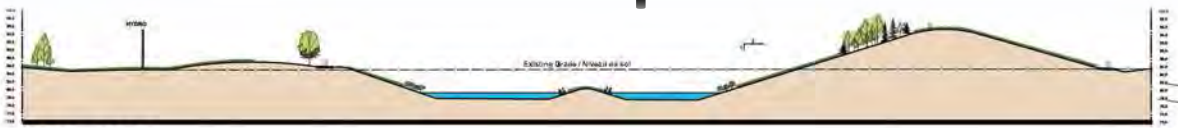
Existing / Existant

Contours (intervalles de 0.5 m)	Contours (0.5 m Intervals)
Ligne de transport d'électricité et poteau	Hydro Pole / Line
Végétation à garder	Vegetation to remain

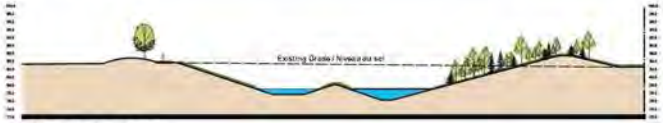
Pond Features / Components
Caractéristiques et composantes du bassin

Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Bassin d'admission	D	Forebay
Berme de sortie du bassin d'admission	E	Forebay Outlet Berm
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

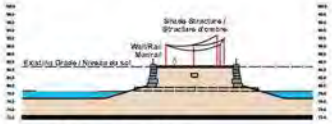
Option 2



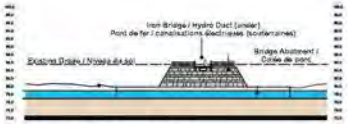
SECTION A



SECTION B



SECTION C (a)



SECTION C (b)

Bridge Option
See Section C(b)

Option du pont -
Voir la section C(b)

Comments & Responses (1/7)

Comment	Response
Background Information and Decision Making Process *Justification for the pond/proposed location*	Project following through on recommendations from previous studies

PINECREST CREEK/WESTBORO STORMWATER MANAGEMENT RETROFIT STUDY

OTTAWA, ON

FINAL REPORT
May 2011

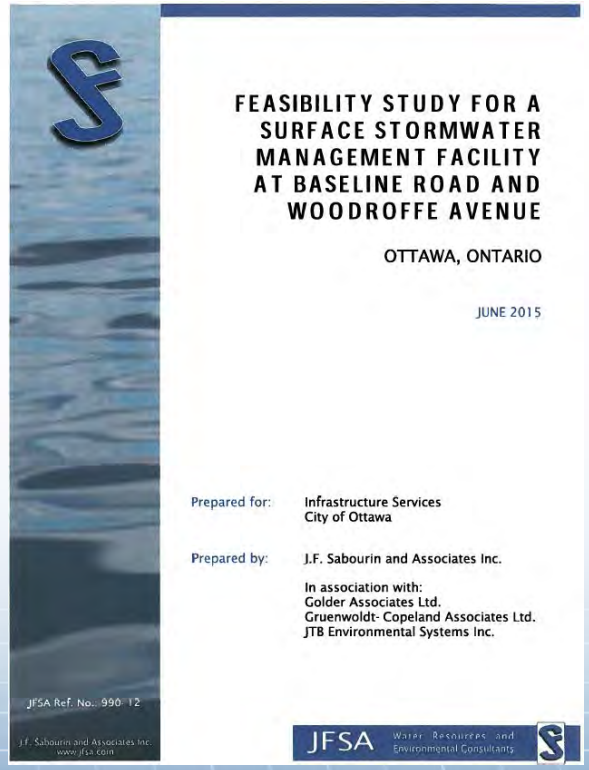
Prepared for: Infrastructure Services & Community Sustainability, City of Ottawa

Prepared by: J.F. Sabourin & Associates Inc.

In association with:
JTB Environmental Systems Inc.
Kidd Consulting
Baird & Associates

JFSA Water Resources and Environmental Consultants

J.F. Sabourin and associates inc.
www.jfsa.com



FEASIBILITY STUDY FOR A SURFACE STORMWATER MANAGEMENT FACILITY AT BASELINE ROAD AND WOODROFFE AVENUE

OTTAWA, ONTARIO

JUNE 2015

Prepared for: Infrastructure Services
City of Ottawa

Prepared by: J.F. Sabourin and Associates Inc.

In association with:
Golder Associates Ltd.
Gruenwoldt- Copeland Associates Ltd.
JTB Environmental Systems Inc.

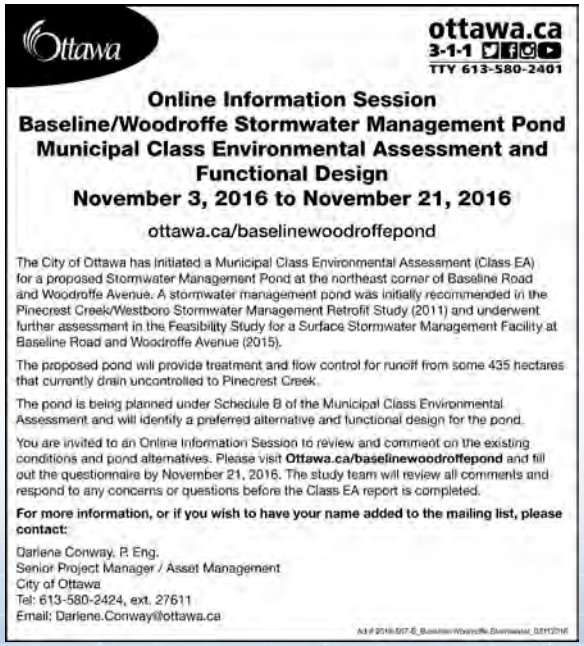
JFSA Ref. No.: 990-12

J.F. Sabourin and Associates Inc.
www.jfsa.com

JFSA Water Resources and Environmental Consultants

Comments & Responses (2/7)

Comment	Response
Consultation and Notification *Insufficient and inadequate notification to date*	Public meeting provided in response to Online Open House Required (Provincial) Class Environmental Assessment consultation process is being followed



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Online Information Session
Baseline/Woodroffe Stormwater Management Pond
Municipal Class Environmental Assessment and Functional Design
November 3, 2016 to November 21, 2016

ottawa.ca/baselinewoodroffepond

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed Stormwater Management Pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).

The proposed pond will provide treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The pond is being planned under Schedule B of the Municipal Class Environmental Assessment and will identify a preferred alternative and functional design for the pond.

You are invited to an Online Information Session to review and comment on the existing conditions and pond alternatives. Please visit **Ottawa.ca/baselinewoodroffepond** and fill out the questionnaire by November 21, 2016. The study team will review all comments and respond to any concerns or questions before the Class EA report is completed.

For more information, or if you wish to have your name added to the mailing list, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
Tel: 613-580-2424, ext. 27611
Email: Darlene.Conway@ottawa.ca

ottawa.ca
3-1-1
ATS 613-580-2401

Avis de séance d'information en ligne
Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe
Évaluation environnementale de portée générale et étude de conception fonctionnelle
Du 3 novembre 2016 au 21 novembre 2016

ottawa.ca/ bassinderetentionbaselinewoodroffe

La Ville d'Ottawa a entrepris une évaluation environnementale de portée générale concernant l'aménagement d'un bassin de rétention des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude de modernisation de la gestion des eaux pluviales du réseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015).

Le bassin proposé assurera le traitement et la régulation des eaux de ruissellement provenant de quelque 435 hectares qui s'écoulent actuellement d'une manière incontrôlée vers le ruisseau Pinecrest.

L'étude d'aménagement du bassin, qui est effectuée en vertu de l'annexe B de l'évaluation environnementale municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

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Pour obtenir de plus amples renseignements ou faire ajouter votre nom à la liste d'envoi, veuillez communiquer avec :

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Gestionnaire principale de projet
Ville d'Ottawa
Tél. : 613-580-2424, poste 27611
Courriel : Darlene.Conway@ottawa.ca

Comments & Responses (3/7)

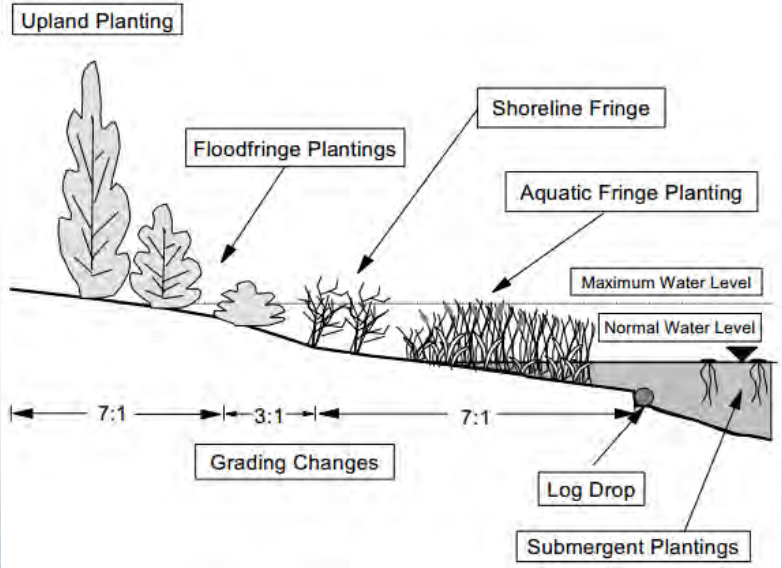
Comment	Response
Recreation *Protection and enhancement of pathways for pedestrians and cyclists* *Opportunity for complementary community uses*	Pedestrian pathways to be incorporated/ connected to City and NCC pathway networks Complementary land uses may be considered at detailed design

Comments & Responses (4/7)

Comment	Response
Natural Environment and Creek Health *Enhance habitat for native wildlife and vegetation*	Proposed options have accounted for protection/enhancement of creek Landscaping with native species

Comments & Responses (5/7)

Comment	Response
Safety, Human Health and Comfort *Undesirable byproducts of stagnant water* *Risks associated with unsupervised body of water and proximity to vulnerable populations*	Pond will have sufficient water movement (minimize mosquitoes/algae) Clear signage Safe grading/side slopes Pathway connections to consider “desire lines” and destinations such as schools



Comments & Responses (6/7)

Comment	Response
Pond Operation and Drainage *Concern that existing drainage issues will worsen* *Maintenance of pond*	Site re-grading will not affect adjacent properties City to maintain pond / ensure it continues to function properly

Comments & Responses (7/7)

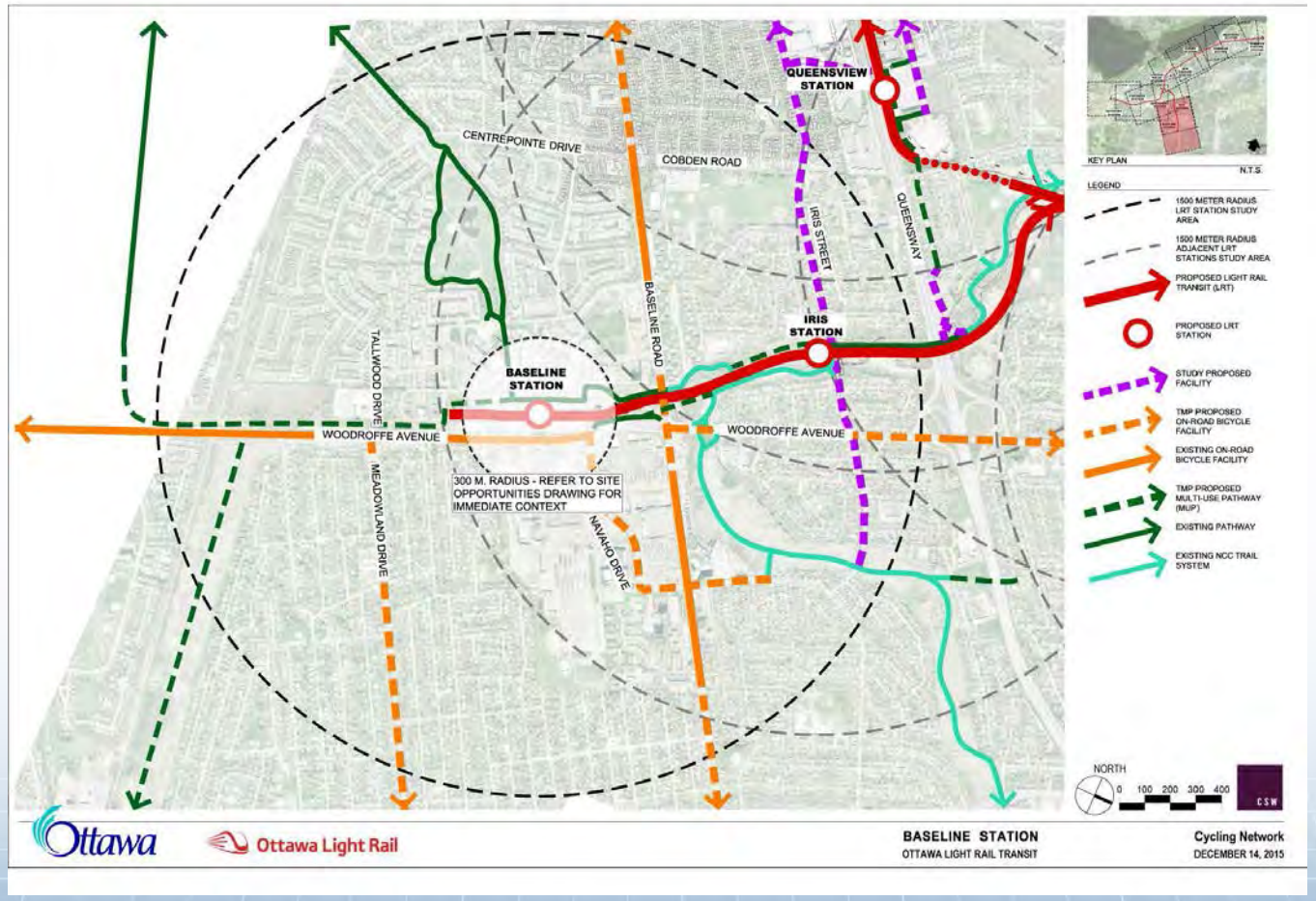
Comment	Response
Property and Residences *Decreased property values* *Concern that litter will worsen*	Based upon experience with SWM ponds throughout the City, environmental, aesthetic and recreational benefits have made them valued community assets

Next Steps

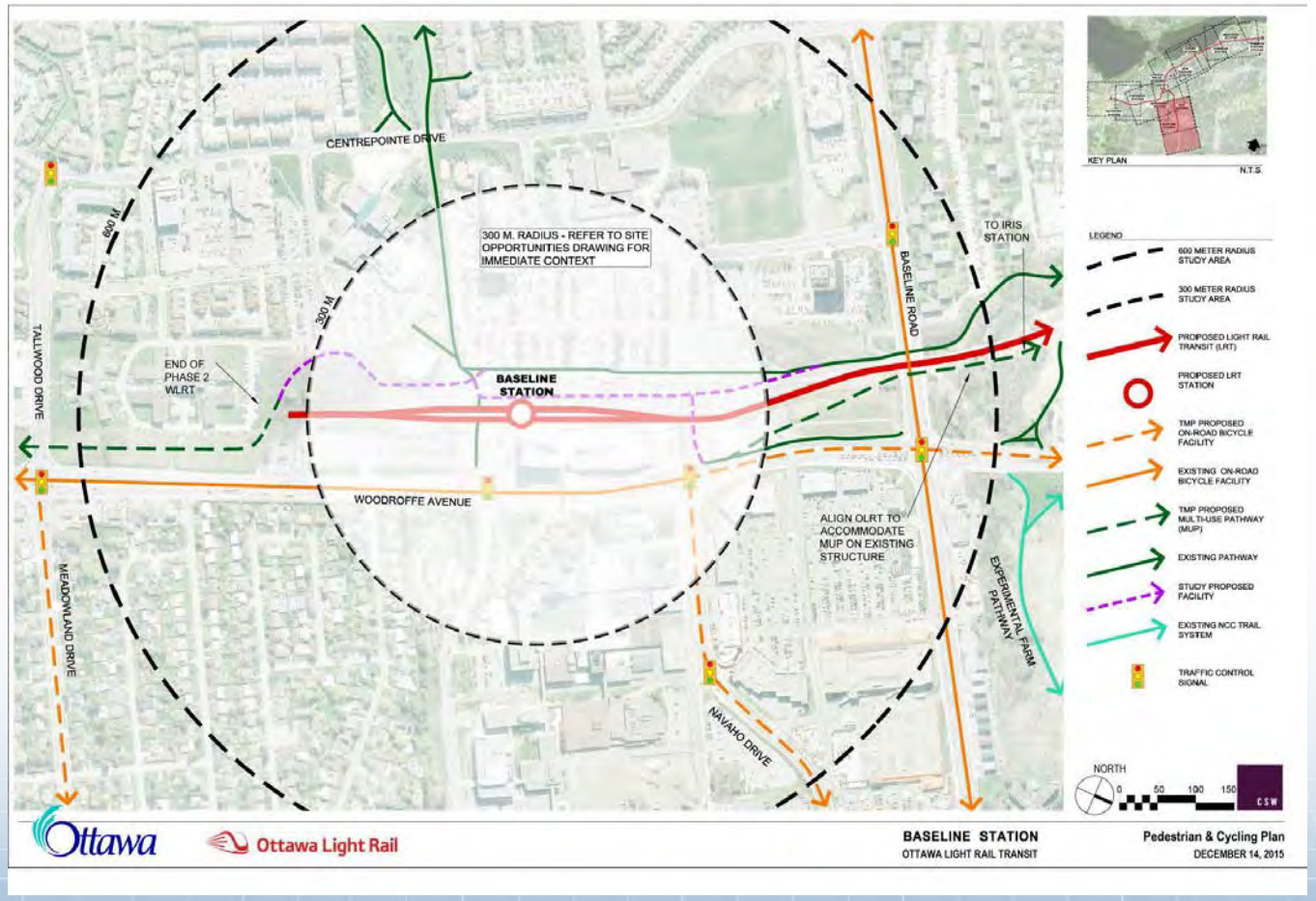
- Choose the preferred option (Winter 2017)
- Prepare the Class EA report (Winter 2017)
- Environment Committee and City Council approvals (Spring 2017)
- 30-day public review of Class EA Report (Spring 2017)
- Detailed design (2017)
- Construction (2018/2019)

Questions?

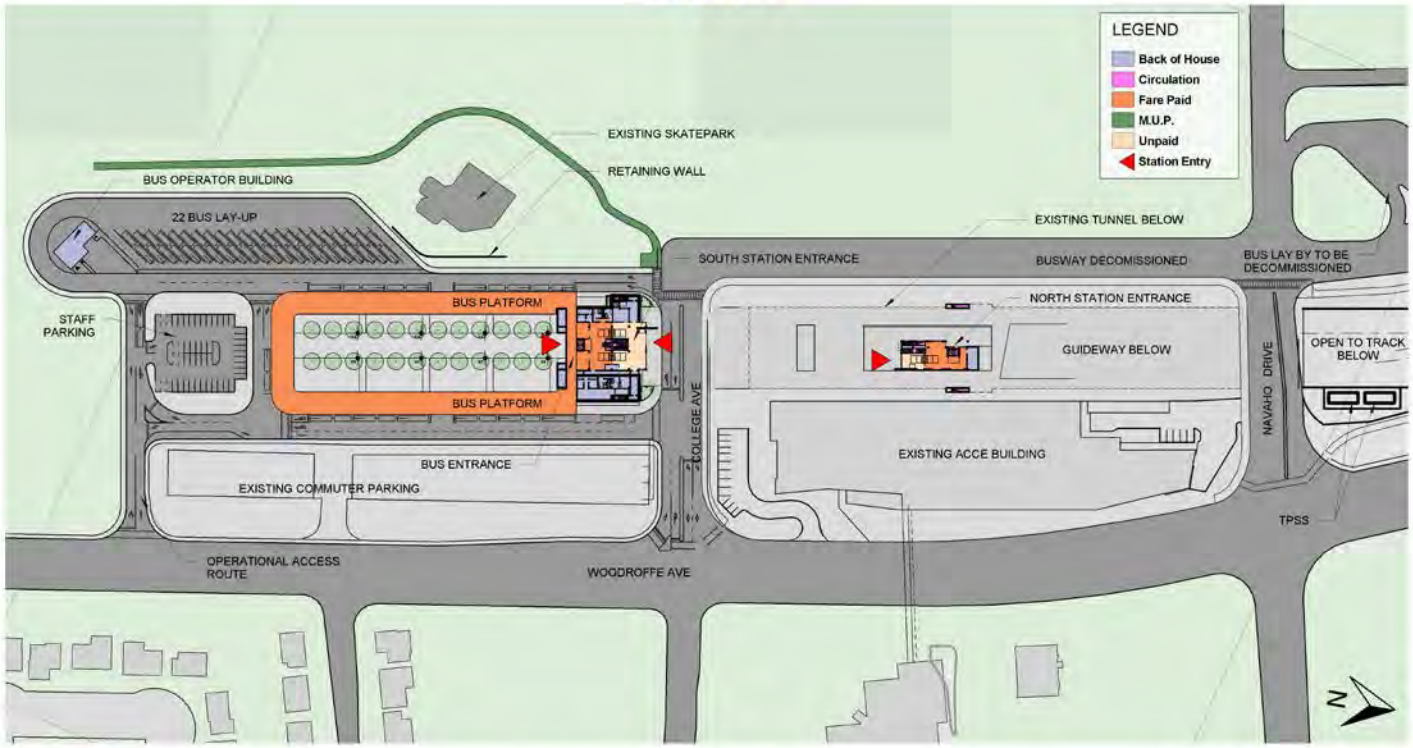
Baseline Station Connectivity



Baseline Station Connectivity



Baseline Station Configuration



Train

Baseline Station

STAGE 2 ETAPE

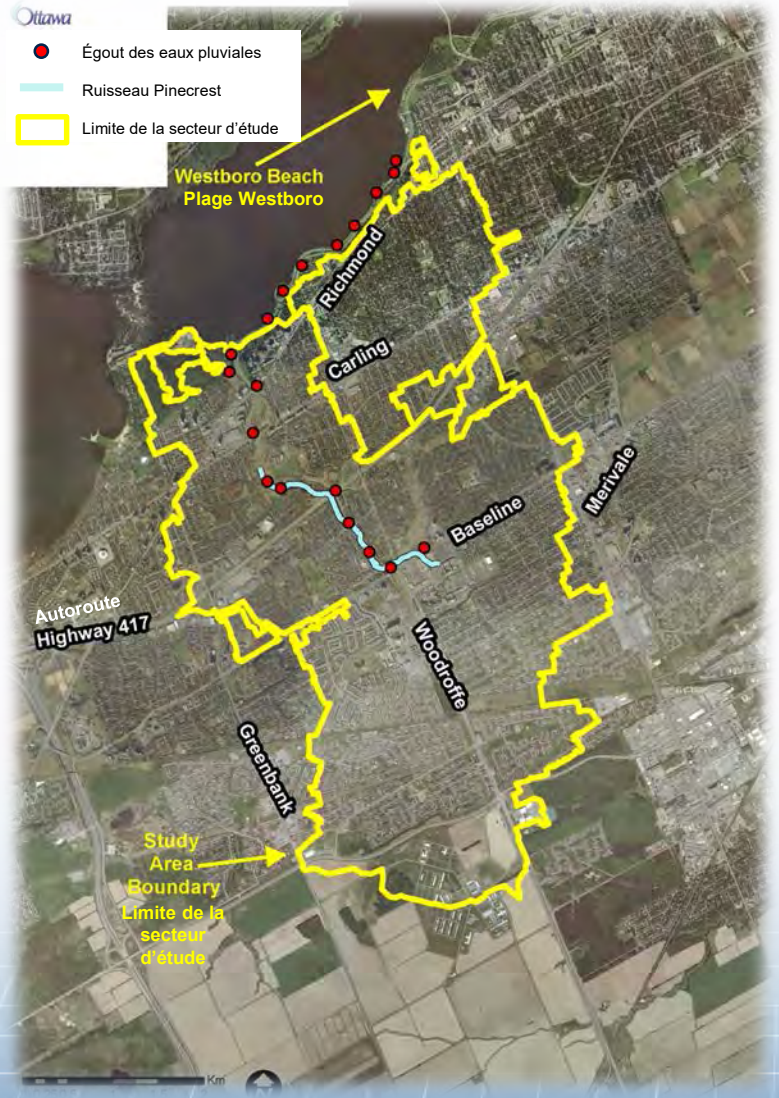
Bassin de gestion des eaux pluviales de Baseline et Woodroffe
Évaluation environnementale

Séance publique
9 janvier 2017

L’ordre du jour

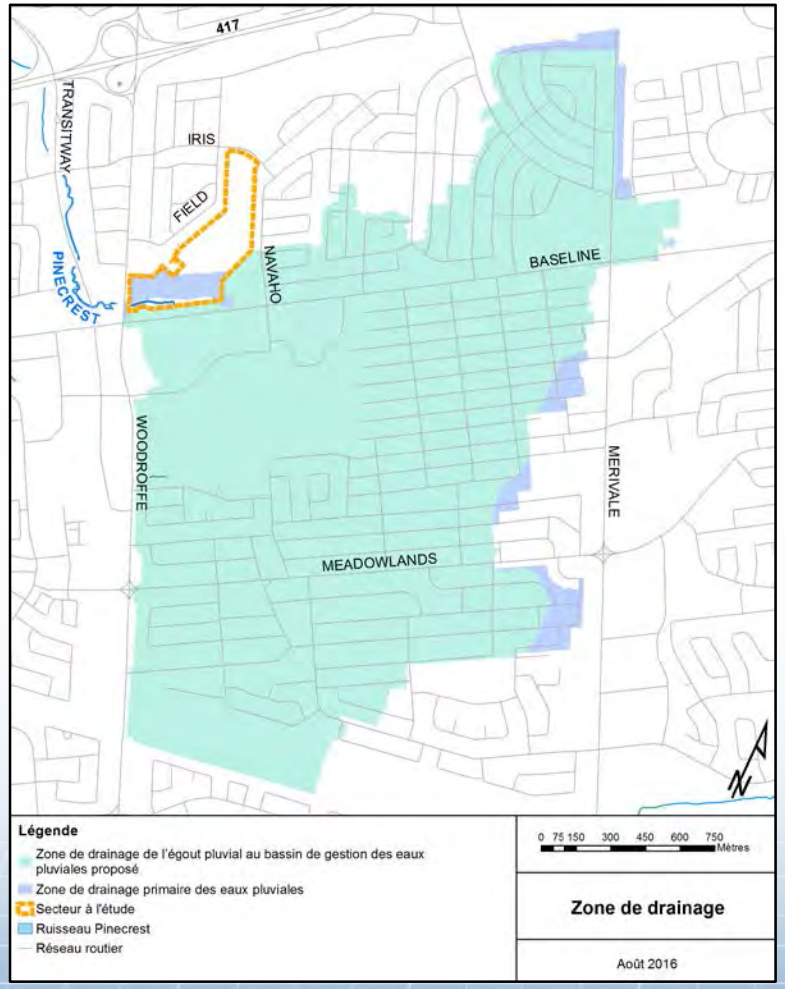
- Contexte
- Processus d’évaluation environnementale de portée générale
- Conditions actuelles et contraintes
- Options d’aménagement du bassin
- Résumé des commentaires recueillis à ce jour
- Prochaines étapes

Contexte



- Bassin avait été initialement recommandé dans l'Étude de modernisation de la gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011), partie d'une plan directeur pour le sous-bassin hydrographique du ruisseau Pinecrest
- Avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015) pour confirmer l'accord préliminaire de la Commission de la capitale nationale (CCN)
- Situé sur la propriété appartenant à la Commission de la capitale nationale (CCN)

Processus d'évaluation environnementale (ÉE) de portée générale

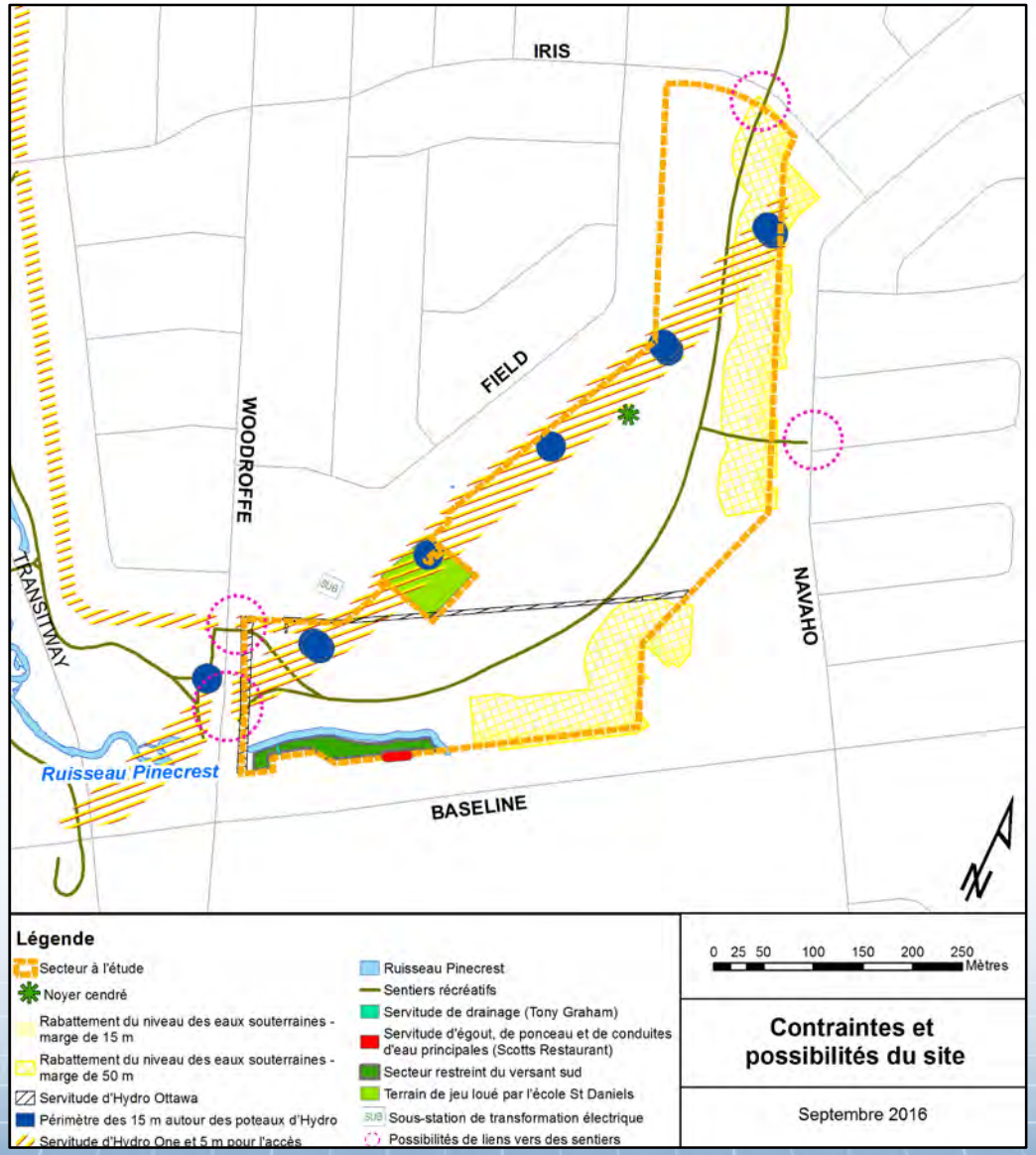


- L'Annexe B du document d'ÉE municipale de portée générale est en cours, qui s'exige:
  - Identification des conditions actuelles et les contraintes
  - Tenir compte des études antérieures
  - Confirmation et l'évaluation des options pour le bassin de GEP
  - Documentation du processus
- L'ÉE de portée générale permettra de définir une option privilégiées pour le bassin de GEP

Conditions actuelles et contraintes

- Conditions en sous-surface
- Contamination environnementale
- Poissons et milieu aquatique
- Cours d'eau et zones humides
- Végétation terrestre
- Faune et habitats
- Espèces en péril
- Revendications territoriales des Autochtones
- Patrimoine culturel et archéologie
- Propriété des terrains publics
- Utilisation actuelle du sol
- Réseaux d'infrastructures
- Pistes récréatives, piétonnes et cyclables

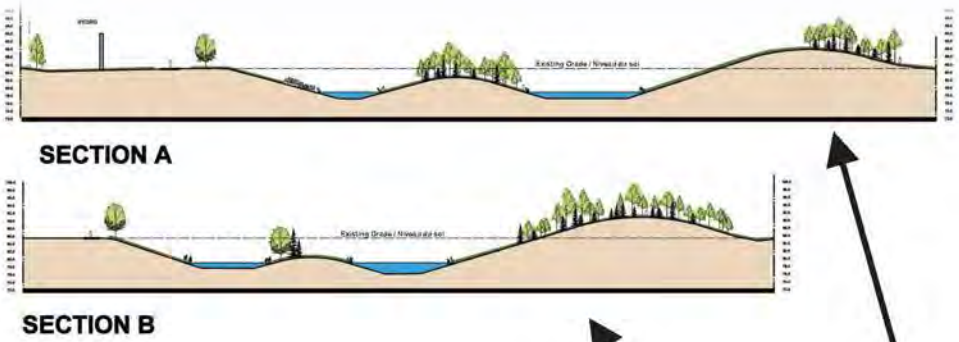
Contraintes du site



Options d’aménagement du bassin

- L’étude de faisabilité de 2015 a développée 2 options pour élaborer comment le bassin pourra s’intégrer dans le secteur d’étude
- Les deux options:
  - optimisent la qualité de l'eau et les avantages pour la lutte contre les inondations;
  - réduise les effets des impacts du débit (érosion) sur le ruisseau Pinecrest;
  - intègrent des sentiers;
  - fourni des améliorations significatives pour l’aménagement paysager;
  - sont situés sur une propriété appartenant à la CCN.

Option 1



Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
Plantation de gros arbres	Large Tree Planting
Plantation d'arbustes	Shrub Planting
Sentier récréatif asphalté de 3 m	3 m Asphalt Recreational Path
Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
Limite de rabattement de 50 m	50 m Draw Down Limit

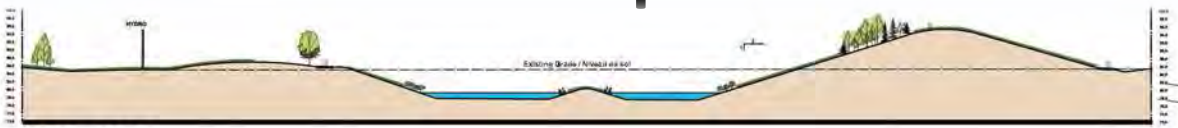
Existing / Existant

Contours (intervalles de 0.5 m)	Contours (0.5 m Intervals)
Ligne de transport d'électricité et poteau	Hydro Pole / Line
Végétation à garder	Vegetation to remain

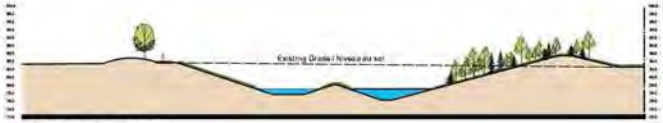
Pond Features / Components
Caractéristiques et composantes du bassin

Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Bassin d'admission	D	Forebay
Berme de sortie du bassin d'admission	E	Forebay Outlet Berm
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

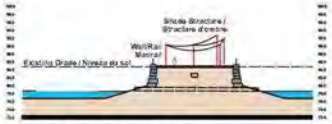
Option 2



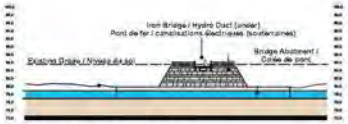
SECTION A



SECTION B



SECTION C (a)



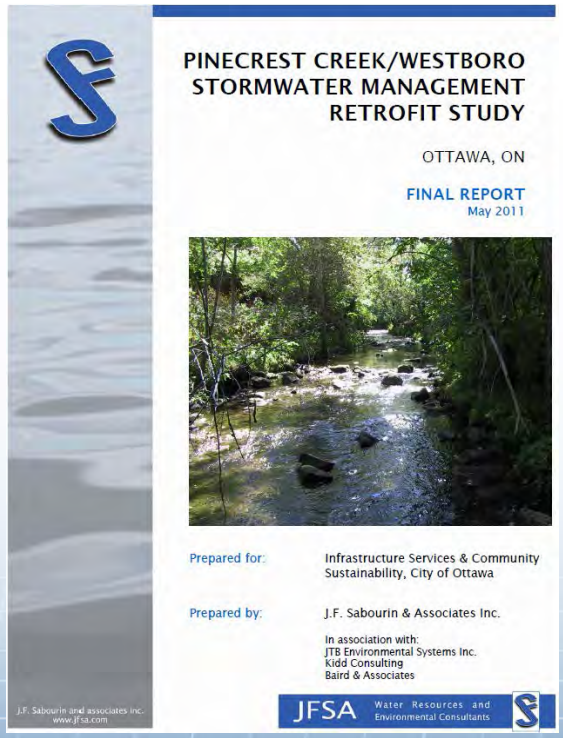
SECTION C (b)

Bridge Option
See Section C(b)

Option du pont -
Voir la section C(b)

Commentaires & Réponses (1/7)

Commentaire	Réponse
Information contextuelle et processus décisionnel *Justification du bassin et de l'emplacement proposé*	Poursuite et achèvement du projet sur la base des recommandations émises lors de précédentes études


PINECREST CREEK/WESTBORO STORMWATER MANAGEMENT RETROFIT STUDY

OTTAWA, ON

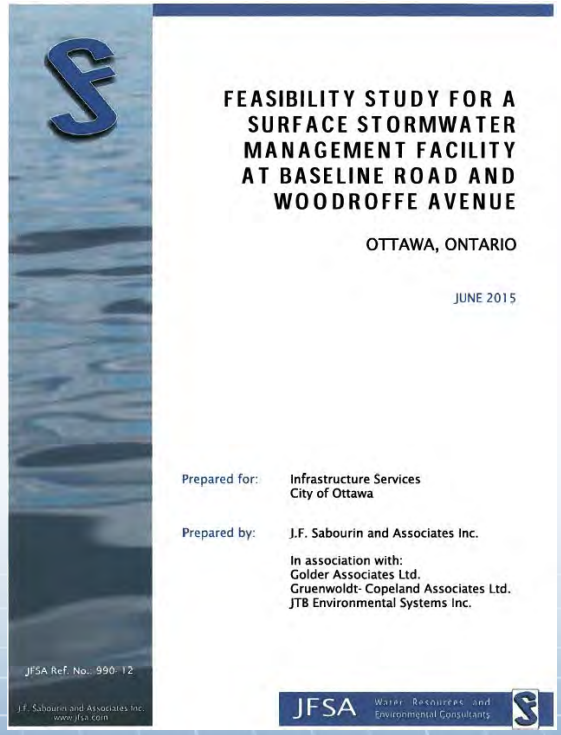
FINAL REPORT
May 2011

Prepared for: Infrastructure Services & Community Sustainability, City of Ottawa

Prepared by: J.F. Sabourin & Associates Inc.

In association with:
JTB Environmental Systems Inc.
Kidd Consulting
Baird & Associates

JFSA Water Resources and Environmental Consultants


FEASIBILITY STUDY FOR A SURFACE STORMWATER MANAGEMENT FACILITY AT BASELINE ROAD AND WOODROFFE AVENUE

OTTAWA, ONTARIO

JUNE 2015

Prepared for: Infrastructure Services City of Ottawa

Prepared by: J.F. Sabourin and Associates Inc.

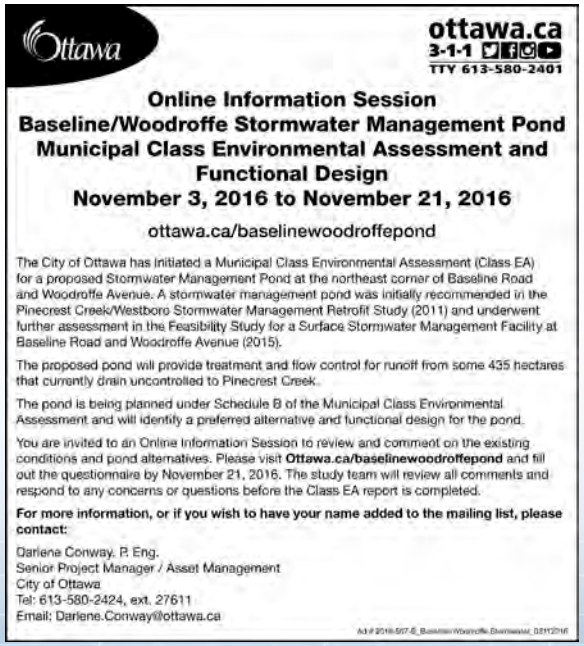
In association with:
Golder Associates Ltd.
Gruenwoldt- Copeland Associates Ltd.
JTB Environmental Systems Inc.

JFSA Ref. No.: 990-12

JFSA Water Resources and Environmental Consultants

Commentaires & Réponses (2/7)

Commentaire	Réponse
Consultation et avis *Avis insuffisants et inadéquats jusqu'à présent*	Réunion publique organisée en réponse à la séance portes ouvertes en ligne Mise en place du processus obligatoire (provincial) de consultation sur l'évaluation environnementale de portée générale



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Ville d'Ottawa
Tél. : 613-580-2424, poste 27611
Courriel : Darlene.Conway@ottawa.ca

Commentaires & Réponses(3/7)

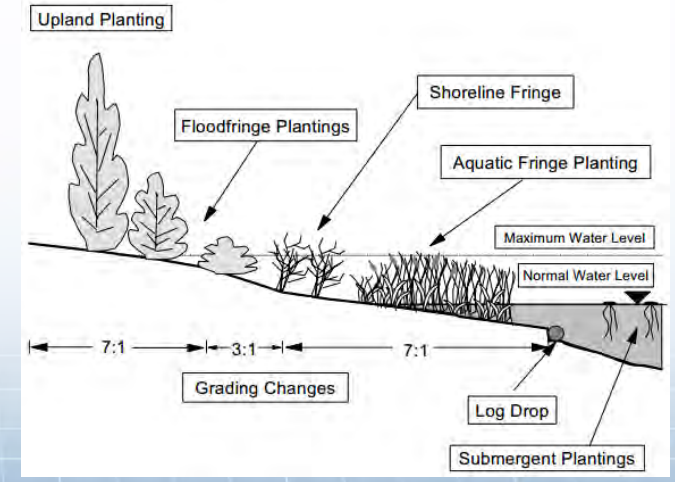
Commentaire	Réponse
Loisirs *Protection et amélioration des sentiers pour les piétons et les cyclistes* *Utilisations communautaires complémentaires possibles*	Sentiers piétonniers à intégrer/relier aux réseaux de sentiers de la Ville et de la CCN Des utilisations du sol complémentaires pourraient être envisagées lors de la conception détaillée

Commentaires & Réponses(4/7)

Commentaire	Réponse
Environnement naturel et santé du ruisseau *Amélioration de l'habitat naturel pour la faune et la flore indigènes*	Les options proposées tiennent compte de la protection et de la mise en valeur du ruisseau Aménagement paysager réalisé à l'aide d'espèces indigènes

Commentaires & Réponses (5/7)

Commentaire	Réponse
Sécurité, santé et confort des personnes *Effets indésirables de l'eau stagnante* *Risques associés à un cours d'eau sans supervision et proximité de populations vulnérables*	La circulation de l'eau du bassin sera suffisante (présence limitée de moustiques et d'algues) Signalisation claire Nivellement et pentes de talus sans danger Les sentiers doivent tenir compte des « lignes de désir » et de certaines destinations, comme les écoles



Commentaires & Réponses (6/7)

Commentaire	Réponse
Fonctionnement et drainage du bassin *Préoccupation concernant l'aggravation des problèmes de drainage actuels* *Entretien du bassin*	Le nivellement de l'emplacement n'aura aucune conséquence sur les propriétés adjacentes La Ville devra entretenir le bassin et veiller à ce qu'il continue de bien fonctionner

Commentaires & Réponses (7/7)

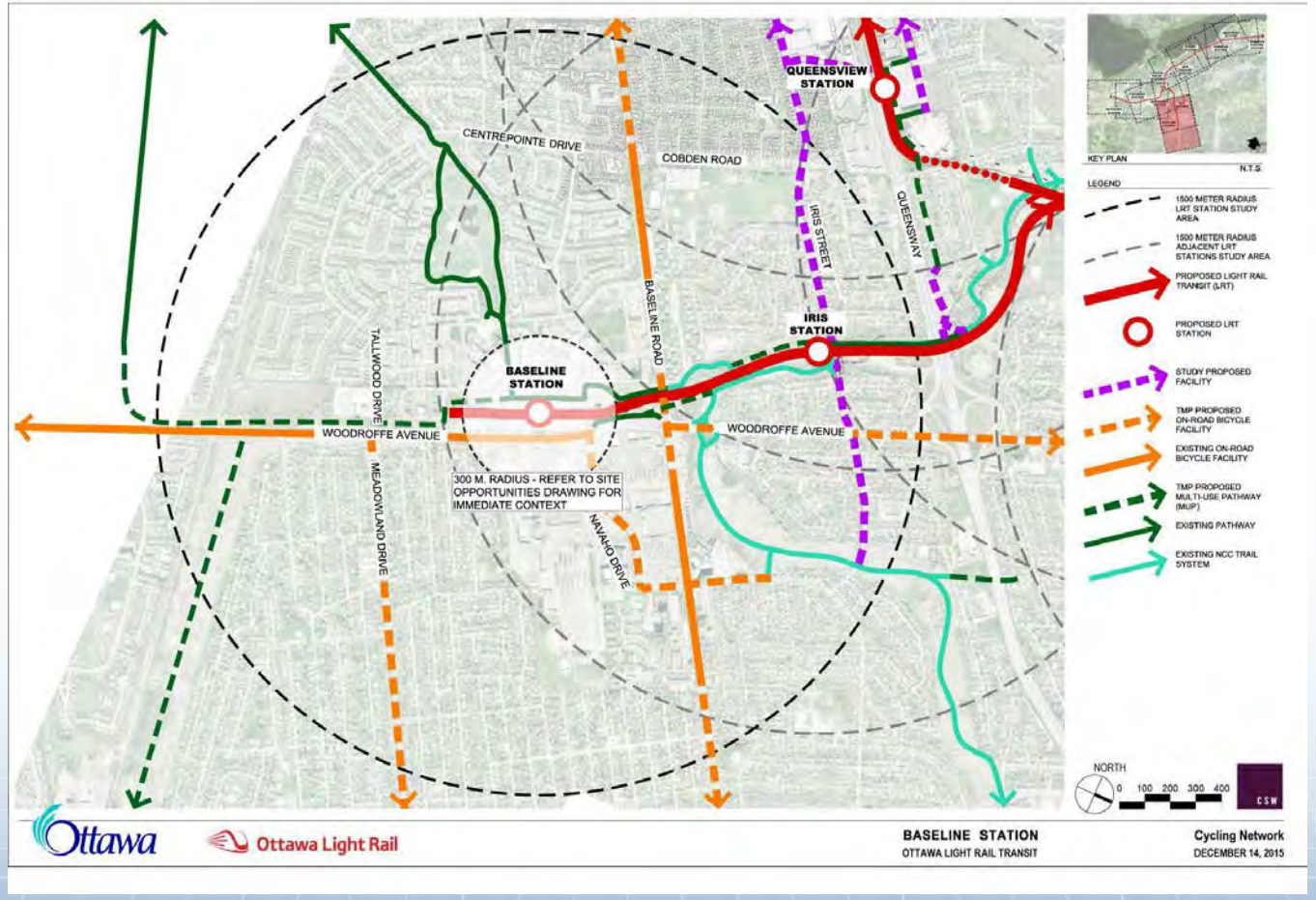
Commentaire	Réponse
Propriété et résidences *Diminution de la valeur des propriétés* *Préoccupation concernant l'aggravation de la pollution*	Based upon experience with SWM ponds throughout the City, environmental, aesthetic and recreational benefits have made them valued community assets

Prochaines étapes

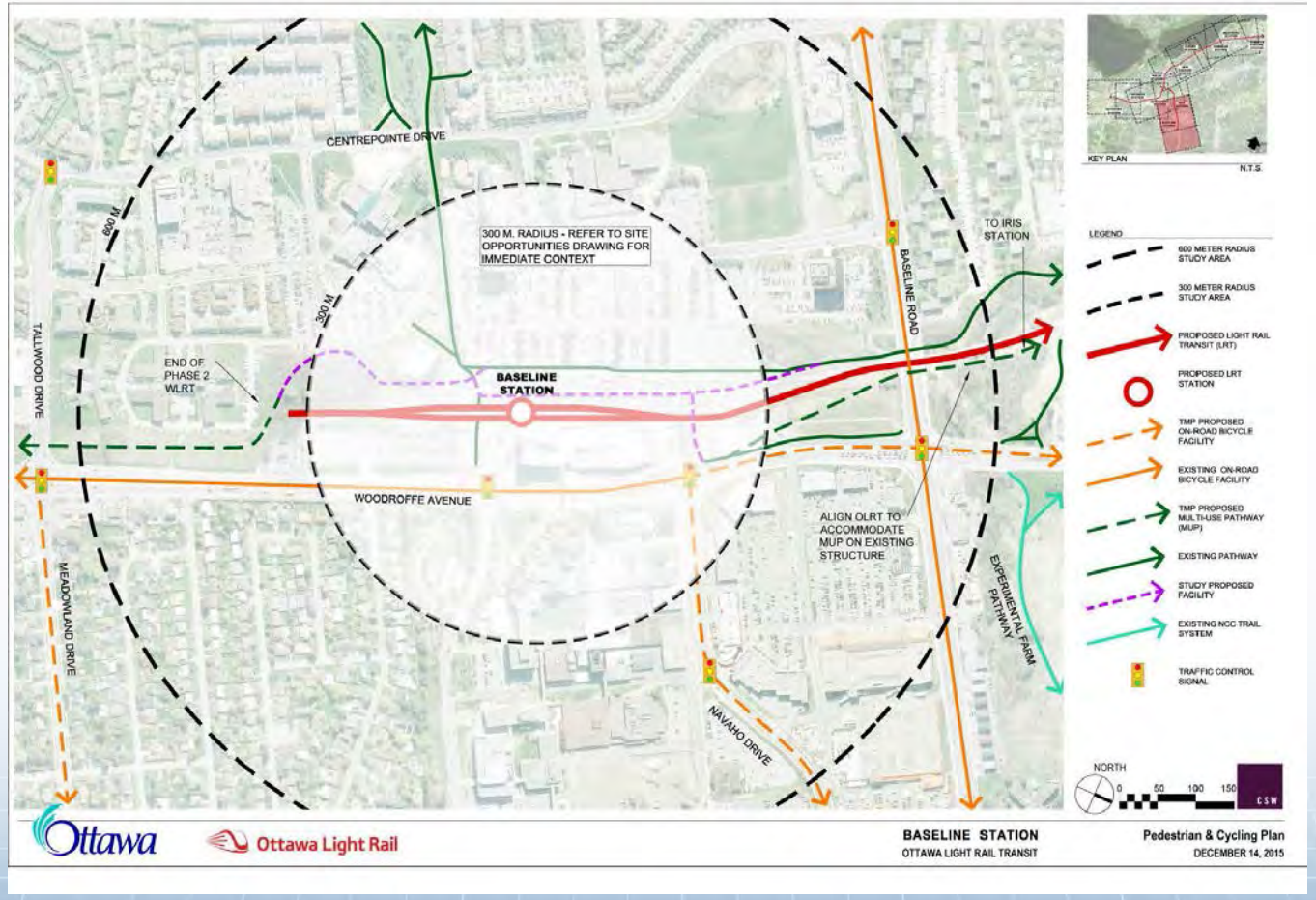
- Choix de l'option privilégiée (hiver 2017)
- Préparation du rapport d'évaluation environnementale de portée générale (hiver 2017)
- Approbation du Comité sur l'environnement et du Conseil municipal (printemps 2017)
- Examen public de 30 jours du rapport d'évaluation environnementale de portée générale (printemps 2017)
- Conception détaillée (2017)
- Construction (2018-2019)

Questions?

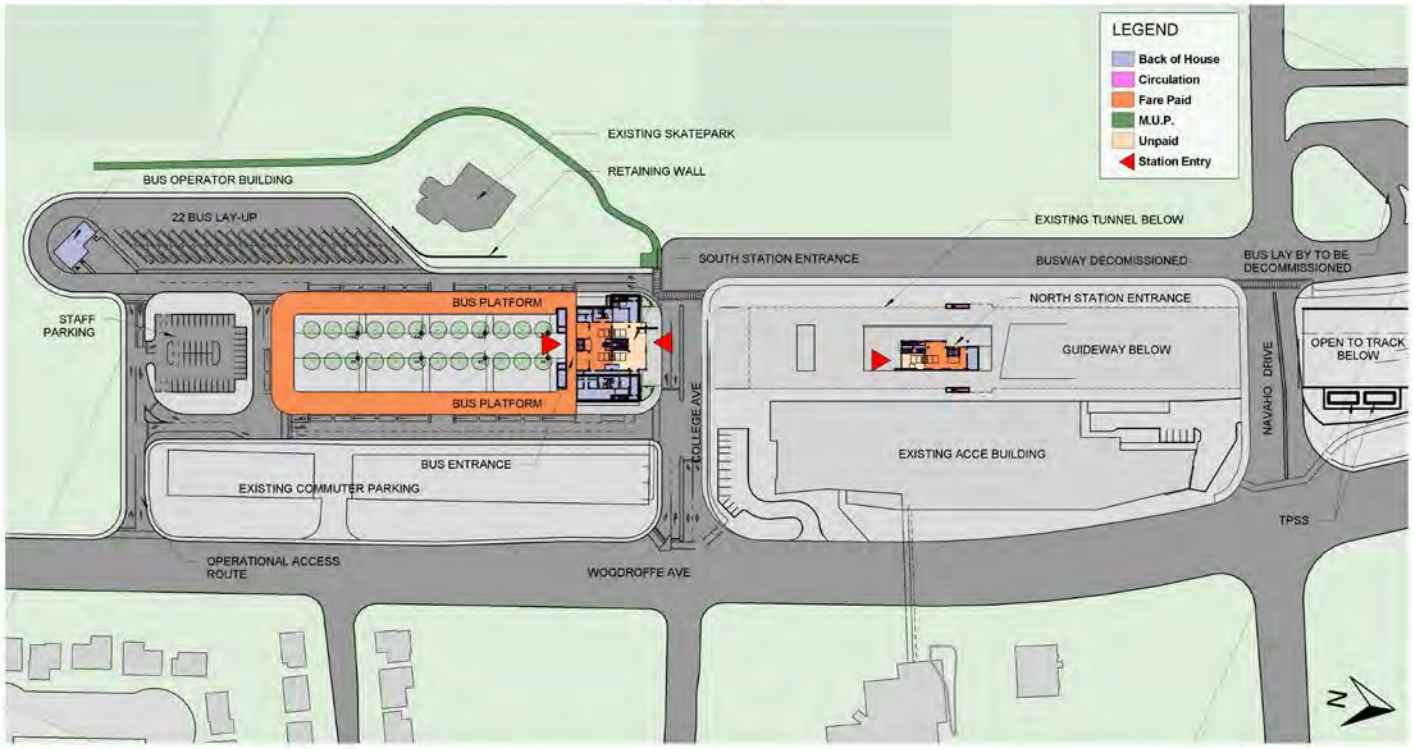
Connectivité de la station Baseline



Connectivité de la station Baseline

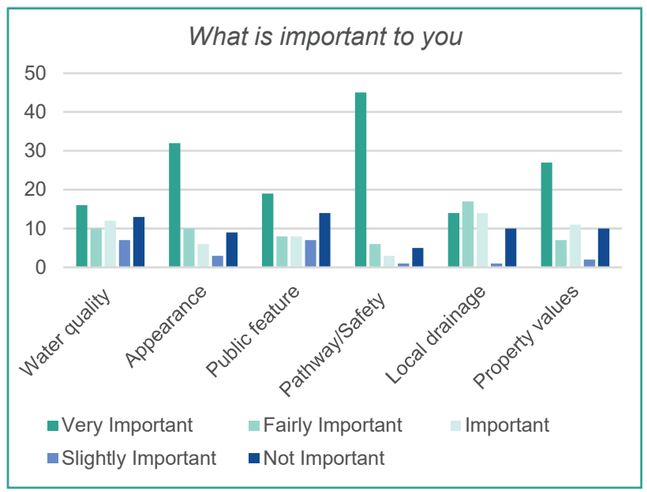


Configuration de la station Baseline



Comments and Concerns to Date

Comments and Concerns	Response
Background Information and Decision Making Process Justification for the pond and its proposed location	This project is following through on the recommendations from the SWM Retrofit Study (2011) and Feasibility Study (2015), which describe the purpose, the stormwater management alternatives, and the evaluation of the alternatives, and are available for review at this link: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
Consultation and Notification Insufficient and inadequate notification to date	In response to the comments received from the Online Consultation, this public meeting is being held to provide additional information and respond further to comments and concerns. All those on the study mailing list and all properties directly abutting the proposed site of the pond were directly notified in addition to ads placed in local newspapers.
Recreation Protection and enhancement of pathways for pedestrians and cyclists Opportunity for complementary community uses	When completed, pedestrian pathways will be incorporated and connected to City of Ottawa pathway and NCC Capital Pathway networks. Complementary community uses may be considered at the detailed design stage.
Natural Environment and Creek Health Enhance the natural habitat for native wildlife and vegetation	The proposed options have taken into account the protection and enhancement of the creek. Landscaping will incorporate native species and provide natural greenspace and habitat.
Safety, Human Health and Comfort Undesirable byproducts of stagnant water Risks associated with an unsupervised body of water and the proximity to vulnerable populations	The pond will provide sufficient water movement (due to wind activity as well as continuous flow from a large inlet storm sewer) to discourage mosquitoes and avoid excessive odours. Safety must always be addressed in any stormwater management pond that the City constructs. Typical approaches include clear signage at key locations regarding the function of the pond and the use of plantings to actively discourage access to the open water. Ponds are also provided with "gentle" side slopes near and below the water surface. In a worst case scenario, if someone does slip and fall into the water, the flatness of the slope and the shallow water depths near the edge of the pond ensure one can readily climb out.
Pond Operation and Drainage Concern that existing drainage issues will worsen Maintenance of pond	The site will be re-graded and drainage will not negatively impact adjacent properties. The City will be maintain the facility and ensure that it functions properly.
Property and Residences Decreased property values Concern that litter will worsen	Based upon experience with SWM ponds throughout the City, the environmental, aesthetic, and recreational benefits of these types of facilities have made them valued community assets.



Summary of results for online questionnaire (results received to December 15, 2016)

Next Steps

- Choose the preferred option (Winter 2017)
- Prepare the Class EA report (Winter 2017)
- Environment Committee and City Council approvals (Spring 2017)
- 30-day public review of Class EA report (Spring 2017)
- Detailed design (2017)
- Construction (2018 / 2019)

Information about this project can also be found on the City of Ottawa's website: Ottawa.ca/baselinewoodroffepond

Responses to the online questionnaire at this link will be received until January 16, 2017.

For further information about the project or to add your name to the project mailing list, please contact:

Darlene Conway, P. Eng.
Senior Project Manager, Asset Management
Planning, Infrastructure and Economic Development Dept.
City of Ottawa
110 Laurier Avenue West, 3rd Floor
Ottawa, ON K1P 1J1
613-580-2424 ext. 27611
Darlene.Conway@ottawa.ca

Baseline and Woodroffe Stormwater Management Pond Environmental Assessment Study

Welcome

Welcome to the Public Meeting for the Baseline and Woodroffe Stormwater Management Pond Environmental Assessment (EA).

A stormwater management pond is proposed at the northeast corner of Baseline Road and Woodroffe Avenue to improve water quality, reduce erosion and lessen the risk of flooding along Pinecrest Creek.

Tonight you will have the opportunity to learn about and comment on:

- Project and background
- Environmental assessment process
- Existing conditions, constraints and opportunities
- Evaluation of pond options
- Comments and concerns to date (in response to the Online Consultation)
- Next steps

Representatives from the City of Ottawa and the Project Team are here to answer your questions.

Project and Background

A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015). Both studies can be viewed at this link: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

The proposed pond is located on land owned by the National Capital Commission (NCC).

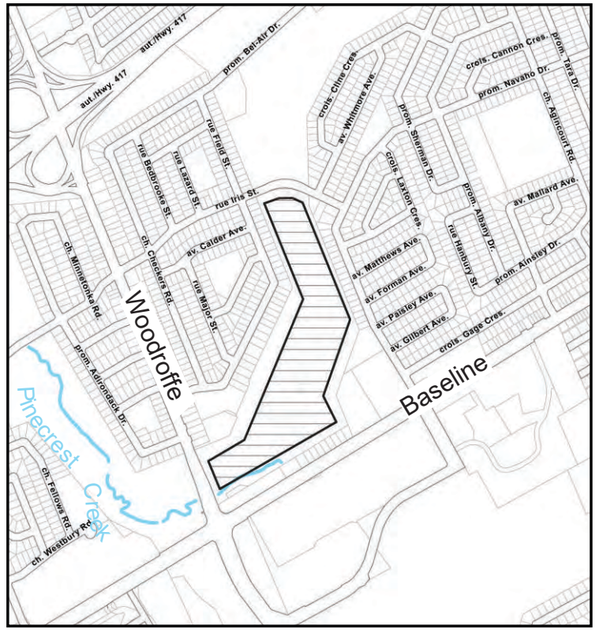
Environmental Assessment Process

This project is being planned under Schedule B of the Municipal Class Environmental Assessment (Class EA). The Class EA process includes the following steps:

- Identify the existing conditions and constraints
- Consider previous studies
- Confirm the preferred option for the stormwater management pond
- Document the process

The Class EA will identify a preferred option and functional design for the proposed pond which will be presented to City Council for approval.

Interested persons can provide comments throughout the Class EA process. Upon completion of this study, it will be made available for public review and comment. A Notice of Study Completion will be published at that time.



Existing Conditions, Constraints and Opportunities

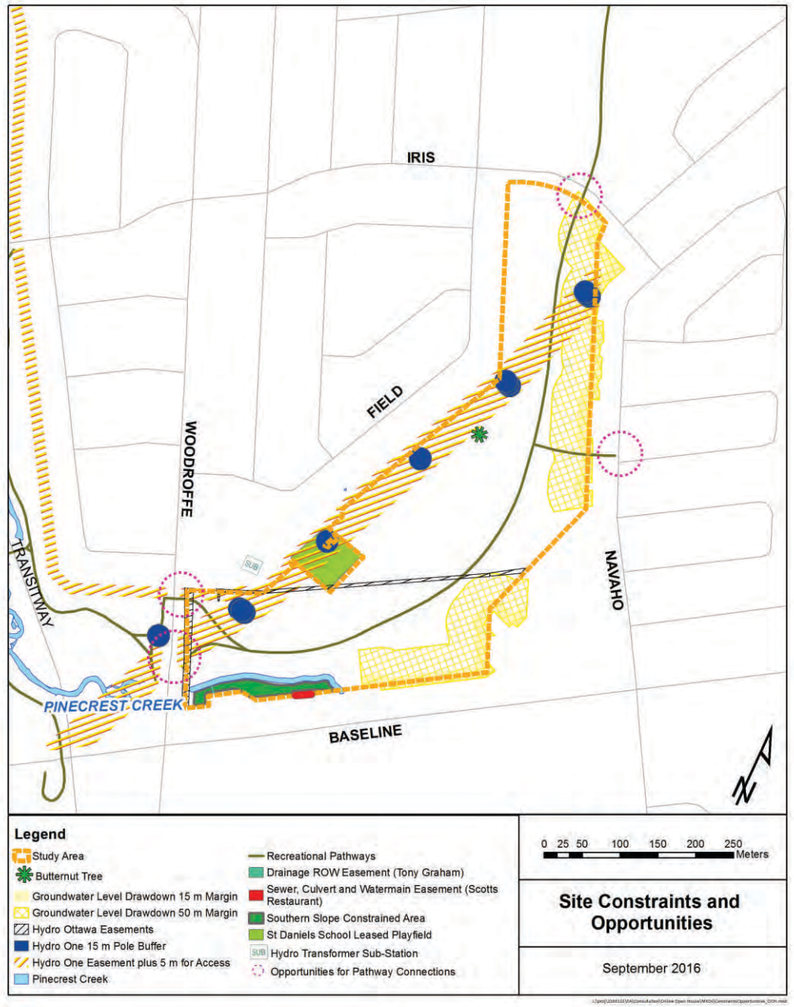
The following aspects of the site were reviewed as part of the ongoing Class EA process and the previously completed studies:

- Subsurface conditions (bedrock, surficial geology, groundwater)
- Environmental contamination
- Watercourses
- Fluvial geomorphology
- Fish and aquatic habitat
- Wetlands and Areas of Natural and Scientific Interest (ANSI)
- Natural terrestrial vegetation
- Wildlife and habitat
- Species at risk and critical habitat
- Aboriginal land claims
- Cultural heritage/archaeology
- Public land ownership
- Existing land use
- Infrastructure networks
- Recreation and pedestrian/cycling routes

Existing Conditions, Constraints and Opportunities (continued)

The following elements are within or adjacent to the site, and are considered either a constraint or an opportunity:

- A butternut tree centrally located in the mid-western region of the site
- 15 and 50 metre wide zones along the east and southeast boundaries of the site that may experience groundwater level drawdown when the pond is constructed
- A Hydro Ottawa easement that bisects the southern portion of the site
- A Hydro One easement and associated poles located along the western boundary of the site
- Pinecrest Creek crosses under Baseline Road to enter and then exit the site under Woodroffe Avenue at the southwest corner of the site
- A recreational pathway runs through the entire site in a north-south direction, and connects to the neighbourhood east of Navaho Drive, and to Woodroffe Avenue and the Transitway west of the site
- Opportunities for future pathway connections in addition to maintaining current connections
- A small drainage right-of-way easement (in favour of Tony Graham) at the southeast corner of the site
- A sewer, culvert, and watermain easement (in favour of Scotts Restaurant) along the southern boundary of the site
- A Hydro transformer sub-station located adjacent to the study area, within 3 to 4 metres of the southwest site boundary
- St Daniels School has a leased playing field that extends into the western boundary of the site



Evaluation of Pond Options

The purpose of the Pinecrest Creek/Westboro SWM Retrofit Study (2011) was to identify a long-term plan to improve water quality in the Creek and Ottawa River and reduce erosion and flooding in the Creek.

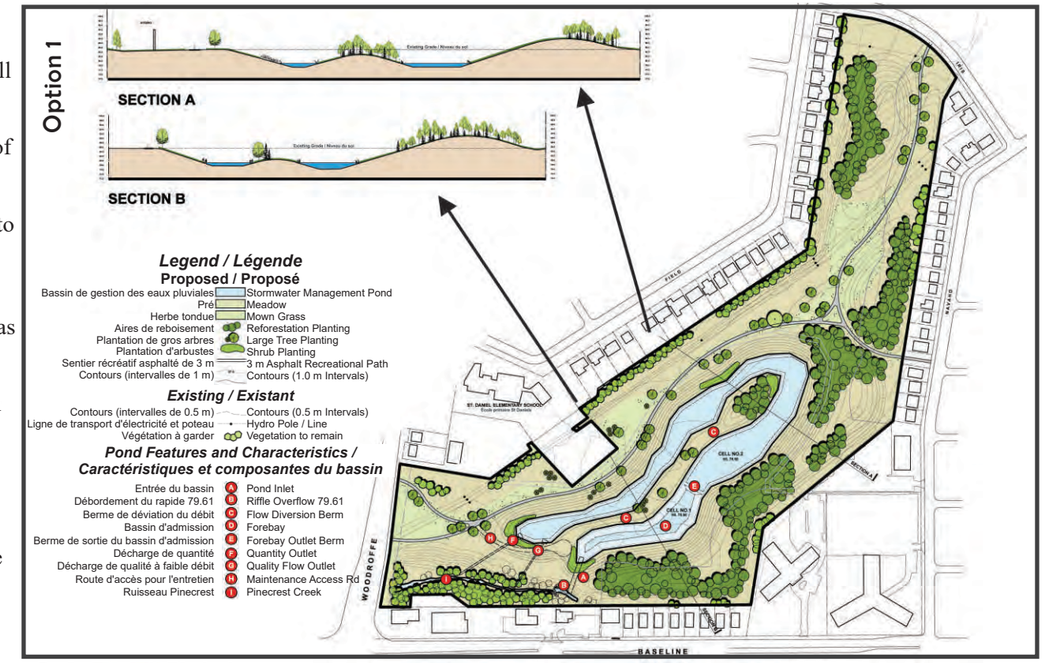
In addition to a range of other stormwater management measures, the 2011 SWM Retrofit Study recommended that an end-of-pipe facility (stormwater management pond) be constructed on NCC property at the northeast corner of Baseline Road and Woodroffe Avenue.

Through the subsequent 2015 Feasibility Study, the requirements for the proposed stormwater management pond were refined and two conceptual designs (Option 1 and Option 2) were prepared. The NCC and City of Ottawa reviewed the options and selected Option 1 as their preferred concept.

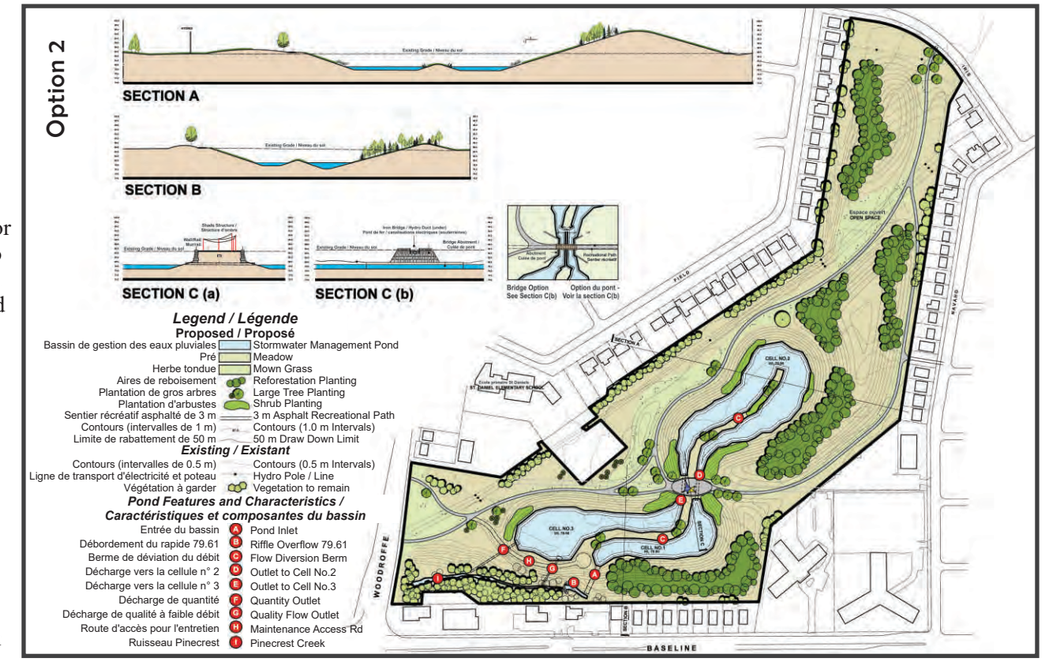
For the current Class EA study, the existing conditions and constraints and opportunities have been revisited. These elements were then considered in evaluating the options for the stormwater management pond and will influence the final design and construction.

Evaluation of Pond Options (continued)

Option 1 consists of a forebay and larger treatment cell both with a permanent pool of water. The length of the larger cell extends around an internal peninsula to maximize the pond's length to width ratio. There are landscaped areas around the pond including grassed areas, reforestation planting, and large tree and shrub planting. The recreational pathways are realigned along the edge of the pond and existing pathway connections are maintained. The site is re-graded with pond excavation materials and this provides landforms to buffer the adjacent developments.

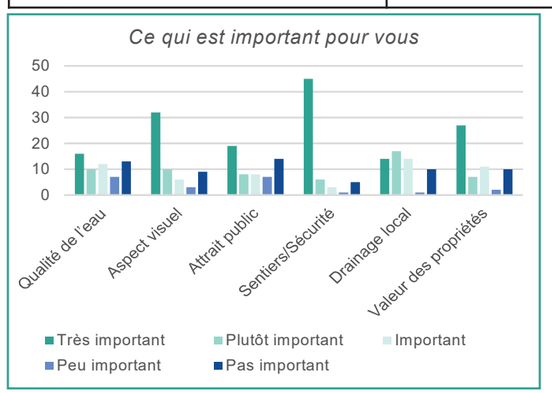


Option 2 consists of three cells, a forebay and two larger treatment cells, all with a permanent pool of water. The pond cells are separated by open channels or culverts. Similar to Option 1, the pond cells extend around an internal peninsula. Buried Hydro Ottawa cables are accommodated through this separation of the three pond cells. The areas around the pond are landscaped, including grassed areas, reforestation planting, and large tree and shrub planting. The recreational pathways are realigned to cross over the pond near the mid-point via culverts or a footbridge. Vistas are provided for viewing across the pond and informal activity areas are located along the paths. The site is re-graded with pond excavation materials and this provides landforms to buffer the adjacent developments.



Résumé des commentaires et des préoccupations recueillis à ce jour

Commentaires et préoccupations	Réponse
Information contextuelle et processus décisionnel Justification du bassin et de l'emplacement proposé	Ce projet fait suite aux recommandations de l'Étude de modernisation de la gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et de l'Étude de faisabilité (2015), qui décrivent le but du projet, proposent des options de gestion des eaux pluviales et évaluent ces options. Il est possible de consulter la version anglaise de ces deux études à l'adresse http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
Consultation et avis Avis insuffisants et inadéquats jusqu'à présent	En réponse aux commentaires recueillis lors de la consultation en ligne, nous tenons cette réunion publique afin de fournir un supplément d'information et de répondre aux commentaires et préoccupations. Un avis sera envoyé à chaque personne qui s'est inscrite sur la liste d'envoi de l'étude et à chaque propriétaire d'une propriété limitrophe du site proposé pour le bassin de rétention, en plus des annonces qui paraîtront dans les journaux locaux.
Loisirs Protection et amélioration des sentiers pour les piétons et les cyclistes Utilisations communautaires complémentaires	Une fois terminés, les sentiers pédestres seront intégrés et reliés au réseau de sentiers de la Ville d'Ottawa et au réseau du Sentier de la capitale de la CCN. Des utilisations communautaires complémentaires peuvent être envisagées lors de l'étape de conception détaillée.
Environnement naturel et santé du ruisseau Amélioration de l'habitat naturel pour la faune et la flore indigènes	Les options proposées tiennent compte de la protection et de l'amélioration du ruisseau. L'aménagement paysager sera en harmonie avec les espèces indigènes et leur fournira un espace et un habitat naturels.
Sécurité, santé et confort des personnes Effets indésirables de l'eau stagnante Risques associés à un cours d'eau sans supervision et proximité de populations vulnérables	L'eau du bassin sera animée d'un certain mouvement (en raison du vent et du débit continu provenant d'un grand égout pluvial) qui suffira à éloigner les moustiques et à éviter l'émanation excessive d'odeurs. La sécurité est toujours une préoccupation de la Ville lorsqu'elle aménage un bassin de gestion des eaux pluviales. Parmi les mesures habituelles, on trouve l'affichage à des endroits clés de panneaux clairs annonçant la fonction du bassin et la plantation de végétaux comme mesure de dissuasion active pour contrer l'accès à une étendue d'eau libre. Les parois latérales d'un bassin sont légèrement inclinées au-dessus et au-dessous de la surface de l'eau. Si par malheur quelqu'un tombait dans le bassin, la légère inclinaison des parois et la faible profondeur de l'eau sur les berges du bassin lui permettraient d'en ressortir facilement.
Fonctionnement et drainage du bassin Préoccupation concernant l'aggravation des problèmes de drainage actuels Entretien du bassin	Le site sera renivelé et le drainage n'aura pas d'impact néfaste sur les propriétés adjacentes. La Ville est responsable de l'entretien régulier de l'installation et veille à son bon fonctionnement.
Propriété et résidences Diminution de la valeur des propriétés Préoccupation concernant l'aggravation de la pollution	À la lumière de l'expérience avec les autres bassins de rétention aménagés ailleurs dans la ville, les avantages environnementaux, esthétiques et récréatifs de ce type d'installations en font des biens communautaires estimés.



Résumé des résultats du questionnaire en ligne (résultats reçus jusqu'au 15 décembre 2016)

Vous trouverez d'autres renseignements au sujet de ce projet sur le site de la Ville d'Ottawa : ottawa.ca/bassinbaselinewoodroffe

Il sera possible de répondre au questionnaire en ligne à partir de ce lien jusqu'au 16 janvier 2017.

Pour obtenir tout autre renseignement au sujet du projet ou pour vous inscrire à la liste d'envoi, veuillez communiquer avec :

Darlene Conway, ing.
Gestionnaire principale de projet, Gestion des biens
Direction générale de la planification, de l'infrastructure et du développement économique
Ville d'Ottawa
110, avenue Laurier Ouest, 3e étage
Ottawa, ON K1P 1J1
613-580-2424, poste 27611
Darlene.Conway@ottawa.ca

Bienvenue

Bienvenue à la séance publique portant sur l'évaluation environnementale (ÉE) du bassin de rétention des eaux pluviales Baseline et Woodroffe.

L'aménagement d'un bassin de gestion des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe a été proposé en vue d'optimiser la qualité de l'eau, de réduire l'érosion et de diminuer le risque d'inondations aux abords du ruisseau Pinecrest.

Ce soir, vous aurez la chance de vous renseigner et de vous prononcer sur :

- La nature et le contexte du projet
- Le processus d'évaluation environnementale
- Les conditions actuelles, contraintes et possibilités
- L'évaluation des options d'aménagement du bassin
- Les commentaires et les préoccupations recueillis à ce jour (lors de la consultation en ligne)
- Les prochaines étapes

Des représentants de la Ville d'Ottawa et de l'équipe chargée du projet sont ici pour répondre à vos questions.

La nature et le contexte du projet

L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude de modernisation de la gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015). Il est possible de consulter ces deux études en cliquant sur le lien suivant (en anglais) :
http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

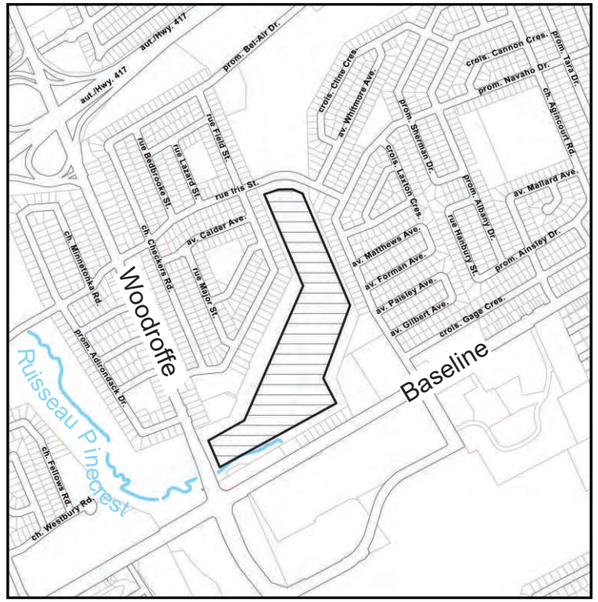
Le bassin proposé est situé sur une propriété appartenant à la Commission de la capitale nationale (CCN).

Processus d'évaluation environnementale

Ce projet est mené en vertu de l'annexe B de l'évaluation environnementale municipale de portée générale. Le processus d'ÉE de portée générale comporte les étapes suivantes :

- déterminer les conditions actuelles et les contraintes;
- tenir compte des études antérieures;
- confirmer l'option privilégiée pour le bassin de gestion des eaux pluviales;
- documenter le processus.

L'ÉE de portée générale permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement du bassin proposé. Elles seront soumises à l'approbation du Conseil municipal.



Les personnes intéressées peuvent transmettre leurs commentaires en tout temps durant le processus d'ÉE de portée générale.

Une fois l'étude terminée, elle sera rendue publique pour que la population puisse en prendre connaissance et la commenter. Un avis de fin d'étude sera publié à ce moment.

Conditions actuelles, contraintes et possibilités

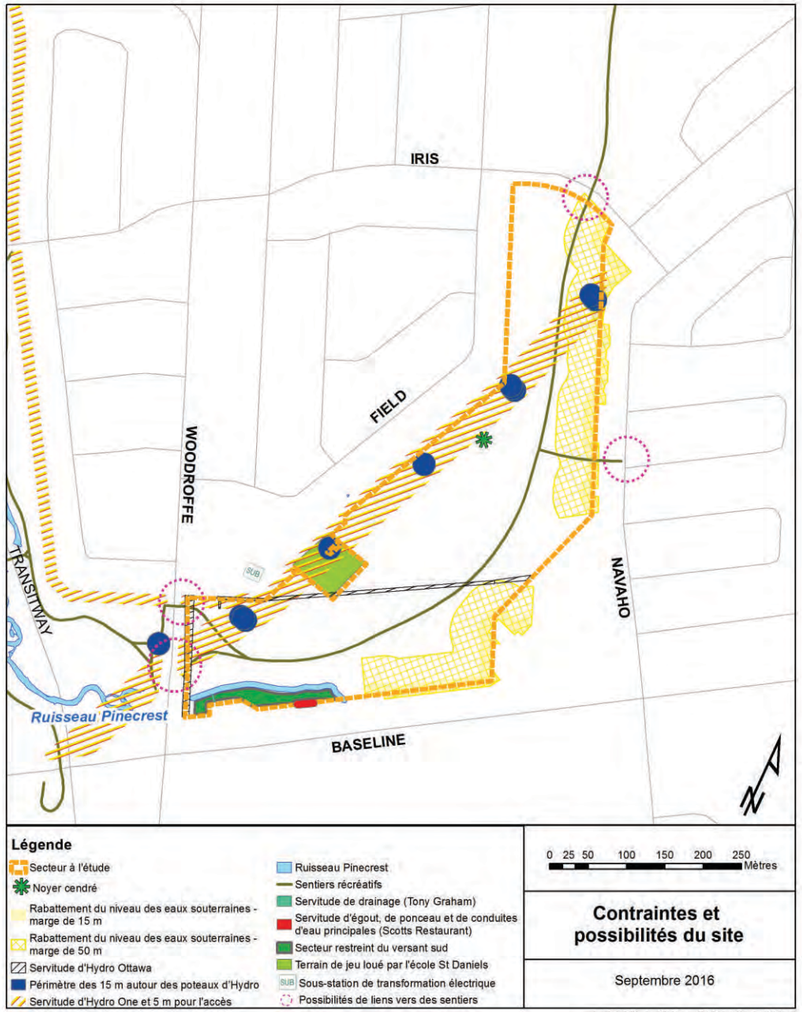
Les aspects suivants ont été étudiés durant le processus d'ÉE de portée générale et durant les études antérieures :

- conditions en sous-surface (sous-sol rocheux, géologie de surface, eau souterraine);
- contamination environnementale;
- cours d'eau;
- géomorphologie fluviale;
- poissons et milieu aquatique;
- zones humides et Zones d'intérêt naturel et scientifique (ZINS);
- végétation terrestre naturelle;
- faune et habitats;
- espèces en péril et habitats essentiels;
- revendications territoriales des Autochtones;
- patrimoine culturel et archéologie;
- propriété des terrains publics;
- utilisation actuelle du sol;
- réseaux d'infrastructures;
- pistes récréatives, piétonnes et cyclables.

Conditions actuelles, contraintes et possibilités (continué)

Les éléments suivants se trouvent sur le site même ou à proximité et sont considérés soit comme une contrainte, soit comme une possibilité d'aménagement :

- un noyer cendré est situé au milieu de la zone centre-ouest du site;
- la construction du bassin pourrait entraîner un rabattement du niveau des eaux souterraines dans des zones de 15 mètres et de 50 mètres de large le long des limites est et sud-est du site;
- une servitude d'Hydro Ottawa traverse la partie sud du site;
- une servitude d'Hydro One et des poteaux sont situés le long de la limite ouest du site;
- le ruisseau Pinecrest entre sur le site sous le chemin Baseline et en ressort sous l'avenue Woodroffe, à l'angle sud-ouest du site;
- un sentier récréatif traverse l'ensemble du site en direction nord-sud et assure la liaison avec le quartier à l'est de la promenade Navaho et avec l'avenue Woodroffe et le Transitway à l'ouest du site;
- il serait possible d'aménager de nouvelles liaisons avec les sentiers et d'entretenir les liaisons actuelles;
- une petite servitude de drainage (au bénéfice de Tony Graham) se trouve dans le coin sud-est du site;
- une servitude d'égout, de ponceau et de conduites d'eau principales (au bénéfice de Scotts Restaurant) est située le long de la limite sud du site;
- une sous-station de transformation électrique est adjacente au secteur à l'étude, à moins de 3 à 4 mètres de la limite sud-ouest du site;
- l'école St. Daniels loue un terrain de jeu qui s'avance dans la limite ouest du site.



Évaluation des options d'aménagement du bassin

L'objet de l'Étude de modernisation de la gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) était d'élaborer un plan à long terme pour optimiser la qualité de l'eau du ruisseau et de la rivière des Outaouais et pour réduire l'érosion et les inondations aux abords du ruisseau.

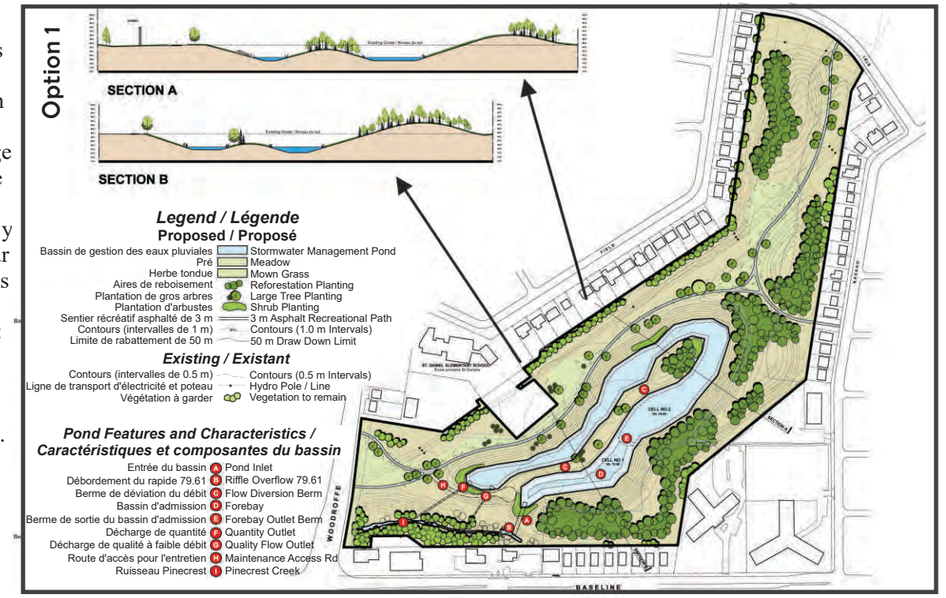
Outre la mise en œuvre des meilleures pratiques de gestion des eaux pluviales, l'Étude de modernisation de 2011 recommandait qu'une installation au point de rejet (bassin de gestion des eaux pluviales) soit construite sur la propriété de la CCN à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe.

Par le biais de l'Étude de faisabilité de 2015, les exigences pour le bassin de gestion des eaux pluviales proposé ont été précisées, et deux conceptions (Option 1 et Option 2) ont été élaborées. La CCN et la Ville d'Ottawa ont examinés les options et ont choisis l'Option 1 comme modèle privilégié.

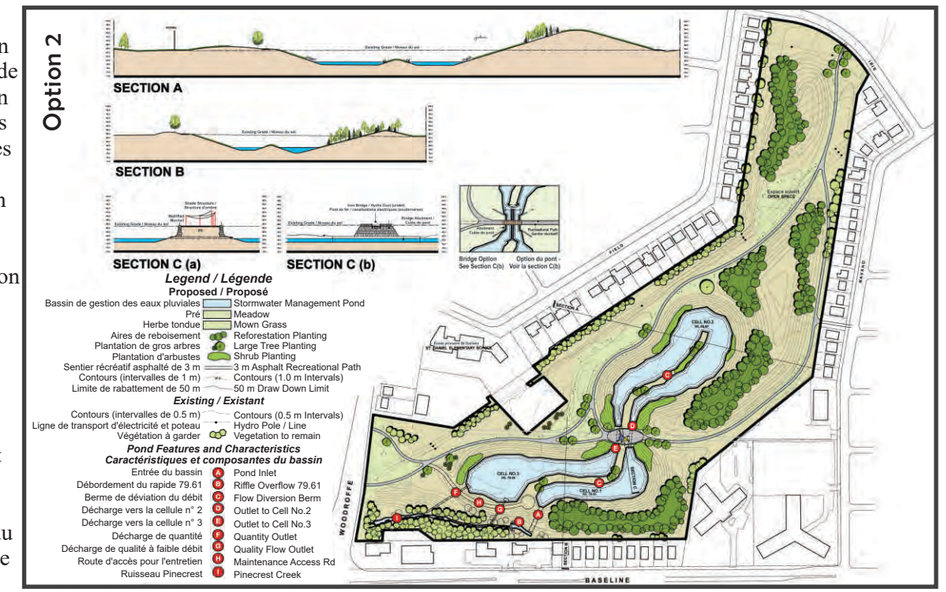
Pour les besoins de l'étude d'ÉE de portée générale, les conditions actuelles, les contraintes et les possibilités ont été réexaminées. Elles ont ensuite été prises en compte lors de l'évaluation des options d'aménagement du bassin de gestion des eaux pluviales et influeront sur sa conception finale et sa construction.

Évaluation des options d'aménagement du bassin (continué)

L'Option 1 consiste en un bassin d'admission et une plus grande cellule de traitement, les deux comportant un bassin permanent. La longueur de la plus grande cellule se prolonge autour d'une péninsule interne afin de maximiser le rapport longueur/largeur du bassin. Il y a des espaces paysagers autour du bassin, y compris des zones gazonnées, des aires de reboisement, de gros arbres et des arbustes. Le tracé des sentiers récréatifs est modifié pour longer le bassin et les liens existants sont maintenus. Le site est renivelé avec les matériaux d'excavation du bassin et cela donne du relief pour protéger les aménagements adjacents.



L'Option 2 consiste en trois cellules, un bassin d'admission et deux plus grandes cellules de traitement, comportant tous un bassin permanent. Les cellules du bassin sont séparées par des canaux ou des ponceaux ouverts. Comme dans l'Option 1, les cellules du bassin se prolongent autour d'une péninsule interne. La séparation de ces trois cellules du bassin permettra d'enfouir les câbles d'Hydro Ottawa. Il y a des espaces paysagers autour du bassin, y compris des zones gazonnées, des aires de reboisement, de gros arbres et des arbustes. Le tracé des sentiers récréatifs est modifié pour traverser le bassin près du point central par l'entremise de ponceaux ou d'une passerelle. Des endroits sont aménagés pour permettre une vue dégagée sur le bassin, et des zones d'activités informelles sont situées le long des sentiers. Le site est renivelé avec les matériaux d'excavation du bassin et cela donne du relief pour protéger les aménagements adjacents.



Prochaines étapes

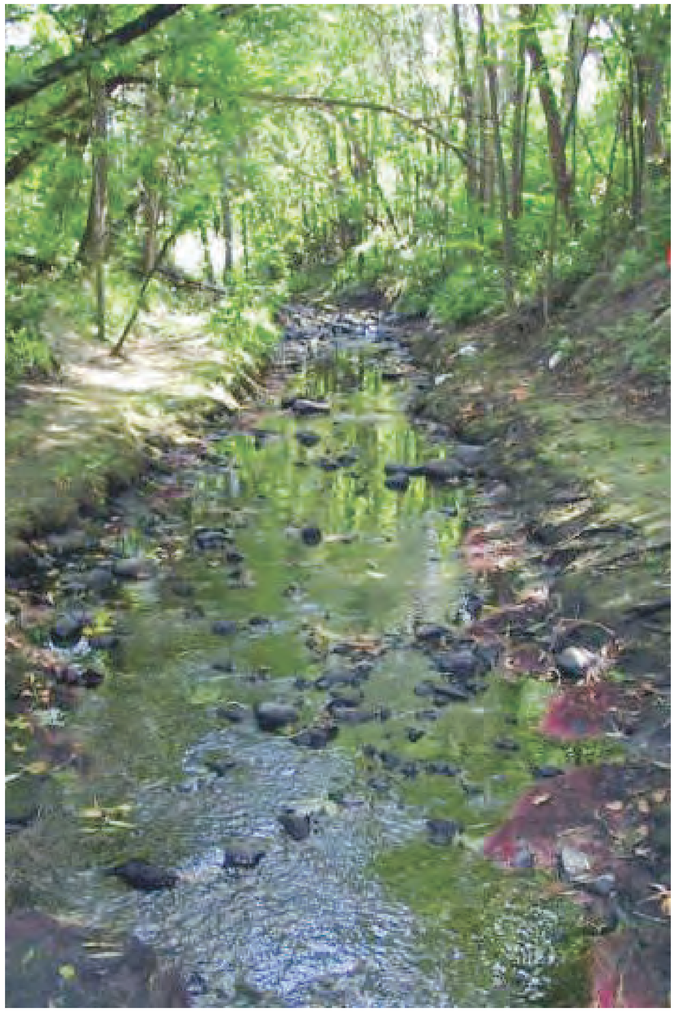
- Choix de l'option privilégiée (hiver 2017)
- Préparation du rapport d'ÉE de portée générale (hiver 2017)
- Approbation du Comité sur l'environnement et du Conseil municipal (printemps 2017)
- Examen public de 30 jours du rapport d'ÉE de portée générale (printemps 2017)
- Conception détaillée (2017)
- Construction (2018-2019)

Welcome

Baseline and Woodroffe Stormwater Management Pond Environmental Assessment Study

Public Meeting

January 9, 2017



Bienvenue

Bassin de gestion des eaux pluviales de Baseline et Woodroffe évaluation environnementale de portée générale

Séance publique

9 janvier 2017

The Project

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a Stormwater Management (SWM) Pond.

- **Northeast corner of Baseline Road and Woodroffe Avenue**
- **Initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011)**
- **Underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015)**

Le projet

La Ville d'Ottawa a entrepris une évaluation environnementale (ÉE) municipale de portée générale en vue d'aménager un bassin de gestion des eaux pluviales (GEP).

- **L'angle nord-est du chemin Baseline et de l'avenue Woodroffe**
- **Recommendait au départ, l'étude sur la rénovation de l'installation de gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011)**
- **L'objet d'une nouvelle évaluation dans le cadre de l'étude de faisabilité pour l'installation de gestion des eaux pluviales de surface du chemin Baseline et de l'avenue Woodroffe (2015)**

Process

Schedule B Municipal Class Environmental Assessment, requiring:

- **Identification of the existing conditions and constraints**
- **Consideration of the previous studies**
- **Confirmation and assessment of the options for the SWM pond**
- **Documentation of the process**

The Class EA will identify a preferred option and functional design for the SWM pond.

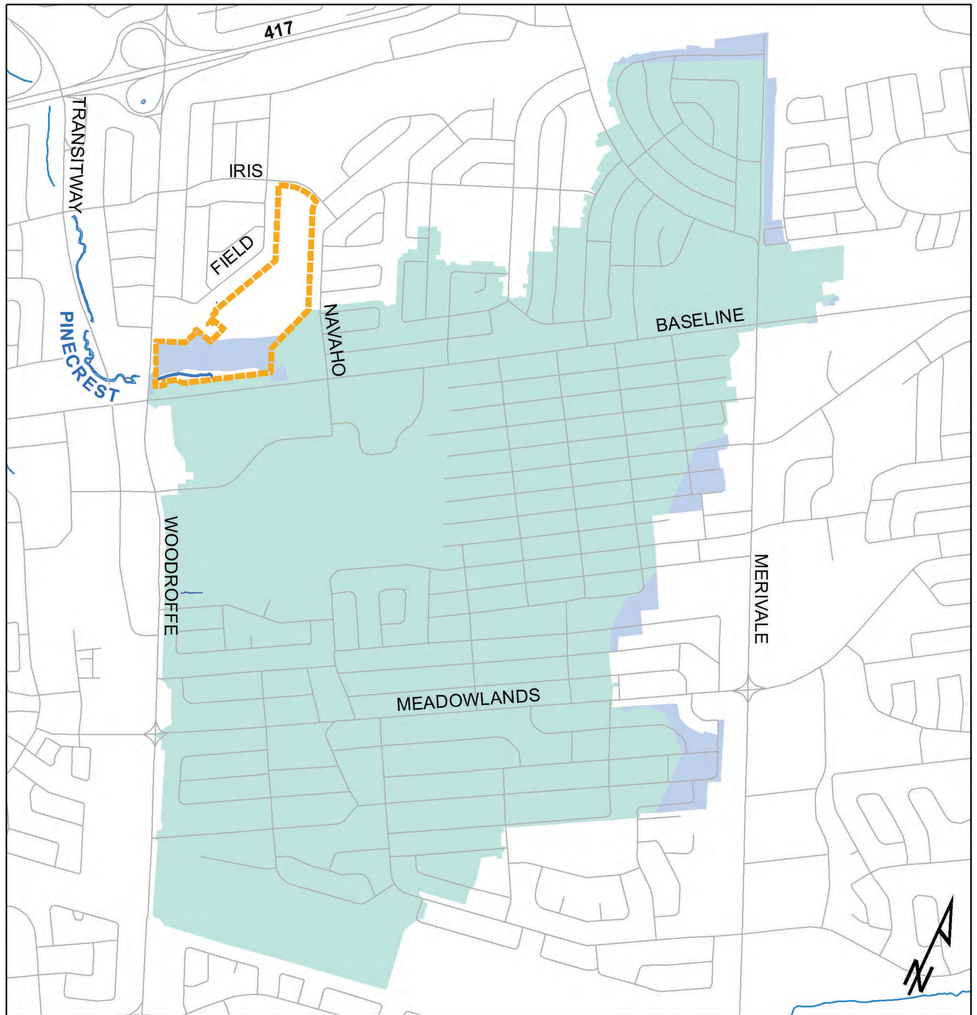
Processus

L'Annexe B du document d'ÉE municipale de portée générale, qui s'exige:

- **Identification des conditions actuelles et les contraintes**
- **Tenir compte des études antérieures**
- **Confirmation et l'évaluation des options pour le bassin de GEP**
- **Documentation du processus**

L'ÉE de portée générale permettra de définir une option et une conception fonctionnelle privilégiées pour le bassin de GEP.

Drainage Area



Legend

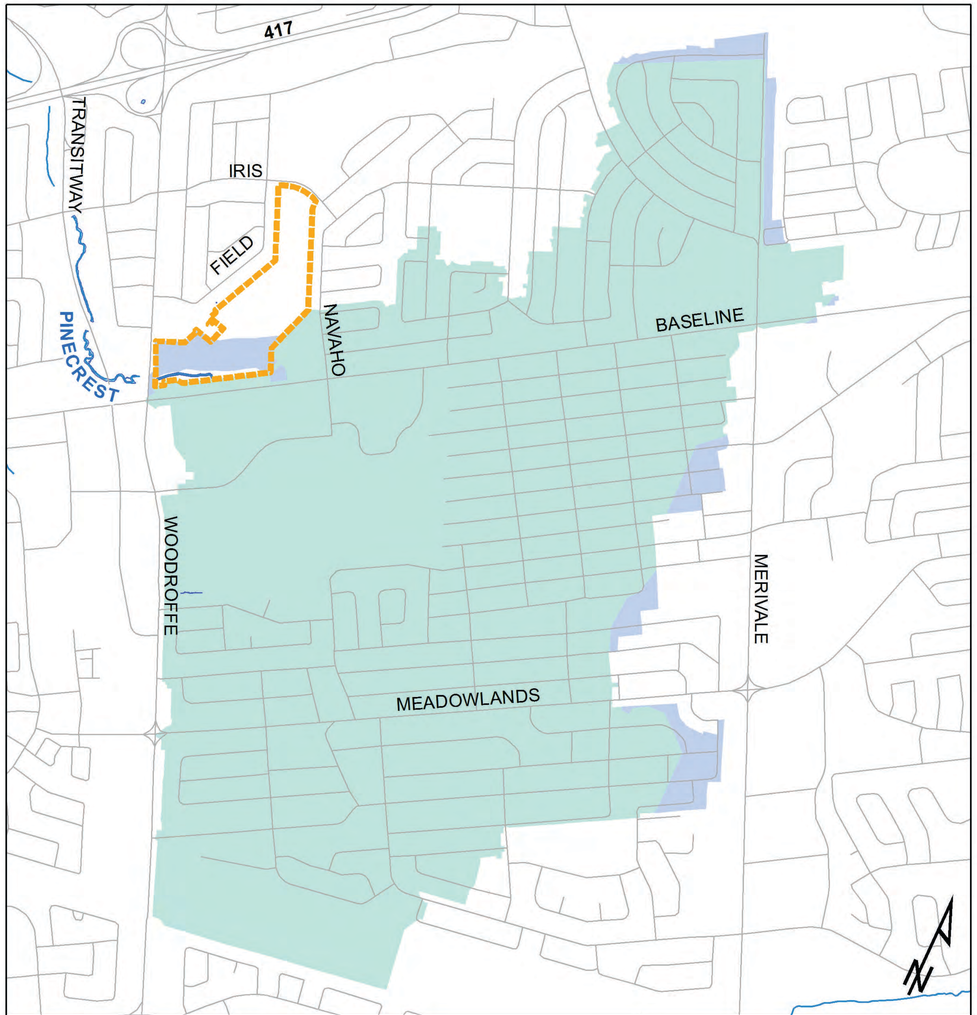
- Storm Sewer Drainage Area to Proposed SWM Pond
- Major Storm Drainage Area
- Study Area
- Pinecrest Creek
- Road Network

0 75 150 300 450 600 750 Meters

Drainage Area

August 2016

Zone de Drainage



Légende

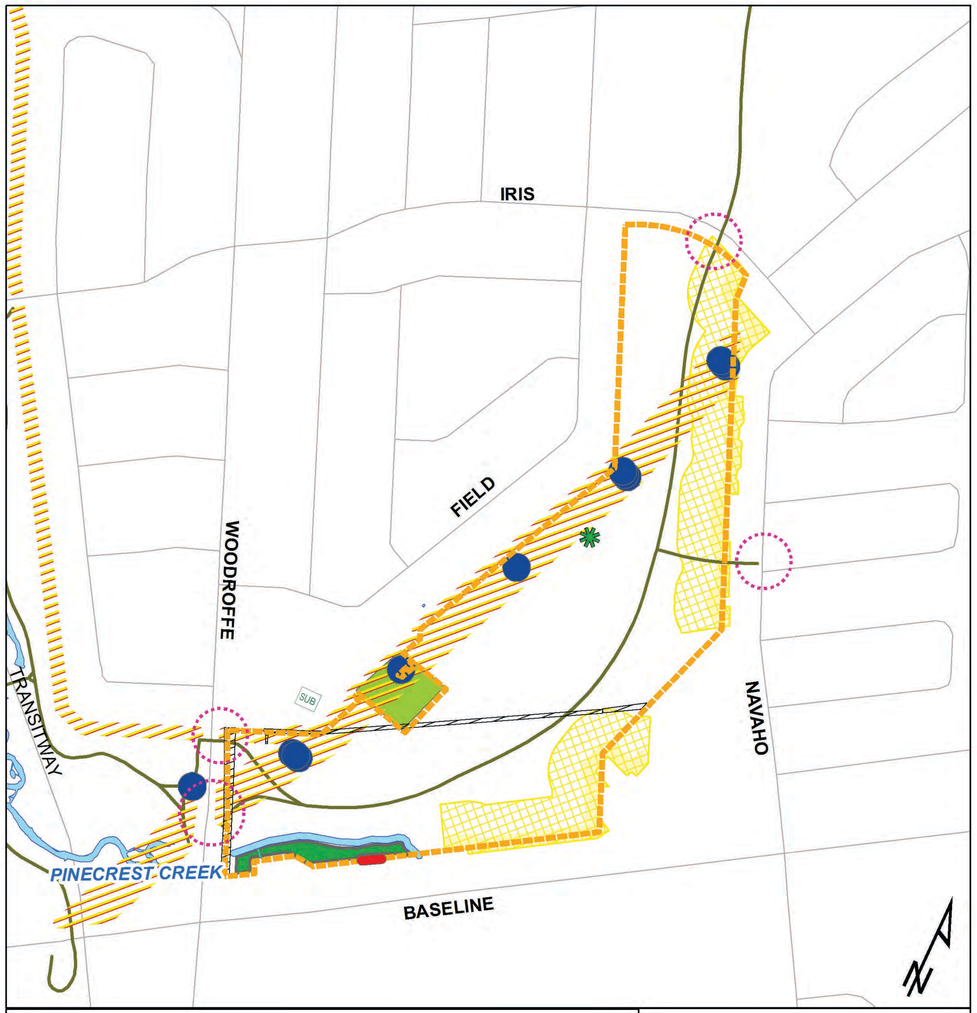
- Zone de drainage de l'égout pluvial au bassin de gestion des eaux pluviales proposé
- Zone de drainage primaire des eaux pluviales
- Secteur à l'étude
- Ruisseau Pinecrest
- Réseau routier

0 75 150 300 450 600 750 Mètres

Zone de drainage

Août 2016

Site Constraints and Opportunities



Legend

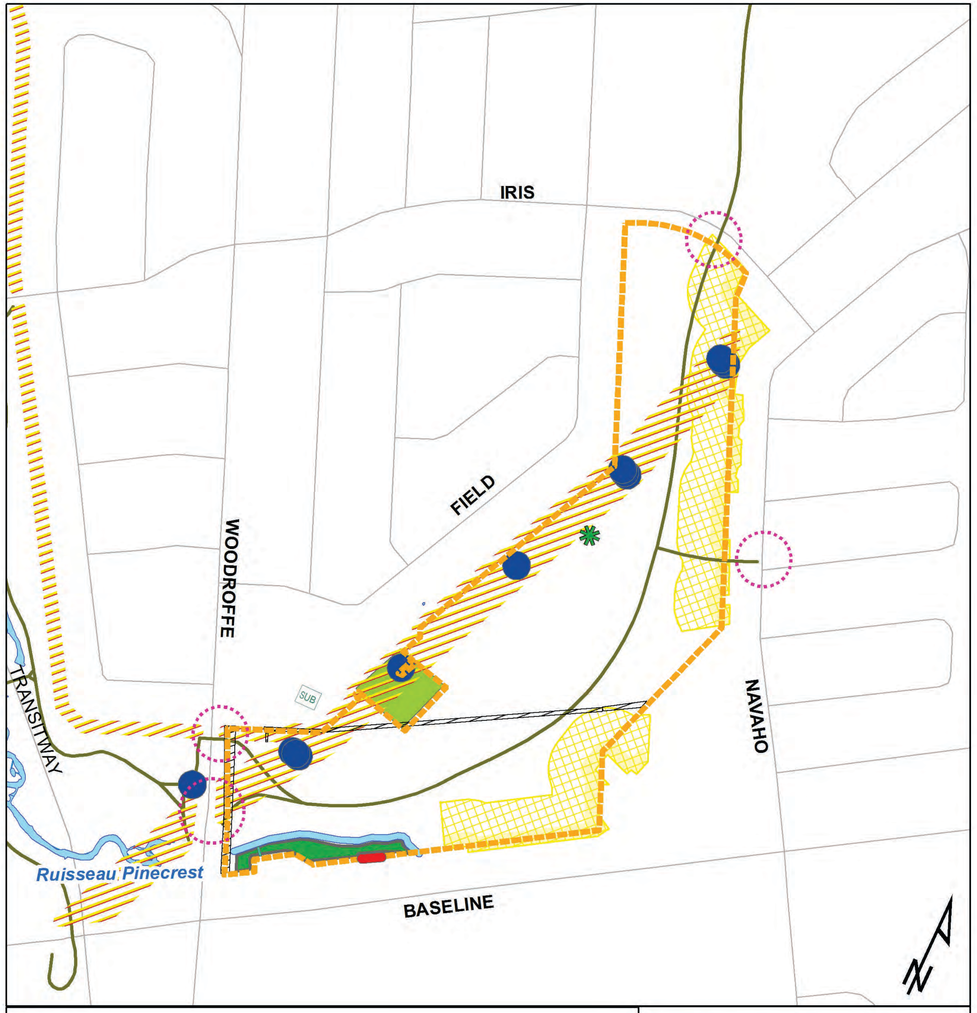
- Study Area
- Butternut Tree
- Groundwater Level Drawdown 15 m Margin
- Groundwater Level Drawdown 50 m Margin
- Hydro Ottawa Easements
- Hydro One 15 m Pole Buffer
- Hydro One Easement plus 5 m for Access
- Pinecrest Creek
- Recreational Pathways
- Drainage ROW Easement (Tony Graham)
- Sewer, Culvert and Watermain Easement (Scotts Restaurant)
- Southern Slope Constrained Area
- St Daniels School Leased Playfield
- SUB Hydro Transformer Sub-Station
- Opportunities for Pathway Connections

0 25 50 100 150 200 250 Meters

Site Constraints and Opportunities

September 2016

Contraintes et possibilités du site



Légende

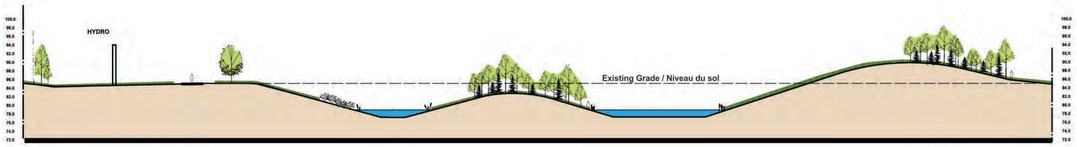
- Secteur à l'étude
- Noyer cendré
- Rabattement du niveau des eaux souterraines - marge de 15 m
- Rabattement du niveau des eaux souterraines - marge de 50 m
- Servitude d'Hydro Ottawa
- Périmètre des 15 m autour des poteaux d'Hydro
- Servitude d'Hydro One et 5 m pour l'accès
- Ruisseau Pinecrest
- Sentiers récréatifs
- Servitude de drainage (Tony Graham)
- Servitude d'égout, de ponceau et de conduites d'eau principales (Scotts Restaurant)
- Secteur restreint du versant sud
- Terrain de jeu loué par l'école St Daniels
- SUB Sous-station de transformation électrique
- Possibilités de liens vers des sentiers

0 25 50 100 150 200 250 Mètres

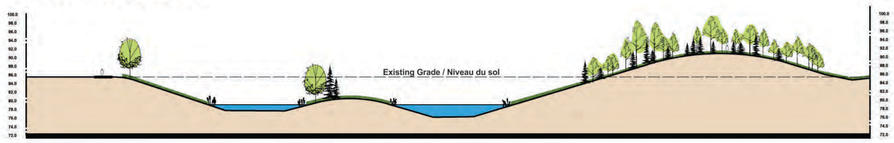
Contraintes et possibilités du site

Septembre 2016

Option 1



SECTION A



SECTION B

Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
Plantation de gros arbres	Large Tree Planting
Plantation d'arbustes	Shrub Planting
Sentier récréatif asphalté de 3 m	3 m Asphalt Recreational Path
Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
Limite de rabattement de 50 m	50 m Draw Down Limit

Existing / Existant

Contours (intervalles de 0.5 m)	Contours (0.5 m Intervals)
Ligne de transport d'électricité et poteau	Hydro Pole / Line
Végétation à garder	Vegetation to remain

Pond Features / Components
Caractéristiques et composantes du bassin

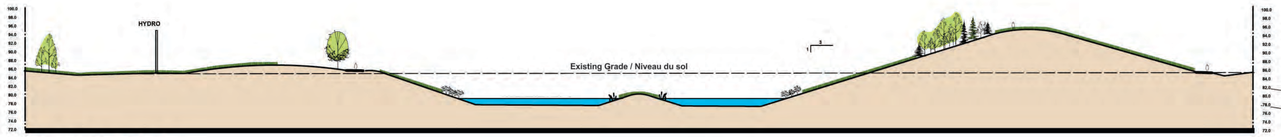
Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Bassin d'admission	D	Forebay
Berme de sortie du bassin d'admission	E	Forebay Outlet Berm
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

Option 1

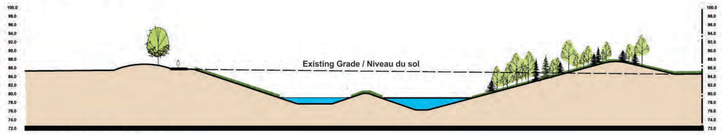
Originally prepared for the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue, 2015

Préparé à l'origine pour l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface du chemin Baseline et de l'avenue Woodroffe, 2015

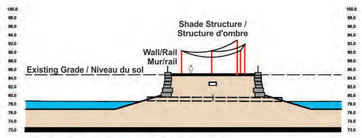
Option 2



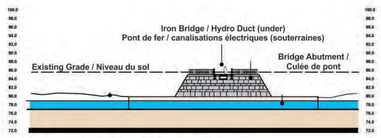
SECTION A



SECTION B



SECTION C (a)



SECTION C (b)

Bridge Option See Section C(b) — Option du pont - Voir la section C(b)

Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
Plantation de gros arbres	Large Tree Planting
Plantation d'arbustes	Shrub Planting
Sentier récréatif asphalté de 3 m	3 m Asphalt Recreational Path
Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
Limite de rabattement de 50 m	50 m Draw Down Limit

Existing / Existant

Contours (intervalles de 0.5 m)	Contours (0.5 m Intervals)
Ligne de transport d'électricité et poteau	Hydro Pole / Line
Végétation à garder	Vegetation to remain

Pond Features / Components
Caractéristiques et composantes du bassin

Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Décharge vers la cellule n° 2	D	Outlet to Cell No.2
Décharge vers la cellule n° 3	E	Outlet to Cell No.3
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

Option 2

Originally prepared for the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue, 2015

Préparé à l'origine pour l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface du chemin Baseline et de l'avenue Woodroffe, 2015

Next Steps

- Choose the preferred option (Winter 2017)
- Prepare the Class EA report (Winter 2017)
- Environment Committee and City Council approvals (Spring 2017)
- 30-day public review of Class EA Report (Spring 2017)
- Detailed design (2017)
- Construction (2018 / 2019)

Prochaines Étapes

- Choix de l'option priviligiée (hiver 2017)
- Préparation du rapport d'ÉE de portée générale (hiver 2017)
- Approbation du Comité sur l'environnement et du Conseil municipal (printemps 2017)
- Examen public de 30 jours du rapport d'ÉE de portée générale (printemps 2017)
- Conception détaillée (2017)
- Construction (2018/2019)

City of Ottawa

Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment

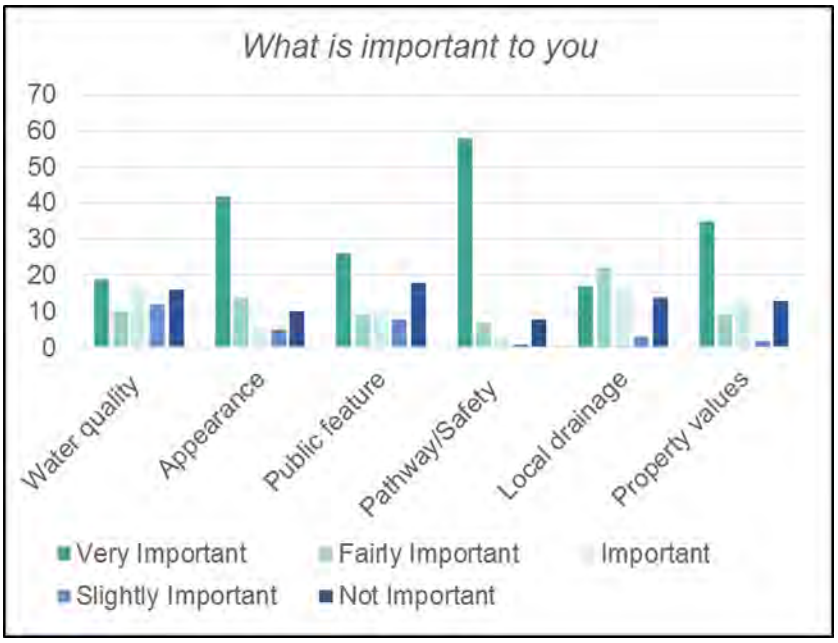
As We Heard It Report – May 2017

Planning, Infrastructure and Economic Development
110 Laurier Street West, Ottawa, ON K1P 1J1

As We Heard It
Baseline/Woodroffe Stormwater Management Pond
Class Environmental Assessment

Thanks to all who provided comments via the online information session (November 3, 2016 to January 16, 2017), the January 9, 2017 public meeting and through individual correspondence with City staff. A total of 98 responses to the online information session were received and 49 people signed in at the January public meeting.

The figure below summarizes the values identified by those who responded to the online questionnaire.



All comments received have been summarized and responses provided, including how the pond concept has been revised in response to these comments.

Comment/Concern		Response
Public health and safety concerns	i) Mosquitoes	Mosquitoes: The pond will provide water movement (due to wind activity and continuous flow from a large inlet storm sewer) that will discourage mosquitoes and avoid excessive odours. However, the potential for habitat conducive to mosquitoes cannot be completely eliminated, particularly at the shallower edges of the pond. The City's experience to date with over 100 other wet ponds indicates excessive mosquitoes (over and above what is currently experienced on the site) should not result. However, the application of larvicide to the pond would be undertaken if necessary to respond to this issue over the life of the pond.
	ii) Concern due to permanent open water	Safety: Safety concerns are a primary consideration in the design of any stormwater management pond the City constructs. Typical approaches include: • clear signage at key locations regarding the function of the pond • the use of plantings to actively discourage access to the open water • decorative fencing (not continuous chain link) to better delineate the pond area (in winter and summer). Ponds are also provided with flatter side slopes near and below the water's edge. The flatness of the slope in this area of the pond ensures that a person could navigate the slope should there be a need to. The City has considerable experience with these facilities in urban areas and is committed to providing a safe environment around the pond through proper design and maintenance.
	iii) Concern that pedestrians will cut across surface of pond if/when frozen in winter; risk of breaking through the ice	A pedestrian crossing with guard rails will be provided near the mid-point of the pond. Smaller-scale/decorative fencing options can also help delineate the edge of the pond
	iv) Pond is located within the Bird Hazard Zone of the Airport; concerns that geese will be attracted to pond and	The proposed pond is located at the extreme northerly edge of the bird hazard zone, partially inside the boundary. The City has

	adjacent schoolyard	retained a wildlife management expert who has recommended mitigating measures to be incorporated in the pond design that will discourage geese and gulls (the birds of primary concern) from frequenting the site. These measures include: • narrow linear design with much of the pond being 25 m or less in width (geese prefer larger/wider open water areas that provide greater distance from potential predators) • peninsula will be provided with dense shrub plantings and root wads along the shoreline to prevent loafing and nesting opportunities for geese • minimum 5m width of dense shrub planting adjacent to the water's edge (geese prefer easy access to the water's edge) • manicured areas (preferred by geese) will be strictly limited to a 1.5m mow strip adjacent to the pathways; all other upland/open space areas will be reforested or provided with tall grass/meadow conditions to discourage geese. The proposed mitigating measures have been presented to Transport Canada and the Airport Authority. Discussions are ongoing on this issue. The mitigating measures to discourage geese will have no negative impacts on other birds (songbirds, raptors).
Concerns re: increased risk of flooding	i) Increase in groundwater levels/flood risk to basements of adjacent homes	The proposed pond will not result in increased flood risk to adjacent properties, either from groundwater levels or fluctuating water levels in the pond during rainfall events. Existing homes that abut the site of the proposed pond are well above the permanent water level in the pond of 78.90m and the maximum (100yr) water level in the pond of 80.15m. For example, as shown on **Figure 1**, the existing elevation at the rear property line of Field Street homes is about 84.50m. Conservatively assuming no further increase in grade at the house, the basements of these

		homes would not be below 81.50m - still well above the 100year pond level of 80.15m. Also, the design of the inlet to the pond will preclude the maximum water level from rising any higher, as excess flows will bypass the pond and continue downstream.
	ii) Concern that major storms will flood adjacent homes if outlet becomes blocked; concern that ice may block or freeze up the outlet	If the outlet were to become blocked, flows would be forced back out via the inlet structure and into the creek to be conveyed downstream without further increasing the maximum water level in the pond.
	iii) Pond liner may be needed; may not be enough to prevent flooding	While the *Feasibility Study (2015)* deemed a pond liner unnecessary, this will be revisited and confirmed during detailed design on the basis of further geotechnical field work. The purpose of the pond liner (if confirmed to be required) would not be to prevent flooding of adjacent homes (they are too high to be at risk) but to avoid a reduction in the required permanent water depth due to exfiltration (loss of water) into the surrounding soils.
	iv) Local drainage impacts	Site grading and excavation for the pond will not negatively impact the existing drainage in the vicinity of adjacent properties.
Habitat / Endangered Species	i) Butternut tree protection	One butternut tree was originally identified in the *Feasibility Study (2015)*. Additional study was completed in January 2017, and fifty-six (56) Butternut trees (*Juglans cinerea)* have been identified in the area. A recent visit to the site has revealed a number of small saplings that were undetectable under the winter snow cover. This number will be confirmed. Under the Species at Risk Act (S.C. 2002, c. 29), all butternuts found on federal property are protected, unless they are determined to be hybrid. Hybridity testing will be undertaken when field conditions permit, to confirm the genetic status of the trees within or adjacent to the area of impact. As a precautionary approach, a 50m buffer has been applied to the single mature butternut (not a hybrid) on the site, and an appropriate buffer will be applied to all other true butternuts on

		site. The landscaping and pathway relocation that was originally proposed on the eastern portion of the site has been substantially reduced to avoid butternut tree impacts. However, the relocated pathway and the pond grading may encroach on some of these buffers. Appropriate mitigation techniques will be applied to reduce impacts to these individual trees.
	ii) Wildlife/habitat removal needs to be more careful	The City and the NCC will work together to ensure that this project is not likely to cause significant adverse effects to all listed species under the federal Species at Risk Act including the Monarch butterfly. Mitigation measures to arrive at that result will be determined through the environmental review of this project under section 67 of the *Canadian Environmental Assessment Act*, 2012.
	iii) NCC does not cut the grass anymore because of the milkweed/Monarch butterfly habitat	The Monarch is protected under the federal *Species at Risk Act* (SARA).Its status was elevated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to Threatened Species in December 2016 but is still currently listed as Special Concern under SARA. The landscaping plan will include plants which have breeding and nectaring habitat opportunities such as milkweed.
Pathways	i) Current pathway does not connect to appropriate location on Pinecrest pathway at Woodroffe Avenue ii) Realign path to better match pathway at the Fire Station	When completed, pedestrian pathways will be incorporated and connected to City of Ottawa pathway and NCC Capital Pathway networks. It is not feasible to cross Woodroffe Avenue at the southern traffic signal so the proposed pathways currently match existing near Woodroffe Avenue. The multi-use pathway crossing at Woodroffe Avenue makes use of the existing signalized intersection for the Fire Station and connects the trails on the east and west side of Woodroffe Avenue
	iii) Concern with transition time between construction and implementation regarding routing of pathway	The City will work to maintain the existing multi-use pathway throughout the construction period. During the final site works, the north-south pathway connections will be constructed.
	iv) Concern that pathway in Option 2 along the backyards	This pathway location has been revised and will be pushed further west to address concerns. It

	on Navaho Drive would require increased home security and lighting	will be offset from the rear yards of the homes along Navaho Drive, and additional planting will be provided as a buffer between the pathway and the rear yards.
Consultation	i) Lack of notification to abutting property owners ii) Community Association found out about the project late iii) Did the *Feasibility Study (2015)* to go to Council for approval?	During the consultation undertaken in 2009 and 2010 for the *SWM Retrofit Study (2011)*, residents abutting the proposed pond location should have received direct notice. At that time, standard notification included newspaper advertisements and open houses. The *Feasibility Study (2015)* did not include public consultation as it was not yet certain whether NCC, as the owner of the property, would ultimately permit the construction of the SWM pond. If the NCC were to object, there would have been no need to pursue the pond further. Once NCC confirmed their acceptance of the pond based upon the concept provided in the *Feasibility* Study and funding for the pond was secured, the City was able to proceed with a Class Environmental Assessment, including public consultation. City staff had an initial mailing list that did not include the Bel Air Community Association but a notice was sent out on November 9, 2016 immediately after we were contacted by a resident (initial notices were published on November 3, 2016). Given the feedback received from the November 2016 online consultation, a Public Meeting was arranged for January 9, 2016 and the original deadline for comments was extended to January 16, 2017.Public meeting notices were mailed to all properties abutting the proposed pond site. The *Feasibility Study* was not brought to City Council for approval. As noted above, this study was an initial effort to confirm whether the NCC, as the owner of the property, would ultimately permit the construction of the SWM pond. Once the NCC confirmed their acceptance of the pond based upon the further details provided in the *Feasibility Study* and funding for the pond was secured, the City was able to proceed with a Class Environmental Assessment, which will

		proceed to the Environment and Climate Protection Committee and City Council for approval.
	iv) SWM Retrofit Study included no evidence of contacting Community Associations or doing proper consultation	Community Associations on record with the City when the *Retrofit Study* began (2009) were included on the project mailing list. A detailed record of the consultation undertaken is provided in Appendix O of the *Retrofit Study (2011)* available here: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
	v) St. Daniel's school was contacted and the principal had not been notified	St. Daniel's School's principal and staff of the Ottawa Carleton School Board (OCSB) were contacted in 2012 during the preparation of the *Feasibility Study (2015*) and no objections to a pond on the site were raised. The OSCB was also notified of the November 2016 online information session and the January 2017 public meeting. The City received a response from the OCSB subsequent to the November 2016 online information session requesting that the facility be designed to reduce risks and limit the extent of standing water to the greatest extent possible.
Alternatives to the pond	i) What, if any, alternate sites were considered?	Through the detailed screening completed in the *SWM Retrofit Study (2011*), this site was one of only 5 sites that offered sufficient space for end-of-pipe retrofits. Of these 5 sites, only 3 were carried forward in the final Retrofit Plan (refer to Figure 3 in Part D: Implementation and Monitoring Plan of the SWM Retrofit Study available at this link: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html). The site at the northeast corner of Baseline Road and Woodroffe Avenue was the largest of the short-listed sites, offering the best opportunity to provide significant benefits. The measures at the other short-listed sites included a (subsurface) oil grit separator in Elmhurst Park and near Connaught Park. These measures were proposed in addition to the Baseline Woodroffe pond, not as alternatives to it. Yes – a wet pond in this location was the only

	ii) Was a wet pond the only type of pond to be considered? Was a dry pond considered? iii) Was there an option with no pond? iv) An underground option should have been considered as it would alleviate many of the concerns v) The SWM Retrofit Study looked at options other than a pond, such as rain barrels, porous pavement, etc. - these were high on the list of options and cheaper – why were they not considered? vi)Examples of existing similar ponds for reference	type of pond considered. Wet ponds are the most effective at improving water quality as they avoid resuspension of collected sediments during each rainfall event. Dry ponds for water quality control are not recommended for this reason. The *SWM Retrofit Study (2011*) considered a scenario with no ponds or end-of-pipe facilities but this was not selected as the preferred retrofit approach for the Pinecrest Creek subwatershed. An underground option that could provide comparable benefits to the proposed pond would be significantly more expensive to construct and maintain and is not considered practical or affordable in this context. Other retrofit measures have also been considered and will be implemented over time as the City rebuilds existing streets and City-owned facilities. However, the proposed pond was also recommended as one part of an overall solution that included a range of retrofit measures. Examples of existing similar ponds include: • Corrigan Pond: located west of the Jock River on Half Moon Bay at Tuscana Way (Barrhaven) • Todd Pond (close to Corrigan Pond): located near 2647 Fallingwater Circle (Barrhaven) • Clarke Bellinger pond: located near 129 Leikin Drive (former Nepean) • Strandherd pond: located near 3110 Prince of Wales north of Woodroffe Avenue. The general locations of these ponds are provided on the attached **Figure 2**.
How pond will operate under different conditions; design features	i) Will the peninsula be covered during larger storms?	Yes – the south peninsula will be flooded to a maximum depth of 0.3m during a 100 year event. The north peninsula will remain dry during a 100 year storm event. During more frequent events that will occur several times a year, the depth of flooding will just reach the crest of the south peninsula (25mm of rainfall) or lower (rainfall less than 25mm).

		The proposed pedestrian crossing of the pond will not be subject to flooding during a 100year event.
	ii) What will be the total depth of the pond at the deepest point?	During dry weather, the maximum wet depth of the pond will be 3m in the forebay near the pond inlet. The permanent wet depth elsewhere in the pond will be about 1.5m. During a 100 year storm event, the total (maximum) depth of water would increase to 4.25 m and then drain down to the permanent wet depth of 1.5 to 3m over a period of 3 to 4 days. During more frequent events (up to about 25mm rainfall) that would occur every year, the total water depth would rise to about 4m total depth and drain down to the permanent wet depth of 1.5 to 3m in about 2 to 3 days. Please refer to **Figure 1** attached, that illustrates the above-noted range of water levels.
	iii) Height of proposed landscape berms?	The extent of berming has been significantly reduced for aesthetic reasons to be more consistent with the lands north of Iris. Subject to excavation and disposal costs, some limited berming may be included in the detailed design.
Pond maintenance	i) Concern that pond will not be maintained	All stormwater management facilities owned and operated by the City (100+ wet ponds) are subject to regular maintenance to ensure continued performance and address concerns as they arise. Each pond requires an Environmental Compliance Approval (ECA) from the provincial Ministry of Environment and Climate Change which has conditions requiring regular inspection and maintenance On-going operation and maintenance costs of all stormwater management facilities in the City are tracked and budgeted for annually. These costs are and will continue to be reflected in the resulting stormwater rate.
	ii) How often will pond have accumulated sediments dredged?	Sediment removal will be required approximately once every 10 years. Clean-out/dredging with an excavator will last about a week and likely take place in winter months. Local residents will be notified in advance of dredging operations

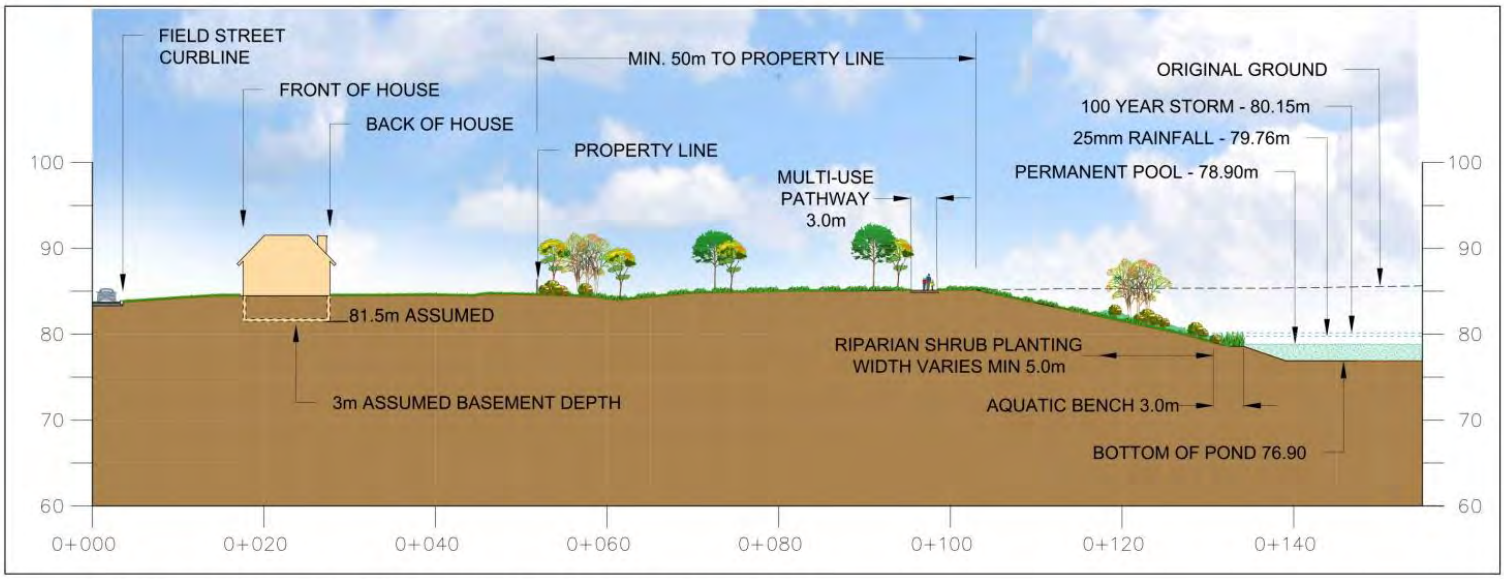
		proceeding.
	iii) Dogwalkers frequenting the site do not clean up after their pets; need for bylaw enforcement, signage, provision of dog waste bags on-site	Potential for additional signage and/or enforcement of by-law will be discussed with NCC.
	iv) When dredging in winter, how are inhabitants of the pond dealt with (frogs, fish, etc)?	Prior to dredging, the presence of fish would have to be confirmed and removals may be required. All regulations at the time the dredging takes place will be complied with.
	v) Concern that property values will decrease	Where similar facilities exist in newer developments throughout Ottawa, they continue to be popular and well-used by local residents. Design features and landscaping measures that create an attractive and aesthetically pleasing community asset will be a high priority in the detailed design.
Purpose and effectiveness of pond	i) If this SWM pond has only a 10% effect on flow rate, is it worth the money to build it?	The pond was primarily recommended to improve the water quality of runoff from the catchment area and reduce erosion downstream. Significant benefits to the creek can be provided by storing and releasing the runoff more slowly from the very frequent, smaller rainfall events that the pond has been designed for. There are also flooding concerns in the creek, particularly where the creek was enclosed (piped) just south of Carling Avenue. This piping occurred during the 1960s and has resulted in a relatively high flood risk to the Sir John A. MacDonald Parkway (SJAMP). While the pond cannot be made large enough to eliminate the flood risk to the SJAMP at this location, it will provide some benefit in reducing the extent of flooding during major storm events.
	ii) Continuing benefits of pond questioned with the advent of climate change	The pond will continue to provide significant benefits notwithstanding the future impacts of climate change. This is based on comparing these benefits (improved water quality, reduced erosion impacts and some limited flood control) to the current situation where stormwater runoff from a large area (some 435ha) is uncontrolled

		and untreated prior to direct discharge to Pinecrest Creek. Even with the advent of climate change, the pond will continue to provide treatment and flow attenuation for a large proportion of rainfall events, improving conditions in the creek as compared to the current uncontrolled condition.
	iii) Effectiveness of the impacts/benefits of the pond downstream questioned; pond will address only one of several major storm outlets; what about other storm outlets downstream?	The proposed pond is only one part of a longer-term solution for the whole of the Pinecrest Creek subwatershed and the adjacent Westboro area. The pond is not being built as a single solution but is the first major investment aimed at mitigating the long-standing impacts of uncontrolled urban runoff on Pinecrest Creek and the local reach of the Ottawa River. Additional retrofits implemented over time will also contribute to mitigating the impacts of runoff from other downstream storm outlets. These retrofits have been recommended in addition to the pond and not as an alternative to it.
	iv) How will the pond improve erosion in Pinecrest Creek? Where does the water go now?	The uncontrolled runoff from some 435 hectares of existing development drains to the creek from the storm sewer that outlets near the northeast corner of Baseline Road and Woodroffe Avenue. This runoff will continue to drain to the same location but will first be captured, stored and released slowly from the pond to mitigate current erosion conditions in the creek.
	v) Other properties (Algonquin College, College Square) should take on more responsibility	The City is actively working with Algonquin College in the implementation of their Water Strategy, in particular providing input to and guidance on their campus stormwater management plan.
	vi) What are the implications if the pond does not proceed?	If the pond is not built, the area will continue to drain as it does now. However, the creek will not receive the benefits of improved water quality, reduced erosion and (slightly) reduced flooding. The stormwater management requirements for the Baseline Station works that will be implemented with Stage 2 LRT would also have to be revisited. The pond is an important requirement for the construction of Baseline Station. The storm runoff from the station cannot

		be discharged directly to Pinecrest Creek without the offsetting mitigation to flooding and erosion impacts that will be provided by the pond.
	vii) Concerns that pond is proposed in an existing neighbourhood; pond is being built to address transit projects and intensification at expense of this neighbourhood; fear that pond will be expanded in future	The proposed pond was first identified as a retrofit project independent of any other City projects at the time. However, subsequent to the completion of the *Retrofit Study* in 2011, City staff wished to determine whether the NCC would support the runoff impacts of proposed works at Baseline Station being mitigated by the upstream pond rather than on-site SWM measures, given the very constrained conditions at Baseline Station. In addition to providing NCC with a more refined concept of the proposed pond than had been provided in the 2011 *Retrofit Study*, the *Feasibility Study* also provided the analysis that confirmed the benefits of the pond could address the runoff impacts of the Baseline Station work which will now be completed as part of the Stage 2 LRT program. Notwithstanding the implementation of the pond, future redevelopment within the catchment area will still be required to implement appropriate on-site stormwater management measures in accordance with the City's current requirements. There is no intent and it would not be feasible to expand the proposed pond in the future given various restrictions and lack of space on the site to do so.
	viii) Relationship to Stage 2 LRT	The pond construction will be "bundled" with the overall Stage 2 LRT construction to ensure it is constructed in a timeframe consistent with Baseline Station improvements.
	ix) SWM ponds are obsolete and have run their course; Federation of Canadian Municipalities does not recommend end-of-pipe SWM facilities and their Infra Guide recommends low impact development (LID) measures and underground storage tanks	Notwithstanding the continuing evolution of stormwater management, wet ponds remain an effective and widely-used approach to address the impacts of urban runoff on receiving streams. That being said, the City is also taking steps to implement other approaches to mitigate the impacts of urban runoff on receiving streams. Pilot projects implementing bioretention (or "rain gardens") have recently been implemented on Sunnyside Avenue in old Ottawa South and

		Stewart Street in Sandy Hill. Further efforts within the Pinecrest Creek subwatershed include: • Hemmingwood Way: A number of bioretention features are proposed in conjunction with forthcoming area traffic management measures. These are now in design and will be constructed in 2018. • Outreach: A further initiative is being launched this year that will focus on outreach efforts to educate residents about stormwater management and encourage homeowners to take action to reduce runoff from their properties. The FCM document referenced notes that, *"Wet ponds are less suitable for retrofit situations and are typically unsuitable for infill situations, because of their comparatively large land area and drainage area requirements (typically > 5 ha to allow adequate turnover and sustainability)."* In this case, there is a very large contributing drainage area (some 435ha) for turnover purposes and sufficient land area to construct a pond that will provide significant downstream benefits.
NCC approval process	Has NCC officially signed off on the project? NCC board approval is required	NCC has advised: The pond is under review in Capital Planning Branch, Federal Approvals and Environment. It is going through a Level 2 design review. Level 2 design approval projects are reviewed by a cross-functional work group of NCC staff and then presented to an Internal Design Review Committee (IDRC) – which has been done. Once the design has been revised and finalized to NCC staff's satisfaction, the project will be sent to an executive committee of the NCC Board for approval, via an E-vote. After the Board approves the project, the executive director of the Capital Planning Branch will sign the approval. The City has and continues to consult closely with NCC about the proposed pond.

Figure 1 – Range of water levels in pond



TYPICAL CROSS–SECTION OF POND NEAR FIELD STREET

Figure 2. Examples of Similar Stormwater Management Ponds
Figure 2. Exemples de bassins de rétention des eaux pluviales existants
Bassin Clarke Pond
Located near 129 Leikin Drive
Situé près de 129 promenade Leikin
Bassin Strandherd Pond
Located near 3110 Prince of Wales
Situé près de 3110 promenade Prince of Wales
Bassin Corrigan Pond
Located on Half Moon Bay Road at Tuscana Way
Situé sur le chemin Half Moon Bay, proche du chemin Tuscana
Bassin Todd Pond
Located near 2647 Fallingwater Circle
Situé près de 2647 Cercle Fallingwater
ch. Fallowfield Rd.
prom. Longfields Dr.
prom. Leikin Dr.
ch. Merivale Rd.
ch. River Rd.
ch. Leitrim Rd.
av. Woodroffe Ave.
prom. Crestway Dr.
prom. Prince Of Wales Dr.
ch. Spratt Rd.
prom. Strandherd Dr.
prom. Chapman Mills Dr.
ch. Greenbank Rd.
ch. Earl Armstrong Rd.
prom. Paul Métivier Dr.
ch. Jockvale Rd.
ch. Cambrian Rd.
ch. Rideau Rd.
0 0.25 0.5 1 Kilometers

Ville d’Ottawa

Bassin de rétention des eaux pluviales à l’angle du chemin Baseline et de l’avenue Woodroffe Évaluation environnementale de portée générale

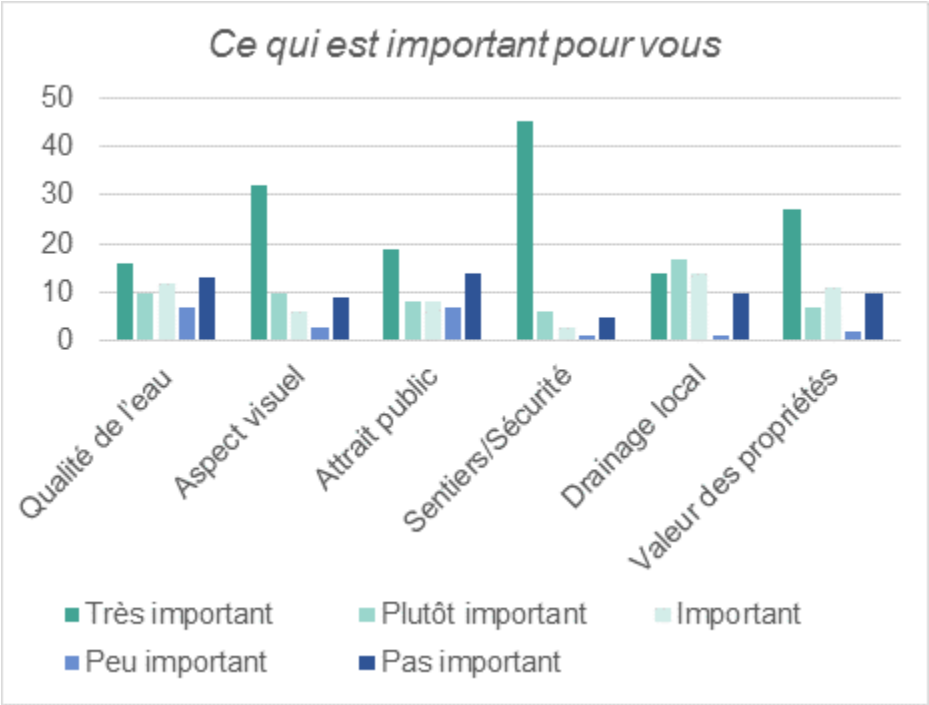
Ce qui a été di – le mai 2017

Services de planification, d'infrastructure et de développement économique, 110, avenue Laurier Ouest, Ottawa, ON K1P 1J1

Ce qui a été dit :
Bassin de rétention des eaux pluviales à l'angle du chemin Baseline et de l'avenue Woodroffe
Évaluation environnementale de portée générale

Merci à tous ceux qui ont fait part de leurs commentaires à la séance d'information en ligne (du 3 novembre 2016 au 16 janvier 2017) et à la réunion publique du 9 janvier 2017, ainsi que par correspondance individuelle avec le personnel de la Ville. Nous avons reçu 98 réponses lors de la séance d'information, et 49 personnes ont participé à la réunion publique en janvier.

Le graphique ci-dessous résume les opinions formulées par ceux qui ont rempli le questionnaire en ligne.



Tous les commentaires ont été résumés, et les réponses indiquées, avec la nouvelle définition d'un bassin qui en découle.

Commentaire/problème		Réponse
Santé et sécurité publiques	i) Moustiques	Moustiques : L'eau du bassin ne stagnera pas (en raison du vent et du courant continu provenant d'une prise d'eau d'égout pluvial de grand diamètre), ce qui dissuadera les moustiques et évitera les odeurs fortes. Cependant, il est impossible d'éliminer complètement les caractéristiques d'un habitat propice aux moustiques, surtout au bord du bassin où l'eau est peu profonde. À ce jour, l'expérience de la Ville avec plus de 100 bassins avec retenue permanente révèle que la population de moustiques ne devrait pas augmenter. Par contre, on procédera à l'épandage de larvicide si la santé du bassin en dépend.
	ii) Eau libre en permanence	Sécurité : La sécurité est une priorité de la Ville dans la conception de ses bassins de rétention des eaux pluviales. Approche habituelle : • Signalisation bien en vue aux endroits importants indiquant la fonction du bassin; • Végétation visant à dissuader les gens d'accéder au bassin; • Clôtures décoratives (pas de clôtures à mailles losangées) délimitant la zone du bassin (en hiver et en été). De plus, près du bord et sous l'eau, les parois des bassins sont moins inclinées. Cette pente douce permet d'entrer dans l'eau et d'en sortir si besoin est. La Ville possède une grande expérience de ces installations dans les zones urbaines et s'efforce de concevoir des bassins sécuritaires et de les entretenir adéquatement.
	iii) Piétons traversant la surface glacée du bassin en hiver; risque de défoncer la glace	Un passage pour piétons muni de garde-corps sera aménagé à peu près au centre du bassin, et des types de clôtures décoratives plus petites peuvent aussi marquer le bord de celui-ci.
	iv) Emplacement du bassin dans la zone de péril aviaire de l'aéroport; attraction des bernaches au bassin et à la cour d'école du voisinage	Le bassin proposé sera situé à l'extrémité nord de la zone de péril aviaire, partiellement à l'intérieur de cette dernière. La Ville a retenu les services d'un expert en gestion de la faune,

		qui a recommandé l'intégration de mesures d'atténuation dans la conception du bassin en vue d'éloigner les bernaches du Canada et les goélands (les espèces d'oiseaux les plus préoccupantes) : • Conception linéaire et étroite; largeur de 25 m et moins sur la plus grande partie du bassin (les bernaches préfèrent les plans d'eau plus grands et plus larges, où elles sont loin des prédateurs); • Péninsule accueillant des buissons touffus et des mottes racinaires le long du rivage pour empêcher la fréquentation et la nidification par les bernaches; • Buissons touffus sur une largeur minimale de 5 m jusqu'au bord de l'eau (les bernaches aiment avoir un accès facile au rivage); • Zones entretenues (appréciées des bernaches) limitées strictement à une bande tondue de 1,5 m de large en bordure des sentiers; toutes les autres zones sèches ou dégagées seront reboisées ou aménagées avec des herbes hautes ou des prés afin d'éloigner les bernaches. Les mesures d'atténuation proposées ont été présentées à Transports Canada et à l'Administration de l'aéroport. Les délibérations à ce sujet sont en cours. Les mesures d'éloignement des bernaches n'auront aucun effet sur les autres espèces d'oiseaux (oiseaux chanteurs, rapaces).
Risque d'inondation accru	i) Élévation de la nappe souterraine et augmentation du risque d'inondation dans les sous-sols des domiciles à proximité	Le bassin proposé n'augmentera pas le risque d'inondation dans les propriétés à proximité par l'élévation de la nappe souterraine ou du niveau d'eau lors des averses. Les domiciles existants contigus au site proposé sont situés bien au-delà du niveau d'eau permanent (78,90 m) et du niveau des crues de récurrence de 100 ans (80,15 m). Par exemple, selon la **figure 1,** la hauteur actuelle de la limite de propriété arrière des domiciles sur la rue Field se situe à environ 84,50 m. Dans l'hypothèse prudente où la pente des

		terrains n'est pas accentuée près des domiciles, les sous-sols ne seraient pas sous 81,50 m, soit bien au-delà du niveau des crues de récurrence de 100 ans du bassin (80,15 m). De plus, la prise d'eau du bassin est conçue de façon à empêcher l'eau d'augmenter au-delà du niveau de crue en la détournant du bassin pour l'envoyer en aval.
	ii) Inondation des domiciles à proximité en cas de précipitations abondantes si l'exutoire est obstrué; congélation de l'eau dans l'exutoire ou obstruction par la glace	Si l'exutoire devait être obstrué, l'eau remonterait dans le ruisseau par la prise d'eau et serait évacuée en aval sans augmenter le niveau de crue du bassin.
	iii) Possibilité qu'une géomembrane soit nécessaire; peut ne pas suffire à empêcher les inondations	Bien que selon l'étude de faisabilité de 2015 une géomembrane ne soit pas nécessaire, sa pertinence sera réexaminée dans la conception détaillée à la lumière de travaux géotechniques supplémentaires sur le terrain. Le but de la géomembrane (si elle s'avère nécessaire) n'est pas d'empêcher l'inondation des domiciles à proximité (ils sont protégés par la hauteur), mais d'éviter que le niveau d'eau requis en permanence ne baisse à cause de l'exfiltration (perte d'eau par le sol).
	iv) Effets sur le drainage dans la zone	L'augmentation de la pente et l'excavation du bassin n'auront aucun effet néfaste sur la capacité de drainage actuelle près des domiciles à proximité.
Habitat et espèces en voie de disparition	i) Protection du noyer cendré	Au départ, l'Étude de faisabilité de 2015 avait relevé un seul noyer cendré. Une autre étude a été effectuée en janvier 2017, qui a permis de relever la présence de cinquante-six (56) noyers cendrés (*Juglans cinerea)* dans le secteur. Une récente visite des lieux a permis de repérer un certain nombre de jeunes gaules qui n'avaient pas été relevées sous la neige. Leur nombre reste à confirmer. En vertu de la *Loi sur les espèces en péril* (L.C.2002, ch.29), tous les noyers cendrés qui se trouvent sur un terrain appartenant au gouvernement fédéral sont protégés, à moins qu'il ne s'agisse de variétés hybrides. Des tests génétiques seront effectués lorsque les conditions du terrain le

		permettront afin de confirmer la nature génétique de ces arbres dans le secteur ou près du secteur concerné. Comme moyen de précaution, une zone tampon de 50 m a été instaurée autour du seul noyer cendré mature (qui n'est pas un hybride) du secteur, et une zone tampon semblable sera instaurée autour de tous les autres noyers cendrés véritables du secteur. Le déplacement des sentiers et l'aménagement paysager proposés à l'origine dans la partie est du site ont été réduits considérablement pour éviter la perturbation des noyers cendrés. Cependant, le sentier déplacé et le nivellement de l'étang pourraient empiéter sur certaines de ces zones tampons. Des techniques d'atténuation appropriées seront utilisées pour réduire les répercussions sur chaque arbre en question.
	ii) Précautions additionnelles pour limiter la destruction de l'habitat et l'éloignement de la faune	La Ville et la Commission de la capitale nationale (CCN) collaborent pour que ce projet n'ait pas trop d'effets nuisibles sur les espèces visées par la *Loi concernant la protection des espèces sauvages en péril au Canada,* dont le monarque. Les mesures d'atténuation permettant d'y arriver seront déterminées par l'examen environnemental du projet, conformément à l'article 67 de la *Loi canadienne sur l'évaluation environnementale (2012).*
	iii) Arrêt de la coupe de pelouse par la CCN pour préserver l'asclépiade commune et l'habitat du monarque	Le monarque est protégé par la *Loi sur les espèces en péril* (LEP). Son état a été rehaussé à « espèce menacée » par le Comité sur la situation des espèces en péril au Canada (COSEPAC) en décembre 2016, mais il est toujours considéré comme « espèce préoccupante » dans la LEP. Le plan d'aménagement paysager prévoit des plantes qui créent un habitat de reproduction et produisent du nectar, comme l'asclépiade commune.
Sentiers	i) Sentier actuel ne débouchant pas sur un bon endroit du sentier du Ruisseau-Pinecrest à l'avenue Woodroffe ii) Retraçage du sentier pour mieux l'adapter au site de la	Lorsqu'ils seront terminés, les sentiers pour piétons seront intégrés aux réseaux de la Ville d'Ottawa et du Sentier de la capitale de la CCN. Il est impossible de faire traverser le sentier au feu de circulation au sud sur l'avenue Woodroffe, et donc les sentiers projetés correspondent aux sentiers actuels des environs. Le sentier

	caserne de pompiers	polyvalent qui traverse l'avenue Woodroffe passe par le carrefour à feux de la caserne de pompiers et relie les sentiers des côtés est et ouest de l'avenue.
	iii) Durée de la transition entre la construction et la mise en service du sentier	La Ville s'efforcera de maintenir le sentier polyvalent en service pendant la construction. À la fin des travaux, les liens entre les sentiers nord et sud seront aménagés.
	iv) Besoin d'améliorer la sécurité et l'éclairage pour les arrière-cours le long du sentier (option 2) pour les domiciles de la promenade Navaho	Cette section du sentier a été réexaminée et sera déplacée vers l'ouest pour éviter les problèmes. Elle s'écartera des arrière-cours le long de la promenade Navaho, et une bande tampon de végétation sera aménagée entre le sentier et les arrière-cours.
Consultation	i) Manque de communication avec les propriétaires des terrains adjacents	Pendant la consultation entreprise en 2009 et 2010 dans le cadre de l'étude sur la modernisation des installations de gestion des eaux pluviales de 2011, les propriétaires des terrains adjacents auraient dû recevoir un avis en mains propres. À l'époque, les avis étaient publiés dans les journaux et communiqués lors de séances portes ouvertes.
	ii) Découverte tardive du projet par l'association communautaire	L'étude de faisabilité de 2015 n'avait pas de volet consultatif, car on ne savait pas si la CCN, le propriétaire du terrain, finirait par permettre la construction du bassin de rétention des eaux pluviales. Si la CCN avait refusé, le projet aurait été abandonné. Dès que la CCN a accepté la construction du bassin selon le concept exposé dans l'étude de faisabilité et que le financement a été obtenu, la Ville a pu commencer une évaluation environnementale de portée générale, qui comporte une consultation de la population. Au début, le personnel de la Ville avait une liste de diffusion dont la Bel-Air Community Association ne faisait pas partie, mais il lui a envoyé un avis le 9 novembre 2016 immédiatement après qu'un résident a communiqué avec la Ville (les premiers avis avaient été envoyés le 3 novembre 2016). Par suite des commentaires reçus à la consultation en ligne de novembre 2016, une

		réunion publique a eu lieu le 9 janvier 2016, et la période d'envoi des commentaires a été prolongée au 16 janvier 2017. Un avis annonçant la réunion publique a été envoyé par la poste à tous les propriétaires des terrains adjacents au site du bassin projeté.
	iii) L'étude de faisabilité de 2015 a-t-elle été soumise à l'approbation du Conseil municipal?	L'étude de faisabilité n'a pas été soumise à l'approbation du Conseil municipal. Nous venons de mentionner que cette étude était une première tentative de déterminer si la CCN, le propriétaire du terrain, finirait pas permettre la construction du bassin de rétention des eaux pluviales. Dès que la CCN a accepté la construction du bassin, après avoir pris connaissance des renseignements supplémentaires fournis dans l'étude de faisabilité, et que le financement a été obtenu, la Ville a pu commencer une évaluation environnementale de portée générale, qui sera soumise à l'approbation du Comité de l'environnement et de la protection climatique et du Conseil municipal.
	iv) Absence d'indications que l'étude sur la modernisation des installations de gestion des eaux pluviales a comporté une communication avec les associations communautaires ou une consultation en bonne et due forme	Les associations communautaires inscrites auprès de la Ville au commencement de l'étude sur la modernisation (en 2009) étaient sur la liste de diffusion du projet. Un registre détaillé de la consultation se trouve à l'annexe O de l'étude sur la modernisation de 2011 : http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
	v) Communication avec l'école St. Daniel : le directeur n'était pas au courant	Le directeur et le personnel de l'école St. Daniel, du Ottawa Catholic School Board (OCSB), ont été joints en 2012 pendant la préparation de l'étude de faisabilité de 2015, et ils n'ont opposé aucune objection à la construction d'un bassin sur le site. L'OCSB a également été informé de la séance d'information en ligne de novembre 2016 et de la réunion publique de janvier 2017. La Ville a reçu une réponse de l'OCSB après la séance d'information en ligne de novembre 2016, par laquelle on lui demandait de concevoir l'installation de façon à réduire au maximum les risques et l'eau stagnante.
Solutions de	i) D'autres sites ont-ils été	À l'évaluation détaillée de l'étude sur la

rechange au bassin	envisagés?	modernisation des installations de gestion des eaux pluviales de 2011, le site actuel était l'un de seulement cinq emplacements assez grands pour la modernisation des points de rejet. Sur ces cinq emplacements, seuls trois ont été envisagés dans le plan de modernisation (voir la figure 3 à la partie D du plan de mise en œuvre et de surveillance de l'étude sur la modernisation des installations de gestion des eaux pluviales : http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html). Le site à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe était le plus grand des emplacements présélectionnés, et il présentait de meilleures chances de succès. On comptait parmi les autres sites présélectionnés un désableur-déshuileur souterrain au parc Elmhurst et près du parc Connaught. Ces emplacements avaient été proposés en complément du bassin à l'angle du chemin Baseline et de l'avenue Woodroffe, et non à titre de solutions de rechange à ce dernier.
	ii) Le bassin avec retenue permanente est-il le seul type de bassin à avoir été envisagé? Un bassin sec a-t-il été envisagé?	En effet, le bassin avec retenue permanente est le seul type de bassin à avoir été envisagé à cet endroit. Les bassins avec retenue permanente améliorent la qualité de l'eau plus efficacement, car ils empêchent la remise en suspension des sédiments recueillis à chaque averse. C'est pourquoi les bassins secs ne sont pas recommandés pour le contrôle de la qualité de l'eau.
	iii) Y avait-il une option qui n'exigeait pas la construction d'un bassin?	L'étude sur la modernisation des installations de gestion des eaux pluviales de 2011 comportait un scénario sans bassin ni installation de point de rejet, mais il n'a pas été privilégié dans l'approche de la modernisation du sous-bassin hydrographique du ruisseau Pinecrest.
	iv) Il aurait fallu envisager l'option souterraine, qui réglerait bon nombre de problèmes	Une option souterraine présentant des avantages comparables à ceux du bassin projeté coûterait beaucoup plus cher à construire et à entretenir, et n'est pas considérée comme pratique ou abordable dans notre contexte.

	v) L'étude sur la modernisation des installations de gestion des eaux pluviales a examiné des options autres qu'un bassin comme des citernes pluviales, des chaussées poreuses, etc. Ces options étaient parmi les plus intéressantes, et moins coûteuses – pourquoi n'ont-elles pas été envisagées?	D'autres mesures de modernisation ont aussi été envisagées, et elles seront mises en œuvre à mesure que la Ville reconstruit les rues et les installations municipales existantes. Cependant, il a été recommandé d'inclure le bassin projeté dans une solution globale qui comprend une série de mesures de modernisation.
	vi) Exemples de bassins existants semblables aux fins de comparaison	Voici des exemples de bassins existants semblables : • Bassin Corrigan – situé à l'ouest de la rivière Jock, à l'intersection de la rue Half Moon Bay et de la voie Tuscana (Barrhaven); • Bassin Todd (près du bassin Corrigan) – situé près du 2647, cercle Fallingwater (Barrhaven); • Bassin de l'installation environnementale Clarke-Bellinger – situé près du 129, promenade Leikin (ancienne ville de Nepean); • Bassin Strandherd – situé près du 3110, promenade Prince of Wales au nord de l'avenue Woodroffe. L'emplacement de l'ensemble de ces bassins est indiqué à la **figure 2** ci-jointe.
Fonctionnement du bassin dans différentes conditions; éléments conceptuels	i) La péninsule sera-t-elle submergée lors des précipitations abondantes?	Oui : la péninsule du côté sud sera inondée sous un maximum de 0,3 m lors des crues de récurrence de 100 ans, tandis que celle du côté nord ne sera pas submergée. Pendant les crues qui auront lieu plusieurs fois par année, le niveau d'eau n'atteindra que la crête de la péninsule sud (25 mm de pluie) ou moins (moins de 25 mm de pluie). Le passage pour piétons envisagé du bassin ne sera pas inondé lors des crues de récurrence de 100 ans.
	ii) Quelle sera la profondeur maximale du bassin?	Par temps sec, la profondeur maximale du bassin sera de 3 m, dans le bassin d'admission près de la prise d'eau. La profondeur en permanence ailleurs dans le bassin sera d'environ 1,5 m.

		Pendant les crues de récurrence de 100 ans, la profondeur maximale augmentera à 4,25 m, puis baissera sous l'effet du drainage à un niveau permanent de 1,5 à 3 m en trois ou quatre jours. Au cours des crues plus fréquentes (de 25 mm de pluie et moins) qui auront lieu chaque année, la profondeur maximale augmentera à environ 4 m, puis baissera sous l'effet du drainage à un niveau permanent de 1,5 à 3 m en deux ou trois jours. La **figure 1** ci-jointe illustre ces niveaux d'eau.
	Quelle sera la hauteur des talus paysagés projetés?	La taille des talus a considérablement été réduite pour des raisons d'esthétisme et d'uniformité avec le territoire au nord d'Iris. Sous réserve des coûts d'excavation et d'élimination, la conception détaillée pourrait prévoir quelques talus.
Entretien du bassin	i) Entretien déficient du bassin	Toutes les installations de gestion des eaux pluviales détenues et gérées par la Ville (plus de 100 bassins avec retenue permanente) font l'objet d'un entretien régulier visant à assurer leur bon fonctionnement et à régler les problèmes dès qu'ils surviennent. Chaque bassin est régi par une autorisation environnementale (AE) du ministère de l'Environnement et de l'Action en matière de changement climatique de l'Ontario qui impose des inspections et des entretiens réguliers. Les coûts de fonctionnement et d'entretien permanents de toutes les installations de gestion des eaux pluviales de la Ville sont consignés et prévus au budget chaque année. Ils sont pris en compte dans les redevances d'eaux pluviales et continuerons de l'être.
	ii) Fréquence de dragage des sédiments accumulés dans le bassin	Les sédiments devront être dragués environ une fois tous les 10 ans. Le dragage, à l'aide d'une excavatrice, durera environ une semaine et aura probablement lieu en hiver. Les résidents recevront un préavis les informant de ces travaux.
	iii) Les promeneurs de chien ne ramassent pas les excréments de leur animal de compagnie; application du règlement, amélioration de la	Les possibilités d'amélioration de la signalisation et de l'application du règlement seront examinées avec la CCN.

	signalisation et mise à la disposition de sacs sur place iv) Gestion des animaux présents dans le bassin au moment du dragage v) Diminution de la valeur des propriétés	 Avant le dragage, on devra confirmer si des poissons sont présents dans le bassin; il pourrait être nécessaire de les sortir. Tous les règlements en vigueur au moment du dragage seront respectés. Des installations semblables existent dans des aménagements plus récents de la ville, et elles sont toujours populaires et bien utilisées par les résidents. L'intégration d'éléments conceptuels et d'un aménagement paysager créant un espace communautaire attirant et joli sera l'une des priorités de la conception détaillée.
Visée et efficacité du bassin	i) Pertinence de la construction du bassin de rétention des eaux pluviales si son effet sur le débit est de seulement 10 % ii) Avantages à long terme du bassin remis en question à cause des changements climatiques	À l'origine, la construction du bassin a été recommandée pour améliorer la qualité du ruissellement à partir de la zone de captage des eaux et diminuer l'érosion en aval. D'importants avantages peuvent être apportés au ruisseau en stockant l'eau et la faisant ruisseler plus lentement que lors des petits épisodes de pluie très fréquents pour lesquels le bassin a été conçu. Le ruisseau entraîne également des risques d'inondation, particulièrement où il était fermé (canalisation) tout juste au sud de l'avenue Carling. Cette canalisation a été installée durant les années soixante et a entraîné un risque relativement élevé d'inondation pour la promenade Sir-John-A.-Macdonald. Bien que le bassin ne puisse être élargi suffisamment pour éliminer les risques d'inondation à cet endroit, il pourra tout de même les atténuer en cas de précipitations abondantes. Le bassin apportera des avantages considérables, peu importe les effets qu'entraîneront les changements climatiques. Cette affirmation se confirme par la comparaison desdits avantages (amélioration de la qualité de l'eau, diminution de l'érosion et contrôle limité des inondations) à la situation actuelle où l'eau pluviale non traitée d'une zone étendue (environ 435 hectares) ruisselle librement et se déverse directement

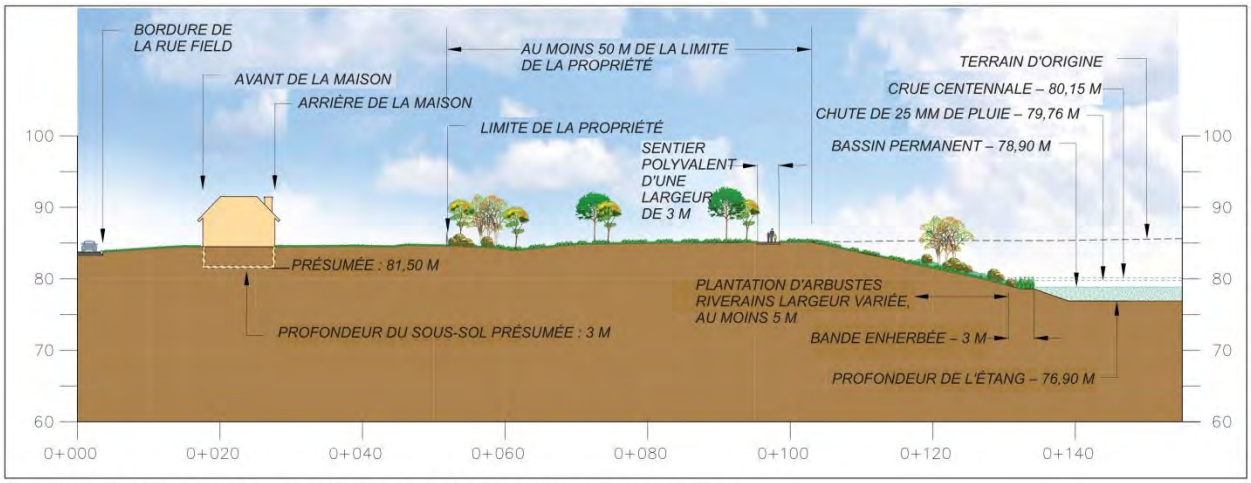
		dans le ruisseau Pinecrest. Même avec les changements climatiques, le bassin continuera de traiter l'eau et de réduire le débit pour une grande partie des épisodes de pluie. Ce faisant, les conditions du ruisseau seront meilleures que celles d'aujourd'hui.
	iii) Efficacité des effets et des avantages du bassin en aval; seulement un des principaux égouts pluviaux sera avantagé et non les autres égouts pluviaux en aval	Le bassin proposé n'est qu'une partie de la solution à long terme pour le sous-bassin hydrographique du ruisseau Pinecrest et le secteur adjacent de Westboro. Ce bassin n'est pas le point final à la solution, mais plutôt le premier investissement majeur visant à mitiger les effets de longue date du ruissellement libre aux abords du ruisseau Pinecrest et de la section locale de la rivière des Outaouais. D'autres modernisations seront effectuées pour mitiger davantage les effets du ruissellement pour les autres égouts pluviaux en aval. Ces modernisations ont été recommandées en plus du bassin; elles ne constituent pas une solution de rechange.
	iv) Diminution de l'érosion dans le ruisseau Pinecrest; nouvel itinéraire de l'eau	Le ruissellement libre de quelque 435 hectares de terrain se déverse dans le ruisseau à partir de l'égout pluvial qui débouche près du coin nord-est de l'intersection du chemin Baseline et de l'avenue Woodroffe. Le ruissellement continuera de se rendre au même endroit, mais l'eau sera d'abord stockée dans le bassin, puis relâchée doucement pour diminuer les effets de l'érosion.
	v) Propriétés autres qui devraient prendre plus de responsabilités (Collège Algonquin, College Square)	La Ville et le Collège Algonquin collaborent activement à la mise en œuvre d'une stratégie de gestion des eaux, particulièrement pour orienter le plan de gestion des eaux pluviales du campus.
	vi) Quelles sont les répercussions si le bassin n'est pas construit?	Si la construction du bassin ne va pas de l'avant, la zone continuera de se drainer comme elle le fait actuellement. Par contre, la qualité de l'eau dans le ruisseau ne sera pas meilleure, l'érosion ne diminuera pas et les risques d'inondation ne seront pas du tout atténués. De plus, les mesures de gestion des eaux pluviales à mettre en place pendant les travaux de l'étape deux du projet de train léger à la station Baseline devront être revues. Le bassin est une exigence importante

		dans le cadre de la construction de la station Baseline. Les eaux pluviales provenant de la station ne peuvent pas ruisseler et se déverser directement dans le ruisseau Pinecrest sans l'atténuation des risques d'inondation et des effets de l'érosion que procurera le bassin.
	vii) Bassin proposé dans un quartier déjà aménagé; construction du bassin pour répondre aux besoins du projet de transport en commun et de l'intensification au détriment du quartier; crainte d'expansion du bassin dans le futur	Le bassin proposé a d'abord été présenté comme un projet de modernisation indépendant de tout autre projet de la Ville. Toutefois, après l'étude sur la modernisation de 2011, le personnel de la Ville se demandait si la CCN accepterait que les effets sur le ruissellement qu'entraîneraient les travaux proposés à la station Baseline soient atténués par un bassin en amont plutôt que par des moyens de gestion des eaux pluviales sur le site même, où les restrictions sont très importantes. En plus de fournir à la CCN un concept plus élaboré que le bassin proposé dans l'étude sur la modernisation de 2011, l'étude de faisabilité a confirmé que les avantages potentiels du bassin viendraient contrer les effets des travaux de la station Baseline sur le ruissellement pendant l'étape deux du projet de train léger. Même sans la mise en place du bassin, un réaménagement de la zone de captage des eaux sera requis pour mettre en œuvre des moyens de gestion des eaux pluviales qui répondent aux exigences actuelles de la Ville. Le bassin n'est pas conçu en vue d'un élargissement futur. D'ailleurs, il ne serait pas possible de le faire en raison de diverses restrictions et du manque d'espace.
	viii) Lien avec l'étape deux du projet de train léger	La construction du bassin sera intégrée à l'Étape 2 du projet de train léger pour que l'échéancier respecte celui des travaux à la station Baseline.
	ix) Les bassins de gestion des eaux pluviales sont désuets et ont fait leur temps; la Fédération canadienne des municipalités ne recommande pas de mettre en place des installations de	Malgré l'évolution constante de la gestion des eaux pluviales, les bassins avec retenue permanente demeurent un moyen efficace et très utilisé pour atténuer les effets du ruissellement urbain sur les cours d'eau. Cela étant, la Ville entreprend aussi la mise en œuvre d'autres moyens d'atténuation.

	gestions des eaux pluviales au bout de canalisations, et l'InfraGuide recommande des méthodes de gestion écologique des eaux pluviales (GEP) et des réservoirs de stockage souterrains	Un projet pilote de biorétention (ou « jardin de pluie ») a récemment été mis en œuvre sur l'avenue Sunnyside dans le Vieil Ottawa-Sud et sur la rue Stewart dans la Côte-de-Sable. Voici des mesures supplémentaires pour le sous-bassin hydrographique du ruisseau Pinecrest : • Voie Hemmingwood : Plusieurs éléments de biorétention sont proposés conjointement aux mesures de gestion de la circulation locale à venir. Ces éléments sont en conception et seront construits en 2018. • Sensibilisation : Une initiative de sensibilisation sera lancée cette année pour informer les résidents sur la gestion des eaux pluviales et encourager les propriétaires à prendre des moyens pour réduire le ruissellement provenant de leur propriété. L'InfraGuide dit que les bassins avec retenue permanente *« sont plus ou moins recommandés pour les projets de modernisation et ils ne sont habituellement pas du tout recommandés dans le cas des projets réalisés sur terrain intercalaire, en raison des superficies de terrain et de drainage nécessaires comparativement importantes (habituellement > 5 ha pour permettre une durabilité et un renversement adéquats). »* Dans le cas qui nous intéresse, la zone de drainage est très étendue, environ 435 ha, ce qui est suffisant pour y construire un bassin qui apporterait des avantages considérables en aval.
Processus d'approbation de la CCN	La CCN a-t-elle officiellement approuvé le projet? Approbation du conseil d'administration de la CCN requise	CCN a indiqué que la Direction de l'aménagement de la capitale examine le projet de bassin, qui doit aussi recevoir les approbations fédérales et environnementales. La conception est à la deuxième phase d'examen. Les projets qui en sont à cette phase sont examinés par un groupe de travail interfonctionnel composé d'employés de la CCN, puis présentés à un comité de révision interne – ce qui a été fait. Une fois la conception revue et corrigée selon les exigences de la CCN, le projet est envoyé à un comité exécutif du conseil d'administration de la CCN pour être soumis à un

		vote électronique. Après l'approbation du conseil, le directeur général de la Commission de la capitale nationale signe l'approbation. La Ville continue de travailler en étroite collaboration avec la CCN sur le bassin proposé.

Figure 1 – Niveaux d'eau dans le bassin proposé



COUPE TRANSVERSALE TYPIQUE DU BASSIN PRÈS DE LA RUE FIELD

Figure 2. Examples of Similar Stormwater Management Ponds
Figure 2. Exemples de bassins de rétention des eaux pluviales existants
Bassin Clarke Pond
Located near 129 Leikin Drive
Situé près de 129 promenade Leikin
Bassin Strandherd Pond
Located near 3110 Prince of Wales
Situé près de 3110 promenade Prince of Wales
Bassin Corrigan Pond
Located on Half Moon Bay Road at Tuscana Way
Situé sur le chemin Half Moon Bay, proche du chemin Tuscana
Bassin Todd Pond
Located near 2647 Fallingwater Circle
Situé près de 2647 Cercle Fallingwater
ch. Fallowfield Rd.
prom. Longfields Dr.
prom. Leikin Dr.
ch. Merivale Rd.
ch. River Rd.
ch. Leitrim Rd.
prom. Longfields Dr.
av. Woodroffe Ave.
prom. Crestway Dr.
prom. Prince Of Wales Dr.
ch. River Rd.
ch. Spratt Rd.
prom. Strandherd Dr.
prom. Chapman Mills Dr.
ch. Greenbank Rd.
ch. River Rd.
ch. Earl Armstrong Rd.
prom. Prince Of Wales Dr.
prom. Paul Métivier Dr.
ch. Jockvale Rd.
prom. Longfields Dr.
ch. Greenbank Rd.
prom. Longfields Dr.
ch. Cambrian Rd.
ch. Rideau Rd.
0 0.25 0.5 1
Kilometers

Baseline and Woodroffe Stormwater Management Pond Environmental Assessment Study /
Bassin de gestion des eaux pluviales de Baseline et Woodroffe évaluation environnementale
Public Meeting / *Séance publique*
Monday January 9, 2017 / *Lundi le 9 janvier, 2017*

Thank you for taking the time to provide your feedback. Responses from interested parties will help to refine the design of the Baseline/Woodroffe Stormwater Management (SWM) Pond.
Merci de prendre le temps de nous faire part de vos commentaires. Les réponses des parties intéressées nous aideront à affiner la conception de l'installation de gestion des eaux pluviales Baseline et Woodroffe.

Question 1: Do you have any concerns with respect to the options considered for the SWM Pond? / *Avez-vous des préoccupations en ce qui concerne les options envisagées pour l'installation de gestion des eaux pluviales?*
□ No, I do not have any concerns. / *Non, je n'ai aucune préoccupation.*
□ Yes, I have these concerns: / *Oui, j'ai certaines préoccupations :*

Question 2: Do you have any concerns with respect to drainage or landscaping, around the Facility? / *Avez-vous des préoccupations au sujet du drainage ou de l'aménagement paysager autour de l'installation?*
□ No, I do not have any concerns. / *Non, je n'ai aucune préoccupation.*
□ Yes, I have these concerns: / *Oui, j'ai certaines préoccupations :*

Question 3: When completed, pedestrian pathways will be incorporated and connected to the City of Ottawa pathway and NCC Capital Pathway networks. Do you have concerns with these connections? / *Une fois le projet terminé, les sentiers piétonniers seront incorporés et reliés aux réseaux des sentiers de la Ville d'Ottawa et de la NCC. Avez-vous des préoccupations en ce qui concerne ces liens?*
□ No, I do not have concerns with the pathway connections. / *Non, je n'ai aucune préoccupation en ce qui concerne ces liens.*
□ Yes, I have these concerns: / *Oui, j'ai certaines préoccupations :*

Question 4: What is important to you? Rank the following (1 = very important to me, 5 = not important to me): / *Qu'est-ce qui est important pour vous? Classez les considérations suivantes par ordre de priorité (1 = très important pour moi, 5 = pas important pour moi) :*

Water quality improvements to Pinecrest Creek / *Améliorations de la qualité de l'eau du ruisseau Pinecrest*	
Attractiveness and visual appearance / *Attrait et aspect visuel*	
Creating a local public feature / *Création d'un attrait public local*	
Pathway access and safety / *Accès aux sentiers et sécurité*	
Improvements to local drainage / *Amélioration du drainage local*	
Increased property values / *Augmentation de la valeur des propriétés*	
Other (please specify): / *Autre (veuillez préciser) :*	

Question 5: Do you have any other comments, suggestions or concerns? / *Avez-vous d'autres commentaires, suggestions ou préoccupations?*

_____

_____

_____

_____

_____

_____

_____

If you wish to be added to the project mailing list, please provide your contact information: / *Si vous souhaitez être ajouté à la liste de diffusion du projet, veuillez fournir vos coordonnées :*

Name / nom	**Telephone / téléphone**
Address / adresse	
City / ville	**Postal code / code postale**
Email / courriel	

Please submit your responses and any other comments about the project by **January 16, 2017**. The study team will review all comments and respond to any concerns or questions before the Class EA report is completed. / *Veuillez soumettre vos réponses et tout autre commentaire sur le projet d'ici le **16 janvier 2017**. L'équipe de l'étude examinera tous les commentaires et répondra aux préoccupations et questions avant que le rapport d'évaluation environnementale de portée générale ne soit terminé.*

Note: Personal information on this form is collected under the authority of the *Municipal Act,* 2001 S.O. 2001, C. 25 and will only be used by staff to review public feedback related to this project. The collection, use, and disclosure of your personal information is governed by the *Municipal Freedom of Information and Protection of Privacy Act,* R.S.O. 1990, c.M. 56. Questions about this collection and use should be directed to: /
Nota : Les renseignements personnels inscrits sur le présent formulaire sont recueillis en vertu de la Loi de 2001 sur les municipalités, L.O. 2001 ch. 25, et ne seront utilisés que par le personnel responsable d'examiner les commentaires reçus du public sur ce projet. La collecte, l'utilisation et la divulgation de vos renseignements personnels sont assujetties à la Loi sur l'accès à l'information municipale et la protection de la vie privée, R.S.O. 1990, c.M. 56. Veuillez acheminer toute question concernant la collecte et l'utilisation de données à :

Darlene Conway, P.Eng / *ing.*
Senior Project Manager / *Gestionnaire de projet principal*
City of Ottawa / *Ville d'Ottawa*
110 Laurier Avenue West / *110, avenue Laurier Ouest*
Ottawa, ON, K1P 1J1
Phone / *Téléphone* : 613-580-2424, ext. / *poste* 27611
Fax / *télécopieur* : 613-580-2578
Email / *courriel* : Darlene.Conway@ottawa.ca

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ottawa.ca
3-1-1
ATS 613-580-2401

RÉUNION D'INFORMATION

Bassin de gestion des eaux pluviales à l'angle Baseline-Woodroffe
Évaluation environnementale municipale de portée générale et conception fonctionnelle

Le 17 mai 2017
De 18 h à 21 h, présentation à 19 h
École secondaire St-Paul
2675, avenue Draper

En assistant à cette réunion d'information, les résidents pourront découvrir comment la Ville entend donner suite à leurs préoccupations entourant la conception et la construction du bassin de gestion des eaux pluviales proposé. Ils pourront poser des questions aux employés et aux experts en la matière présents, et en apprendre un peu plus sur les étapes à venir. Cette séance constitue la dernière phase du processus de participation du public mené pour ce projet.

Les participants pourront également obtenir de l'information sur le contexte du projet, sur les conditions actuelles observées sur l'emplacement et sur les diverses options de conception du bassin.

La Ville d'Ottawa a entrepris une évaluation environnementale (ÉE) municipale de portée générale concernant l'aménagement d'un bassin de gestion des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude sur la rénovation de l'installation de gestion des eaux pluviales du ruisseau Pinecrest-Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015). Le bassin proposé contribuera à améliorer la qualité de l'eau et la régulation du débit des eaux de ruissellement sur les quelque 435 hectares de terrain qui se déversent de manière incontrôlée dans le ruisseau Pinecrest.

L'étude, menée conformément à l'annexe B de l'ÉE municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour ce projet.

L'accessibilité est une considération importante pour la Ville d'Ottawa. Si vous avez besoin d'un hébergement spécialisé, veuillez envoyer votre demande avant le 15 mai 2017. Pour obtenir plus d'information, consultez **ottawa.ca/baselinewoodroffbassin**.

Si vous souhaitez que votre nom soit ajouté à la liste d'envoi ou si vous avez d'autres questions, communiquez avec :

Darlene Conway, P.Eng
Gestionnaire principale de projet/gestion des biens
Ville d'Ottawa
Tél. : 613-580-2424, poste 27611
Courriel : darlene.conway@ottawa.ca

Nº Pub 2017-501-S_Baseline Woodroffe Stormwater Pond_11052017

Canada's best in robotics on display at Aviation museum

Kanata-based NEPTEC shows off Juno rover at conference

BY MICHELLE NASH BAKER
michelle.nash@metroland.com

Measuring the scope of an iceberg to roaming along the moon — the latest in Canadian robotics was on display, and available for play at the Canadian Aviation and Space Museum.

The NSERC Canadian Field Robotics Network held a Canadian-made robotics conference at the museum, 11 Aviation Pkwy. on May 4.

The conference welcomed scientists and engineers from across Canada to showcase the latest in robotics in the country.

Kanata-based space flight engineering company NEPTEC, which had partnered with NCFRN for the conference, had its latest project, a lunar exploration vehicle, on display.

Software manager Jason Muise and Brad Jones explained that their rover, Juno, offers a new type of technology that scans 360 degrees continuously in one spot.

The rover, a large-scale prototype, also allows for additional equipment, such as arms and other functional additions to be added, depending on a space agency's needs Jones added.

Alan Do-Omri wheeled around the conference in a self-driving wheelchair, which gives users the opportunity to map and remember locations.

The goal, Do-Omri said, is to allow users better navigation in tight spots.

"This is a machine that can help people who are using power wheelchairs navigate without requiring to control the chair," he said.

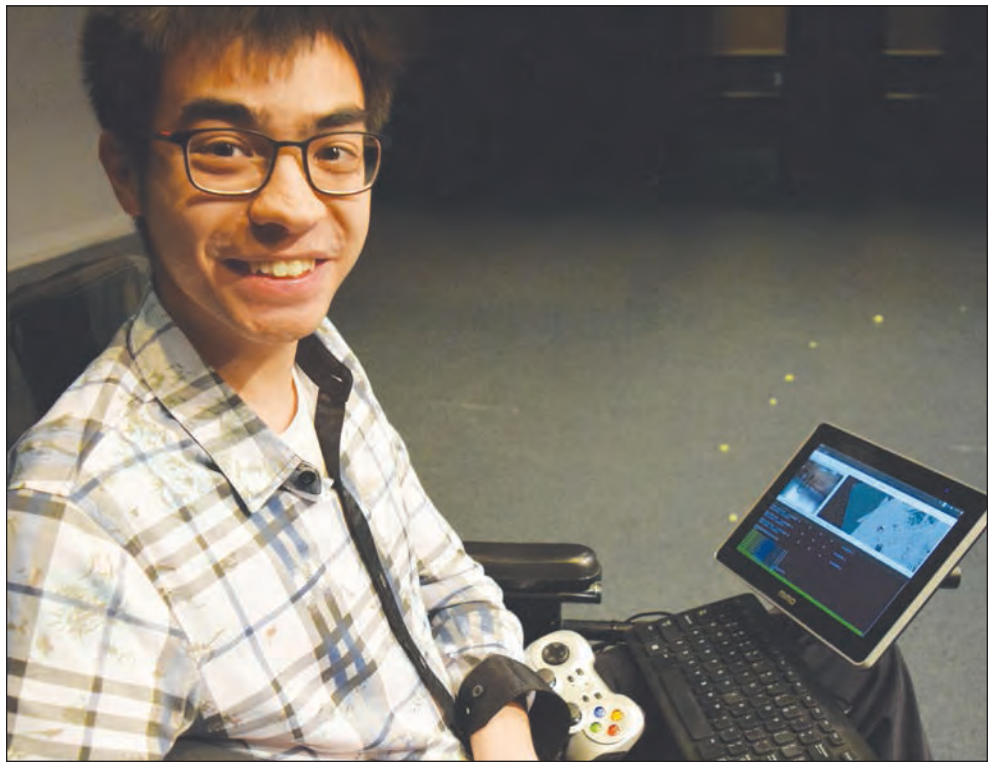
Do-Omri noted artificial intelligence such as the power wheelchair is a great tool if it's used right, adding it can help a lot of people.

There were 20 different projects on display at the museum, as well as drone demonstrations at the Rockcliffe Flying Club.

According to Greg Dudek, professor at McGill University and scientific director of Robotics Field Network, this conference offers the opportunity to see the latest innovations in four different themes; land, air, water and human interaction.

Since the network was established in 2012, the NCFRN has funded the work of 180 researchers across the country, working with dozens of Canadian robotics companies and startups.

To date, the organization has supported 100 different research projects.



Michelle Nash Baker/Metroland

Alan Do-Omri, a masters students at McGill University, shows off the Smart Wheeler - a self-driving wheelchair that avoids crowds and obstacles at the Canadian-made robotics conference at the Canada Aviation and Space Museum on May 4.

Michelle Nash Baker/Metroland

Jason Muise and Brad Jones from Kanata-based Neptec take a break on the Juno rover - a federally funded lunar exploration prototype vehicle at the Canadian-made robotics conference.

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Information Session
Baseline and Woodroffe Stormwater Management Pond
Municipal Class Environmental Assessment and Functional Design

May 17, 2017
6 to 9 p.m. Presentation at 7 p.m.
St. Paul High School
2675 Draper Avenue

By attending this information session, residents will be updated on how the City will address the community's concerns related to the design and construction of the proposed stormwater management pond. Residents will be able to ask questions of staff and subject matter experts and hear more about the project's next steps. This session is the last step in the public engagement process for this project.

Information about the project's background, existing conditions on the site, and pond alternatives will also be available at the meeting.

The City of Ottawa has initiated this Municipal Class Environmental Assessment (Class EA) for a proposed stormwater management pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).The proposed pond will provide water quality treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The study process is following the requirements of a Schedule B project under the Municipal Class EA and has identified a preferred alternative and functional design for the proposed pond.

Accessibility is an important consideration for the City of Ottawa. If you require special accessibility accommodation, please email your request before May 15, 2017.
For more information, visit **ottawa.ca/baselinewoodroffepond.**

If you wish to have your name added to the mailing list or ask further questions, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
Tel.: 613-580-2424, ext. 27611
Email: darlene.conway@ottawa.ca

Ad # 2017-501-S_Baseline Woodroffe Stormwater Pond_11052017

From:	Conway, Darlene
To:	Conway, Darlene
Subject:	FW: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l"intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017
Date:	Wednesday, May 17, 2017 3:22:37 PM
Attachments:	BW pond POH flyer_May 17bil FINAL.pdf

From: Conway, Darlene
Sent: Thursday, May 04, 2017 4:58 PM
Subject: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017

Hello/Bonjour,
Thanks again to all who have provided comments to date about the proposed pond.
A public meeting will be held on **May 17, 2017 from 6:00pm to 9:00pm at St. Paul High School, 2675 Draper Avenue** (see attached for further details). A presentation will be provided at 7pm, followed by a Question and Answer session.
More information about the project can be viewed at: Ottawa.ca/baselinewoodroffepond
Two background studies can be viewed at: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
In the mean time, if you have any additional comments or concerns, please do not hesitate to contact me.
Merci à tous ceux qui nous ont fait part de leurs commentaires concernant le bassin de gestion des eaux pluviales de Baseline et Woodroffe.
Une séance publique sera tenue **le 17 mai 2017, de 18h00 à 21h00 à l'École Secondaire St. Paul, 2675 avenue Draper** (voir ci-joint pour plus de détails). Une présentation concernant le bassin de rétention aura lieu à 19h, suivi d'une période de question et réponse.
Pour en savoir plus sur le projet, visitez: Ottawa.ca/bassinderetentionbaselinewoodroffe
Deux études de fond peuvent être consultées en cliquant sur le lien suivant:
http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html
Dans l'intervalle, n'hésitez pas à me contacter si vous avez des questions ou quelconque préoccupation.
Regards/Salutations,
DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27611
ottawa.ca/planning / ottawa.ca/urbanisme

From:	Conway, Darlene
To:	"evelyn.liu@rvca.ca"; "jamie.batchelor@rvca.ca"; Jolliet, Laurent; Polkinghorne, Ryan; Robinson, Julia; Tousignant, Eric; O"Connor, Susan; "arto.keklikian@ncc-ccn.ca"; "michael.muir@ncc-ccn.ca"; Siddique, Jabbar; "charles.goulet@ontario.ca"; Edwards, Nelson; Colin P. Brennan; Kelly Roberts; Eric Emery; Rogers, Christopher; "juan.galindez@ncc-ccn.ca"; "jbeebe@geoprocessresearch.com"; "binitha.chakraburtty@ncc-ccn.ca"; Elie Dagher; Marc Magierowicz; "Barakengera, Martin"; Strang, Benjamin; Karine Bertrand; Murphy, Elizabeth; Sarah MacKelvie; James Fookes; Charles Wheeler; Karyn Cornfield; "Jason Hutchison"; Spal, Eva; Kukalis, John; Melanson, Chris J; Stow, Nick
Subject:	FW: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l"intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017
Date:	Monday, May 15, 2017 12:56:40 PM
Attachments:	AIWH BW-SWMPEA_final.pdf AIWH BW-SWMPEA_final_FR.pdf BW pond POH flyer_May 17bil FINAL.pdf

---

Hello all – FYI, a copy of the "As We Heard It" report is attached. This summary was prepared as part of the public consultation for the Class EA.

Regards,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27611
ottawa.ca/planning / ottawa.ca/urbanisme

From: Conway, Darlene
Sent: Monday, May 15, 2017 12:43 PM
Subject: RE: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017

Hello/Bonjour,

Attached please find a copy of the "As We Heard It" report.
Thanks to all who provided comments via the online information session (November 3, 2016 to January 16, 2017), the January 9, 2017 public meeting and through individual correspondence with City staff. A total of 98 responses to the online information session were received and 49 people signed in at the January public meeting.

All comments received have been summarized and responses provided in the attached report, including how the pond concept has been revised in response to these comments.

If you have any further questions or concerns, please join us at the Public Meeting this Wednesday evening, **May 17, 2017, 6:00pm to 9:00pm at St. Paul High School, 2675 Draper Avenue** (see

attached for further details).

Ci-joint, veuillez trouver une copie du rapport « Ce qui a été dit. »
Merci à tous ceux qui ont fait part de leurs commentaires à la séance d'information en ligne (du 3 novembre 2016 au 16 janvier 2017) et à la réunion publique du 9 janvier 2017, ainsi que par correspondance individuelle avec le personnel de la Ville. Nous avons reçu 98 réponses lors de la séance d'information, et 49 personnes ont participé à la réunion publique en janvier.

Tous les commentaires ont été résumés, et les réponses indiquées, avec la nouvelle définition d'un bassin qui en découle.

Pour toute autre question, nous vous invitons à la réunion publique qui aura lieu le mercredi soir **17 mai 2017, de 18h00 à 21h00 à l'École Secondaire St. Paul, 2675 avenue Draper** (voir ci-joint pour plus de détails).

Regards/Salutations,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

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From: Conway, Darlene
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Subject: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017

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Pour en savoir plus sur le projet, visitez: Ottawa.ca/bassinderetentionbaselinewoodroffe
Deux études de fond peuvent être consultées en cliquant sur le lien suivant:
http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

Dans l'intervalle, n'hésitez pas à me contacter si vous avez des questions ou quelconque préoccupation.

Regards/Salutations,

DEC

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une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

Information Session

Baseline and Woodroffe Stormwater Management Pond
Municipal Class Environmental Assessment and Functional Design

May 17, 2017
6:00 to 9:00p.m. Presentation at 7 p.m.
St. Paul High School
2675 Draper Avenue

By attending this information session, residents will be updated on how the City will address the community's concerns related to the design and construction of the proposed stormwater management pond. Residents will be able to ask questions of staff and subject matter experts and hear more about the project's next steps. This session is the last step in the public engagement process for this project.

The City of Ottawa has initiated this Municipal Class Environmental Assessment (Class EA) for a proposed stormwater management pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).The proposed pond will provide water quality treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The study process is following the requirements of a Schedule B project under the Municipal Class EA and has identified a preferred alternative and functional design for the proposed pond.

For more information visit **ottawa.ca/baselinewoodroffepond**

Accessibility is an important consideration for the City of Ottawa. If you require special accessibility accommodation, please email your request before May 12, 2017. If you wish to have your name added to the mailing list or ask further questions, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
City of Ottawa
e-mail darlene.conway@ottawa.ca
613-580-2424 ext. 27611

Avis de réunion publique

Bassin de rétention des eaux pluviales à l'angle du chemin Baseline et de l'avenue Woodroffe
Évaluation environnementale municipale de portée générale et conception fonctionnelle

Le 17 mai 2017
de 18h00 à 21h00 – Présentation à 19h
École Secondaire St. Paul
2675 avenue Draper

En assistant à cette séance d'information, les résidents pourront en apprendre un peu plus sur la manière dont la Ville tiendra compte des préoccupations de la collectivité entourant la conception et la construction du bassin de rétention des eaux pluviales proposé. Ils pourront poser des questions aux employés et aux experts présents, et en savoir davantage sur les prochaines étapes de ce projet. Cette réunion constitue la dernière étape du processus de participation du public mis en place pour ce projet.

La Ville d'Ottawa a entrepris une évaluation environnementale (ÉE) municipale de portée générale concernant l'aménagement d'un bassin de rétention des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude sur la rénovation de l'installation de gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015). Le bassin proposé assurera le traitement et la régulation des eaux de ruissellement provenant de quelque 435 hectares qui s'écoulent actuellement d'une manière incontrôlée vers le ruisseau Pinecrest.

L'étude sur l'aménagement du bassin, conformément à l'annexe B de l'ÉE municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

Pour obtenir plus d'information à ce sujet, consultez ottawa.ca/bassinderetentionbaselinewoodroffe.

La Ville d'Ottawa accorde une grande importance à l'accessibilité. Si vous avez besoin de mesures d'accessibilité particulières, veuillez nous en faire part par courriel avant le 12 mai 2017. Si vous souhaitez que votre nom soit ajouté à la liste d'envoi, ou si vous avez d'autres questions, communiquez avec la personne-ressource suivante :

Darlene Conway, P. Eng.
Gestionnaire principale de projet, Gestion des biens
Ville d'Ottawa
Courriel : Darlene.Conway@ottawa.ca
Téléphone : 613-580-2424, poste 27611

Flood recovery information (http://ottawa.ca/en/residents/older-adults/safety/emergency-preparedness/emergency-notifications-flooding-information)

Baseline/Woodroffe Stormwater Management Pond Municipal Class Environmental Assessment and Functional Design

Notice of study commencement

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed Stormwater Management Facility at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).

Location of proposed stormwater mangement pond [PDF 3.57 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/pond_map_en.pdf)

The Process

The study is being planned under Schedule B of the Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011, and 2015). In order to satisfy the requirements of the Class EA process, alternatives of the stormwater management pond will be confirmed, assessed and the process documented, considering the work already undertaken. The Class EA will identify a preferred alternative and functional design for the pond.

Consultation

Interested persons can provide comments at any time during the Class EA process. There will be opportunity for feedback through the City of Ottawa's website, ottawa.ca/baselinewoodroffepond. With the exception of personal information, comments received become part of the public record.

Information Session - May 17, 2017

May 17, 2017
6 to 9:00 p.m. Presentation at 7 p.m.
St. Paul High School
2675 Draper Avenue

By attending this information session, residents will be updated on how the City will address the community's concerns related to the design and construction of the proposed stormwater management pond. Residents will be able to ask questions of staff and subject matter experts and hear more about the project's next steps. This session is the last step in the public engagement process for this project.

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The study process is following the requirements of a Schedule B project under the Municipal Class EA and has identified a preferred alternative and functional design for the proposed pond.

Accessibility is an important consideration for the City of Ottawa. If you require special accessibility accommodation, please email your request before May 15, 2017. If you wish to have your name added to the mailing list or ask further questions, please contact:

Darlene Conway, P. Eng.
Senior Project Manager / Asset Management
e-mail: darlene.conway@ottawa.ca (mailto:darlene.conway@ottawa.ca)
613-580-2424 ext. 27611

Notice of online information session

November 3, 2016 to January 16, 2017

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed Stormwater Management Pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).

The proposed pond will provide treatment and flow control for runoff from some 435 hectares that currently drains uncontrolled to Pinecrest Creek.

The pond is being planned under Schedule B of the Municipal Class Environmental Assessment and will identify a preferred alternative and functional design for the pond.

The questionnaire is now closed. The City would like to thank everyone who participated in the questionnaire. The study team will review all comments and respond to any concerns or questions before the Class EA report is completed.

Online consultation - feedback questionnaire

Have your say!

The questionnaire is now closed. The City would like to thank everyone who participated in the questionnaire. The study team will review all comments and respond to any concerns or questions before the Class EA report is completed.

Existing conditions and constraints

The following aspects of the site were studied:

- Subsurface conditions (bedrock, surficial geology, groundwater)
- Environmental contamination
- Watercourses
- Fluvial geomorphology
- Fish and aquatic habitat
- Wetlands and Areas of Natural and Scientific Interest (ANSI)
- Natural terrestrial vegetation
- Wildlife and habitat
- Species at risk and critical habitat
- Aboriginal land claims
- Cultural heritage/archaeology
- Public land ownership
- Existing land use
- Infrastructure networks
- Recreation and pedestrian/cycling routes

Drainage map [PDF 1.284 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/base_wood_drainage_en.pdf)

One of three landscape zones identified in the Study Area is considered. Hay fields evolved into what is now grassy meadow with woody vegetation seeding from the surrounding residential development. (City of Ottawa, 2015)

The existing conditions have been assessed and constraints and opportunities identified. The constraints and opportunities were then considered in developing and evaluating the options for the SWM pond and will influence its final design and construction.

An isolated Butternut tree along the northern edge of the site is the only species at risk verified by field studies to date. (City of Ottawa, 2015)

Constraints and Opportunities map [PDF 1.444 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/base_wood_const_opps_en.pdf)

Options

In the 2011 Retrofit Study, three types of stormwater management measures were considered in the development of the SWM retrofit scenarios:

1. Public and private lot level measures
2. Conveyance measures
3. End-of-pipe facilities

These measures were based on an analysis of the study area characteristics and the study objectives. The 2011 Retrofit Study recommended that an end-of pipe facility (SWM pond) be built on National Capital Commission (NCC) property at the northeast corner of Baseline Road and Woodroffe Avenue.

Through the 2015 Feasibility Study, the specifications and requirements for the proposed SWM pond were refined and two conceptual designs (Option 1 and Option 2) were developed and evaluated. The NCC reviewed the options and chose Option 1 as its preferred design.

Option 1 [PDF 2.080 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/base_wood_pond_option1_en.pdf)

Option 2 [PDF 2.266 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/base_wood_pond_option2_en.pdf)

Both pond options:

- Maximize water quality and flood control benefits within the space available
- Minimize negative impacts on adjacent residents
- Mitigate frequent flow impacts on Pinecrest Creek
- Integrate pathways

The Baseline/W oodroffe SWM pond will be designed and built in accordance with best management practices for:

- Erosion and sediment control
- Noise By-Law adherence
- Spill control measures
- Post-construction monitoring

In addition to implementing best management practices, the following site-specific mitigation measures will be incorporated in the detailed design and construction to reduce or eliminate potential negative effects:

- Detailed geotechnical investigations
- Landscaping plan
- Public communications plan
- Pedestrian detour / management plan
- Traffic management plan
- Hoarding and exclusionary fencing

Reach 6 of Pinecrest Creek within the Study Area, parallel to Baseline Road. While erosion is occurring along the eastern bank of this section of the creek for approximately 25 metres, the remainder of Reach 6 is well vegetated and stable, with no erosion, as shown in this photo. (City of Ottawa, 2015)

Next steps

- Choose the preferred option (fall 2016)
- Prepare the Class EA report (fall 2016)
- Environment Committee and City Council approvals (winter 2016)
- 30-day public review of Class EA Report (winter 2016/early 2017)
- Detailed design (2017)
- Begin construction (2018/2019)

For further information or to provide comments, please contact:

Darlene Conway, P.Eng.
Senior Project Manager
City of Ottawa
110 Laurier Avenue West
Ottawa, ON, K1P 1J1
Phone: 613-580-2424, ext. 27611
Fax: 613-580-2578
Email: Darlene.Conway@ottawa.ca (mailto:Darlene.Conway@ottawa.ca)
ottawa.ca/baselinewoodroffepond

Notice of Public Meeting - January 9, 2017

January 9, 2017
6:30 to 8:30 p.m. – Presentation at 7 p.m.
Ben Franklin Place
101 Centrepointe Drive

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed stormwater management pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface

Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).The proposed pond will provide water quality treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek.

The study process is following the requirements of a Schedule B project under the Municipal Class and will identify a preferred alternative and functional design for the proposed pond.

At the meeting, a presentation will be provided covering the background to the project, existing conditions on the site, pond alternatives, and the preliminary preferred alternative. City staff and the study team will be on hand to answer questions and receive comments.

Open House Display Boards 1 [PDF 409 KB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards1_en.pdf)
Open House Display Boards 2 [PDF 753 KB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards2_en.pdf)
Open House Display Boards 3 [PDF 759 KB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards3_en.pdf)
Open House Display Boards 4 [PDF 1.636 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards4_en.pdf)
Open House Display Boards 5 [PDF 1.320 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards5_en.pdf)
Open House Display Boards 6 [PDF 1.563 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards6_en.pdf)
Open House Display Boards 7 [PDF 408 KB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards7_en.pdf)
Open House Display Boards 8 [PDF 1.691 MB] (https://documents.ottawa.ca/sites/documents.ottawa.ca/files/baseline_woodroffe_boards8_en.pdf)

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613-580-2424 ext. 27611

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Baseline and Woodroffe Stormwater Management Pond

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Get more detailed information on the project (http://ottawa.ca/en/city-hall/public-consultations/baseline-and-woodroffe-stormwater-management-pond-environmental)

Address:

St. Paul High School 2675 Draper Avenue
Ottawa, ON K2H 7A1

Date:

Wednesday, May 17, 2017 - 18:00

Phone:

613-580-2424 ext. 27611

Email:

darlene.conway@ottawa.ca (mailto:darlene.conway@ottawa.ca)

Type:

Event

Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment Study

Public Meeting
May 17, 2017

Agenda

Part A – Why a Pond and Why Here?

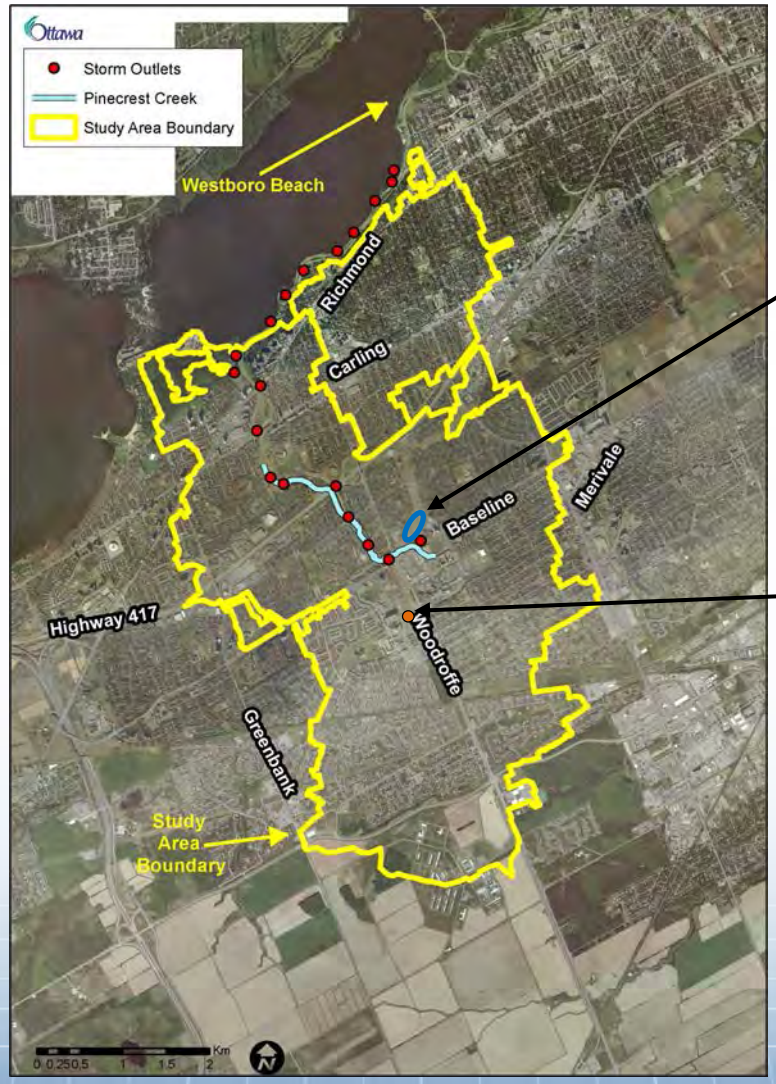
- Background….how we got here…need for a stormwater pond

Part B – Pond Options and Design Features

- Class EA Process
- Pond Options 1 and 2
- What we heard about pond design
- Refined Pond Option
- Next Steps

WHY A POND AND WHY HERE?

Context for Stormwater Pond



Proposed Pond

Baseline Station

Need for a Stormwater Pond

- Improved water quality and some reduced risk of flooding
- Slower release of water to creek which will reduce erosion during storm events
- Removal of suspended solids prior to discharge
- Baseline LRT station flows to creek not permitted without stormwater improvements
- Existing stormwater inlet at Baseline station NOT connected to Pinecrest Creek

Baseline/Woodroffe Stormwater Pond a MUST HAVE Project

- Funding agreement with Province signed in 2015, City/Province are co-sponsors
- As pond directly affects Baseline LRT station drainage, pond approvals, design and construction have been “bundled” with Stage 2 LRT
- Stage 2 LRT Project will control/implement pond to meet schedule for Baseline LRT station construction
- Stage 2 LRT Project also responsible for EA and NCC approvals
- Implementation of the pond is an LRT requirement

Prior City Studies (2009-11)

PINECREST CREEK/WESTBORO STORMWATER MANAGEMENT RETROFIT STUDY

OTTAWA, ON

FINAL REPORT

May 2011

Prepared for: Infrastructure Services & Community Sustainability, City of Ottawa

Prepared by: J.F. Sabourin & Associates Inc.

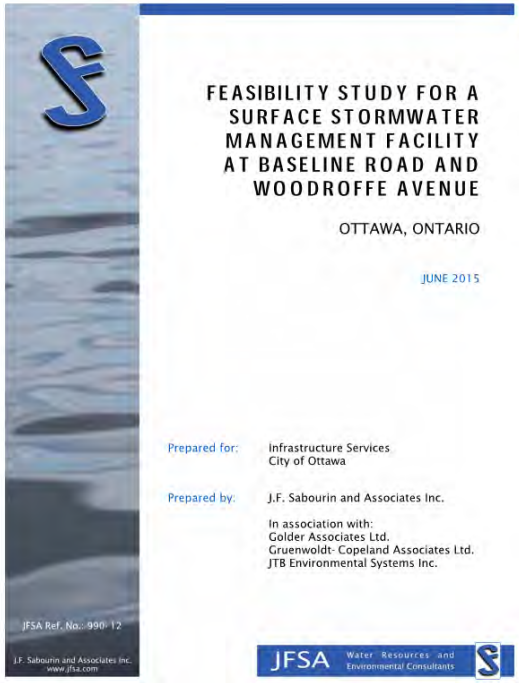
In association with
JTB Environmental Systems Inc.
Kidd Consulting
Baird & Associates

JFSA Water Resources and Environmental Consultants

- Pond initially proposed in Pinecrest Creek/Westboro Stormwater Management (SWM) Retrofit Study
- Related to Ottawa River Action Plan to enhance use of river and reduce beach closures
- Public open house in 2010 presented pond proposal
- Combination of SWM retrofit measures to provide best solution taking into account social, environmental and economic factors
- Other pond sites ruled out as too small/did not as effectively address creek water quality issues
- Public consultation included newspaper ads/open houses
- Feasibility of pond from NCC's perspective still unknown…..needs to be confirmed

Prior City Studies (2011-15)

- Feasibility study for stormwater management pond at Baseline/Woodroffe undertaken
- Undertaken to confirm NCC's support
- To determine a more sustainable solution to the construction of a large underground storage tank for flows from SW Transitway/LRT
- Underground storage tanks are:
  - ❑ Expensive to construct/maintain
  - ❑ Potentially affect a large area near LRT station that could be developed
  - ❑ Not as effective as stormwater ponds in improving water quality



FEASIBILITY STUDY FOR A SURFACE STORMWATER MANAGEMENT FACILITY AT BASELINE ROAD AND WOODROFFE AVENUE

OTTAWA, ONTARIO

JUNE 2015

Prepared for: Infrastructure Services
City of Ottawa

Prepared by: J.F. Sabourin and Associates Inc.

In association with:
Golder Associates Ltd.
Gruenwoldt- Copeland Associates Ltd.
JTB Environmental Systems Inc.

JFSA Ref. No.: 990-12

J.F. Sabourin and Associates Inc.
www.jfsa.com

JFSA Water Resources and Environmental Consultants

Feasibility Study - Conclusions

- 2 pond concepts developed/evaluated for Woodroffe site, both options are feasible
- Would offset stormwater management flows from future City transportation projects including LRT to Baseline (timing of LRT unknown at time of study)
- Also mitigates water quality and erosion impacts from 430 hectares of existing development upstream of pond
- Existing catchment area of pond is very urbanized without stormwater management controls
- Uncontrolled urban run off is bad for the environment
- City is being pro-active/acting as a good steward of the environment in fixing existing problem

Feasibility Study - Public Consultation

- Feasibility Study did not involve any public consultation
- Study was NOT completed as an EA
- An internal study to confirm technical/environmental feasibility and confirm NCC as a willing host of the pond
- No budget available to implement recommended pond until funding agreement with Province signed in 2015
- LRT implementation timing still uncertain
- Should we have consulted the public on potential project with feasibility in doubt and unfunded …..?

NCC Position

- In 2014, NCC confirmed their support for a pond on the site subject to conditions:
  - ❑ Cumulative Impact Study (CIS) of all anticipated study area projects including Baseline LRT station (in progress)
  - ❑ City to commit to implementing stormwater retrofit measures as per Pinecrest Creek/Westboro Area Study
  - ❑ Demonstrate that pond will have environmental, visual and landscape benefits
- Stormwater retrofit measures are in ADDITION to the pond NOT an alternative to it
- A Class EA must be completed for the pond (current study process)

Class Environmental Assessment (EA) Process

- City is following the Provincial Schedule B Class EA process for the Woodroffe stormwater pond
- Applies to “projects that have predictable and manageable environmental effects”
- Public consultation is mandatory and the City/Stage 2 intends to fully consult the public now and in the future as LRT/pond construction proceeds

Our Commitment to Future Public Engagement About the Pond

- Stage 2 LRT Project responsible for implementation of Woodroffe stormwater pond
- Stage 2 is committed to:
  - ❑ Being open and transparent
  - ❑ Being as consultative as possible on program implementation
  - ❑ Listening/responding to community issues and concerns about pond design and construction
  - ❑ Being pro-active/being a good neighbour during construction
  - ❑ Dedicated Stage 2 stakeholder relations team
- Reflects the reality that the pond is a Stage 2 requirement

Ownership of Woodroffe/ Baseline Stormwater Pond

- Land is currently owned by NCC
- Real estate negotiations are still in progress (City/NCC)
- 99 year easement for pond (NCC retains ownership) is the likely outcome
- Regardless of final real estate agreement with NCC, Stage 2 LRT Project/City will:
  - ❑ Award the construction contract for the pond
  - ❑ Supervise the design and construction of the pond
  - ❑ Obtain NCC and EA pond approvals required
  - ❑ Monitor the pond after construction for compliance with approvals
  - ❑ Maintain the pond over its life including mitigative measures

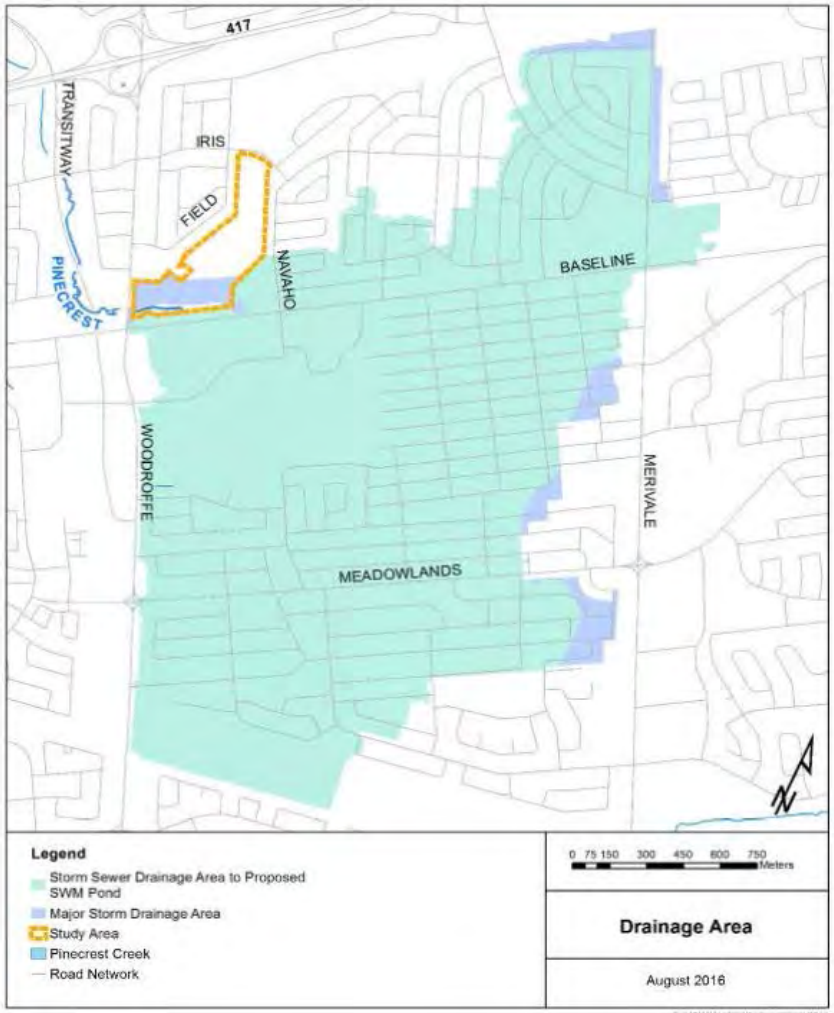
Funding for Design and Construction of the Baseline/Woodroffe Pond

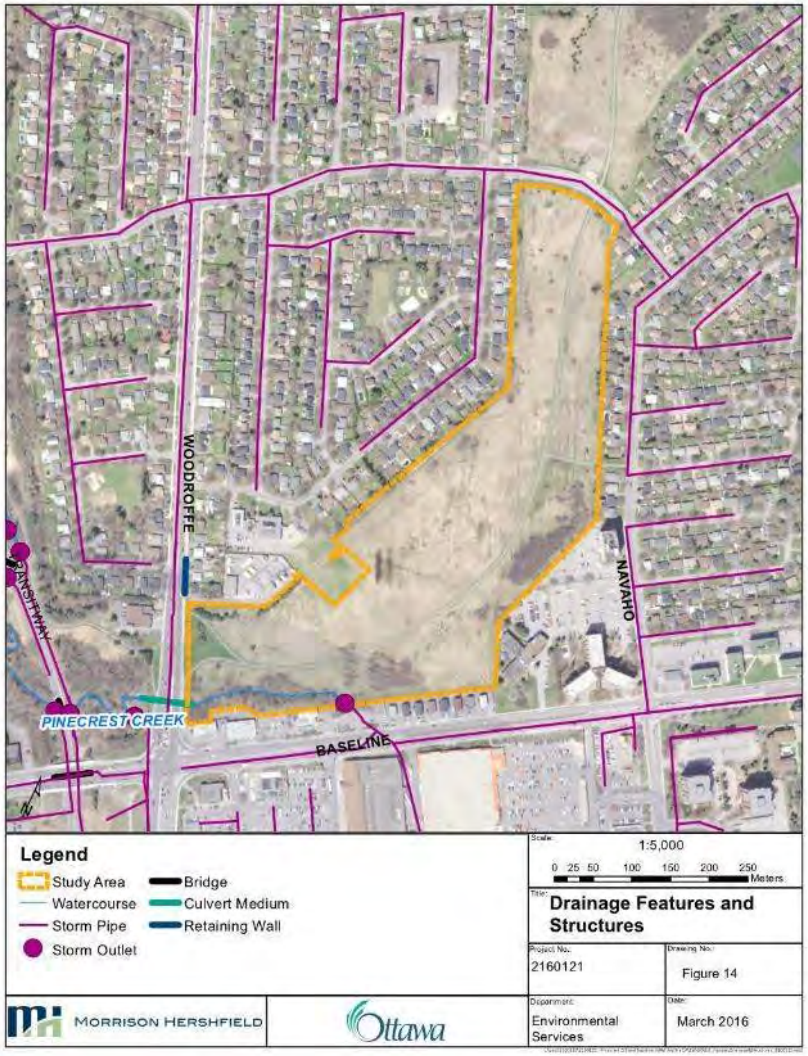
- Infrastructure Funding Agreement with the Province implemented in 2015
- $12.5M for pond design and construction (Province of Ontario)
- $9M approved in City rate budget in addition to Provincial funding for costs that are not eligible (e.g. real estate costs)
- With funding secured, feasibility confirmed and timing of LRT now known, EA study was initiated

Remainder of Presentation

- Focuses on implementation of preferred pond design
- Proposed design concept responds to community and agency issues/concerns
- Specific design changes and new features have been made since the last public meeting
- We are listening/responding to concerns about pond design and community impacts from the presence of the pond

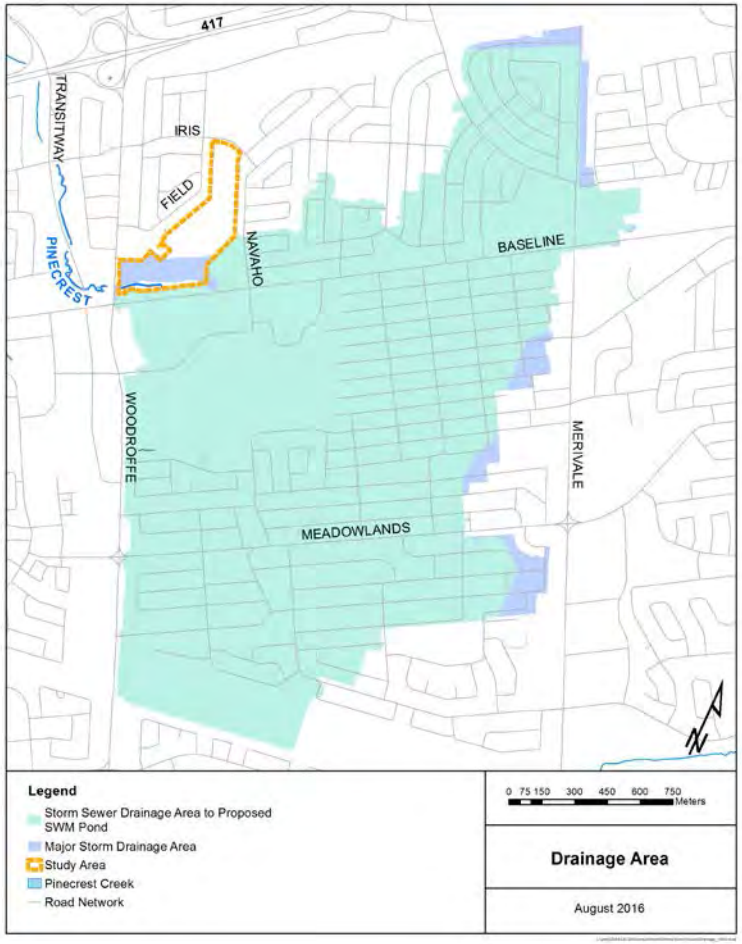
POND OPTIONS AND DESIGN FEATURES


417
TRANSITWAY
IRIS
FIELD
PINECREST
NAVAHO
BASELINE
WOODROFFE
MERIVALE
MEADOWLANDS
Legend
Storm Sewer Drainage Area to Proposed SWM Pond
Major Storm Drainage Area
Study Area
Pinecrest Creek
Road Network
0 75 150 300 450 600 750 Meters
Drainage Area
August 2016


WOODROFFE
TRANSITWAY
NAVAHO
PINECREST CREEK
BASELINE
Legend
Study Area
Watercourse
Storm Pipe
Storm Outlet
Bridge
Culvert Medium
Retaining Wall
Scale: 1:5,000
0 25 50 100 150 200 250 Meters
Title: Drainage Features and Structures
Project No.: 2160121
Drawing No.: Figure 14
Department: Environmental Services
Date: March 2016
MORRISON HERSHFIELD
Ottawa

Iris St
Calder Ave
Field St
Laxton Crescent
Matthews
Belair Park
Major St
Berwick Ave
Checkers Rd
15
Tecumseh St
Domalatchy Pl
Field St
16

Class EA Process



- Schedule B Class EA includes:
  - Identification of existing conditions and constraints
  - Consideration of previous studies
  - Confirmation and assessment of the options for the SWM pond
  - Responding to community design issues
  - Documentation of the process
- Class EA has identified a preferred design concept for the pond

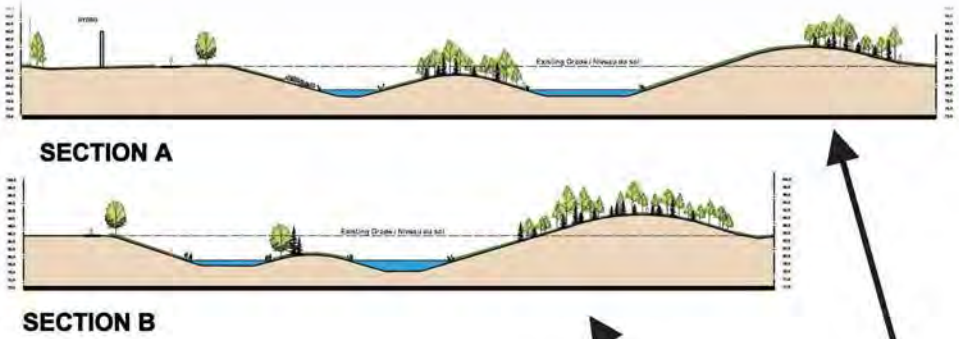
Existing Conditions and Constraints

- Subsurface conditions
- Environmental contamination
- Fish and aquatic habitat
- Watercourses and wetlands
- Terrestrial vegetation
- Wildlife and habitat
- Species at Risk
- Aboriginal Land Claims
- Cultural heritage/archaeology
- Public land ownership
- Existing land use/Airport zoning
- Infrastructure networks
- Recreation and pedestrian/ cycling routes

Pond Options

- 2015 Feasibility Study developed two options to further detail how a pond could be implemented
- Both options:
  - Maximize water quality and flood control benefits
  - Reduce frequent flow impacts (erosion) in Pinecrest Creek
  - Integrate existing pathways
  - Provide for significant landscaping improvements

Option 1



Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
Plantation de gros arbres	Large Tree Planting
Plantation d'arbustes	Shrub Planting
Sentier récréatif asphalté de 3 m	3 m Asphalt Recreational Path
Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
Limite de rabattement de 50 m	50 m Draw Down Limit

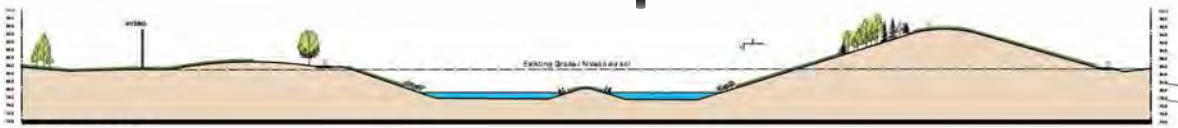
Existing / Existant

Contours (intervalles de 0.5 m)	Contours (0.5 m Intervals)
Ligne de transport d'électricité et poteau	Hydro Pole / Line
Végétation à garder	Vegetation to remain

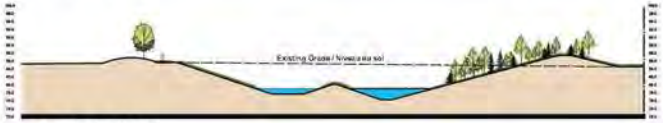
Pond Features / Components
Caractéristiques et composantes du bassin

Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Bassin d'admission	D	Forebay
Berme de sortie du bassin d'admission	E	Forebay Outlet Berm
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

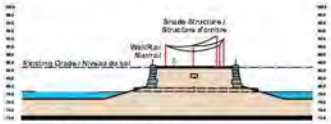
Option 2



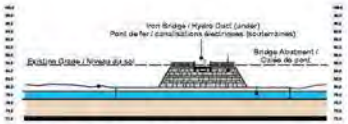
SECTION A



SECTION B



SECTION C (a)



SECTION C (b)

Bridge Option
See Section C(b)

Option du pont -
Voir la section C(b)

Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
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Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
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Caractéristiques et composantes du bassin

Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Décharge vers la cellule n° 2	D	Outlet to Cell No.2
Décharge vers la cellule n° 3	E	Outlet to Cell No.3
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

Initial Comments & Responses

Comment	Response
Background Information and Decision Making Process *Justification for the pond/proposed location*	•Project following through on recommendations from previous studies – see Part A of this presentation
Consultation and Notification *Insufficient and inadequate notification to date*	•During the consultation undertaken in 2010 for the *SWM Retrofit Study (2011)*, residents abutting the proposed pond location should have received greater notice; at that time, standard notification included newspaper advertisements and open houses •For current Class EA, public meeting provided in response to Online Open House; properties abutting pond site were notified of public meeting by direct mail . On line forum and two public meetings held to address community issues
Recreation • *Protection and enhancement of pathways for pedestrians and cyclists* • *Opportunity for complementary community uses*	•Pedestrian pathways to be incorporated/connected to City and NCC pathway networks •Complementary land uses may be considered at detailed design
Habitat and Creek Health *Enhance habitat for native wildlife and vegetation*	•Proposed options have accounted for protection/enhancement of creek •Landscaping with native species
Health and Safety Concerns • *Undesirable byproducts of stagnant water* • *Risks associated with unsupervised body of water and proximity to vulnerable populations*	•Pond will have sufficient water movement (minimize mosquitoes/algae) •Clear signage •Safe grading/side slopes •Pathway connections to consider “desire lines” and key destinations
Pond Operation and Drainage • *Concern that existing drainage issues will worsen* • *Maintenance of pond*	•Site re-grading will not affect adjacent properties •City required to maintain pond/ensure it continues to function properly
Property and Residences • *Decreased property values* • *Concern that litter will worsen*	•Based upon experience with SWM ponds throughout the City, environmental, aesthetic and recreational benefits have made them valued community assets

Additional Comments & Responses

Comment	Response
Pathway connections *Connections to the school*	Pathways can be re-oriented to connect to the school respecting desire lines Redesign includes a pedestrian crossing of the pond (Pond Option 2)

Additional Comments & Responses

Comment	Response
Operations and Maintenance *How will dredging be managed?*	All City stormwater management facilities are regularly inspected and maintained to ensure continued performance Pond will require dredging approximately once every 10 years, in winter Area for storage of sediment with reseeding

Additional Comments & Responses

Comment	Response
Wildlife and Habitat *Species at Risk Act* • *Monarch* • *Butternut*	Seed mixes can be used that attract butterflies including milkweed for monarch Additional surveys for butternut have been conducted and hybridity testing is scheduled to be undertaken this spring

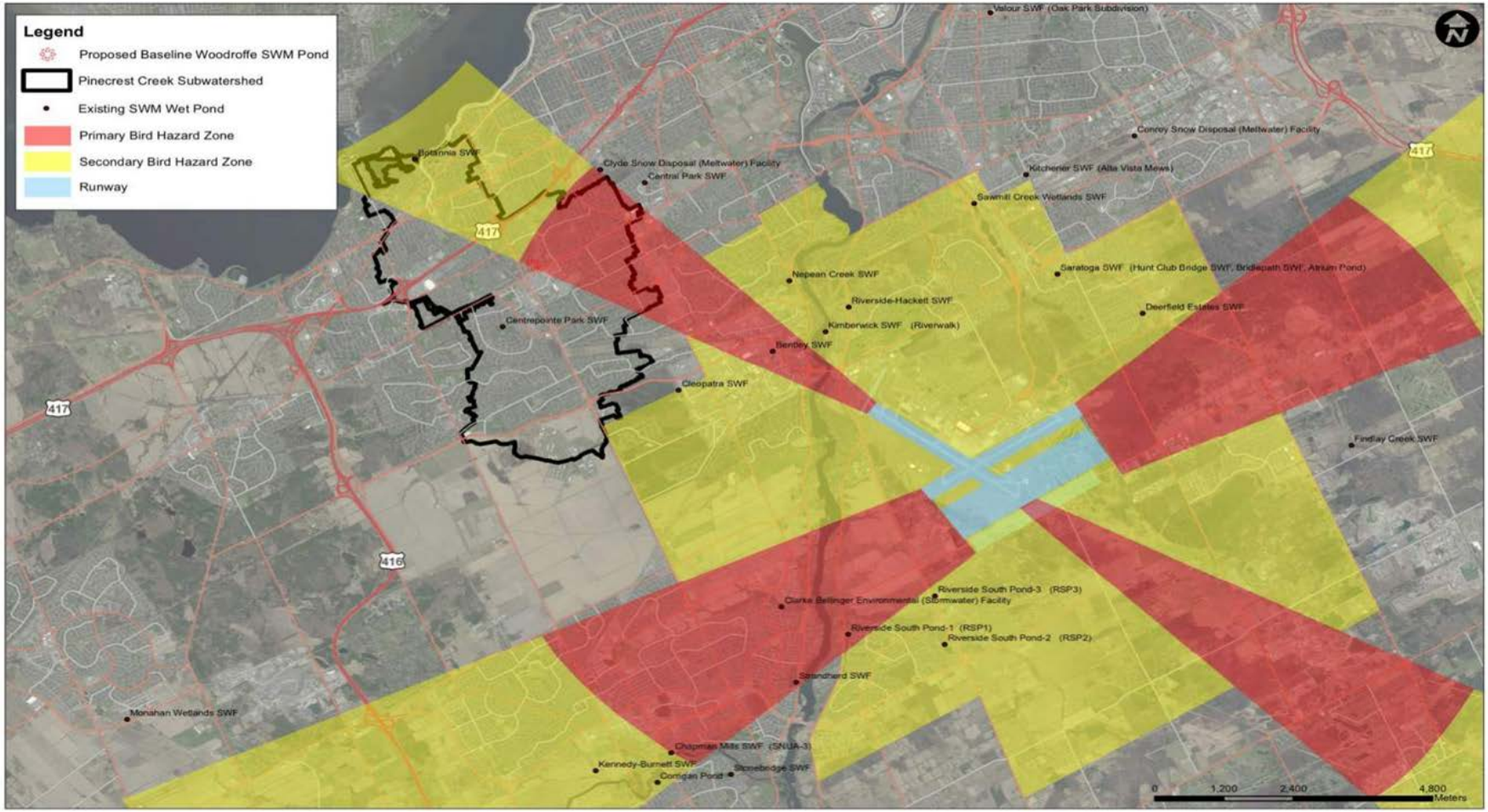
Additional Comments & Responses

Comment	Response
Bird Hazard Zone *Site is on outer edge of Primary Bird Hazard Zone of Ottawa Airport*	Wildlife expert retained to assess risks and recommend mitigation measures and contingency plans. Working with Transport Canada/Airport concerning: • Vegetation: types/ height, limit grass areas • Slopes and water edge treatments • Reduce nesting areas • Configuration of open water • Decoys • Monitoring

Refinements to Preliminary Pond Concept

- Reconsideration of Option 2 for improved pedestrian connectivity across middle of pond
- Butternut Trees:
  - Additional surveys undertaken
  - Precautionary buffers and reduced work in northeast part of pond site
- Transport Canada:
  - Bird Hazard Zoning

Ottawa Airport AZR



Risk Assessment from Beacon Environmental(wild life expert)

- Proposed pond is 6.6 km from Runway 14-32
- Pond at the extreme outer edge of Primary Bird Hazard Zone (PBHZ)
- At a typical 3% glide slope to Runway 14, aircraft will operate at or above 305 m (1000 ft) above ground at the location of the pond
- As a result of the steeper incline of the takeoff, aircraft will operate at higher altitude above the pond on departure
- Local bird movements are typically below 150 m (500 ft) above ground below altitude of aircraft in this area

Bird Mitigation Strategies

- Based on risk assessment approach by wild life management expert
- Design pond to avoid it being an attractive area for gulls/geese to frequent
- Design elements to be implemented to mitigate potential risks
- Requires a site specific design approach…not your typical SWP

Design Features to Mitigate Bird Risks

- Extent of mowed grass areas strictly limited to 1.5 m on either side of pathways
- Plant trees, shrubs, long grass meadow to discourage geese from entering pond from grassed areas near pathways
- Tall grass habitat/high density plantings not preferred by geese/gulls due to predators being able to use this as cover
- Root wads at waters edge to limit access to shoreline/tall grass
- Use stone/wood retaining walls to make pond slopes steep/uncomfortable for geese/gulls
- Long linear ponds not preferred by geese (they prefer large expanses of open water)
- Trees/bushes on peninsulas to discourage bird nesting

Design Elements

Root Wads

Design Elements

Retaining Walls

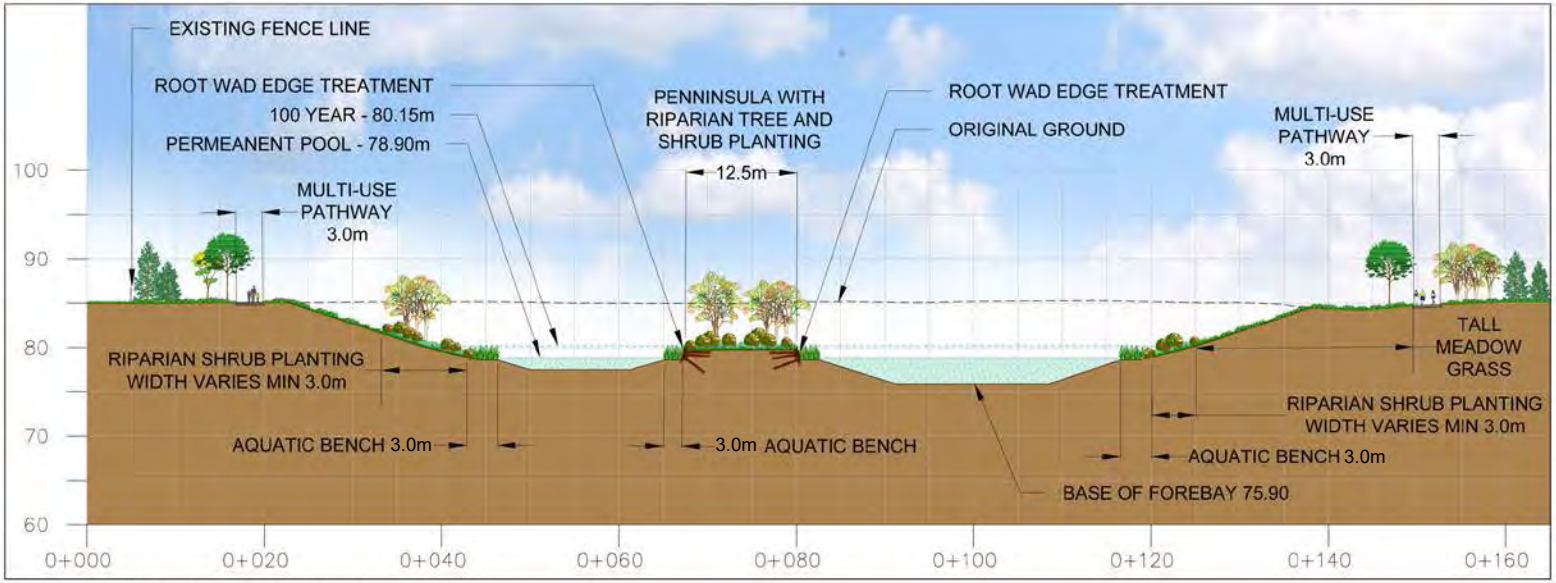
Design Elements

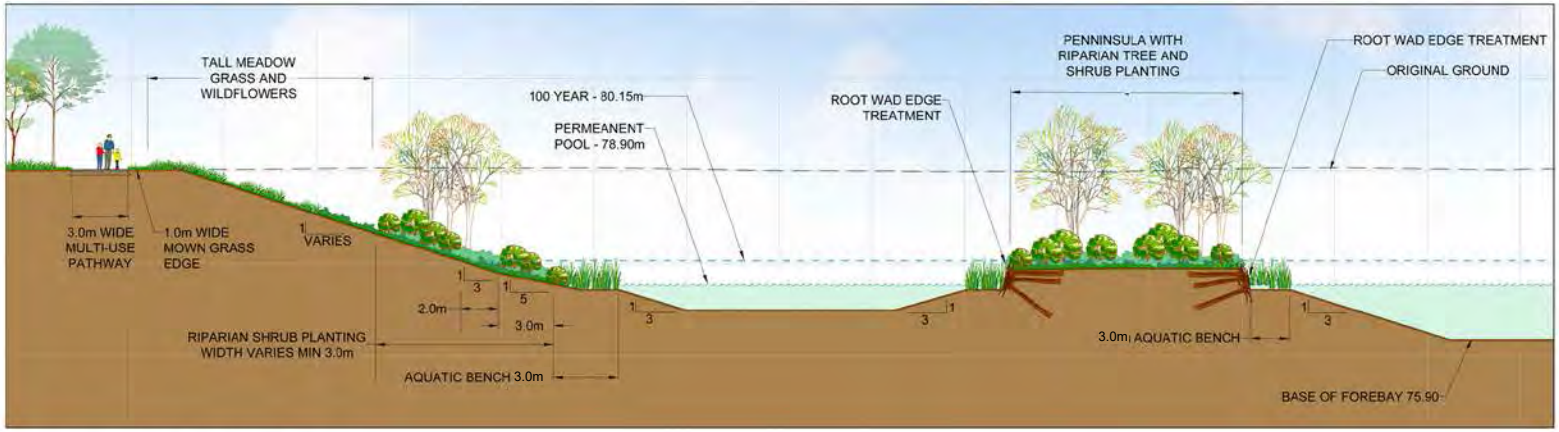
Riparian Planting

Design Elements

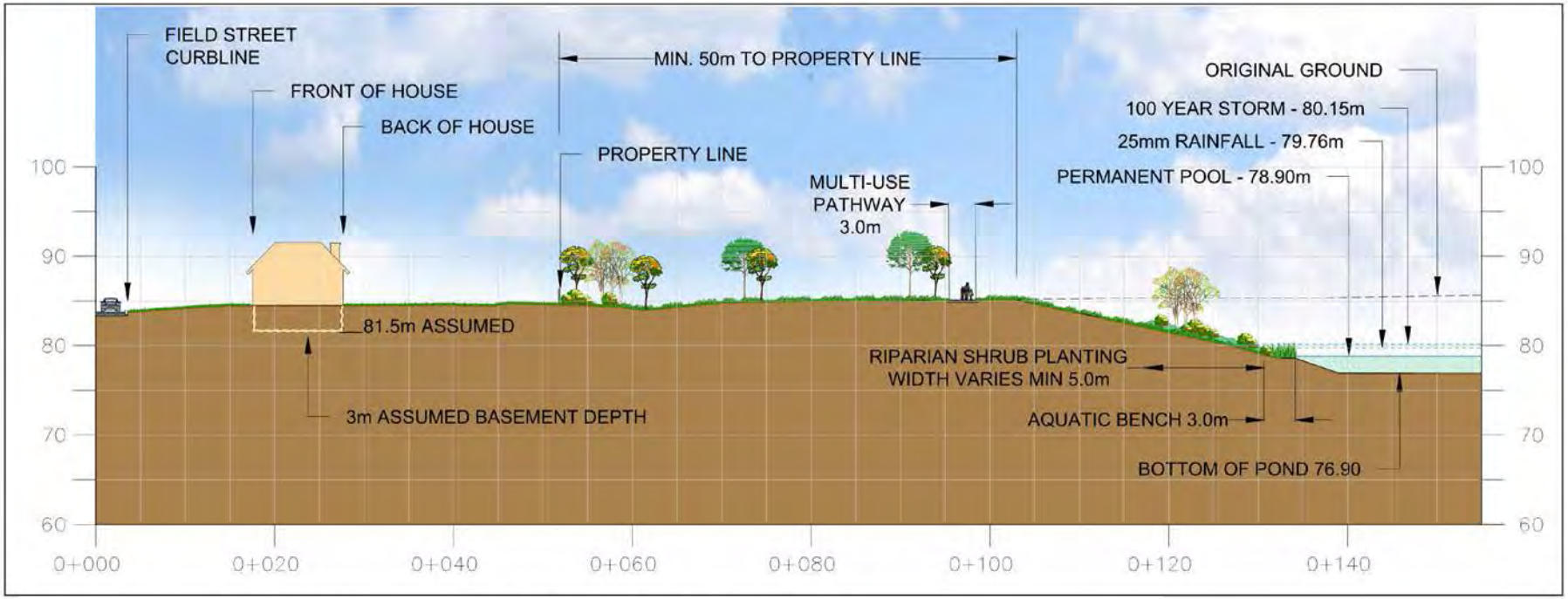
Upland Planting

Preliminary Revised Pond Concept





Cross Section A-A



Cross Section B-B: Typical cross section near Field Street

Contingency Measures

- Baseline and ongoing monitoring after construction of pond
- In the event there is hazardous bird activity in the vicinity of the pond, contingency measures would apply
- Design Modification and Wildlife Management
- Transport Canada response to risk assessment/mitigative measures/contingency plans is pending

Potential Contingency Measures

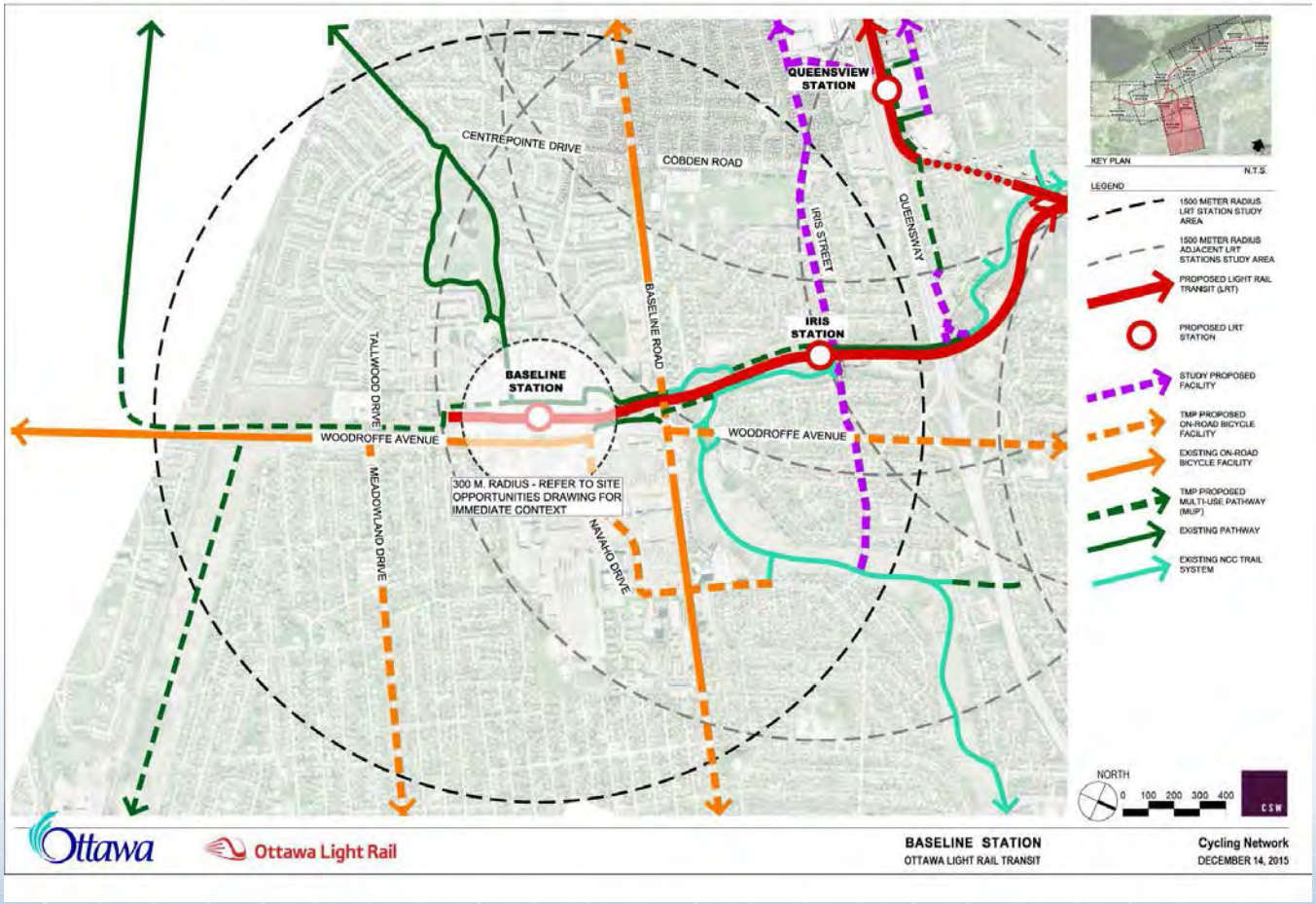
- Redesign:
  - Over wiring
  - Additional landscape / hardening
  - Alternate landscape planting to reduce use of specific areas
- Wildlife Management:
  - Egg oiling/addling
  - Capture/release
  - Harassment

Next Steps

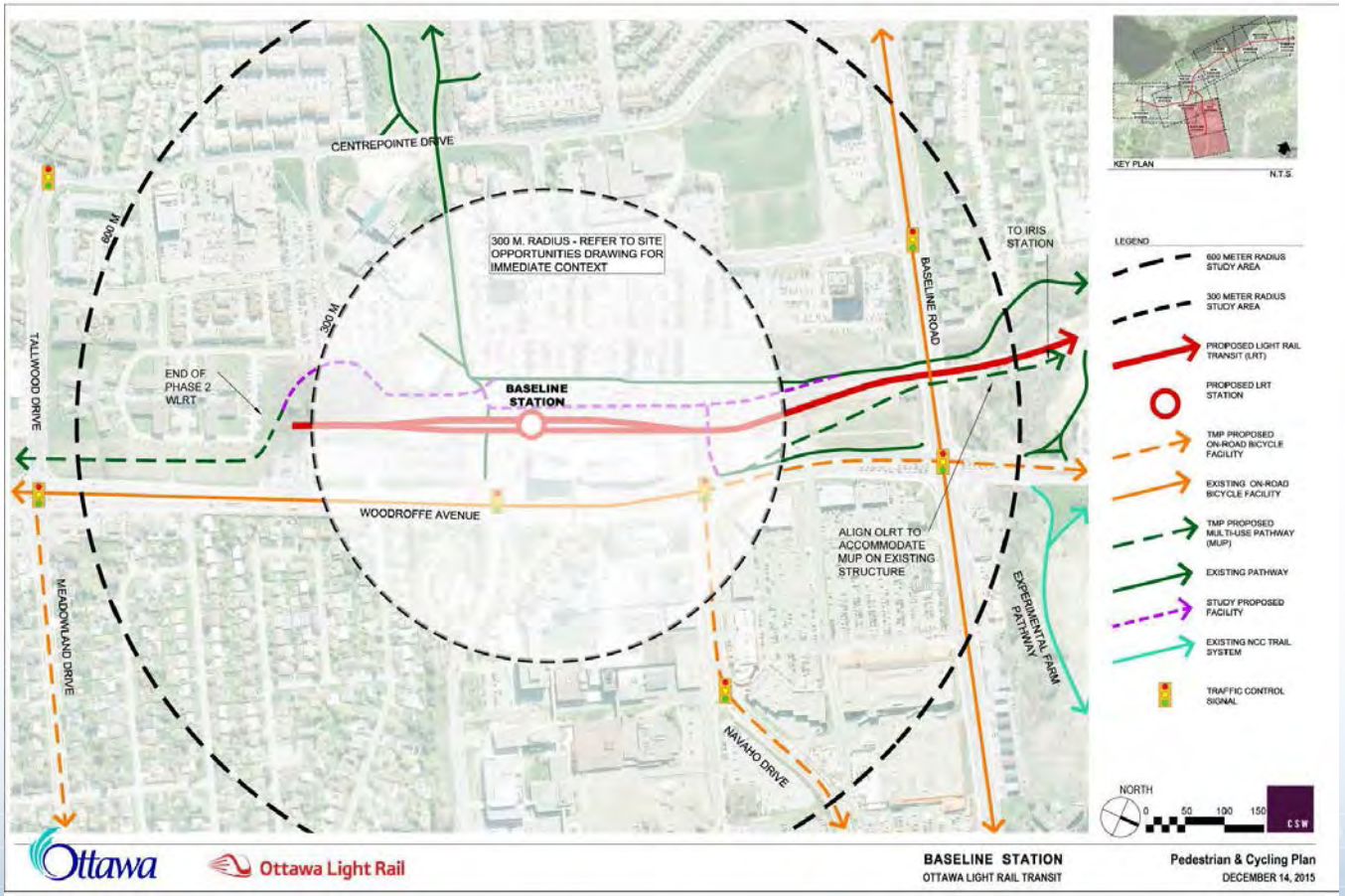
- Address remaining public concerns about pond design (now, ongoing)
- Prepare the Class EA report (Spring 2017)
- Environment Committee and City Council approvals (June 2017)
- 30-day public review of Class EA Report (Summer 2017)
- Detailed design (2017)
- Construction as part of LRT program (timing TBD, after 2018)

Questions?

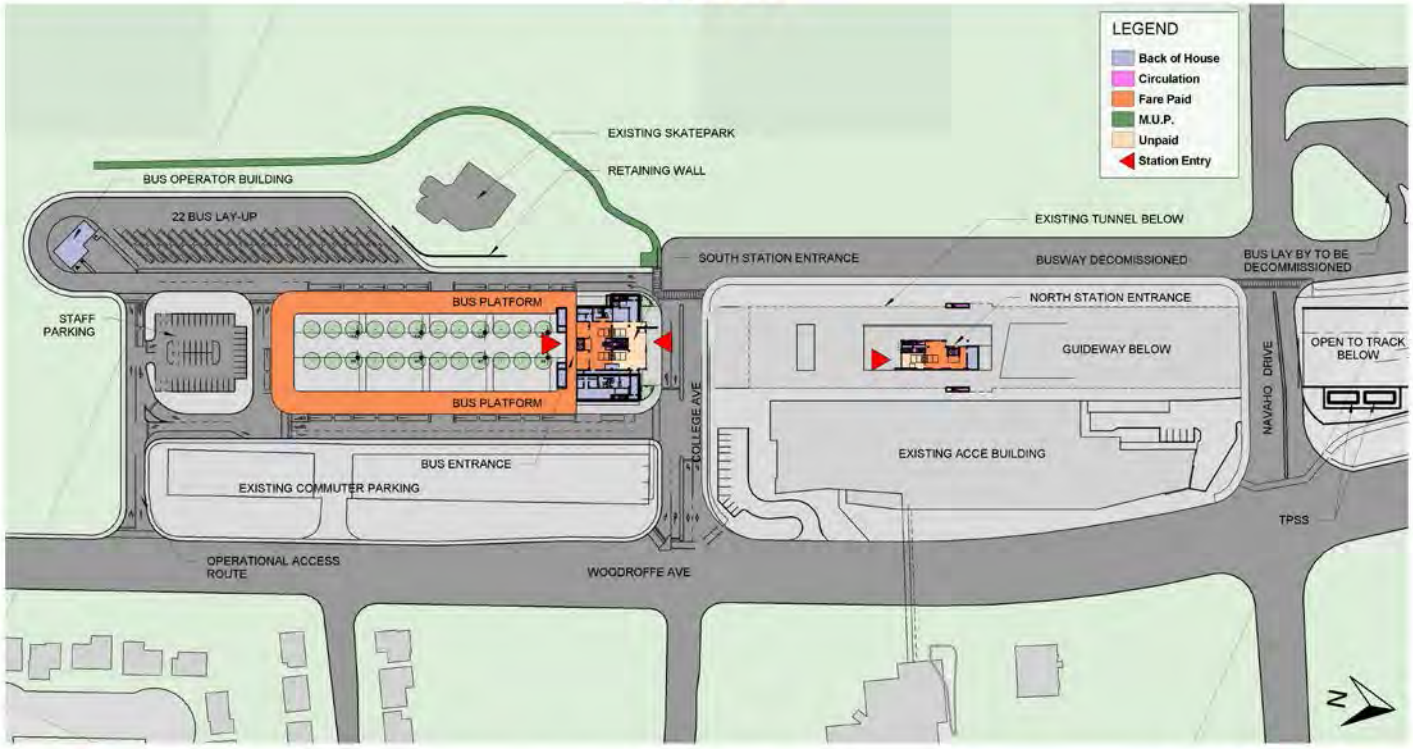
Baseline Station Connectivity



Baseline Station Connectivity



Baseline Station Configuration



Train

Baseline Station

STAGE 2 ETAPE

Bassin de rétention des eaux pluviales, Baseline et Woodroffe
Évaluation environnementale de portée générale

Réunion publique
Le 17 mai 2017

Ordre du jour

Partie A - pourquoi un bassin de rétention et pourquoi ici?

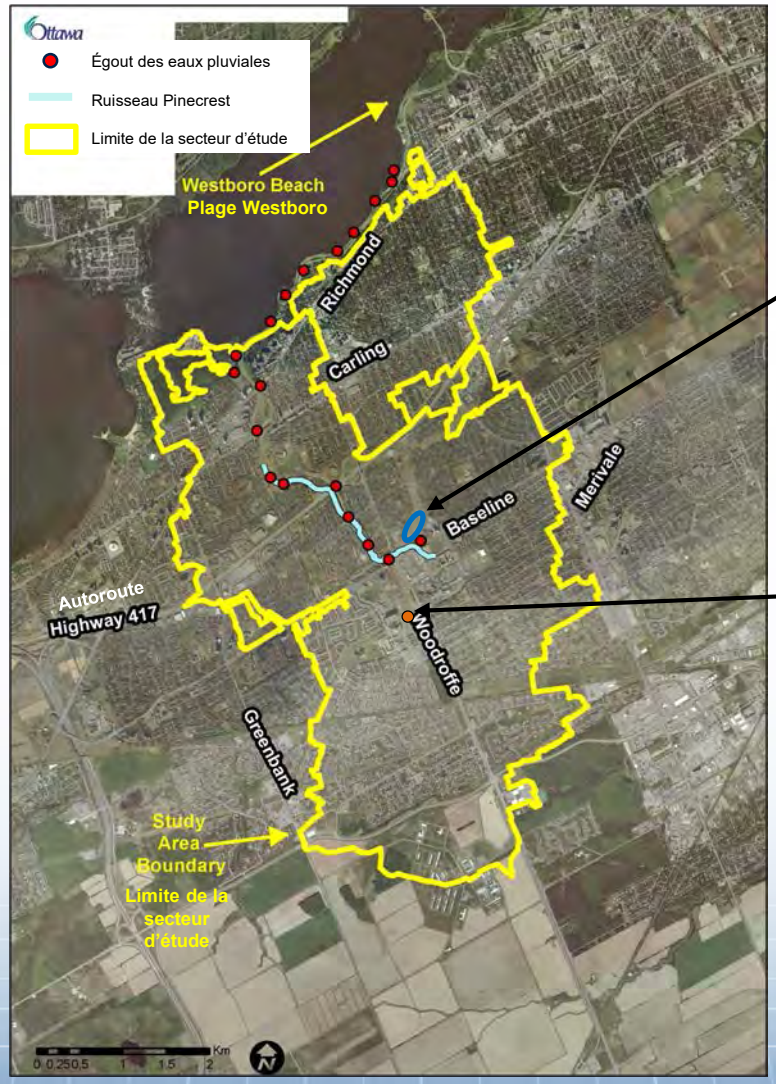
- Mise en contexte... ce qui nous a conduits ici... besoin d'un bassin de rétention des eaux pluviales

Partie B - options de bassin et caractéristiques de conception

- Processus d'évaluation environnementale (ÉE) de portée générale
- Bassin - options 1 et 2
- Ce qu'on nous a dit au sujet de la conception du bassin
- Option améliorée
- Prochaines étapes

POURQUOI UN BASSIN DE RÉTENTION ET POURQUOI ICI?

Aire de captage du bassin de rétention



Bassin proposé

Station Baseline

Besoin d'un bassin de rétention des eaux pluviales

- Amélioration de la qualité de l'eau et une certaine réduction des risques d'inondation.
- Ralentissement du déversement de l'eau dans le ruisseau réduisant ainsi l'érosion durant les tempêtes.
- Enlèvement des solides en suspension avant le déversement.
- Les écoulements de la station Baseline du TLR dans le ruisseau sont interdits à moins d'améliorer la gestion des eaux pluviales.
- L'actuel bassin d'eaux pluviales de la station Baseline N'EST PAS raccordé au ruisseau Pinecrest.

Le bassin de rétention Baseline/Woodroffe est un projet ESSENTIEL

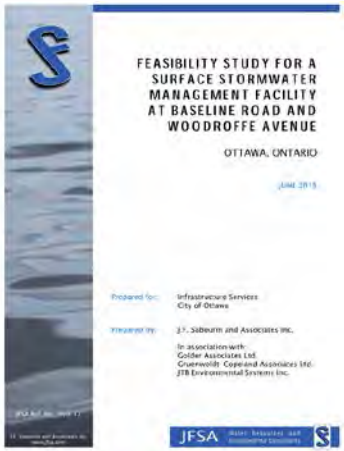
- L'entente de financement avec le gouvernement provincial a été conclue en 2015; la Ville et le gouvernement provincial en sont les parties prenantes.
- Comme le bassin a une incidence directe sur le drainage de la station Baseline du TLR, les approbations pour l'aménagement d'un bassin, sa construction et sa conception ont été regroupées dans l'Étape 2 du TLR.
- Le Bureau de l'Étape 2 du TLR supervisera les travaux et aménagera le bassin dans les limites du calendrier de construction de la station Baseline du TLR.
- Le Bureau de l'Étape 2 du TLR est également chargé de respecter les exigences de l'ÉE et d'obtenir les approbations de la CCN.
- L'aménagement du bassin de rétention est obligatoire pour la réalisation du TLR.

Études antérieures de la Ville (2009-2011)

- L'aménagement du bassin fut initialement proposé dans le cadre de l'étude de modernisation de l'installation de gestion des eaux pluviales du ruisseau Pinecrest/Westboro.
- Relié au Plan d'action de la rivière des Outaouais visant à améliorer les utilisations de la rivière et à réduire les fermetures de plage.
- Une proposition de bassin de rétention fut présentée à une séance portes ouvertes en 2010.
- Mélange de mesures pour moderniser l'installation de gestion des eaux pluviales et fournir la meilleure solution possible tout en tenant compte de facteurs sociaux, environnementaux et économiques.
- D'autres emplacements pour le bassin ont été rejetés parce que trop petits et moins efficaces pour améliorer la qualité de l'eau du ruisseau.
- La consultation publique a comporté des annonces publiées dans les journaux et des séances portes ouvertes.
- Les propriétés contiguës n'ont pas reçu d'avis concernant l'emplacement possible du bassin de rétention Woodroffe.
- La faisabilité du bassin du point de vue de la CCN demeurait un inconnu... approbation à recevoir.

Études antérieures de la Ville (2011-2015)

- Réalisation d'une étude de faisabilité pour l'aménagement d'un bassin de rétention des eaux pluviales, angle Baseline et Woodroffe.
- Entreprise pour obtenir l'accord de la CCN.
- Pour trouver une solution plus durable que la construction d'un gros réservoir souterrain pour recueillir les écoulements du Transitway/TLR sud-ouest.
- Les réservoirs de stockage souterrains :
  - ❑ Coûtent cher à construire et à entretenir
  - ❑ Susceptibles de nuire à l'aménagement d'un vaste secteur à proximité de la station de TLR
  - ❑ Ne sont pas aussi efficaces que les bassins de rétention pour améliorer la qualité de l'eau


FEASIBILITY STUDY FOR A SURFACE STORMWATER MANAGEMENT FACILITY AT BASELINE ROAD AND WOODROFFE AVENUE

OTTAWA, ONTARIO

JFSA

Étude de faisabilité - conclusions

- Deux conceptions de bassin ont été élaborées et évaluées pour le site Woodroffe, et les deux options sont réalisables.
- Les deux options permettent de gérer l'écoulement des eaux pluviales des projets de transport de la Ville, y compris du TLR jusqu'à la station Baseline (calendrier du TLR inconnu au moment de l'étude.)
- Elles diminueraient les répercussions sur la qualité de l'eau et sur l'érosion reliées aux 430 hectares aménagés en amont du bassin.
- L'aire de captage actuelle du bassin est très urbanisée, et cela, sans installation de gestion des eaux pluviales.
- Les ruissellements non contrôlés provenant d'une zone urbaine sont mauvais pour l'environnement.
- La Ville agit de façon proactive et en bon protecteur de l'environnement en réglant les problèmes existants.

Étude de faisabilité - consultation publique

- Il n'y a pas eu de consultation publique dans le cadre de l'étude de faisabilité.
- L'étude N'A PAS ÉTÉ réalisée à titre d'évaluation environnementale.
- Étude interne afin de valider la faisabilité technique et environnementale et de confirmer l'acceptation de la CCN de l'aménagement du bassin sur ses terres.
- Aucun budget disponible pour aménager le bassin recommandé avant l'entente de financement avec le gouvernement provincial conclue en 2015.
- Le calendrier de mise en œuvre du TLR encore incertain.
- Est-ce que nous aurions dû consulter la population sur un projet dont la faisabilité était encore incertaine et qui n'était pas financé...?

Position de la CCN

- En 2014, la CCN a confirmé son appui à l'aménagement d'un bassin sur l'emplacement sous réserve de certaines conditions :
  - ❑ Réalisation d'une étude sur les effets cumulatifs de tous les projets dans le secteur à l'étude, notamment de la station Baseline du TLR (en développement)
  - ❑ Engagement de la Ville à moderniser l'installation de gestion des eaux pluviales conformément à l'étude sur le secteur ruisseau Pinecrest et Westboro
  - ❑ Faire la démonstration des avantages environnementaux, visuels et paysagers du bassin
- Les mesures de modernisation du système de gestion des eaux pluviales S'AJOUTENT au bassin de rétention, elles NE S'Y SUBTITUENT PAS.
- Le bassin doit faire l'objet d'une ÉE de portée générale (processus d'étude actuel).

Processus d'évaluation environnementale (ÉE) de portée générale

- Pour le bassin de rétention des eaux pluviales Woodroffe, la Ville suit le processus d'ÉE de portée générale pour les projets de catégorie B.
- 'applique aux « projets qui ont des effets environnementaux prévisibles et gérables ».
- La consultation publique est obligatoire et, pour l'Étape 2, la Ville a l'intention de consulter pleinement le public dès maintenant et dans le futur, au fur et à mesure de la construction du TLR et du bassin.

Notre engagement à consulter le public sur le bassin de rétention

- Bureau de l'Étape 2 du TLR responsable de l'aménagement du bassin de rétention des eaux pluviales Woodroffe
- Engagement du Bureau à :
  - ❑ Faire preuve d'ouverture et de transparence
  - ❑ Consulter dans la mesure du possible entourant la mise en œuvre du projet
  - ❑ Écouter et répondre aux questions et aux préoccupations de la collectivité eu égard à la conception et à la construction du bassin de rétention
  - ❑ Être proactif et bon voisin durant la construction
  - ❑ Équipe désignée chargée des relations avec les intervenants pour l'Étape 2
- Correspond à la réalité : le bassin est nécessaire pour la réalisation de l'Étape 2 du TLR

Appropriation du bassin de rétention Woodroffe/Baseline

- Le terrain appartient actuellement à la CCN
- Les négociations immobilières se poursuivent (Ville et CCN)
- Le résultat probable sera une servitude de 99 ans pour le bassin (la CCN demeurant propriétaire)
- Peu importe l'entente immobilière définitive avec la CCN, le Bureau de l'Étape 2 du TLR et la Ville:
  - ❑ Attribueront le contrat de construction du bassin
  - ❑ Superviseront la conception et la construction du bassin
  - ❑ Obtiendront les approbations de la CCN et de l'ÉE
  - ❑ Surveilleront le bassin après sa construction pour s'assurer de sa conformité aux approbations
  - ❑ Entretiendront le bassin pour sa durée de vie et verront à appliquer les mesures pour en atténuer les effets

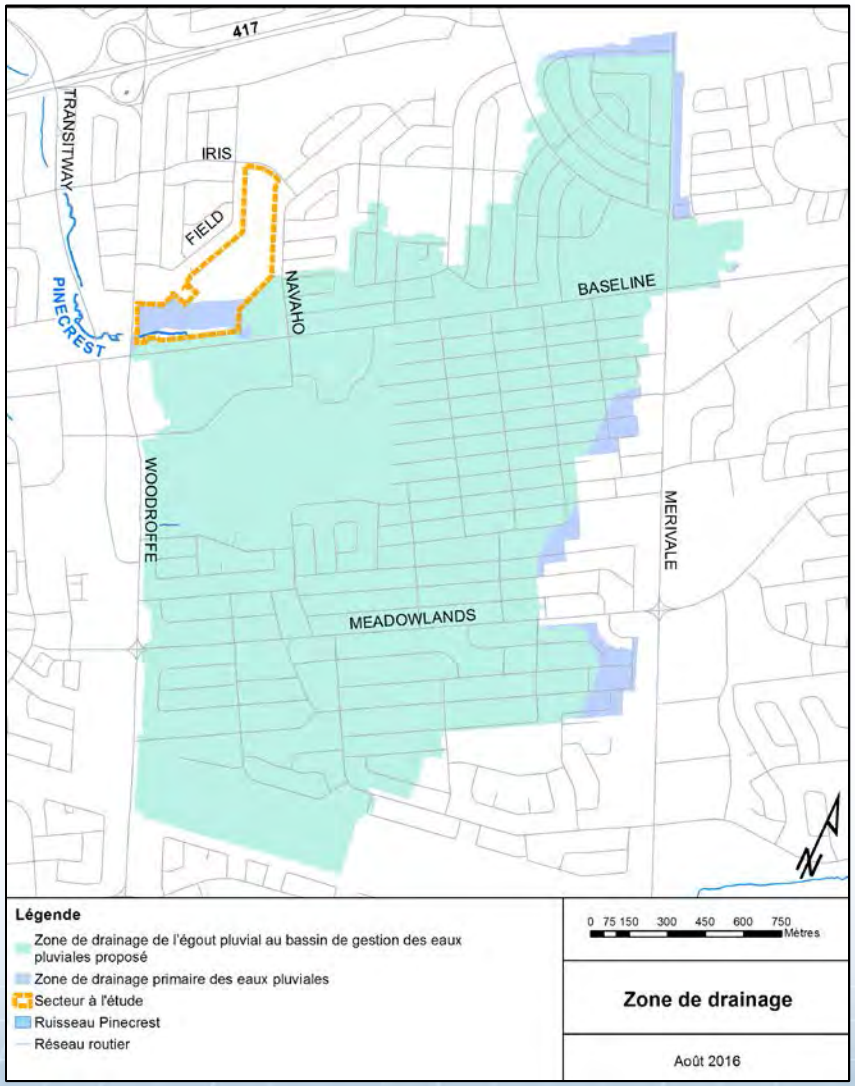
Financement de la conception et de la construction du bassin de rétention Baseline/Woodroffe

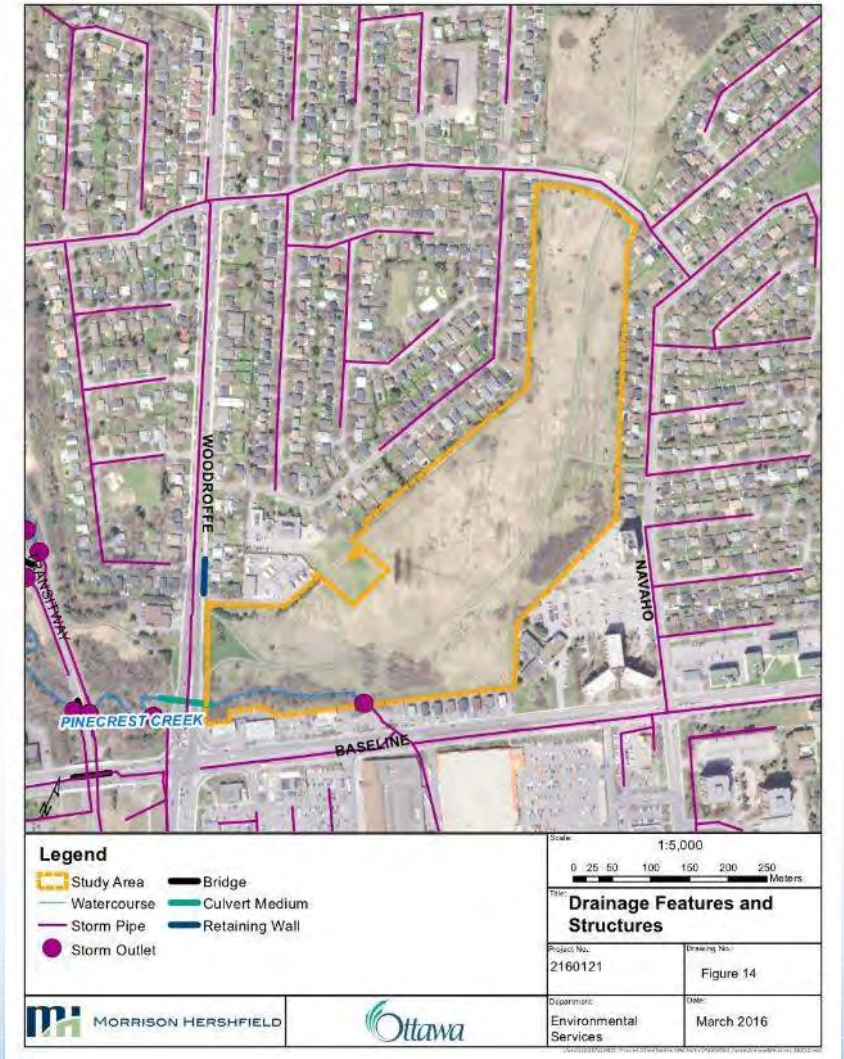
- Entente pour le financement de l'infrastructure intervenue avec le gouvernement provincial en 2015
- 12,5 millions de dollars pour la conception et la construction du bassin de rétention (gouvernement de l'Ontario)
- 9 millions de dollars approuvés dans le budget soutenu par les redevances de la Ville en plus du financement provincial, notamment pour les dépenses non admissibles (p. ex. les coûts immobiliers)
- Le financement étant assuré, la faisabilité étant confirmée et le calendrier de réalisation du TLR étant maintenant connu, il a été possible d'entreprendre l'évaluation environnementale

Le reste de la présentation

- Est axé sur la conception du bassin qui a été privilégiée
- La conception proposée répond aux questions et aux préoccupations de la collectivité et des organismes de contrôle
- Des modifications précises ont été apportées et des caractéristiques ajoutées à la conception depuis la dernière réunion publique
- Nous écoutons/répondons aux préoccupations de la population entourant la conception du bassin et ses répercussions sur le milieu

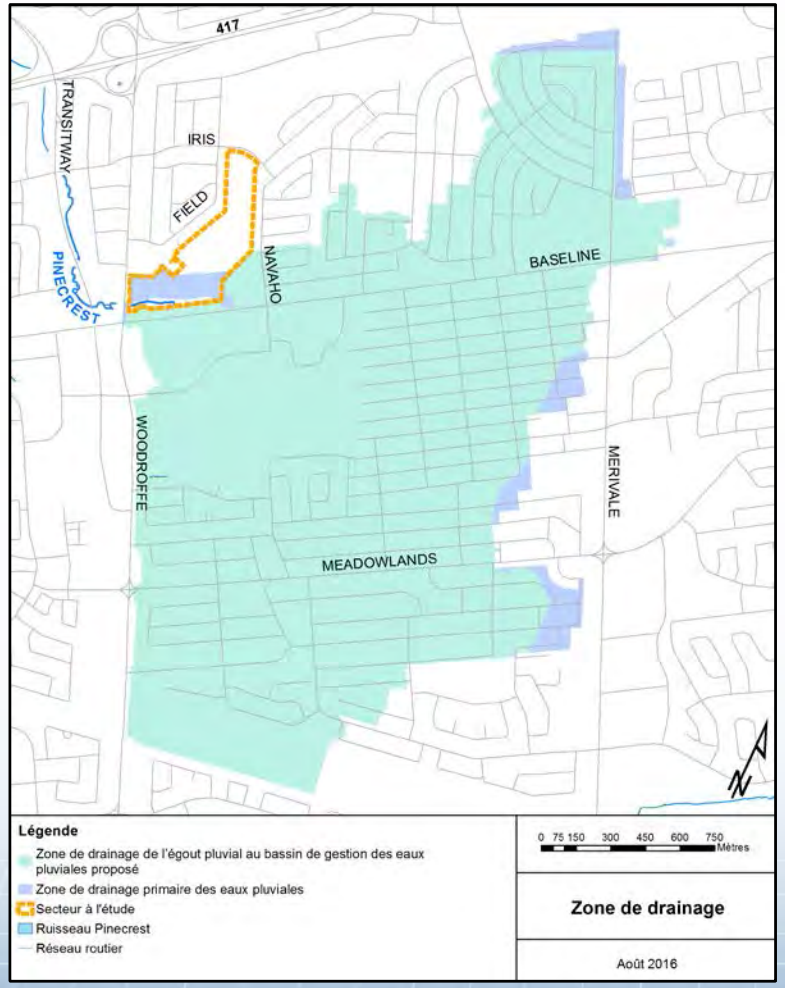
OPTIONS POUR LE BASSIN ET CARACTÉRISTIQUES DE CONCEPTION


417
TRANSITWAY
IRIS
FIELD
PINECREST
NAVAHO
BASELINE
WOODROFFE
MERIVALE
MEADOWLANDS
Légende
Zone de drainage de l'égout pluvial au bassin de gestion des eaux pluviales proposé
Zone de drainage primaire des eaux pluviales
Secteur à l'étude
Ruisseau Pinecrest
Réseau routier
0 75 150 300 450 600 750
Mètres
Zone de drainage
Août 2016


WOODROFFE
TRANSITWAY
NAVAHO
PINECREST CREEK
BASELINE
Legend
Study Area
Watercourse
Storm Pipe
Storm Outlet
Bridge
Culvert Medium
Retaining Wall
Scale:
1:5,000
0 25 50 100 150 200 250
Meters
Title:
Drainage Features and Structures
Project No.
2160121
Drawing No.:
Figure 14
Department:
Environmental Services
Date:
March 2016
MORRISON HERSHFIELD
Ottawa

Iris St
Calder Ave
Field St
Laxton Crescent
Matthews
Belair Park
Major St
Berwick Ave
Checkers Rd
15
Tecumseh St
Domalatchy Pl
Field St
16

Processus d'évaluation environnementale de portée générale



- L'ÉE de portée générale pour des projets de catégorie B inclut :
  - Détermination des conditions et des contraintes existantes
  - Considération des études antérieures
  - Confirmation et évaluation des options de bassins pour la gestion des eaux pluviales
  - Réponse aux préoccupations de la collectivité entourant la conception
  - Documentation du processus
- L'ÉE de portée générale a permis de dégager une conception de bassin préférée

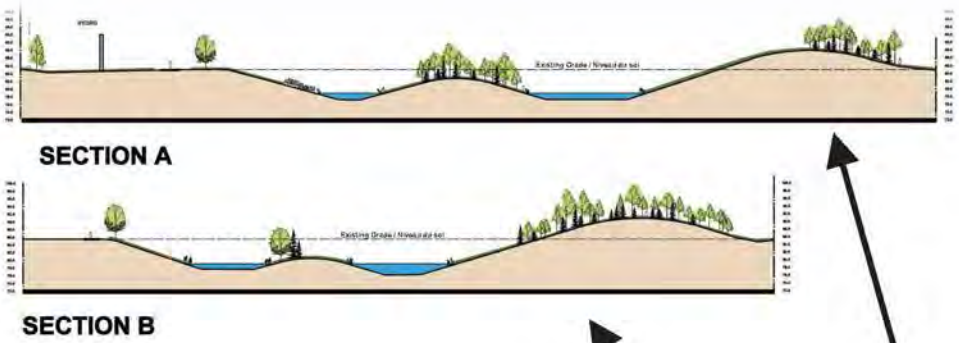
Conditions et contraintes existantes

- Conditions en sous-surface
- Contamination de l’environnement
- Poissons et milieu aquatique
- Cours d'eau et terres humides
- Flore terrestre
- Faune et habitat
- Espèces en péril
- Revendications territoriales des Autochtones
- Patrimoine culturel et archéologie
- Propriété des terrains publics
- Utilisation actuelle du sol et zonage de l'aéroport
- Réseaux d'infrastructures
- Loisirs et parcours piétonniers et cyclables

Options pour le bassin

- L'étude de faisabilité de 2015 a permis de dégager deux options pour l'aménagement du bassin
- Les deux options :
  - Optimisent les avantages quant à la qualité de l'eau et au contrôle des inondations
  - Réduisent l'impact des écoulements fréquents (érosion) dans le ruisseau Pinecrest
  - Intègrent les sentiers existants
  - Améliorent considérablement l'aménagement paysager

Option 1



Legend / Légende

Proposed / Proposé

Bassin de gestion des eaux pluviales	Stormwater Management Pond
Pré	Meadow
Herbe tondue	Mown Grass
Aires de reboisement	Reforestation Planting
Plantation de gros arbres	Large Tree Planting
Plantation d'arbustes	Shrub Planting
Sentier récréatif asphalté de 3 m	3 m Asphalt Recreational Path
Contours (intervalles de 1 m)	Contours (1.0 m Intervals)
Limite de rabattement de 50 m	50 m Draw Down Limit

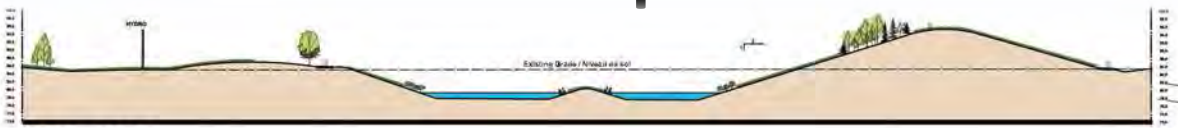
Existing / Existant

Contours (intervalles de 0.5 m)	Contours (0.5 m Intervals)
Ligne de transport d'électricité et poteau	Hydro Pole / Line
Végétation à garder	Vegetation to remain

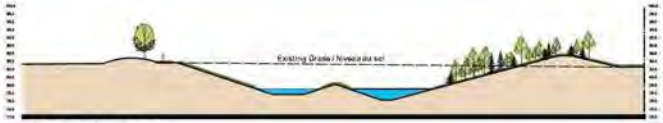
Pond Features / Components
Caractéristiques et composantes du bassin

Entrée du bassin	A	Pond Inlet
Débordement du rapide 79.61	B	Riffle Overflow 79.61
Berme de déviation du débit	C	Flow Diversion Berm
Bassin d'admission	D	Forebay
Berme de sortie du bassin d'admission	E	Forebay Outlet Berm
Décharge de quantité	F	Quantity Outlet
Décharge de qualité à faible débit	G	Quality Flow Outlet
Route d'accès pour l'entretien	H	Maintenance Access Road
Ruisseau Pinecrest	I	Pinecrest Creek

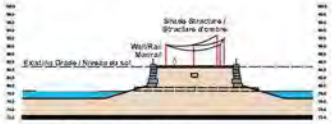
Option 2



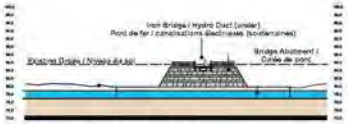
SECTION A



SECTION B



SECTION C (a)



SECTION C (b)

Bridge Option
See Section C(b)

Option du pont -
Voir la section C(b)

Commentaires initiaux et réponses

Commentaire	Réponse
Mise en contexte et processus décisionnel *Justification de l'aménagement du bassin et de l'emplacement proposé*	•Le projet fait suite aux recommandations des études antérieures - voir la partie A de cette présentation
Consultation et notification *Processus de notification jugé insuffisant et inadéquat à ce jour*	•Au cours de la consultation de 2010, dans le cadre de l'étude sur la modernisation des installations de gestion des eaux pluviales (2011), il aurait fallu aviser directement les résidents contigus au site proposé pour le bassin; à l'époque, le processus de notification consistait à publier des annonces dans les journaux et à tenir des séances portes ouvertes •Dans le cadre de cette ÉE de portée générale, il y a eu une réunion publique organisée suivant une séance portes ouvertes en ligne; et les propriétés contigües à l'emplacement du bassin ont reçu par la poste un avis pour les inviter à la réunion Un forum en ligne et deux réunions publiques ont été organisés pour répondre aux préoccupations de la population
Loisirs • *Protection et amélioration des sentiers pour piétons et cyclistes* • *Possibilité d'utilisations complémentaires par la collectivité*	•Sentiers piétonniers à intégrer et à relier aux réseaux de sentiers de la Ville et de la CCN •Des utilisations du sol complémentaires pourront être envisagées dans la conception détaillée
Habitat et santé du ruisseau *Améliorer les habitats de la faune et de la flore indigènes*	•Les options proposées ont tenu compte de la protection et de la mise en valeur du ruisseau •Aménagement paysager réalisé à l'aide d'espèces indigènes
Préoccupation en matière de santé et de sécurité • *Effets indésirables de l'eau stagnante* • *Risques associés à un plan d'eau sans supervision et proximité de populations vulnérables*	•La circulation de l'eau du bassin sera suffisante (présence limitée de moustiques et d'algues) •Signalisation claire •Nivellement et pentes de talus sans danger •Lessentiers doivent tenir compte des parcours de prédilection et des destinations principales
Fonctionnement et drainage du bassin • *Crainte que les problèmes de drainage actuels s'accentuent* • *Entretien du bassin*	•Le renivellement du site ne nuira pas aux propriétés adjacentes •La Ville sera tenue d'entretenir le bassin et de veiller à son bon fonctionnement
Propriété et résidences • *Diminution de la valeur des propriétés* • *Crainte d'avoir plus de déchets*	•Au contraire, les autres bassins de gestion des eaux pluviales dans la Ville ont engendré des bienfaits environnementaux, esthétiques et récréatifs; ils sont devenus un actif prisé par la population.

Autres commentaires et réponses

Commentaire	Réponse
Liens entre les sentiers *Liens avec l'école*	Les tracés des sentiers peuvent être modifiés afin de les relier à l'école en respectant les parcours de prédilection. La nouvelle conception du bassin comporte un passage pour piétons (Bassin - option 2).

Autres commentaires et réponses

Commentaire	Réponse
Opérations et entretien *Comment procédera-t-on pour le dragage?*	Toutes les installations municipales de gestion des eaux pluviales sont inspectées et entretenues régulièrement pour en assurer le bon rendement. Il faudra procéder au dragage du bassin une fois tous les dix ans environ, l'hiver. Aire de stockage des sédiments et réensemencement.

Autres commentaires et réponses

Commentaire	Réponse
Faune et habitat *Loi sur les espèces en péril* • *Papillon monarque* • *Noyer cendré*	Des mélanges de semences sont utilisés pour attirer les papillons y compris l'asclépiade pour les papillons monarques. D'autres relevés du noyer cendré ont été effectués et des contrôles d'hybridité sont planifiés ce printemps.

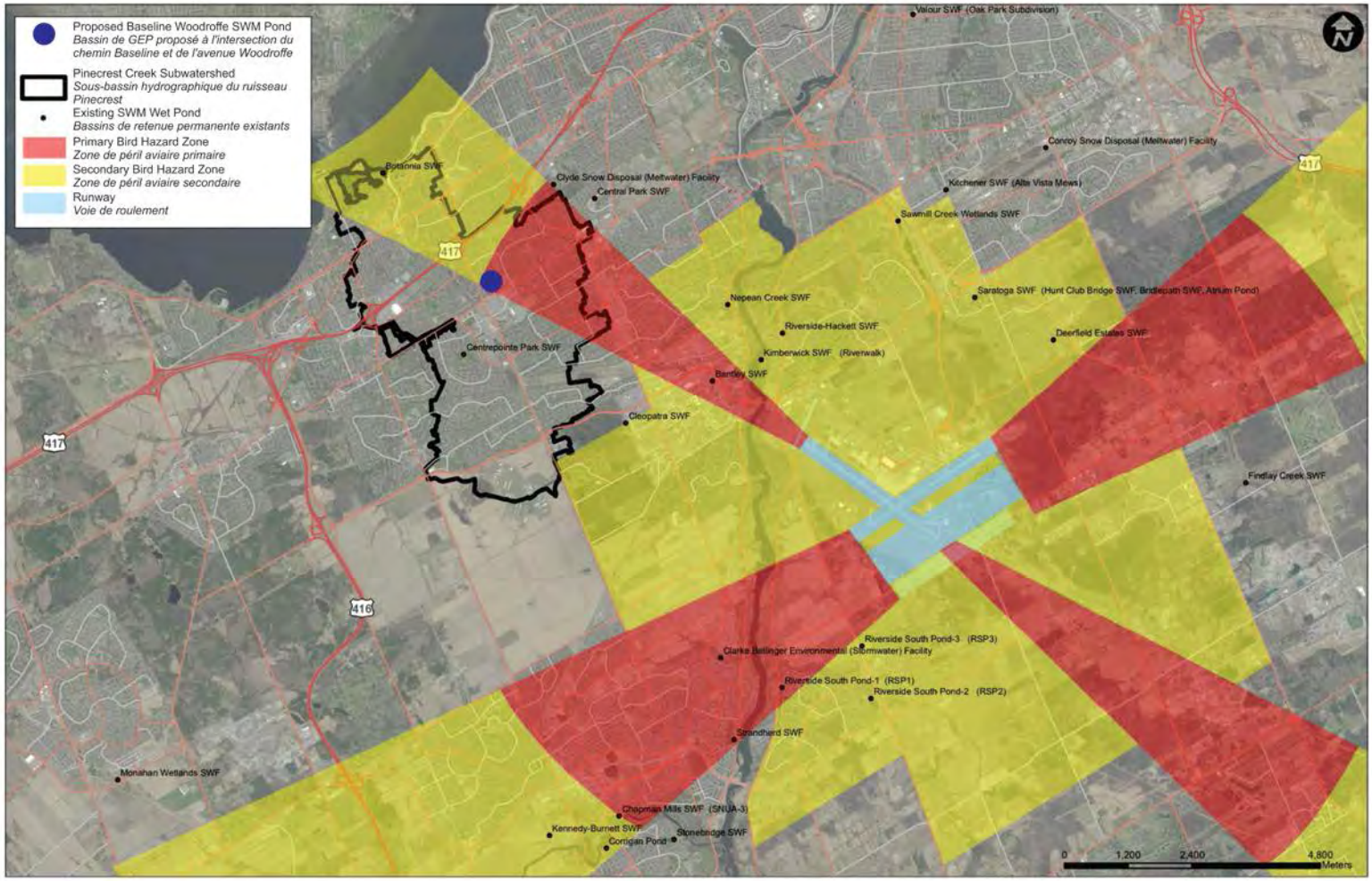
Autres commentaires et réponses

Commentaire	Réponse
Zone de péril aviaire *L'emplacement du bassin est à la périphérie de la zone de péril aviaire de l'aéroport d'Ottawa*	Les services d'un expert de la faune ont été retenus afin d'évaluer les risques et de recommander des mesures d'atténuation et des plans d'urgence. Collaboration avec Transport Canada et l'aéroport entourant: • Végétation : types et hauteur, limitation des aires gazonnée • Pentes et aménagement du rivage • Réduire les aires de nidification • Configuration du plan d'eau • Leurres • Surveillance

Améliorations apportées à la conception préliminaire du bassin

- Réexamen de l'option 2 afin d'améliorer la liaison piétonne en aménageant un passage au milieu du bassin
- Les noyers cendrés
  - Autres relevés effectués
  - Zones tampons protectrices et travaux réduits dans la partie nord-est du bassin
- Transport Canada
  - Zone de péril aviaire

Aéroport d'Ottawa, code AZR



Évaluation de risques par Beacon Environmental (spécialiste de la faune)

- Le bassin proposé se situe à 6,6 km de la piste 14-32.
- Le bassin est situé à l'extrême périphérie de la zone de péril aviaire.
- À une pente de descente typique de 3 % en direction de la piste 14, les aéronefs voleront à 305 m (1000 pieds) ou plus au-dessus du sol là où se trouve le bassin.
- En raison de leur angle plus abrupt au moment du décollage, les aéronefs seront à une altitude supérieure lorsqu'ils survoleront le bassin.
- Les oiseaux locaux se déplacent habituellement à moins de 150 m (500 pieds) au-dessus du sol, en deçà de l'altitude des aéronefs dans ce secteur.

Stratégies d'atténuation reliées aux oiseaux

- Élaborées sur la base d'une approche recommandée par un spécialiste en gestion de la faune.
- Concevoir le bassin de manière à éviter qu'il soit attirant pour les goélands et les bernaches.
- Éléments conceptuels à mettre en place pour atténuer les risques possibles.
- Nécessite une conception propre au site... il ne s'agit pas d'une installation typique de gestion des eaux pluviales.

Éléments conceptuels pour atténuer les risques liés aux oiseaux

- Étendue des aires de gazon coupé strictement limitée à 1,5 m de chaque côté des sentiers
- Plantation d'arbres et de buissons et pré d'herbes hautes afin d'empêcher les bernaches d'accéder au plan d'eau à partir des aires gazonnées le long des sentiers.
- Les habitats d'herbes hautes et de plantations denses ne sont pas privilégiés par les bernaches et les goélands parce que les prédateurs peuvent les utiliser comme couverts
- Mottes racinaires le long du rivage pour restreindre l'accès à la rive et aux herbes hautes
- Utilisation de murs de soutènement en pierre/bois pour accentuer les pentes du bassin et les rendre inhospitalières pour les bernaches et les goélands
- Les bernaches ne prisent pas les longs plans d'eau linéaires (elles préfèrent les vastes plans d'eau ouverts)
- Arbres et buissons sur des péninsules pour empêcher la nidification

Éléments conceptuels

Mottes racinaires

Éléments conceptuels

Murs de soutènement

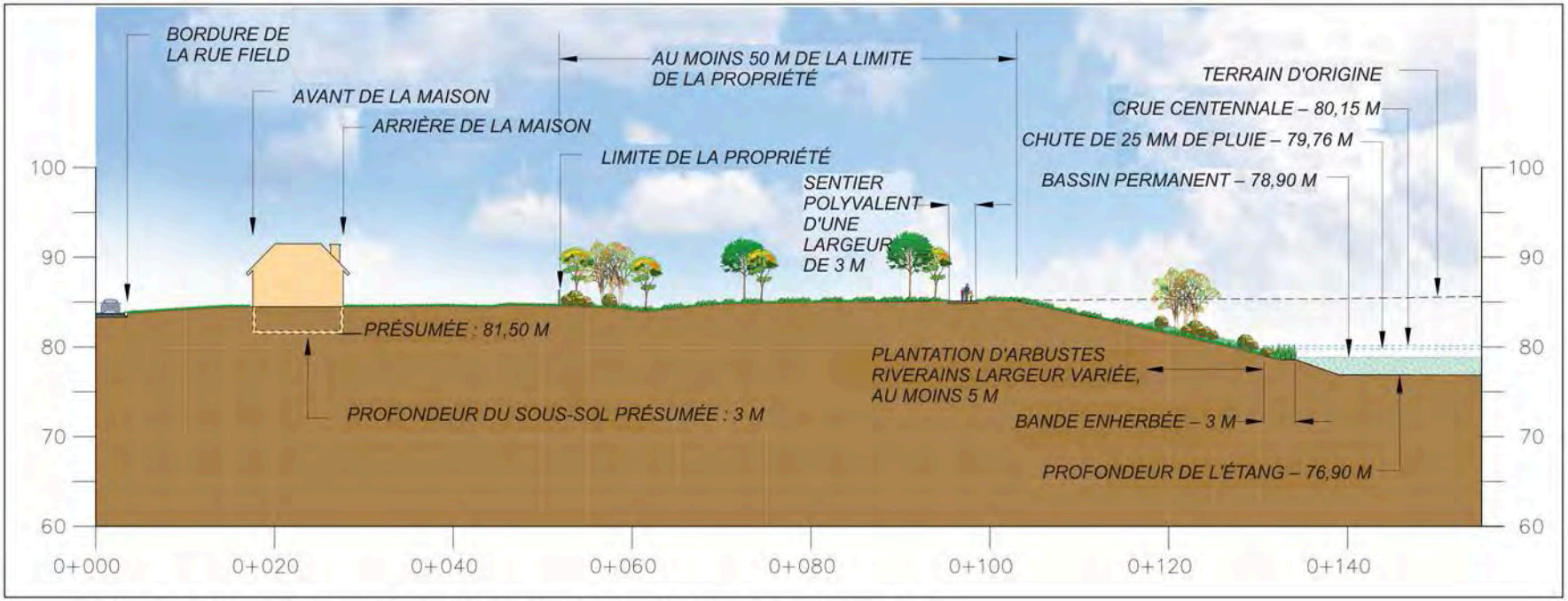
Éléments conceptuels

Plantation riveraine

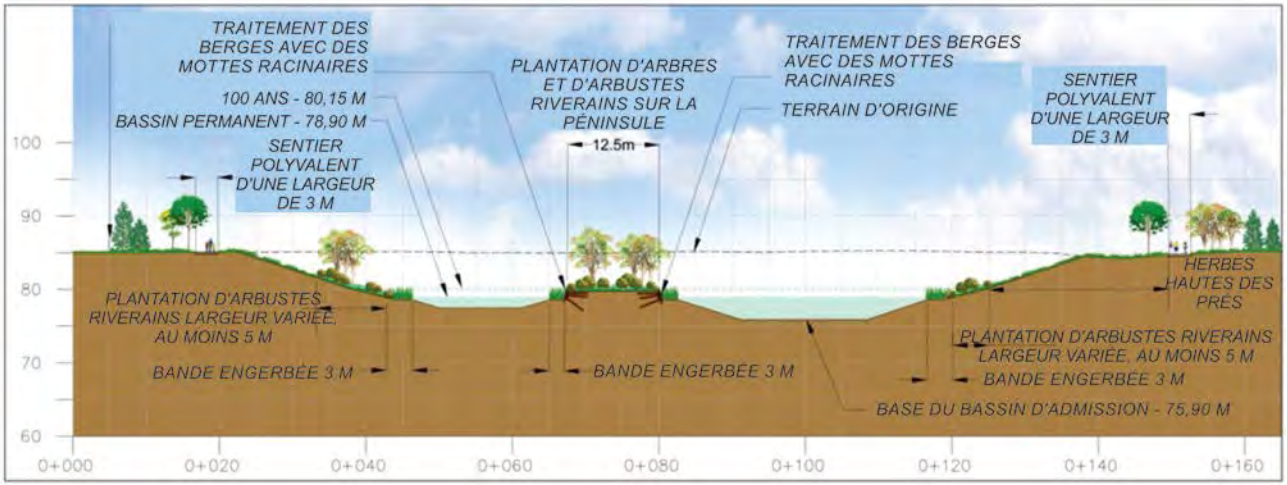
Éléments conceptuels

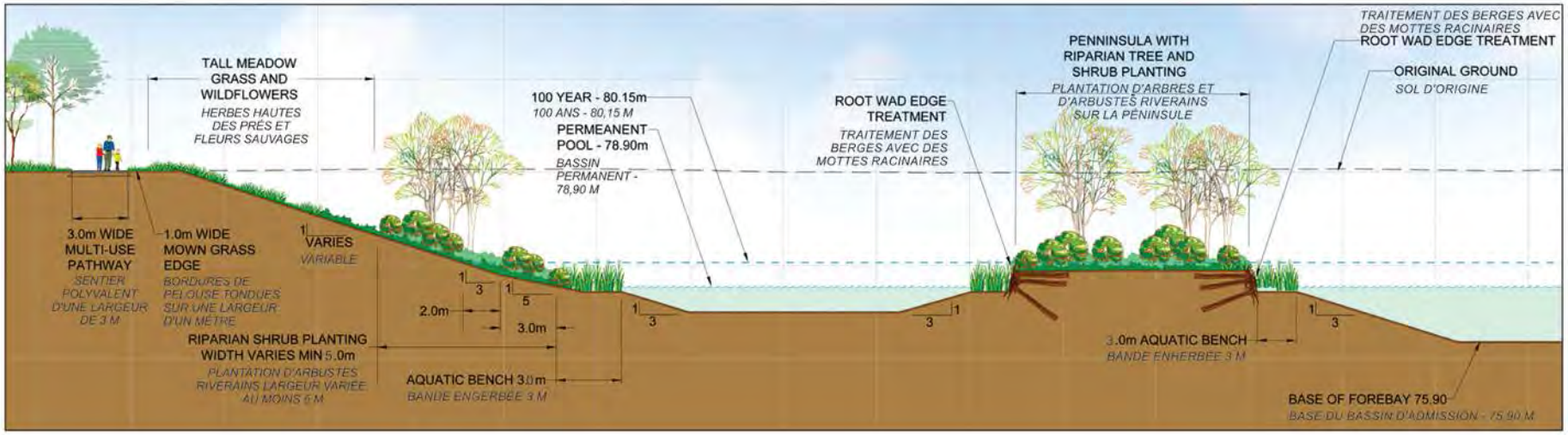
Plantation en hauteur

Conception préliminaire révisée du bassin de rétention



Vue transversale A-A: coupe transversale typique près de la rue Field





Vue transversale B-B

Mesures d'urgence

- Surveillance de base et régulière suivant la construction du bassin
- Advenant des activités à risque liées aux oiseaux à proximité du bassin, les mesures d'urgence s'appliqueraient
- Modification de la conception et gestion de la faune
- Toujours en attente de la réponse de Transport Canada relativement à l'évaluation des risques, aux mesures d'atténuation et aux plans d'urgence

Mesures d'atténuation possibles

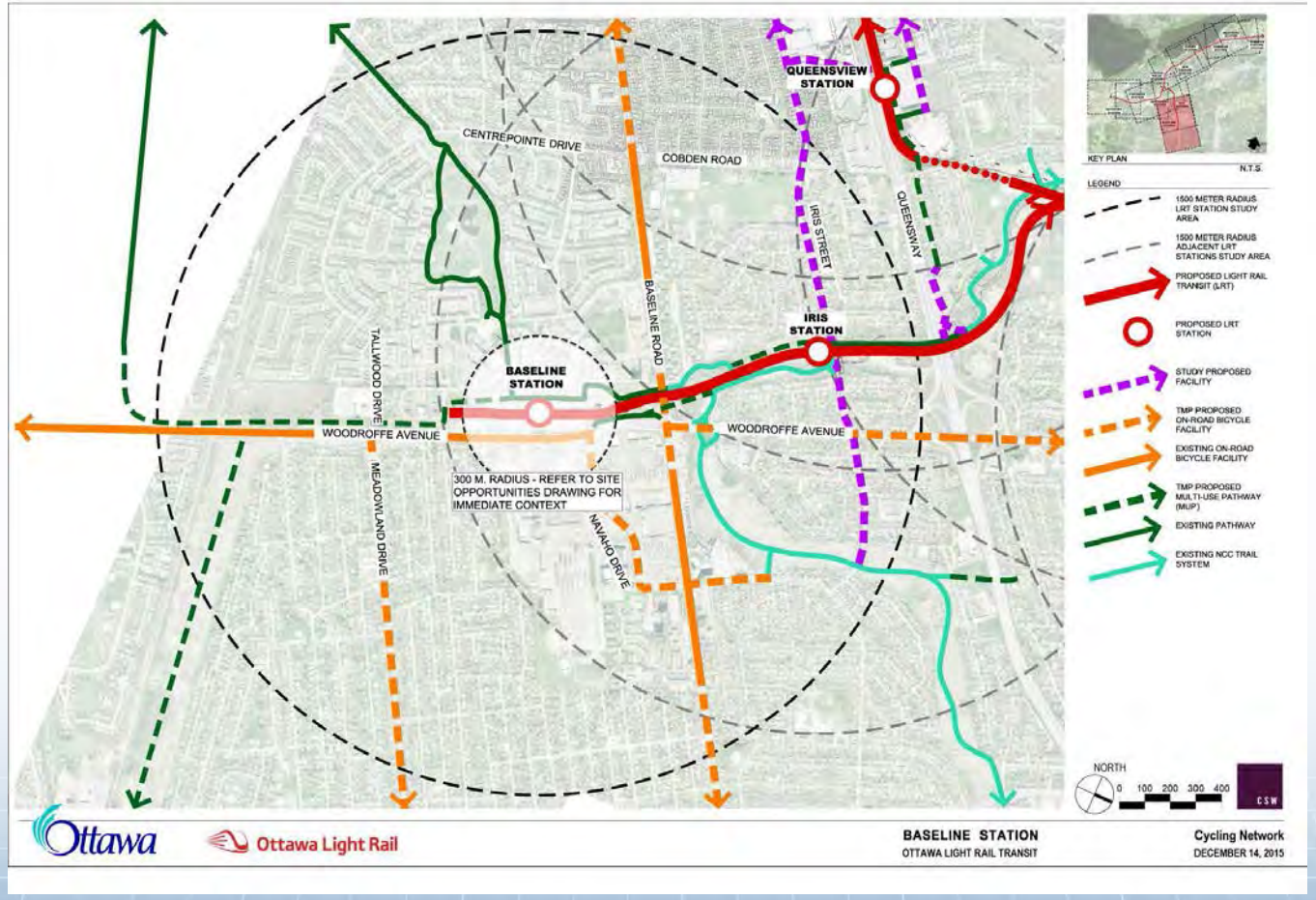
- Nouvelle conception :
  - Surcâblage
  - Autre aménagement paysager/durcissement
  - Autres plantations et aménagements paysagers pour réduire l'utilisation de certaines sections en particulier
- Gestion de la faune :
  - Enduire les œufs d'huile/secouer les œufs
  - Capturer/relâcher
  - Harcèlement

Prochaines étapes

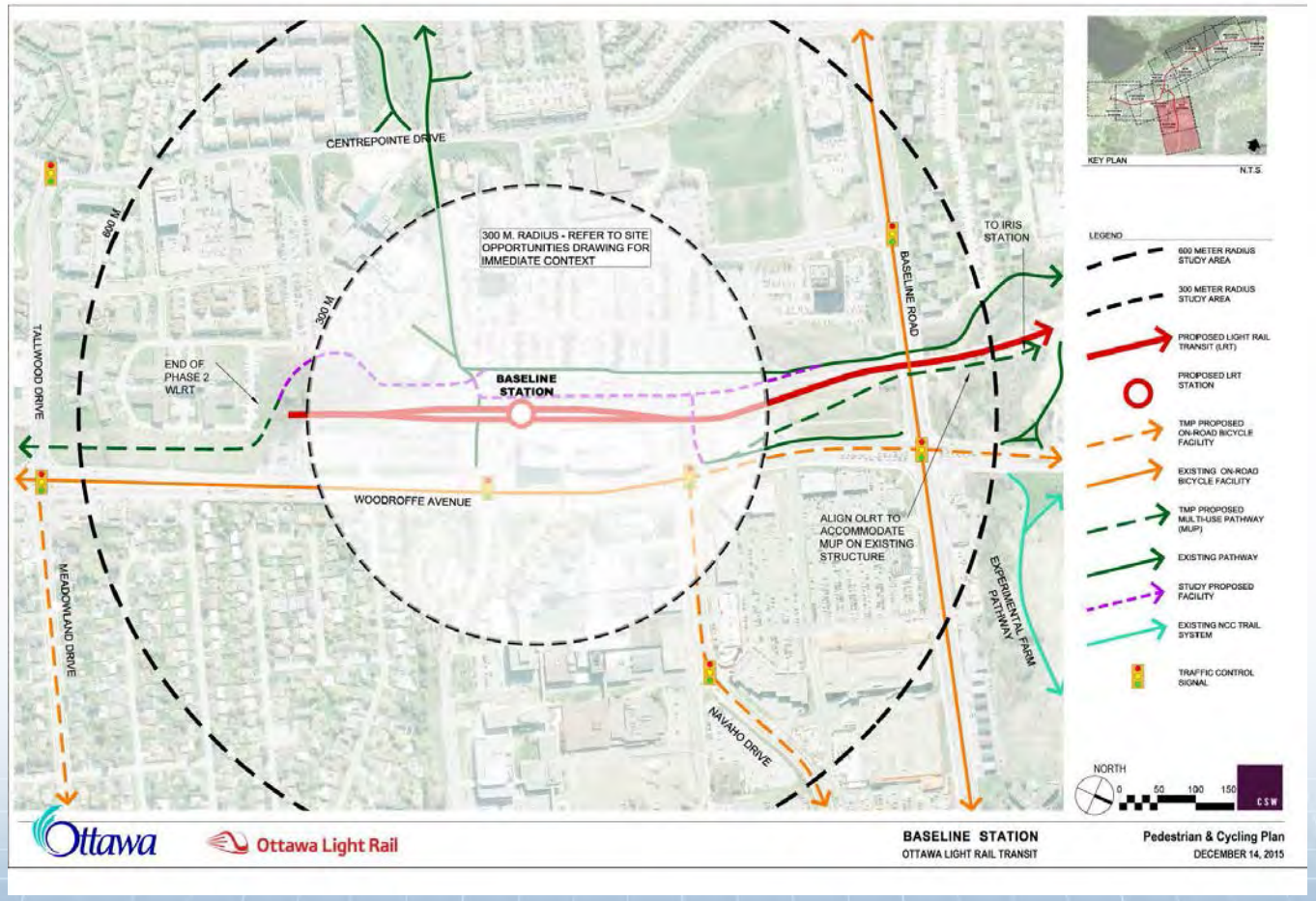
- Répondre aux autres préoccupations de la population entourant la conception du bassin (maintenant et régulièrement)
- Produire le rapport d'ÉE de portée générale (printemps 2017)
- Approbations du Comité de l'environnement et du Conseil municipal (juin 2017)
- Période de révision publique du rapport d'ÉE de portée générale de 30 jours (printemps/été 2017)
- Conception détaillée (2017)
- Construction dans le cadre du projet du TLR (calendrier à déterminer, après 2018)

Questions?

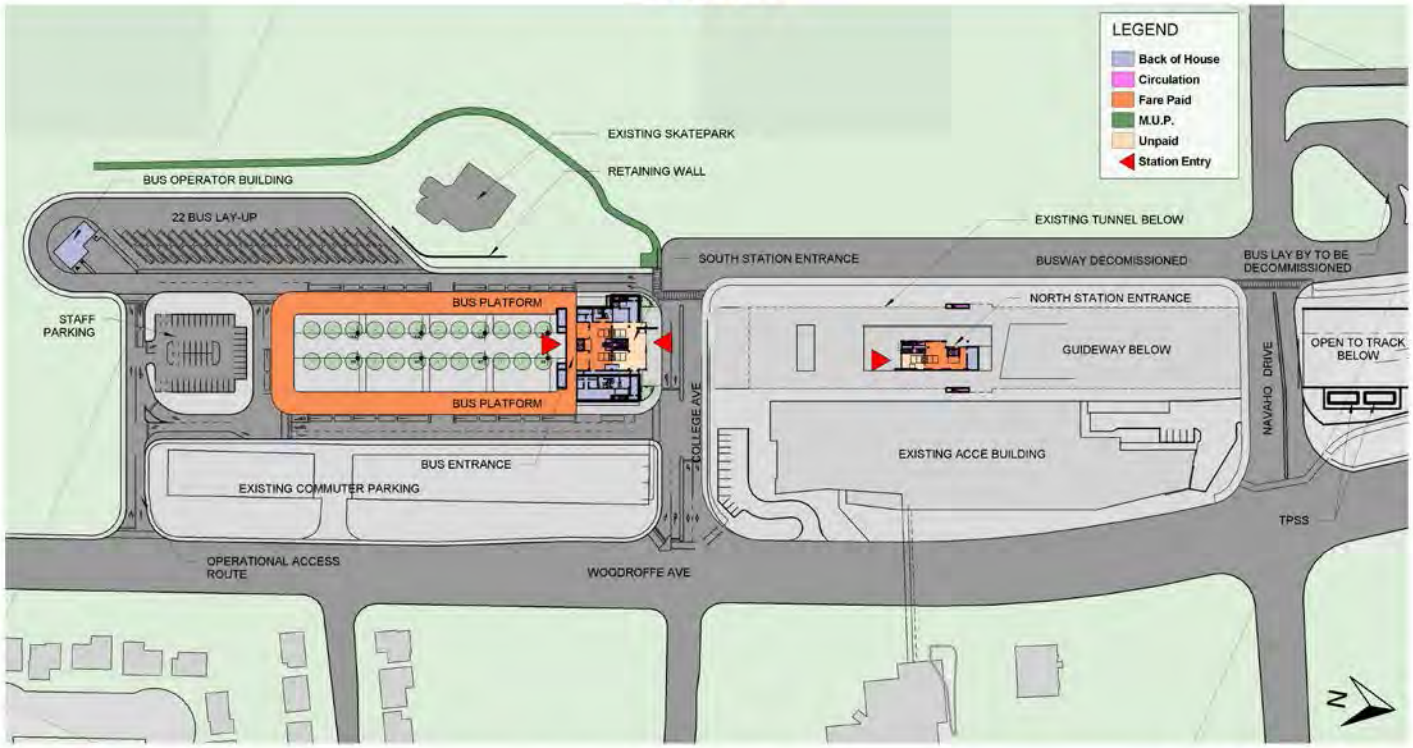
Connectivité - station Baseline



Connectivité - station Baseline



Configuration - station Baseline



Train

Baseline Station

STAGE ETAPE 2

Appendix C: Government Agencies Consultation Material

MNRF Correspondence

- Information Request – Pinecrest Creek SWMP near Baseline/Woodroffe, February 24, 2017
  - Attached: Natural Areas and Features Information Request Form
  - Attached: Pinecrest SWMP Project Study Area Map
- Information Request – Ottawa Light Rail Transit Expansion (Confederation East and West, and Trillium), August 29, 2016
- MNRF Response to Information Request – Ottawa Light Rail Transit Expansion (Confederation East and West, and Trillium), October 6, 2016

RVCA Correspondence

- Data Request – Pinecrest Creek Fisheries Values, February 24, 2017
  - Attached: Pinecrest Creek SWMP Project Study Area Map

Transport Canada Correspondence

- Meeting minutes: Transport Canada Meeting, May 2, 2017 (will be appended once finalized)
- Response from Transport Canada (will be appended once received)

From:	Thomas Howson
To:	Inforequest, Kemptville (MNRF)
Cc:	Casey Little; Bettina Henkelman; Grant Nichol; Sarah MacKelvie; Stage2; Kelly Roberts
Subject:	Information Request Form - City of Ottawa - Pinecrest Creek SWMP near Baseline/Woodroffe
Date:	Friday, February 24, 2017 12:35:04 PM
Attachments:	image001.jpg Kemptville Info Request Form-Pinecrest Creek SWMP-Feb24_2017.pdf Pinecrest Creek SWMP Study Area.pdf

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To whom this may concern,

Morrison Hershfield Limited (MH) has been retained by the City of Ottawa to conduct desktop research and field investigations to support the following proposed project in the Kemptville District.

- **Design of a Stormwater Management Facility at Pinecrest Creek near Baseline Road/Woodroffe Avenue – Bundled project to be potentially included under the current Ottawa Light Rail Transit (OLRT) Stage 2 Project.**

In partial fulfillment of the project agreement, MH is requesting both fisheries and terrestrial background information for the project study area along Pinecrest Creek. Please find attached the following documents/files related to the natural environment data request for this project:

- **Completed Information Request Form**
- **Pinecrest SWMP Project Study Area**

Thank you in advance and I look forward to your response.

Regards,
Tom

Thomas Howson
Fisheries Biologist
thowson@morrisonhershfield.com

cid:image001.jpg@01D163E9.86063AA0

2440 Don Reid Drive | Ottawa, ON K1H 1E1 Canada
Phone: 613-739-2910 ext. 1022421 | Fax: 613 739 4926
morrisonhershfield.com

Ministry of Natural Resources and Forestry

Natural. Valued. Protected.

Ontario

Email to MNR

Natural Areas and Features Information Request Form

Contact Information

Clear Contact

Name: Thomas Howson

Address: 2440 Don Reid Drive, Ottawa ON, K1H 1E1

Phone Number: (613) 739-2910 ☐ **Owner** ☑ **Consultant**

E-mail Address: thowson@morrisonhershfield.com

All red fields are mandatory

This includes X & Y Coordinates.

Please see page 2 for assistance.

Site Information

Clear Site

Project Name: Baseline/Woodroffe Stormwater Manageme

Geographic Township: NEPEAN **Lot:** 26 **Concession:** 2

Please refer to map on page 2 for info

X: 45.3529 **Y:** -75.7619 **Address:** _____

If more than 1 site, please provide all individual coordinates in an attached spreadsheet

Type of Proposal

Clear Details

- ☐ **Severance / Zoning**
- ☐ **Hydroline clearing**
- ☐ **RE Projects**
- ☐ **Aggregate Project**
- ☐ **Drains / Roads / Culverts**
- ☐ **Small Scale Projects (less than 5 hectares)**
- ☑ **Large Scale Projects (5 hectares or greater)**
- ☑ **Other:** Stormwater management facility

Attachments

****Please attach a Site Map showing the area of interest***

☐ **Picture** ☑ **Map(s)** ☐ **Engineered Drawings** ☐ **Other:** _____

Request

I would like to request the following information for the property identified above:

I would like to request all natural heritage/terrestrial/wildlife, Species at Risk, and fisheries/mussel information available for the above noted site as depicted in the attached map. Specific fisheries values that we would like to request include the in-water timing window for Pinecrest Creek, fish

To better respond to your request please briefly outline the purpose for which this information is required
(e.g. proposed development, lot severance, etc. or attach details):

The purpose of this request is to gather natural environment information for the project area prior to completing field investigations that will ground-truth the information received. The proposed works under this project include the design of a stormwater management facility/pond near the

Date of works proposed: 31 / Dec / 2018

Please forward the competed form to:

Kemptville.Inforequest@Ontario.ca OR **Fax: 613-258-3920**

Attention: Information Requests

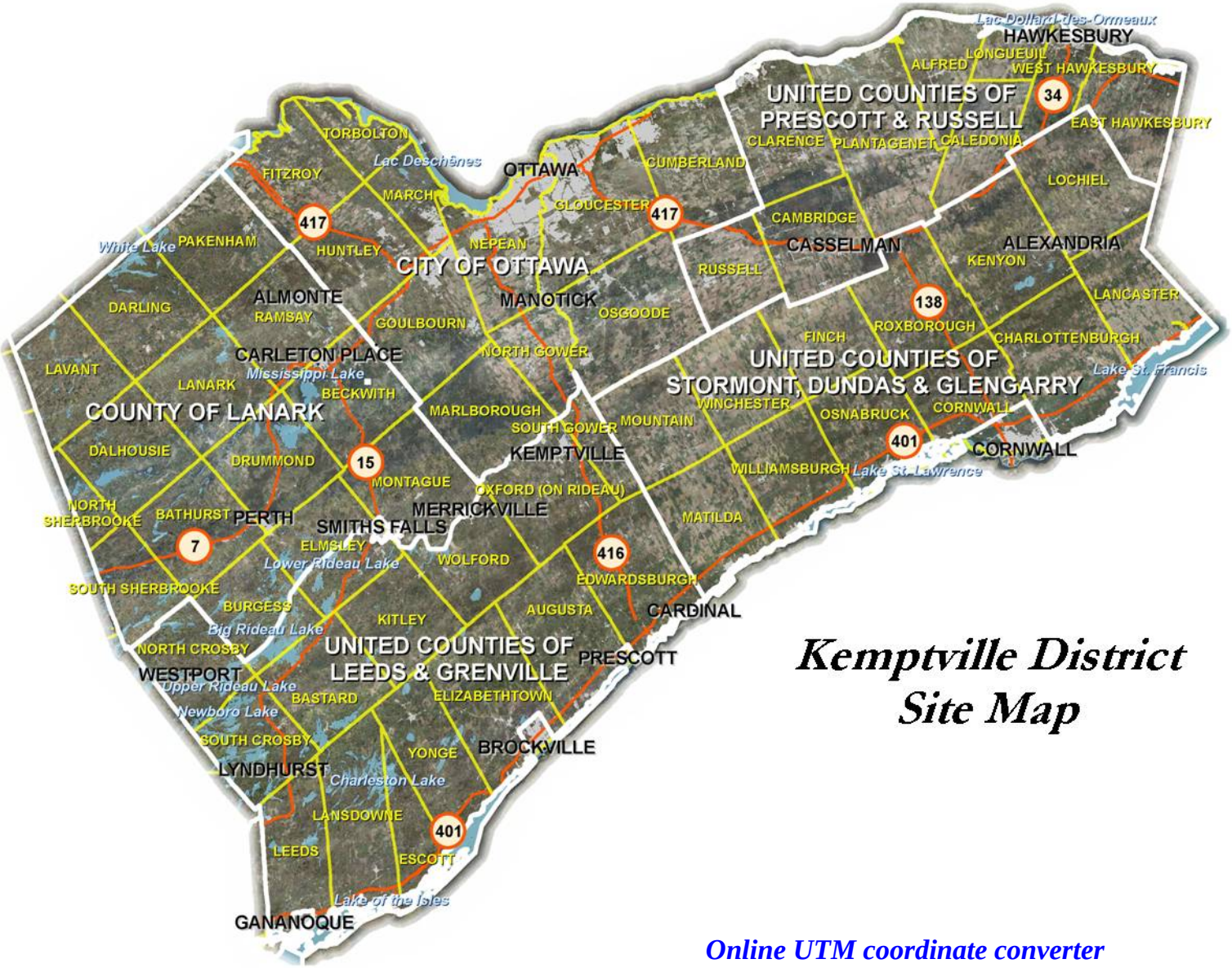
10 Campus Drive, Postal Bag 2002

Kemptville, ON K0G 1J0

Personal information contained in this form is collected in order to fulfill your request, respond to your inquiries and for other administration purposes. With regard to the personal information it collects, the ministry is bound by privacy protection rules under the Freedom of Information and Protection of Privacy Act and takes all necessary steps to safeguard personal information collected.

Please Note: This request MUST be made by the property owner or by someone acting on their behalf. Depending on the nature of the request, it may take 6-8 weeks to respond to your inquiry. If the request does not include the mandatory information, it may delay response time.

☑ ***I have read the above and agree to all Terms and Conditions***



Kemptville District Site Map

Online UTM coordinate converter

<u>How to get X, Y coordinates from Google Maps (2 options):</u>

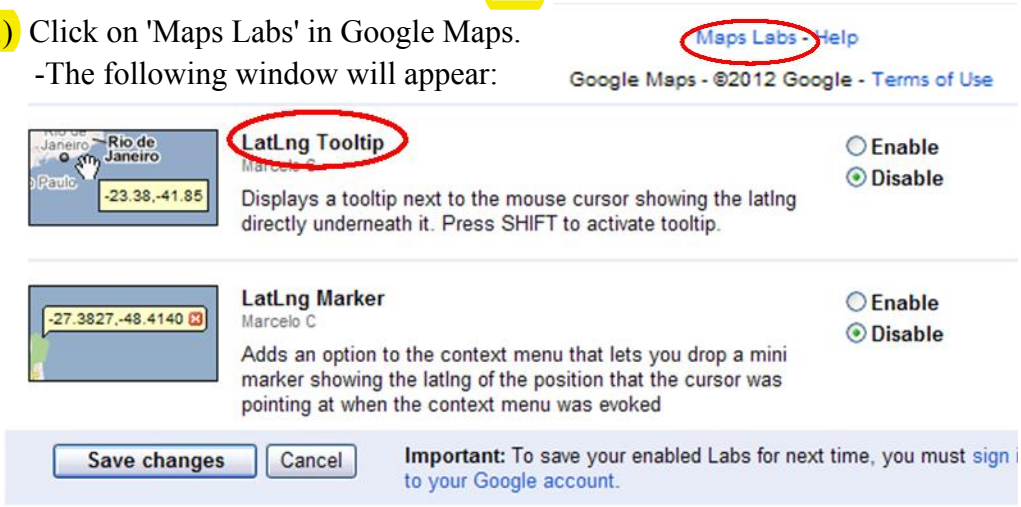
1.) Right-click on the map, at the point of interest, and select 'What's here?'.

-The Latitude & Longitude of the mouse click, in decimal degrees, will automatically appear in the Search box.

OR

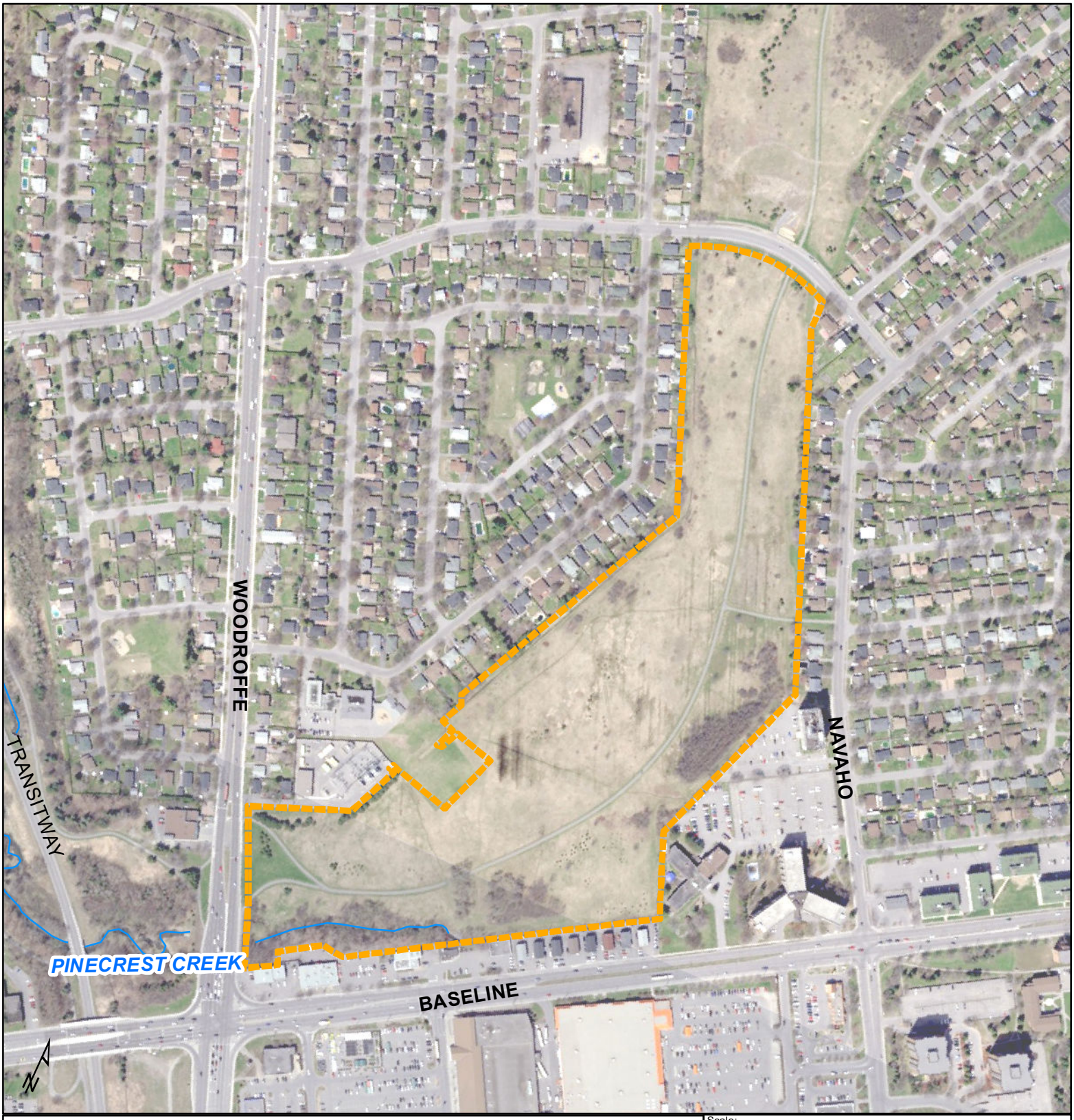
2.) Click on 'Maps Labs' in Google Maps.

-The following window will appear:



-Enable the LatLng Tooltip and then Save Changes.

-Now every time the **SHIFT** button is pressed in Google Maps, a Tool tip will appear with the Latitude and Longitude of the mouse location in decimal degrees.



Legend

- Study Area
- Watercourse
- Road Network

Scale: 1:5,000

0 25 50 100 150 200 250 Meters

Title: **Study Area**

Project No.: 2160121

Drawing No.:

MORRISON HERSHFIELD

Ottawa

Department: Environmental Services

Date: March 2016

L:\proj\2150384\00 North Island Link EA and Functional Design\EA Figures\Portrait\StudyArea_2160121.mxd

Ontario

MNR File Number: _____

Kemptville MNR Natural Areas and Features Information Request Form

Name*: Bettina Henkelman

Address*: 2440 Don Reid Drive

Phone Number*: 613-739-2910 x 2470

E-mail Address*: bhenkelman@morrisonhershfield.com

Property Location: OLRT Stage 2 (map attached)

Township (geographic)* - Ottawa

Lot and Concession* - too many properties to list

Property Roll No. - _____

*Fields with asterisk are manditory.

Attachments

I have attached a ☐ Picture ☒ Map ☐ Other _____

Request

I would like to request the following information for the property identified above:

Any SAR information for both federally and provincially listed species, (list attached) including those that are under review.

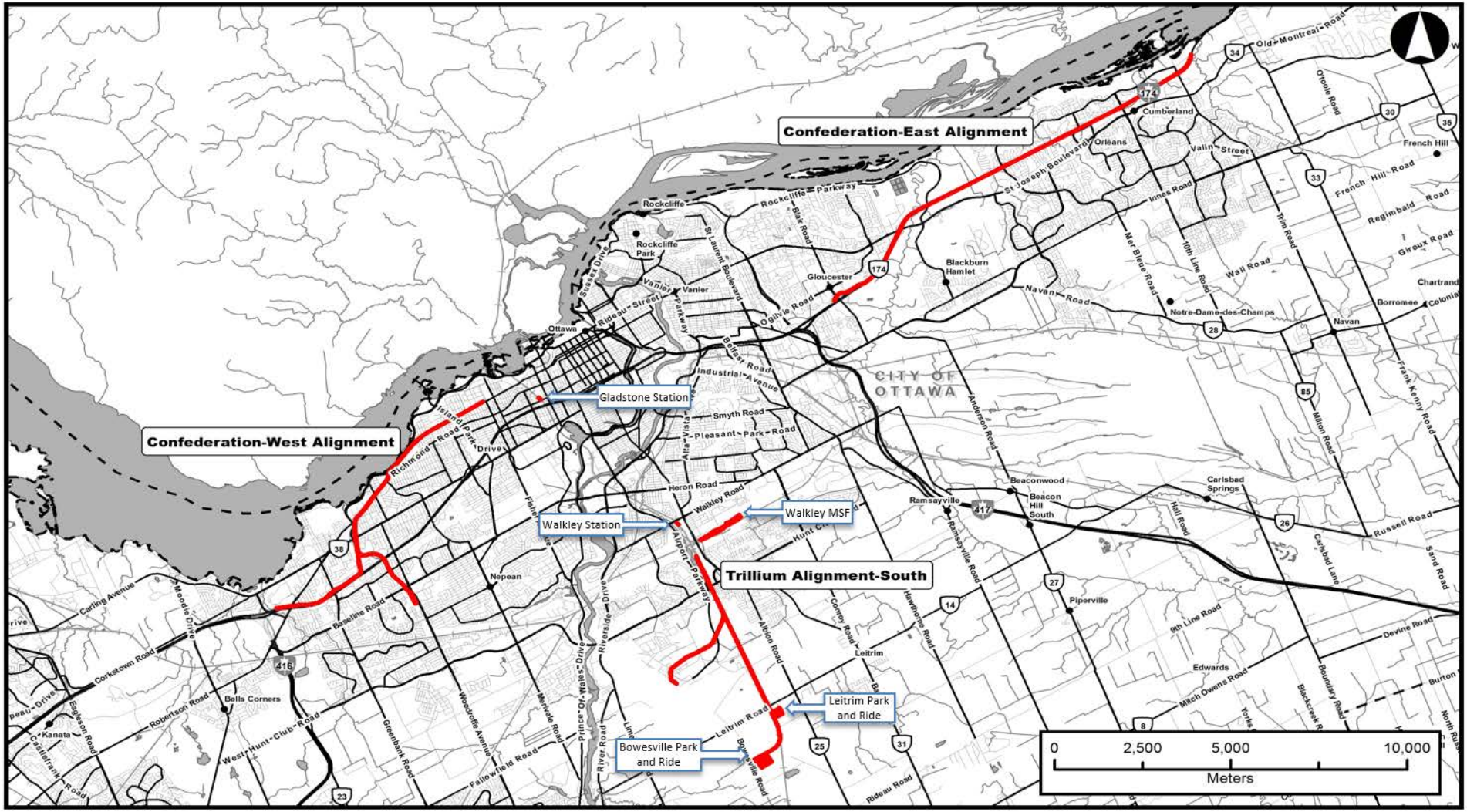
To better respond to your request please briefly outline the purpose for which this information is required (e.g. proposed development, lot severance, etc. or attach details):

For OLRT Stage 2 planning

Please forward the completed form to:

Kemptville.Inforequest@ontario.ca or Fax: 613-258-3920

10 Campus Drive, Postal Bag 2002
Kemptville, ON K0G 1J0
Atten: Information Requests


Confederation-East Alignment
Confederation-West Alignment
Trillium Alignment-South
Gladstone Station
Walkley Station
Walkley MSF
Leitrim Park and Ride
Bowesville Park and Ride
CITY OF OTTAWA
Ottawa
Rockcliffe
Rockcliffe Park
Vanier
Gloucester
Blackburn Hamlet
Orleans
Cumberland
Navan
Notre-Dame-des-Champs
Ramsayville
Beaconwood
Beacon Hill South
Carlsbad Springs
Piperville
Nepean
Bells Corners
Kanata
Leitrim
Edwards
Rockcliffe Parkway
Blair Road
St Laurent Boulevard
Ogilvie Road
Rideau Street
Sussex Drive
Vanier Parkway
Ballast Road
Industrial Avenue
Smyth Road
Pleasant Park Road
Alta Vista Drive
Heron Road
Walkley Road
Airport Parkway
Albion Road
Conroy Road
Hawthorne Road
Ramsayville Road
Anderson Road
Leitrim Road
Bowesville Road
Rideau Road
River Road
Prince of Wales Drive
Riverside Drive
Merivale Road
Woodroffe Avenue
Fallowfield Road
Greenbank Road
West Hunt Club Road
Robertson Road
Corkstown Road
Carling Avenue
Baseline Road
Moodie Drive
Richmond Road
Island Park Drive
Fisher Avenue
Hunt Club Road
Old Montreal Road
St Joseph Boulevard
Valin Street
Innes Road
Mer Bleue Road
10th Line Road
Wall Road
Navan Road
Trim Road
Milton Road
Frank Kenny Road
Russell Road
Hall Road
Carlsbad Lane
Sand Road
9th Line Road
Devine Road
Mitch Owens Road
Boundary Road
Blackcreek Road
Burton
Orchard Road
French Hill Road
Regimbald Road
Giroux Road
Chartrand
Borromee
Colonia
Eastern Road
Castlefrank Road
Peau Drive
Yorks
North Rus
0
2,500
5,000
10,000
Meters

List of SAR for Kemptville MNRF info-request, Aug 29, 2016 (note: status is in brackets after name, first federal, then provincial)

- Butternut (END|END)
- Western Chorus Frog (THR|NAR)
- Barn Swallow (THR|THR)
- Bobolink (NAR|THR)
- Eastern Meadowlark (NAR|THR)
- Little Brown Myotis (END|END)
- Flooded Jellyskin (NAR|THR)
- Blanding's Turtle (THR|THR)
- Bank Swallow (NAR|THR)
- Canada Warbler (THR|SC)
- Chimney Swift (THR|THR)
- Common Nighthawk (THR|SC)
- Eastern Whip-poor-will (THR|THR)
- Golden-winged Warbler (THR|SC)
- Olive-sided Flycatcher (THR|SC)
- Northern Myotis (END|END)
- Monarch (SC|SC)
- Yellow-banded Bumble Bee (NAR|SC)
- Eastern Milksnake (SC|NAR)
- Eastern Ribbonsnake (SC|SC)
- Northern Map Turtle (SC|SC)
- Snapping Turtle (SC|SC)
- Eastern Wood-pewee (NAR|SC)
- Peregrine Falcon (SC|SC)
- Rusty Blackbird (SC|NAR)
- Short-eared Owl (SC|SC)
- Wood Thrush (NAR|SC)
- Hickorynut (NAR|END)

No Current Status but may be under COSEWIC review:

- Black-foam Lichen (COSEWIC THR, no status provincially or federally)

Ministry of Natural Resources and Forestry

Kemptville District

10 Campus Drive
Postal Box 2002
Kemptville ON K0G 1J0
Tel.: 613 258-8204
Fax: 613 258-3920

Ministère des Richesses naturelles et des Forêts

District de Kemptville

10, promenade Campus
Case postale, 2002
Kemptville ON K0G 1J0
Tél.: 613 258-8204
Téléc.: 613 258-3920

Thu. Oct 6, 2016

Bettina Henkeman
Morrison Herschfield
2440 Don Reid Drive
Ottawa, Ontario
(613) 739 2910 x 2470

Attention: Bettina Henkelman

Subject: Information Request - Developments
Project Name: Ottawa Light Rail Transit Expansion (Confederation East and West, and Trillium)
Our File No. 2016_KVD-2255

Natural Heritage Values

The Ministry of Natural Resources and Forestry (MNRF) Kemptville District has carried out a preliminary review of the above mentioned area in order to identify any potential natural resource and natural heritage values.

The following Natural Heritage values were identified for the general subject area:

- ANSI, Life Science, Greens Creek Conservation Area (Provincial)
- Candidate ANSI, Life Science, Albion Road Wetland (Provincial)
- Candidate ANSI, Life Science, Petrie Island Wetland (Provincial)
- Evaluated Wetland, Leitrim (Evaluated-Provincial)
- Evaluated Wetland, Lester Road Wetland Complex (Evaluated-Provincial)
- Evaluated Wetland, Petrie Island (Evaluated-Provincial)
- Lake, Lac Deschênes (Non-Sensitive)
- Municipal Drain, Alexander (SAWMILLCK) Drain (Non-Sensitive)
- Municipal Drain, Orleans Drain (Non-Sensitive)
- Pond (Non-Sensitive)
- Unevaluated Wetland (Not evaluated per OWES)

Municipal Official Plans contain information related to natural heritage features. Please see the local municipal Official Plan for more information, such as specific policies and direction pertaining to activities which may impact natural heritage features. For planning advice or Official Plan interpretation, please contact the local municipality. Many municipalities require environmental impact studies and other supporting studies be carried out as part of the development application

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process to allow the municipality to make planning decisions which are consistent with the Provincial Policy Statement (PPS, 2014).

The MNRF strongly encourages all proponents to contact partner agencies and appropriate municipalities early on in the planning process. This provides the proponent with early knowledge regarding agency requirements, authorizations and approval timelines; Ministry of the Environment and Climate Change (MOECC) and the local Conservation Authority may require approvals and permitting where natural values and natural hazards (e.g., floodplains) exist.

As per the Natural Heritage Reference Manual (NHRM, 2010) the MNRF strongly recommends that an ecological site assessment be carried out to determine the presence of natural heritage features and species at risk and their habitat on site. The MNRF can provide survey methodology for particular species at risk and their habitats.

The NHRM also recommends that cumulative effects of development projects on the integrity of natural heritage features and areas be given due consideration. This includes the evaluation of the past, present and possible future impacts of development in the surrounding area that may occur as a result of demand created by the presently proposed project.

In Addition, the following Fish species were identified: American eel, banded killifish, black bullhead, black crappie, blackchin shiner, blacknose shiner, bluegill, bluntnose minnow, brassy minnow, brook stickleback, brown bullhead, brown trout, burbot, Carps and Minnows, central mudminnow, channel catfish, channel darter, cisco, common carp, common shiner, creek chub, eastern blacknose dace, eastern silvery minnow, emerald shiner, fallfish, fathead minnow, finescale dace, golden shiner, Iowa darter, johnny darter, johnny darter/tesselated darter, lake sturgeon, largemouth bass, logperch, longnose dace, longnose gar, longnose sucker, mimic shiner, mooneye, mottled sculpin, muskellunge, ninespine stickleback, North American Catfishes, northern brook lamprey, northern pike, northern redbelly dace, Notropis sp., pearl dace, Perches, pumpkinseed, rainbow smelt, Rhinichthys sp., river redhorse, rock bass, rosyface shiner, sand shiner, sauger, shorthead redhorse, silver lamprey, silver redhorse, slimy sculpin, smallmouth bass, spotfin shiner, spottail shiner, Suckers, Sunfishes, tadpole madtom, tessellated darter, trout-perch, walleye, white crappie, white sucker, yellow bullhead, yellow perch.

Wildland Fire

MNRF woodland data shows that the site contains woodlands. The lands should be assessed for the risk of wildland fire as per PPS 2014, Section 3.1.8 "*Development shall generally be directed to areas outside of lands that are unsafe for development due to the presence of hazardous forest types for wildland fire. Development may however be permitted in lands with hazardous forest types for wildland fire where the risk is mitigated in accordance with wildland fire assessment and*

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mitigation standards". Further discussion with the local municipality should be carried out to address how the risks associated with wildland fire will be covered for such a development proposal. Please see the Wildland Fire Risk Assessment and Mitigation Guidebook (2016) for more information.

MNRF's data identifies this areas in proximity to this project as having High Potential for wildland fire.

Significant Woodlands

Section 2.1.5 b) of the PPS states: *Development and site alteration shall not be permitted in significant woodlands unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.* The 2014 PPS directs that significant woodlands must be identified following criteria established by the Ontario Ministry of Natural Resources and Forestry, i.e. the Natural Heritage Reference Manual (NHRM), 2010. Where the local or County Official Plan has not yet updated significant woodland mapping to reflect the 2014 PPS, all wooded areas should be reviewed on a site specific basis for significance. The MNRF Kemptville District modelled locations of significant woodlands in 2011 based on NHRM criteria. The presence of significant woodland on site or within 120 metres should trigger an assessment of the impacts to the feature and its function from the proposed development.

Based on criteria from the NHRM, the site has potential for significant woodlands, based on the following criteria: Interior Forest and Interior Forest Support, Linkages, Old Growth and Old Growth Support, Proximity, Riparian Wood, Uncommon Species and Uncommon Species Support and Woodland Size

Significant Wildlife Habitat

Section 2.1.5 d) of the PPS states: *Development and site alteration shall not be permitted in significant wildlife habitat unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.* It is the responsibility of the approval authority to identify significant wildlife habitat or require its identification. The MNRF has several guiding documents which may be useful in identification of significant wildlife habitat and characterization of impacts and mitigation options:

- Significant Wildlife Habitat Technical Guide, 2000
- The Natural Heritage Reference Manual, 2010
- Significant Wildlife Habitat Mitigation Support Tool, 2014
- Significant Wildlife Habitat Criteria Schedule for Ecoregion 5E and 6E, 2015

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The habitat of special concern species (as identified by the Species at Risk in Ontario list) and Natural Heritage Information Centre tracked species with a conservation status rank of S1, S2 and S3 may be significant wildlife habitat and should be assessed accordingly.

Species at Risk

A review of the Natural Heritage Information Centre (NHIC) and internal records indicate that there is a potential for the following threatened (THR) and/or endangered (END) species on the site or in proximity to it:

- American Eel (END)
- Bank Swallow (THR)
- Barn Swallow (THR)
- Blanding's Turtle (THR)
- Bobolink (THR)
- Butternut (END)
- Chimney Swift (THR)
- Eastern Meadowlark (THR)
- Hickorynut (END)
- Little Brown Bat (END)
- Northern Long-eared Bat (END)
- Whip poor will (THR)

All endangered and threatened species receive individual protection under section 9 of the ESA and receive general habitat protection under Section 10 of the ESA, 2007. Thus any potential works should consider disturbance to the individuals as well as their habitat (e.g. nesting sites). General habitat protection applies to all threatened and endangered species. Note some species in Kemptville District receive regulated habitat protection. The habitat of these listed species is protected from damage and destruction and certain activities may require authorization(s) under the ESA. For more on how species at risk and their habitat is protected, please see: https://www.ontario.ca/page/how-species-risk-are-protected.

If the proposed activity is known to have an impact on any endangered or threatened species at risk (SAR), or their habitat, an authorization under the ESA may be required. It is recommended that MNRF Kemptville be contacted prior to any activities being carried out to discuss potential survey protocols to follow during the early planning stages of a project, as well as mitigation measures to avoid contravention of the ESA. Where there is potential for species at risk or their habitat on the property, an Information Gathering Form should be submitted to Kemptville MNRF at sar.kemptville@ontario.ca.

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The Information Gathering Form may be found here:
http://www.forms.ssb.gov.on.ca/mbs/ssb/forms/ssbforms.nsf/FormDetail?OpenForm&ACT=RDR&TAB=PROFILE&ENV=WWE&NO=018-0180E

For more information on the ESA authorization process, please see:
https://www.ontario.ca/page/how-get-endangered-species-act-permit-or-authorization

One or more special concern species has been documented to occur either on the site or nearby. Species listed as special concern are not protected under the ESA, 2007. However, please note that some of these species may be protected under the Fish and Wildlife Conservation Act and/or Migratory Birds Convention Act. Again, the habitat of special concern species may be significant wildlife habitat and should be assessed accordingly. Species of special concern for consideration:

- Canada Warbler (SC)
- Common Nighthawk (SC)
- Eastern Musk Turtle (SC)
- Eastern Wood-Pewee (SC)
- Golden-winged Warbler (SC)
- Milksnake (SC)
- Monarch (SC)
- Northern Map Turtle (SC)
- Olive-sided Flycatcher (SC)
- Peregrine Falcon (SC)
- Short-eared Owl (SC)
- Snapping Turtle (SC)
- Wood Thrush (SC)

If any of these or any other species at risk are discovered throughout the course of the work, and/or should any species at risk or their habitat be potentially impacted by on site activities, MNRF should be contacted and operations be modified to avoid any negative impacts to species at risk or their habitat until further direction is provided by MNRF.

Please note that information regarding species at risk is based largely on documented occurrences and does not necessarily include an interpretation of potential habitat within or in proximity to the site in question. Although this data represents the MNRF's best current available information, it is important to note that a lack of information for a site does not mean that additional features and values are not present. It is the responsibility of the proponent to ensure that species at risk are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the activities carried out on the site.

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The MNRF continues to strongly encourage ecological site assessments to determine the potential for SAR habitat and occurrences. When a SAR or potential habitat for a SAR does occur on a site, it is recommended that the proponent contact the MNRF for technical advice and to discuss what activities can occur without contravention of the Act. For specific questions regarding the Endangered Species Act (2007) or SAR, please contact MNRF Kemptville District at sar.kemptville@ontario.ca.

The approvals processes for a number of activities that have the potential to impact SAR or their habitat have recently changed. For information regarding regulatory exemptions and associated online registration of certain activities, please refer to the following website: https://www.ontario.ca/page/how-get-endangered-species-act-permit-or-authorization.

Please note: The advice in this letter may become invalid if:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) re-assesses the status of the above-named species OR adds a species to the SARO List such that the section 9 and/or 10 protection provisions apply to those species; or
- Additional occurrences of species are discovered on or in proximity to the site.

This letter is valid until: Fri. Oct 6, 2017

The MNRF would like to request that we continue to be circulated on information with regards to this project. If you have any questions or require clarification please do not hesitate to contact me.

Sincerely,

Lisa McShane
Management Biologist
lisa.mcshane@ontario.ca

Encl.\
-ESA Infosheet
-NHIC/LIO Infosheet

From:	Thomas Howson
To:	Justin Robert
Cc:	Jennifer Lamoureux; Grant Nichol; Sarah MacKelvie; Kelly Roberts; Stage2; Jocelyn.Chandler@rvca.ca; Ferdous.Ahmed@rvca.ca
Subject:	Data Request - Pinecrest Creek Fisheries Values
Date:	Friday, February 24, 2017 12:46:41 PM
Attachments:	Pinecrest Creek SWMP Project Location.kmz Pinecrest Creek SWMP Study Area.pdf image001.jpg

---

Hi Justin,

Morrison Hershfield Limited (MH) has been retained by the City of Ottawa to conduct a fisheries field investigation for the following proposed project within the jurisdictional boundaries of the Rideau Valley Conservation Authority.

- **Design of a Stormwater Management Facility at Pinecrest Creek near Baseline Road/Woodroffe Avenue – Bundled project to be potentially included under the current Ottawa Light Rail Transit (OLRT) Stage 2 Project (see attachments for project location details).**

In partial fulfillment of the project agreement, we would like to request any fish and fish habitat background information that the RVCA is able to provide us with for Pinecrest Creek with an emphasis on the proposed stormwater management facility/pond location. Specifically, the following fisheries information would be appreciated:

- Thermal regime
- Known areas of sensitivity (i.e. spawning and nursery locations)
- Fish/mussel species present (including aquatic SAR)
- In-water timing window

Please note that we are also requesting both fisheries and terrestrial background information from the MNRF Kemptville District for the project study area and have accessed the most recent City Stream Watch Summary Report for Pinecrest Creek.

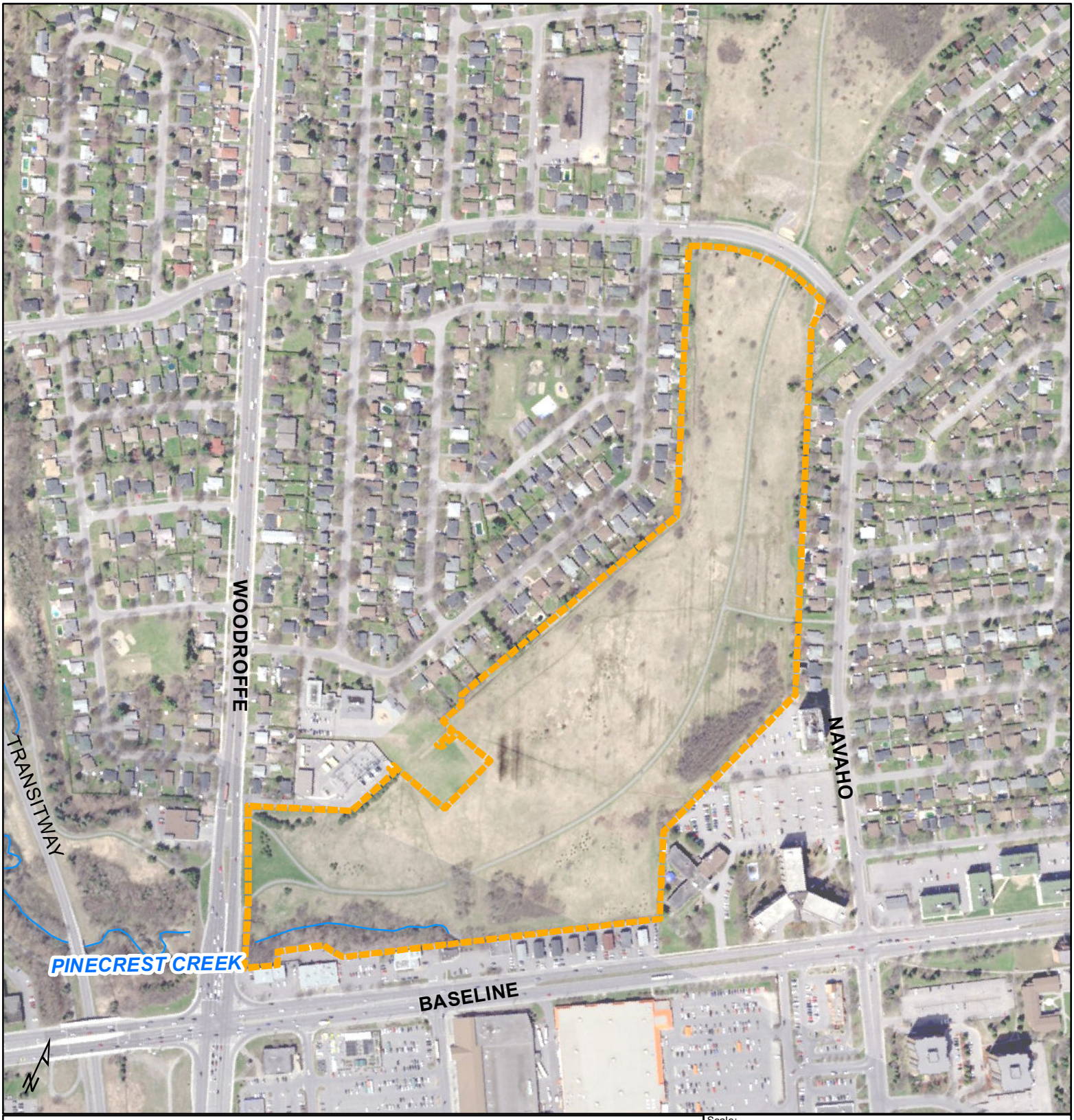
If there are any additional aquatic ecosystem values for the project study area that you are able to provide, please send along. Let us know if you have any comments or questions regarding this data request.

Thank you,
Tom

Thomas Howson
Fisheries Biologist
thowson@morrisonhershfield.com

cid:image001.jpg@01D163E9.86063AA0

2440 Don Reid Drive | Ottawa, ON K1H 1E1 Canada
Phone: 613-739-2910 ext. 1022421 | Fax: 613 739 4926
morrisonhershfield.com



Legend

- Study Area
- Watercourse
- Road Network

Scale: 1:5,000

0 25 50 100 150 200 250 Meters

Title: **Study Area**

Project No.: 2160121

Drawing No.:

MORRISON HERSHFIELD

Ottawa

Department: Environmental Services

Date: March 2016

L:\proj\2150384\00 North Island Link EA and Functional Design\EA Figures\Portrait\StudyArea_2160121.mxd

Appendix D: Aboriginal Consultation Material

- Correspondence: Email Notification of Public Meeting #2 to Aboriginal Communities of consultation May 15, 2017
    - Algonquins of Ontario - c/o Janet Stavinga
    - Algonquins of Pikwàkanagàn - Chief Kirby Whiteduck
    - Kitigan Zibi Anishinabeg - Chief Jean-Guy Whiteduck
    - Métis Council of Ontario

- Correspondence: Email Notification of Public Meeting #1 to Aboriginal Communities of consultation December 15, 2016
    - Algonquins of Ontario - c/o Janet Stavinga
    - Algonquins of Pikwàkanagàn - Chief Kirby Whiteduck
    - Kitigan Zibi Anishinabeg - Chief Jean-Guy Whiteduck
    - Métis Council of Ontario

- Correspondence: Email Notification of Online Open House to Aboriginal Communities of project and consultation November 3, 2016
    - Algonquins of Ontario - c/o Janet Stavinga
    - Algonquins of Pikwàkanagàn - Chief Kirby Whiteduck
    - Kitigan Zibi Anishinabeg - Chief Jean-Guy Whiteduck
    - Métis Council of Ontario

From: Conway, Darlene
To:

Subject: FW: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l"intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017
Date: Monday, May 15, 2017 12:56:40 PM
Attachments: AIWH BW-SWMPEA_final.pdf
AIWH BW-SWMPEA_final_FR.pdf
BW pond POH flyer_May 17bil FINAL.pdf

Hello all – FYI, a copy of the "As We Heard It" report is attached. This summary was prepared as part of the public consultation for the Class EA.

Regards,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27611
ottawa.ca/planning / ottawa.ca/urbanisme

From: Conway, Darlene
Sent: Monday, May 15, 2017 12:43 PM
Subject: RE: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017

Hello/Bonjour,

Attached please find a copy of the "As We Heard It" report.
Thanks to all who provided comments via the online information session (November 3, 2016 to January 16, 2017), the January 9, 2017 public meeting and through individual correspondence with City staff. A total of 98 responses to the online information session were received and 49 people signed in at the January public meeting.

All comments received have been summarized and responses provided in the attached report, including how the pond concept has been revised in response to these comments.

If you have any further questions or concerns, please join us at the Public Meeting this Wednesday evening, **May 17, 2017, 6:00pm to 9:00pm at St. Paul High School, 2675 Draper Avenue** (see

attached for further details).

Ci-joint, veuillez trouver une copie du rapport « Ce qui a été dit. »
Merci à tous ceux qui ont fait part de leurs commentaires à la séance d'information en ligne (du 3 novembre 2016 au 16 janvier 2017) et à la réunion publique du 9 janvier 2017, ainsi que par correspondance individuelle avec le personnel de la Ville. Nous avons reçu 98 réponses lors de la séance d'information, et 49 personnes ont participé à la réunion publique en janvier.

Tous les commentaires ont été résumés, et les réponses indiquées, avec la nouvelle définition d'un bassin qui en découle.

Pour toute autre question, nous vous invitons à la réunion publique qui aura lieu le mercredi soir **17 mai 2017, de 18h00 à 21h00 à l'École Secondaire St. Paul, 2675 avenue Draper** (voir ci-joint pour plus de détails).

Regards/Salutations,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27611
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From: Conway, Darlene
Sent: Thursday, May 04, 2017 4:58 PM
Subject: Baseline/Woodroffe SWM Pond Class EA - Public Meeting: May 17, 2017 / Bassin de rétention des eaux pluviales à l'intersection Baseline/Woodroffe évaluation environnementale- Réunion publique - le 17 mai 2017

Hello/Bonjour,

Thanks again to all who have provided comments to date about the proposed pond.

A public meeting will be held on **May 17, 2017 from 6:00pm to 9:00pm at St. Paul High School, 2675 Draper Avenue** (see attached for further details). A presentation will be provided at 7pm, followed by a Question and Answer session.

More information about the project can be viewed at: Ottawa.ca/baselinewoodroffepond

Two background studies can be viewed at: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

In the mean time, if you have any additional comments or concerns, please do not hesitate to contact me.

Merci à tous ceux qui nous ont fait part de leurs commentaires concernant le bassin de gestion des eaux pluviales de Baseline et Woodroffe.

Une séance publique sera tenue **le 17 mai 2017, de 18h00 à 21h00 à l'École Secondaire St. Paul, 2675 avenue Draper** (voir ci-joint pour plus de détails). Une présentation concernant le bassin de rétention aura lieu à 19h, suivi d'une période de question et réponse.

Pour en savoir plus sur le projet, visitez: Ottawa.ca/bassinderetentionbaselinewoodroffe
Deux études de fond peuvent être consultées en cliquant sur le lien suivant:
http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

Dans l'intervalle, n'hésitez pas à me contacter si vous avez des questions ou quelconque préoccupation.

Regards/Salutations,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

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From:
To:
Subject: FW: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Public Meeting: January 9, 2017
Date: Friday, December 16, 2016 10:56:55 AM
Attachments: BW pond POH flyer_bil.pdf
BWpond bassin.pdf

From: Conway, Darlene [mailto:Darlene.Conway@ottawa.ca]
Sent: Thursday, December 15, 2016 2:22 PM
Subject: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Public Meeting: January 9, 2017

Hello/Bonjour,

Thanks to all who have provided comments to date about the proposed pond.

A public meeting will be held on **January 9, 2017 from 6:30pm to 8:30pm at Ben Franklin Centre** (see attached for further details). A presentation about the proposed pond will be provided at 7pm, followed by a Question and Answer session.

More information about the project can be viewed at: Ottawa.ca/baselinewoodroffepond
Two background studies can be viewed at: http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

In the mean time, if you have any additional comments or concerns, please do not hesitate to contact me.

Merci à tous ceux qui nous ont fait part de leurs commentaires concernant le bassin de gestion des eaux pluviales de Baseline et Woodroffe.

Une séance publique sera tenue **le 9 janvier 2017, de 18h30 à 20h30 au centre Ben Franklin** (voir ci-joint pour plus de détails). Une présentation concernant le bassin de rétention aura lieu à 19h, suivi d'une période de question et réponse.

Pour en savoir plus sur le projet, visitez: Ottawa.ca/bassinderetentionbaselinewoodroffe
Deux études de fond peuvent être consultées en cliquant sur le lien suivant:
http://www.rickchiarelli.com/baselinewoodroffe-stormwater-management.html

Dans l'intervalle, n'hésitez pas à me contacter si vous avez des questions ou quelconque préoccupation.

Regards/Salutations,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

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From:	Conway, Darlene
To:	Conway, Darlene
Subject:	FW: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Online Information Session: November 3 to November 21, 2016
Date:	Tuesday, March 28, 2017 2:21:13 PM
Attachments:	image001.jpg image002.gif BWpond bassin.pdf

From: Conway, Darlene
Sent: Thursday, November 03, 2016 8:58 AM
Subject: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Online Information Session: November 3 to November 21, 2016

Hello/Bonjour,

The City of Ottawa has initiated a Municipal Class Environmental Assessment (Class EA) for a proposed Stormwater Management Pond at the northeast corner of Baseline Road and Woodroffe Avenue. A stormwater management pond was initially recommended in the Pinecrest Creek/Westboro Stormwater Management Retrofit Study (2011) and underwent further assessment in the Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue (2015).

The proposed pond will provide treatment and flow control for runoff from some 435 hectares that currently drain uncontrolled to Pinecrest Creek. The pond is being planned under Schedule B of the Municipal Class EA and will identify a preferred alternative and functional design for the pond.

You are invited to an Online Information Session at this link to review and comment on the existing conditions and pond alternatives: Ottawa.ca/baselinewoodroffepond
Please fill out the questionnaire by November 21, 2016. The study team will review all comments and respond to any concerns or questions before the Class EA report is completed.

Should you have any questions, please do not hesitate to contact me.

La Ville d'Ottawa a entrepris une évaluation environnementale de portée générale concernant l'aménagement d'un bassin de rétention des eaux pluviales à l'angle nord-est du chemin Baseline et de l'avenue Woodroffe. L'aménagement d'un tel bassin avait été initialement recommandé dans l'Étude de modernisation de la gestion des eaux pluviales du ruisseau Pinecrest/Westboro (2011) et avait fait l'objet d'une nouvelle évaluation dans le cadre de l'Étude de faisabilité pour l'installation de gestion des eaux pluviales de surface à l'angle du chemin Baseline et de l'avenue Woodroffe (2015).

Le bassin proposé assurera le traitement et la régulation des eaux de ruissellement provenant de quelque 435 hectares qui s'écoulent actuellement d'une manière incontrôlée vers le

ruisseau Pinecrest.

L'étude d'aménagement du bassin, qui est effectuée en vertu de l'annexe B de l'évaluation environnementale municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

Le lien ci-dessous vous invite à une séance d'information en ligne qui vous permettra d'examiner et de commenter les conditions actuelles et les options proposées pour le bassin:
Ottawa.ca/ bassinderetentionbaselinewoodroffe **Veuillez remplir le questionnaire d'ici le 21 novembre 2016.** L'équipe de l'étude examinera tous les commentaires reçus et répondra aux préoccupations et questions soulevées avant que le rapport d'évaluation environnementale de portée générale ne soit terminé.

Si vous avez des questions, veuillez ne pas hésiter à communiquer avec moi.

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
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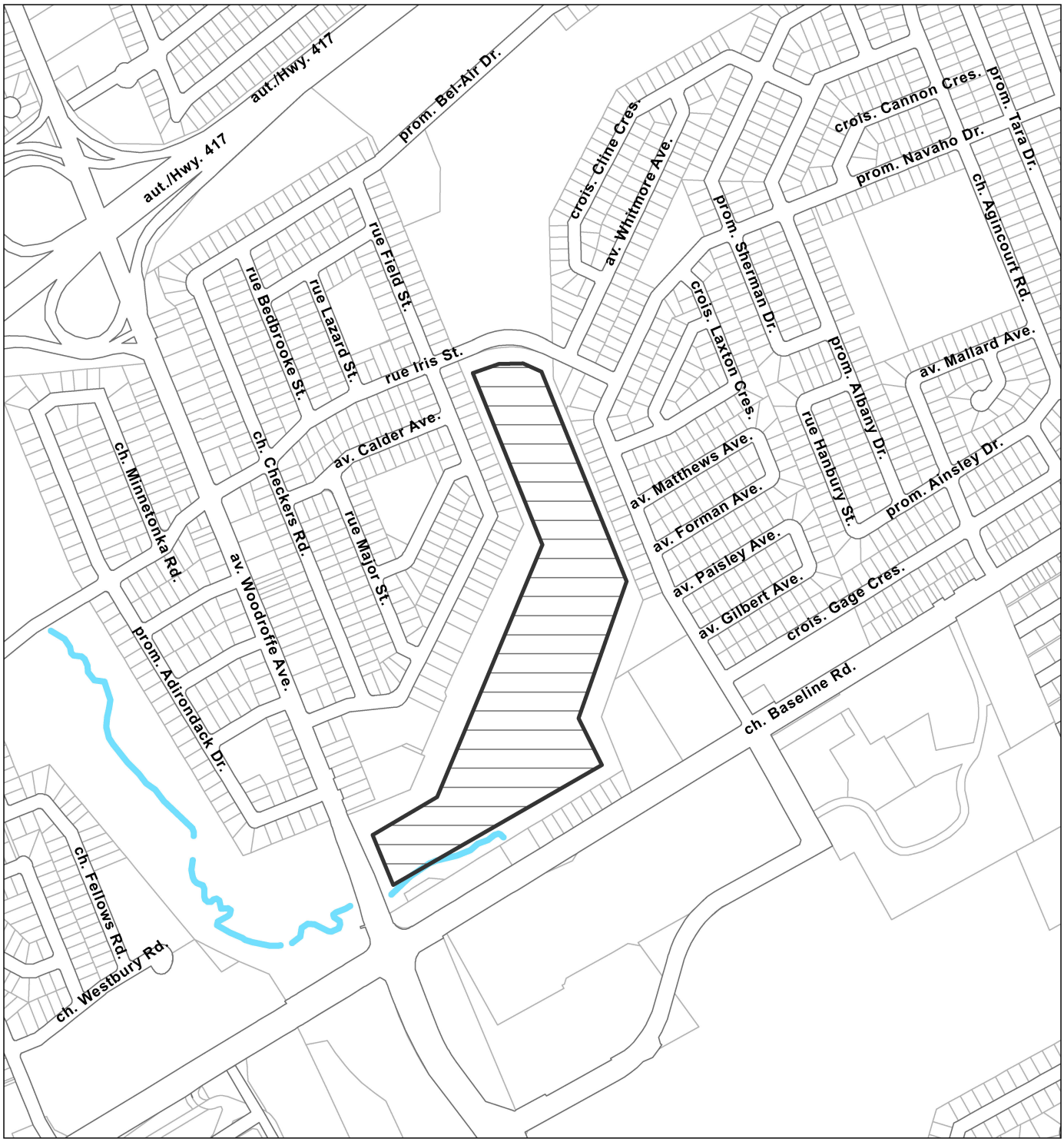

Ottawa PLANNING AND GROWTH MANAGEMENT URBANISME ET GESTION DE LA CROISSANCE

	16-0941-B

I:\CO\2016\ Location \BAselineWoodroffePond

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REVISION / RÉVISION - 2016 / 07 /05

LOCATION MAP / PLAN DE LOCALISATION

Ruisseau Pinecrest Creek

Location of proposed stormwater management pond
Emplacement du bassin de gestion des eaux pluviales proposé

NOT TO SCALE

FAX COMMUNICATION / TÉLÉCOPIE

To / Destinataire	Métis Nation of Ontario
Fax / Télécopieur	613-722-4225
From / Expéditeur	Darlene Conway, P. Eng., City of Ottawa
Pages / pages :	1 of 3 Date: November 3, 2016
Subject / Objet	Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment – Online Information Session

Please see attached.

Regards,

DEC

Darlene Conway, P. Eng.
Senior Project Manager / Policy Development and Urban Design
Gestionnaire principal de projet / Service d'urbanisme et de la gestion de la croissance

PLANNING AND GROWTH MANAGEMENT
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Conway, Darlene

From: Conway, Darlene
Sent: Thursday, November 03, 2016 8:58 AM
Subject: Baseline/Woodroffe Stormwater Management Pond Class Environmental Assessment - Online Information Session: November 3 to November 21, 2016
Attachments: BWpond bassin.pdf

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You are invited to an Online Information Session at this link to review and comment on the existing conditions and pond alternatives: Ottawa.ca/baselinewoodroffepond
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L'étude d'aménagement du bassin, qui est effectuée en vertu de l'annexe B de l'évaluation environnementale municipale de portée générale, permettra de définir l'option et la conception fonctionnelle qui conviennent le mieux pour l'aménagement.

Le lien ci-dessous vous invite à une séance d'information en ligne qui vous permettra d'examiner et de commenter les conditions actuelles et les options proposées pour le bassin:
Ottawa.ca/ bassinderetentionbaselinewoodroffe **Veuillez remplir le questionnaire d'ici le 21 novembre 2016.** L'équipe de l'étude examinera tous les commentaires reçus et répondra aux préoccupations et questions soulevées avant que le rapport d'évaluation environnementale de portée générale ne soit terminé.

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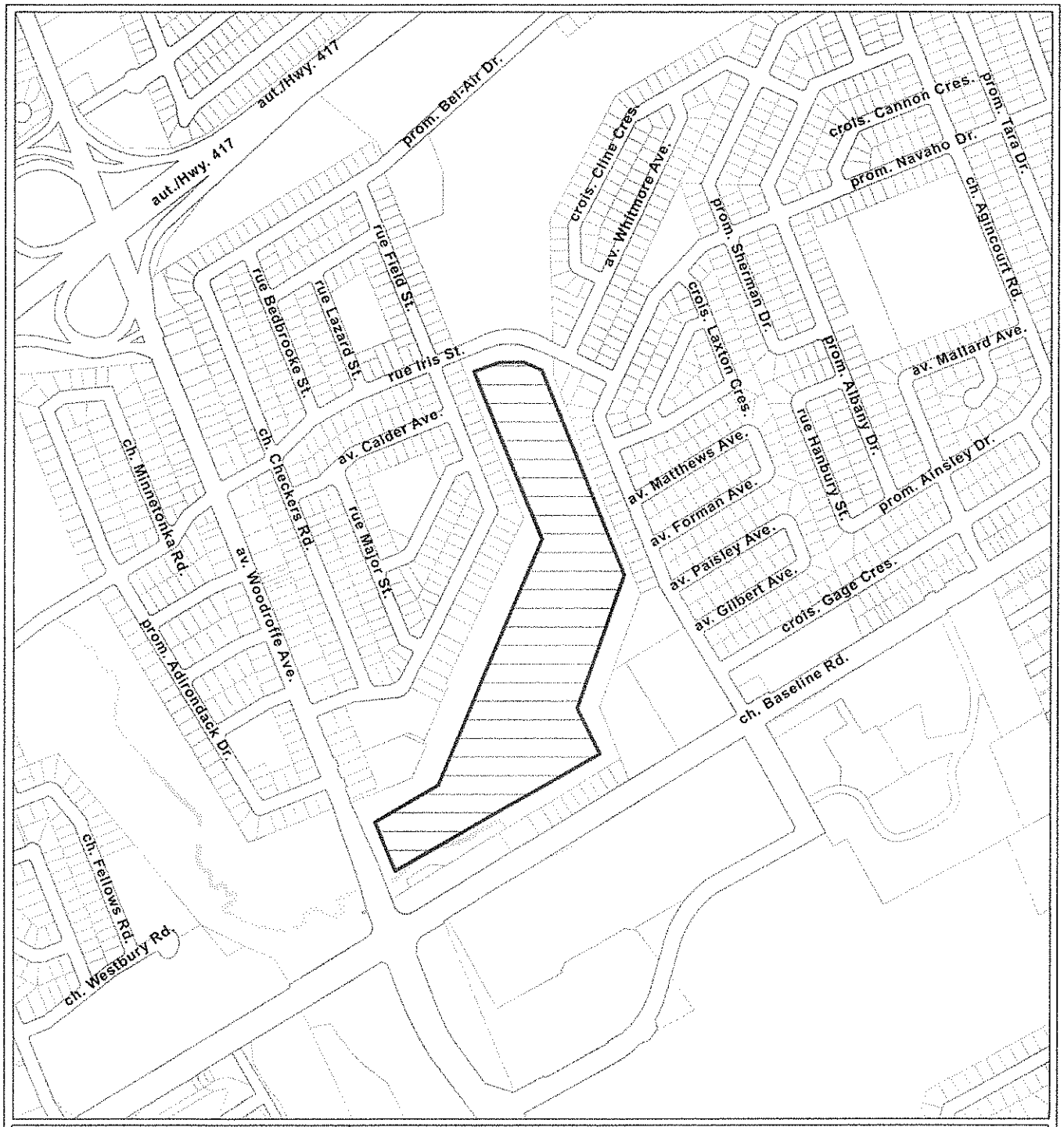

Ottawa PLANNING AND GROWTH MANAGEMENT URBANISME ET GESTION DE LA CROISSANCE

16-0941-B

I:\CO\2016\ Location \BAselineWoodroffePond

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REVISION / RÉVISION - 2016 / 07 /05

LOCATION MAP / PLAN DE LOCALISATION

Ruisseau Pinecrest Creek

Location of proposed stormwater management pond
Emplacement du bassin de gestion des eaux pluviales proposé

Appendix E: Phase II Environmental Site Assessment

- Phase II Environmental Site Assessment, Morrison Hershfield Limited, June 6, 2017

MEMORANDUM

TO:	Karyn Cornfield	ACTION BY:	
FROM:	Mitchell Dawley, Adel Chowdhury	FOR INFO OF:	
RESPOND BY:		PROJECT No.:	2150308
RE:	Pinecrest Stormwater Management Pond - Phase II ESA	DATE:	June 6, 2017

Introduction

This technical memorandum provides the results of the Phase II Environmental Site Assessment (ESA) completed at the National Capital Commission (NCC) owned parkland situated at the north-east corner of the intersection of Baseline Road and Woodroffe Avenue (the Site). This Site is the planned location for the proposed Pinecrest Stormwater Management Pond (SWMP) and this Phase II ESA was carried out to support the pond design.

The objectives of this Phase II ESA were to determine excess material management requirements during pond construction and to assess the site from an environmental quality standpoint in order to determine any risk reduction measures or remedial options that may be required to build the SWMP.

Site Description and Project Background

The Site of the proposed Pinecrest SWMP is currently owned by the NCC and is parkland, consisting of grassed areas and multi-use pathways. Pinecrest Creek travels along the southern limit of the Site before crossing beneath Woodroffe Avenue. The Site limits can be seen on **Figure 1** in **Appendix A**.

The design for the proposed Pinecrest SWMP consists of a U-shaped pond geometry involving two storage cells. The first cell is a sediment forebay, used to improve water quality via sedimentation before the water flows to the larger permanent pool (the second cell). The proposed SWMP will have one inlet that will allow excessive flow from Pinecrest Creek to enter the pond via a culvert. Similarly, the SWMP design includes two outlet structures leading back to Pinecrest Creek: a quality control pipe, used to handle the majority of flows and a quantity control box culvert used to manage volume during excessive storm events.

Areas of Potential Environmental Concern

The following supporting environmental reports were reviewed prior to initiation of this Phase II ESA:

- *Phase I Environmental Site Assessment Vacant Lot of Land Woodroffe Avenue to Iris Street Property Asset # 95594, Ottawa, Ontario. Trow Associates Inc., 2006.*

- *Enhanced Phase I Environmental Site Assessment Vacant Lot of Land, East of Woodroffe Avenue, North of Baseline Road, Ottawa, Ontario. Trow Associates Inc., 2008.*

These Phase I ESAs were prepared for the NCC, with the first report being an assessment of the Site and the second report being an assessment of a vacant parcel of land to the north of the Site, just east of Woodroffe Avenue. The reports concluded that the Site has been recreational vacant land since the 1950s and that even though historical commercial land use (including a dry cleaner and gasoline service stations) was present to the south of the Site along Baseline Road, groundwater impacts from these activities are unlikely as any impacts would have been observed in Pinecrest Creek.

The reports did identify one area of potential environmental concern (APEC) in the form of a hydro transformer sub-station, present to the north of the Site. Staining was observed on the gravel surface within the transformer station. Identified contaminants of concern (COCs) associated with this APEC included metals, petroleum hydrocarbons (PHCs) and polychlorinated biphenyls (PCBs) in both soil and groundwater.

Additionally, an inquiry made to the City of Ottawa regarding potential contamination within the Site identified an active Ministry of Environment and Climate Change (MOECC) Environmental Compliance Approval (ECA) for an Oxygen Injection System on the property located at 1980 Baseline Road, related to a treatment system for PHCs and chlorinated Volatile Organic Compounds (VOCs.) Based on further review of historical photographs, available documents, and site visit carried out on the treatment system, the following was concluded:

- A former retail fuel outlet is apparent on the 1965, 1976, 1991, and 1999 aerial photos on the geo-Ottawa site. Its location is approximately 50 m south of Baseline Road and 90 m east of Woodroffe, at the northwest corner of the current Loblaws parking lot.

- A treatment system for petroleum hydrocarbons in groundwater has been operational in the location of this former retail fuel outlet under MOECC ECA No. 2914-66JL7Z from November 9, 20014 to June 23, 2016 and under ECA No. 3878-AB7LHZ from June 23, 2016 to present.

- Based on the likely location of the contaminated soil and/or groundwater, on the far side of Pinecrest Creek from the proposed pond and at least 140 m from the closest area where excavation will occur, and based on the fact the neither PHC F1-F4 nor BTEX were detected in the two installed monitoring wells, no further investigation of this issue is required, and it is not expected to have any impact on the construction, maintenance, or operation of the proposed storm pond.

Methodology

Refer to **Appendix B** for details on the Phase II ESA methodology.

Environmental Field Investigation

The environmental investigation was performed alongside the geotechnical and hydrogeological field investigation. Two geo-environmental boreholes were advanced at the Site, one in the central portion of the Site where the permanent pool is planned (BWP-1) and another in the immediate vicinity of the transformer substation (BWP-2), to address the identified APEC. Environmental soil samples were collected from both boreholes, with select samples being sent to the lab for analysis of one or more COCs**.**

The locations of the geo-environmental boreholes can be seen on **Figure 1** in **Appendix A**. Both boreholes were drilled between January 16 and January 18, 2017. Borehole BWP-1 included bedrock coring and was advanced to a total depth of 16.58 meters below ground surface (mbgs). The environmental screening and sample collection in this borehole concluded at 8.23 mbgs. Borehole BWP-2 was advanced in the overburden to a depth of 7.62 mbgs, with environmental screening throughout. Both boreholes were equipped with monitoring wells containing a 3.05 m well screen. The monitoring well in BWP-1 was installed according to requirements of the hydrogeological investigation, resulting in the well being installed in bedrock with a bottom screen depth of 16.58 mbgs. The monitoring well at BWP-2 was constructed according to environmental protocols, with the bottom of the screen installed at 7.45 mbgs in an effort to straddle the water table. Groundwater samples were collected from both monitoring wells and submitted to the lab for analysis of the COCs.

A summary of the environmental field investigation is provided in **Table 1**.

Table 1: Summary of the Phase II ESA Field Program

Borehole No.	Total Drilling Depth (mbgs)	Soil Analysis Performed	Monitoring Well Screen Interval (mbgs)	Groundwater Analysis Performed
BWP-1	16.58	SA1 (Native): Metals SA4 (Native): Metals SA7 (Native): PAHs, PHCs, VOCs, PCBs SA8 (SA7 DUP): PAHs, PHCs, VOCs, PCBs	13.53 – 16.58	Dissolved Metals, PAHs, PHCs, VOCs, PCBs
BWP-2	7.62	SA1 (Native): PAHs, PCBs SA2 (Native): Metals SA22 (SA2 DUP): Metals SA4 (Native): PHCs, VOCs	4.40 – 7.45	Dissolved Metals, PAHs, PHCs, VOCs, PCBs

Subsurface Conditions Encountered

Surficial Geology

The subsurface conditions encountered in the two geo-environmental boreholes consisted of topsoil and silty sand underlain by intermediate to high plasticity silty clay. The silty sand

deposit extends to a depth of 1.98 mbgs in BWP-1 and 0.46 mbgs in BWP-2. The silty sand layer is underlain by a clay to silty clay deposit that extended to the borehole completion depth in BWP-2 (7.62 mbgs) and to the completion depth of the environmental portion of BWP-1 (8.23 mbgs). No field evidence of contamination (odour or staining) was observed in the soil from either borehole.

Headspace organic vapour measurements in the form of peak Photoionization Detector (PID) and Combustible Gas Indicator (CGI) readings were taken for all collected environmental samples. No measurable PID or CGI readings were obtained from the soil samples collected from BWP-1. Likewise, no measurable PID readings were obtained from the soil samples from BWP-2, but a maximum CGI reading of 15 ppm was obtained from soil sample SA4. This sample corresponded with the water table and was submitted for PHC and VOC analysis.

A detailed description of the subsurface conditions encountered during drilling is presented on the borehole logs in **Appendix C**.

Hydrogeology

Groundwater levels in BWP-1 and BWP-2 were measured on January 25, 2017 and January 20, 2017, respectively, using an electronic water level tape. The water levels were measured prior to purging and sampling of the wells and are considered to be representative of static conditions. The water level depths and water elevations in meters above sea level (masl) are presented in **Table 2** below:

Table 2: Static Water Levels

Monitoring Well ID	Screen Interval (mbgs)	Date of Water Level Measurement	Water Level (mbgs)	Surface Elevation (masl)	Water Elevation (masl)
BWP-1	13.53 – 16.58	Jan 25, 2017	5.38	85.69	80.31
BWP-2	4.40 – 7.45	Jan 20, 2017	2.37	84.32	81.95

Three wells volumes were purged from both wells using polyethylene tubing and a dedicated Waterra™ inertial pump prior to sampling with a peristaltic pump. No sheen or odour was observed in the purge water from either monitoring well.

Applicable Standards

Provincial standards described in the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*" dated April 15, 2011 are currently used for the assessment of potentially contaminated sites in the context of *Ontario Regulation ("O. Reg.") 153/04* as amended. Given that the Site and the surrounding lands are serviced by a municipal drinking water supply which is not supplied by the local groundwater, that the overburden thickness encountered in the two (2) boreholes completed at the Site was greater than 2 m, that the Site is not considered an environmentally sensitive site and that the closest water body is over 30 m away, the following Site Condition Standards (SCS) were used to assess the soil and groundwater quality at the Site:

- **For Soil:** MOECC Soil, Groundwater and Sediment Standards for Use under Part XV.1 of the *Environmental Protection Act*, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil Conditions for Residential/ Parkland/ Institutional Property Use, April 15, 2011. (MOECC Table 3)

- **For Groundwater:** MOECC Soil, Groundwater and Sediment Standards for Use under Part XV.1 of the *Environmental Protection Act*, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil Conditions, for All Types of Property Use, April 15, 2011. (MOECC Table 3)

While the MOECC Table 3 SCS are the most applicable standards in terms of contaminated site characterization, there are additional criteria that apply to the management of excess material (soil and groundwater) generated at the Site during the construction phase of the Pinecrest SWMP. As such, the soil and groundwater results were also compared to the following SCS and criteria:

- **For Soil:** MOECC Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the *Environmental Protection Act*, Table 1: *Full Depth Background Site Condition Standards*, Residential/Institutional/Industrial/Commercial/Community Property Use, 2011. (MOECC Table 1).

- **For Groundwater:** City of Ottawa Sewer Use By-Law 2003-514:
    - Schedule A, Table 1: Limits for Sanitary and Combined Sewers Discharge.
    - Schedule A, Table 2: Limits for Storm Sewer Discharge.

There are no published standards for PHC F1 to F4 in the City of Ottawa Sewer Use Bylaw discharge limits; however, based on guidance from the City of Ottawa, a value of 500 µg/L was used for each PHC Fraction in the assessment of the groundwater results.

As the Site is located on NCC lands, the soil results were also compared to the following SCS:

- **For Soil Metals, PAHs, VOCs, and PCBs:** Canadian Environmental Quality Guidelines (CEQG), recommended by the Canadian Council of Ministers of the Environment (CCME), *Soil Quality Guidelines for the Protection of Environmental and Human Health (SQGEHH)*, Residential/Parkland Property Use (CCME SQGEHH)

- **For Soil PHCs:** Canada-Wide Standards (CWS) *for Petroleum Hydrocarbons (PHCs) in Soil*, endorsed by CCME, April 30 - May 1, 2001, Revised January 2008, Tier 1 levels for Non-Potable, Coarse-Grained, Surface Soil Conditions, for Residential/Parkland Property Use (CCME CWS)

- **For Groundwater:** Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Water Quality Guidelines for Federal Contaminated Sites, Table 2: Generic Guidelines for Residential/Parkland Land Use, for Coarse Grained Soil (FIGQG).

Soil Analytical Results

The soil analytical results compared to the MOECC Table 1 and MOECC Table 3 SCS are presented in **Tables D1a to D1e** in **Appendix D**. The soil analytical results compared to the FIGQG SCS are presented in **Tables E1a to E1e** in **Appendix E**. The soil exceedances relative to the provincial standards are also presented on **Figure 1** in **Appendix A**. Laboratory Certificates of Analysis are provided in **Appendix F**.

A summary of the soil analytical results in terms of MOECC and CCME SCS along with the soil description, observations of contamination, parameters analyzed and the soil headspace organic and combustible vapour readings are presented in **Table 3** below:

Table 3: Summary of the Soil Sample Results

Borehole ID	Sample ID and Depth Interval (mbgs)	Soil Description and Evidence of Contamination	COCs Analyzed	Soil Headspace Measurements (ppm)		SCS Exceedances		
				PID	CGI	CCME	MOECC Table 1	MOECC Table 3
BWP-1	SA1 (0–0.61)	Topsoil (Silty Sand), No evidence of contamination.	Metals	0	0	None	None	None
	SA4 (2.29–2.90)	Silty Clay, No evidence of contamination.	Metals	0	0	Hexavalent Chromium	Hexavalent Chromium	None
	SA7 (4.57-5.18)	Silty Clay, No evidence of contamination.	PAHs, PHCs, VOCs, PCBs	0	0	None	None	None
	SA8 (SA7 DUP)	Silty Clay, No evidence of contamination.	PAHs, PHCs, VOCs, PCBs	0	0	None	None	None
BWP-2	SA1 (0-0.61)	Topsoil (Silty Sand), No evidence of contamination.	PAHs, PCBs	0	0	None	None	None
	SA2 (0.76-1.37)	Silty Clay, No evidence of contamination.	Metals	0	0	Chromium, Hexavalent Chromium	Barium, Chromium, Hexavalent Chromium	None
	SA22 (SA2 DUP)	Silty Clay, No evidence of contamination.	Metals	0	0	Chromium, Hexavalent Chromium	Barium, Chromium, Hexavalent Chromium	None
	SA4 (2.29-2.90)	Silty Clay, No evidence of contamination.	PHCs, VOCs	0	15	None	None	None

Notes:
PHCs - petroleum hydrocarbons
VOCs – volatile organic compounds
PAHs – polycyclic aromatic hydrocarbons
CGI - Headspace combustible vapour reading as taken with a Combustible Gas Indicator

PID – Headspace organic vapour reading as taken with a Photo-Ionization Detector
mbgs – Metres below ground surface
ppm – Parts per million

Groundwater Analytical Results

Groundwater samples were collected from each monitoring well and submitted to the lab for analysis of metals, PAHs, PHCs, VOCs and PCBs. The groundwater analytical results compared to the MOECC Table 3 SCS and the City of Ottawa Sewer Use By-Law Limits are presented in **Tables D2a to D2e** found in **Appendix D**. The groundwater analytical results compared to the FIGQG SCS are presented in **Tables E2a to E2e** found in **Appendix E**. The groundwater exceedances of MOECC Table 3 SCS are also presented on **Figure 1** in Appendix A. Laboratory Certificates of Analysis are provided in **Appendix F**.

A summary of the groundwater exceedances are presented in **Table 4** below:

Table 4: Summary of the Groundwater Sample Results

Groundwater Sample	Evidence of groundwater contamination	Parameters Analyzed	FIGQG	City of Ottawa Storm Sewer Discharge Criteria Exceedances		MOECC Table 3
				Storm	Sanitary and Combined	
BWP-1	None	Dissolved Metals, PAHs, PHCs, VOCs, PCBs	None	None	None	None
BWP-2	None	Dissolved Metals, PAHs, PHCs, VOCs, PCBs	None	None	None	None

Quality Assurance and Quality Control Results

As part of the Quality Assurance/Quality Control (QA/QC) program implemented during the Phase II ESA, two blind duplicate soil samples were submitted to the lab. A duplicate of BWP-1 SA7 was submitted for analysis of PAHs, PHCs, VOCs and PCBs while a duplicate of BWP-2 SA2 was submitted for metals analysis. No detectable concentrations of the analyzed parameters were found in the parent or duplicate sample of BWP-1 SA7 so the relative percent difference (RPD) was not calculated. The RPD was calculated for the parent and duplicate metal results from BWP-2 SA2. The peak RPD was 17% which is within the acceptable limits of 80% for metals in soil (CCME, 2016).

Evaluation of Results

The review of the Phase II ESA results indicate that PAH, PHC, VOC and PCB impacts are not present in the soil or groundwater. In fact, all contaminants within these parameter suites had non-detectable concentrations in both soil and groundwater, except for chloroform, which was present in the groundwater from BWP-1, but at a concentration below MOECC Table 3.

Arsenic and chromium were also detected in groundwater from BWP-1 at concentrations above CCME SCS, but below MOECC and the City of Ottawa SCS. All other dissolved metals which were detected in groundwater were at concentrations below CCME, MOECC, and the City of Ottawa SCS. These analytical results coupled with the low to non-existent soil headspace organic vapour readings and lack of field evidence of contamination lead to the conclusion that anthropogenic contamination is not present in either borehole.

In terms of metals in the soil, no metal impacts were detected in the silty sand topsoil, however, MOECC Table 1 and CCME exceedances of barium, chromium and hexavalent chromium were confirmed in the silty clay present at the Site. These elevated metal concentrations are likely naturally occurring as this contaminant profile has been observed in other fine grained Champlain Sea deposits that form part of the Ottawa Valley Clay Plain physiographic region. (Morrison Hershfield, 2017).

It should also be noted that the CCME guidelines are subject to professional judgement and require interpretation. For the chromium exceedances of the CCME SCS, it is noted that values derived in the CCME guidelines are based on protection of soil quality for plant growth (nutrient content and metabolism) and mainly apply to agricultural land use. These CCME SCS are not designed for the protection of human health or ecological receptors and are therefore overly conservative for the current and planned property use.

Recommendations

Anthropogenic contamination is not present at the Site. Naturally elevated metals are present in the silty clay at concentrations slightly above the Ontario background (Table 1) standards and the CCME standards designed mainly for agricultural land use. Given that the metals are naturally occurring and prevalent in clay from the Champlain Sea deposit which is widespread across eastern Ontario, there are no special recommendations for handling or re-use of the material on site. The contractor should be made aware of the elevated metals concentrations and should ensure that all excess materials are managed in accordance with environmental laws. There are options for the beneficial reuse of this material at receiving sites.

References

Canadian Council of Ministers of the Environment, 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 4 Analytical Methods.

Morrison Hershfield, 2017. Phase II Environmental Site Assessment, OLRT Stage 2, Confederation East Alignment. Ottawa, Ontario.

Closure

We trust the above is satisfactory for your purposes at this time. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Yours truly,

Morrison Hershfield Limited

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Attachments: **Appendix A** - Figure
Appendix B – Pinecrest SWMP Phase II ESA Methodology
Appendix C - Record of Borehole Logs
Appendix D - Soil and Groundwater Analytical Results – Provincial Guidelines
Appendix E - Soil and Groundwater Analytical Results – Federal Guidelines
Appendix F - Laboratory Certificates of Analysis

Appendix A

Figures

BWP-2 Soil Results Compared to MOECC Table 3[1]		
Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below MOECC Table 3
SA1	0 - 0.61	Metals: <SCS
SA4	2.29 - 2.90	Metals: <SCS
SA7	4.57 - 5.18	PAH, PHC, VOC, PCB: <SCS
SA8 (SA7 DUP)	4.57 - 5.18	PAH, PHC, VOC, PCB: <SCS
BWP-2 GW Results Compared to MOECC Table 3[2]		
Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below MOECC Table 3
BWP-1	13.53 - 16.58	Metals, PAH, PHC, VOC, PCB: <SCS

BWP-2 Soil Results Compared to MOECC Table 3[1]		
Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below MOECC Table 3
SA1	0 - 0.61	PAH, PCB: <SCS
SA2	0.76 - 1.37	Metals: <SCS
SA22 (SA2 DUP)	0.76 - 1.37	Metals: <SCS
SA4	2.29 - 2.90	PHC, VOC: <SCS
BWP-2 GW Results Compared to MOECC Table 3[2]		
Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below MOECC Table 3
BWP-2	4.40 - 7.45	Metals, PAH, PHC, VOC, PCB: <SCS

LEGEND

- *Geo-Environmental Borehole*
- *Soil Exceedance(s)*
- *Geo-Environmental Monitoring Well*
- *Groundwater Exceedance(s)*
- *Approximate Site Limits*
- *Area of Potential Environmental Concern (APEC)*

NOTES:

[1] MOECC Table 3 means: Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) - Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Coarse Grained Soil, Residential/Parkland/Institutional Property Use.

[2] MOECC Table 3 means: Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) - Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition,Coarse Grained Soil, All Types of Property Use.

<SCS: Concentrations are Less than the Applicable Site Condition Standard (MOECC Table 3)

PROJECT:
Pinecrest Stormwater Management Pond

PREPARED FOR:
Ottawa

DESIGNED BY:	M.D
DRAWN BY:	M.D
CHECKED BY:	A.C
DATE:	May 2017
SCALE:	1:1000
PROJECT NO:	2150308

TITLE:
Pinecrest Stormwater Management Pond - Soil and Groundwater Analytical Results

FIGURE NO:
1

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Appendix B

Phase II ESA Methodology

PINECREST SWMP PHASE II ESA METHODOLOGY

1. PROJECT INITIATION AND HEALTH AND SAFETY

The Phase II ESA was performed in conjunction with the geotechnical and hydrogeological investigation performed at the Site. Based on a review of the supporting environmental reports listed in section 3 of the memo, a Phase II ESA sampling and analysis plan was developed that specified the boreholes to be advanced using environmental protocols, termed "geo-environmental boreholes", and included details on monitoring well installations and screening forms to be filled in during the soil and groundwater sampling,

Golder Associates Ltd. (Golder), led the geotechnical drilling program and developed a health and safety plan (HASP) that was used throughout the investigations.

2. UNDERGROUND SERVICE LOCATES

The clearance of the underground services in the proposed geo-environmental borehole locations was arranged by Golder. Prior to commencing the geotechnical drilling program, Golder retained a contractor to identify the locations of private and public utilities within the work area and to mark the location of the subsurface utilities.

3. SOIL INVESTIGATION

Borehole Drilling and Soil Sampling

The borehole drilling was carried out by George Downing Estate Drilling Ltd. (Downing) of Grenville-sur-la-rouge, Quebec under the supervision of Golder staff. Downing is a licensed well contractor, with staff who are licensed well technicians in accordance with O. Reg. 903. The drilling was conducted using a track mounted hollow-stem auger equipped with air hammer and split spoon sampling equipment. The drill rig was equipped with a hydraulic equivalent of a 63.5 kg sampler hammer that was used to hammer the split spoon into the ground and collect discrete soil samples. Split spoons were cleaned between samples with a brush in a dilute solution of potable water and phosphate-free detergent, and rinsed with distilled water and laboratory grade methanol before being wiped dry using disposable towels.

During the drilling of the geo-environmental boreholes, soil samples for potential laboratory analysis were collected by the field staff. During the soil sampling, precautionary measures were taken to minimize the potential for cross-contamination. Nitrile gloves were used by field technicians and were changed between collection and handling of different soil samples.

Environmental soil samples were collected every 0.76 m (2.5 ft) using a 0.61 m (2 ft) long, 50 mm diameter drive open split spoon sampler. Geo-environmental soil samples were immediately inspected in the split-spoon for field evidence of contamination and split into two portions. One portion was quickly transferred to laboratory supplied jars and the other portion to a Ziploc bag for headspace organic and combustible vapour screening.

The borehole ID, sample ID, soil depth interval, soil description and soil headspace vapour readings, etc. were logged for every split spoon sample in the "*Geo-Environmental Soil Sample Field Screening*" forms. Following the soil logging, the environmental soil samples were placed in laboratory supplied glass sample jars and vials. Every soil sample was bottled into a minimum of one (1) and up to two (2) 250 ml glass jars with Teflon-lined lids. Jars were filled as much as possible in order to minimize headspace. Soil to be submitted for PHC F1 or VOCs analysis was collected in 5 gram samples using dedicated Terra Core ™ samplers, and placed in 40 ml glass vials containing methanol preservative. Soil samples were stored in ice-filled coolers immediately after collection and were brought to Golder's office and kept refrigerated prior to soil sample selection and submission to the analytical laboratory.

The bagged portion of the soil samples were allowed to equilibrate for several minutes before conducting headspace readings, which were measured using an RKI Eagle II probe. Soils were broken up and manipulated by hand in the closed bag while the readings were being measured. Peak Photoionization Detector (PID) and Combustible Gas Indicator (CGI) headspace readings were then noted in the *Geo-Environmental Soil Sample Field Screening* form.

Soil Sample Selection for Laboratory Analysis

Following the collection of the environmental soil samples and the completion of the *Geo-Environmental Soil Sample Field Screening* forms by field personnel, the Capital Transit Partners 2 (CTP2) Geo-Environmental lead was contacted and the decision was made regarding which samples were to be sent to the laboratory for the analysis of specified contaminants of concern (COCs).

Following sample selection, the soil samples were submitted by Golder staff under chain of custody documentation to ALS Environmental of Ottawa within the MOECC accepted sample holding times. ALS is a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for the analyses performed.

The submitted soil samples were analyzed for one or more of the following COCs:

- Metals;
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Petroleum Hydrocarbons Fraction 1 to Fraction 4 (PHC F1-F4);
- Volatile Organic Compounds (VOCs);
- Polychlorinated Biphenyls (PCBs)

4. GROUNDWATER INVESTIGATION

Monitoring Well Installation

Monitoring wells were installed in the geo-environmental boreholes to allow for groundwater sampling. Unless requirements of the geotechnical/hydrogeological investigation dictated a deeper well screen depth, the monitoring wells included a 3.05 m long well screen installed at a depth that would straddle the water table.

The monitoring wells were constructed using 51 mm diameter PVC pipe. Each monitoring well consisted of a 3.05 m long slotted screen (0.25 mm) and a solid riser pipe which extended to the ground surface. The monitoring wells were installed by Downing in accordance with the requirements of O.Reg. 903 under the supervision of Golder personnel. The top of each riser pipe was sealed with a slip cap and covered with a flush mount protective casing. Silica sand backfill was used around the screened portion of the monitoring well, and extended approximately 30 cm above the top of the screen. Bentonite was placed to seal the annular space between the PVC risers up to the ground surface.

Groundwater Water Level Measurements and Sample Collection

Prior to monitoring well purging and groundwater sampling, the static water levels were measured in the monitoring wells as part of the geotechnical and hydrogeological investigation. The water levels were measured in metres below the top of the well casing (mbtc) using an electronic water level tape. The water level measurements and the groundwater sampling was performed by Golder personnel. The water levels and the date of the water level measurements were recorded on the *"Geo-Environmental Groundwater Sampling Form"*. During the purging and groundwater sampling qualitative observations of sheen, colour, sediment load, odour, etc. were made and recorded on the same form. Monitoring wells were purged using polyethylene tubing and a dedicated Waterra™ inertial pump and sampled using a peristaltic pump. Samples were collected after the well had been purged a minimum of three well volumes, or had been purged three times dry. Groundwater samples collected for metals analysis (including mercury and hexavalent chromium) were field filtered at the time of sample collection using in-line 0.45 µm Waterra® filters. Groundwater samples were collected in the laboratory provided sample bottles and were placed in a cooler on ice.

The groundwater samples were submitted by Golder staff under chain of custody documentation to ALS Environmental of Ottawa within the MOECC accepted sample holding times. Groundwater samples were submitted for analysis of the following COCs: metals, PAHs, PHCs, VOCs, and PCBs.

The measured water levels, the date of measurements, details on the volumes purged, the COCs analyzed and any observations of potential contamination in groundwater were recorded in the *"Geo-Environmental Groundwater Sampling Form"* and provided to the field coordinator.

5. SURVEY

Northing and easting coordinates of the boreholes and the geodetic elevations of the ground surface and the top of the casing of the monitoring wells was completed using a Trimble GPS unit. The northing and easting coordinates were reported using the Modified Transverse Mercator (MTM) Zone 9 horizontal datum, referenced to the North American Datum of 1983 (NAD83).

6. QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control measures were employed during the Phase II ESA field program and included the following measures:

- Collection of one (1) blind duplicate soil sample from each geo-environmental borehole. The blind duplicate alternated between a shallow duplicate (performed for one of the first three soil samples collected) and a deep duplicate (performed for one of the soil samples collected after the first three). Where possible, the deep duplicate soil sample was collected for a parent soil sample showing field evidence of contamination or elevated PID/CGI readings. The sample name of the blind duplicate and the sample ID of the original soil sample were indicated in the "*Geo-Environmental Soil Sample Field Screening*" form.

Duplicate soil samples were evaluated using the Relative Percent Difference (RPD) method. The RPD was calculated as follows:

$$RPD = \frac{|C_s - C_d|}{(C_s + C_d)/2} \; x \; 100$$

where Cs is the parent sample concentration and Cd is the duplicate concentration. Acceptable RPD limits for field quality control measures such as duplicates, are generally two times the published acceptable RPD limits for laboratory quality control measures (CCME, 2016). As such the upper bounds for acceptable RPD values for soils are 80% and 60%, for metals and PHCs, respectively, and 100% for PAHs and VOCs.

7. REFERENCES

Canadian Council of Ministers of the Environment, 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 4 Analytical Methods.

Appendix C

Record of Borehole Logs

Morrison Hershfield
2440 Don Reid Drive
Ottawa, ON K1H 1E1
Telephone: 613-739-2910

RECORD OF BOREHOLE BWP-1 (ENVIRONMENTAL)

CLIENT City of Ottawa
PROJECT NAME Pinecrest Stormwater Management Pond
PROJECT NUMBER 2150308
PROJECT LOCATION Ottawa, ON
DATE STARTED 1/16/17 **COMPLETED** 1/17/17
MTM Zone 9 362703.6m E, 5024069m N
DRILLING CONTRACTOR Downing Drilling
GROUNDWATER LEVELS:
DRILLING METHOD Hollow Stem Auger (200 mm diameter)
STATIC WATER LEVEL 5.38 m / Elev 80.31 m
LOGGED BY RI **CHECKED BY** MD
MEASUREMENT DATE 1/25/2017
DRILLING SUPERVISED BY: GOLDER ASSOCIATES LTD.

STRATIGRAPHY AND WELL COMPLETION DETAILS ARE FOR INFORMATION ONLY. REFER TO MEMORANDUM FROM GEOTECHNICAL INVESTIGATION FOR ORIGINAL DATA

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations ▲ IBL (ppm) 500 1000 1500 2000	Headspace Combustible Vapour Concentrations ✠ HEX (ppm) 2500 5000 7500 ◕ HEX (%LEL) 25 50 75	ANALYSES	WELL DIAGRAM
0		0.2 TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); moist	SA1	0	0	Metals	
1		(SM/ML) SILTY SAND; brown, contains thin laminations of silty clay; non-cohesive, moist, very loose to loose	SA2	0	0		
2		2.0	SA3	0	0		
3		(CI/CH) SILTY CLAY to CLAY, trace to some sand, trace gravel; grey brown, highly fissured, contains thin laminations of silty sand (WEATHERED CRUST); cohesive, w>PL, very stiff to stiff	SA4	0	0	Metals	
4			SA5	0	0		
5		4.9 (CI/CH) SILTY CLAY, trace to some sand; grey, contains thin laminations to thin beds of silty sand; cohesive, w>PL, stiff	SA6	0	0		
6			SA7	0	0	PAH, PHC, VOC, PCB	
7			SA9	0	0		Bentonite and Grout
8			SA10	0	0		
9		8.2 End of Environmental Borehole at 8.23 metres. Refer to Golder geotechnical borehole log of BWP-1 for geotechnical investigation to 16.58 metres. Field technician noted that no odour or staining was observed on any samples.	SA11	0	0		
10			SA12	0	0		

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ENVIRONMENTAL BH PLOTS BASELINE SWMP.GPJ GINT STD CANADA LAB.GDT 3/11/17

(Continued Next Page)

Morrison Hershfield
2440 Don Reid Drive
Ottawa, ON K1H 1E1
Telephone: 613-739-2910

RECORD OF BOREHOLE BWP-1 (ENVIRONMENTAL)

CLIENT City of Ottawa
PROJECT NAME Pinecrest Stormwater Management Pond
PROJECT NUMBER 2150308
PROJECT LOCATION Ottawa, ON

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations ▲ IBL (ppm) 500 1000 1500 2000	Headspace Combustible Vapour Concentrations ✠ HEX (ppm) 2500 5000 7500 ◐ HEX (%LEL) 25 50 75	ANALYSES	WELL DIAGRAM
10							
11							
12							Bentonite Seal
13							Silica Sand
14							
15							50 mm Diam. PVC #10 Slot Screen
16							

Draft

Morrison Hershfield
2440 Don Reid Drive
Ottawa, ON K1H 1E1
Telephone: 613-739-2910

RECORD OF BOREHOLE BWP-2 (ENVIRONMENTAL)

CLIENT City of Ottawa
PROJECT NAME Pinecrest Stormwater Management Pond
PROJECT NUMBER 2150308
PROJECT LOCATION Ottawa, ON
DATE STARTED 1/18/17 **COMPLETED** 1/18/17
MTM Zone 9 362587.8m E, 5023996m N
DRILLING CONTRACTOR Downing Drilling
GROUNDWATER LEVELS:
DRILLING METHOD Hollow Stem Auger (200 mm diameter)
STATIC WATER LEVEL 2.37 m / Elev 81.95 m
LOGGED BY RI **CHECKED BY** MD
MEASUREMENT DATE 1/20/2017
DRILLING SUPERVISED BY: GOLDER ASSOCIATES LTD.

STRATIGRAPHY AND WELL COMPLETION DETAILS ARE FOR INFORMATION ONLY. REFER TO MEMORANDUM FROM GEOTECHNICAL INVESTIGATION FOR ORIGINAL DATA

DEPTH (m)	SOIL DESCRIPTION	SAMPLE NUMBER	IBL (ppm) (500 1000 1500 2000)	HEX (ppm) (2500 5000 7500)	HEX (%LEL) (25 50 75)	ANALYSES
0	0.3 TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); moist	SA1	0	0		PAH, PCB
	0.5 (SM) SILTY SAND, trace gravel; brown; non-cohesive, moist, loose					
1	(CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains thin laminations of silty sand (WEATHERED CRUST); cohesive, w>PL, very stiff	SA2	0	0		Metals
2		SA3	0	0		
3		SA4	0	15		PHC, VOC
		SA5	0	0		
4		SA6	0	5		
5	4.9 (CI/CH) SILTY CLAY, trace sand; grey, contains thin laminations of silty sand; cohesive, w>PL, stiff	SA7	0	0		
6		SA8	0	0		
7		SA9	0	0		
	7.6 End of Borehole at 7.62 metres.					

WELL DIAGRAM: Bentonite Seal; Silica Sand; 50 mm Diam. PVC #10 Slot Screen; Silica Sand

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Appendix D

Tables of Soil and Groundwater Analytical Results – Provincial Guidelines

Table D1a: Soil Analytical Results - Provincial Guidelines - Metals

		Sampling Location:		BWP-1	BWP-1	BWP-2	BWP-2
		Sample ID:		BWP-1 SA1	BWP-1 SA4	BWP-2 SA2	BWP-2 SA22 (SA2 DUP)
		Date of Collection		16-Jan-17	16-Jan-17	16-Jan-17	16-Jan-17
		Sample Depth (mbgs)		0 - 0.61	2.29 - 2.9	0.76 - 1.37	0.76 - 1.37
		Stratigraphy		Topsoil - Silty Sand	Silty Clay - Clay	Silty Clay - Clay	Silty Clay - Clay
		Evidence of Contamination		-	-	-	-
Parameter	**Units**	**MOECC Table 1 (1)**	**MOECC Table 3 (2)**				
Antimony	µg/g	1.3	7.5	<1.0	<1.0	<1.0	<1.0
Arsenic	µg/g	18	18	2	2.8	1.6	1.9
Barium	µg/g	220	390	22.5	205	**319**	**348**
Beryllium	µg/g	2.5	4	<0.50	0.64	0.89	0.8
Boron (HWS)	µg/g	NA	1.5	0.23	0.14	<0.10	<0.10
Boron	µg/g	36	120	<5.0	5.6	<5.0	<5.0
Cadmium	µg/g	1.2	1.2	<0.50	<0.50	<0.50	<0.50
Chromium	µg/g	70	160	16.6	42.7	**73.9**	**71.8**
Cobalt	µg/g	21	22	3.9	11.3	17.4	17.6
Copper	µg/g	92	140	3.7	22.6	32.3	32.2
Lead	µg/g	120	120	4	5.5	6.4	6.7
Mercury	µg/g	0.27	0.27	0.0214	<0.0050	0.0064	0.0055
Molybdenum	µg/g	2	6.9	<1.0	<1.0	<1.0	<1.0
Nickel	µg/g	82	100	8.8	24.9	38.5	40.4
Selenium	µg/g	1.5	2.4	<1.0	<1.0	<1.0	<1.0
Silver	µg/g	0.5	20	<0.20	<0.20	<0.20	<0.20
Thallium	µg/g	1	1	<0.50	<0.50	<0.50	<0.50
Uranium	µg/g	2.5	23	<1.0	<1.0	<1.0	<1.0
Vanadium	µg/g	86	86	27.4	62.3	84.8	85.1
Zinc	µg/g	290	340	26.6	65.2	98.5	104
Chromium (VI)	µg/g	0.66	8	<0.20	**1.1**	**0.92**	**0.99**

MOECC Table 1 Exceedances	0	1	3	3
MOECC Table 3 Exceedances	0	0	0	0
MDL Exceedances of Table 1	0	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Exceed MOECC Table 1 Site Condition Standards
Shaded Values Exceed MOECC Table 3 Site Condition Standards

Notes:

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 1: Full Depth Background Site Condition Standards, for Residential/Parkland/Institutional/Commercial/Industrial Property Use

(2) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil for Residential/Parkland/Institutional Property Use

mbgs - Meters below ground surface
MDL - method detection limit
< xx - Less than laboratory MDL of "xx"

Prepared by: MD
Reviewed by: AC
Date: 5/24/2017
Pinecrest SWMP Soil Analytical Results_Provincial.xlsx

Table D1b: Soil Analytical Results - Provincial Guidelines - Polycyclic Aromatic Hydrocarbons

		Sampling Location:		BWP-1	BWP-1	BWP-2
		Sample ID:		BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA1
		Date of Collection		16-Jan-17	16-Jan-17	16-Jan-17
		Sample Depth (mbgs)		4.57 - 5.18	4.57 - 5.18	0 - 0.61
		Stratigraphy		Silty Clay - Clay	Silty Clay - Clay	Topsoil - Silty Sand
		Evidence of Contamination		-	-	-
Parameter	**Units**	**MOECC Table 1(1)**	**MOECC Table 3(2)**			
Acenaphthene	µg/g	0.072	7.9	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.093	0.15	<0.050	<0.050	<0.050
Anthracene	µg/g	0.16	0.67	<0.050	<0.050	<0.050
Benzo(a)anthracene	µg/g	0.36	0.5	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.3	0.3	<0.050	<0.050	<0.050
Benzo(b)fluoranthene	µg/g	0.47	0.78	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.68	6.6	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	µg/g	0.48	0.78	<0.050	<0.050	<0.050
Chrysene	µg/g	2.8	7	<0.050	<0.050	<0.050
Dibenzo(a,h)anthracene	µg/g	0.1	0.1	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.56	0.69	<0.050	<0.050	<0.050
Fluorene	µg/g	0.12	62	<0.050	<0.050	<0.050
Indeno(1,2,3,-cd)pyrene	µg/g	0.23	0.38	<0.050	<0.050	<0.050
1+2-Methylnaphthalene	µg/g	0.59	0.99	<0.042	<0.042	<0.042
1-Methylnaphthalene	µg/g	0.59	0.99	<0.030	<0.030	<0.030
2-Methylnaphthalene	µg/g	0.59	0.99	<0.030	<0.030	<0.030
Naphthalene	µg/g	0.09	0.6	<0.050	<0.050	<0.050
Phenanthrene	µg/g	0.69	6.2	<0.050	<0.050	<0.050
Pyrene	µg/g	1	78	<0.050	<0.050	<0.050

MOECC Table 1 Exceedances	0	0	0
MOECC Table 3 Exceedances	0	0	0
MDL Exceedances of Table 1	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Exceed MOECC Table 1 Site Condition Standards
Shaded Values Exceed MOECC Table 3 Site Condition Standards

Notes:

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 1: Full Depth Background Site Condition Standards, for Residential/Parkland/Institutional/Commercial/Industrial Property Use

(2) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil for Residential/Parkland/Institutional Property Use

mbgs - Meters below ground surface
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Table D1c: Soil Analytical Results - Provincial Guidelines - Petroleum Hydrocarbons

			Sampling Location:	BWP-1	BWP-1	BWP-2
			Sample ID:	BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA4
			Date of Collection	16-Jan-17	16-Jan-17	16-Jan-17
			Sample Depth (mbgs)	4.57 - 5.18	4.57 - 5.18	2.29 - 2.9
			Stratigraphy	Silty Clay - Clay	Silty Clay - Clay	Silty Clay - Clay
			Evidence of Contamination	-	-	-
Parameter	**Units**	**MOECC Table 1(1)**	**MOECC Table 3(2)**			
PHC F1 (C6-C10)	µg/g	25	55	<5.0	<5.0	<5.0
PHC F1 - BTEX	µg/g	25	55	<5.0	<5.0	<5.0
PHC F2 (C10-C16)	µg/g	10	98	<10	<10	<10
PHC F3 (C16-C34)	µg/g	240	300	<50	<50	<50
PHC F4 (C34-C50)	µg/g	120	2800	<50	<50	<50

MOECC Table 1 Exceedances	0	0	0
MOECC Table 3 Exceedances	0	0	0
MDL Exceedances of Table 1	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Exceed MOECC Table 1 Site Condition Standards
Shaded Values Exceed MOECC Table 3 Site Condition Standards

Notes:

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 1: Full Depth Background Site Condition Standards, for Residential/Parkland/Institutional/Commercial/Industrial Property Use

(2) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil for Residential/Parkland/Institutional Property Use

mbgs - Meters below ground surface
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Table D1d: Soil Analytical Results - Provincial Guidelines - Volatile Organic Compounds

			Sample Location:	BWP-1	BWP-1	BWP-2
			Sample ID:	BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA4
			Date of Collection	16-Jan-17	16-Jan-17	16-Jan-17
			Sample Depth (mbgs)	4.57 - 5.18	4.57 - 5.18	2.29 - 2.9
			Stratigraphy	Silty Clay - Clay	Silty Clay - Clay	Silty Clay - Clay
			Evidence of Contamination	-	-	-
Parameter	**Units**	**MOECC Table 1(1)**	**MOECC Table 3(2)**			
Acetone	µg/g	0.5	16	<0.50	<0.50	<0.50
Benzene	µg/g	0.02	0.21	<0.0068	<0.0068	<0.0068
Bromodichloromethane	µg/g	0.05	13	<0.050	<0.050	<0.050
Bromoform	µg/g	0.05	0.27	<0.050	<0.050	<0.050
Bromomethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050
Carbon tetrachloride	µg/g	0.05	0.05	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.05	2.4	<0.050	<0.050	<0.050
Dibromochloromethane	µg/g	0.05	9.4	<0.050	<0.050	<0.050
Chloroform	µg/g	0.05	0.05	<0.050	<0.050	<0.050
1,2-Dibromoethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	µg/g	0.05	3.4	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	µg/g	0.05	4.8	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	µg/g	0.05	0.083	<0.050	<0.050	<0.050
Dichlorodifluoromethane	µg/g	0.05	16	<0.050	<0.050	<0.050
1,1-Dichloroethane	µg/g	0.05	3.5	<0.050	<0.050	<0.050
1,2-Dichloroethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050
1,1-Dichloroethylene	µg/g	0.05	0.05	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	µg/g	0.05	3.4	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	µg/g	0.05	0.084	<0.050	<0.050	<0.050
Methylene Chloride	µg/g	0.05	0.1	<0.050	<0.050	<0.050
1,2-Dichloropropane	µg/g	0.05	0.05	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	µg/g	-	-	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	µg/g	-	-	<0.030	<0.030	<0.030
1,3-Dichloropropene (cis & trans)	µg/g	0.05	0.05	<0.042	<0.042	<0.042
Ethylbenzene	µg/g	0.05	2	<0.018	<0.018	<0.018
n-Hexane	µg/g	0.05	2.8	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	µg/g	0.5	16	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	µg/g	0.5	1.7	<0.50	<0.50	<0.50
MTBE	µg/g	0.05	0.75	<0.050	<0.050	<0.050
Styrene	µg/g	0.05	0.7	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	µg/g	0.05	0.058	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050
Tetrachloroethylene	µg/g	0.05	0.28	<0.050	<0.050	<0.050
Toluene	µg/g	0.2	2.3	<0.080	<0.080	<0.080
1,1,1-Trichloroethane	µg/g	0.05	0.38	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.05	0.061	<0.010	<0.010	<0.010
Trichlorofluoromethane	µg/g	0.25	4	<0.050	<0.050	<0.050
Vinyl chloride	µg/g	0.02	0.02	<0.020	<0.020	<0.020
o-Xylene	µg/g	-	-	<0.020	<0.020	<0.020
m+p-Xylenes	µg/g	-	-	<0.030	<0.030	<0.030
Xylenes (Total)	µg/g	0.05	3.1	<0.050	<0.050	<0.050

MOECC Table 1 Exceedances	0	0	0
MOECC Table 2 Exceedances	0	0	0
MDL Exceedances of Table 1	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Exceed MOECC Table 1 Site Condition Standards
Shaded Values Exceed MOECC Table 3 Site Condition Standards

Notes:
(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 1: Full Depth Background Site Condition Standards, for Residential/Parkland/Institutional/Commercial/Industrial Property Use
(2) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil for Residential/Parkland/Institutional Property Use
mbgs - Meters below ground surface
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Prepared by: MD
Reviewed by: AC
Date: 5/24/2017
Pinecrest SWMP Soil Analytical Results_Provincial.xlsx

Table D1e: Soil Analytical Results - Provincial Guidelines - Polychlorinated Biphenyls

		Sample Location:		BWP-1	BWP-1	BWP-2
		Sample ID:		BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA1
		Date of Collection		16-Jan-17	16-Jan-17	16-Jan-17
		Sample Depth (mbgs)		4.57 - 5.18	4.57 - 5.18	0 - 0.61
		Stratigraphy		Silty Clay - Clay	Silty Clay - Clay	Topsoil - Silty Sand
		Evidence of Contamination		-	-	-
Parameter	**Units**	**MOECC Table 1(1)**	**MOECC Table 3(2)**			
Aroclor 1242	µg/g	-	-	<0.010	<0.010	<0.010
Aroclor 1248	µg/g	-	-	<0.010	<0.010	<0.010
Aroclor 1254	µg/g	-	-	<0.010	<0.010	<0.010
Aroclor 1260	µg/g	-	-	<0.010	<0.010	<0.010
Total PCB	µg/g	0.3	0.35	<0.020	<0.020	<0.020

MOECC Table 1 Exceedances	0	0	0
MOECC Table 3 Exceedances	0	0	0
MDL Exceedances of Table 1	0	0	0

Underlined Values Detected within Applicable Site Condition
Bold Values Exceed MOECC Table 1 Site Condition Standards
Shaded Values Exceed MOECC Table 3 Site Condition Standards

Notes:

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 1: Full Depth Background Site Condition Standards, for Residential/Parkland/Institutional/Commercial/Industrial Property Use

(2) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, for Coarse Grained Soil for Residential/Parkland/Institutional Property Use

mbgs - Meters below ground surface
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Table D2a: Groundwater Analytical Results - Provincial Guidelines - Dissolved Metals

Sample ID:					BWP-1	BWP-2
Date of Collection					20-Jan-17	20-Jan-17
Static Water Level (mbgs)					5.38	2.37
Screen Depth Interval (mbgs)					13.53 - 16.58	4.40 - 7.45
Evidence of Contamination					-	-
Parameter	**Units**	**City of Ottawa Storm SUB (1,a)**	**City of Ottawa Sanitary SUB (2,a)**	**MOECC Table 3 (3)**		
Antimony	µg/L	-	5000	20000	*0.85*	<0.10
Arsenic	µg/L	20	1000	1900	*6.88*	*0.4*
Barium	µg/L	-	-	29000	*243*	*27.6*
Beryllium	µg/L	-	-	67	<0.10	<0.10
Boron	µg/L	-	25000	45000	*133*	<10
Cadmium	µg/L	8	20	2.7	*0.012*	<0.010
Chromium	µg/L	80	5000	810	*29.2*	*1.52*
Cobalt	µg/L	-	5000	66	<0.10	*0.13*
Copper	µg/L	40	3000	87	<0.20	*0.94*
Lead	µg/L	120	5000	25	<0.050	<0.050
Mercury	µg/L	0.4	1	0.29	<0.010	<0.010
Molybdenum	µg/L	-	5000	9200	*41.3*	*1.07*
Nickel	µg/L	80	3000	490	<0.50	<0.50
Selenium	µg/L	20	5000	63	*0.242*	*0.302*
Silver	µg/L	120	5000	1.5	<0.050	<0.050
Sodium	µg/L	-	-	2300000	*31300*	*19300*
Thallium	µg/L	-	-	510	*0.038*	<0.010
Uranium	µg/L	-	-	420	*1.7*	*0.725*
Vanadium	µg/L	-	5000	250	*1.04*	*5.65*
Zinc	µg/L	40	3000	1100	<1.0	*1.9*
Chromium (VI)	µg/L	-	-	140	*10.4*	*2.6*

Sanitary Sewer Use By-Law Exceedances	0	0
MOECC Table 3 Exceedances	0	0
MDL Exceedances of Table 3	0	0

Italicized Values Detected within Applicable Site Condition Standards
Underlined Values Exceed City of Ottawa Storm SUB
Bold Values Exceed City of Ottawa Sanitary SUB
Shaded Values Exceed MOECC Table 3 Standards

Notes:
(1) City of Ottawa Storm Sewer Use By-Law 2003-514.
(2) City of Ottawa Sanitary Sewer Use By-Law 2003-514.
(3) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Coarse Grained Soil for All Types of Property Use
(a) The concentration limits for metals under the City of Ottawa Sewer Use By-Law are expressed in terms of **Total Metals.** Only dissolved metals were measured during these sampling events.
mbgs - Meters below ground surface
SUB - Sewer Use By-Law
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Table D2b: Groundwater Analytical Results - Provincial Guidelines - Polycyclic Aromatic Hydrocarbons

Sample Location:	BWP-1	BWP-2
Date of Collection	20-Jan-17	20-Jan-17
Static Water Level (mbgs)	5.38	2.37
Screen Depth Interval (mbgs)	13.53 - 16.58	4.40 - 7.45
Evidence of Contamination	-	-

Parameter	Units	City of Ottawa Storm SUB (1)	City of Ottawa Sanitary SUB (2)	MOECC Table 3(3)		
Acenaphthene	µg/L	-	-	600	<0.020	<0.020
Acenaphthylene	µg/L	-	-	1.8	<0.020	<0.020
Anthracene	µg/L	-	-	2.4	<0.020	<0.020
Benzo(a)anthracene	µg/L	-	-	4.7	<0.020	<0.020
Benzo(a)pyrene	µg/L	-	-	0.81	<0.010	<0.010
Benzo(b)fluoranthene	µg/L	-	-	0.75	<0.020	<0.020
Benzo(g,h,i)perylene	µg/L	-	-	0.2	<0.020	<0.020
Benzo(k)fluoranthene	µg/L	-	-	0.4	<0.020	<0.020
Chrysene	µg/L	-	-	1	<0.020	<0.020
Dibenzo(a,h)anthracene	µg/L	-	-	0.52	<0.020	<0.020
Fluoranthene	µg/L	-	-	130	<0.020	<0.020
Fluorene	µg/L	-	59	400	<0.020	<0.020
Indeno(1,2,3,-cd)pyrene	µg/L	-	-	0.2	<0.020	<0.020
1+2-Methylnaphthalene	µg/L	-	-	1800	<0.028	<0.028
1-Methylnaphthalene	µg/L	-	32	1800	<0.020	<0.020
2-Methylnaphthalene	µg/L	-	22	1800	<0.020	<0.020
Naphthalene	µg/L	6.4	59	1400	<0.050	<0.050
Phenanthrene	µg/L	-	-	580	<0.020	<0.020
Pyrene	µg/L	-	-	68	<0.020	<0.020

Sanitary Sewer Use By-Law Exceedances	0	0
MOECC Table 3 Exceedances	0	0
MDL Exceedances of Table 3	0	0

Italicized Values Detected within Applicable Site Condition Standards
Underlined Values Exceed City of Ottawa Storm SUB
Bold Values Exceed City of Ottawa Sanitary SUB
Shaded Values Exceed MOECC Table 3 Standards

Notes:
(1) City of Ottawa Storm Sewer Use By-Law 2003-514.
(2) City of Ottawa Sanitary Sewer Use By-Law 2003-514.
(3) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Coarse Grained Soil for All Types of Property Use
mbgs - Meters below ground surface
SUB - Sewer Use By-Law
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Table D2c: Groundwater Analytical Results - Provincial Guidelines - Petroleum Hydrocarbons and BTEX

		Sample Location:			BWP-1	BWP-2
		Date of Collection			20-Jan-17	20-Jan-17
		Static Water Level (mbgs)			5.38	2.37
		Screen Depth Interval (mbgs)			13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination			-	-
Parameter	**Units**	**City of Ottawa Storm SUB (1)**	**City of Ottawa Sanitary SUB (2)**	**MOECC Table 3(3)**		
PHC F1 (C6-C10)	µg/L	500	500	750	<25	<25
F1-BTEX	µg/L	500	500	750	<25	<25
PHC F2 (C10-C16)	µg/L	500	500	150	<100	<100
PHC F3 (C16-C34)	µg/L	500	500	500	<250	<250
PHC F4 (C34-C50)	µg/L	500	500	500	<250	<250

Sanitary Sewer Use By-Law Exceedances	0	0
MOECC Table 3 Exceedances	0	0
MDL Exceedances of Table 3	0	0

Italicized Values Detected within Applicable Site Condition Standards
Underlined Values Exceed City of Ottawa Storm SUB
Bold Values Exceed City of Ottawa Sanitary SUB
Shaded Values Exceed MOECC Table 3 Standards

Notes:
(1) City of Ottawa Storm Sewer Use By-Law 2003-514.
(2) City of Ottawa Sanitary Sewer Use By-Law 2003-514.
(3) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Coarse Grained Soil for All Types of Property Use
mbgs - Meters below ground surface
SUB - Sewer Use By-Law
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Table D2d: Groundwater Analytical Results - Provincial Guidelines - Volatile Organic Compounds

		Sample Location:			BWP-1	BWP-2
		Date of Collection			20-Jan-17	20-Jan-17
		Static Water Level (mbgs)			5.38	2.37
		Screen Depth Interval (mbgs)			13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination			-	-
Parameter	**Units**	**City of Ottawa Storm SUB (1)**	**City of Ottawa Sanitary SUB (2)**	**MOECC Table 3(3)**		
Acetone	µg/L	-	-	130000	<30	<30
Benzene	µg/L	2	10	44	<0.50	<0.50
Bromodichloromethane	µg/L	-	350	85000	<2.0	<2.0
Bromoform	µg/L	-	630	380	<5.0	<5.0
Bromomethane	µg/L	-	110	5.6	<0.50	<0.50
Carbon tetrachloride	µg/L	-	57	0.79	<0.20	<0.20
Chlorobenzene	µg/L	-	57	630	<0.50	<0.50
Dibromochloromethane	µg/L	-	57	82000	<2.0	<2.0
Chloroform	µg/L	2	80	2.4	*1.3*	<1.0
1,2-Dibromoethane	µg/L	-	28	0.25	<0.20	<0.20
1,2-Dichlorobenzene	µg/L	5.6	88	4600	<0.50	<0.50
1,3-Dichlorobenzene	µg/L	-	36	9600	<0.50	<0.50
1,4-Dichlorobenzene	µg/L	6.8	17	8	<0.50	<0.50
Dichlorodifluoromethane	µg/L	-	-	4400	<2.0	<2.0
1,1-Dichloroethane	µg/L	-	200	320	<0.50	<0.50
1,2-Dichloroethane	µg/L	-	210	1.6	<0.50	<0.50
1,1-Dichloroethylene	µg/L	-	40	1.6	<0.50	<0.50
cis-1,2-Dichloroethylene	µg/L	5.6	200	1.6	<0.50	<0.50
trans-1,2-Dichloroethylene	µg/L	-	200	1.6	<0.50	<0.50
Methylene Chloride	µg/L	-	211	610	<5.0	<5.0
1,2-Dichloropropane	µg/L	-	850	16	<0.50	<0.50
cis-1,3-Dichloropropene	µg/L	-	70	-	<0.30	<0.30
trans-1,3-Dichloropropene	µg/L	5.6	70	-	<0.30	<0.30
1,3-Dichloropropene (cis & trans)	µg/L	-	-	5.2	<0.50	<0.50
Ethylbenzene	µg/L	2	57	2300	<0.50	<0.50
n-Hexane	µg/L	-	-	51	<0.50	<0.50
Methyl Ethyl Ketone	µg/L	-	-	470000	<20	<20
Methyl Isobutyl Ketone	µg/L	-	-	140000	<20	<20
MTBE	µg/L	-	-	190	<2.0	<2.0
Styrene	µg/L	-	40	1300	<0.50	<0.50
1,1,1,2-Tetrachloroethane	µg/L	-	-	3.3	<0.50	<0.50
1,1,2,2-Tetrachloroethane	µg/L	17	40	3.2	<0.50	<0.50
Tetrachloroethylene	µg/L	4.4	50	1.6	<0.50	<0.50
Toluene	µg/L	2	80	18000	<0.50	<0.50
1,1,1-Trichloroethane	µg/L	-	54	640	<0.50	<0.50
1,1,2-Trichloroethane	µg/L	-	800	4.7	<0.50	<0.50
Trichloroethylene	µg/L	7.6	54	1.6	<0.50	<0.50
Trichlorofluoromethane	µg/L	-	20	2500	<5.0	<5.0
Vinyl chloride	µg/L	-	400	0.5	<0.50	<0.50
o-Xylene	µg/L	-	-	-	<0.30	<0.30
m+p-Xylenes	µg/L	-	-	-	<0.40	<0.40
Xylenes (Total)	µg/L	4.4	320	4200	<0.50	<0.50

Sanitary Sewer Use By-Law Exceedances	0	0
MOECC Table 3 Exceedances	0	0
MDL Exceedances of Table 3	0	0

Italicized Values Detected within Applicable Site Condition Standards
Underlined Values Exceed City of Ottawa Storm SUB
Bold Values Exceed City of Ottawa Sanitary SUB
Shaded Values Exceed MOECC Table 3 Standards

Notes:
(1) City of Ottawa Storm Sewer Use By-Law 2003-514
(2) City of Ottawa Sanitary Sewer Use By-Law 2003-514
(3) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Coarse Grained Soil for All Types of Property Use
mbgs - Meters below ground surface
SUB - Sewer Use By-Law
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Prepared by: MD
Reviewed by: AC
Date: 5/24/2017
Pinecrest SWMP Soil Analytical Results_Provincial.xlsx

Table D2e: Groundwater Analytical Results - Provincial Guidelines - Polychlorinated Biphenyls

		Sample ID:			BWP-1	BWP-2
		Date of Collection			20-Jan-17	20-Jan-17
		Static Water Level (mbgs)			5.38	2.37
		Screen Depth Interval (mbgs)			13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination			-	-
Parameter	**Units**	**City of Ottawa Storm SUB (1)**	**City of Ottawa Sanitary SUB (2)**	**MOECC Table 3(3)**		
Aroclor 1242	µg/L	-	-	-	<0.020	<0.020
Aroclor 1248	µg/L	-	-	-	<0.020	<0.020
Aroclor 1254	µg/L	-	-	-	<0.020	<0.020
Aroclor 1260	µg/L	-	-	-	<0.020	<0.020
Total PCB	µg/L	0.4	-	7.8	<0.040	<0.040

Sanitary Sewer Use By-Law Exceedances	0	0
MOECC Table 3 Exceedances	0	0
MDL Exceedances of Table 3	0	0

Italicized Values Detected within Applicable Site Condition Standards
Underlined Values Exceed City of Ottawa Storm SUB
Bold Values Exceed City of Ottawa Sanitary SUB
Shaded Values Exceed MOECC Table 3 Standards

Notes:
(1) City of Ottawa Storm Sewer Use By-Law 2003-514.
(2) City of Ottawa Sanitary Sewer Use By-Law 2003-514.
(3) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, Coarse Grained Soil for All Types of Property Use
mbgs - Meters below ground surface
SUB - Sewer Use By-Law
< - Less than laboratory detection limit
MDL - Laboratory method detection limit

Appendix E

Tables of Soil and Groundwater Analytical Results – Federal Guidelines

Table E1a: Soil Analytical Results - Federal Guidelines - Dissolved Metals

		Sampling Location	BWP-1	BWP-1	BWP-2	BWP-2
		Sample ID	BWP-1 SA1	BWP-1 SA4	BWP-2 SA2	BWP-2 SA22 (SA2 DUP)
		Date of Collection	1/16/2017	1/16/2017	1/16/2017	1/16/2017
		Sample Depth (mbgs)	0 - 0.61	2.29 - 2.9	0.76 - 1.37	0.76 - 1.37
		Stratigraphy	Topsoil - Silty Sand	Silty Clay - Clay	Silty Clay - Clay	Silty Clay - Clay
		Evidence of Contamination	-	-	-	-
Parameters	**Unit**	**CCME SQGEHH(1)**				
Antimony (Sb)	µg/g	20	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	µg/g	12	2	2.8	1.6	1.9
Barium (Ba)	µg/g	500	22.5	205	319	348
Beryllium (Be)	µg/g	4	<0.50	0.64	0.89	0.8
Boron (B), Hot Water Ext.	µg/g	-	0.23	0.14	<0.10	<0.10
Boron (B)	µg/g	-	<5.0	5.6	<5.0	<5.0
Cadmium (Cd)	µg/g	10	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	µg/g	64	16.6	42.7	73.9	71.8
Cobalt (Co)	µg/g	50	3.9	11.3	17.4	17.6
Copper (Cu)	µg/g	63	3.7	22.6	32.3	32.2
Lead (Pb)	µg/g	140	4	5.5	6.4	6.7
Mercury (Hg)	µg/g	6.6	0.0214	<0.0050	0.0064	0.0055
Molybdenum (Mo)	µg/g	10	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	µg/g	45	8.8	24.9	38.5	40.4
Selenium (Se)	µg/g	1	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	µg/g	20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	µg/g	1	<0.50	<0.50	<0.50	<0.50
Uranium (U)	µg/g	23	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	µg/g	130	27.4	62.3	84.8	85.1
Zinc (Zn)	µg/g	200	26.6	65.2	98.5	104
Chromium, Hexavalent	µg/g	0.4	<0.20	1.1	0.92	0.99

CCME SQGEHH Exceedances	0	1	2	2
MDL Exceedances of CCME	0	0	0	0

Underlined Values Detected within Applicable Site Condition Standards

Bold Values Highlight MDL Exceedances of CCME

Shaded Values Exceed CCME SQGEHH Site Condition Standards

Notes:

(1) Canadian Environmental Quality Guidelines (CEQG), recommended by the Canadian Council of Ministers of the Environment (CCME). Soil Quality Guidelines for the Protection of Environmental and Human Health (SQGEHH), for Non-Potable, Coarse-Grained, Surface Soil Conditions, for Residential/Parkland Property Use

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E1b: Soil Analytical Results - Federal Guidelines - Polycyclic Aromatic Hydrocarbons

		Sampling Location	BWP-1	BWP-1	BWP-2
		Sample ID	BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA1
		Date of Collection	1/16/2017	1/16/2017	1/16/2017
		Sample Depth (mbgs)	4.57 - 5.18	4.57 - 5.18	0 - 0.61
		Stratigraphy	Silty Clay - Clay	Silty Clay - Clay	Topsoil - Silty Sand
		Evidence of Contamination	-	-	-
Parameters	**Unit**	**CCME SQGEHH[1]**			
B[a]P TPE[a]	-	0.6	0.0605	0.0605	0.0605
Acenaphthene	µg/g	-	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	-	<0.050	<0.050	<0.050
Anthracene	µg/g	2.5	<0.050	<0.050	<0.050
Benzo(a)anthracene	µg/g	1	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	20	<0.050	<0.050	<0.050
Benzo(b)fluoranthene	µg/g	1	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	-	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	µg/g	1	<0.050	<0.050	<0.050
Chrysene	µg/g	-	<0.050	<0.050	<0.050
Dibenzo(ah)anthracene	µg/g	1	<0.050	<0.050	<0.050
Fluoranthene	µg/g	50	<0.050	<0.050	<0.050
Fluorene	µg/g	-	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	µg/g	1	<0.050	<0.050	<0.050
1+2-Methylnaphthalenes	µg/g	-	<0.042	<0.042	<0.042
1-Methylnaphthalene	µg/g	-	<0.030	<0.030	<0.030
2-Methylnaphthalene	µg/g	-	<0.030	<0.030	<0.030
Naphthalene[b]	µg/g	0.013	**<0.050**	**<0.050**	**<0.050**
Phenanthrene[b]	µg/g	0.046	**<0.050**	**<0.050**	**<0.050**
Pyrene	µg/g	10	<0.050	<0.050	<0.050

CCME SQGEHH Exceedances	0	0	0
MDL Exceedances of CCME	2	2	2

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of CCME
Shaded Values Exceed CCME SQGEHH Site Condition Standards

Notes:

(1) Canadian Environmental Quality Guidelines (CEQG), recommended by the Canadian Council of Ministers of the Environment (CCME). Soil Quality Guidelines for the Protection of Environmental and Human Health (SQGEHH), for Non-Potable, Coarse-Grained, Surface Soil Conditions, for Residential/Parkland Property Use

(a) B[a]P TPE - Benzo[a]pyrene Total Potency Equivalents, sample specific CCME Human Health Guidelines based on Carcinogenic Effects of PAHs. B[a]P TPE values are calculated for each sample according to the methods outlined in the CCME 2010 Polycyclic Aromatic Hydrocarbons factsheet; guideline based on an Incremental Lifetime Cancer Risk of 1 in 1,000,000.

(b) Soil Quality Guideline for the Protection of Freshwater Life as per Table 1 of Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Polycyclic Aromatic Hydrocarbons, 2010

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E1c: Soil Analytical Results - Federal Guidelines - Petroleum Hydrocarbons

		Sampling Location	BWP-1	BWP-1	BWP-2
		Sample ID	BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA4
		Date of Collection	1/16/2017	1/16/2017	1/16/2017
		Sample Depth (mbgs)	4.57 - 5.18	4.57 - 5.18	2.29 - 2.9
		Stratigraphy	Silty Clay - Clay	Silty Clay - Clay	Silty Clay - Clay
		Evidence of Contamination	-	-	-
Parameters	**Unit**	**CCME CWS(1)**			
F1 (C6-C10)	µg/g	30	<5.0	<5.0	<5.0
F1-BTEX	µg/g	30	<5.0	<5.0	<5.0
F2 (C10-C16)	µg/g	150	<10	<10	<10
F3 (C16-C34)	µg/g	300	<50	<50	<50
F4 (C34-C50)	µg/g	2800	<50	<50	<50

CCME CWS Exceedances	0	0	0
MDL Exceedances of CCME	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of CCME
Shaded Values Exceed CCME CWS

Notes:

(1) Canda-Wide Standards (CWS) for Petroleum Hydrocarbons (PHCs) in Soil, endorsed by CCME Council of Ministers, April 30 - May 1, 2001, Revised January 2008, Tier 1 levels for Non-Potable, Coarse-Grained, Surface Soil Conditions, for Residential/Parkland Property Use

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E1d: Soil Analytical Results - Federal Guidelines - Volatile Organic Compounds

		Sampling Location	BWP-1	BWP-1	BWP-2
		Sample ID	BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA4
		Date of Collection	1/16/2017	1/16/2017	1/16/2017
		Sample Depth (mbgs)	4.57 - 5.18	4.57 - 5.18	2.29 - 2.9
		Stratigraphy	Silty Clay - Clay	Silty Clay - Clay	Silty Clay - Clay
		Evidence of Contamination	-	-	-
Parameters	**Unit**	**CCME SQGEHH[1]**			
Acetone	µg/g	-	<0.50	<0.50	<0.50
Benzene[a]	µg/g	0.0095	<0.0068	<0.0068	<0.0068
Bromodichloromethane	µg/g	-	<0.050	<0.050	<0.050
Bromoform	µg/g	-	<0.050	<0.050	<0.050
Bromomethane	µg/g	-	<0.050	<0.050	<0.050
Carbon tetrachloride	µg/g	5	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	1	<0.050	<0.050	<0.050
Dibromochloromethane	µg/g	-	<0.050	<0.050	<0.050
Chloroform	µg/g	5	<0.050	<0.050	<0.050
1,2-Dibromoethane	µg/g	-	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	µg/g	1	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	µg/g	1	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	µg/g	1	<0.050	<0.050	<0.050
Dichlorodifluoromethane	µg/g	-	<0.050	<0.050	<0.050
1,1-Dichloroethane	µg/g	5	<0.050	<0.050	<0.050
1,2-Dichloroethane	µg/g	5	<0.050	<0.050	<0.050
1,1-Dichloroethylene	µg/g	5	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	µg/g	-	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	µg/g	-	<0.050	<0.050	<0.050
Methylene Chloride	µg/g	5	<0.050	<0.050	<0.050
1,2-Dichloropropane	µg/g	-	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	µg/g	-	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	µg/g	-	<0.030	<0.030	<0.030
1,3-Dichloropropene (cis & trans)	µg/g	5	<0.042	<0.042	<0.042
Ethylbenzene	µg/g	0.082	<0.018	<0.018	<0.018
n-Hexane	µg/g	0.49	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	µg/g	-	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	µg/g	-	<0.50	<0.50	<0.50
MTBE	µg/g	-	<0.050	<0.050	<0.050
Styrene	µg/g	5	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	µg/g	-	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	µg/g	5	<0.050	<0.050	<0.050
Tetrachloroethylene	µg/g	0.2	<0.050	<0.050	<0.050
Toluene	µg/g	0.37	<0.080	<0.080	<0.080
1,1,1-Trichloroethane	µg/g	5	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	µg/g	5	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.01	<0.010	<0.010	<0.010
Trichlorofluoromethane	µg/g	-	<0.050	<0.050	<0.050
Vinyl chloride	µg/g	-	<0.020	<0.020	<0.020
o-Xylene	µg/g	-	<0.020	<0.020	<0.020
m+p-Xylenes	µg/g	-	<0.030	<0.030	<0.030
Xylenes (Total)	µg/g	11	<0.050	<0.050	<0.050

CCME SQGEHH Exceedances	0	0	0
MDL Exceedances of CCME	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of CCME
Shaded Values Exceed CCME SQGEHH Site Condition Standards

Notes:

(1) Canadian Environmental Quality Guidelines (CEQG), recommended by the Canadian Council of Ministers of the Environment (CCME). Soil Quality Guidelines for the Protection of Environmental and Human Health (SQGEHH), for Non-Potable, Coarse-Grained Surface Soil Conditions, for Residential/Parkland Property Use

(a) Based on Incremental Lifetime Cancer Risk of 1 in 1,000,000

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E1e: Soil Analytical Results - Federal Guidelines - Polychlorinated Biphenyls

		Sampling Location	BWP-1	BWP-1	BWP-2
		Sample ID	BWP-1 SA7	BWP-1 SA8 (SA7 DUP)	BWP-2 SA1
		Date of Collection	1/16/2017	1/16/2017	1/16/2017
		Sample Depth (mbgs)	4.57 - 5.18	4.57 - 5.18	0 - 0.61
		Stratigraphy	Silty Clay - Clay	Silty Clay - Clay	Topsoil - Silty Sand
		Evidence of Contamination	-	-	-
Parameters	**Unit**	**CCME SQGEHH(1)**			
Aroclor 1242	µg/g	-	<0.010	<0.010	<0.010
Aroclor 1248	µg/g	-	<0.010	<0.010	<0.010
Aroclor 1254	µg/g	-	<0.010	<0.010	<0.010
Aroclor 1260	µg/g	-	<0.010	<0.010	<0.010
Total PCB	µg/g	1.3	<0.020	<0.020	<0.020

CCME SQGEHH Exceedances	0	0	0
MDL Exceedances of CCME	0	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of CCME
Shaded Values Exceed CCME SQGEHH Site Condition Standards

Notes:

(1) Canadian Environmental Quality Guidelines (CEQG), recommended by the Canadian Council of Ministers of the Environment (CCME). Soil Quality Guidelines for the Protection of Environmental and Human Health (SQGEHH), for Non-Potable, Coarse-Grained Surface Soil Conditions, for Residential/Parkland Property Use

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E2a: Groundwater Analytical Results - Federal Guidelines - Dissolved Metals

		Sample ID	BWP-1	BWP-2
		Date of Collection	1/20/2017	1/20/2017
		Static Water Level (mbgs)	5.38	2.37
		Screen Depth Interval (mbgs)	13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination	-	-
Parameters	**Unit**	**FIGQG[1]**		
Antimony (Sb)	µg/L	2000	0.85	<0.10
Arsenic (As)	µg/L	5	6.88	0.4
Barium (Ba)	µg/L	500	243	27.6
Beryllium (Be)	µg/L	5.3	<0.10	<0.10
Boron (B)	µg/L	5000	133	<10
Cadmium (Cd)	µg/L	0.017	0.012	<0.010
Chromium (Cr)	µg/L	8.9	29.2	1.52
Cobalt (Co)	µg/L	-	<0.10	0.13
Copper (Cu)[a,b]	µg/L	2	<0.20	0.94
Lead (Pb)[a,b]	µg/L	1	<0.050	<0.050
Mercury (Hg)[a]	µg/L	0.026	<0.010	<0.010
Molybdenum (Mo)	µg/L	73	41.3	1.07
Nickel (Ni)[a,b]	µg/L	25	<0.50	<0.50
Selenium (Se)	µg/L	1	0.242	0.302
Silver (Ag)	µg/L	0.1	<0.050	<0.050
Sodium (Na)	µg/L	-	31300	19300
Thallium (Tl)	µg/L	0.8	0.038	<0.010
Uranium (U)	µg/L	15	1.7	0.725
Vanadium (V)	µg/L	-	1.04	5.65
Zinc (Zn)	µg/L	10	<1.0	1.9
Chromium, Hexavalent	µg/L	-	10.4	2.6

FIGQG Exceedances	2	0
MDL Exceedances of FIGQG	0	0

Underlined Values Detected within Applicable Site Condition Standards

Bold Values Highlight MDL Exceedances of FIGQG

Shaded Values Exceed FIGQG Site Condition Standards

Notes:

(1) Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites, Table 2: Generic Guidelines for Residential/Parkland Land Use, for Coarse-grained soil

(a) Fresh-water aquatic life guidelines

(b) Based on water hardness value, calculated as per the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME 1999)

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E2b: Groundwater Analytical Results - Federal Guidelines - Polycyclic Aromatic Hydrocarbons

		Sample ID	BWP-1	BWP-2
		Date of Collection	1/20/2017	1/20/2017
		Static Water Level (mbgs)	5.38	2.37
		Screen Depth Interval (mbgs)	13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination	-	-
Parameters	**Unit**	**FIGQG[1]**		
Acenaphthene	µg/L	5.8	<0.020	<0.020
Acenaphthylene	µg/L	46	<0.020	<0.020
Anthracene	µg/L	0.012	**<0.020**	**<0.020**
Benzo(a)anthracene[a]	µg/L	0.018	**<0.020**	**<0.020**
Benzo(a)pyrene[a]	µg/L	0.01	<0.010	<0.010
Benzo(b)fluoranthene[a]	µg/L	0.48	<0.020	<0.020
Benzo(g,h,i)perylene[a]	µg/L	0.17	<0.020	<0.020
Benzo(k)fluoranthene[a]	µg/L	0.48	<0.020	<0.020
Chrysene[a]	µg/L	0.1	<0.020	<0.020
Dibenzo(ah)anthracene[a]	µg/L	0.26	<0.020	<0.020
Fluoranthene	µg/L	0.04	<0.020	<0.020
Fluorene	µg/L	3	<0.020	<0.020
Indeno(1,2,3-cd)pyrene[a]	µg/L	0.21	<0.020	<0.020
1+2-Methylnaphthalenes	µg/L	180	<0.028	<0.028
1-Methylnaphthalene	µg/L	-	<0.020	<0.020
2-Methylnaphthalene	µg/L	-	<0.020	<0.020
Naphthalene	µg/L	1.1	<0.050	<0.050
Phenanthrene	µg/L	0.4	<0.020	<0.020
Pyrene	µg/L	0.025	<0.020	<0.020

FIGQG Exceedances	0	0
MDL Exceedances of FIGQG	2	2

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of FIGQG
Shaded Values Exceed FIGQG Site Condition Standards

Notes:
(1) Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites, Table 2: Generic Guidelines for Residential/Parkland Land Use, for Coarse-grained soil

(a) For ecological receptors only

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E2c: Groundwater Analytical Results - Federal Guidelines - Petroleum Hydrocarbons

		Sample ID	BWP-1	BWP-2
		Date of Collection	1/20/2017	1/20/2017
		Static Water Level (mbgs)	5.38	2.37
		Screen Depth Interval (mbgs)	13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination	-	-
Parameters	Unit	**FIGQG(1)**		
F1 (C6-C10)	µg/L	810	<25	<25
F1-BTEX	µg/L	810	<25	<25
F2 (C10-C16)	µg/L	1300	<100	<100
F3 (C16-C34)	µg/L	-	<250	<250
F4 (C34-C50)	µg/L	-	<250	<250

FIGQG Exceedances	0	0
MDL Exceedances of FIGQG	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of FIGQG
Shaded Values Exceed FIGQG Site Condition Standards

Notes:
(1) Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites, Table 2: Generic Guidelines for Residential/Parkland Land Use, for Coarse-grained soil

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E2d: Groundwater Analytical Results - Federal Guidelines - Volatile Organic Compounds

		Sample ID	BWP-1	BWP-2
		Date of Collection	1/20/2017	1/20/2017
		Static Water Level (mbgs)	5.38	2.37
		Screen Depth Interval (mbgs)	13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination	-	-
Parameters	**Unit**	**FIGQG(1)**		
Acetone	µg/L	13000	<30	<30
Benzene	µg/L	140	<0.50	<0.50
Bromodichloromethane	µg/L	1100	<2.0	<2.0
Bromoform	µg/L	380	<5.0	<5.0
Bromomethane	µg/L	5.6	<0.50	<0.50
Carbon tetrachloride	µg/L	0.56	<0.20	<0.20
Chlorobenzene	µg/L	1.3	<0.50	<0.50
Dibromochloromethane	µg/L	1100	<2.0	<2.0
Chloroform	µg/L	1.8	1.3	<1.0
1,2-Dibromoethane	µg/L	-	<0.20	<0.20
1,2-Dichlorobenzene	µg/L	0.7	<0.50	<0.50
1,3-Dichlorobenzene	µg/L	42	<0.50	<0.50
1,4-Dichlorobenzene	µg/L	26	<0.50	<0.50
Dichlorodifluoromethane	µg/L	-	<2.0	<2.0
1,1-Dichloroethane	µg/L	320	<0.50	<0.50
1,2-Dichloroethane	µg/L	10	<0.50	<0.50
1,1-Dichloroethylene	µg/L	39	<0.50	<0.50
cis-1,2-Dichloroethylene	µg/L	-	<0.50	<0.50
trans-1,2-Dichloroethylene	µg/L	-	<0.50	<0.50
Methylene Chloride	µg/L	98	<5.0	<5.0
1,2-Dichloropropane	µg/L	16	<0.50	<0.50
cis-1,3-Dichloropropene	µg/L	-	<0.30	<0.30
trans-1,3-Dichloropropene	µg/L	-	<0.30	<0.30
1,3-Dichloropropene (cis & trans)	µg/L	5.2	<0.50	<0.50
Ethylbenzene	µg/L	11000	<0.50	<0.50
n-Hexane	µg/L	-	<0.50	<0.50
Methyl Ethyl Ketone	µg/L	150000	<20	<20
Methyl Isobutyl Ketone	µg/L	58000	<20	<20
MTBE	µg/L	340	<2.0	<2.0
Styrene	µg/L	72	<0.50	<0.50
1,1,1,2-Tetrachloroethane	µg/L	3.4	<0.50	<0.50
1,1,2,2-Tetrachloroethane	µg/L	3.2	<0.50	<0.50
Tetrachloroethylene	µg/L	110	<0.50	<0.50
Toluene	µg/L	83	<0.50	<0.50
1,1,1-Trichloroethane	µg/L	640	<0.50	<0.50
1,1,2-Trichloroethane	µg/L	4.7	<0.50	<0.50
Trichloroethylene	µg/L	20	<0.50	<0.50
Trichlorofluoromethane	µg/L	-	<5.0	<5.0
Vinyl chloride	µg/L	1.1	<0.50	<0.50
o-Xylene	µg/L	-	<0.30	<0.30
m+p-Xylenes	µg/L	-	<0.40	<0.40
Xylenes (Total)	µg/L	3900	<0.50	<0.50

FIGQG Exceedances	0	0
MDL Exceedances of FIGQG	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of FIGQG
Shaded Values Exceed FIGQG Site Condition Standards

Notes:
(1) Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites, Table 2: Generic Guidelines for Residential/Parkland Land Use, for Coarse-grained soil

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Table E2e: Groundwater Analytical Results - Federal Guidelines - Ploychlorinated Biphenyls

		Sample ID	BWP-1	BWP-2
		Date of Collection	1/20/2017	1/20/2017
		Static Water Level (mbgs)	5.38	2.37
		Screen Depth Interval (mbgs)	13.53 - 16.58	4.40 - 7.45
		Evidence of Contamination	-	-
Parameters	Unit	**FIGQG(1)**		
Aroclor 1242	µg/L	-	<0.020	<0.020
Aroclor 1248	µg/L	-	<0.020	<0.020
Aroclor 1254	µg/L	-	<0.020	<0.020
Aroclor 1260	µg/L	-	<0.020	<0.020
Total PCB	µg/L	-	<0.040	<0.040

FIGQG Exceedances	0	0
MDL Exceedances of FIGQG	0	0

Underlined Values Detected within Applicable Site Condition Standards
Bold Values Highlight MDL Exceedances of FIGQG
Shaded Values Exceed FIGQG Site Condition Standards

Notes:
(1) Federal Contaminated Sites Action Plan (FCSAP), Guidance Document on Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites, Table 2: Generic Guidelines for Residential/Parkland Land Use, for Coarse-grained soil

mbgs - Meters below ground surface

MDL - method detection limit

< xx - Less than laboratory MDL of "xx"

Appendix F

Laboratory Certificate of Analysis

Morrison Hershfield Limited (Ottawa)
ATTN: Mitchell Dawley
2440 Don Reid Drive
Ottawa ON K1H 1E1

Date Received: 20-JAN-17
Report Date: 27-JAN-17 12:39 (MT)
Version: FINAL

Client Phone: 613-739-2910

Certificate of Analysis

Lab Work Order #: L1882051

Project P.O. #: NOT SUBMITTED
Job Reference: 2150308
C of C Numbers:
Legal Site Desc:

Mary-Lynn Pires
Client Services Supervisor

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ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

				ALS ID	L1882051-1	L1882051-2	L1882051-3	L1882051-4	L1882051-5	L1882051-6	L1882051-7	L1882051-8
				Sampled Date	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17
				Sampled Time	12:55	13:20	14:00	14:00	10:24	10:32	10:32	10:55
				Sample ID	BWP-1 SA1	BWP-1 SA4	BWP-1 SA7	BWP-1 SA8	BWP-2 SA1	BWP-2 SA2	BWP-2 SA22	BWP-2 SA4
Grouping	Analyte	Unit	Guide Limits #1	#2								
Physical Tests	% Moisture	%	-	-	14.1	26.5	33.4	35.5	17.4	25.0	25.9	26.0
Metals	Antimony (Sb)	ug/g	1.3	40	<1.0	<1.0				<1.0	<1.0	
	Arsenic (As)	ug/g	18	18	2.0	2.8				1.6	1.9	
	Barium (Ba)	ug/g	220	670	22.5	205				319	348	
	Beryllium (Be)	ug/g	2.5	8	<0.50	0.64				0.89	0.80	
	Boron (B)	ug/g	36	120	<5.0	5.6				<5.0	<5.0	
	Boron (B), Hot Water Ext.	ug/g	36	2	0.23	0.14				<0.10	<0.10	
	Cadmium (Cd)	ug/g	1.2	1.9	<0.50	<0.50				<0.50	<0.50	
	Chromium (Cr)	ug/g	70	160	16.6	42.7				73.9	71.8	
	Cobalt (Co)	ug/g	21	80	3.9	11.3				17.4	17.6	
	Copper (Cu)	ug/g	92	230	3.7	22.6				32.3	32.2	
	Lead (Pb)	ug/g	120	120	4.0	5.5				6.4	6.7	
	Mercury (Hg)	ug/g	0.27	3.9	0.0214	<0.0050				0.0064	0.0055	
	Molybdenum (Mo)	ug/g	2	40	<1.0	<1.0				<1.0	<1.0	
	Nickel (Ni)	ug/g	82	270	8.8	24.9				38.5	40.4	
	Selenium (Se)	ug/g	1.5	5.5	<1.0	<1.0				<1.0	<1.0	
	Silver (Ag)	ug/g	0.5	40	<0.20	<0.20				<0.20	<0.20	
	Thallium (Tl)	ug/g	1	3.3	<0.50	<0.50				<0.50	<0.50	
	Uranium (U)	ug/g	2.5	33	<1.0	<1.0				<1.0	<1.0	
	Vanadium (V)	ug/g	86	86	27.4	62.3				84.8	85.1	
	Zinc (Zn)	ug/g	290	340	26.6	65.2				98.5	104	
Speciated Metals	Chromium, Hexavalent	ug/g	0.66	8	<0.20	1.10				0.92	0.99	

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use
Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

				ALS ID	L1882051-1	L1882051-2	L1882051-3	L1882051-4	L1882051-5	L1882051-6	L1882051-7	L1882051-8
				Sampled Date	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17
				Sampled Time	12:55	13:20	14:00	14:00	10:24	10:32	10:32	10:55
				Sample ID	BWP-1 SA1	BWP-1 SA4	BWP-1 SA7	BWP-1 SA8	BWP-2 SA1	BWP-2 SA2	BWP-2 SA22	BWP-2 SA4
			Guide Limits									
Grouping	Analyte	Unit	#1	#2								
Volatile Organic Compounds	Acetone	ug/g	0.5	16			<0.50	<0.50				<0.50
	Benzene	ug/g	0.02	0.32			<0.0068	<0.0068				<0.0068
	Bromodichloromethane	ug/g	0.05	18			<0.050	<0.050				<0.050
	Bromoform	ug/g	0.05	0.61			<0.050	<0.050				<0.050
	Bromomethane	ug/g	0.05	0.05			<0.050	<0.050				<0.050
	Carbon tetrachloride	ug/g	0.05	0.21			<0.050	<0.050				<0.050
	Chlorobenzene	ug/g	0.05	2.4			<0.050	<0.050				<0.050
	Dibromochloromethane	ug/g	0.05	13			<0.050	<0.050				<0.050
	Chloroform	ug/g	0.05	0.47			<0.050	<0.050				<0.050
	1,2-Dibromoethane	ug/g	0.05	0.05			<0.050	<0.050				<0.050
	1,2-Dichlorobenzene	ug/g	0.05	6.8			<0.050	<0.050				<0.050
	1,3-Dichlorobenzene	ug/g	0.05	9.6			<0.050	<0.050				<0.050
	1,4-Dichlorobenzene	ug/g	0.05	0.2			<0.050	<0.050				<0.050
	Dichlorodifluoromethane	ug/g	0.05	16			<0.050	<0.050				<0.050
	1,1-Dichloroethane	ug/g	0.05	17			<0.050	<0.050				<0.050
	1,2-Dichloroethane	ug/g	0.05	0.05			<0.050	<0.050				<0.050
	1,1-Dichloroethylene	ug/g	0.05	0.064			<0.050	<0.050				<0.050
	cis-1,2-Dichloroethylene	ug/g	0.05	55			<0.050	<0.050				<0.050
	trans-1,2-Dichloroethylene	ug/g	0.05	1.3			<0.050	<0.050				<0.050
	Methylene Chloride	ug/g	0.05	1.6			<0.050	<0.050				<0.050
	1,2-Dichloropropane	ug/g	0.05	0.16			<0.050	<0.050				<0.050
	cis-1,3-Dichloropropene	ug/g	-	-			<0.030	<0.030				<0.030

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use
Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

				ALS ID	L1882051-1	L1882051-2	L1882051-3	L1882051-4	L1882051-5	L1882051-6	L1882051-7	L1882051-8
				Sampled Date	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17
				Sampled Time	12:55	13:20	14:00	14:00	10:24	10:32	10:32	10:55
				Sample ID	BWP-1 SA1	BWP-1 SA4	BWP-1 SA7	BWP-1 SA8	BWP-2 SA1	BWP-2 SA2	BWP-2 SA22	BWP-2 SA4
			Guide Limits									
Grouping	Analyte	Unit	#1	#2								
Volatile Organic Compounds	trans-1,3-Dichloropropene	ug/g	-	-			<0.030	<0.030				<0.030
	1,3-Dichloropropene (cis & trans)	ug/g	0.05	0.18			<0.042	<0.042				<0.042
	Ethylbenzene	ug/g	0.05	9.5			<0.018	<0.018				<0.018
	n-Hexane	ug/g	0.05	46			<0.050	<0.050				<0.050
	Methyl Ethyl Ketone	ug/g	0.5	70			<0.50	<0.50				<0.50
	Methyl Isobutyl Ketone	ug/g	0.5	31			<0.50	<0.50				<0.50
	MTBE	ug/g	0.05	11			<0.050	<0.050				<0.050
	Styrene	ug/g	0.05	34			<0.050	<0.050				<0.050
	1,1,1,2-Tetrachloroethane	ug/g	0.05	0.087			<0.050	<0.050				<0.050
	1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05			<0.050	<0.050				<0.050
	Tetrachloroethylene	ug/g	0.05	4.5			<0.050	<0.050				<0.050
	Toluene	ug/g	0.2	68			<0.080	<0.080				<0.080
	1,1,1-Trichloroethane	ug/g	0.05	6.1			<0.050	<0.050				<0.050
	1,1,2-Trichloroethane	ug/g	0.05	0.05			<0.050	<0.050				<0.050
	Trichloroethylene	ug/g	0.05	0.91			<0.010	<0.010				<0.010
	Trichlorofluoromethane	ug/g	0.25	4			<0.050	<0.050				<0.050
	Vinyl chloride	ug/g	0.02	0.032			<0.020	<0.020				<0.020
	o-Xylene	ug/g	-	-			<0.020	<0.020				<0.020
	m+p-Xylenes	ug/g	-	-			<0.030	<0.030				<0.030
	Xylenes (Total)	ug/g	0.05	26			<0.050	<0.050				<0.050
	Surrogate: 4-Bromofluorobenzene	%	-	-			96.2	94.2				96.7
	Surrogate: 1,4-Difluorobenzene	%	-	-			99.4	97.0				99.8

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use
Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

				ALS ID	L1882051-1	L1882051-2	L1882051-3	L1882051-4	L1882051-5	L1882051-6	L1882051-7	L1882051-8
				Sampled Date	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17
				Sampled Time	12:55	13:20	14:00	14:00	10:24	10:32	10:32	10:55
				Sample ID	BWP-1 SA1	BWP-1 SA4	BWP-1 SA7	BWP-1 SA8	BWP-2 SA1	BWP-2 SA2	BWP-2 SA22	BWP-2 SA4
Grouping	Analyte	Unit	Guide Limits #1	#2								
Hydrocarbons	F1 (C6-C10)	ug/g	25	55			<5.0	<5.0				<5.0
	F1-BTEX	ug/g	25	55			<5.0	<5.0				<5.0
	F2 (C10-C16)	ug/g	10	230			<10	<10				<10
	F2-Naphth	ug/g	-	-			<10	<10				
	F3 (C16-C34)	ug/g	240	1700			<50	<50				<50
	F3-PAH	ug/g	-	-			<50	<50				
	F4 (C34-C50)	ug/g	120	3300			<50	<50				<50
	Total Hydrocarbons (C6-C50)	ug/g	-	-			<72	<72				<72
	Chrom. to baseline at nC50		-	-			YES	YES				YES
	Surrogate: 2-Bromobenzotrifluoride	%	-	-			92.8	91.0				87.1
	Surrogate: 3,4-Dichlorotoluene	%	-	-			78.4	76.9				79.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene	ug/g	0.072	96			<0.050	<0.050	<0.050			
	Acenaphthylene	ug/g	0.093	0.15			<0.050	<0.050	<0.050			
	Anthracene	ug/g	0.16	0.67			<0.050	<0.050	<0.050			
	Benzo(a)anthracene	ug/g	0.36	0.96			<0.050	<0.050	<0.050			
	Benzo(a)pyrene	ug/g	0.3	0.3			<0.050	<0.050	<0.050			
	Benzo(b)fluoranthene	ug/g	0.47	0.96			<0.050	<0.050	<0.050			
	Benzo(g,h,i)perylene	ug/g	0.68	9.6			<0.050	<0.050	<0.050			
	Benzo(k)fluoranthene	ug/g	0.48	0.96			<0.050	<0.050	<0.050			
	Chrysene	ug/g	2.8	9.6			<0.050	<0.050	<0.050			
	Dibenzo(ah)anthracene	ug/g	0.1	0.1			<0.050	<0.050	<0.050			
	Fluoranthene	ug/g	0.56	9.6			<0.050	<0.050	<0.050			

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use
Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

				ALS ID	L1882051-1	L1882051-2	L1882051-3	L1882051-4	L1882051-5	L1882051-6	L1882051-7	L1882051-8
				Sampled Date	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17	16-JAN-17
				Sampled Time	12:55	13:20	14:00	14:00	10:24	10:32	10:32	10:55
				Sample ID	BWP-1 SA1	BWP-1 SA4	BWP-1 SA7	BWP-1 SA8	BWP-2 SA1	BWP-2 SA2	BWP-2 SA22	BWP-2 SA4
			Guide Limits									
Grouping	Analyte	Unit	#1	#2								
Polycyclic Aromatic Hydrocarbons	Fluorene	ug/g	0.12	62			<0.050	<0.050	<0.050			
	Indeno(1,2,3-cd)pyrene	ug/g	0.23	0.76			<0.050	<0.050	<0.050			
	1+2-Methylnaphthalenes	ug/g	0.59	76			<0.042	<0.042	<0.042			
	1-Methylnaphthalene	ug/g	0.59	76			<0.030	<0.030	<0.030			
	2-Methylnaphthalene	ug/g	0.59	76			<0.030	<0.030	<0.030			
	Naphthalene	ug/g	0.09	9.6			<0.050	<0.050	<0.050			
	Phenanthrene	ug/g	0.69	12			<0.050	<0.050	<0.050			
	Pyrene	ug/g	1	96			<0.050	<0.050	<0.050			
	Surrogate: 2-Fluorobiphenyl	%	-	-			96.7	96.4	100.4			
	Surrogate: p-Terphenyl d14	%	-	-			95.0	93.7	103.4			
Polychlorinated Biphenyls	Aroclor 1242	ug/g	-	-			<0.010	<0.010	<0.010			
	Aroclor 1248	ug/g	-	-			<0.010	<0.010	<0.010			
	Aroclor 1254	ug/g	-	-			<0.010	<0.010	<0.010			
	Aroclor 1260	ug/g	-	-			<0.010	<0.010	<0.010			
	Total PCBs	ug/g	0.3	1.1			<0.020	<0.020	<0.020			
	Surrogate: d14-Terphenyl	%	-	-			104.0	102.4	108.2			

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use
Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Summary of Guideline Exceedances

Guideline ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Ontario Regulation 153/04 - April 15, 2011 Standards - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use						
L1882051-2	BWP-1 SA4	Speciated Metals	Chromium, Hexavalent	1.10	0.66	ug/g
L1882051-6	BWP-2 SA2	Metals	Barium (Ba)	319	220	ug/g
			Chromium (Cr)	73.9	70	ug/g
		Speciated Metals	Chromium, Hexavalent	0.92	0.66	ug/g
L1882051-7	BWP-2 SA22	Metals	Barium (Ba)	348	220	ug/g
			Chromium (Cr)	71.8	70	ug/g
		Speciated Metals	Chromium, Hexavalent	0.99	0.66	ug/g

Ontario Regulation 153/04 - April 15, 2011 Standards - T3-Soil-Ind/Com/Commu. Property Use (Coarse)

(No parameter exceedances)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Dried, ground and sieved soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R3639721								
WG2469271-4 DUP		**L1881885-9**						
Boron (B), Hot Water Ext.		0.58	0.59		ug/g	0.5	30	25-JAN-17
WG2469271-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			122.3		%		70-130	25-JAN-17
WG2469271-3 LCS								
Boron (B), Hot Water Ext.			101.4		%		70-130	25-JAN-17
WG2469271-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	25-JAN-17
CR-CR6-IC-WT	**Soil**							
Batch R3640401								
WG2468918-3 CRM		**WT-SQC012**						
Chromium, Hexavalent			95.3		%		70-130	25-JAN-17
WG2468918-4 DUP		**L1882051-1**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	25-JAN-17
WG2468918-2 LCS								
Chromium, Hexavalent			99.0		%		80-120	25-JAN-17
WG2468918-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	25-JAN-17
F1-HS-511-WT	**Soil**							
Batch R3638911								
WG2468172-4 DUP		**WG2468172-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	24-JAN-17
WG2468172-2 LCS								
F1 (C6-C10)			99.2		%		80-120	24-JAN-17
WG2468172-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	24-JAN-17
Surrogate: 3,4-Dichlorotoluene			93.4		%		60-140	24-JAN-17
WG2468172-7 MS		**WG2468172-6**						
F1 (C6-C10)			100.1		%		60-140	24-JAN-17
F2-F4-511-WT	**Soil**							
Batch R3640296								
WG2468038-3 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			92.4		%		70-130	25-JAN-17
F3 (C16-C34)			97.7		%		70-130	25-JAN-17
F4 (C34-C50)			98.9		%		70-130	25-JAN-17
WG2468038-5 DUP		**WG2468038-4**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	25-JAN-17

Quality Control Report

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Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Soil**							
Batch R3640296								
WG2468038-5 DUP		**WG2468038-4**						
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	25-JAN-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	25-JAN-17
WG2468038-2 LCS								
F2 (C10-C16)			106.9		%		80-120	25-JAN-17
F3 (C16-C34)			107.7		%		80-120	25-JAN-17
F4 (C34-C50)			102.6		%		80-120	25-JAN-17
WG2468038-1 MB								
F2 (C10-C16)			<10		ug/g		10	25-JAN-17
F3 (C16-C34)			<50		ug/g		50	25-JAN-17
F4 (C34-C50)			<50		ug/g		50	25-JAN-17
Surrogate: 2-Bromobenzotrifluoride			90.1		%		60-140	25-JAN-17
HG-200.2-CVAA-WT	**Soil**							
Batch R3638229								
WG2468006-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			93.4		%		70-130	23-JAN-17
WG2468006-6 DUP		**WG2468006-5**						
Mercury (Hg)		0.0538	0.0580		ug/g	7.4	40	23-JAN-17
WG2468006-3 LCS								
Mercury (Hg)			104.5		%		80-120	23-JAN-17
WG2468006-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	23-JAN-17
Batch R3638866								
WG2468594-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			93.6		%		70-130	24-JAN-17
WG2468594-6 DUP		**WG2468594-5**						
Mercury (Hg)		0.0200	0.0188		ug/g	6.4	40	24-JAN-17
WG2468594-3 LCS								
Mercury (Hg)			103.5		%		80-120	24-JAN-17
WG2468594-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	24-JAN-17
MET-200.2-CCMS-WT	**Soil**							
Batch R3638813								
WG2468006-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			103.6		%		70-130	23-JAN-17
Arsenic (As)			108.4		%		70-130	23-JAN-17
Barium (Ba)			107.0		%		70-130	23-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3638813								
WG2468006-2 CRM		**WT-CANMET-TILL1**						
Beryllium (Be)			108.8		%		70-130	23-JAN-17
Cadmium (Cd)			104.2		%		70-130	23-JAN-17
Chromium (Cr)			109.8		%		70-130	23-JAN-17
Cobalt (Co)			95.3		%		70-130	23-JAN-17
Copper (Cu)			97.7		%		70-130	23-JAN-17
Lead (Pb)			98.1		%		70-130	23-JAN-17
Molybdenum (Mo)			101.0		%		70-130	23-JAN-17
Nickel (Ni)			104.5		%		70-130	23-JAN-17
Selenium (Se)			93.8		%		70-130	23-JAN-17
Silver (Ag)			107.4		%		70-130	23-JAN-17
Thallium (Tl)			106.7		%		70-130	23-JAN-17
Uranium (U)			113.1		%		70-130	23-JAN-17
Vanadium (V)			111.0		%		70-130	23-JAN-17
Zinc (Zn)			99.9		%		70-130	23-JAN-17
WG2468006-6 DUP		**WG2468006-5**						
Antimony (Sb)		0.18	0.19		ug/g	3.4	30	23-JAN-17
Arsenic (As)		4.65	4.80		ug/g	3.0	30	23-JAN-17
Barium (Ba)		55.0	60.5		ug/g	9.6	40	23-JAN-17
Beryllium (Be)		0.57	0.63		ug/g	10	30	23-JAN-17
Boron (B)		8.1	9.3		ug/g	14	30	23-JAN-17
Cadmium (Cd)		0.428	0.440		ug/g	2.8	30	23-JAN-17
Chromium (Cr)		17.6	18.2		ug/g	3.5	30	23-JAN-17
Cobalt (Co)		4.84	5.03		ug/g	4.0	30	23-JAN-17
Copper (Cu)		14.8	15.2		ug/g	2.8	30	23-JAN-17
Lead (Pb)		22.2	22.3		ug/g	0.5	40	23-JAN-17
Molybdenum (Mo)		0.44	0.47		ug/g	7.7	40	23-JAN-17
Nickel (Ni)		10.7	10.8		ug/g	1.1	30	23-JAN-17
Selenium (Se)		0.46	0.48		ug/g	4.5	30	23-JAN-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	23-JAN-17
Thallium (Tl)		0.102	0.115		ug/g	12	30	23-JAN-17
Uranium (U)		0.628	0.644		ug/g	2.5	30	23-JAN-17
Vanadium (V)		32.2	33.9		ug/g	5.1	30	23-JAN-17
Zinc (Zn)		84.5	87.2		ug/g	3.1	30	23-JAN-17

Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch	**R3638813**							
WG2468006-4	**LCS**							
Antimony (Sb)			96.7		%		80-120	23-JAN-17
Arsenic (As)			98.3		%		80-120	23-JAN-17
Barium (Ba)			99.0		%		80-120	23-JAN-17
Beryllium (Be)			105.2		%		80-120	23-JAN-17
Boron (B)			103.4		%		80-120	23-JAN-17
Cadmium (Cd)			97.6		%		80-120	23-JAN-17
Chromium (Cr)			96.2		%		80-120	23-JAN-17
Cobalt (Co)			89.2		%		80-120	23-JAN-17
Copper (Cu)			94.4		%		80-120	23-JAN-17
Lead (Pb)			99.1		%		80-120	23-JAN-17
Molybdenum (Mo)			101.9		%		80-120	23-JAN-17
Nickel (Ni)			95.2		%		80-120	23-JAN-17
Selenium (Se)			91.3		%		80-120	23-JAN-17
Silver (Ag)			99.5		%		80-120	23-JAN-17
Thallium (Tl)			96.2		%		80-120	23-JAN-17
Uranium (U)			101.7		%		80-120	23-JAN-17
Vanadium (V)			98.6		%		80-120	23-JAN-17
Zinc (Zn)			88.6		%		80-120	23-JAN-17
WG2468006-1	**MB**							
Antimony (Sb)			<0.10		mg/kg		0.1	23-JAN-17
Arsenic (As)			<0.10		mg/kg		0.1	23-JAN-17
Barium (Ba)			<0.50		mg/kg		0.5	23-JAN-17
Beryllium (Be)			<0.10		mg/kg		0.1	23-JAN-17
Boron (B)			<5.0		mg/kg		5	23-JAN-17
Cadmium (Cd)			<0.020		mg/kg		0.02	23-JAN-17
Chromium (Cr)			<0.50		mg/kg		0.5	23-JAN-17
Cobalt (Co)			<0.10		mg/kg		0.1	23-JAN-17
Copper (Cu)			<0.50		mg/kg		0.5	23-JAN-17
Lead (Pb)			<0.50		mg/kg		0.5	23-JAN-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	23-JAN-17
Nickel (Ni)			<0.50		mg/kg		0.5	23-JAN-17
Selenium (Se)			<0.20		mg/kg		0.2	23-JAN-17
Silver (Ag)			<0.10		mg/kg		0.1	23-JAN-17
Thallium (Tl)			<0.050		mg/kg		0.05	23-JAN-17

Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3638813								
WG2468006-1 MB								
Uranium (U)			<0.050		mg/kg		0.05	23-JAN-17
Vanadium (V)			<0.20		mg/kg		0.2	23-JAN-17
Zinc (Zn)			<2.0		mg/kg		2	23-JAN-17
Batch R3639057								
WG2468594-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			108.5		%		70-130	24-JAN-17
Arsenic (As)			109.2		%		70-130	24-JAN-17
Barium (Ba)			109.0		%		70-130	24-JAN-17
Beryllium (Be)			96.5		%		70-130	24-JAN-17
Cadmium (Cd)			99.7		%		70-130	24-JAN-17
Chromium (Cr)			110.0		%		70-130	24-JAN-17
Cobalt (Co)			99.6		%		70-130	24-JAN-17
Copper (Cu)			100.8		%		70-130	24-JAN-17
Lead (Pb)			98.6		%		70-130	24-JAN-17
Molybdenum (Mo)			93.6		%		70-130	24-JAN-17
Nickel (Ni)			107.0		%		70-130	24-JAN-17
Selenium (Se)			99.8		%		70-130	24-JAN-17
Silver (Ag)			122.9		%		70-130	24-JAN-17
Thallium (Tl)			111.6		%		70-130	24-JAN-17
Uranium (U)			118.5		%		70-130	24-JAN-17
Vanadium (V)			112.3		%		70-130	24-JAN-17
Zinc (Zn)			103.0		%		70-130	24-JAN-17
WG2468594-6 DUP		**WG2468594-5**						
Antimony (Sb)		0.24	0.25		ug/g	2.1	30	24-JAN-17
Arsenic (As)		6.48	6.60		ug/g	1.9	30	24-JAN-17
Barium (Ba)		66.1	67.0		ug/g	1.2	40	24-JAN-17
Beryllium (Be)		0.55	0.55		ug/g	1.1	30	24-JAN-17
Boron (B)		18.4	19.1		ug/g	3.8	30	24-JAN-17
Cadmium (Cd)		0.339	0.346		ug/g	1.9	30	24-JAN-17
Chromium (Cr)		16.2	16.4		ug/g	0.8	30	24-JAN-17
Cobalt (Co)		9.90	9.98		ug/g	0.8	30	24-JAN-17
Copper (Cu)		25.6	25.5		ug/g	0.4	30	24-JAN-17
Lead (Pb)		24.7	26.6		ug/g	7.8	40	24-JAN-17
Molybdenum (Mo)		0.60	0.58		ug/g			24-JAN-17

Quality Control Report

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Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3639057								
WG2468594-6 DUP		**WG2468594-5**						
Molybdenum (Mo)		0.60	0.58		ug/g	2.4	40	24-JAN-17
Nickel (Ni)		21.2	22.2		ug/g	4.6	30	24-JAN-17
Selenium (Se)		0.39	0.41		ug/g	4.4	30	24-JAN-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	24-JAN-17
Thallium (Tl)		0.125	0.127		ug/g	1.9	30	24-JAN-17
Uranium (U)		0.585	0.593		ug/g	1.2	30	24-JAN-17
Vanadium (V)		29.4	28.5		ug/g	3.0	30	24-JAN-17
Zinc (Zn)		133	133		ug/g	0.5	30	24-JAN-17
WG2468594-4 LCS								
Antimony (Sb)			101.1		%		80-120	24-JAN-17
Arsenic (As)			98.2		%		80-120	24-JAN-17
Barium (Ba)			104.1		%		80-120	24-JAN-17
Beryllium (Be)			92.2		%		80-120	24-JAN-17
Boron (B)			94.5		%		80-120	24-JAN-17
Cadmium (Cd)			98.8		%		80-120	24-JAN-17
Chromium (Cr)			97.2		%		80-120	24-JAN-17
Cobalt (Co)			92.7		%		80-120	24-JAN-17
Copper (Cu)			95.7		%		80-120	24-JAN-17
Lead (Pb)			97.9		%		80-120	24-JAN-17
Molybdenum (Mo)			94.2		%		80-120	24-JAN-17
Nickel (Ni)			97.1		%		80-120	24-JAN-17
Selenium (Se)			94.5		%		80-120	24-JAN-17
Silver (Ag)			98.4		%		80-120	24-JAN-17
Thallium (Tl)			99.3		%		80-120	24-JAN-17
Uranium (U)			104.1		%		80-120	24-JAN-17
Vanadium (V)			99.6		%		80-120	24-JAN-17
Zinc (Zn)			91.4		%		80-120	24-JAN-17
WG2468594-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	24-JAN-17
Arsenic (As)			<0.10		mg/kg		0.1	24-JAN-17
Barium (Ba)			<0.50		mg/kg		0.5	24-JAN-17
Beryllium (Be)			<0.10		mg/kg		0.1	24-JAN-17
Boron (B)			<5.0		mg/kg		5	24-JAN-17
Cadmium (Cd)			<0.020		mg/kg		0.02	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3639057								
WG2468594-1 MB								
Chromium (Cr)			<0.50		mg/kg		0.5	24-JAN-17
Cobalt (Co)			<0.10		mg/kg		0.1	24-JAN-17
Copper (Cu)			<0.50		mg/kg		0.5	24-JAN-17
Lead (Pb)			<0.50		mg/kg		0.5	24-JAN-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	24-JAN-17
Nickel (Ni)			<0.50		mg/kg		0.5	24-JAN-17
Selenium (Se)			<0.20		mg/kg		0.2	24-JAN-17
Silver (Ag)			<0.10		mg/kg		0.1	24-JAN-17
Thallium (Tl)			<0.050		mg/kg		0.05	24-JAN-17
Uranium (U)			<0.050		mg/kg		0.05	24-JAN-17
Vanadium (V)			<0.20		mg/kg		0.2	24-JAN-17
Zinc (Zn)			<2.0		mg/kg		2	24-JAN-17
MOISTURE-WT	**Soil**							
Batch R3638613								
WG2468084-3 DUP		**L1882004-1**						
% Moisture		10.3	10.2		%	1.3	20	23-JAN-17
WG2468084-2 LCS								
% Moisture			99.5		%		90-110	23-JAN-17
WG2468084-1 MB								
% Moisture			<0.10		%		0.1	23-JAN-17
Batch R3638634								
WG2468039-3 DUP		**L1881891-2**						
% Moisture		27.0	27.4		%	1.2	20	24-JAN-17
WG2468039-2 LCS								
% Moisture			100.9		%		90-110	24-JAN-17
WG2468039-1 MB								
% Moisture			<0.10		%		0.1	24-JAN-17
PAH-511-WT	**Soil**							
Batch R3639816								
WG2467717-4 DUP		**WG2467717-3**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	25-JAN-17
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	25-JAN-17
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3639816								
WG2467717-4 DUP		**WG2467717-3**						
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-JAN-17
WG2467717-2 LCS								
1-Methylnaphthalene			103.0		%		50-140	25-JAN-17
2-Methylnaphthalene			103.1		%		50-140	25-JAN-17
Acenaphthene			102.9		%		50-140	25-JAN-17
Acenaphthylene			102.0		%		50-140	25-JAN-17
Anthracene			99.3		%		50-140	25-JAN-17
Benzo(a)anthracene			107.4		%		50-140	25-JAN-17
Benzo(a)pyrene			97.0		%		50-140	25-JAN-17
Benzo(b)fluoranthene			94.9		%		50-140	25-JAN-17
Benzo(g,h,i)perylene			101.6		%		50-140	25-JAN-17
Benzo(k)fluoranthene			110.7		%		50-140	25-JAN-17
Chrysene			99.2		%		50-140	25-JAN-17
Dibenzo(ah)anthracene			101.3		%		50-140	25-JAN-17
Fluoranthene			99.97		%		50-140	25-JAN-17
Fluorene			101.1		%		50-140	25-JAN-17
Indeno(1,2,3-cd)pyrene			109.4		%		50-140	25-JAN-17
Naphthalene			106.4		%		50-140	25-JAN-17
Phenanthrene			108.0		%		50-140	25-JAN-17
Pyrene			101.2		%		50-140	25-JAN-17
WG2467717-1 MB								
							0.03	

Quality Control Report

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Ottawa ON K1H 1E1

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3639816								
WG2467717-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	25-JAN-17
2-Methylnaphthalene			<0.030		ug/g		0.03	25-JAN-17
Acenaphthene			<0.050		ug/g		0.05	25-JAN-17
Acenaphthylene			<0.050		ug/g		0.05	25-JAN-17
Anthracene			<0.050		ug/g		0.05	25-JAN-17
Benzo(a)anthracene			<0.050		ug/g		0.05	25-JAN-17
Benzo(a)pyrene			<0.050		ug/g		0.05	25-JAN-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	25-JAN-17
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	25-JAN-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	25-JAN-17
Chrysene			<0.050		ug/g		0.05	25-JAN-17
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	25-JAN-17
Fluoranthene			<0.050		ug/g		0.05	25-JAN-17
Fluorene			<0.050		ug/g		0.05	25-JAN-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	25-JAN-17
Naphthalene			<0.050		ug/g		0.05	25-JAN-17
Phenanthrene			<0.050		ug/g		0.05	25-JAN-17
Pyrene			<0.050		ug/g		0.05	25-JAN-17
Surrogate: 2-Fluorobiphenyl			97.2		%		50-140	25-JAN-17
Surrogate: p-Terphenyl d14			94.3		%		50-140	25-JAN-17
PCB-511-WT	**Soil**							
Batch R3640479								
WG2467717-4 DUP		**WG2467717-3**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-JAN-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-JAN-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-JAN-17
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-JAN-17
WG2467717-2 LCS								
Aroclor 1242			103.9		%		60-140	26-JAN-17
Aroclor 1248			93.8		%		60-140	26-JAN-17
Aroclor 1254			105.9		%		60-140	26-JAN-17
Aroclor 1260			88.4		%		60-140	26-JAN-17
WG2467717-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	26-JAN-17

Quality Control Report

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2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R3640479								
WG2467717-1 MB								
Aroclor 1248			<0.010		ug/g		0.01	26-JAN-17
Aroclor 1254			<0.010		ug/g		0.01	26-JAN-17
Aroclor 1260			<0.010		ug/g		0.01	26-JAN-17
Surrogate: d14-Terphenyl			102.4		%		60-140	26-JAN-17
WG2467717-5 MS		**WG2467717-3**						
Aroclor 1242			104.5		%		60-140	26-JAN-17
Aroclor 1254			105.8		%		60-140	26-JAN-17
Aroclor 1260			88.0		%		60-140	26-JAN-17
VOC-511-HS-WT	**Soil**							
Batch R3638911								
WG2468172-4 DUP		**WG2468172-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-JAN-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	24-JAN-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3638911								
WG2468172-4 DUP		**WG2468172-3**						
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	24-JAN-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-JAN-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-JAN-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-JAN-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-JAN-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	24-JAN-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-JAN-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	24-JAN-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-JAN-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-JAN-17
WG2468172-2 LCS								
1,1,1,2-Tetrachloroethane			100.3		%		60-130	24-JAN-17
1,1,2,2-Tetrachloroethane			107.6		%		60-130	24-JAN-17
1,1,1-Trichloroethane			98.3		%		60-130	24-JAN-17
1,1,2-Trichloroethane			110.1		%		60-130	24-JAN-17
1,1-Dichloroethane			99.3		%		60-130	24-JAN-17
1,1-Dichloroethylene			94.4		%		60-130	24-JAN-17
1,2-Dibromoethane			112.2		%		70-130	24-JAN-17
1,2-Dichlorobenzene			103.3		%		70-130	24-JAN-17
1,2-Dichloroethane			113.9		%		60-130	24-JAN-17
1,2-Dichloropropane			104.9		%		70-130	24-JAN-17
1,3-Dichlorobenzene			98.9		%		70-130	24-JAN-17
1,4-Dichlorobenzene			100.7		%		70-130	24-JAN-17
Acetone			131.5		%		60-140	24-JAN-17
Benzene			101.4		%		70-130	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3638911								
WG2468172-2 LCS								
Bromodichloromethane			107.4		%		50-140	24-JAN-17
Bromoform			106.5		%		70-130	24-JAN-17
Bromomethane			106.2		%		50-140	24-JAN-17
Carbon tetrachloride			97.6		%		70-130	24-JAN-17
Chlorobenzene			101.2		%		70-130	24-JAN-17
Chloroform			104.7		%		70-130	24-JAN-17
cis-1,2-Dichloroethylene			103.3		%		70-130	24-JAN-17
cis-1,3-Dichloropropene			114.7		%		70-130	24-JAN-17
Dibromochloromethane			113.2		%		60-130	24-JAN-17
Dichlorodifluoromethane			70.9		%		50-140	24-JAN-17
Ethylbenzene			94.3		%		70-130	24-JAN-17
n-Hexane			97.7		%		70-130	24-JAN-17
Methylene Chloride			108.5		%		70-130	24-JAN-17
MTBE			97.7		%		70-130	24-JAN-17
m+p-Xylenes			95.5		%		70-130	24-JAN-17
Methyl Ethyl Ketone			124.9		%		60-140	24-JAN-17
Methyl Isobutyl Ketone			121.4		%		60-140	24-JAN-17
o-Xylene			96.7		%		70-130	24-JAN-17
Styrene			98.6		%		70-130	24-JAN-17
Tetrachloroethylene			95.9		%		60-130	24-JAN-17
Toluene			98.1		%		70-130	24-JAN-17
trans-1,2-Dichloroethylene			100.3		%		60-130	24-JAN-17
trans-1,3-Dichloropropene			116.6		%		70-130	24-JAN-17
Trichloroethylene			98.9		%		60-130	24-JAN-17
Trichlorofluoromethane			100.3		%		50-140	24-JAN-17
Vinyl chloride			89.4		%		60-140	24-JAN-17
WG2468172-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	24-JAN-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	24-JAN-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	24-JAN-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	24-JAN-17
1,1-Dichloroethane			<0.050		ug/g		0.05	24-JAN-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	24-JAN-17
1,2-Dibromoethane			<0.050		ug/g		0.05	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

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2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3638911								
WG2468172-1 MB								
1,2-Dichlorobenzene			<0.050		ug/g		0.05	24-JAN-17
1,2-Dichloroethane			<0.050		ug/g		0.05	24-JAN-17
1,2-Dichloropropane			<0.050		ug/g		0.05	24-JAN-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	24-JAN-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	24-JAN-17
Acetone			<0.50		ug/g		0.5	24-JAN-17
Benzene			<0.0068		ug/g		0.0068	24-JAN-17
Bromodichloromethane			<0.050		ug/g		0.05	24-JAN-17
Bromoform			<0.050		ug/g		0.05	24-JAN-17
Bromomethane			<0.050		ug/g		0.05	24-JAN-17
Carbon tetrachloride			<0.050		ug/g		0.05	24-JAN-17
Chlorobenzene			<0.050		ug/g		0.05	24-JAN-17
Chloroform			<0.050		ug/g		0.05	24-JAN-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-JAN-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	24-JAN-17
Dibromochloromethane			<0.050		ug/g		0.05	24-JAN-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	24-JAN-17
Ethylbenzene			<0.018		ug/g		0.018	24-JAN-17
n-Hexane			<0.050		ug/g		0.05	24-JAN-17
Methylene Chloride			<0.050		ug/g		0.05	24-JAN-17
MTBE			<0.050		ug/g		0.05	24-JAN-17
m+p-Xylenes			<0.030		ug/g		0.03	24-JAN-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	24-JAN-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	24-JAN-17
o-Xylene			<0.020		ug/g		0.02	24-JAN-17
Styrene			<0.050		ug/g		0.05	24-JAN-17
Tetrachloroethylene			<0.050		ug/g		0.05	24-JAN-17
Toluene			<0.080		ug/g		0.08	24-JAN-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-JAN-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	24-JAN-17
Trichloroethylene			<0.010		ug/g		0.01	24-JAN-17
Trichlorofluoromethane			<0.050		ug/g		0.05	24-JAN-17
Vinyl chloride			<0.020		ug/g		0.02	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch	**R3638911**							
WG2468172-1	**MB**							
Surrogate: 1,4-Difluorobenzene			107.9		%		50-140	24-JAN-17
Surrogate: 4-Bromofluorobenzene			103.8		%		50-140	24-JAN-17
WG2468172-5	**MS**	**WG2468172-3**						
1,1,1,2-Tetrachloroethane			100.2		%		50-140	24-JAN-17
1,1,2,2-Tetrachloroethane			33.9	MSDL	%		50-140	24-JAN-17
1,1,1-Trichloroethane			99.6		%		50-140	24-JAN-17
1,1,2-Trichloroethane			108.1		%		50-140	24-JAN-17
1,1-Dichloroethane			99.3		%		50-140	24-JAN-17
1,1-Dichloroethylene			95.6		%		50-140	24-JAN-17
1,2-Dibromoethane			110.6		%		50-140	24-JAN-17
1,2-Dichlorobenzene			101.6		%		50-140	24-JAN-17
1,2-Dichloroethane			112.6		%		50-140	24-JAN-17
1,2-Dichloropropane			102.5		%		50-140	24-JAN-17
1,3-Dichlorobenzene			98.3		%		50-140	24-JAN-17
1,4-Dichlorobenzene			100.7		%		50-140	24-JAN-17
Acetone			109.7		%		50-140	24-JAN-17
Benzene			101.8		%		50-140	24-JAN-17
Bromodichloromethane			106.3		%		50-140	24-JAN-17
Bromoform			105.8		%		50-140	24-JAN-17
Bromomethane			105.7		%		50-140	24-JAN-17
Carbon tetrachloride			99.1		%		50-140	24-JAN-17
Chlorobenzene			100.1		%		50-140	24-JAN-17
Chloroform			104.9		%		50-140	24-JAN-17
cis-1,2-Dichloroethylene			102.9		%		50-140	24-JAN-17
cis-1,3-Dichloropropene			113.6		%		50-140	24-JAN-17
Dibromochloromethane			112.1		%		50-140	24-JAN-17
Dichlorodifluoromethane			78.7		%		50-140	24-JAN-17
Ethylbenzene			95.8		%		50-140	24-JAN-17
n-Hexane			102.3		%		50-140	24-JAN-17
Methylene Chloride			107.5		%		50-140	24-JAN-17
MTBE			97.5		%		50-140	24-JAN-17
m+p-Xylenes			97.7		%		50-140	24-JAN-17
Methyl Ethyl Ketone			120.5		%		50-140	24-JAN-17
Methyl Isobutyl Ketone			99.9		%		50-140	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch	**R3638911**							
WG2468172-5	**MS**	**WG2468172-3**						
o-Xylene			99.4		%		50-140	24-JAN-17
Styrene			97.0		%		50-140	24-JAN-17
Tetrachloroethylene			97.0		%		50-140	24-JAN-17
Toluene			103.5		%		50-140	24-JAN-17
trans-1,2-Dichloroethylene			100.0		%		50-140	24-JAN-17
trans-1,3-Dichloropropene			110.7		%		50-140	24-JAN-17
Trichloroethylene			152.8	MSDH	%		50-140	24-JAN-17
Trichlorofluoromethane			103.7		%		50-140	24-JAN-17
Vinyl chloride			91.8		%		50-140	24-JAN-17

Quality Control Report

Workorder: L1882051 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1
Contact: Mitchell Dawley

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MSDH	TCE recovery in MS was high. Spiked 1122-TCA converted to TCE due to sample matrix (dehydrohalogenation).
MSDL	1122-TCA recovery in MS was low. Analyte is unstable in this sample matrix due to dehydrohalogenation.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

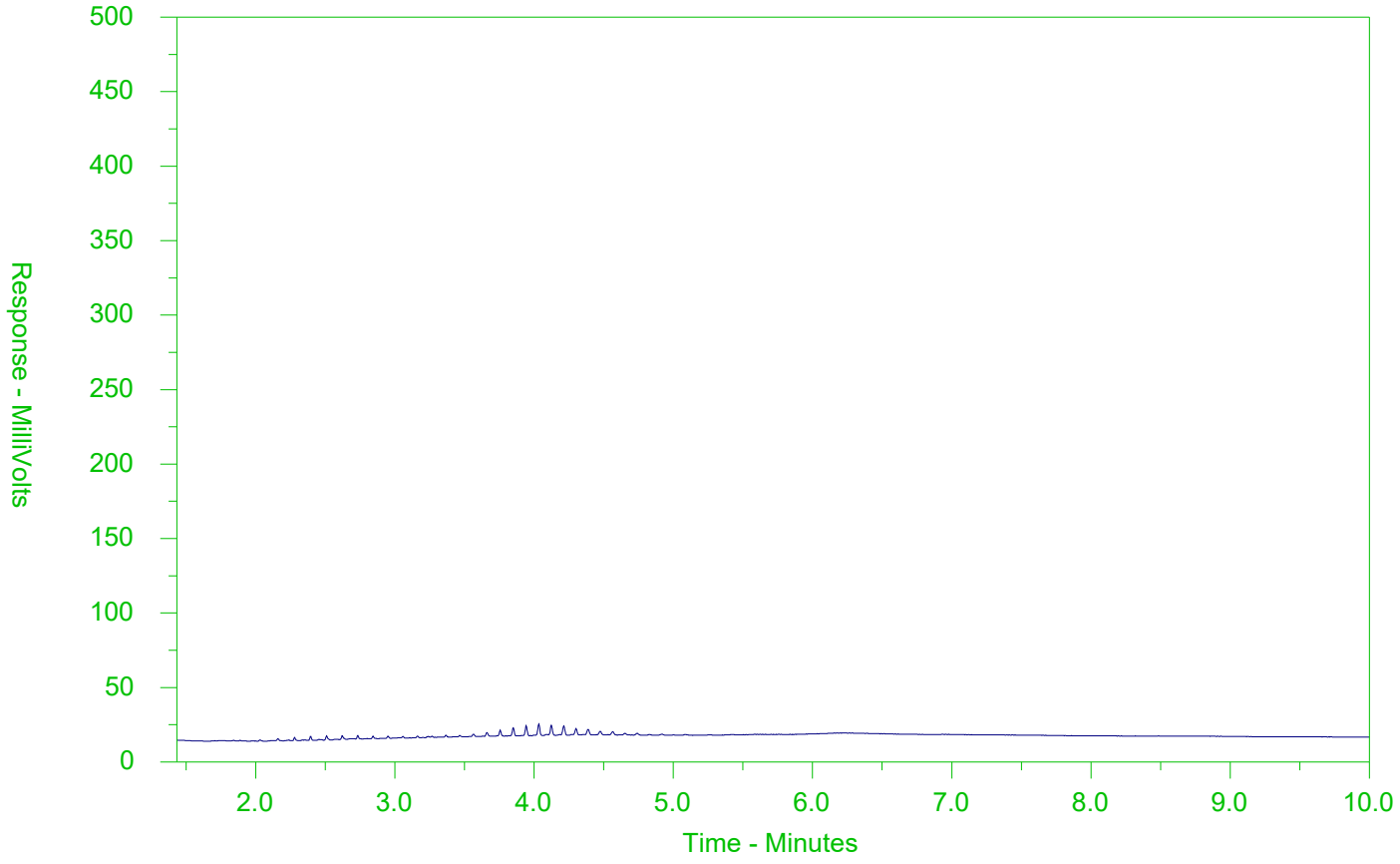
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1882051-3
Client Sample ID: BWP-1 SA7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

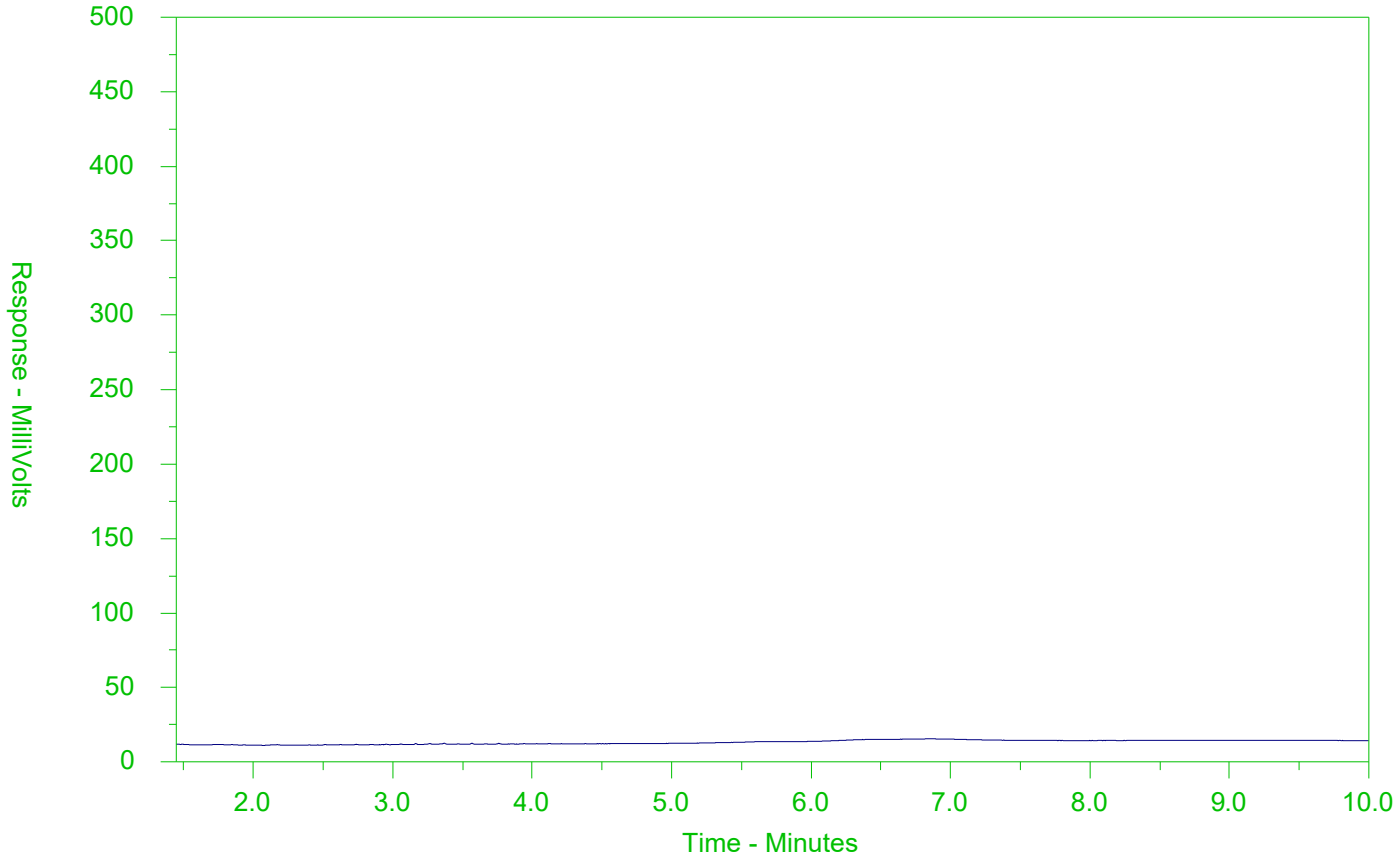
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1882051-4
Client Sample ID: BWP-1 SA8



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

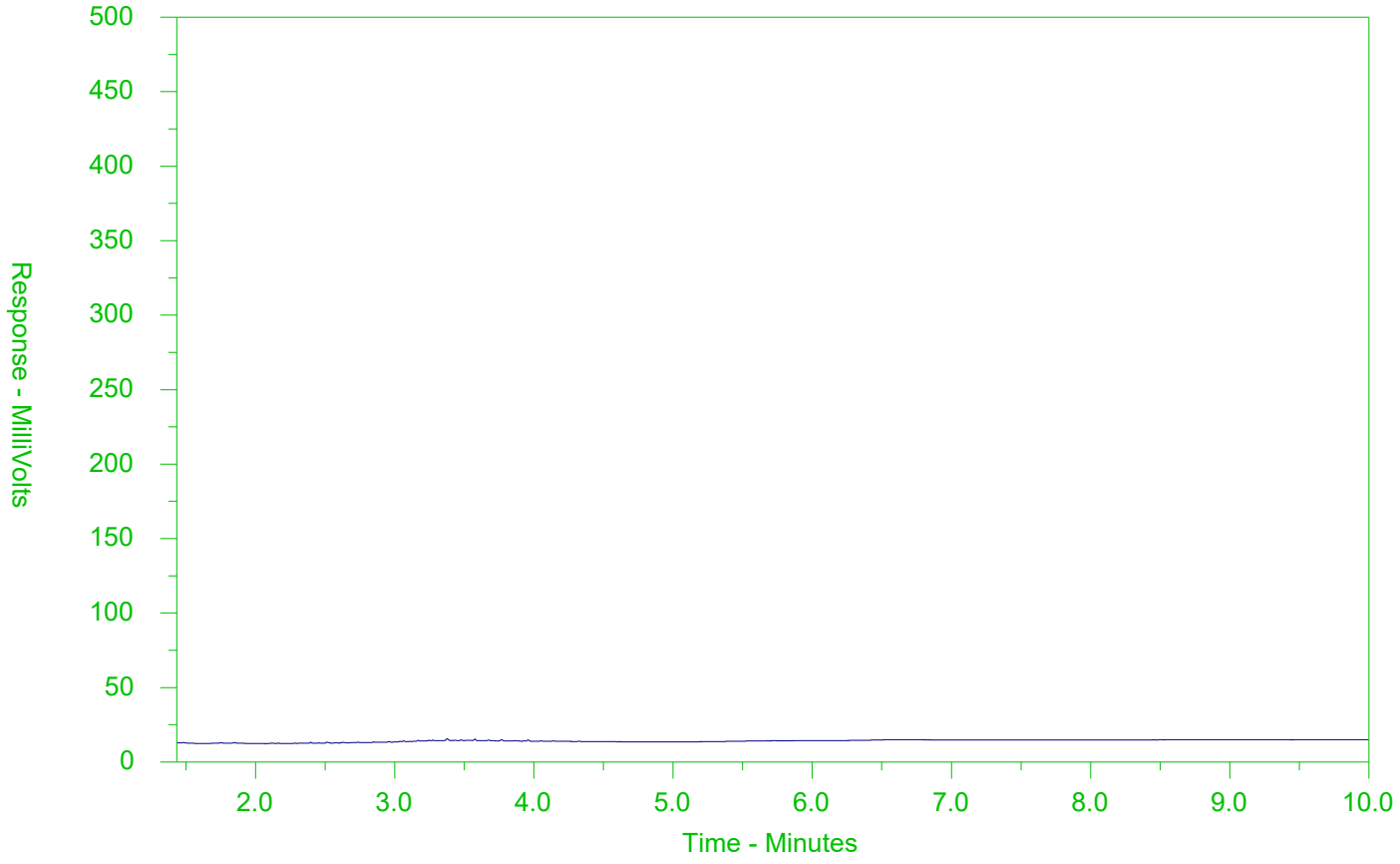
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1882051-8
Client Sample ID: BWP-2 SA4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1882051-COFC

COC Number: 14 -

Page 1 of 1

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Morrison Hershfield	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Mitchell Dawley	Quality Control (QC) Report with Report ☑ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2440 Don Reid Drive, Ottawa ON. K1H 1E1	☑ Criteria on Report - provide details below if box checked	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	613-739-2910	Email 1 or Fax MDawley@morrisonhershfield.com	Specify Date Required for E2,E or P:
		Email 2	

Invoice To	Same as Report To ☑ Yes ☐ No	Invoice Distribution
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Company:		Email 1 or Fax MDawley@morrisonhershfield.com
Contact:		Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q53234 (and Q53236)	Approver ID:	Cost Center:
Job #:	2150308	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L1882051 AM 2/4

ALS Contact: Emerson Perez 416-817-2944

Sampler: Various

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	SOIL Reg 153 Complete Metals	SOIL Reg 153 PAHs	SOIL Reg 153 VOCs	SOIL Reg 153 PCBs	SOIL Reg 153 PHCs and BTEX	WATER Reg 153 Complete Metals	WATER Reg 153 PAHs	WATER Reg 153 VOCs	WATER Reg 153 PCBS	WATER Reg 153 PHCs and BTEX	Salt (Conductivity and SAR)	SOIL PHC F2-F4	SAR	Number of Containers
1	BWP-1 SA1	16-Jan-17	12:55	Soil	R													
2	BWP-1 SA4	16-Jan-17	13:20	Soil	R													
3	BWP-1 SA7	16-Jan-17	14:00	Soil		R	R	R	R									
4	BWP-1 SA8	16-Jan-17	14:00	Soil		R	R	R	R									
5	BWP-2 SA1	18-Jan-17	10:24	Soil		R		R										
6	BWP-2 SA2	18-Jan-17	10:32	Soil	R													
7	BWP-2 SA22	18-Jan-17	10:32	Soil	R													
8	BWP-2 SA4	18-Jan-17	10:55	Soil			R		R									

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	USE THIS CoC FORM FOR ENVIRONMENTAL-RELATED SAMPLING
Are samples for human drinking water use? ☐ Yes ☑ No	Report: O.Reg. 153 Table 1, Table 3 — Criteria on

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐		SIF Observations	Yes ☐	No ☐
Ice packs	Yes ☐	No ☑	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☑				

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
8.6			5.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Connor Gallagh	Date: 20 Jan 2017	Time: 2pm	Received by:	Date: 20/01/17	Time: 2:00	Received by:	Date: 21 JAN 17	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

NA-FM-0326a v08 Front/04 January 2014

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Morrison Hershfield Limited (Ottawa)
ATTN: Mitchell Dawley
2440 Don Reid Drive
Ottawa ON K1H 1E1

Date Received: 20-JAN-17
Report Date: 27-JAN-17 12:40 (MT)
Version: FINAL

Client Phone: 613-739-2910

Certificate of Analysis

Lab Work Order #: L1882055

Project P.O. #: NOT SUBMITTED
Job Reference: 2150308
C of C Numbers:
Legal Site Desc:

Mary-Lynn Pires
Client Services Supervisor

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ANALYTICAL GUIDELINE REPORT

2150308

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3
L1882055-1	BWP-1								
Sampled By:	VARIOUS on 20-JAN-17 @ 10:00								
Matrix:	WATER								
Dissolved Metals									
	Dissolved Mercury Filtration Location	FIELD			No Unit	23-JAN-17			
	Dissolved Metals Filtration Location	FIELD			No Unit	23-JAN-17			
	Antimony (Sb)-Dissolved	0.85		0.10	ug/L	23-JAN-17	1.5	20000	20000
	Arsenic (As)-Dissolved	6.88		0.10	ug/L	23-JAN-17	13	1900	1900
	Barium (Ba)-Dissolved	243		0.10	ug/L	23-JAN-17	610	29000	29000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-JAN-17	0.5	67	67
	Boron (B)-Dissolved	133		10	ug/L	23-JAN-17	1700	45000	45000
	Cadmium (Cd)-Dissolved	0.012		0.010	ug/L	23-JAN-17	0.5	2.7	2.7
	Chromium (Cr)-Dissolved	29.2		0.50	ug/L	23-JAN-17	*11	810	810
	Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	23-JAN-17	3.8	66	66
	Copper (Cu)-Dissolved	<0.20		0.20	ug/L	23-JAN-17	5	87	87
	Lead (Pb)-Dissolved	<0.050		0.050	ug/L	23-JAN-17	1.9	25	25
	Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	23-JAN-17	0.1	0.29	2.8
	Molybdenum (Mo)-Dissolved	41.3		0.050	ug/L	23-JAN-17	*23	9200	9200
	Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	23-JAN-17	14	490	490
	Selenium (Se)-Dissolved	0.242		0.050	ug/L	23-JAN-17	5	63	63
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-JAN-17	0.3	1.5	1.5
	Sodium (Na)-Dissolved	31300		500	ug/L	23-JAN-17	490000	2300000	2300000
	Thallium (Tl)-Dissolved	0.038		0.010	ug/L	23-JAN-17	0.5	510	510
	Uranium (U)-Dissolved	1.70		0.010	ug/L	23-JAN-17	8.9	420	420
	Vanadium (V)-Dissolved	1.04		0.50	ug/L	23-JAN-17	3.9	250	250
	Zinc (Zn)-Dissolved	<1.0		1.0	ug/L	23-JAN-17	160	1100	1100
Speciated Metals									
	Chromium, Hexavalent	10.4		1.0	ug/L	23-JAN-17	25	140	140
Volatile Organic Compounds									
	Acetone	<30		30	ug/L	24-JAN-17	2700	130000	130000
	Benzene	<0.50		0.50	ug/L	24-JAN-17	0.5	44	430
	Bromodichloromethane	<2.0		2.0	ug/L	24-JAN-17	2	85000	85000
	Bromoform	<5.0		5.0	ug/L	24-JAN-17	5	380	770
	Bromomethane	<0.50		0.50	ug/L	24-JAN-17	0.89	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	24-JAN-17	0.2	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	630	630
	Dibromochloromethane	<2.0		2.0	ug/L	24-JAN-17	2	82000	82000
	Chloroform	1.3		1.0	ug/L	24-JAN-17	2	2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	24-JAN-17	0.2	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	4600	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	24-JAN-17	590	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	24-JAN-17	1.6	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	24-JAN-17	1.6	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	24-JAN-17	5	610	5500

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

ANALYTICAL GUIDELINE REPORT

2150308

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3
L1882055-1	BWP-1								
Sampled By:	VARIOUS on 20-JAN-17 @ 10:00								
Matrix:	WATER								
Volatile Organic Compounds									
	1,2-Dichloropropane	<0.50		0.50	ug/L	24-JAN-17	0.5	16	140
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	24-JAN-17			
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	24-JAN-17			
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	24-JAN-17	0.5	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	2300	2300
	n-Hexane	<0.50		0.50	ug/L	24-JAN-17	5	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	24-JAN-17	400	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	24-JAN-17	640	140000	580000
	MTBE	<2.0		2.0	ug/L	24-JAN-17	15	190	1400
	Styrene	<0.50		0.50	ug/L	24-JAN-17	0.5	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	24-JAN-17	1.1	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	17
	Toluene	<0.50		0.50	ug/L	24-JAN-17	0.8	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	640	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	24-JAN-17	150	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	24-JAN-17	0.5	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	24-JAN-17			
	m+p-Xylenes	<0.40		0.40	ug/L	24-JAN-17			
	Xylenes (Total)	<0.50		0.50	ug/L	24-JAN-17	72	4200	4200
	Surrogate: 4-Bromofluorobenzene	87.3		70-130	%	24-JAN-17			
	Surrogate: 1,4-Difluorobenzene	96.4		70-130	%	24-JAN-17			
Hydrocarbons									
	F1 (C6-C10)	<25		25	ug/L	24-JAN-17	420	750	750
	F1-BTEX	<25		25	ug/L	26-JAN-17	420	750	750
	F2 (C10-C16)	<100		100	ug/L	25-JAN-17	150	150	150
	F2-Naphth	<100		100	ug/L	26-JAN-17			
	F3 (C16-C34)	<250		250	ug/L	25-JAN-17	500	500	500
	F3-PAH	<250		250	ug/L	26-JAN-17			
	F4 (C34-C50)	<250		250	ug/L	25-JAN-17	500	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	26-JAN-17			
	Chrom. to baseline at nC50	YES			No Unit	25-JAN-17			
	Surrogate: 2-Bromobenzotrifluoride	102.4		60-140	%	25-JAN-17			
	Surrogate: 3,4-Dichlorotoluene	91.9		60-140	%	24-JAN-17			
Polycyclic Aromatic Hydrocarbons									
	Acenaphthene	<0.020		0.020	ug/L	26-JAN-17	4.1	600	1700
	Acenaphthylene	<0.020		0.020	ug/L	26-JAN-17	1	1.8	1.8
	Anthracene	<0.020		0.020	ug/L	26-JAN-17	0.1	2.4	2.4
	Benzo(a)anthracene	<0.020		0.020	ug/L	26-JAN-17	0.2	4.7	4.7
	Benzo(a)pyrene	<0.010		0.010	ug/L	26-JAN-17	0.01	0.81	0.81
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	26-JAN-17	0.1	0.75	0.75
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	26-JAN-17	0.2	0.2	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	26-JAN-17	0.1	0.4	0.4
	Chrysene	<0.020		0.020	ug/L	26-JAN-17	0.1	1	1

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L1882055-1	BWP-1									
Sampled By:	VARIOUS on 20-JAN-17 @ 10:00									
Matrix:	WATER						#1	#2	#3	
Polycyclic Aromatic Hydrocarbons										
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	26-JAN-17	0.2	0.52	0.52	
	Fluoranthene	<0.020		0.020	ug/L	26-JAN-17	0.4	130	130	
	Fluorene	<0.020		0.020	ug/L	26-JAN-17	120	400	400	
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	26-JAN-17	0.2	0.2	0.2	
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	26-JAN-17	2	1800	1800	
	1-Methylnaphthalene	<0.020		0.020	ug/L	26-JAN-17	2	1800	1800	
	2-Methylnaphthalene	<0.020		0.020	ug/L	26-JAN-17	2	1800	1800	
	Naphthalene	<0.050		0.050	ug/L	26-JAN-17	7	1400	6400	
	Phenanthrene	<0.020		0.020	ug/L	26-JAN-17	0.1	580	580	
	Pyrene	<0.020		0.020	ug/L	26-JAN-17	0.2	68	68	
	Surrogate: d10-Acenaphthene	85.8		60-140	%	26-JAN-17				
	Surrogate: d12-Chrysene	87.6		60-140	%	26-JAN-17				
	Surrogate: d8-Naphthalene	89.5		60-140	%	26-JAN-17				
	Surrogate: d10-Phenanthrene	92.4		60-140	%	26-JAN-17				
Polychlorinated Biphenyls										
	Aroclor 1242	<0.020		0.020	ug/L	27-JAN-17				
	Aroclor 1248	<0.020		0.020	ug/L	27-JAN-17				
	Aroclor 1254	<0.020		0.020	ug/L	27-JAN-17				
	Aroclor 1260	<0.020		0.020	ug/L	27-JAN-17				
	Total PCBs	<0.040		0.040	ug/L	27-JAN-17	0.2	7.8	15	
	Surrogate: 2-fluorobiphenyl	76.2		50-150	%	27-JAN-17				
L1882055-2	BWP-2									
Sampled By:	VARIOUS on 20-JAN-17 @ 11:30									
Matrix:	WATER						#1	#2	#3	
Dissolved Metals										
	Dissolved Mercury Filtration Location	FIELD			No Unit	23-JAN-17				
	Dissolved Metals Filtration Location	FIELD			No Unit	23-JAN-17				
	Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	23-JAN-17	1.5	20000	20000	
	Arsenic (As)-Dissolved	0.40		0.10	ug/L	23-JAN-17	13	1900	1900	
	Barium (Ba)-Dissolved	27.6		0.10	ug/L	23-JAN-17	610	29000	29000	
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-JAN-17	0.5	67	67	
	Boron (B)-Dissolved	<10		10	ug/L	23-JAN-17	1700	45000	45000	
	Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	23-JAN-17	0.5	2.7	2.7	
	Chromium (Cr)-Dissolved	1.52		0.50	ug/L	23-JAN-17	11	810	810	
	Cobalt (Co)-Dissolved	0.13		0.10	ug/L	23-JAN-17	3.8	66	66	
	Copper (Cu)-Dissolved	0.94		0.20	ug/L	23-JAN-17	5	87	87	
	Lead (Pb)-Dissolved	<0.050		0.050	ug/L	23-JAN-17	1.9	25	25	
	Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	23-JAN-17	0.1	0.29	2.8	
	Molybdenum (Mo)-Dissolved	1.07		0.050	ug/L	23-JAN-17	23	9200	9200	
	Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	23-JAN-17	14	490	490	
	Selenium (Se)-Dissolved	0.302		0.050	ug/L	23-JAN-17	5	63	63	
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-JAN-17	0.3	1.5	1.5	
	Sodium (Na)-Dissolved	19300		500	ug/L	23-JAN-17	490000	2300000	2300000	
	Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	23-JAN-17	0.5	510	510	
	Uranium (U)-Dissolved	0.725		0.010	ug/L	23-JAN-17	8.9	420	420	

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

ANALYTICAL GUIDELINE REPORT

2150308

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3
L1882055-2	BWP-2								
Sampled By:	VARIOUS on 20-JAN-17 @ 11:30								
Matrix:	WATER								
Dissolved Metals									
	Vanadium (V)-Dissolved	5.65		0.50	ug/L	23-JAN-17	*3.9	250	250
	Zinc (Zn)-Dissolved	1.9		1.0	ug/L	23-JAN-17	160	1100	1100
Speciated Metals									
	Chromium, Hexavalent	2.6		1.0	ug/L	23-JAN-17	25	140	140
Volatile Organic Compounds									
	Acetone	<30		30	ug/L	24-JAN-17	2700	130000	130000
	Benzene	<0.50		0.50	ug/L	24-JAN-17	0.5	44	430
	Bromodichloromethane	<2.0		2.0	ug/L	24-JAN-17	2	85000	85000
	Bromoform	<5.0		5.0	ug/L	24-JAN-17	5	380	770
	Bromomethane	<0.50		0.50	ug/L	24-JAN-17	0.89	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	24-JAN-17	0.2	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	630	630
	Dibromochloromethane	<2.0		2.0	ug/L	24-JAN-17	2	82000	82000
	Chloroform	<1.0		1.0	ug/L	24-JAN-17	2	2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	24-JAN-17	0.2	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	4600	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	24-JAN-17	590	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	24-JAN-17	1.6	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	24-JAN-17	1.6	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	24-JAN-17	5	610	5500
	1,2-Dichloropropane	<0.50		0.50	ug/L	24-JAN-17	0.5	16	140
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	24-JAN-17			
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	24-JAN-17			
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	24-JAN-17	0.5	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	24-JAN-17	0.5	2300	2300
	n-Hexane	<0.50		0.50	ug/L	24-JAN-17	5	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	24-JAN-17	400	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	24-JAN-17	640	140000	580000
	MTBE	<2.0		2.0	ug/L	24-JAN-17	15	190	1400
	Styrene	<0.50		0.50	ug/L	24-JAN-17	0.5	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	24-JAN-17	1.1	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	17
	Toluene	<0.50		0.50	ug/L	24-JAN-17	0.8	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	640	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	24-JAN-17	0.5	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	24-JAN-17	0.5	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	24-JAN-17	150	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	24-JAN-17	0.5	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	24-JAN-17			
	m+p-Xylenes	<0.40		0.40	ug/L	24-JAN-17			

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3
L1882055-2	BWP-2								
Sampled By:	VARIOUS on 20-JAN-17 @ 11:30								
Matrix:	WATER								
Volatile Organic Compounds									
	Xylenes (Total)	<0.50		0.50	ug/L	24-JAN-17	72	4200	4200
	Surrogate: 4-Bromofluorobenzene	88.1		70-130	%	24-JAN-17			
	Surrogate: 1,4-Difluorobenzene	97.4		70-130	%	24-JAN-17			
Hydrocarbons									
	F1 (C6-C10)	<25		25	ug/L	24-JAN-17	420	750	750
	F1-BTEX	<25		25	ug/L	26-JAN-17	420	750	750
	F2 (C10-C16)	<100		100	ug/L	25-JAN-17	150	150	150
	F2-Naphth	<100		100	ug/L	26-JAN-17			
	F3 (C16-C34)	<250		250	ug/L	25-JAN-17	500	500	500
	F3-PAH	<250		250	ug/L	26-JAN-17			
	F4 (C34-C50)	<250		250	ug/L	25-JAN-17	500	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	26-JAN-17			
	Chrom. to baseline at nC50	YES			No Unit	25-JAN-17			
	Surrogate: 2-Bromobenzotrifluoride	96.8		60-140	%	25-JAN-17			
	Surrogate: 3,4-Dichlorotoluene	90.9		60-140	%	24-JAN-17			
Polycyclic Aromatic Hydrocarbons									
	Acenaphthene	<0.020		0.020	ug/L	26-JAN-17	4.1	600	1700
	Acenaphthylene	<0.020		0.020	ug/L	26-JAN-17	1	1.8	1.8
	Anthracene	<0.020		0.020	ug/L	26-JAN-17	0.1	2.4	2.4
	Benzo(a)anthracene	<0.020		0.020	ug/L	26-JAN-17	0.2	4.7	4.7
	Benzo(a)pyrene	<0.010		0.010	ug/L	26-JAN-17	0.01	0.81	0.81
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	26-JAN-17	0.1	0.75	0.75
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	26-JAN-17	0.2	0.2	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	26-JAN-17	0.1	0.4	0.4
	Chrysene	<0.020		0.020	ug/L	26-JAN-17	0.1	1	1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	26-JAN-17	0.2	0.52	0.52
	Fluoranthene	<0.020		0.020	ug/L	26-JAN-17	0.4	130	130
	Fluorene	<0.020		0.020	ug/L	26-JAN-17	120	400	400
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	26-JAN-17	0.2	0.2	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	26-JAN-17	2	1800	1800
	1-Methylnaphthalene	<0.020		0.020	ug/L	26-JAN-17	2	1800	1800
	2-Methylnaphthalene	<0.020		0.020	ug/L	26-JAN-17	2	1800	1800
	Naphthalene	<0.050		0.050	ug/L	26-JAN-17	7	1400	6400
	Phenanthrene	<0.020		0.020	ug/L	26-JAN-17	0.1	580	580
	Pyrene	<0.020		0.020	ug/L	26-JAN-17	0.2	68	68
	Surrogate: d10-Acenaphthene	82.9		60-140	%	26-JAN-17			
	Surrogate: d12-Chrysene	84.7		60-140	%	26-JAN-17			
	Surrogate: d8-Naphthalene	82.6		60-140	%	26-JAN-17			
	Surrogate: d10-Phenanthrene	84.9		60-140	%	26-JAN-17			
Polychlorinated Biphenyls									
	Aroclor 1242	<0.020		0.020	ug/L	27-JAN-17			
	Aroclor 1248	<0.020		0.020	ug/L	27-JAN-17			
	Aroclor 1254	<0.020		0.020	ug/L	27-JAN-17			
	Aroclor 1260	<0.020		0.020	ug/L	27-JAN-17			
	Total PCBs	<0.040		0.040	ug/L	27-JAN-17	0.2	7.8	15
	Surrogate: 2-fluorobiphenyl	92.7		50-150	%	27-JAN-17			

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the fiReference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil ŒTier 1 Method, CCME, 2001

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT	Water	Diss. Mercury in Water by CVAAS (ug/L)	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

PCB-511-WT	Water	PCB-O. Reg 153/04 (July 2011)	SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	**Water**							
Batch R3638576								
WG2468320-9 DUP		**WG2468320-8**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	23-JAN-17
WG2468320-7 LCS								
Chromium, Hexavalent			102.5		%		80-120	23-JAN-17
WG2468320-6 MB								
Chromium, Hexavalent			<1.0		ug/L		1	23-JAN-17
WG2468320-10 MS		**WG2468320-8**						
Chromium, Hexavalent			100.4		%		70-130	23-JAN-17
F1-HS-511-WT	**Water**							
Batch R3638754								
WG2466333-4 DUP		**WG2466333-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	24-JAN-17
WG2466333-1 LCS								
F1 (C6-C10)			99.3		%		80-120	24-JAN-17
WG2466333-2 MB								
F1 (C6-C10)			<25		ug/L		25	24-JAN-17
Surrogate: 3,4-Dichlorotoluene			97.5		%		60-140	24-JAN-17
WG2466333-5 MS		**WG2466333-3**						
F1 (C6-C10)			84.1		%		60-140	24-JAN-17
F2-F4-511-WT	**Water**							
Batch R3639831								
WG2468637-2 LCS								
F2 (C10-C16)			105.3		%		70-130	25-JAN-17
F3 (C16-C34)			102.3		%		70-130	25-JAN-17
F4 (C34-C50)			109.2		%		70-130	25-JAN-17
WG2468637-3 LCSD		**WG2468637-2**						
F2 (C10-C16)		105.3	121.0		%	14	50	25-JAN-17
F3 (C16-C34)		102.3	119.8		%	16	50	25-JAN-17
F4 (C34-C50)		109.2	126.2		%	14	50	25-JAN-17
WG2468637-1 MB								
F2 (C10-C16)			<100		ug/L		100	25-JAN-17
F3 (C16-C34)			<250		ug/L		250	25-JAN-17
F4 (C34-C50)			<250		ug/L		250	25-JAN-17
Surrogate: 2-Bromobenzotrifluoride			102.2		%		60-140	25-JAN-17
HG-D-UG/L-CVAA-WT	**Water**							

Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3638273								
WG2468136-3 DUP		**L1881875-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	23-JAN-17
WG2468136-2 LCS								
Mercury (Hg)-Dissolved			100.0		%		80-120	23-JAN-17
WG2468136-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	23-JAN-17
WG2468136-4 MS		**L1881887-1**						
Mercury (Hg)-Dissolved			96.8		%		70-130	23-JAN-17
MET-D-UG/L-MS-WT	**Water**							
Batch R3638674								
WG2468386-4 DUP		**WG2468386-3**						
Antimony (Sb)-Dissolved		0.85	0.83		ug/L	2.8	20	23-JAN-17
Arsenic (As)-Dissolved		6.88	6.71		ug/L	2.5	20	23-JAN-17
Barium (Ba)-Dissolved		243	240		ug/L	1.4	20	23-JAN-17
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	23-JAN-17
Boron (B)-Dissolved		133	132		ug/L	0.2	20	23-JAN-17
Cadmium (Cd)-Dissolved		0.012	0.013		ug/L	9.9	20	23-JAN-17
Chromium (Cr)-Dissolved		29.2	29.5		ug/L	0.9	20	23-JAN-17
Cobalt (Co)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	23-JAN-17
Copper (Cu)-Dissolved		<0.20	<0.20	RPD-NA	ug/L	N/A	20	23-JAN-17
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	23-JAN-17
Molybdenum (Mo)-Dissolved		41.3	42.0		ug/L	1.5	20	23-JAN-17
Nickel (Ni)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	23-JAN-17
Selenium (Se)-Dissolved		0.242	0.232		ug/L	4.4	20	23-JAN-17
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	23-JAN-17
Sodium (Na)-Dissolved		31300	30600		ug/L	2.0	20	23-JAN-17
Thallium (Tl)-Dissolved		0.038	0.036		ug/L	5.5	20	23-JAN-17
Uranium (U)-Dissolved		1.70	1.66		ug/L	2.6	20	23-JAN-17
Vanadium (V)-Dissolved		1.04	1.08		ug/L	2.9	20	23-JAN-17
Zinc (Zn)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	23-JAN-17
WG2468386-2 LCS								
Antimony (Sb)-Dissolved			97.6		%		80-120	23-JAN-17
Arsenic (As)-Dissolved			96.8		%		80-120	23-JAN-17
Barium (Ba)-Dissolved			99.2		%		80-120	23-JAN-17
Beryllium (Be)-Dissolved			96.6		%		80-120	23-JAN-17

Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch	**R3638674**							
WG2468386-2	**LCS**							
Boron (B)-Dissolved			97.2		%		80-120	23-JAN-17
Cadmium (Cd)-Dissolved			96.0		%		80-120	23-JAN-17
Chromium (Cr)-Dissolved			95.0		%		80-120	23-JAN-17
Cobalt (Co)-Dissolved			96.1		%		80-120	23-JAN-17
Copper (Cu)-Dissolved			95.4		%		80-120	23-JAN-17
Lead (Pb)-Dissolved			99.6		%		80-120	23-JAN-17
Molybdenum (Mo)-Dissolved			94.8		%		80-120	23-JAN-17
Nickel (Ni)-Dissolved			95.9		%		80-120	23-JAN-17
Selenium (Se)-Dissolved			97.9		%		80-120	23-JAN-17
Silver (Ag)-Dissolved			103.7		%		80-120	23-JAN-17
Sodium (Na)-Dissolved			97.4		%		80-120	23-JAN-17
Thallium (Tl)-Dissolved			97.1		%		80-120	23-JAN-17
Uranium (U)-Dissolved			105.7		%		80-120	23-JAN-17
Vanadium (V)-Dissolved			97.5		%		80-120	23-JAN-17
Zinc (Zn)-Dissolved			91.3		%		80-120	23-JAN-17
WG2468386-1	**MB**							
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	23-JAN-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	23-JAN-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	23-JAN-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	23-JAN-17
Boron (B)-Dissolved			<10		ug/L		10	23-JAN-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	23-JAN-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	23-JAN-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	23-JAN-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	23-JAN-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	23-JAN-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	23-JAN-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	23-JAN-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	23-JAN-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	23-JAN-17
Sodium (Na)-Dissolved			<500		ug/L		500	23-JAN-17
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	23-JAN-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	23-JAN-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	23-JAN-17

Quality Control Report

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Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch	**R3638674**							
WG2468386-1	**MB**							
Zinc (Zn)-Dissolved			<1.0		ug/L		1	23-JAN-17
WG2468386-5	**MS**	**WG2468386-3**						
Antimony (Sb)-Dissolved			104.6		%		70-130	23-JAN-17
Arsenic (As)-Dissolved			103.4		%		70-130	23-JAN-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	23-JAN-17
Beryllium (Be)-Dissolved			106.6		%		70-130	23-JAN-17
Boron (B)-Dissolved			N/A	MS-B	%		-	23-JAN-17
Cadmium (Cd)-Dissolved			101.5		%		70-130	23-JAN-17
Chromium (Cr)-Dissolved			N/A	MS-B	%		-	23-JAN-17
Cobalt (Co)-Dissolved			96.2		%		70-130	23-JAN-17
Copper (Cu)-Dissolved			95.6		%		70-130	23-JAN-17
Lead (Pb)-Dissolved			100.7		%		70-130	23-JAN-17
Molybdenum (Mo)-Dissolved			N/A	MS-B	%		-	23-JAN-17
Nickel (Ni)-Dissolved			94.7		%		70-130	23-JAN-17
Selenium (Se)-Dissolved			106.0		%		70-130	23-JAN-17
Silver (Ag)-Dissolved			102.3		%		70-130	23-JAN-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	23-JAN-17
Thallium (Tl)-Dissolved			99.6		%		70-130	23-JAN-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	23-JAN-17
Vanadium (V)-Dissolved			101.0		%		70-130	23-JAN-17
Zinc (Zn)-Dissolved			98.6		%		70-130	23-JAN-17
PAH-511-WT	**Water**							
Batch	**R3640458**							
WG2468579-2	**LCS**							
1-Methylnaphthalene			92.6		%		50-140	26-JAN-17
2-Methylnaphthalene			95.2		%		50-140	26-JAN-17
Acenaphthene			93.0		%		50-140	26-JAN-17
Acenaphthylene			93.7		%		50-140	26-JAN-17
Anthracene			96.3		%		50-140	26-JAN-17
Benzo(a)anthracene			97.1		%		50-140	26-JAN-17
Benzo(a)pyrene			98.8		%		50-140	26-JAN-17
Benzo(b)fluoranthene			96.8		%		50-140	26-JAN-17
Benzo(g,h,i)perylene			95.5		%		50-140	26-JAN-17
Benzo(k)fluoranthene			96.0		%		50-140	26-JAN-17

Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3640458								
WG2468579-2 LCS								
Chrysene			98.1		%		50-140	26-JAN-17
Dibenzo(ah)anthracene			97.4		%		50-140	26-JAN-17
Fluoranthene			96.5		%		50-140	26-JAN-17
Fluorene			92.6		%		50-140	26-JAN-17
Indeno(1,2,3-cd)pyrene			93.8		%		50-140	26-JAN-17
Naphthalene			91.9		%		50-140	26-JAN-17
Phenanthrene			95.6		%		50-140	26-JAN-17
Pyrene			102.3		%		50-140	26-JAN-17
WG2468579-3 LCSD		**WG2468579-2**						
1-Methylnaphthalene		92.6	88.7		%	4.3	50	26-JAN-17
2-Methylnaphthalene		95.2	90.5		%	5.0	50	26-JAN-17
Acenaphthene		93.0	87.4		%	6.2	50	26-JAN-17
Acenaphthylene		93.7	87.7		%	6.6	50	26-JAN-17
Anthracene		96.3	92.3		%	4.3	50	26-JAN-17
Benzo(a)anthracene		97.1	93.0		%	4.3	50	26-JAN-17
Benzo(a)pyrene		98.8	95.1		%	3.8	50	26-JAN-17
Benzo(b)fluoranthene		96.8	90.8		%	6.4	50	26-JAN-17
Benzo(g,h,i)perylene		95.5	92.0		%	3.8	50	26-JAN-17
Benzo(k)fluoranthene		96.0	91.4		%	5.0	50	26-JAN-17
Chrysene		98.1	93.5		%	4.8	50	26-JAN-17
Dibenzo(ah)anthracene		97.4	93.7		%	3.9	50	26-JAN-17
Fluoranthene		96.5	91.6		%	5.2	50	26-JAN-17
Fluorene		92.6	87.5		%	5.6	50	26-JAN-17
Indeno(1,2,3-cd)pyrene		93.8	90.1		%	4.1	50	26-JAN-17
Naphthalene		91.9	85.8		%	6.9	50	26-JAN-17
Phenanthrene		95.6	91.8		%	4.1	50	26-JAN-17
Pyrene		102.3	97.0		%	5.4	50	26-JAN-17
WG2468579-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	26-JAN-17
2-Methylnaphthalene			<0.020		ug/L		0.02	26-JAN-17
Acenaphthene			<0.020		ug/L		0.02	26-JAN-17
Acenaphthylene			<0.020		ug/L		0.02	26-JAN-17
Anthracene			<0.020		ug/L		0.02	26-JAN-17

Quality Control Report

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2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3640458								
WG2468579-1 MB								
Benzo(a)anthracene			<0.020		ug/L		0.02	26-JAN-17
Benzo(a)pyrene			<0.010		ug/L		0.01	26-JAN-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	26-JAN-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	26-JAN-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	26-JAN-17
Chrysene			<0.020		ug/L		0.02	26-JAN-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	26-JAN-17
Fluoranthene			<0.020		ug/L		0.02	26-JAN-17
Fluorene			<0.020		ug/L		0.02	26-JAN-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	26-JAN-17
Naphthalene			<0.050		ug/L		0.05	26-JAN-17
Phenanthrene			<0.020		ug/L		0.02	26-JAN-17
Pyrene			<0.020		ug/L		0.02	26-JAN-17
Surrogate: d8-Naphthalene			74.2		%		60-140	26-JAN-17
Surrogate: d10-Phenanthrene			82.8		%		60-140	26-JAN-17
Surrogate: d12-Chrysene			95.0		%		60-140	26-JAN-17
Surrogate: d10-Acenaphthene			79.5		%		60-140	26-JAN-17
PCB-511-WT	**Water**							
Batch R3640322								
WG2469004-2 LCS								
Aroclor 1242			78.2		%		60-140	26-JAN-17
Aroclor 1248			81.8		%		60-140	26-JAN-17
Aroclor 1254			104.2		%		60-140	26-JAN-17
Aroclor 1260			103.7		%		60-140	26-JAN-17
WG2469004-3 LCSD		**WG2469004-2**						
Aroclor 1242		78.2	77.7		%	0.6	50	26-JAN-17
Aroclor 1248		81.8	81.8		%	0.0	50	26-JAN-17
Aroclor 1254		104.2	99.5		%	4.6	50	26-JAN-17
Aroclor 1260		103.7	109.4		%	5.3	50	26-JAN-17
WG2469004-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	26-JAN-17
Aroclor 1248			<0.020		ug/L		0.02	26-JAN-17
Aroclor 1254			<0.020		ug/L		0.02	26-JAN-17
Aroclor 1260			<0.020		ug/L		0.02	26-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Water**							
Batch	**R3640322**							
WG2469004-1	**MB**							
Surrogate: 2-fluorobiphenyl			89.9		%		50-150	26-JAN-17
VOC-511-HS-WT	**Water**							
Batch	**R3638754**							
WG2466333-4	**DUP**	**WG2466333-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	24-JAN-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	24-JAN-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-JAN-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	24-JAN-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	24-JAN-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Chloroform		1.3	1.5		ug/L	13	30	24-JAN-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	24-JAN-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-JAN-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-JAN-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	24-JAN-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	24-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3638754								
WG2466333-4 DUP		**WG2466333-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	24-JAN-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	24-JAN-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-JAN-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	24-JAN-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	24-JAN-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	24-JAN-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-JAN-17
WG2466333-1 LCS								
1,1,1,2-Tetrachloroethane			97.9		%		70-130	24-JAN-17
1,1,2,2-Tetrachloroethane			115.2		%		70-130	24-JAN-17
1,1,1-Trichloroethane			99.8		%		70-130	24-JAN-17
1,1,2-Trichloroethane			107.9		%		70-130	24-JAN-17
1,1-Dichloroethane			104.6		%		70-130	24-JAN-17
1,1-Dichloroethylene			104.5		%		70-130	24-JAN-17
1,2-Dibromoethane			109.0		%		70-130	24-JAN-17
1,2-Dichlorobenzene			100.8		%		70-130	24-JAN-17
1,2-Dichloroethane			113.8		%		70-130	24-JAN-17
1,2-Dichloropropane			108.9		%		70-130	24-JAN-17
1,3-Dichlorobenzene			100.3		%		70-130	24-JAN-17
1,4-Dichlorobenzene			104.2		%		70-130	24-JAN-17
Acetone			138.6		%		60-140	24-JAN-17
Benzene			104.8		%		70-130	24-JAN-17
Bromodichloromethane			105.0		%		70-130	24-JAN-17
Bromoform			106.4		%		70-130	24-JAN-17
Bromomethane			107.9		%		60-140	24-JAN-17
Carbon tetrachloride			97.0		%		70-130	24-JAN-17
Chlorobenzene			99.9		%		70-130	24-JAN-17
Chloroform			106.1		%		70-130	24-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3638754								
WG2466333-1 LCS								
cis-1,2-Dichloroethylene			104.5		%		70-130	24-JAN-17
cis-1,3-Dichloropropene			118.7		%		70-130	24-JAN-17
Dibromochloromethane			108.1		%		70-130	24-JAN-17
Dichlorodifluoromethane			67.3		%		50-140	24-JAN-17
Ethylbenzene			88.5		%		70-130	24-JAN-17
n-Hexane			115.8		%		70-130	24-JAN-17
m+p-Xylenes			98.4		%		70-130	24-JAN-17
Methyl Ethyl Ketone			124.3		%		60-140	24-JAN-17
Methyl Isobutyl Ketone			111.8		%		60-140	24-JAN-17
Methylene Chloride			119.6		%		70-130	24-JAN-17
MTBE			96.8		%		70-130	24-JAN-17
o-Xylene			96.8		%		70-130	24-JAN-17
Styrene			99.7		%		70-130	24-JAN-17
Tetrachloroethylene			92.6		%		70-130	24-JAN-17
Toluene			94.7		%		70-130	24-JAN-17
trans-1,2-Dichloroethylene			110.9		%		70-130	24-JAN-17
trans-1,3-Dichloropropene			105.2		%		70-130	24-JAN-17
Trichloroethylene			98.4		%		70-130	24-JAN-17
Trichlorofluoromethane			104.4		%		60-140	24-JAN-17
Vinyl chloride			90.0		%		60-140	24-JAN-17
WG2466333-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	24-JAN-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	24-JAN-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	24-JAN-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	24-JAN-17
1,1-Dichloroethane			<0.50		ug/L		0.5	24-JAN-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	24-JAN-17
1,2-Dibromoethane			<0.20		ug/L		0.2	24-JAN-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	24-JAN-17
1,2-Dichloroethane			<0.50		ug/L		0.5	24-JAN-17
1,2-Dichloropropane			<0.50		ug/L		0.5	24-JAN-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	24-JAN-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	24-JAN-17
Acetone			<30		ug/L		30	24-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3638754								
WG2466333-2 MB								
Benzene			<0.50		ug/L		0.5	24-JAN-17
Bromodichloromethane			<2.0		ug/L		2	24-JAN-17
Bromoform			<5.0		ug/L		5	24-JAN-17
Bromomethane			<0.50		ug/L		0.5	24-JAN-17
Carbon tetrachloride			<0.20		ug/L		0.2	24-JAN-17
Chlorobenzene			<0.50		ug/L		0.5	24-JAN-17
Chloroform			<1.0		ug/L		1	24-JAN-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	24-JAN-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	24-JAN-17
Dibromochloromethane			<2.0		ug/L		2	24-JAN-17
Dichlorodifluoromethane			<2.0		ug/L		2	24-JAN-17
Ethylbenzene			<0.50		ug/L		0.5	24-JAN-17
n-Hexane			<0.50		ug/L		0.5	24-JAN-17
m+p-Xylenes			<0.40		ug/L		0.4	24-JAN-17
Methyl Ethyl Ketone			<20		ug/L		20	24-JAN-17
Methyl Isobutyl Ketone			<20		ug/L		20	24-JAN-17
Methylene Chloride			<5.0		ug/L		5	24-JAN-17
MTBE			<2.0		ug/L		2	24-JAN-17
o-Xylene			<0.30		ug/L		0.3	24-JAN-17
Styrene			<0.50		ug/L		0.5	24-JAN-17
Tetrachloroethylene			<0.50		ug/L		0.5	24-JAN-17
Toluene			<0.50		ug/L		0.5	24-JAN-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	24-JAN-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	24-JAN-17
Trichloroethylene			<0.50		ug/L		0.5	24-JAN-17
Trichlorofluoromethane			<5.0		ug/L		5	24-JAN-17
Vinyl chloride			<0.50		ug/L		0.5	24-JAN-17
Surrogate: 1,4-Difluorobenzene			96.4		%		70-130	24-JAN-17
Surrogate: 4-Bromofluorobenzene			88.2		%		70-130	24-JAN-17
WG2466333-5 MS		**WG2466333-3**						
1,1,1,2-Tetrachloroethane			100.4		%		50-140	24-JAN-17
1,1,2,2-Tetrachloroethane			122.4		%		50-140	24-JAN-17
1,1,1-Trichloroethane			99.4		%		50-140	24-JAN-17
1,1,2-Trichloroethane			113.4		%		50-140	24-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3638754								
WG2466333-5 MS		**WG2466333-3**						
1,1-Dichloroethane			127.6		%		50-140	24-JAN-17
1,1-Dichloroethylene			101.5		%		50-140	24-JAN-17
1,2-Dibromoethane			114.2		%		50-140	24-JAN-17
1,2-Dichlorobenzene			100.5		%		50-140	24-JAN-17
1,2-Dichloroethane			118.5		%		50-140	24-JAN-17
1,2-Dichloropropane			111.2		%		50-140	24-JAN-17
1,3-Dichlorobenzene			94.2		%		50-140	24-JAN-17
1,4-Dichlorobenzene			95.6		%		50-140	24-JAN-17
Acetone			102.4		%		50-140	25-JAN-17
Benzene			104.6		%		50-140	24-JAN-17
Bromodichloromethane			109.0		%		50-140	24-JAN-17
Bromoform			111.4		%		50-140	24-JAN-17
Bromomethane			101.3		%		50-140	24-JAN-17
Carbon tetrachloride			95.3		%		50-140	24-JAN-17
Chlorobenzene			99.8		%		50-140	24-JAN-17
Chloroform			109.7		%		50-140	24-JAN-17
cis-1,2-Dichloroethylene			105.5		%		50-140	24-JAN-17
cis-1,3-Dichloropropene			113.2		%		50-140	24-JAN-17
Dibromochloromethane			109.8		%		50-140	24-JAN-17
Dichlorodifluoromethane			57.7		%		50-140	24-JAN-17
Ethylbenzene			85.6		%		50-140	24-JAN-17
n-Hexane			108.4		%		50-140	24-JAN-17
m+p-Xylenes			96.2		%		50-140	24-JAN-17
Methyl Ethyl Ketone			138.2		%		50-140	24-JAN-17
Methyl Isobutyl Ketone			119.5		%		50-140	24-JAN-17
Methylene Chloride			122.6		%		50-140	24-JAN-17
MTBE			96.7		%		50-140	24-JAN-17
o-Xylene			95.2		%		50-140	24-JAN-17
Styrene			97.3		%		50-140	24-JAN-17
Tetrachloroethylene			90.4		%		50-140	24-JAN-17
Toluene			93.5		%		50-140	24-JAN-17
trans-1,2-Dichloroethylene			108.2		%		50-140	24-JAN-17
trans-1,3-Dichloropropene			100.6		%		50-140	24-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3638754								
WG2466333-5 MS		**WG2466333-3**						
Trichloroethylene			97.1		%		50-140	24-JAN-17
Trichlorofluoromethane			99.1		%		50-140	24-JAN-17
Vinyl chloride			82.8		%		50-140	24-JAN-17

Quality Control Report

Workorder: L1882055 Report Date: 27-JAN-17

Client: Morrison Hershfield Limited (Ottawa)
2440 Don Reid Drive
Ottawa ON K1H 1E1
Contact: Mitchell Dawley

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

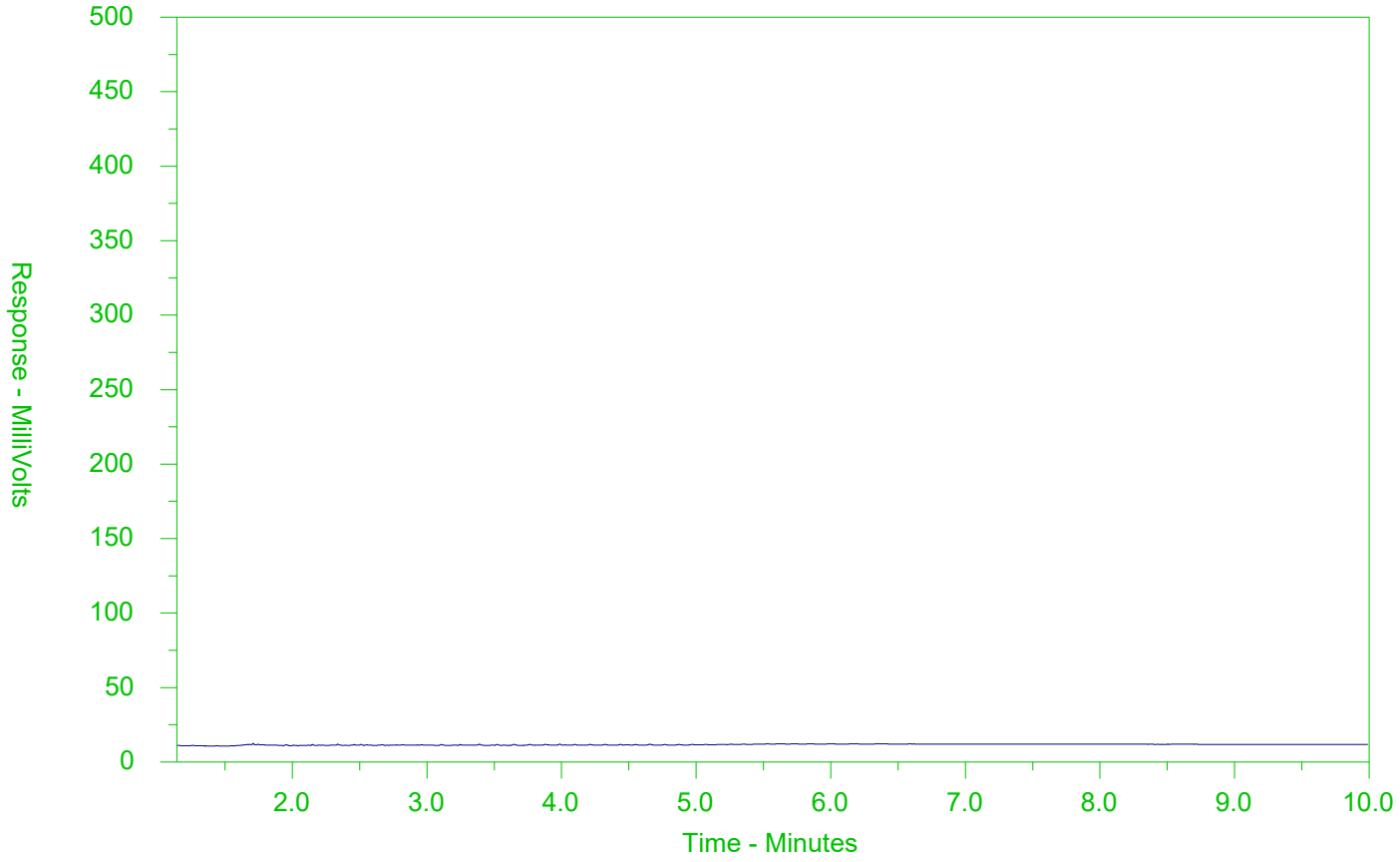
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1882055-1
Client Sample ID: BWP-1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

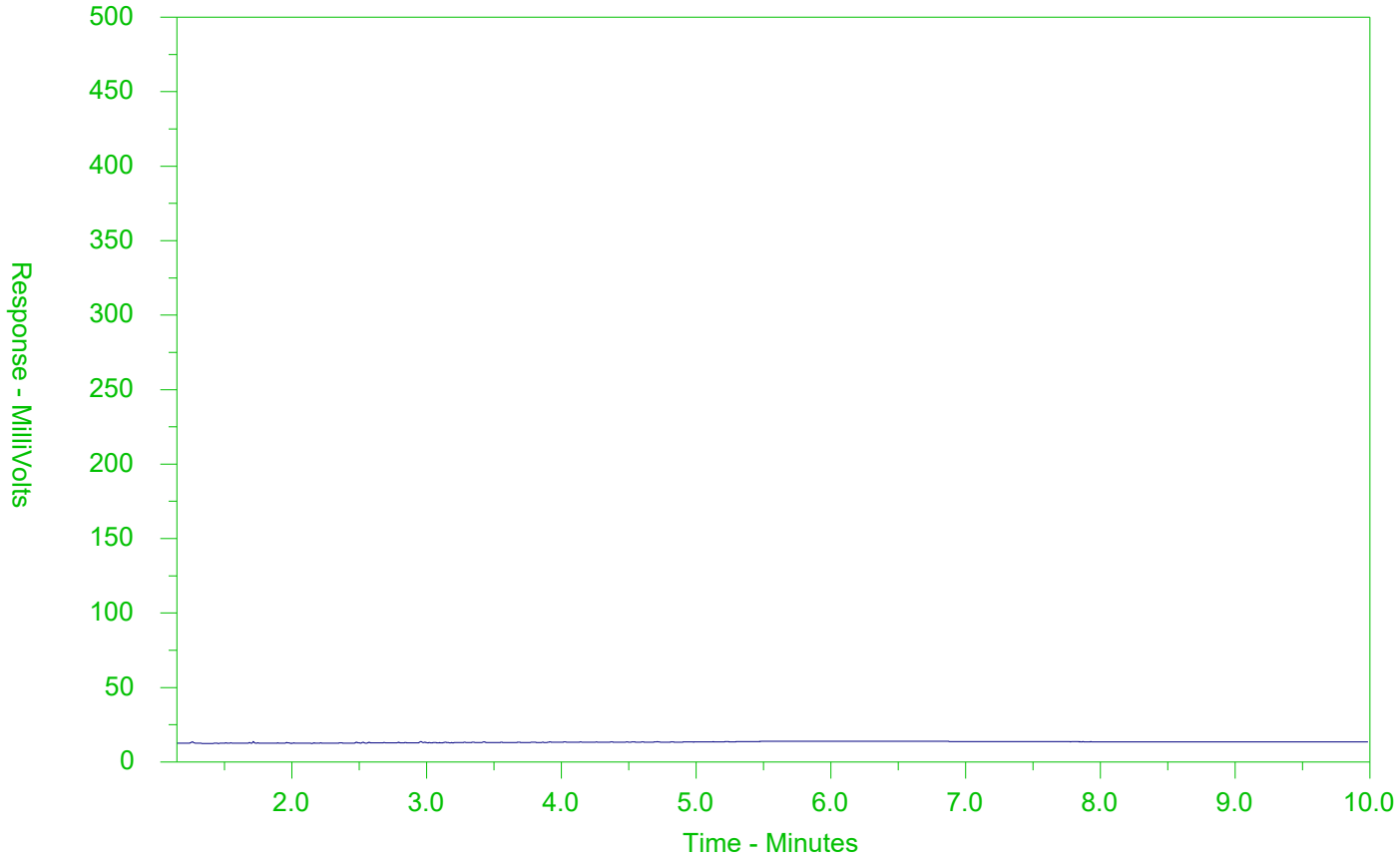
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1882055-2
Client Sample ID: BWP-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1882055-COFC

COC Number: 14 -

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Morrison Hershfield	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Mitchell Dawley	Quality Control (QC) Report with Report	☑ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2440 Don Reid Drive, Ottawa ON. K1H 1E1	☑ Criteria on Report - provide details below if box checked		E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	613-739-2910	Email 1 or Fax	MDawley@morrisonhershfield.com	Specify Date Required for E2,E or P:
		Email 2		

Invoice To		Invoice Distribution	
	Same as Report To ☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☐ Yes ☑ No	Email 1 or Fax	MDawley@morrisonhershfield.com
Company:		Email 2	
Contact:			

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q53234 (and Q53236)	Approver ID:	Cost Center:
Job #:	2150308	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L1882055 RH 21/7	ALS Contact: Emerson Perez 416-817-2944	Sampler: Various

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	SOIL Reg 153 Complete Metals	SOIL Reg 153 PAHs	SOIL Reg 153 VOCs	SOIL Reg 153 PCBs	SOIL Reg 153 PHCs and BTEX	WATER Reg 153 Complete Metals	WATER Reg 153 PAHs	WATER Reg 153 VOCs	WATER Reg 153 PCBS	WATER Reg 153 PHCs and BTEX	Salt (Conductivity and SAR)	SOIL PHC F2-F4	SAR	Number of Containers
1	BWP-1	20-01-16	10:00	GW						X	X	X	X	X				
2	BWP-2	20-01-16	11:30	GW						X	X	X	X	X				

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	USE THIS CoC FORM FOR ENVIRONMENTAL-RELATED SAMPLING
Are samples for human drinking water use? ☐ Yes ☑ No	Criteria on Report: O.Reg. 153 Table 1, Table 3

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐ No ☐
Ice packs	Yes ☑ No ☐	Custody seal intact	Yes ☐ No ☐
Cooling Initiated	☑		

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
5.4			5.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 20/01/20	Time: 12:30	Received by:	Date: 20/1/17	Time: 12:30	Received by:	Date: 21/01/16	Time: 1200

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326a v09 Front 04 January 2014

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Appendix F: Tree Survey

- Memorandum: Pinecrest Stormwater Management Facility Tree Inventory Data, Morrison Hershfield Limited, March 16, 2017

MEMORANDUM

TO:	Martha Lush, CSW Landscape Architect	ACTION BY:	
FROM:	Casey Little	FOR INFO OF:	
RESPOND BY:		PROJECT No.:	
RE:	Pinecrest Stormwater Management Facility Tree Inventory Data	DATE:	March 16, 2017

In order to satisfy the requirements of the Landscape and Site Restoration Plan required by CSW Landscape Architects (CSW) as part of the Pinecrest Stormwater Management Facility Workplan, Morrison Hershfield (MH) prepared this memo of findings and associated tree inventory field data in support of the Tree Conservation Report and Tree Compensation Plan.

Background

Annis O'Sullivan Vollebekk Ltd. (AOV) was retained to complete a land survey of the study area and to update base mapping to facilitate the project design and construction standards. AOV also located and surveyed all existing trees within the property limits. All trees with a diameter at breast height (DBH) of ≥ 3 cm were given a unique identifier by means of a hand-written flag attached to each individual. Although the National Capital Commission (NCC) does not require any information on species that are considered invasive (i.e. buckthorn and honeysuckle) and are < 10 cm DBH, the AOV survey included all trees, irrespective of species, as survey staff were unable to identify which trees were invasive species. All trees were assigned an estimated DBH as well as a "type" which separated the deciduous trees from the coniferous trees. This information was provided to MH in a Microsoft Excel spreadsheet and AutoCAD drawing.

Methodology and Results

MH was retained to complete a Tree Inventory as per the City of Ottawa (CoO) and NCC guidelines. It should be noted that although the CoO Tree Conservation Report guidelines require that all trees ≥ 10 cm DBH be included, all trees ≥ 3 cm were included in this inventory as per a request from NCC, as the study area is located on NCC property. As requested by the NCC, the DBH was recorded for invasive species ≥ 10 cm, but no other information was recorded; for invasive species with a DBH of < 3 cm, the code TS (for 'Too Small') was entered into the DBH column.

This inventory was carried out approximately three weeks after the trees had been surveyed and flagged by AOV. Efforts were made to inventory all trees flagged by AOV (3,201 individuals) within the study area, however, the following inconsistencies were noted:

- 15 trees flagged by AOV (<1%) could not be located in the field by MH (noted as "not found" in the MH Tree Number column of the dataset).
- 22 multi-stemmed trees were flagged by AOV as separate trees (these double-flagged individuals are noted in the MH dataset Remarks column).
- 18 trees were given duplicate numbers and flagged twice during the AOV survey (noted as "duplicate" in the AOV Tree Number column of the dataset). Both duplicates were surveyed by MH and are included in the dataset but the location was surveyed and mapped for only one of the duplicates in the AOV survey.

- An additional 17 trees were inventoried by MH but were not documented in the spreadsheet provided by AOV (noted as “not documented” in the AOV Tree Number column of the dataset).

A total of 3,221 individuals were inventoried by MH, resulting in an additional twenty trees than what was recorded during the AOV survey.

The field survey was conducted from the ground, viewing the tree from all sides where safe and possible in order to provide an adequate condition assessment. As the inventory was conducted during winter, the condition assessment for deciduous trees did not include leaf condition. MH collected and recorded the following information for every tree surveyed within the study area:

- Tree flag number;
- Species name;
- DBH;
- Estimated height (in metres);
- Estimated crown diameter (in metres);
- Number of stems;
- Health notes;
- Health condition; and
- General remarks.

The MH dataset is provided in **Attachment 1**. The following provides descriptions for the health note codes within the MH dataset.

Table 1 Health Note Description as Used in the Assessment

Health Note Code	Symptom	Description
BB	Broken Branches	Branches > ~5 cm DBH are broken and may provide disease entry point, or become hazardous.
D1	Dieback over 5-15% of crown	Dead branches in 5-15% of the crown that would generally be alive if the tree were healthy and was growing in suitable conditions; is normally indicative of stress due to poor growing conditions or poor health.
D2	Dieback over 16-30% of crown	Dead branches in 16-30% of the crown that would generally be alive.
D3	Dieback over > 30% of crown	Dead branches in > 30% of the crown that would generally be alive.
S1	Scar over 5-15% of main stem	Scars form as a result of injury and damage, and may become an entry point for disease or cause the tree to become structurally unsound, particularly when they are on the main stem (trunk) of a tree. When they are occurring over 5-15% of the circumference of the main stem, there is typically a minor risk of the damage causing serious problems.
S2	Scar over 16-30% of main stem	Scars occur over 16-30% of the circumference of the main stem, there is typically a moderate risk of the damage causing serious problems.

Health Note Code	Symptom	Description
S3	Scar over >30% of main stem	Scars occur over >30% of the circumference of the main stem, there is typically a high risk of the damage causing serious problems.
FC	Frost Crack	Frost cracks noted on the main stem, which occur as a result of fluctuating temperatures causing the wood to expand and contract, which causes a typically vertical crack. Although the resulting scar does not cover a large circumference, it may indicate a weakness in the bark which occurred due to earlier damage.
FD	Fungal Damage	Evident fungal fruiting structures or rot on the main stem or main branches of the tree. The fungi can damage the tree by weakening their structure, causing dieback, and/or creating conditions suitable for other pests and pathogens.
E	Epicormic Growth	Epicormic shoots sprouting from a main stem are typically a growth response to damage or stress.
EAB	Emerald Ash Borer	Damage on ash trees (*Fraxinus* sp.) due to the Emerald Ash Borer (*Agrilus planiplennis*). Is evident due to crown dieback, epicormic growth, and extensive bark damage resulting in patches were the beige lower bark layers are evident.
Eq	Equipment Damage	Typically on the lower part of the main stem, damage which is generally caused by mowers and weed-whackers that remove or destroy the bark.
Le	Leaning	The main stem is leaning more than 1%. May have a higher probability of falling over when the soil is saturated, particularly if the crown is unbalanced.
BC	Butternut Canker	A disease caused by the invasive fungus *Ophiognomonia clavigignenti-juglandacearum*, and is lethal to most Butternuts (*Juglans cinerea*). Symptoms include elongated, sunken cankers, which commonly originate at leaf scars, buds, or wounds. Sooty patches or inky fluids are also typically present.
IB	Included Bark	Bark is growing within a tree fork (called “included bark”), the union is typically weaker and more likely to fail during a wind, heavy rain, freezing rain, or heavy snow event.
T-P	Trunk Pruned	Large branches were pruned leaving large scars on the trunk.
RF-D	Root Flare Damage	Damage to the portion to the tree where the trunk widens at the base as it transitions to the root system.
V	Vines covering tree	A tree with heavy vine growth, which may cause excessive weight stress and/or shade the tree leaves.
PB	Peeling Bark	Bark peeling off the trunk or large branches on trees where this is not typical (such as on birches); generally caused by fungal damage, sunscald, or frost damage.
Ca	Cavity	Cavities that are more than ~5 cm in diameter, and may provide wildlife habitat. They may indicate other problems, such as a hollow stem, and are typically the result of rot due to disease, and/or woodpecker damage.
Co	Codominant stems	2 or more main stems (or "leaders") that are about the same diameter and emerge from the same location on the lower part of the tree, normally below 1.4 m above ground.
TT	Topped Tree	A tree where the main stem has been deliberately pruned off to either reduce the height or for aesthetic purposes; side branches will typically be taking over as the main stem, but are generally less strongly attached than the original main stem, and can create a higher risk of the top breaking off as a result.

Health Note Code	Symptom	Description
NL	No Leader (top of tree broken off)	A tree where the main stem has broken off or is missing.

The following (Table 2) provides definitions for the health condition rank within the MH dataset, which was assigned based on the health notes.

Table 2 Health Condition Description as Used in the Assessment

Health Condition Rank	Health Condition	Description
1	Excellent	No apparent health problems; good structural form
2	Good	Minor problems with health and/or structural form
3	Fair	More serious problems with health and/or structural form
4	Poor	Major problems with health and structural form
5	Dead	The tree was completely dead at the time of inspection

This information is provided to support the recommendations for tree retention and protection required for the Tree Conservation Report. It reflects the conditions of the trees at the time of the inspection. It must be understood that trees are a living organism and their health and vigour change over time. Although every effort was made to ensure the assessment was accurate, trees should be re-assessed annually. The assessment is valid at the time of the inspection only.

Attachment 1

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4030	4030	Juglans cinerea	Butternut	JUGCINE	4.5	3.5	5	2	S2, D1	4	-
4031	4031	Tilia cordifolia	Littleleaf Linden	TILCORD	4	4	3	2	-	1	-
4038	4038	Juglans cinerea	Butternut	JUGCINE	6	4	5	1	S2	4	-
4039	4039	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4040	4040	Juglans nigra	Black Walnut	JUGNIGR	6	5	4	1	-	1	-
4041	4041	Juglans nigra	Black Walnut	JUGNIGR	5	6	4	2	-	1	-
4042	4042	Juglans nigra	Black Walnut	JUGNIGR	6	6	6	3	-	1	-
4043	4043	Juglans nigra	Black Walnut	JUGNIGR	3	4	3	1	-	1	-
4044	4044	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	EAB, PB, D2, S2	4	-
4045	4045	Juglans nigra	Black Walnut	JUGNIGR	5	4	4	1	-	1	-
4046	4046	Juglans nigra	Black Walnut	JUGNIGR	6	5	3	1	-	1	-
4047	4047	Juglans nigra	Black Walnut	JUGNIGR	7	6	5	2	-	1	-
4048	4048	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4049	4049	Juglans nigra	Black Walnut	JUGNIGR	3	4	4	1	-	1	-
4050	4050	Juglans nigra	Black Walnut	JUGNIGR	5	5	5	3	-	1	-
4051	4051	Juglans cinerea	Butternut	JUGCINE	3.5	4.5	4	1	-	1	-
4052	4052	Juglans nigra	Black Walnut	JUGNIGR	5	6	3	1	-	1	-
4053	4053	Juglans nigra	Black Walnut	JUGNIGR	6	7	6	4	S1, IB, BB, V	2	-
4054	4054	Juglans nigra	Black Walnut	JUGNIGR	11	8	6	1	-	1	-
4055	4055	Juglans nigra	Black Walnut	JUGNIGR	4	4	3	1	-	1	-
4056	4056	Juglans nigra	Black Walnut	JUGNIGR	8.5	7	6	2	-	1	-
4057	4057	Juglans nigra	Black Walnut	JUGNIGR	6	7	6	2	-	1	-
4058	4058	Juglans nigra	Black Walnut	JUGNIGR	8	6	5	2	-	1	-
4059	4059	Juglans nigra	Black Walnut	JUGNIGR	3	4	2	1	-	1	-
4060	4060	Juglans nigra	Black Walnut	JUGNIGR	9	8	7	2	-	1	-
4061	4061	Juglans nigra	Black Walnut	JUGNIGR	10	8	6	1	-	1	-
4062	4062	Juglans nigra	Black Walnut	JUGNIGR	8	7	6	2	-	1	-
4063	4063	Juglans nigra	Black Walnut	JUGNIGR	6	5	5	1	-	1	-
4064	4064	Juglans nigra	Black Walnut	JUGNIGR	9	4	5	1	-	1	-
4065	4065	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4066	4066	Juglans cinerea	Butternut	JUGCINE	3.5	3.5	5	5	S1, BC	2	-
4067	4067	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4068	4068	Juglans cinerea	Butternut	JUGCINE	3	3.5	5	2	-	1	-
4069	4069	Juglans nigra	Black Walnut	JUGNIGR	4.5	4	3	2	-	1	-
4070	4070	Juglans nigra	Black Walnut	JUGNIGR	11	9	10	7	D1, BB	2	-
4071	4071	Juglans nigra	Black Walnut	JUGNIGR	10	8	4	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4072	4072	Juglans nigra	Black Walnut	JUGNIGR	11	8	6	1	-	1	-
4073	4073	Juglans nigra	Black Walnut	JUGNIGR	7	10	8	3	-	1	-
4074	4074	Juglans nigra	Black Walnut	JUGNIGR	10	9	8	5	BB, V	2	-
4075	4075	Juglans nigra	Black Walnut	JUGNIGR	8.5	9	10	2	NL, BB, D1	3	-
4076	4076	Juglans nigra	Black Walnut	JUGNIGR	13	9	6	2	BB, D1, V	2	-
4077	4077	Juglans nigra	Black Walnut	JUGNIGR	5	6	5	1	S1, D1	2	-
4078	4078	Juglans nigra	Black Walnut	JUGNIGR	14	9	8	1	-	1	-
4079	4079	Juglans nigra	Black Walnut	JUGNIGR	13.5	9	7	2	D1, BB, S1	2	-
4080	4080	Juglans nigra	Black Walnut	JUGNIGR	10	5	6	1	S1	2	-
4081	4081	Juglans nigra	Black Walnut	JUGNIGR	22	8	9	1	S1, BB, IB	2	-
4082	4082	Juglans nigra	Black Walnut	JUGNIGR	13	8	8	2	BB, S1	2	-
4083	4083	Juglans nigra	Black Walnut	JUGNIGR	10	8	4	1	-	1	-
4084	4084	Juglans nigra	Black Walnut	JUGNIGR	10	9	6	3	-	1	-
4085	4085	Juglans nigra	Black Walnut	JUGNIGR	7	7	4	2	BB, D1	2	-
4086	4086	Juglans cinerea	Butternut	JUGCINE	3	4	4	1	S1	2	-
4087	4087	Juglans nigra	Black Walnut	JUGNIGR	10	10	10	5	D2, S1	3	-
4088	4088	Juglans nigra	Black Walnut	JUGNIGR	7	7	7	2	-	1	-
4089	4089	Juglans nigra	Black Walnut	JUGNIGR	12	9	8	3	S1, D1	2	-
4090	4090	Juglans nigra	Black Walnut	JUGNIGR	8.5	8	8	2	S1, D1	2	-
4091	4091	Juglans nigra	Black Walnut	JUGNIGR	10.5	8	9	2	IB, FC, S1, BB, D1	3	-
4092	4092	Juglans nigra	Black Walnut	JUGNIGR	8	6	7	3	BB, D1, S1	2	-
4093	4093	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4094	4094	Juglans nigra	Black Walnut	JUGNIGR	9.5	8	8	6	-	1	-
4095	4095	Juglans nigra	Black Walnut	JUGNIGR	9	7	7	3	-	1	-
4096	4096	Juglans nigra	Black Walnut	JUGNIGR	11	7	8	2	-	1	-
4097	4097	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4098	4098	Acer rubrum	Red Maple	ACERUBR	40	15	12	7	T-P, FC, S1, BB	2	-
4099	4099	Quercus rubra	Red Oak	QUERUBR	46	15	15	7	FC, S1, BB, IB	2	-
4100	4100	Prunus species	Cherry	PRUN SP.	6	4	4	7	D2	3	-
4101	4101	Prunus species	Cherry	PRUN SP.	3	4	3	7	D1	2	-
4102	4102	Abies balsamea	Balsam Fir	ABIBALS	28	15	12	7	BB, D1	2	-
4103	4103	Amelanchier species	Serviceberry	AMEL SP.	5.5	8	7	2	Le, FC, D1, S1	2	-
4104	4104	Amelanchier species	Serviceberry	AMEL SP.	-	-	-	-	-	-	SAME AS 4103
4105	4105	Juglans nigra	Black Walnut	JUGNIGR	18	15	13	2	IB, D1	2	-
4106	4106	Prunus species	Cherry	PRUN SP.	7	8	6	1	-	1	-
4107	4107	Picea glauca	White Spruce	PICGLAU	42	14	12	1	-	1	-
4108	4108	Prunus species	Cherry	PRUN SP.	7	10	6	2	S2, BB, D2	3	-
4109	4109	Prunus species	Cherry	PRUN SP.	3.5	4	3	2	Le, S1, D1	2	-
4110	4110	Prunus species	Cherry	PRUN SP.	-	-	-	-	-	-	SAME AS 4108

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4111	4111	Tilia cordifolia	Littleleaf Linden	TILCORD	5	5	5	2	-	1	-
4112	4112	Tilia cordifolia	Littleleaf Linden	TILCORD	-	-	-	-	-	-	SAME AS 4111
4113	4113	Tilia cordifolia	Littleleaf Linden	TILCORD	5	5	4	5	S1, BB	2	-
4114	4114	Tilia cordifolia	Littleleaf Linden	TILCORD	8.5	7	4	2	S1, IB, D1	2	-
4115	4115	Tilia cordifolia	Littleleaf Linden	TILCORD	3.5	6	3	2	-	1	-
4116	4116	Tilia cordifolia	Littleleaf Linden	TILCORD	4	9	4	6	IB, BB, S1	2	-
4117	4117	Juglans cinerea	Butternut	JUGCINE	8	9	4	1	S2	3	-
4118	4118	Tilia cordifolia	Littleleaf Linden	TILCORD	11	10	5	1	D2, BB, S1	3	-
4119	4119	Tilia cordifolia	Littleleaf Linden	TILCORD	4.5	10	2	1	-	1	-
4120	4120	Prunus species	Cherry	PRUN SP.	7	9	4	1	S1, FC, BB	3	Growing into 4122
4121	4121	Prunus species	Cherry	PRUN SP.	3	7	4	1	S1, BB	2	-
4122	4122	Acer negundo	Manitoba Maple	ACENEGU	6	9	9	2	BB, E, S2	3	-
4123	4123	Prunus species	Cherry	PRUN SP.	4	8	4	1	BB, S1, D1	2	-
4124	4124	Picea pungens	Colorado Blue Spruce	PICPUNG	27	15	10	1	D1, BB	2	-
4125	4125	Picea pungens	Colorado Blue Spruce	PICPUNG	46	15	12	1	D1, BB	2	-
4126	4126	Picea pungens	Colorado Blue Spruce	PICPUNG	36	15	13	1	D1, BB	2	-
4127	4127	Fraxinus pennsylvanica	Green Ash	FRAPENN	17	14	10	1	Le, E, EAB	3	-
4128	4128	Juglans nigra	Black Walnut	JUGNIGR	11	6	7	1	BB, S1	2	-
4129	4129	Juglans nigra	Black Walnut	JUGNIGR	15	7	8	1	-	1	-
4130	4130	Juglans nigra	Black Walnut	JUGNIGR	11.5	5	6	2	-	1	-
4131	4131	Juglans nigra	Black Walnut	JUGNIGR	8	6	5	2	-	1	-
4132	4132	Juglans nigra	Black Walnut	JUGNIGR	9	7	6	2	-	1	-
4133	4133	Juglans nigra	Black Walnut	JUGNIGR	8	6	7	3	-	1	-
4134	4134	Juglans nigra	Black Walnut	JUGNIGR	7.5	6	6	2	-	1	-
4135	4135	Pinus strobus	Eastern White Pine	PINSTRO	8	6	4	2	-	1	-
4136	4136	Pinus strobus	Eastern White Pine	PINSTRO	9	5	5	1	-	1	-
4137	4137	Pinus strobus	Eastern White Pine	PINSTRO	9	5	5	1	-	1	-
4138	4138	Pinus strobus	Eastern White Pine	PINSTRO	9	7	5	1	-	1	-
4139	4139	Pinus strobus	Eastern White Pine	PINSTRO	7	7	4	1	-	1	-
4140	4140	Pinus strobus	Eastern White Pine	PINSTRO	10	6	5	1	-	1	-
4141	4141	Pinus strobus	Eastern White Pine	PINSTRO	8	7	6	1	-	1	-
4142	4142	Pinus strobus	Eastern White Pine	PINSTRO	7	7	4	1	-	1	-
4143	4143	Pinus strobus	Eastern White Pine	PINSTRO	10	6	5	1	-	1	-
4144	4144	Pinus strobus	Eastern White Pine	PINSTRO	7	5	4	1	-	1	-
4145	4145	Pinus resinosa	Red Pine	PINRESI	-	-	-	-	-	5	-
4146	4146	Pinus resinosa	Red Pine	PINRESI	23	8	10	1	-	1	-
4147	4147	Quercus rubra	Red Oak	QUERUBR	22	9	10	1	FC, BB	2	-
4148	4148	Quercus rubra	Red Oak	QUERUBR	13	10	8	1	-	1	-
4149	4149	Quercus rubra	Red Oak	QUERUBR	17	12	8	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4150	4150	Picea glauca	White Spruce	PICGLAU	9	5	3	1	Le, D1	2	-
4151	4151	Picea glauca	White Spruce	PICGLAU	8	5	5	1	Le	1	-
4152	4152	Picea glauca	White Spruce	PICGLAU	6	4	4	1	Le, D1	2	-
4153	4153	Picea glauca	White Spruce	PICGLAU	12	6	5	1	Le	1	-
4154	4154	Picea glauca	White Spruce	PICGLAU	4	4	4	2	Le, D1	2	-
4155	4155	Pinus resinosa	Red Pine	PINRESI	16	8	4	1	-	1	-
4156	4156	Pinus banksiana	Jack Pine	PINBANK	4	4	6	8	-	1	-
4157	4157	Pinus banksiana	Jack Pine	PINBANK	5	4	6	1	-	1	-
4158	4158	Pinus banksiana	Jack Pine	PINBANK	4	3.5	4	1	-	1	-
4159	4159	Pinus banksiana	Jack Pine	PINBANK	4	4	5	1	-	1	-
4160	4160	Pinus banksiana	Jack Pine	PINBANK	4	4	5	2	D1	2	-
4161	4161	Pinus banksiana	Jack Pine	PINBANK	5	4	5	1	-	1	-
4162	4162	Pinus banksiana	Jack Pine	PINBANK	5	5	5	1	-	1	-
4163	4163	Pinus banksiana	Jack Pine	PINBANK	9	4	5	1	-	1	-
4164	4164	Pinus banksiana	Jack Pine	PINBANK	4.5	4	5	2	-	1	-
4165	4165	Pinus banksiana	Jack Pine	PINBANK	6	4	4	1	-	1	-
4166	4166	Pinus banksiana	Jack Pine	PINBANK	5	4	4	1	-	1	-
4167	4167	Pinus banksiana	Jack Pine	PINBANK	3	4	3	1	-	1	-
4168	4168	Pinus banksiana	Jack Pine	PINBANK	4	3	4	3	-	1	-
4169	4169	Juglans nigra	Black Walnut	JUGNIGR	8	5	6	4	BB, IB, S1, D1	2	-
4170	4170	Juglans nigra	Black Walnut	JUGNIGR	7	4	5	1	-	1	-
4171	4171	Juglans cinerea	Butternut	JUGCINE	5	5	7	6	BC, S1, D1	3	-
4172	4172	Picea pungens	Colorado Blue Spruce	PICPUNG	34	15	12	1	D1, S1, BB	2	-
4173	4173	Picea pungens	Colorado Blue Spruce	PICPUNG	36	15	12	1	D1, BB, T-P	2	-
4174	4174	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	13	8	1	D1, T-P	2	-
4175	4175	Syringa reticulata	Silk Lilac	SYRRETI	7.5	11	7	2	S1, T-P, BB	2	-
4176	4176	Syringa reticulata	Silk Lilac	SYRRETI	4.5	5	4	2	-	1	-
4177	4177	Syringa reticulata	Silk Lilac	SYRRETI	4	5	2	1	BB, E	2	-
4178	4178	Syringa reticulata	Silk Lilac	SYRRETI	5	10	4	1	-	1	-
4179	4179	Syringa reticulata	Silk Lilac	SYRRETI	7	9	8	6	S2, D1, BB, E	3	-
4180	4180	Syringa reticulata	Silk Lilac	SYRRETI	5	8	3	1	-	1	-
4181	4181	Syringa reticulata	Silk Lilac	SYRRETI	4	6	4	3	S1, D1, BB	2	-
4182	4182	Syringa reticulata	Silk Lilac	SYRRETI	7	8	4	2	BB, S1	2	-
4183	4183	Syringa reticulata	Silk Lilac	SYRRETI	4	7	4	3	D1, S1	2	-
4184	4184	Syringa reticulata	Silk Lilac	SYRRETI	5	10	2	1	-	1	-
4185	4185	Syringa reticulata	Silk Lilac	SYRRETI	4	8	4	2	D1	2	-
4186	4186	Syringa reticulata	Silk Lilac	SYRRETI	6	6	3	1	Le	1	-
4187	4187	Syringa reticulata	Silk Lilac	SYRRETI	3	4	3	2	-	1	-
4188	4188	Syringa reticulata	Silk Lilac	SYRRETI	3.5	3	3	2	BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4189	4189	Syringa reticulata	Silk Lilac	SYRRETI	4.5	5	5	3	BB, S1	2	-
4190	4190	Syringa reticulata	Silk Lilac	SYRRETI	-	-	-	-	-	-	SAME AS 4189
4191	4191	Syringa reticulata	Silk Lilac	SYRRETI	6	9	5	1	-	1	-
4192	4192	Syringa reticulata	Silk Lilac	SYRRETI	8	11	5	2	T-P, BB	2	-
4193	4193	Syringa reticulata	Silk Lilac	SYRRETI	4	7	3	1	-	1	-
4194	4194	Syringa reticulata	Silk Lilac	SYRRETI	3	7	3	1	-	1	-
4195	4195	Syringa reticulata	Silk Lilac	SYRRETI	3	5	5	1	-	1	-
4196	4196	Syringa reticulata	Silk Lilac	SYRRETI	-	-	-	-	-	-	SAME AS 4197
4197	4197	Syringa reticulata	Silk Lilac	SYRRETI	10	10	5	1	D1, BB, T-P	2	-
4198	4198	Syringa reticulata	Silk Lilac	SYRRETI	10	10	3	1	T-P	2	-
4199	4199	Syringa reticulata	Silk Lilac	SYRRETI	5	4	4	3	-	1	-
4200	4200	Thuja occidentalis	Eastern White Cedar	THUOCCI	7	7	3	2	T-P	2	-
4201	4201	Thuja occidentalis	Eastern White Cedar	THUOCCI	10	12	5	3	D1	2	-
4202	4202	Thuja occidentalis	Eastern White Cedar	THUOCCI	9	12	5	2	D1, BB	2	-
4203	4203	Thuja occidentalis	Eastern White Cedar	THUOCCI	8.5	12	4	2	T-P	2	-
4204	4204	Thuja occidentalis	Eastern White Cedar	THUOCCI	14	10	4	1	-	1	-
4205	4205	Thuja occidentalis	Eastern White Cedar	THUOCCI	10	10	2	1	T-P	2	-
4206	4206	Pinus sylvestris	Scots Pine	PINSYLV	27	13	12	1	D1, BB	2	-
4207	4207	Amelanchier species	Serviceberry	AMEL SP.	8	4	12	10	FC, S2, D2, BB, Le	4	-
4208	4208	Juglans nigra	Black Walnut	JUGNIGR	7	6	3	1	-	1	-
4209	4209	Acer ginnala	Amur Maple	ACEGINN	5	6	2	1	Le, V	1	-
4210	4210	Juglans nigra	Black Walnut	JUGNIGR	9	7	5	2	D1, BB, V	2	-
4211	4211	Juglans nigra	Black Walnut	JUGNIGR	7	8	6	3	D1, BB, V	2	-
4212	4212	Juglans nigra	Black Walnut	JUGNIGR	6	5	3	2	D1, BB, V	2	-
4213	4213	Juglans nigra	Black Walnut	JUGNIGR	6.5	5	5	5	D1, BB, V	2	-
4214	4214	Juglans nigra	Black Walnut	JUGNIGR	10	7	8	2	D1, BB, V	2	-
4215	4215	Juglans nigra	Black Walnut	JUGNIGR	6	6	4	3	D1, BB, V	2	-
4216	4216	Juglans nigra	Black Walnut	JUGNIGR	8	8	6	2	D1, BB	2	-
4217	4217	Juglans nigra	Black Walnut	JUGNIGR	7	7	7	3	D1, BB	2	-
4218	4218	Juglans nigra	Black Walnut	JUGNIGR	7	8	8	4	D1, BB, V	2	-
4219	4219	Amelanchier species	Serviceberry	AMEL SP.	TS	-	-	-	-	-	-
4220	4220	Juglans nigra	Black Walnut	JUGNIGR	9	8	7	2	BB, D1, V	2	-
4221	4221	Juglans nigra	Black Walnut	JUGNIGR	8	8	7	4	BB, D1	2	-
4222	4222	Juglans cinerea	Butternut	JUGCINE	7.5	8	5	2	BC, S1	2	-
4223	4223	Juglans nigra	Black Walnut	JUGNIGR	9	8	6	2	-	1	-
4224	4224	Juglans nigra	Black Walnut	JUGNIGR	5	6	3	1	BB, D2	3	-
4225	4225	Juglans nigra	Black Walnut	JUGNIGR	-	-	-	-	-	-	SAME AS 4224
4226	4226	Juglans cinerea	Butternut	JUGCINE	TS	-	-	-	-	-	-
4227	4227	Juglans nigra	Black Walnut	JUGNIGR	9	9	6	2	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4228	4228	Juglans nigra	Black Walnut	JUGNIGR	8.5	9	8	3	-	1	-
4229	4229	Juglans nigra	Black Walnut	JUGNIGR	7	8	7	4	BB, D1	2	-
4230	4230	Juglans nigra	Black Walnut	JUGNIGR	8	7	8	7	IB, D1, V	2	-
4231	4231	Juglans nigra	Black Walnut	JUGNIGR	8	5	4	1	FC, S1, IB, BB	3	-
4232	4232	Juglans nigra	Black Walnut	JUGNIGR	6	5	5	5	-	1	-
4233	4233	Juglans nigra	Black Walnut	JUGNIGR	9	9	8	2	-	1	-
4234	4234	Juglans nigra	Black Walnut	JUGNIGR	8	9	6	3	-	1	-
4235	4235	Juglans nigra	Black Walnut	JUGNIGR	-	-	-	-	-	-	SAME AS 4234
4236	4236	Juglans nigra	Black Walnut	JUGNIGR	8	9	5	1	-	1	-
4237	4237	Juglans nigra	Black Walnut	JUGNIGR	9	10	8	5	D1, BB	2	-
4238	4238	Juglans nigra	Black Walnut	JUGNIGR	8.5	9	5	3	-	1	-
4239	4239	Juglans nigra	Black Walnut	JUGNIGR	8	9	6	2	BB, V,D1	2	-
4240	4240	Juglans nigra	Black Walnut	JUGNIGR	7	7	4	1	-	1	-
4241	4241	Juglans cinerea	Butternut	JUGCINE	7	10	7	2	BC, S1	3	-
4242	4242	Juglans cinerea	Butternut	JUGCINE	6	9	5	1	BC, S1	3	-
4243	4243	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	2	1	-	1	-
4244	4244	Juglans cinerea	Butternut	JUGCINE	7.5	9	8	2	BC, S2	4	-
4245	4245	Juglans nigra	Black Walnut	JUGNIGR	10	10	4	1	V	2	-
4246	4246	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4247	4247	Juglans nigra	Black Walnut	JUGNIGR	5.5	6	4	2	IB, FC, S1, BB	3	-
4248	4248	Amelanchier species	Serviceberry	AMEL SP.	4	5	5	6	FC, BB, D2	3	-
4249	4249	Amelanchier species	Serviceberry	AMEL SP.	5	5	2	1	BB, S1	2	-
4250	4250	Juglans nigra	Black Walnut	JUGNIGR	6	6	2	1	-	1	-
4251	4251	Juglans nigra	Black Walnut	JUGNIGR	8	9	8	4	S1, E, BB, V, IB	2	-
4252	4252	Juglans nigra	Black Walnut	JUGNIGR	5	5	5	2	-	1	-
4253	4253	Juglans cinerea	Butternut	JUGCINE	22	10	10	3	BB, S1	2	-
4254	4254	Tilia cordifolia	Littleleaf Linden	TILCORD	16	10	15	3	Le, D2, S2, BB	3	-
4255	4255	Acer negundo	Manitoba Maple	ACENEGU	29	11	10	1	Le, E, S2, BB	3	-
4256	4256	Tilia cordifolia	Littleleaf Linden	TILCORD	7	7	4	1	S1, BB	2	-
4257	4257	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	3	1	Le, EAB, D3, E	4	-
4258	4258	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4259	4259	Rhamnus cathartica	Common Buckthorn	RHACATH	7.5	-	-	-	-	-	-
4260	4260	Juglans cinerea	Butternut	JUGCINE	7	9	6	1	S1, BC, V	2	-
4261	4261	Juglans nigra	Black Walnut	JUGNIGR	4	7	3	2	S2, BB, E	3	-
4262	4262	Juglans nigra	Black Walnut	JUGNIGR	5	7	2	1	-	1	-
4263	4263	Juglans nigra	Black Walnut	JUGNIGR	10	10	7	1	S1, E, BB, V	2	-
4264	4264	Juglans cinerea	Butternut	JUGCINE	3.5	5	5	2	S1, BC	3	-
duplicate	4264	Acer negundo	Manitoba Maple	ACENEGU	7	8	10	4	Le, E, BB	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4265	4265	Juglans nigra	Black Walnut	JUGNIGR	9	9	8	6	V, BB	2	-
4266	4266	Juglans nigra	Black Walnut	JUGNIGR	9	10	6	5	V, BB	2	-
4267	4267	Juglans nigra	Black Walnut	JUGNIGR	6	8	3	1	V	2	-
4268	4268	Amelanchier species	Serviceberry	AMEL SP.	4	6	3	1	-	1	-
4269	4269	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	3	1	EAB, PB, D2, S2	4	-
4270	4270	Amelanchier species	Serviceberry	AMEL SP.	4	5	4	2	BB, PB, S1, V	3	-
4271	4271	Amelanchier species	Serviceberry	AMEL SP.	5	6	3	1	BB, S1	2	-
4272	4272	Juglans nigra	Black Walnut	JUGNIGR	6	7	3	1	-	1	-
4273	4273	Amelanchier species	Serviceberry	AMEL SP.	7	5	3	1	-	1	-
4274	4274	Amelanchier species	Serviceberry	AMEL SP.	5	6	2	1	BB, FD	3	-
4275	4275	Juglans nigra	Black Walnut	JUGNIGR	6	7	3	1	-	1	-
4276	4276	Amelanchier species	Serviceberry	AMEL SP.	5	4	3	1	S1, V	2	-
4277	4277	Juglans nigra	Black Walnut	JUGNIGR	10	11	6	1	-	1	-
4278	4278	Amelanchier species	Serviceberry	AMEL SP.	TS	-	-	-	-	-	-
4279	4279	Juglans nigra	Black Walnut	JUGNIGR	6	9	4	1	-	1	-
4280	4280	Juglans nigra	Black Walnut	JUGNIGR	10	10	6	1	-	1	-
4281	4281	Amelanchier species	Serviceberry	AMEL SP.	5	5	4	1	Le, V	2	-
4282	4282	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	2	1	-	1	-
4283	4283	Acer saccharum	Sugar Maple	ACESASA	4	4	2	1	-	1	-
4284	4284	Amelanchier species	Serviceberry	AMEL SP.	4	3	3	2	FD, BB, S2, V	3	-
4285	4285	Amelanchier species	Serviceberry	AMEL SP.	3	3	2	2	BB, V, S1	2	-
4286	4286	Amelanchier species	Serviceberry	AMEL SP.	5	7	5	2	V, FC, BB	2	-
4287	4287	Amelanchier species	Serviceberry	AMEL SP.	4	5	2	1	BB, S1	2	-
4288	4288	Amelanchier species	Serviceberry	AMEL SP.	5	6	2	1	-	1	-
4289	4289	Amelanchier species	Serviceberry	AMEL SP.	5	5	1	1	BB, V	2	-
4290	4290	Amelanchier species	Serviceberry	AMEL SP.	4	4	2	1	S1, FC, FD	3	-
4291	4291	Amelanchier species	Serviceberry	AMEL SP.	6	7	2	1	S1, FD, BB, V	2	-
4292	4292	Amelanchier species	Serviceberry	AMEL SP.	5	6	2	1	-	1	-
4293	4293	Amelanchier species	Serviceberry	AMEL SP.	6	4	2	1	BB, V, S1	2	-
4294	4294	Amelanchier species	Serviceberry	AMEL SP.	TS	-	-	-	-	-	-
4295	4295	Amelanchier species	Serviceberry	AMEL SP.	4	4	2	1	BB, V, S1	2	-
4296	4296	Juglans nigra	Black Walnut	JUGNIGR	6	6	6	5	-	1	-
4297	4297	Juglans nigra	Black Walnut	JUGNIGR	8	9	8	5	-	5	-
4298	4298	Juglans nigra	Black Walnut	JUGNIGR	8	8	8	4	IB, BB, S1	2	-
4299	4299	Juglans nigra	Black Walnut	JUGNIGR	5	5	6	4	BB, S1, D1, IB	3	-
4300	4300	Juglans nigra	Black Walnut	JUGNIGR	3	3	5	4	S1, IB, BB, D1	2	-
4301	4301	Juglans nigra	Black Walnut	JUGNIGR	8	7	5	3	-	1	-
4302	-	Not Found	-	-	-	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4303	4303	Amelanchier species	Serviceberry	AMEL SP.	7	4	6	4	S2, BB, FD	3	-
duplicate	4303	Juglans nigra	Black Walnut	JUGNIGR	9	6	5	1	BB, S1	2	-
4304	4304	Juglans nigra	Black Walnut	JUGNIGR	8	7	6	3	-	1	-
4305	4305	Juglans nigra	Black Walnut	JUGNIGR	7	7	7	5	IB, BB, S1	2	-
4306	4306	Juglans nigra	Black Walnut	JUGNIGR	10	9	8	4	-	1	-
duplicate	4306	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
4307	4307	Juglans nigra	Black Walnut	JUGNIGR	8	10	8	5	-	1	-
4308	4308	Juglans nigra	Black Walnut	JUGNIGR	10	10	6	3	S1, BB, V	2	-
4309	4309	Juglans nigra	Black Walnut	JUGNIGR	7	8	6	4	-	1	-
4310	4310	Juglans nigra	Black Walnut	JUGNIGR	8.5	10	7	2	IB, BB	2	-
4311	4311	Juglans nigra	Black Walnut	JUGNIGR	9	10	8	4	-	1	-
4312	4312	Juglans nigra	Black Walnut	JUGNIGR	8	7	7	1	-	1	-
4313	4313	Juglans cinerea	Butternut	JUGCINE	6	6	7	3	S1, BC	3	-
4314	4314	Juglans nigra	Black Walnut	JUGNIGR	10	10	8	3	BB, S1, IB	2	-
4315	4315	Juglans nigra	Black Walnut	JUGNIGR	8	8	7	2	BB, S1	2	-
duplicate	4315	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
4316	4316	Juglans nigra	Black Walnut	JUGNIGR	8	9	7	3	-	1	-
duplicate	4316	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
4317	4317	Juglans nigra	Black Walnut	JUGNIGR	7	6	6	1	-	1	-
4318	4318	Juglans cinerea	Butternut	JUGCINE	3	2.5	3	1	-	1	-
4319	4319	Juglans nigra	Black Walnut	JUGNIGR	6	6	7	4	-	1	-
4320	4320	Juglans cinerea	Butternut	JUGCINE	3	3	4	2	BC, B1	3	-
4321	4321	Juglans nigra	Black Walnut	JUGNIGR	6	8	8	6	IB, BB, S1	2	-
4322	4322	Juglans nigra	Black Walnut	JUGNIGR	9	10	8	7	-	1	-
4323	4323	Juglans nigra	Black Walnut	JUGNIGR	10	9	8	5	-	1	-
4324	4324	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4325	4325	Juglans nigra	Black Walnut	JUGNIGR	6	8	5	5	BB, IB	2	-
4326	4326	Juglans nigra	Black Walnut	JUGNIGR	8	10	7	2	BB, S1	2	-
4327	4327	Juglans nigra	Black Walnut	JUGNIGR	6	10	6	4	-	1	-
4328	4328	Juglans nigra	Black Walnut	JUGNIGR	11	10	7	1	BB, S1	2	-
4329	4329	Juglans nigra	Black Walnut	JUGNIGR	5.5	7	7	4	BB, S1	2	-
4330	4330	Juglans nigra	Black Walnut	JUGNIGR	8	10	8	5	IB, S1, BB	2	-
4331	4331	Juglans nigra	Black Walnut	JUGNIGR	6	9	7	4	-	1	-
4332	4332	Juglans nigra	Black Walnut	JUGNIGR	9	9	7	2	-	1	-
4333	4333	Juglans nigra	Black Walnut	JUGNIGR	6	8	5	1	BB, S1, PB	2	-
4334	4334	Juglans nigra	Black Walnut	JUGNIGR	4	5	4	3	BB, S2, FC, D1	3	-
4335	4335	Juglans nigra	Black Walnut	JUGNIGR	4	4	3	1	-	1	-
4336	4336	Juglans nigra	Black Walnut	JUGNIGR	5	7	8	5	BB, S1, IB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4337	4337	Juglans nigra	Black Walnut	JUGNIGR	7	7	8	2	BB, S1	2	-
4338	4338	Juglans cinerea	Butternut	JUGCINE	TS	-	-	-	-	-	-
4339	4339	Juglans cinerea	Butternut	JUGCINE	3.5	7	5	3	BB, IB, S1, BC	2	-
4340	4340	Juglans nigra	Black Walnut	JUGNIGR	5.5	9	7	3	S1, BB	2	-
4341	4341	Juglans nigra	Black Walnut	JUGNIGR	7	9	7	5	BB, IB	2	-
4342	4342	Juglans cinerea	Butternut	JUGCINE	4	5	6	4	BB, IB, S1	2	-
4343	4343	Juglans cinerea	Butternut	JUGCINE	3	4	5	3	BB, IB	2	-
4344	4344	Juglans cinerea	Butternut	JUGCINE	3	3	4	2	BB, IB	2	-
4345	4345	Juglans nigra	Black Walnut	JUGNIGR	9	9	8	5	-	1	-
4346	4346	Juglans nigra	Black Walnut	JUGNIGR	7	6	7	4	S1, BB	2	-
4347	4347	Juglans nigra	Black Walnut	JUGNIGR	7	8	7	5	S1, IB	2	-
4348	4348	Juglans nigra	Black Walnut	JUGNIGR	7	6	5	1	-	1	-
4349	4349	Juglans nigra	Black Walnut	JUGNIGR	11	10	7	1	IB, BB	2	-
4350	4350	Juglans nigra	Black Walnut	JUGNIGR	8	10	7	4	IB, BB	2	-
4351	4351	Juglans cinerea	Butternut	JUGCINE	4	4	4	3	IB, BB	2	-
4352	4352	Juglans nigra	Black Walnut	JUGNIGR	8	10	7	3	BB	2	-
4353	4353	Juglans nigra	Black Walnut	JUGNIGR	10	9	5	1	BB	2	-
4354	4354	Juglans nigra	Black Walnut	JUGNIGR	5	9	7	3	IB, BB	2	-
4355	4355	Juglans nigra	Black Walnut	JUGNIGR	8	9	7	3	-	1	-
4356	4356	Juglans nigra	Black Walnut	JUGNIGR	8	7	7	3	V, S1	2	-
4357	4357	Juglans nigra	Black Walnut	JUGNIGR	7	8	7	3	V, S1	2	-
4358	4358	Juglans nigra	Black Walnut	JUGNIGR	6.5	7	5	3	-	1	-
4359	4359	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4360	4360	Acer ginnala	Amur Maple	ACEGINN	6	5	5	1	BB	2	-
4361	4361	Amelanchier species	Serviceberry	AMEL SP.	4	5	8	4	Le, T-P, BB	3	-
4362	4362	Amelanchier species	Serviceberry	AMEL SP.	7	10	7	8	BB, S1	2	-
4363	4363	Syringa reticulata	Silk Lilac	SYRRETI	8	10	8	2	S1, IB, BB	2	-
4364	4364	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4365	4365	Juglans nigra	Black Walnut	JUGNIGR	4	5	5	4	-	1	-
4366	4366	Acer rubrum	Red Maple	ACERUBR	120	15	18	1	BB, IB, S1, T-P	2	-
4367	4367	Prunus species	Cherry	PRUN SP.	18	11	8	3	S1, T-P, IB	3	-
4368	4368	Pinus strobus	Eastern White Pine	PINSTRO	42	18	12	1	-	1	-
4369	4369	Picea glauca	White Spruce	PICGLAU	32	16	10	1	-	1	-
4370	4370	Tilia cordifolia	Littleleaf Linden	TILCORD	9	10	4	1	-	1	-
4371	4371	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4372	4372	Tilia cordifolia	Littleleaf Linden	TILCORD	7.5	10	7	5	-	1	-
4373	4373	Pinus resinosa	Red Pine	PINRESI	26	15	13	1	D1, Le	2	-
4374	4374	Amelanchier species	Serviceberry	AMEL SP.	6	6	4	1	Le, D1, BB	2	-
4375	4375	Tilia cordifolia	Littleleaf Linden	TILCORD	9	9	10	2	BB, S1, PB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4376	4376	Populus species	Poplar	POPU SP.	9	10	5	2	PB, D1, Le	2	-
4377	4377	Amelanchier species	Serviceberry	AMEL SP.	3	7	2	1	-	1	-
4378	4378	Amelanchier species	Serviceberry	AMEL SP.	4	7	4	2	-	1	-
4379	4379	Tilia cordifolia	Littleleaf Linden	TILCORD	5	5	3	2	Le, D1	2	-
4380	4380	Prunus species	Cherry	PRUN SP.	5	6	4	1	FD	3	-
4381	4381	Amelanchier species	Serviceberry	AMEL SP.	3.5	7	3	2	-	1	-
4382	4382	Tilia cordifolia	Littleleaf Linden	TILCORD	11	10	5	1	D1, S1	2	-
4383	4383	Tilia cordifolia	Littleleaf Linden	TILCORD	4	8	3	1	D2	3	-
4384	4384	Tilia cordifolia	Littleleaf Linden	TILCORD	7.5	7	5	6	Le, IB, D1, BB	2	-
4385	4385	Amelanchier species	Serviceberry	AMEL SP.	3	7	2	1	Le	1	-
4386	4386	Amelanchier species	Serviceberry	AMEL SP.	3.5	4	3	2	-	1	-
4387	4387	Amelanchier species	Serviceberry	AMEL SP.	3.5	4	3	2	-	1	-
4388	4388	Amelanchier species	Serviceberry	AMEL SP.	3	5	2	1	-	1	-
4389	4389	Acer ginnala	Amur Maple	ACEGINN	9	8	12	10	BB, D1, FC, Le, T-P	3	-
4390	4390	Syringa reticulata	Silk Lilac	SYRRETI	3.5	6	4	3	-	1	-
4391	4391	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4392	4392	Acer rubrum	Red Maple	ACERUBR	69	15	15	1	IB, D1	2	-
4393	4393	Syringa reticulata	Silk Lilac	SYRRETI	4	7	7	6	E, D2, BB	3	-
4394	4394	Syringa reticulata	Silk Lilac	SYRRETI	4	4	7	2	D1, BB, Le	2	-
4395	4395	Acer platanoides	Norway Maple	ACEPLAT	17	12	10	1	-	1	-
4396	4396	Acer platanoides	Norway Maple	ACEPLAT	10.5	12	10	2	-	1	-
4397	4397	Acer ginnala	Amur Maple	ACEGINN	7	7	10	8	D1, BB	2	-
4398	4398	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4399	4399	Syringa reticulata	Silk Lilac	SYRRETI	4	7	5	2	D1, S1	2	-
4400	4400	Amelanchier species	Serviceberry	AMEL SP.	3	5	4	1	D1, S1	2	-
4401	4401	Acer platanoides	Norway Maple	ACEPLAT	9	10	4	1	-	1	-
4402	4402	Amelanchier species	Serviceberry	AMEL SP.	9.5	10	5	2	-	1	written as 3402 in field
4403	4403	Amelanchier species	Serviceberry	AMEL SP.	3.5	6	5	4	S1, D1, BB	3	written as 3403 in field
4404	4404	Tilia cordifolia	Littleleaf Linden	TILCORD	5	7	8	2	Le, D1, BB	3	-
4405	4405	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4406	4406	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4407	4407	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4408	4408	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4409	4409	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4410	4410	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4411	4411	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4412	4412	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4413	4413	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4414	4414	Tilia cordifolia	Littleleaf Linden	TILCORD	7	5	5	1	Eq	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4415	4415	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4416	4416	Acer saccharum	Sugar Maple	ACESASA	4	5	2	1	-	1	-
4417	4417	Syringa reticulata	Silk Lilac	SYRRETI	3	5	3	2	-	1	-
4418	4418	Rhus typhina	Staghorn Sumac	RHUTYPH	4	4	6	2	S1	2	-
4419	4419	Rhus typhina	Staghorn Sumac	RHUTYPH	4.5	5	4	2	S1	2	-
4420	4420	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4421	4421	Amelanchier species	Serviceberry	AMEL SP.	3	2	1	1	Le	4	On the ground
4422	4422	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4423	4423	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4424	4424	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4425	4425	Syringa reticulata	Silk Lilac	SYRRETI	7	11	4	1	-	1	-
4426	4426	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4427	4427	Juglans nigra	Black Walnut	JUGNIGR	6	7	6	5	IB, BB	2	-
4428	4428	Juglans nigra	Black Walnut	JUGNIGR	7.5	7	6	2	-	1	-
4429	4429	Juglans nigra	Black Walnut	JUGNIGR	5	7	3	1	V	2	-
4430	4430	Juglans nigra	Black Walnut	JUGNIGR	6	7	5	5	V	2	-
4431	4431	Juglans nigra	Black Walnut	JUGNIGR	6	7	5	2	V	2	-
4432	4432	Juglans nigra	Black Walnut	JUGNIGR	7	5	5	2	-	1	-
4433	4433	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	3	1	S1	2	-
4434	4434	Juglans nigra	Black Walnut	JUGNIGR	5	4	4	3	-	1	-
4435	4435	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4436	4436	Juglans nigra	Black Walnut	JUGNIGR	9	8	7	2	-	1	no flag in field
4437	4437	Juglans nigra	Black Walnut	JUGNIGR	10	8	7	3	-	1	-
4438	4438	Juglans nigra	Black Walnut	JUGNIGR	5.5	6	6	3	PB, S1	2	-
4439	4439	Juglans nigra	Black Walnut	JUGNIGR	6	6	4	2	-	1	-
4440	4440	Unknown species	Unknown species	UNKNOWN	6.5	9	6	3	D2, S2	3	-
4441	4441	Juglans nigra	Black Walnut	JUGNIGR	6	7	5	4	-	1	-
4442	4442	Juglans nigra	Black Walnut	JUGNIGR	7	7	5	3	S1, PB, FC	2	-
4443	4443	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4444	4444	Juglans nigra	Black Walnut	JUGNIGR	4	4	4	4	-	1	-
4445	4445	Juglans nigra	Black Walnut	JUGNIGR	6	7	4	5	-	1	-
4446	4446	Juglans nigra	Black Walnut	JUGNIGR	5	5	5	3	BB	2	-
4447	4447	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	4	2	EAB	3	-
4448	4448	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4449	4449	Juglans nigra	Black Walnut	JUGNIGR	3	3	2	1	-	1	-
4450	4450	Juglans nigra	Black Walnut	JUGNIGR	3	4	4	2	-	2	-
4451	4451	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	1	EAB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4452	4452	Juglans nigra	Black Walnut	JUGNIGR	6	6	5	1	-	1	-
4453	4453	Juglans nigra	Black Walnut	JUGNIGR	6	6	4	2	-	1	-
4454	4454	Juglans nigra	Black Walnut	JUGNIGR	8	8	7	5	-	1	-
4455	4455	Juglans nigra	Black Walnut	JUGNIGR	7	7	6	3	-	1	-
4456	4456	Juglans nigra	Black Walnut	JUGNIGR	6	6	5	3	-	1	-
4457	4457	Juglans nigra	Black Walnut	JUGNIGR	6	6	6	2	-	1	-
4458	4458	Juglans nigra	Black Walnut	JUGNIGR	6	7	5	3	-	1	-
4459	4459	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	7	4	2	EAB	2	-
4460	4460	Juglans nigra	Black Walnut	JUGNIGR	6	5	4	1	-	1	-
4461	4461	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	EAB	3	-
4462	4462	Juglans nigra	Black Walnut	JUGNIGR	4	5	4	3	BB	2	-
4463	4463	Rhus typhina	Staghorn Sumac	RHUTYPH	7	8	8	2	D2, T-P, BB	4	-
4464	4464	Rhus typhina	Staghorn Sumac	RHUTYPH	-	-	-	-	-	-	SAME AS 4463
4465	4465	Syringa reticulata	Silk Lilac	SYRRETI	3	4	3	1	-	1	-
4466	4466	Fraxinus pennsylvanica	Green Ash	FRAPENN	22	12	10	1	EAB, E, PB, D3	4	-
4467	4467	Syringa reticulata	Silk Lilac	SYRRETI	3.5	3	4	2	-	1	-
4468	4468	Celtis occidentalis	Hackberry	CELOCCI	4	4	2	1	-	1	-
4469	4469	Rhus typhina	Staghorn Sumac	RHUTYPH	9	8	4	1	S1, D1	2	-
4470	4470	Rhus typhina	Staghorn Sumac	RHUTYPH	7	7	6	3	PB, S1, D1	2	-
4471	4471	Rhus typhina	Staghorn Sumac	RHUTYPH	3	4	3	1	-	1	-
4472	4472	Rhus typhina	Staghorn Sumac	RHUTYPH	5	7	4	1	-	1	-
4473	4473	Juglans nigra	Black Walnut	JUGNIGR	9	8	7	2	-	1	-
4474	4474	Amelanchier species	Serviceberry	AMEL SP.	7	7	4	1	BB, Le	2	-
4475	4475	Rhus typhina	Staghorn Sumac	RHUTYPH	6	7	5	3	D1, BB	2	-
4476	4476	Juglans nigra	Black Walnut	JUGNIGR	11	11	10	1	D1	2	-
4477	4477	Syringa reticulata	Silk Lilac	SYRRETI	3	4	4	1	-	1	-
4478	4478	Rhus typhina	Staghorn Sumac	RHUTYPH	5	6	2	1	-	5	-
4479	4479	Juglans nigra	Black Walnut	JUGNIGR	14	9	8	1	-	1	-
4480	4480	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4481	4481	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4482	4482	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4483	4483	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4484	4484	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4485	4485	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4486	4486	Rhus typhina	Staghorn Sumac	RHUTYPH	4.5	6	5	2	S1, FC, D1	2	-
4487	4487	Ulmus americana	White Elm	ULMAMER	6.5	8	4	1	S2, D1, BB, PB	4	-
4488	4488	Rhus typhina	Staghorn Sumac	RHUTYPH	4	5	5	1	S1, D1, BB	2	-
4489	4489	Rhus typhina	Staghorn Sumac	RHUTYPH	5	6	5	2	S1, D1, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4490	4490	Rhus typhina	Staghorn Sumac	RHUTYPH	3	4	3	1	S1	2	-
4491	4491	Tilia cordifolia	Littleleaf Linden	TILCORD	3	4	5	4	Eq, S1	2	-
4492	4492	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	2	EAB, PB, FC, S2	4	-
4493	4493	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	3	EAB	3	-
4494	4494	Juglans nigra	Black Walnut	JUGNIGR	8	9	6	2	-	1	-
4495	4495	Syringa reticulata	Silk Lilac	SYRRETI	3	4	3	1	-	1	-
4496	4496	Juglans nigra	Black Walnut	JUGNIGR	5	6	4	1	-	1	-
4497	4497	Juglans nigra	Black Walnut	JUGNIGR	8	6	5	2	-	1	-
4498	4498	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4499	4499	Juglans nigra	Black Walnut	JUGNIGR	4	4	4	2	-	1	-
4500	4500	Syringa reticulata	Silk Lilac	SYRRETI	3	4	4	3	-	1	-
4501	4501	Juglans nigra	Black Walnut	JUGNIGR	5	5	4	4	-	1	-
4502	4502	Juglans nigra	Black Walnut	JUGNIGR	4	4	4	1	-	1	-
4503	4503	Juglans nigra	Black Walnut	JUGNIGR	4	3	3	1	-	1	-
4504	4504	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	4	3	1	EAB	3	-
4505	4505	Juglans nigra	Black Walnut	JUGNIGR	3	3	2	1	-	1	-
4506	4506	Juglans nigra	Black Walnut	JUGNIGR	5	5	5	2	-	1	-
4507	4507	Juglans nigra	Black Walnut	JUGNIGR	7	7	6	5	-	1	-
4508	4508	Juglans nigra	Black Walnut	JUGNIGR	9	9	7	1	-	1	-
4509	4509	Juglans nigra	Black Walnut	JUGNIGR	-	-	-	-	-	-	SAME AS 4514
4510	4510	Juglans nigra	Black Walnut	JUGNIGR	17	13	10	1	BB, S1	2	-
4511	4511	Juglans nigra	Black Walnut	JUGNIGR	17	11	10	1	D1, BB	2	-
4512	4512	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	4	1	EAB, PB, D2, S2	4	-
4513	4513	Juglans nigra	Black Walnut	JUGNIGR	15	13	10	1	D1, BB	2	-
4514	4514	Juglans nigra	Black Walnut	JUGNIGR	34	15	14	1	BB, S1	2	-
4515	4515	Amelanchier species	Serviceberry	AMEL SP.	3	3	4	1	FD, BB	2	-
4516	4516	Acer negundo	Manitoba Maple	ACENEGU	6	4	8	1	Le, V, BB	3	-
4517	4517	Amelanchier species	Serviceberry	AMEL SP.	3.5	3	4	2	PB	2	-
4518	4518	Amelanchier species	Serviceberry	AMEL SP.	4	4	5	1	FD, BB	2	-
4519	4519	Amelanchier species	Serviceberry	AMEL SP.	3	3	4	1	FD	2	-
4520	4520	Juglans nigra	Black Walnut	JUGNIGR	22	13	10	1	-	1	-
4521	4521	Juglans nigra	Black Walnut	JUGNIGR	7	9	5	1	-	1	-
4522	4522	Juglans nigra	Black Walnut	JUGNIGR	13	12	9	3	-	1	-
4523	4523	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	1	EAB	3	-
4524	4524	Juglans nigra	Black Walnut	JUGNIGR	-	-	-	-	-	-	SAME AS 4525
4525	4525	Juglans nigra	Black Walnut	JUGNIGR	11	12	10	2	-	1	-
4526	4526	Juglans nigra	Black Walnut	JUGNIGR	12	10	8	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4527	4527	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	4	1	EAB, PB, D2, S2	4	-
4528	4528	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	4	1	EAB, PB, D2, S2	4	-
4529	4529	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	6	1	EAB	3	-
4530	4530	Acer negundo	Manitoba Maple	ACENEGU	19	15	12	3	RF-D, S1	3	-
4531	4531	Juglans nigra	Black Walnut	JUGNIGR	15	13	9	1	-	1	-
4532	4532	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	6	1	EAB, PB, D2, S2	4	-
4533	4533	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	4	1	EAB, PB, D2, S2	4	-
4534	4534	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	8	3	EAB	3	-
4535	4535	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4536	4536	Juglans nigra	Black Walnut	JUGNIGR	28	13	10	1	-	1	-
4537	4537	Amelanchier species	Serviceberry	AMEL SP.	3.5	4	3	2	-	1	-
4538	4538	Juglans cinerea	Butternut	JUGCINE	6	7	5	1	BB, S2, D2, BC	3	-
4539	4539	Juglans nigra	Black Walnut	JUGNIGR	9	8	8	6	-	1	-
4540	4540	Juglans nigra	Black Walnut	JUGNIGR	9	9	8	2	-	1	-
4541	4541	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
4542	4542	Juglans nigra	Black Walnut	JUGNIGR	8	6	5	1	BB, S1, D2	3	-
4543	4543	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	10	8	4	EAB, PB, D2, S2	4	-
4544	4544	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	8	3	EAB, PB, D2, S2	4	-
4545	4545	Acer negundo	Manitoba Maple	ACENEGU	4	5	3	1	E, D1, Le	2	-
4546	4546	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4547	4547	Juglans nigra	Black Walnut	JUGNIGR	3	4	3	2	-	1	-
4548	4548	Juglans nigra	Black Walnut	JUGNIGR	8	10	8	3	-	1	-
4549	4549	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	2	1	EAB, PB, D2, S2	4	-
4550	-	Not Found	-	-	-	-	-	-	-	-	-
4551	4551	Juglans nigra	Black Walnut	JUGNIGR	10	7	8	6	-	1	-
4552	4552	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	6	2	EAB, E	3	-
4553	4553	Juglans cinerea	Butternut	JUGCINE	3.5	3	4	2	-	1	-
4554	4554	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4555	4555	Acer negundo	Manitoba Maple	ACENEGU	4	5	3	1	Le	1	-
4556	4556	Juglans nigra	Black Walnut	JUGNIGR	4	4	3	1	-	1	-
4557	4557	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	6	7	EAB, D1, E	2	-
4558	4558	Juglans nigra	Black Walnut	JUGNIGR	7	9	8	6	-	1	-
4559	4559	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	7	4	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4560	4560	Juglans cinerea	Butternut	JUGCINE	5	5	6	1	D2, S2, BC	3	-
4561	4561	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB	3	-
4562	4562	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	2	1	EAB, PB, D2, S2	4	-
4563	4563	Amelanchier species	Serviceberry	AMEL SP.	4	6	3	1	-	1	-
4564	4564	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	12	10	2	EAB	3	-
4565	4565	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	6	1	EAB	3	-
4566	4566	Euonymus europaeus	Spindle	EUOEURO	5	8	7	9	FC, IB, BB, S1, FD	3	-
4567	4567	Juglans nigra	Black Walnut	JUGNIGR	5	6	4	2	-	1	-
4568	4568	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, E, PB, D3	4	-
4569	4569	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	2	1	EAB, D1, E	2	-
4570	4570	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	2	EAB, PB, D2, S2	4	-
4571	4571	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB	3	-
4572	4572	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4573	4573	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	9	4	1	EAB	3	-
4574	4574	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
4575	4575	Amelanchier species	Serviceberry	AMEL SP.	6	6	4	1	-	1	-
4576	4576	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	1	EAB	3	-
4577	4577	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, PB, D2, S2	4	-
4578	4578	Juglans cinerea	Butternut	JUGCINE	5	6	2	1	-	1	-
4579	4579	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	4	1	EAB, PB, D2, S2	4	-
4580	4580	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	EAB, PB, D2, S2	4	-
4581	4581	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	3	1	EAB, PB, D2, S2	4	-
4582	4582	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	2	1	EAB	3	-
4583	4583	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	EAB	3	-
4584	4584	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	2	1	EAB	2	-
4585	4585	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, PB, D2, S2	4	-
4586	4586	Acer negundo	Manitoba Maple	ACENEGU	3	4	3	1	Le	1	-
4587	4587	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	3	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4588	4588	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	1	EAB, PB, D2, S2	4	-
4589	4589	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	3	1	EAB, PB, D2, S2	4	-
4590	4590	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	EAB, PB, D2, S2	4	-
4591	4591	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	3	1	EAB, PB, D2, S2	4	-
duplicate	4591	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	5	1	EAB, S2	4	-
4592	4592	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	-	1	-
4593	4593	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	2	1	EAB, PB, D2, S2	4	-
4594	4594	Juglans nigra	Black Walnut	JUGNIGR	5	3	2	1	-	1	-
4595	4595	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, PB, D2, S2	4	-
4596	4596	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	4	2	EAB, PB, D2, S2	4	-
4597	4597	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	4	2	EAB, PB, D2, S2	4	-
4598	4598	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
4599	4599	Juglans nigra	Black Walnut	JUGNIGR	8	10	7	4	-	1	-
4600	4600	Juglans nigra	Black Walnut	JUGNIGR	5	5	5	3	-	1	-
4601	4601	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	EAB, PB, D2, S2	4	-
4602	4602	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	6	1	EAB	3	-
4603	4603	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	3	1	EAB	3	-
4604	4604	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	4	1	EAB, PB, D2, S2	4	-
4605	4605	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	EAB	2	-
4606	4606	Juglans nigra	Black Walnut	JUGNIGR	3	4	2	1	-	1	-
4607	4607	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	2	1	EAB, PB, D2, S2	4	-
4608	4608	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	2	EAB, PB, D2, S2	4	-
4609	4609	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, PB, D2, S2	4	-
4610	4610	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	EAB, PB, D2, S2	4	-
4611	4611	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, PB, D2, S2	4	-
4612	4612	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	7	3	1	EAB, PB, D2, S2	4	-
4613	4613	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, PB, D2, S2	4	-
4614	4614	Amelanchier species	Serviceberry	AMEL SP.	3	3	4	1	FD, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4615	4615	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, PB, D2, S2	4	-
4616	4616	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB	3	-
4617	4617	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	EAB	3	-
4618	4618	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	6	3	1	-	5	-
4619	4619	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	4	1	EAB, PB, D2, S2	4	-
4620	4620	Juglans nigra	Black Walnut	JUGNIGR	10	8	6	1	-	1	-
4621	4621	Juglans nigra	Black Walnut	JUGNIGR	9	8	6	3	-	1	-
4622	4622	Juglans nigra	Black Walnut	JUGNIGR	9	10	6	1	-	1	-
4623	4623	Acer ginnala	Amur Maple	ACEGINN	4	6	8	10	PB, S2, D1	3	-
4624	4624	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	8	3	1	-	1	-
4625	4625	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	2	1	EAB, PB, D2, S2	4	-
4626	4626	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	EAB, E, PB, D3	4	-
4627	4627	Juglans cinerea	Butternut	JUGCINE	4	4	3	1	-	1	-
4628	4628	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4629	4629	Juglans nigra	Black Walnut	JUGNIGR	7	6	8	3	-	1	-
4630	4630	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4631	4631	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	6	3	EAB	3	-
4632	4632	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	6	2	EAB	3	-
4633	4633	Juglans nigra	Black Walnut	JUGNIGR	7	6	6	2	-	1	-
4634	4634	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4635	4635	Juglans nigra	Black Walnut	JUGNIGR	5	5	6	3	-	1	-
4636	4636	Amelanchier species	Serviceberry	AMEL SP.	6	8	10	12	FD, S2, FC, BB	3	-
4637	4637	Ulmus americana	White Elm	ULMAMER	25	15	8	1	S1, FD, D1, PB	3	-
4638	4638	Amelanchier species	Serviceberry	AMEL SP.	9	8	8	13	-	2	
4639	-	Not Found	-	-	-	-	-	-	-	-	-
4640	4640	Juglans nigra	Black Walnut	JUGNIGR	20	10	12	2	FC, BB	3	-
4641	4641	Juglans nigra	Black Walnut	JUGNIGR	6	10	7	2	IB, BB	2	-
4642	4642	Juglans nigra	Black Walnut	JUGNIGR	6	5	6	2	-	1	-
4643	4643	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	4	3	-	1	-
4644	4644	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	2	-	1	-
4645	-	Not Found	-	-	-	-	-	-	-	-	-
4646	4646	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	4	4	7	EAB, D1	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4647	4647	Juglans nigra	Black Walnut	JUGNIGR	5	5	6	7	-	1	-
4648	4648	Juglans nigra	Black Walnut	JUGNIGR	5	6	6	4	-	1	-
4649	4649	Juglans nigra	Black Walnut	JUGNIGR	7	7	6	3	-	1	-
4650	4650	Juglans nigra	Black Walnut	JUGNIGR	5	5	4	2	-	1	-
4651	4651	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	8	2	EAB	3	-
4652	4652	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	7	6	EAB	3	-
4653	4653	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	5	4	EAB, PB, D2, S2	4	-
4654	4654	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	4	1	RF, D1	2	-
4655	4655	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	2	-	1	-
4656	4656	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	9	5	EAB	3	-
4657	4657	Juglans nigra	Black Walnut	JUGNIGR	4	4	5	2	-	1	-
4658	4658	Juglans nigra	Black Walnut	JUGNIGR	3	3	3	2	-	1	-
4659	4659	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	7	2	EAB	3	-
4660	4660	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	12	4	4	RF-D, EAB, D2, BB	4	-
4661	4661	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	11	5	2	EAB	3	-
4662	4662	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	6	4	3	EAB, PB, D2, S2	4	-
4663	4663	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	6	5	1	EAB	3	-
4664	4664	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	4	EAB	3	-
4665	4665	Fraxinus pennsylvanica	Green Ash	FRAPENN	19	12	8	1	EAB	3	-
4666	4666	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	5	1	EAB	3	-
4667	4667	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	11	8	2	EAB	3	-
4668	4668	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	7	4	1	EAB	3	-
4669	4669	Amelanchier species	Serviceberry	AMEL SP.	4	6	4	2	-	1	-
4670	4670	Amelanchier species	Serviceberry	AMEL SP.	5	6	4	1	-	1	-
4671	4671	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	2	-	1	-
4672	4672	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4673	4673	Ulmus americana	White Elm	ULMAMER	17	14	10	3	BB, T-P	3	-
4674	4674	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	4	1	S1	2	-
4675	4675	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	4	1	S1	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4676	4676	Juglans nigra	Black Walnut	JUGNIGR	10	7	5	1	-	1	-
4677	4677	Fraxinus pennsylvanica	Green Ash	FRAPENN	17	10	4	1	T-P, EAB, E	3	-
4678	4678	Quercus rubra	Red Oak	QUERUBR	16	8	5	1	-	1	-
4679	4679	Juglans nigra	Black Walnut	JUGNIGR	5	3	5	1	-	1	-
4680	4680	Pinus strobus	Eastern White Pine	PINSTRO	11	6	6	1	-	1	-
4681	4681	Picea glauca	White Spruce	PICGLAU	17	7	6	1	-	1	-
4682	4682	Picea glauca	White Spruce	PICGLAU	19	8	8	1	-	1	-
4683	4683	Picea glauca	White Spruce	PICGLAU	15	7	5	1	D3, NL	3	-
4684	4684	Ulmus species	Elm	ULMU SP.	6	5	4	2	-	1	-
4685	4685	Ulmus species	Elm	ULMU SP.	4	5	3	5	-	1	-
4686	4686	Pinus resinosa	Red Pine	PINRESI	20	10	7	1	-	1	-
4687	4687	Ulmus species	Elm	ULMU SP.	4	5	3	2	-	1	-
4688	4688	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	10	5	4	T-P, S1, PB, EAB	3	-
4689	4689	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	10	6	1	D1, EAB, PB, T-P, S1	4	-
4690	4690	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	6	1	EAB, E, PB, D3	4	-
4691	4691	Ulmus pumila	Siberian Elm	ULMPUMI	23.5	18	10	2	T-P, BB, E, S1	3	-
4692	4692	Ulmus americana	White Elm	ULMAMER	20	12	8	2	D1	2	-
4693	4693	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	6	4	EAB, E, NL, D2	3	-
4694	4694	Acer ginnala	Amur Maple	ACEGINN	5	7	2	1	-	1	-
4695	4695	Pinus resinosa	Red Pine	PINRESI	23	15	9	1	-	1	-
4696	4696	Pinus resinosa	Red Pine	PINRESI	23	13	9	1	-	1	-
4697	4697	Pinus resinosa	Red Pine	PINRESI	23	13	9	1	T-P, Eq	2	-
4698	4698	Pinus resinosa	Red Pine	PINRESI	20	13	9	1	-	1	-
4699	4699	Pinus resinosa	Red Pine	PINRESI	26	12	10	1	-	1	-
4700	4700	Ulmus species	Elm	ULMU SP.	6	7	4	2	-	1	-
4701	4701	Ulmus species	Elm	ULMU SP.	8	6	3	1	-	1	-
4702	4702	Ulmus species	Elm	ULMU SP.	3	3	3	3	-	1	-
4703	4703	Ulmus species	Elm	ULMU SP.	3	3	2	1	-	1	-
4704	4704	Ulmus species	Elm	ULMU SP.	5	4	3	1	-	1	-
4705	4705	Pinus resinosa	Red Pine	PINRESI	12	8	8	1	-	1	-
4706	4706	Pinus strobus	Eastern White Pine	PINSTRO	19	12	10	1	D1, T-P	2	-
4707	4707	Pinus strobus	Eastern White Pine	PINSTRO	22	12	10	1	T-P	2	-
4708	4708	Pinus strobus	Eastern White Pine	PINSTRO	20	10	8	1	-	1	-
4709	4709	Pinus resinosa	Red Pine	PINRESI	13	8	7	1	D1	2	-
4710	4710	Pinus resinosa	Red Pine	PINRESI	19	8	5	1	D1	1	-
4711	4711	Fraxinus nigra	Black Ash	FRANIGR	15	10	6	1	EAB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4712	4712	Fraxinus pennsylvanica	Green Ash	FRAPENN	20	10	6	1	EAB, FC, PB	2	-
4713	4713	Acer platanoides	Norway Maple	ACEPLAT	16	9	8	1	-	1	-
4714	4714	Rhamnus cathartica	Common Buckthorn	RHACATH	4	-	-	-	-	-	-
4715	4715	Quercus rubra	Red Oak	QUERUBR	15	11	12	2	EAB	3	-
4716	4716	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4717	4717	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4718	4718	Acer ginnala	Amur Maple	ACEGINN	8	10	7	6	D1, BB, PB	2	-
4719	4719	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-
4720	4720	Juglans nigra	Black Walnut	JUGNIGR	3	3	2	2	E, T-P, BB	2	-
4721	4721	Juglans nigra	Black Walnut	JUGNIGR	4	4	4	1	-	1	-
4722	4722	Pinus banksiana	Jack Pine	PINBANK	33	15	12	1	-	1	-
4723	4723	Picea abies	Norway Spruce	PICABIE	19	15	12	3	-	1	-
4724	4724	Picea abies	Norway Spruce	PICABIE	6	6	4	1	-	1	-
4725	4725	Picea abies	Norway Spruce	PICABIE	22	9	3	1	-	1	-
4726	4726	Picea abies	Norway Spruce	PICABIE	16	10	3	1	-	1	-
4727	4727	Picea abies	Norway Spruce	PICABIE	14	10	8	2	-	1	-
4728	4728	Picea abies	Norway Spruce	PICABIE	10	10	3	2	-	1	-
4729	4729	Picea abies	Norway Spruce	PICABIE	24	10	3	1	-	1	-
4730	4730	Picea abies	Norway Spruce	PICABIE	12	9	3	2	D1	2	-
4731	4731	Picea abies	Norway Spruce	PICABIE	10	9	3	2	-	1	-
4732	4732	Picea abies	Norway Spruce	PICABIE	26	10	6	1	-	1	-
4733	4733	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4734	4734	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4735	4735	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4736	4736	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4737	4737	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4738	4738	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4739	4739	Juglans nigra	Black Walnut	JUGNIGR	4	5	5	1	-	1	-
4740	4740	Juglans nigra	Black Walnut	JUGNIGR	3	3	2	2	BB, S1	2	-
4741	4741	Acer rubrum	Red Maple	ACERUBR	30	15	12	5	T-P	2	-
4742	4742	Fraxinus pennsylvanica	Green Ash	FRAPENN	42	9	8	1	EAB, PB	3	-
4743	4743	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4744	4744	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4745	4745	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4746	4746	Picea abies	Norway Spruce	PICABIE	12	10	3	1	-	1	-
4747	4747	Picea abies	Norway Spruce	PICABIE	12	10	3	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4748	4748	Picea abies	Norway Spruce	PICABIE	22	9	5	1	-	1	
4749	4749	Malus species	Crabapple	MALU SP.	8	7	6	7	BB, D1	2	-
4750	4750	Pinus sylvestris	Scots Pine	PINSYLV	29	12	6	1	-	1	-
4751	4751	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4752	4752	Pinus sylvestris	Scots Pine	PINSYLV	42	18	8	1	D3	4	-
4753	4753	Acer negundo	Manitoba Maple	ACENEGU	8	8	5	2	S2, T-P, FC, E	3	-
4754	4754	Prunus serotina	Black Cherry	PRUSERO	5	6	4	1	T-P, S1	2	-
4755	4755	Acer ginnala	Amur Maple	ACEGINN	6	7	6	10	-	1	-
4756	4756	Picea glauca	White Spruce	PICGLAU	15	10	6	2	IB, T-P, Co, S1, D1	2	-
4757	4757	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4758	4758	Picea glauca	White Spruce	PICGLAU	14	7	6	1	T-P, S1, D1	3	-
4759	4759	Picea glauca	White Spruce	PICGLAU	14	7	6	1	T-P, S1, D1	3	-
4760	4760	Pinus sylvestris	Scots Pine	PINSYLV	45	12	10	1	T-P, D1	2	-
4761	4761	Sorbus decora	Showy Mountain Ash	SORDECO	9.5	10	4	2	S1, D1	2	
4762	4762	Prunus serotina	Black Cherry	PRUSERO	3.5	5	4	3	D2, FD	3	-
4763	4763	Pinus sylvestris	Scots Pine	PINSYLV	32	16	10	1	T-P, BB	2	-
4764	4764	Prunus species	Cherry	PRUN SP.	5	8	5	3	FD	3	-
4765	4765	Sorbus decora	Showy Mountain Ash	SORDECO	15	8	5	1	S1, PB	2	-
4766	4766	Pinus sylvestris	Scots Pine	PINSYLV	33	18	6	1	T-P, D2	3	-
4767	4767	Prunus species	Cherry	PRUN SP.	7	9	3	1	-	1	-
4768	4768	Euonymus europaeus	Spindle	EUOEURO	3.5	5	4	2	-	1	-
4769	4769	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	5	2	EAB	3	-
4770	4770	Pinus sylvestris	Scots Pine	PINSYLV	43	15	7	1	D2, PB	2	-
4771	4771	Euonymus europaeus	Spindle	EUOEURO	3	4	2	1	-	1	-
4772	4772	Euonymus europaeus	Spindle	EUOEURO	5	6	4	2	-	1	-
4773	4773	Pinus sylvestris	Scots Pine	PINSYLV	39	15	12	1	D2, PB	2	-
4774	4774	Picea glauca	White Spruce	PICGLAU	3	3	3	3	-	1	-
4775	4775	Picea glauca	White Spruce	PICGLAU	29	12	10	1	-	1	-
4776	4776	Picea glauca	White Spruce	PICGLAU	17	7	6	1	-	1	-
4777	4777	Syringa vulgaris	Common Lilac	SYRVULG	4	4	4	5	-	1	-
4778	4778	Syringa vulgaris	Common Lilac	SYRVULG	3	4	3	1	-	1	-
4779	4779	Syringa vulgaris	Common Lilac	SYRVULG	3	4	4	3	-	1	-
4780	4780	Syringa vulgaris	Common Lilac	SYRVULG	TS	-	-	-	-	-	-
4781	4781	Syringa vulgaris	Common Lilac	SYRVULG	3	4	4	6	-	1	-
4782	4782	Acer rubrum	Red Maple	ACERUBR	25	13	9	1	T-P	2	-
4783	4783	Gleditsia triacanthos	Honey Locust	GLETRIA	17	11	10	1	-	1	-
4784	4784	Populus deltoides	Eastern Cottonwood	POPDEDE	3	4	2	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4785	4785	Populus deltoides	Eastern Cottonwood	POPDEDE	4	5	2	1	-	1	-
4786	4786	Gleditsia triacanthos	Honey Locust	GLETRIA	21	10	8	1	-	1	-
4787	4787	Picea glauca	White Spruce	PICGLAU	29	13	8	1	-	1	-
4788	4788	Pinus strobus	Eastern White Pine	PINSTRO	24	13	10	1	-	1	-
4789	4789	Picea glauca	White Spruce	PICGLAU	24	13	10	1	-	1	-
4790	4790	Picea glauca	White Spruce	PICGLAU	17	10	6	1	T-P, S1	2	-
4791	4791	Picea glauca	White Spruce	PICGLAU	29	12	10	1	T-P	2	-
4792	4792	Populus deltoides	Eastern Cottonwood	POPDEDE	30	13	-	1	TT, NL, T-P, BB	4	-
4793	4793	Populus deltoides	Eastern Cottonwood	POPDEDE	30	8	-	1	TT, NL, T-P, BB	4	-
4794	4794	Acer ginnala	Amur Maple	ACEGINN	13	8	5	2	T-P, FC, D2	3	-
4795	4795	Populus deltoides	Eastern Cottonwood	POPDEDE	7	8	2	1	-	1	-
4796	4796	Populus deltoides	Eastern Cottonwood	POPDEDE	7	8	2	1	-	1	-
4797	4797	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	10	-	-	-	-	-	-
4798	4798	Picea glauca	White Spruce	PICGLAU	16	8	8	1	T-P, D1	2	-
4799	4799	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	3	-	-	-	-	-	-
4800	4800	Malus species	Crabapple	MALU SP.	10	8	4	2	T-P, BB, S1	2	-
4801	4801	Acer rubrum	Red Maple	ACERUBR	31	15	10	1	Co, E, RF-D, BB	4	-
4802	4802	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4803	4803	Acer rubrum	Red Maple	ACERUBR	25.5	15	10	2	IB, S1, PB	2	-
4804	4804	Acer rubrum	Red Maple	ACERUBR	58	16	10	1	IB, Ca, T-P	2	-
4805	4805	Acer rubrum	Red Maple	ACERUBR	34	16	12	2	-	1	-
4806	4806	Thuja occidentalis	Eastern White Cedar	THUOCCI	9	7	4	1	-	1	-
4807	4807	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	3	2	1	-	1	-
4808	4808	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4809	4809	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	2	1	-	1	-
4810	4810	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4811	4811	Salix fragilis	Crack Willow	SALFRAG	3	4	4	1	-	1	-
4812	4812	Picea pungens	Colorado Blue Spruce	PICPUNG	19	11	8	1	-	1	-
4813	4813	Picea abies	Norway Spruce	PICABIE	16	11	10	1	-	1	-
4814	4814	Acer platanoides	Norway Maple	ACEPLAT	8	6	4	1	T-P	2	-
4815	4815	Acer saccharum	Sugar Maple	ACESASA	5	6	3	1	-	1	-
4816	4816	Quercus macrocarpa	Bur Oak	QUEMACR	8	5	4	1	-	1	-
4817	4817	Acer platanoides	Norway Maple	ACEPLAT	7	6	4	1	T-P	2	-
4818	4818	Acer saccharum	Sugar Maple	ACESASA	5	5	4	1	-	1	-
4819	4819	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
4820	4820	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
4821	4821	Ulmus pumila	Siberian Elm	ULMPUMI	8	7	4	2	1	-	SAME AS 9300
4822	4822	Ulmus pumila	Siberian Elm	ULMPUMI	12	7	4	1	-	1	SAME AS 9301

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4823	4823	Quercus species	Oak	QUER SP.	8	5	3	1	-	1	SAME AS 9302
4824	4824	Quercus macrocarpa	Bur Oak	QUEMACR	5	4.5	2.5	1	-	1	-
4825	4825	Acer saccharum	Sugar Maple	ACESASA	6	5	2.5	1	-	1	-
4826	4826	Pinus strobus	Eastern White Pine	PINSTRO	TS	-	-	-	-	-	-
4827	4827	Pinus strobus	Eastern White Pine	PINSTRO	TS	-	-	-	-	-	-
4828	4828	Quercus macrocarpa	Bur Oak	QUEMACR	5	4	2.5	1	-	1	-
4829	4829	Acer saccharum	Sugar Maple	ACESASA	6	4	3	1	-	1	-
4830	4830	Pinus strobus	Eastern White Pine	PINSTRO	TS	-	-	-	-	-	-
4831	4831	Celtis occidentalis	Hackberry	CELOCCI	4	3.5	1.5	1	NL	2	-
4832	4832	Acer saccharum	Sugar Maple	ACESASA	5	7	3	1	-	1	-
4833	4833	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	5	10	EAB, E, PB, D3	4	-
4834	4834	Quercus macrocarpa	Bur Oak	QUEMACR	5	4.5	2	1	-	1	-
4835	4835	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
4836	4836	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4837	4837	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	10	7	EAB, E, PB, D3	4	-
4838	4838	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4839	4839	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	7	3	EAB, E, PB, D3	4	-
4840	4840	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4841	4841	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
4842	4842	Acer negundo	Manitoba Maple	ACENEGU	8	6	4	1	-	1	-
4843	4843	Acer ginnala	Amur Maple	ACEGINN	TS	-	-	-	-	-	-
4844	4844	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4845	4845	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4846	4846	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4847	4847	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4848	4848	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	6	6	EAB, E, PB, D3	4	-
4849	4849	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	9	3	EAB, E	3	-
4850	4850	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	7	4	EAB, E, PB, D3	4	-
4851	4851	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4852	4852	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4853	4853	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4854	4854	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4855	4855	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4856	4856	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	-	1	-
4857	4857	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
4858	4858	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
4859	4859	Amelanchier species	Serviceberry	AMEL SP.	3	3	4	1	FD, BB	2	-
4860	4860	Quercus macrocarpa	Bur Oak	QUEMACR	4	4.5	1.5	1	-	1	-
4861	4861	Acer saccharum	Sugar Maple	ACESASA	5.5	6	2	1	-	1	-
4862	4862	Pinus strobus	Eastern White Pine	PINSTRO	3	4.5	2	1	S1,D1	2	-
4863	4863	Pinus strobus	Eastern White Pine	PINSTRO	3	4	2	1	-	1	-
4864	4864	Picea abies	Norway Spruce	PICABIE	18	8	8	1	-	1	-
4865	4865	Juglans nigra	Black Walnut	JUGNIGR	5.5	4	5	6	-	1	-
4866	4866	Juglans nigra	Black Walnut	JUGNIGR	3	3	4	3	-	1	-
4867	4867	Juglans cinerea	Butternut	JUGCINE	3	3	4	2	FC	2	-
4868	4868	Pinus resinosa	Red Pine	PINRESI	51	10	10	1	-	1	-
4869	4869	Pinus resinosa	Red Pine	PINRESI	29	11	10	1	-	1	-
4870	4870	Pinus resinosa	Red Pine	PINRESI	27	10	8	1	-	1	-
4871	4871	Pinus resinosa	Red Pine	PINRESI	26	8	8	1	-	1	-
4872	4872	Pinus resinosa	Red Pine	PINRESI	17	9	8	2	-	1	-
4873	4873	Pinus resinosa	Red Pine	PINRESI	27	9	8	1	-	1	-
4874	4874	Pinus resinosa	Red Pine	PINRESI	33	10	10	1	-	1	-
4875	4875	Pinus resinosa	Red Pine	PINRESI	30	9	8	1	-	1	-
4876	4876	Pinus resinosa	Red Pine	PINRESI	27	8	7	1	-	1	-
4877	4877	Pinus resinosa	Red Pine	PINRESI	35	10	9	1	-	1	-
4878	4878	Pinus resinosa	Red Pine	PINRESI	34	9	10	1	-	1	-
4879	4879	Pinus resinosa	Red Pine	PINRESI	37	9	10	1	-	1	-
4880	4880	Pinus resinosa	Red Pine	PINRESI	35	8	8	1	-	1	-
4881	4881	Pinus resinosa	Red Pine	PINRESI	34	10	10	1	-	1	-
4882	4882	Pinus resinosa	Red Pine	PINRESI	29	8	9	1	Le	1	-
4883	4883	Pinus resinosa	Red Pine	PINRESI	32	8	9	1	-	1	-
4884	4884	Pinus resinosa	Red Pine	PINRESI	55	10	10	1	-	1	-
4885	4885	Pinus resinosa	Red Pine	PINRESI	26	9	7	2	D1	2	-
4886	4886	Pinus resinosa	Red Pine	PINRESI	40	9	8	1	-	1	-
4887	4887	Pinus resinosa	Red Pine	PINRESI	33	7	10	1	-	1	-
4888	4888	Juglans nigra	Black Walnut	JUGNIGR	6	6	6	6	-	1	-
4889	4889	Juglans nigra	Black Walnut	JUGNIGR	4	4	6	3	-	1	-
4890	4890	Juglans nigra	Black Walnut	JUGNIGR	5	5	6	3	-	1	-
4891	4891	Juglans nigra	Black Walnut	JUGNIGR	TS	-	-	-	-	-	-
4892	4892	Picea abies	Norway Spruce	PICABIE	20	8	9	1	-	1	-
4893	4893	Pinus banksiana	Jack Pine	PINBANK	6	4	4	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4894	4894	Pinus banksiana	Jack Pine	PINBANK	8	5	4	1	-	1	-
4895	4895	Pinus sylvestris	Scots Pine	PINSYLV	3	3	5	3	-	1	-
4896	4896	Pinus banksiana	Jack Pine	PINBANK	8	4	5	1	-	1	-
4897	4897	Pinus banksiana	Jack Pine	PINBANK	7	4	4	1	-	1	-
4898	4898	Pinus banksiana	Jack Pine	PINBANK	7	5	4	1	-	1	-
4899	4899	Pinus banksiana	Jack Pine	PINBANK	7	4	4	1	-	1	-
4900	4900	Pinus banksiana	Jack Pine	PINBANK	8	5	4	1	-	1	-
4901	4901	Pinus banksiana	Jack Pine	PINBANK	8	4	4	1	-	1	-
4902	4902	Pinus banksiana	Jack Pine	PINBANK	7	4	5	1	-	1	-
4903	4903	Pinus sylvestris	Scots Pine	PINSYLV	7	4	4	1	-	1	-
4904	4904	Pinus banksiana	Jack Pine	PINBANK	9	6	5	1	-	1	-
4905	4905	Pinus banksiana	Jack Pine	PINBANK	7	5	4	1	-	1	-
4906	4906	Juglans nigra	Black Walnut	JUGNIGR	4	4	5	6	-	1	-
4907	4907	Juglans nigra	Black Walnut	JUGNIGR	4	4	5	9	-	1	-
4908	4908	Juglans nigra	Black Walnut	JUGNIGR	4	3	4	3	-	1	-
4909	4909	Juglans nigra	Black Walnut	JUGNIGR	8	4	6	2	-	1	-
4910	4910	Juglans nigra	Black Walnut	JUGNIGR	6	6	6	3	-	1	-
4911	4911	Pinus resinosa	Red Pine	PINRESI	13	4	5	3	-	1	-
4912	4912	Pinus resinosa	Red Pine	PINRESI	30	5	8	1	BB	2	-
4913	4913	Pinus resinosa	Red Pine	PINRESI	25	7	7	1	-	1	-
4914	4914	Pinus resinosa	Red Pine	PINRESI	20	6	7	1	D2	2	-
4915	4915	Pinus resinosa	Red Pine	PINRESI	38	8	7	1	-	1	-
4916	4916	Pinus resinosa	Red Pine	PINRESI	31	9	8	1	-	1	-
4917	4917	Pinus resinosa	Red Pine	PINRESI	28	9	8	1	-	1	-
4918	4918	Pinus resinosa	Red Pine	PINRESI	30	8	7	1	-	1	-
4919	4919	Pinus resinosa	Red Pine	PINRESI	23	7	6	1	-	1	-
4920	4920	Pinus resinosa	Red Pine	PINRESI	21	7	6	2	-	1	-
4921	4921	Pinus resinosa	Red Pine	PINRESI	27	8	6	1	-	1	-
4922	4922	Pinus resinosa	Red Pine	PINRESI	28	8	7	1	-	1	-
4923	4923	Pinus resinosa	Red Pine	PINRESI	30	8	7	1	-	1	-
4924	4924	Pinus resinosa	Red Pine	PINRESI	28	8	7	1	-	1	-
4925	4925	Pinus resinosa	Red Pine	PINRESI	30	9	8	1	-	1	-
4926	4926	Pinus resinosa	Red Pine	PINRESI	30	10	8	1	-	1	-
4927	4927	Pinus resinosa	Red Pine	PINRESI	27	9	8	1	-	1	-
4928	4928	Pinus resinosa	Red Pine	PINRESI	32	8	7	1	T-P, D1	2	-
4932	4932	Pinus resinosa	Red Pine	PINRESI	18	6	7	1	-	1	-
4933	4933	Pinus resinosa	Red Pine	PINRESI	18	7	7	1	-	1	-
4934	4934	Pinus resinosa	Red Pine	PINRESI	20	7	7	1	-	1	-
4935	4935	Pinus resinosa	Red Pine	PINRESI	15	5	6	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
4936	4936	Pinus resinosa	Red Pine	PINRESI	16	5	5	1	-	1	-
4937	4937	Pinus resinosa	Red Pine	PINRESI	17	4	5	1	-	1	-
4938	4938	Pinus resinosa	Red Pine	PINRESI	17	7	7	1	-	1	-
4939	4939	Pinus resinosa	Red Pine	PINRESI	17	6	7	1	-	1	-
4940	4940	Pinus resinosa	Red Pine	PINRESI	17	7	7	1	-	1	-
4941	4941	Pinus resinosa	Red Pine	PINRESI	20	7	6	1	-	1	-
4942	4942	Pinus resinosa	Red Pine	PINRESI	22	8	8	1	-	1	-
4943	4943	Pinus resinosa	Red Pine	PINRESI	22	9	10	1	-	1	-
4944	4944	Ulmus americana	White Elm	ULMAMER	25	20	12	1	-	1	-
4945	4945	Quercus macrocarpa	Bur Oak	QUEMACR	23	10	7	1	FC	1	-
4946	4946	Quercus macrocarpa	Bur Oak	QUEMACR	23	9	7	1	E	1	-
4947	4947	Picea abies	Norway Spruce	PICABIE	20	9	9	1	-	1	-
4948	4948	Picea abies	Norway Spruce	PICABIE	20	9	9	1	-	1	-
5000	5000	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5001	5001	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5002	5002	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5003	5003	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5004	5004	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5005	5005	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	8	4	EAB, E, PB, D3	4	-
5006	5006	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	11	6	4	EAB, E	3	-
5007	5007	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	4	3	EAB, E, PB, D3	4	-
5008	5008	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5009	5009	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5010	5010	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5011	5011	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	12	5	1	EAB, E, PB, D3	4	-
5012	5012	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	13	7	1	E, EAB	3	-
5013	5013	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5014	5014	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5015	5015	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5016	5016	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
5017	5017	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	8	5	EAB, E, PB, D3	4	-
5018	5018	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5019	5019	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	4	2	EAB, E, PB, D3	4	-
5020	5020	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5021	5021	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5022	5022	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5023	5023	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5024	5024	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5025	5025	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5026	5026	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5027	5027	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5028	5028	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5029	5029	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5030	5030	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5031	5031	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5032	5032	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5033	5033	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5034	5034	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5035	5035	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	7	2	BB, PB, D2, EAB	3	-
5036	-	Not Found	-	-	-	-	-	-	-	-	-
5037	5037	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5038	5038	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5039	5039	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5040	5040	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5041	5041	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5042	5042	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5043	5043	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5044	5044	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5045	-	Not Found	-	-	-	-	-	-	-	-	-
5046	5046	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5047	5047	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5048	5048	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5049	5049	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	9	4	1	EAB, E	3	-
5050	5050	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	9	3	1	EAB, E, PB, D3	4	-
5051	5051	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	8	5	2	EAB, E	3	-
5052	5052	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	2	EAB, E	3	-
5053	5053	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5054	5054	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	6	4	EAB, E, PB, D3	4	-
5055	5055	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	6	4	EAB, E, PB, D3	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5056	5056	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5057	5057	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5058	5058	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	11	7	3	EAB, E, PB, D3	4	-
5059	5059	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	7	4	EAB, E, PB, D3	4	-
5060	5060	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5061	5061	Acer ginnala	Amur Maple	ACEGINN	6	7	8	10	D2, E, BB	3	-
5062	5062	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5063	5063	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5064	5064	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5065	-	Not Found	-	-	-	-	-	-	-	-	-
5066	5066	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5067	5067	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5068	5068	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	9	4	EAB, E, PB, D3	4	-
5069	5069	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5070	5070	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5071	5071	Fraxinus pennsylvanica	Green Ash	FRAPENN	13.5	10	9	3	D2, E, S2	3	-
5072	5072	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	3	2	EAB, S2	3	-
5073	5073	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5074	5074	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5075	5075	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5076	5076	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
5077	5077	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5078	5078	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	8	3	EAB, E, PB, D3	4	-
5079	5079	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-
5080	5080	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-
5081	5081	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5082	5082	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5083	5083	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5084	5084	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5085	5085	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5086	5086	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5087	5087	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5088	5088	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5089	5089	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5090	5090	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5091	5091	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5092	5092	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5093	5093	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5094	5094	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	11	7	10	EAB, E, PB, D3	4	-
5095	5095	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5096	5096	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5097	5097	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	4	1	EAB, E	3	-
5098	5098	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5099	5099	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5100	5100	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5101	5101	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5102	5102	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5103	5103	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5104	5104	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5105	5105	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5106	5106	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5107	5107	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5108	5108	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5109	5109	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5110	5110	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5111	5111	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	4	2	EAB, E, BB	3	-
5112	5112	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	7	4	EAB, E, PB, S2, D2	3	-
5113	5113	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5114	5114	Fraxinus pennsylvanica	Green Ash	FRAPENN	23	14	7	1	EAB, S1, PB	2	-
5115	5115	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5116	5116	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5117	5117	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5118	5118	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5119	5119	Acer ginnala	Amur Maple	ACEGINN	9	8	10	10	S1, D1	2	-
5120	5120	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5121	5121	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5122	5122	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5123	5123	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5124	5124	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5125	5125	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5126	5126	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5127	5127	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5128	5128	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5129	5129	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5130	5130	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	4	2	EAB, S2, BB, D2	3	-
5131	5131	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
duplicate	5131	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5132	5132	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	6	2	EAB, E, PB, D3	4	-
5133	5133	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5134	5134	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5135	5135	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5136	5136	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5137	5137	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5138	5138	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5139	5139	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5140	5140	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5150	5150	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5151	5151	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5152	5152	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5153	5153	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5154	5154	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5155	5155	Tsuga canadensis	Eastern Hemlock	TSUCANA	3.5	3	3	1	-	1	-
5156	5156	Pinus strobus	Eastern White Pine	PINSTRO	9	7	6	1	-	1	-
5157	5157	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5158	5158	Pinus strobus	Eastern White Pine	PINSTRO	9.5	8	5	1	-	1	-
5159	5159	Picea pungens	Colorado Blue Spruce	PICPUNG	7	5	3	1	-	1	-
5160	5160	Tsuga canadensis	Eastern Hemlock	TSUCANA	TS	-	-	-	-	-	-
5161	5161	Picea pungens	Colorado Blue Spruce	PICPUNG	4	5	4	1	-	1	-
5162	5162	Pinus strobus	Eastern White Pine	PINSTRO	5	5	5	3	-	1	-
5163	5163	Pinus strobus	Eastern White Pine	PINSTRO	7	7	5	1	-	1	-
5164	5164	Pinus strobus	Eastern White Pine	PINSTRO	10	7	6	1	-	1	-
5165	5165	Pinus strobus	Eastern White Pine	PINSTRO	9.5	5	5	1	-	1	-
5166	5166	Pinus strobus	Eastern White Pine	PINSTRO	6.5	6	5	1	-	1	-
5167	5167	Tsuga canadensis	Eastern Hemlock	TSUCANA	4.5	4	4	1	-	1	-
5168	5168	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5169	5169	Acer negundo	Manitoba Maple	ACENEGU	16.5	8	7	2	S1, RF-D, BB	3	-
5170	5170	Larix species	Larch	LARI SP.	5	4	4	1	-	1	-
5171	5171	Larix species	Larch	LARI SP.	TS	-	-	1	-	-	-
5172	5172	Larix species	Larch	LARI SP.	5	5	4	1	-	-	-
5173	5173	Larix species	Larch	LARI SP.	7	6	5	1	FC	2	-
5174	5174	Larix species	Larch	LARI SP.	4	6	4	1	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5175	5175	Larix species	Larch	LARI SP.	6	5	4	1	-	-	-
5176	5176	Pinus strobus	Eastern White Pine	PINSTRO	7.5	6	4	1	-	-	-
5177	5177	Pinus strobus	Eastern White Pine	PINSTRO	8.5	7	5	1	-	-	-
5178	5178	Pinus strobus	Eastern White Pine	PINSTRO	9	6	5	2	-	1	-
5179	5179	Pinus strobus	Eastern White Pine	PINSTRO	8	6	5	1	-	-	-
5180	5180	Picea pungens	Colorado Blue Spruce	PICPUNG	6	6	4	1	D2, BB, V	3	-
5181	5181	Picea pungens	Colorado Blue Spruce	PICPUNG	6.5	6	3	1	-	1	-
5182	-	Not Found	-	-	-	-	-	-	-	-	-
5183	5183	Picea glauca	White Spruce	PICGLAU	5	5	3	1	D2, BB, V	3	-
5184	5184	Picea pungens	Colorado Blue Spruce	PICPUNG	7	5	3.5	1	D1, BB, V	2	-
5185	5185	Picea pungens	Colorado Blue Spruce	PICPUNG	6	7	4	1	D2, BB	3	-
5186	5186	Picea pungens	Colorado Blue Spruce	PICPUNG	5	5	3	1	D1	2	-
5187	5187	Picea pungens	Colorado Blue Spruce	PICPUNG	7	7	4	1	-	1	-
5188	5188	Picea pungens	Colorado Blue Spruce	PICPUNG	5	4	3	1	D2, BB	3	-
5189	5189	Populus species	Poplar	POPU SP.	7	6	3	1	-	1	-
5190	5190	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5191	5191	Ulmus americana	White Elm	ULMAMER	5.5	7	4	2	-	1	-
5192	5192	Pinus strobus	Eastern White Pine	PINSTRO	-	-	-	-	-	5	-
5193	5193	Pinus strobus	Eastern White Pine	PINSTRO	10	6	5	2	-	1	-
5194	5194	Pinus strobus	Eastern White Pine	PINSTRO	12.5	7	7	1	-	1	-
5195	5195	Pinus strobus	Eastern White Pine	PINSTRO	6.5	6	6	1	-	1	-
5196	5196	Pinus strobus	Eastern White Pine	PINSTRO	12	7	6	1	-	1	-
5197	5197	Pinus strobus	Eastern White Pine	PINSTRO	9	6	5	1	-	1	-
5198	5198	Picea glauca	White Spruce	PICGLAU	9	7	5	1	-	1	-
5199	5199	Acer negundo	Manitoba Maple	ACENEGU	5	6	3	1	-	1	-
5200	5200	Picea glauca	White Spruce	PICGLAU	5	4	3	1	-	1	-
5201	5201	Picea pungens	Colorado Blue Spruce	PICPUNG	8.5	5	4	1	-	1	-
5202	5202	Picea pungens	Colorado Blue Spruce	PICPUNG	10	6	4	1	-	1	-
5203	5203	Picea pungens	Colorado Blue Spruce	PICPUNG	7.5	5	4	1	-	1	-
duplicate	5203	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5204	5204	Picea pungens	Colorado Blue Spruce	PICPUNG	9.5	7	6	1	-	1	-
5205	5205	Picea glauca	White Spruce	PICGLAU	5	4	3	1	-	1	-
5206	5206	Picea pungens	Colorado Blue Spruce	PICPUNG	8	6	4	1	-	1	-
5207	5207	Picea pungens	Colorado Blue Spruce	PICPUNG	9	7	4	1	-	1	-
5208	5208	Picea pungens	Colorado Blue Spruce	PICPUNG	9.5	7	6	1	-	1	-
5209	5209	Picea pungens	Colorado Blue Spruce	PICPUNG	9	6	6	1	-	1	-
5210	5210	Picea glauca	White Spruce	PICGLAU	9.5	7	6	1	-	1	-
5211	5211	Quercus macrocarpa	Bur Oak	QUEMACR	5	3	2	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5212	5212	Pinus strobus	Eastern White Pine	PINSTRO	13.5	6	6	1	-	1	-
5213	5213	Pinus strobus	Eastern White Pine	PINSTRO	10	7	5	1	-	1	-
5214	5214	Pinus strobus	Eastern White Pine	PINSTRO	11	7	6	1	-	1	-
5215	5215	Tsuga canadensis	Eastern Hemlock	TSUCANA	3.5	3	3	1	-	1	-
5216	5216	Tsuga canadensis	Eastern Hemlock	TSUCANA	4	4	4	1	-	1	-
5217	5217	Tsuga canadensis	Eastern Hemlock	TSUCANA	4	3	3	1	TT, D2	3	-
5218	5218	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5219	5219	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5220	5220	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5221	5221	Pinus strobus	Eastern White Pine	PINSTRO	TS	-	-	-	-	-	-
5222	5222	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5223	5223	Pinus strobus	Eastern White Pine	PINSTRO	TS	-	-	-	-	-	-
5224	5224	Pinus strobus	Eastern White Pine	PINSTRO	5	5	3	1	-	1	-
5225	5225	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5226	5226	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5227	5227	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5228	5228	Pinus banksiana	Jack Pine	PINBANK	TS	-	-	-	-	-	-
5229	5229	Pinus strobus	Eastern White Pine	PINSTRO	TS	-	-	-	-	-	-
5230	5230	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	5	2	Le, E	2	-
5231	5231	Acer negundo	Manitoba Maple	ACENEGU	5.5	9	4	1	-	1	-
5232	5232	Ulmus americana	White Elm	ULMAMER	36	15	10	1	IB, D1	2	-
5233	5233	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5234	5234	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5235	5235	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	10	9	2	EAB, PB, D2, S2	4	-
5236	5236	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5237	5237	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5238	5238	Syringa reticulata	Silk Lilac	SYRRETI	4.5	6	3	3	S2, BB	2	-
5239	5239	Acer negundo	Manitoba Maple	ACENEGU	24	16	9	1	T-P, D1	2	-
5240	5240	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	4	EAB, PB, D2, S2	4	-
5241	5241	Acer ginnala	Amur Maple	ACEGINN	3	3	4	1	Le, BB	2	-
duplicate	5241	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	11	6	3	EAB, E, PB, D3	4	-
5242	5242	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	4	1	EAB, E, PB, D3	4	-
5243	5243	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5244	5244	Juglans nigra	Black Walnut	JUGNIGR	5	6	5	2	D2, S2, BB, PB	3	-
5245	5245	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	3	EAB, E	3	
5246	5246	Acer ginnala	Amur Maple	ACEGINN	3.5	3	3	1	Le, E	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5247	5247	Acer negundo	Manitoba Maple	ACENEGU	6	8	3	1	-	1	-
5248	5248	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5249	5249	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5250	5250	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5251	5251	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5252	5252	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	8	4	EAB, E, PB, D3	4	-
5253	5253	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	13	5	3	EAB, E, PB, D3	4	-
5254	5254	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5255	5255	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	14	5	3	EAB, PB, S2, D1	3	-
5256	5256	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	5	2	EAB, PB, S2, D1	3	-
5257	-	Not Found	-	-	-	-	-	-	-	-	-
5258	5258	Acer negundo	Manitoba Maple	ACENEGU	15	15	9	2	-	1	-
5259	5259	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5260	5260	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5261	5261	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5262	5262	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	6	2	EAB, E	3	-
5263	5263	Acer negundo	Manitoba Maple	ACENEGU	15	12	10	4	E, V, Le, BB, S1, D1	3	-
5264	5264	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5265	5265	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	8	3	EAB, E	3	-
5266	5266	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5267	5267	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5268	-	Not Found	-	-	-	-	-	-	-	-	-
5269	5269	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5270	5270	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5271	5271	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5272	5272	Acer negundo	Manitoba Maple	ACENEGU	6	8	3	1	-	1	-
5273	5273	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5274	5274	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5275	5275	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5276	5276	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5277	5277	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	7	1	EAB, E, PB, D3	4	-
5278	5278	Amelanchier species	Serviceberry	AMEL SP.	3	3	4	1	FD, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5279	5279	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	12	7	3	EAB, S1, D1, PB, BB	3	-
5280	5280	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	SAME AS 8000
5281	5281	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5282	5282	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5283	5283	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5284	5284	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5285	5285	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, E, PB, D3	4	-
5286	5286	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5287	5287	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5288	5288	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5289	5289	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5290	5290	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5291	5291	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5292	5292	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5293	5293	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5294	5294	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5295	5295	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5296	5296	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5297	5297	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5298	5298	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5299	5299	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5300	5300	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5301	5301	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5302	5302	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5303	5303	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5304	5304	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5306	5306	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5307	5307	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	4	4	1	EAB, E, PB, D3	4	-
5308	5308	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5309	5309	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	5	1	EAB, E, PB, D3	4	-
5310	5310	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5311	5311	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5312	5312	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5313	5313	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5314	5314	Acer ginnala	Amur Maple	ACEGINN	10	8	10	5	D2, S2, Le, BB	3	-
5315	5315	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5316	5316	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5317	5317	Acer negundo	Manitoba Maple	ACENEGU	3	5	3	1	-	1	-
5318	5318	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5319	5319	Acer negundo	Manitoba Maple	ACENEGU	7	8	4	1	Le	1	-
5320	5320	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5321	5321	Acer negundo	Manitoba Maple	ACENEGU	5	7	4	1	-	1	-
5322	5322	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5323	5323	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5324	5324	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5325	5325	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5326	5326	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5327	5327	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5328	5328	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5329	5329	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5330	5330	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5331	5331	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5332	5332	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5333	5333	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5334	5334	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5335	5335	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5336	5336	Acer negundo	Manitoba Maple	ACENEGU	7	13	7	1	D1, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5337	5337	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5338	5338	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-
5339	5339	Tilia cordifolia	Littleleaf Linden	TILCORD	13	9	5	1	-	1	-
5340	5340	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	4	1	EAB, E, PB, D3	4	-
5341	5341	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5342	5342	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5343	5343	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5344	5344	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5345	5345	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5346	5346	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5347	5347	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5348	5348	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5349	5349	Fraxinus pennsylvanica	Green Ash	FRAPENN	18	15	9	1	EAB	3	-
5350	5350	Acer negundo	Manitoba Maple	ACENEGU	12	12	10	2	BB, E, Le	2	-
5351	5351	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	6	2	EAB, E, PB, D3	4	-
5352	5352	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	5	2	EAB, E	3	-
5353	5353	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	7	3	EAB, E, PB, D3	4	-
5354	5354	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	4	1	EAB, E	3	-
5355	5355	Acer negundo	Manitoba Maple	ACENEGU	3	6	2	1	D1, S1	2	-
5356	5356	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	4	3	EAB, E, PB, D3	4	-
5357	5357	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	6	3	EAB, E, PB, D3	4	-
5358	5358	Acer negundo	Manitoba Maple	ACENEGU	11	14	8	3	E, RF-D, BB, D1	3	-
5359	5359	Acer negundo	Manitoba Maple	ACENEGU	18	15	15	5	E, Le, RF-D	2	-
5360	5360	Acer negundo	Manitoba Maple	ACENEGU	6	8	2	1	Le, BB	2	-
5361	5361	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	6	1	EAB, E, PB, D3	4	-
5362	5362	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5363	5363	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5364	5364	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5365	5365	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5366	5366	Acer negundo	Manitoba Maple	ACENEGU	17.5	12	10	2	-	1	-
5367	5367	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5368	5368	Acer negundo	Manitoba Maple	ACENEGU	9.5	10	5	1	Le, D1	2	-
5369	5369	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5370	5370	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5371	5371	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5372	5372	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5373	5373	Acer negundo	Manitoba Maple	ACENEGU	4.5	8	3	1	S1, D1, BB	3	-
5374	5374	Acer negundo	Manitoba Maple	ACENEGU	10	15	7	1	-	1	-
5375	5375	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5376	5376	Acer negundo	Manitoba Maple	ACENEGU	9	8	5	1	-	1	-
5377	5377	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5378	5378	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5379	5379	Acer negundo	Manitoba Maple	ACENEGU	35	14	20	2	D2, S2, B, E	3	-
5380	5380	Acer negundo	Manitoba Maple	ACENEGU	9	6	10	12	Le, BB, D2	2	-
5381	5381	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
5382	5382	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	6	10	2	EAB, D2, S1, BB, NL	4	-
5383	5383	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5384	5384	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	7	7	3	EAB, PB, D2, S2	4	-
5385	5385	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5600	5600	Pinus strobus	Eastern White Pine	PINSTRO	22	9	7	1	-	1	-
5601	5601	Pinus strobus	Eastern White Pine	PINSTRO	19	8	6	1	-	1	-
5602	5602	Pinus strobus	Eastern White Pine	PINSTRO	23	8	7	1	-	1	-
5603	5603	Juglans nigra	Black Walnut	JUGNIGR	7	4	5	3	-	1	-
5604	5604	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5605	5605	Ulmus rubra	Slippery Elm	ULMRUBR	26.5	13	10	1	V, D2, PB, S2	3	-
5606	5606	Ulmus americana	White Elm	ULMAMER	22	10	10	1	BB, D2, S2, PB	4	-
5607	5607	Ulmus species	Elm	ULMU SP.	17	7	5	3	NL, E, D2, S2, BB	4	-
5608	5608	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5609	5609	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5610	5610	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5611	5611	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	9	7	6	EAB	3	-
5612	5612	Ulmus rubra	Slippery Elm	ULMRUBR	32	18	15	1	D2, PB, D1, S1	3	-
5613	5613	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5614	5614	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	12	8	1	EAB, PB, D2, S2	4	-
5615	5615	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5616	5616	Salix fragilis	Crack Willow	SALFRAG	48	18	22	1	E, Le, BB, D2	3	-
5617	5617	Salix fragilis	Crack Willow	SALFRAG	40	20	25	3	D2, S2, BB, PB, E	4	-
5618	5618	Salix fragilis	Crack Willow	SALFRAG	-	-	-	-	-	-	SAME AS 5617
5619	5619	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5620	5620	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	15	6	1	E, BB, D1	3	-
5621	5621	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	9	2	EAB, PB, D2, S2	4	-
5622	5622	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5623	5623	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	5	1	EAB, PB, D2, S2	4	-
5624	5624	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5625	5625	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5626	5626	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5627	5627	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	4	2	1	S1, D1, EAB	3	-
5628	5628	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5629	5629	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5630	5630	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
5631	5631	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5632	5632	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5633	5633	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5634	5634	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5635	5635	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	10	7	1	EAB, PB, D2, S2	4	-
5636	5636	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5637	5637	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	9	7	1	EAB, PB, D2, S2	4	-
5638	5638	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5639	5639	Acer negundo	Manitoba Maple	ACENEGU	4.5	4	6	2	Le, D1	2	-
5640	5640	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5641	5641	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5642	5642	Acer negundo	Manitoba Maple	ACENEGU	3.5	4	7	2	-	1	-
5643	5643	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5644	5644	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	-	1	-
5645	5645	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5646	5646	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	BB, E, D1, Le	3	-
5647	5647	Betula papyrifera	White Birch	BETPAPY	19	14	8	1	D1	2	-
5648	5648	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5649	5649	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5650	5650	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	D1	2	-
5651	5651	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	6	3	1	-	1	-
5652	5652	Acer negundo	Manitoba Maple	ACENEGU	12.5	8	6	1	BB, E, D1, Le	3	-
5653	5653	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5654	5654	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5655	5655	Acer negundo	Manitoba Maple	ACENEGU	5	7	4	1	BB, E, D1	3	-
5656	5656	Acer negundo	Manitoba Maple	ACENEGU	28.5	13	10	1	Le, D1	2	-
5657	5657	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	1	EAB	3	-
5658	5658	Acer negundo	Manitoba Maple	ACENEGU	10	11	6	1	E, D1, BB	3	-
5659	5659	Ulmus americana	White Elm	ULMAMER	5	7	3	1	Le, BB, D1	3	-
5660	5660	Acer negundo	Manitoba Maple	ACENEGU	10	7	10	2	BB, D1, Le, E	3	-
5661	5661	Ulmus americana	White Elm	ULMAMER	28	20	15	1	S3, D2, BB	4	-
5662	5662	Acer negundo	Manitoba Maple	ACENEGU	6	7	4	1	D1	2	-
5663	5663	Acer negundo	Manitoba Maple	ACENEGU	13	13	7	1	E, BB, D1, Le	3	-
5664	5664	Ulmus americana	White Elm	ULMAMER	4.5	6	4	2	D1, BB	3	-
5665	5665	Ulmus americana	White Elm	ULMAMER	12	13	8	1	D1, BB, S1	2	-
5666	5666	Ulmus americana	White Elm	ULMAMER	3	5	3	1	D1, BB	3	-
5667	5667	Acer negundo	Manitoba Maple	ACENEGU	5	5	4	1	Le, E, D1, S1	3	-
5668	5668	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	4	1	EAB, D1, PB	3	-
5669	5669	Acer negundo	Manitoba Maple	ACENEGU	7.5	10	6	2	BB, D1	2	-
5670	5670	Acer negundo	Manitoba Maple	ACENEGU	7	7	5	1	Le, E, BB, D1, S1	3	-
5671	5671	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5672	5672	Acer negundo	Manitoba Maple	ACENEGU	5	6	3	1	BB, D1, S1	1	-
5673	5673	Acer negundo	Manitoba Maple	ACENEGU	12.5	7	7	1	D1, S2, Le, BB, E	3	-
5674	5674	Acer negundo	Manitoba Maple	ACENEGU	16.5	10	15	2	D1, S2, Le, BB, E	3	-
5675	5675	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5676	5676	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	9	6	2	S1, D1, EAB	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5677	5677	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5678	5678	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5679	5679	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5680	5680	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5681	5681	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5682	5682	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5683	5683	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5684	5684	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	6	4	1	EAB, D1, BB, PB	3	-
5685	5685	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	6	1	EAB, PB, D2, S2	4	-
5686	5686	Acer negundo	Manitoba Maple	ACENEGU	15	10	7	1	D2, BB, E, PB	4	-
5687	5687	Acer negundo	Manitoba Maple	ACENEGU	11	10	8	1	D1, S2, LE, E, BB	3	-
5688	5688	Acer negundo	Manitoba Maple	ACENEGU	7	10	6	2	Le, D2, S2, BB	3	-
5689	5689	Acer negundo	Manitoba Maple	ACENEGU	13	10	10	3	Le, D1, BB, E	3	-
5690	5690	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5691	5691	Ulmus americana	White Elm	ULMAMER	22	20	15	1	D1, BB	2	-
5692	5692	Acer negundo	Manitoba Maple	ACENEGU	11	12	9	2	RF-D, E, BB, D1, Le	3	-
5693	5693	Acer negundo	Manitoba Maple	ACENEGU	7.5	10	6	1	E, D1, Le	2	-
5694	5694	Acer negundo	Manitoba Maple	ACENEGU	5	4	7	2	E, D1, Le	2	-
5695	5695	Acer negundo	Manitoba Maple	ACENEGU	8.5	10	7	1	D1, Le, BB, E	2	-
5696	5696	Acer negundo	Manitoba Maple	ACENEGU	13	13	10	1	Le, D1, BB	2	-
5697	5697	Acer negundo	Manitoba Maple	ACENEGU	16	13	7	1	D2, Le, E, BB	3	-
5698	5698	Acer negundo	Manitoba Maple	ACENEGU	8	9	6	1	RF-D, D2, BB, E	3	-
5699	5699	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5700	5700	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5701	5701	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5702	5702	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5703	5703	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5704	5704	Ulmus americana	White Elm	ULMAMER	25	25	15	1	D2, S1, BB	3	-
5705	5705	Ulmus species	Elm	ULMU SP.	-	-	-	-	-	5	-
5706	5706	Ulmus species	Elm	ULMU SP.	-	-	-	-	-	5	-
5707	5707	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5708	5708	Ulmus species	Elm	ULMU SP.	-	-	-	-	-	5	-
5709	5709	Acer negundo	Manitoba Maple	ACENEGU	4	5	4	1	Le, D1	2	-
5710	5710	Ulmus americana	White Elm	ULMAMER	5	6	5	1	D3, BB	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5711	5711	Ulmus americana	White Elm	ULMAMER	3.5	6	4	1	D3, BB	4	-
5712	5712	Ulmus americana	White Elm	ULMAMER	7	7	6	1	D1, BB, Le	2	-
5713	5713	Ulmus americana	White Elm	ULMAMER	10	12	7	1	D2, BB, V	3	-
5714	5714	Ulmus americana	White Elm	ULMAMER	8	10	7	1	D1, BB, V	3	-
5715	5715	Ulmus americana	White Elm	ULMAMER	6	9	8	1	D1, BB	2	-
5716	5716	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	11	5	2	D2, E, BB	3	-
5717	5717	Ulmus americana	White Elm	ULMAMER	22	15	10	1	D1, BB, V	3	-
5718	5718	Ulmus americana	White Elm	ULMAMER	8	8	4	1	D1, BB	2	-
5719	5719	Ulmus americana	White Elm	ULMAMER	17.5	18	10	2	D2, S1, BB, PB	3	-
5720	5720	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5721	5721	Ulmus americana	White Elm	ULMAMER	10	11	8	2	D1, BB	2	-
5722	5722	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	9	4	1	EAB, PB, D2, S2	4	-
5723	5723	Unknown species	Unknown species	UNKNOWN	-	-	-	-	-	5	-
5724	5724	Ulmus rubra	Slippery Elm	ULMRUBR	-	-	-	-	-	-	SAME AS 5725
5725	5725	Ulmus rubra	Slippery Elm	ULMRUBR	22.5	20	18	2	D1, BB, V	2	-
5726	5726	Ulmus americana	White Elm	ULMAMER	8	9	6	2	D2, BB, S1, V	3	-
5727	5727	Ulmus americana	White Elm	ULMAMER	5	6	4	1	D2, BB	3	-
5728	5728	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5729	5729	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5730	5730	Ulmus americana	White Elm	ULMAMER	10	11	6	1	D1, BB	2	-
5731	5731	Ulmus americana	White Elm	ULMAMER	8.5	10	4	1	D1, BB, V	2	-
5732	5732	Ulmus americana	White Elm	ULMAMER	13.5	13	7	1	D1, BB	2	-
5733	5733	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5734	5734	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5735	5735	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	11	7	1	D1, BB, V	4	-
5736	5736	Acer negundo	Manitoba Maple	ACENEGU	15	10	10	2	D3, Le, E, BB, PB	4	-
5737	5737	Acer negundo	Manitoba Maple	ACENEGU	33	15	15	1	D3, E, PB, BB, S3, Ca	4	-
5738	5738	Acer negundo	Manitoba Maple	ACENEGU	16	20	15	2	E, BB, RF-D, D2	3	-
5739	5739	Acer negundo	Manitoba Maple	ACENEGU	20	10	10	1	D3, PB, BB, E	4	-
5740	5740	Acer negundo	Manitoba Maple	ACENEGU	18	18	10	1	Le, E, BB	2	-
5741	5741	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5742	5742	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5743	5743	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5744	5744	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5745	5745	Acer ginnala	Amur Maple	ACEGINN	7	7	10	14	BB, D2, FC, E	4	-
5746	5746	Ulmus americana	White Elm	ULMAMER	7	2	3	1	Le, D3, PB, S3	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5747	5747	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5748	5748	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5749	5749	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5750	5750	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5751	5751	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5752	5752	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5753	5753	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5754	5754	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5755	5755	Ulmus species	Elm	ULMU SP.	3.5	3	3	1	-	1	-
5756	5756	Ulmus species	Elm	ULMU SP.	3	3	4	1	S1, BB	2	-
5757	5757	Ulmus species	Elm	ULMU SP.	3	3	4	1	S1, BB	2	-
5758	5758	Ulmus species	Elm	ULMU SP.	3	3	4	1	S1, BB	2	-
5759	5759	Ulmus americana	White Elm	ULMAMER	15.5	18	10	1	D2, S2, BB, PB	3	-
5760	5760	Salix fragilis	Crack Willow	SALFRAG	-	-	-	-	-	5	-
5761	5761	Salix fragilis	Crack Willow	SALFRAG	30	22	15	1	D2, S2, BB	3	-
5762	5762	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5763	5763	Acer negundo	Manitoba Maple	ACENEGU	38	15	20	1	FC, D2, S2, BB, PB	3	-
5764	5764	Ulmus americana	White Elm	ULMAMER	5	3	1	1	D3, BB, PB	4	-
5765	5765	Ulmus americana	White Elm	ULMAMER	11	12	5	1	D2, S1, BB	3	-
5766	5766	Ulmus americana	White Elm	ULMAMER	5	5	4	1	D1, BB	2	-
5767	5767	Ulmus americana	White Elm	ULMAMER	8	8	5	1	-	1	-
5768	5768	Salix fragilis	Crack Willow	SALFRAG	26	22	15	2	-	1	-
5769	5769	Juglans nigra	Black Walnut	JUGNIGR	8	8	7	1	D1, BB, S1	3	-
5770	5770	Salix fragilis	Crack Willow	SALFRAG	5	25	15	1	D2, BB, PB	3	-
5771	5771	Fraxinus pennsylvanica	Green Ash	FRAPENN	33	6	3	1	S2, PB, EAB	3	-
5772	5772	Ulmus americana	White Elm	ULMAMER	6	-	-	-	-	5	-
5773	5773	Salix fragilis	Crack Willow	SALFRAG	22.5	20	15	6	D2, S2, BB	3	-
5774	5774	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5775	5775	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	6	1	EAB, S1, D1, BB	3	-
5776	5776	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5777	5777	Acer negundo	Manitoba Maple	ACENEGU	15	5	5	1	Le, E, D3, BB, S2	4	-
5778	5778	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5779	5779	Salix fragilis	Crack Willow	SALFRAG	31.5	25	20	2	D1, S2, E, Le, BB, PB	3	-
5780	5780	Salix fragilis	Crack Willow	SALFRAG	25	20	15	2	-	1	-
5781	5781	Ulmus americana	White Elm	ULMAMER	11	13	6	1	D1, BB	2	-
5782	5782	Ulmus americana	White Elm	ULMAMER	29	22	15	1	-	1	-
5783	5783	Salix fragilis	Crack Willow	SALFRAG	32	20	12	1	D2, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5784	5784	Acer rubrum	Red Maple	ACERUBR	28	13	5	1	FC, E	1	-
5785	5785	Ulmus americana	White Elm	ULMAMER	9.5	12	5	1	-	1	-
5786	5786	Ulmus americana	White Elm	ULMAMER	16	12	6	1	-	1	-
5787	5787	Ulmus americana	White Elm	ULMAMER	10	10	7	1	D1, BB	2	-
5788	5788	Salix fragilis	Crack Willow	SALFRAG	25	20	12	2	-	1	-
5789	5789	Salix fragilis	Crack Willow	SALFRAG	26	22	20	3	PB, D1, BB	2	-
5790	5790	Ulmus americana	White Elm	ULMAMER	13	14	6	1	D1, BB	2	-
5791	5791	Ulmus americana	White Elm	ULMAMER	11	11	7	1	D1, BB	2	-
5792	5792	Ulmus americana	White Elm	ULMAMER	3.5	4	3	1	D2, BB	3	-
5793	5793	Ulmus americana	White Elm	ULMAMER	10	10	6	1	D1, BB	2	-
5794	5794	Acer negundo	Manitoba Maple	ACENEGU	12	12	8	1	D1, E, BB	2	-
5795	5795	Acer negundo	Manitoba Maple	ACENEGU	25	10	20	2	D2, BB, FD, Le, S2	4	-
5796	5796	Acer rubrum	Red Maple	ACERUBR	32	13	7	1	FC, E, IB	2	-
5797	5797	Salix fragilis	Crack Willow	SALFRAG	25	15	5	1	D1, S1, PB	3	-
5798	5798	Ulmus americana	White Elm	ULMAMER	8.5	9	4	1	D2, BB	3	-
duplicate	5798	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5799	5799	Ulmus americana	White Elm	ULMAMER	11	11	6	1	D1, BB	3	-
5800	5800	Ulmus americana	White Elm	ULMAMER	5	5	3	1	D1, BB	2	-
5801	5801	Ulmus americana	White Elm	ULMAMER	3	4	3	1	D1, BB	3	-
5802	5802	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5803	5803	Salix fragilis	Crack Willow	SALFRAG	-	-	-	-	-	5	-
5804	5804	Salix fragilis	Crack Willow	SALFRAG	30	20	25	1	D2, S2, BB, PB	3	-
5805	5805	Acer negundo	Manitoba Maple	ACENEGU	25	20	22	4	E, D2, S3, BB, PB	3	-
5806	5806	Ulmus americana	White Elm	ULMAMER	4.5	4	7	1	D2, BB, S1	3	-
5807	5807	Ulmus americana	White Elm	ULMAMER	8.5	10	10	1	D2, Le	3	-
5808	5808	Ulmus americana	White Elm	ULMAMER	11	10	10	1	D2, BB	3	-
5809	5809	Ulmus americana	White Elm	ULMAMER	21	18	10	1	D2, PB, S1, BB	3	-
5810	5810	Ulmus americana	White Elm	ULMAMER	14	14	10	1	D2, BB, PB	3	-
5811	5811	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	14	10	1	EAB, D1, BB, PB	3	-
5812	5812	Ulmus americana	White Elm	ULMAMER	10	10	10	1	D1, BB	2	-
5813	5813	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	4	6	2	S2, BB, E, D2	3	-
5814	5814	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5815	5815	Ulmus americana	White Elm	ULMAMER	13	16	8	1	D2, BB, S1	3	-
5816	5816	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	1	D2, S2, PB, BB	3	-
5817	5817	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5818	5818	Ulmus americana	White Elm	ULMAMER	3.5	5	3	1	D3, S3, PB	4	-
5819	5819	Tilia cordifolia	Littleleaf Linden	TILCORD	7	6	5	1	EAB, D2, BB	1	-
5820	5820	Ulmus americana	White Elm	ULMAMER	3.5	3	5	1	D2	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5821	5821	Ulmus americana	White Elm	ULMAMER	7	7	4	2	D2, S2, PB, BB	4	-
5822	5822	Ulmus americana	White Elm	ULMAMER	19	18	11	1	-	4	-
5823	5823	Ulmus americana	White Elm	ULMAMER	9	10	6	1	D1, BB	3	-
5824	5824	Acer negundo	Manitoba Maple	ACENEGU	22	12	12	1	D3, BB, PB	4	-
5825	5825	Acer negundo	Manitoba Maple	ACENEGU	15	13	9	1	D3, S3, PB, BB, FD	3	-
5826	5826	Ulmus americana	White Elm	ULMAMER	6	-	-	-	D2, BB	-	-
5827	5827	Ulmus americana	White Elm	ULMAMER	8	-	-	-	D3, S3, PB, BB	-	-
5828	5828	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5829	5829	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5830	5830	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5831	5831	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5832	5832	Ulmus americana	White Elm	ULMAMER	15	12	10	1	D2, PB, BB, V	3	-
5833	5833	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5834	5834	Ulmus americana	White Elm	ULMAMER	14	3	5	1	D3, S3, PB, BB	4	-
5835	5835	Ulmus americana	White Elm	ULMAMER	7	9	5	1	D1, BB	2	-
5836	5836	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5837	5837	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5838	5838	Ulmus americana	White Elm	ULMAMER	8	8	5	1	D1, BB	2	-
5839	5839	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5840	-	Not Found	-	-	-	-	-	-	-	-	-
5841	5841	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5842	5842	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5843	5843	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5844	5844	Ulmus americana	White Elm	ULMAMER	17	20	7	1	D3, S3, PB, BB	4	-
5845	5845	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5846	5846	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5847	5847	Ulmus americana	White Elm	ULMAMER	13	13	6	1	D2, BB, S1	3	-
5848	5848	Ulmus americana	White Elm	ULMAMER	20	17	10	1	D2, BB, S1	3	-
5849	5849	Ulmus americana	White Elm	ULMAMER	4.5	6	3	1	D2, BB, S1	3	-
5850	5850	Ulmus americana	White Elm	ULMAMER	5.5	6	4	1	D2, S1, BB	3	-
5851	5851	Ulmus americana	White Elm	ULMAMER	12	13	5	1	D1, BB	2	-
5852	5852	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5853	5853	Ulmus americana	White Elm	ULMAMER	25	16	10	1	D1	2	-
5854	5854	Ulmus americana	White Elm	ULMAMER	6	7	4	1	D1, BB	2	-
5855	5855	Ulmus americana	White Elm	ULMAMER	14	16	8	1	BB, D2	3	-
5856	5856	Ulmus americana	White Elm	ULMAMER	11	8	8	1	D1, BB	2	-
5857	5857	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5858	5858	Ulmus americana	White Elm	ULMAMER	21	15	10	1	D3, S3, PB, BB	4	-
5859	5859	Ulmus americana	White Elm	ULMAMER	15	12	6	1	D3, S3, PB, BB	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5860	5860	Ulmus americana	White Elm	ULMAMER	13	11	6	1	D2, S2, PB, BB	3	-
5861	5861	Acer negundo	Manitoba Maple	ACENEGU	-	-	-	-	-	5	-
5862	5862	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5863	5863	Ulmus americana	White Elm	ULMAMER	5.5	7	5	1	D1	2	-
5864	5864	Ulmus americana	White Elm	ULMAMER	10.5	12	6	1	D1, BB	2	-
5865	5865	Ulmus americana	White Elm	ULMAMER	6	6	4	1	D1, BB	2	-
5866	5866	Ulmus americana	White Elm	ULMAMER	5	5	3	1	-	1	-
5867	5867	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5868	5868	Ulmus americana	White Elm	ULMAMER	9	11	6	1	D2, BB, PB, Le	3	-
5869	5869	Ulmus americana	White Elm	ULMAMER	5	6	3	1	-	4	-
5870	5870	Ulmus americana	White Elm	ULMAMER	10	10	5	1	D2, S1	3	-
5871	5871	Ulmus americana	White Elm	ULMAMER	15	15	10	1	D1, BB, PB	2	-
5872	5872	Ulmus americana	White Elm	ULMAMER	3.5	3	5	1	D1, S1	3	-
5873	5873	Tilia cordifolia	Littleleaf Linden	TILCORD	11.5	8	8	3	Eq, T-P, D1, S1, BB	2	-
5874	5874	Ulmus americana	White Elm	ULMAMER	11	10	8	1	D1, S1	3	-
5875	5875	Juglans nigra	Black Walnut	JUGNIGR	8	8	5	1	-	1	-
5876	5876	Ulmus americana	White Elm	ULMAMER	5	6	3	1	D1, PB, BB, V	3	-
5877	5877	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	6	1	EAB, E	3	-
5878	5878	Ulmus americana	White Elm	ULMAMER	8	8	4	1	D2, PB, BB	3	-
5879	5879	Ulmus americana	White Elm	ULMAMER	11	11	6	1	D1, PB, BB	2	-
5880	5880	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5881	5881	Ulmus americana	White Elm	ULMAMER	5	3	2	1	D2, BB	3	-
5882	5882	Ulmus americana	White Elm	ULMAMER	6	6	6	1	D2, PB, BB	3	-
5883	5883	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5884	5884	Ulmus americana	White Elm	ULMAMER	5	8	3	1	D1, BB	2	-
5885	5885	Ulmus americana	White Elm	ULMAMER	TS	-	-	-	-	-	-
5886	5886	Ulmus americana	White Elm	ULMAMER	12	12	7	1	-	1	-
5887	5887	Ulmus americana	White Elm	ULMAMER	11	11	4	1	D2, S2, PB, BB	4	-
5888	5888	Ulmus americana	White Elm	ULMAMER	4	5	5	2	D1, BB	2	-
5889	5889	Ulmus americana	White Elm	ULMAMER	TS	-	-	-	-	-	-
5890	5890	Ulmus americana	White Elm	ULMAMER	TS	-	-	-	-	-	-
5891	5891	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5892	5892	Populus tremuloides	Trembling Aspen	POPTREM	7	11	4	1	-	1	-
5893	5893	Populus tremuloides	Trembling Aspen	POPTREM	6.5	10	4	1	-	1	-
5894	5894	Populus tremuloides	Trembling Aspen	POPTREM	8	11	4	1	-	1	-
5895	5895	Populus tremuloides	Trembling Aspen	POPTREM	7	10	4	1	-	1	-
5896	5896	Populus tremuloides	Trembling Aspen	POPTREM	6	9	3	1	-	1	-
5897	5897	Populus tremuloides	Trembling Aspen	POPTREM	9.5	10	4	1	-	1	-
5898	5898	Ulmus rubra	Slippery Elm	ULMRUBR	18.5	13	9	1	D1, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5899	5899	Populus tremuloides	Trembling Aspen	POPTREM	4.5	7	2	1	-	1	-
5900	5900	Populus tremuloides	Trembling Aspen	POPTREM	4	6	2	1	-	1	-
5901	5901	Populus tremuloides	Trembling Aspen	POPTREM	3.5	6	2	1	-	1	-
5902	5902	Populus tremuloides	Trembling Aspen	POPTREM	4	6	2	1	-	1	-
5903	5903	Populus tremuloides	Trembling Aspen	POPTREM	3	5	2	1	-	1	-
5904	5904	Populus tremuloides	Trembling Aspen	POPTREM	5.5	7	3	1	-	1	-
5905	5905	Populus tremuloides	Trembling Aspen	POPTREM	5	7	2	1	-	1	-
5906	5906	Populus tremuloides	Trembling Aspen	POPTREM	4.5	6	2	1	-	1	-
5907	5907	Populus tremuloides	Trembling Aspen	POPTREM	4	5	2	1	-	4	-
5908	5908	Rhus typhina	Staghorn Sumac	RHUTYPH	4	5	2	1	D1, FC, BB	2	-
5909	5909	Acer negundo	Manitoba Maple	ACENEGU	7.5	8	7	2	V, S2, D2, BB	3	-
5910	5910	Ulmus americana	White Elm	ULMAMER	29	15	10	1	D2, S1, BB, PB	3	-
5911	5911	Ulmus americana	White Elm	ULMAMER	20	12	10	1	D2, S1, BB, V	3	-
5912	5912	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5913	5913	Ulmus americana	White Elm	ULMAMER	7.5	7	8	1	D1, BB	2	-
5914	5914	Ulmus americana	White Elm	ULMAMER	14	12	7	1	D2, BB	3	-
5915	5915	Acer negundo	Manitoba Maple	ACENEGU	19.5	13	13	5	NL, T-P, D2, S2	3	-
5916	5916	Acer negundo	Manitoba Maple	ACENEGU	14	8	10	1	NL, T-P, E, D2, BB	4	-
5917	5917	Acer negundo	Manitoba Maple	ACENEGU	30	12	25	9	PB, BB, RF-D, T-P, E, D2, S2	4	-
5918	5918	Tilia cordifolia	Littleleaf Linden	TILCORD	3.5	4	4	2	-	1	-
5919	5919	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5920	5920	Tilia cordifolia	Littleleaf Linden	TILCORD	3.5	4	3	1	V	1	-
5921	5921	Tilia cordifolia	Littleleaf Linden	TILCORD	5.5	8	6	2	V	1	-
5922	5922	Tilia cordifolia	Littleleaf Linden	TILCORD	-	-	-	-	-	-	SAME AS 5921
5923	5923	Tilia cordifolia	Littleleaf Linden	TILCORD	6	7	5	1	-	1	-
5924	5924	Tilia cordifolia	Littleleaf Linden	TILCORD	5	6	3	1	-	1	-
5925	5925	Tilia cordifolia	Littleleaf Linden	TILCORD	8.5	7	5	2	S1, BB	2	Equipment damage from fence growing into tree
5926	5926	Tilia cordifolia	Littleleaf Linden	TILCORD	11.5	10	8	4	T-P, IB, S1, D1, Eq	3	Equipment damage from fence growing into tree
5927	5927	Tilia cordifolia	Littleleaf Linden	TILCORD	14	10	8	2	T-P, IB, S1, D1, Eq	2	Equipment damage from fence growing into tree
5928	5928	Tilia cordifolia	Littleleaf Linden	TILCORD	18	10	8	1	BB, Eq, D1, S1	2	-
5929	5929	Acer negundo	Manitoba Maple	ACENEGU	25	15	23	4	PB, T-P, D2, FD, BB	3	-
5930	5930	Acer negundo	Manitoba Maple	ACENEGU	22.5	15	20	6	S2, D2, PB, BB, FD	4	-
5931	5931	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5932	5932	Acer negundo	Manitoba Maple	ACENEGU	26.5	18	23	3	-	4	-
5933	5933	Acer ginnala	Amur Maple	ACEGINN	12	12	10	1	D2, BB	2	-
5934	5934	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	8	8	1	EAB, PB, D2, S2	4	-
5935	5935	Unknown species	Unknown species	UNKNOWN	-	-	-	-	-	5	-
5936	5936	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5937	5937	Acer negundo	Manitoba Maple	ACENEGU	30	15	22	2	V	4	-
5938	5938	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	5	2	EAB, PB, D2, S2	4	-
5939	5939	Acer negundo	Manitoba Maple	ACENEGU	30	14	20	2	V, BB, D2, S2, FD	3	-
5940	5940	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	4	3	1	S1, BB, E	2	-
5941	5941	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	1	-	1	-
5942	5942	Acer negundo	Manitoba Maple	ACENEGU	30	14	15	1	FD, D2, S3, BB, T-P	4	-
5943	5943	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5944	5944	Acer negundo	Manitoba Maple	ACENEGU	7.5	4	10	1	Le, D2, S2, BB	3	-
5945	5945	Acer negundo	Manitoba Maple	ACENEGU	45.5	15	22	4	S2, D2, PB, T-P, RF-D	4	-
5946	5946	Acer negundo	Manitoba Maple	ACENEGU	26.5	15	15	2	S2, D2, PB, T-P	3	-
5947	5947	Acer negundo	Manitoba Maple	ACENEGU	55	15	15	1	S2, D2, PB, T-P	3	-
5948	5948	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4.5	4	2	V, S1, D1	2	-
5949	5949	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
5950	5950	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	2	-	1	-
5951	5951	Acer negundo	Manitoba Maple	ACENEGU	49	12	15	1	D2, S3, PB, T-P	4	-
5952	5952	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5953	5953	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5954	5954	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5955	5955	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5956	5956	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5957	5957	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5958	5958	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	6	4	1	-	1	-
5959	5959	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	7	4	1	-	1	-
5960	5960	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	5	4	1	-	1	-
5961	5961	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	-	1	-
5962	5962	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	6	4	1	-	1	-
5963	5963	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5964	5964	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5965	5965	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5966	5966	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	ACENEGU ON TOP
5967	5967	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	3	3	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5968	5968	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5969	5969	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5970	5970	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5971	5971	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	4	1	EAB, D1, PB	3	-
5972	5972	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	6	7	1	EAB, D1, PB	3	-
5973	5973	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	8	1	EAB, PB, D2, S2	4	-
5974	5974	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5975	5975	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	6	4	1	EAB, PB, D2, S2	4	-
5976	5976	Euonymus europaeus	Spindle	EUOEURO	5	6	7	4	-	1	-
5977	5977	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5978	5978	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	4	4	1	EAB, PB, D2, S2	4	-
5979	5979	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5980	5980	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	7	6	1	EAB, PB, BB, V, Le	3	-
5981	5981	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5982	5982	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	5	1	EAB, D1, PB	3	-
5983	5983	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	5	1	EAB, D1, PB	3	-
5984	5984	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	4	5	2	EAB, D1, BB, PB, V	3	-
5985	5985	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5986	5986	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	6	7	1	EAB, D2, S2, BB, Le	4	-
5987	5987	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5988	5988	Fraxinus pennsylvanica	Green Ash	FRAPENN	12.5	15	7	1	EAB, PB, D2, S2	4	-
5989	5989	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5990	5990	Fraxinus pennsylvanica	Green Ash	FRAPENN	12.5	15	7	1	EAB, D2, S2, PB, Le	4	-
5991	5991	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
5992	5992	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
5993	5993	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	14	7	1	EAB, PB, D1, Le	3	-
5994	5994	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
5995	5995	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	9	5	1	EAB, PB, D2, S2, V	4	-
5996	5996	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	5	1	EAB, D1, PB	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
5997	5997	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
5998	5998	Euonymus europaeus	Spindle	EUOEURO	5	5	5	1	D1, S2, BB	3	-
5999	5999	Euonymus europaeus	Spindle	EUOEURO	5.5	4	7	7	D1, S1, BB	2	-
6000	6000	Euonymus europaeus	Spindle	EUOEURO	-	-	-	-	-	5	-
6001	6001	Euonymus europaeus	Spindle	EUOEURO	-	-	-	-	-	5	-
6002	6002	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	6	2	EAB, D1, BB, PB, V	3	-
6003	6003	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	9	6	1	EAB, D1, PB	3	-
6004	6004	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	4	5	1	EAB, PB, BB, V, Le	3	-
6005	6005	Acer ginnala	Amur Maple	ACEGINN	4	6	4	2	BB	2	-
6006	6006	Acer negundo	Manitoba Maple	ACENEGU	60	15	15	1	D1, S2, Le, PB	3	-
6007	6007	Acer negundo	Manitoba Maple	ACENEGU	18	15	10	1	D3, BB	4	-
6008	6008	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	2	1	EAB, D1, PB	3	-
6009	6009	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	4	5	1	EAB, D1, PB	3	-
6010	6010	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6011	6011	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	14	6	1	EAB, D1, PB	3	-
6012	6012	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6013	6013	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6014	6014	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6015	6015	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	3	1	EAB, D1, PB	3	-
6016	6016	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	4	1	EAB, PB, D2, S2	4	-
6017	6017	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6018	6018	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	1	-	1	-
6019	6019	Acer negundo	Manitoba Maple	ACENEGU	29	14	20	3	D2, S2, BB, PB, E, RF-D	4	-
6020	6020	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6021	6021	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	4	1	V	1	-
6022	6022	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	6	4	1	V	1	-
6023	6023	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	3	3	1	V	1	-
6024	6024	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6025	6025	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6026	6026	Acer negundo	Manitoba Maple	ACENEGU	4.4	5	5	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6027	6027	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6028	6028	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6029	6029	Rhamnus cathartica	Common Buckthorn	RHACATH	11	-	-	-	-	-	-
6030	6030	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	4	1	EAB, PB, D2, S2	4	-
6031	6031	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	5	3	1	EAB, PB, D1, Le	3	-
6032	6032	Fraxinus pennsylvanica	Green Ash	FRAPENN	12.5	12	5	1	EAB, PB, D2, S2	4	-
6033	6033	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6034	6034	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	4	1	EAB, PB, D2, S2	4	-
6035	6035	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	4	1	EAB, PB, D2, S2	4	-
6036	6036	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	12	6	1	EAB, D1, PB	3	-
6037	6037	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	6	1	EAB, PB, D2, S2	4	-
6038	6038	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	8	4	1	EAB, PB, D2, S2	4	-
6039	6039	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6040	6040	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	12	5	1	EAB, D1, PB	3	-
6041	6041	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	7	2	EAB, D1, PB	3	-
6042	6042	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	5	1	EAB, PB, D1, Le	3	-
6043	6043	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	5	1	E, BB, D2	3	
6044	6044	Prunus species	Cherry	PRUN SP.	10	7	5	1	IB, FD	3	-
6045	6045	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	4	1	EAB, D1, PB	3	-
6046	6046	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	4	1	EAB, PB, D2, S2	4	-
6047	6047	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	6	1	EAB, PB, D2, S2	4	-
6048	6048	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	7	1	EAB, PB, D2, S2	4	-
6049	6049	Fraxinus pennsylvanica	Green Ash	FRAPENN	9.5	10	5	1	EAB, D1, PB	3	-
6050	6050	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	8	3	1	EAB, PB, D2, S2	4	-
6051	6051	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	8	3	EAB, PB, D2, S2	4	-
6052	6052	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	7	1	EAB, PB, D2, S2	4	-
6053	6053	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	5	3	1	EAB, D1, PB	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6054	6054	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	7	2	EAB, D2, S2, BB, Le	4	-
6055	6055	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	5	1	EAB, PB, D2, S2	4	-
6056	6056	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	7	3	1	EAB, PB, D2, S2	4	-
6057	6057	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	14	6	1	EAB, PB, D2, S2	4	-
6058	6058	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	14	5	1	EAB, PB, D1, Le	3	-
6059	6059	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	4	1	EAB, PB, D2, S2	4	-
6060	6060	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	5	1	EAB, PB, D2, S2	4	-
6061	6061	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	12	4	1	EAB, D1, PB	3	-
6062	6062	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6063	6063	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	4	3	1	EAB, PB, D2, S2	4	-
6064	6064	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	7	5	1	EAB, D1, PB	3	-
6065	6065	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	5	1	EAB, D1, PB	3	-
6066	6066	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6067	6067	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6068	6068	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6069	-	Not Found	-	-	-	-	-	-	-	-	-
6070	6070	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	5	1	EAB, PB, D2, S2	4	-
6071	6071	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6072	6072	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	7	1	EAB, PB, D2, S2	4	-
6073	6073	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
6074	6074	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
6075	6075	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	8	1	EAB, PB, D2, S2	4	-
6076	6076	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	5	1	EAB, PB, D2, S2	4	-
6077	6077	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6078	6078	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	5	8	1	EAB, D2, S2, BB, Le	4	-
6079	6079	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	1	EAB, PB, D2, S2	4	-
6080	6080	Ulmus americana	White Elm	ULMAMER	13	15	7	1	-	4	-
6081	6081	Ulmus americana	White Elm	ULMAMER	23	15	10	1	V, S1, D1	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6082	6082	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	9	10	1	EAB, PB, D2, S2	4	-
6083	6083	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	7	1	EAB, PB, D2, S2	4	-
6084	6084	Acer negundo	Manitoba Maple	ACENEGU	9	7	6	1	T-P, D1, S1	2	-
6085	6085	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	5	7	1	EAB, PB, D2, S2	4	-
6086	6086	Fraxinus pennsylvanica	Green Ash	FRAPENN	TS	-	-	-	-	-	-
6087	6087	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	8	1	EAB, PB, D2, S2	4	-
6088	6088	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	6	1	EAB, PB, D2, S2	4	-
6089	6089	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	8	1	EAB, PB, D2, S2	4	-
6090	6090	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6091	6091	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	1	3	1	EAB, PB, D2, S2	4	-
6092	6092	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	8	6	1	EAB, PB, D2, S2	4	-
6093	6093	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	2	5	1	Le	1	-
6094	6094	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	3	8	1	EAB, D2, S2, PB, Le	4	-
6095	6095	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, PB, D2, S2	4	-
6096	6096	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	5	1	EAB, PB, D2, S2	4	-
6097	6097	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	11	7	1	EAB, PB, D2, S2	4	-
6098	6098	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	8	1	EAB, PB, D2, S2	4	-
6099	6099	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6100	6100	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
6101	6101	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6102	6102	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	14	10	1	EAB, PB, D2, S2	4	-
6103	6103	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	4	1	-	1	-
6104	6104	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	10	1	EAB, PB, D2, S2	4	-
6105	6105	Acer negundo	Manitoba Maple	ACENEGU	3	2.5	2	1	-	1	-
6106	6106	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	15	8	1	EAB, PB, D2, S2	4	-
6107	6107	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	EAB, PB, D2, S2	4	-
6108	6108	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6109	6109	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	6	1	EAB, PB, D2, S2	4	-
duplicate	6109	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	7	1	EAB, PB, D2, S2	4	-
6110	6110	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6111	6111	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	4	8	1	EAB, PB, D2, S2	4	-
6112	6112	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6113	6113	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	11	5	1	EAB, PB, D2, S2	4	-
6114	6114	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6115	6115	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	5	2	EAB, PB, D2, S2	4	-
6116	6116	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	7	3	1	EAB, PB, D2, S2	4	-
6117	6117	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	8	8	2	EAB, PB, D2, S2	4	-
6118	6118	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	14	8	1	EAB, PB, D2, S2	4	-
6119	6119	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6120	6120	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6121	6121	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	14	4	1	EAB, PB, D2, S2	4	-
6122	6122	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6123	6123	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	6	3	2	EAB, PB, D2, S2	4	-
6124	6124	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	9	10	1	EAB, PB, D2, S2	4	-
6125	6125	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6126	6126	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6127	6127	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6128	6128	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6129	6129	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	9	4	1	EAB, PB, D2, S2	4	-
6130	6130	Acer negundo	Manitoba Maple	ACENEGU	5	5	2	1	D2, BB	3	-
6131	6131	Acer negundo	Manitoba Maple	ACENEGU	6	6	4	1	D1, S2	3	-
6132	6132	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6133	6133	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	4	1	EAB, PB, D2, S2	4	-
6134	6134	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6135	6135	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6136	6136	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	7	5	1	EAB, PB, D2, S2	4	-
6137	6137	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	2	1	EAB, PB, D2, S2	4	-
6138	6138	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6139	6139	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	3	1	EAB, PB, D2, S2	4	-
6140	6140	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6141	6141	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6142	6142	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6143	6143	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6144	6144	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	5	1	EAB, PB, D2, S2	4	-
6145	6145	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, PB, D2, S2	4	-
6146	6146	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	2	1	-	1	-
6147	6147	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	1	BB, S2, D2	3	-
6148	6148	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	7	4	1	EAB, PB, D2, S2	4	-
6149	6149	Ulmus species	Elm	ULMU SP.	10.5	11	7	1	-	4	-
6150	6150	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6151	6151	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6152	6152	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6153	6153	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6154	6154	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6155	6155	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	6	7	1	EAB, PB, D2, S2	4	-
6156	6156	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	5	1	EAB, PB, D2, S2	4	-
6157	6157	Ulmus species	Elm	ULMU SP.	5	7	3	1	V	1	-
6158	6158	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6159	6159	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	7	1	EAB, PB, D2, S2	4	-
6160	6160	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6161	6161	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6162	6162	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6163	6163	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6164	6164	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	6	1	EAB, PB, D2, S2	4	-
6165	6165	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	6	1	EAB, PB, D2, S2	4	-
6166	6166	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	6	2	1	EAB, PB, D2, S2	4	-
6167	6167	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	11	4	1	EAB, PB, D2, S2	4	-
6168	6168	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6169	6169	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6170	6170	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6171	6171	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	D2, S2, BB	3	-
6172	6172	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, PB, D2, S2	4	-
6173	6173	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	1	EAB, PB, D2, S2	4	-
6174	6174	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	5	1	EAB, PB, D2, S2	4	-
6175	6175	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	4	1	EAB, PB, D2, S2	4	-
6176	6176	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	3	1	EAB, PB, D2, S2	4	-
6177	6177	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	8	4	1	EAB, PB, D2, S2	4	-
6178	6178	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	9	3	1	EAB, PB, D2, S2	4	-
6179	6179	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	5	1	EAB, PB, D2, S2	4	-
6180	6180	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	3	1	EAB, PB, D2, S2	4	-
6181	6181	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6182	6182	Rhamnus cathartica	Common Buckthorn	RHACATH	12	-	-	-	-	-	-
6183	6183	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6184	6184	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	15	4	1	EAB, D1, PB	3	-
6185	6185	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	4	1	EAB, PB, D2, S2	4	-
6186	6186	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6187	6187	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	EAB, D1, PB	3	-
6188	6188	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	15	6	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6189	6189	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	13	3	1	EAB, D1, PB	3	-
6190	6190	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6191	6191	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	4	1	EAB, D1, PB	3	-
6192	6192	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	3	2	EAB, D1, PB	3	-
6193	6193	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6194	6194	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	12	3	1	EAB, PB, D2, S2	4	-
6195	6195	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	3	1	EAB, PB, D2, S2	4	-
6196	6196	Fraxinus pennsylvanica	Green Ash	FRAPENN	9.5	13	4	1	EAB, PB, D2, S2	4	-
6197	6197	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, PB, D2, S2	4	-
6198	6198	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	13	4	1	EAB, PB, D2, S2	4	-
6199	6199	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	10	3	1	EAB, PB, D2, S2	4	-
6200	6200	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6201	6201	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6202	6202	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, D2, S2, PB, Le	4	-
6203	6203	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	5	1	-	1	-
6204	6204	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6205	6205	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6206	6206	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6207	6207	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	3	3	1	EAB, D2, S2, PB, Le	4	-
6208	6208	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	3	3	1	EAB, D2, S2, BB, Le	4	-
6209	6209	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	2	3	1	EAB, D2, S2, PB, Le	4	-
6210	6210	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	3	1	EAB, PB, D2, S2	4	-
6211	6211	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	14	5	1	EAB, PB, D1, Le	3	-
6212	6212	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	13	4	1	EAB, PB, D2, S2	4	-
6213	6213	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6214	6214	Juglans nigra	Black Walnut	JUGNIGR	12	6	7	3	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6215	6215	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6216	6216	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6217	6217	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6218	6218	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	11	3	1	EAB, PB, D2, S2	4	-
6219	6219	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	3	1	EAB, D1, PB	3	-
6220	6220	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	5	1	EAB, D1, PB	3	-
6221	6221	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	4	1	EAB, PB, D2, S2	4	-
6222	6222	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	13	3	1	EAB, PB, D2, S2	4	-
6223	6223	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	5	1	EAB, D2, S2, BB, Le	4	-
6224	6224	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	4	1	EAB, PB, D2, S2	4	-
6225	6225	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	5	1	EAB, PB, D2, S2	4	-
6226	6226	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	5	2	EAB, PB, D2, S2	4	-
6227		Not Found									
6228	6228	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	5	3	EAB, BB, D2, E	3	-
6229	6229	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	6	4	EAB, PB, D2, S2	4	-
6230	6230	Acer negundo	Manitoba Maple	ACENEGU	6	5	5	1	Le, BB, S2	3	-
6231	6231	Syringa reticulata	Silk Lilac	SYRRETI	7	7	3	1	V, BB	2	-
6232	6232	Syringa reticulata	Silk Lilac	SYRRETI	7	7	3	1	V, BB	2	-
6233	6233	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	3	1	EAB, PB, D2, S2	4	-
6234	6234	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	4	1	EAB, D1, PB	3	-
6235	6235	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	4	1	EAB, D1, PB	3	-
6236	6236	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	4	2	EAB, PB, D2, S2	4	-
6237	6237	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	6	1	EAB, PB, D2, S2	4	-
6238	6238	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, PB, D2, S2	4	-
6239	6239	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	5	1	EAB, PB, D2, S2	4	-
6240	6240	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	7	4	1	EAB, D1, PB	3	-
6241	6241	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	4	1	EAB, D1, PB	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6242	6242	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	11	6	2	EAB, D1, PB	3	-
6243	6243	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	10	5	1	EAB, D1, PB	3	No flag in field - assumption based on AOV data
6244	6244	Acer negundo	Manitoba Maple	ACENEGU	50	12	8	1	D3, BB, PB, S3	5	-
6245	6245	Acer negundo	Manitoba Maple	ACENEGU	12	5	10	2	Le, BB, V, D2, S2	4	-
6246	6246	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6247	6247	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6248	6248	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6249	6249	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6250	6250	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6251	6251	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, PB, D2, S2	4	-
6252	6252	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	3	1	EAB, PB, D2, S2	4	-
6253	6253	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	13	4	2	EAB, PB, D2, S2	4	-
6254	6254	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6255	6255	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	12	3	1	EAB, PB, D2, S2	4	-
6256	6256	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	5	1	EAB, PB, D2, S2	4	-
6257	6257	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	5	1	EAB, D2, S2, PB, Le	4	-
6258	6258	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	12	3	1	EAB, PB, D2, S2	4	-
6259	6259	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	5	1	EAB, PB, D2, S2	4	-
6260	6260	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	4	1	EAB, D1, PB	3	-
6261	6261	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	12	4	1	EAB, D1, PB	3	-
6262	6262	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	3	1	EAB, D1, PB	3	-
6263	6263	Acer negundo	Manitoba Maple	ACENEGU	6	8	6	2	BB, D2, S2	4	-
6264	6264	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6265	6265	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6266	6266	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6268	6268	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	7	2	EAB, PB, D2, S2	4	-
6269	6269	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6270	6270	Fraxinus pennsylvanica	Green Ash	FRAPENN	9.5	12	6	1	EAB, D2, S2, PB, Le	4	-
6271	6271	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	12	5	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6272	6272	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6273	6273	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	5	1	EAB, PB, D1, Le	3	-
6274	6274	Acer negundo	Manitoba Maple	ACENEGU	3	5	3	1	-	1	-
6275	6275	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	5	1	EAB, D1, PB	3	-
6276	6276	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, D2, S2, BB, Le	4	-
6277	6277	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6278	6278	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6279	6279	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6280	6280	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6281	6281	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	4	2	1	EAB, D2, S2, BB, Le	4	-
6282	6282	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, PB, D2, S2	4	-
6283	6283	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, PB, D2, S2	4	-
6284	6284	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	7	4	1	EAB, D1, PB	3	-
6285	6285	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	4	1	EAB, E	3	-
6286	6286	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	10	7	2	EAB, D2, S2, PB, Le	4	-
6287	6287	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	4	1	EAB, D2, S2, BB, Le	4	-
6288	6288	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	4	1	EAB, PB, D2, S2	4	-
6289	6289	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	4	1	EAB, PB, D2, S2	4	-
6290	6290	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	12	4	1	EAB, D2, S2, BB, Le	4	-
6291	6291	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	9	4	1	EAB, D2, S2, PB, Le	4	-
6292	6292	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	3	1	EAB, D1, PB	3	-
6293	6293	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	4	2	EAB, PB, D2, S2	4	-
6294	6294	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6295	6295	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	5	1	EAB, D2, S2, PB, Le	4	-
6296	6296	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3	3	1	EAB, D2, S1, BB, Le, V	4	
6297	6297	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	9	4	2	EAB, D3, PB	4	-
6298	6298	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6299	6299	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6300	6300	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6301	6301	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	11	3	1	EAB, PB, D2, S2	4	-
6302	6302	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6303	6303	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	5	1	EAB, PB, D2, S2	4	-
6304	6304	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	14	6	2	EAB, PB, D2, S2	4	-
6305	6305	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6306	6306	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, PB, D2, S2	4	-
6307	6307	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	3	1	EAB, PB, D2, S2	4	-
6308	6308	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6309	6309	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, PB, D2, S2	4	-
6310	6310	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	4	5	1	EAB, D2, S2, BB, Le	4	-
6311	6311	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	5	5	1	EAB, PB, D1, Le	3	-
6312	6312	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	12	5	1	EAB, PB, D2, S2	4	-
6313	6313	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	EAB, PB, D2, S2	4	-
6314	6314	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, PB, D2, S2	4	-
6315	6315	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	3	1	EAB, PB, D2, S2	4	-
6316	6316	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	EAB, D2, S2, PB, Le	4	-
6317	6317	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6318	6318	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	10	3	1	EAB, D1, PB	3	-
6319	6319	Fraxinus pennsylvanica	Green Ash	FRAPENN	9.5	14	3	1	EAB, PB, D2, S2	4	-
6320	6320	Fraxinus pennsylvanica	Green Ash	FRAPENN	9.5	15	4	1	EAB, D1, PB	3	-
6321	6321	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, PB, D2, S2	4	-
6322	6322	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	5	1	EAB, PB, D1, Le	3	-
6323	6323	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	4	1	EAB, PB, D2, S2	4	-
6324	6324	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6325	6325	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	1	EAB, PB, D2, S2	4	-
6326	6326	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6327	6327	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6328	6328	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	6	5	1	EAB, D2, S2, BB, Le	4	-
6329	6329	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	5	2	EAB, D2, S2, PB, Le	4	-
6330	6330	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	4	1	EAB, PB, D2, S2	4	-
6331	6331	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	5	1	BB, S2, D1, E	3	-
6332	6332	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	9	1	BB, S2, D1	3	-
6333	6333	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	8	1	E, D2, S2	3	-
6334	6334	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	5	1	EAB, D2, S2, PB, Le	4	-
6335	6335	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6336	6336	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	12	10	1	E, S1, D1	3	-
6337	6337	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6338	6338	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6339	6339	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	5	1	EAB, PB, D2, S2	4	-
6340	6340	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	3	1	EAB, PB, D2, S2	4	-
6341	6341	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	11	6	1	E, D2, S2	3	-
6342	6342	Fraxinus pennsylvanica	Green Ash	FRAPENN	18	15	10	1	E, D2, S2, Le	3	-
6343	6343	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	8	2	EAB, PB, D2, S2	4	-
6344	6344	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	6	1	E, S1, D1	3	-
6345	6345	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	6	2	EAB, PB, D2, S2	4	-
6346	6346	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	7	6	2	E, S2, D2, PB	3	-
6347	6347	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	5	1	FC, S2, D2	3	-
6348	6348	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6349	6349	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	5	1	E, S2, D2	3	-
6350	6350	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	3	2	1	EAB, D2, S2, PB, BB, FC	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6351	6351	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	5	1	EAB, PB, D2, S2	4	-
6352	6352	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	EAB, PB, D2, S2	4	-
6353	6353	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	6	1	D2, S1, BB	3	-
6354	6354	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	1	EAB, PB, D2, S2	4	-
6355	6355	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6356	6356	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	9	3	1	E, D1, S1, PB	3	-
6357	6357	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	7	1	Le, E, D1, S1, PB, BB	3	-
6358	6358	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	13	7	1	E, D2, S2, BB	3	-
6359	6359	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, D1, S1, BB	3	-
6360	6360	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	FC, S2, BB, D1	3	-
6361	6361	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	15	4	1	EAB, PB, D2, S2	4	-
6362	6362	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	18	4	1	EAB	3	-
6363	6363	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	10	6	2	BB, E, D1, S1	3	-
6364	6364	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	5	1	E, D2, BB	3	-
6365	6365	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	4	1	S2, D2, BB, Le	3	-
6366	6366	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6367	6367	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	7	3	1	D1	2	-
6368	6368	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	E, D2	3	-
6369	6369	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6370	6370	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	6	3	1	EAB, PB, D2, S2	4	-
6371	6371	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	5	1	EAB, PB, D2, S2	4	-
6372	6372	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	6	2	1	EAB, PB, D2, S2	4	-
6373	6373	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	2	1	E, D2, S2	3	-
6374	6374	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6375	6375	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	IB, D1, S1	3	-
6376	6376	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	4	2	1	D1, BB	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6377	6377	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	EAB, PB, D2, S2	4	-
6378	6378	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6379	6379	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	9	5	1	E, D2, S1	3	-
6380	6380	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	EAB, PB, D2, S2	4	-
6381	6381	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6382	6382	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	9	4	1	EAB, PB, D2, S2	4	-
6383	6383	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	10	8	1	E, BB, D2	3	-
6384	6384	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	3	1	D2, BB, PB, S2	3	-
6385	6385	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	8	8	2	EAB, PB, D2, S2	4	-
6386	6386	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	7	2	D2, BB, E	3	-
6387	6387	Fraxinus pennsylvanica	Green Ash	FRAPENN	9.5	10	6	1	EAB, PB, D2, S2	4	-
6388	6388	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	14	6	1	BB, D2	3	-
6389	6389	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	11	4	1	EAB, PB, D2, S2	4	-
6390	6390	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6391	6391	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	5	1	EAB, PB, D2, S2	4	-
6392	6392	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	11	7	2	EAB, PB, D2, S2	4	-
6393	6393	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	4	1	D2, S2, BB	3	-
6394	6394	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6395	6395	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	EAB, PB, D2, S2	4	-
6396	6396	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	6	1	EAB, PB, D2, S2	4	-
6397	6397	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	6	2	EAB, PB, D2, S2	4	-
6398	6398	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6399	6399	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	9	5	2	EAB, PB, D2, S2	4	-
6400	6400	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	11	4	1	EAB, PB, D2, S2	4	-
6401	6401	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	13	5	2	EAB, PB, D2, S2	4	-
6402	6402	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	3	1	E, D2	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6403	6403	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	3	1	D2, FC, E	3	-
6404	6404	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	5	1	EAB, D1, BB, PB, V	3	-
6405	6405	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	12	6	2	EAB, PB, D2, S2	4	-
6406	6406	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	8	2	EAB, PB, D2, S2	4	-
6407	6407	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	5	1	D2, BB	3	-
6408	6408	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	2	S2, D2, BB	3	-
6409	6409	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6410	6410	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	10	4	2	EAB, D1, S1, BB	3	-
6411	6411	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	4	1	EAB, PB, D2, S2	4	-
6412	6412	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	13	7	2	EAB, PB, D2, S2	4	-
6413	6413	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	13	5	1	EAB, PB, D2, S2	4	-
6414	6414	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	7	1	EAB, D2, S2, BB, FC	4	-
6415	6415	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	10	2	EAB, PB, D2, S2	4	-
6416	6416	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	18	8	2	V, D2	3	-
6417	6417	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	18	5	1	EAB, D1, PB	3	-
6418	6418	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	17	6	1	EAB, PB, D2, S2	4	-
6419	6419	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	17	6	1	EAB, PB, D2, S2	4	-
6420	6420	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	17	5	1	EAB, PB, D2, S2	4	-
6421	6421	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6422	6422	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6423	6423	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6424	6424	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	13	4	1	EAB, PB, D2, S2	4	-
6425	6425	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6426	6426	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	17	5	1	EAB, PB, D2, S2	4	-
6427	6427	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6428	6428	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6429	6429	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	4	1	EAB, PB, D2, S2	4	-
6430	6430	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	17	8	1	S2, D2, BB	3	-
6431	6431	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	8	6	1	FC, S3, EAB, BB	4	-
duplicate	6431	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	10	1	EAB, PB, D2, S2	4	-
6432	6432	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	8	1	EAB, PB, D2, S2	4	-
6433	6433	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	16	7	1	EAB, PB, D2, S2	4	-
6434	6434	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	13	7	1	EAB, PB, D2, S2	4	-
6435	6435	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6436	6436	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6437	6437	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6438	6438	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6439	6439	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	14	8	1	EAB, PB, D2, S2	4	-
6440	6440	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6441	6441	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	14	6	1	EAB, PB, D2, S2	4	-
6442	6442	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6443	6443	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6444	6444	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6445	6445	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6446	6446	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6447	6447	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	5	1	EAB, PB, D2, S2	4	-
6448	6448	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6449	-	Not Found	-	-	-	-	-	-	-	-	-
6450	6450	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6451	6451	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6452	6452	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6453	6453	Fraxinus pennsylvanica	Green Ash	FRAPENN	17	15	6	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6454	6454	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	12	6	1	EAB, PB, D2, S2	4	-
6455	6455	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	10	4	1	EAB, PB, D2, S2	4	-
6456	6456	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6457	6457	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	4	1	EAB, PB, D2, S2	4	-
6458	6458	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	13	5	1	EAB, PB, D2, S2	4	-
6459	6459	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6460	6460	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6461	6461	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	3	1	EAB, PB, D2, S2	4	-
6462	6462	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6463	6463	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6464	6464	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	14	3	1	EAB, D1, PB	3	-
6465	6465	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6466	6466	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6467	6467	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6468	6468	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6469	6469	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6470	6470	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6471	6471	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	8	8	1	EAB, PB, D2, S2	4	-
6472	6472	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	12	3	1	EAB, PB, D2, S2	4	-
6473	6473	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	11	3	1	EAB, PB, D2, S2	4	-
6474	6474	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6475	6475	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6476	6476	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6477	6477	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	4	1	E, BB, D2	3	-
6478	6478	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	14	7	2	EAB, PB, D2, S2	4	-
6479	6479	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	7	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6480	6480	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	3	1	EAB, PB, D2, S2	4	-
6481	6481	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6482	6482	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6483	6483	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	2	1	EAB, PB, D2, S2	4	-
6484	6484	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6485	6485	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	11	2	1	EAB, PB, D2, S2	4	-
6486	6486	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6487	6487	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	14	3	1	EAB, PB, D2, S2	4	-
6488	6488	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	3	1	EAB, PB, D2, S2	4	-
6489	6489	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	9	2	1	EAB, PB, D2, S2	4	
6490	6490	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	9	2	1	EAB, PB, E	3	-
6491	6491	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	11	2	1	EAB, PB, D2, S2	4	-
6492	6492	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6493	6493	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6494	6494	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6495	6495	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6496	6496	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6497	6497	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	5	1	EAB, PB, D2, S2	4	-
6498	6498	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6499	6499	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6500	6500	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6501	6501	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6502	6502	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	4	1	EAB, D1, PB	3	-
6503	6503	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	11	3	1	EAB, PB, D2, S2	4	-
6504	6504	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	11	5	1	EAB, PB, D2, S2	4	-
6505	6505	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	3	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
duplicate	6505	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
6506	6506	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6507	6507	Fraxinus pennsylvanica	Green Ash	FRAPENN	18	13	6	1	EAB, PB, D2, S2	4	-
6508	6508	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	11	2	1	EAB, PB, D2, S2	4	-
6509	6509	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6510	6510	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6511	6511	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	4	1	EAB, D1, PB	3	-
6512	6512	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	4	1	EAB, PB, D2, S2	4	-
6513	6513	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6514	6514	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	4	1	EAB, PB, D2, S2	4	-
6515	6515	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	11	3	1	EAB, PB, D2, S2	4	-
6516	6516	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6517	6517	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	11	3	1	EAB, PB, D2, S2	4	-
6518	6518	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6519	6519	Acer negundo	Manitoba Maple	ACENEGU	4	5	2	1	Le, BB	2	-
duplicate	6519	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	1	EAB, PB, D2, S2	4	-
6520	6520	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6521	6521	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6522	6522	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	4	1	EAB, PB, D2, S2	4	-
6523	6523	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	12	5	1	EAB, PB, D2, S2	4	-
6524	6524	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	3	1	EAB, PB, D2, S2	4	-
6525	6525	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6526	6526	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6527	6527	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	6	4	1	EAB, PB, D2, S2	4	-
6528	6528	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	4	1	EAB, PB, D2, S2	4	-
6529	6529	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	4	1	EAB, PB, D2, S2	4	-
6530	6530	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	7	7	3	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6531	6531	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6532	6532	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6533	6533	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6534	6534	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	EAB, D1, PB	3	-
6535	6535	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	10	3	1	EAB, PB, D2, S2	4	-
6536	6536	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6537	6537	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	3	1	EAB, PB, D2, S2	4	-
6538	6538	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	9	3	1	EAB, PB, D2, S2	4	-
6539	6539	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	13	4	1	EAB, PB, D2, S2	4	-
6540	6540	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6541	6541	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	14	6	1	EAB, PB, D2, S2	4	-
6542	6542	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	EAB, PB, D2, S2	4	-
6543	6543	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	3	1	EAB, PB, D2, S2	4	-
6544	6544	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, D1, PB	3	-
6545	6545	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	7	3	1	S1, D1,EAB	3	-
6546	6546	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	5	1	EAB, PB, D2, S2	4	-
6547	6547	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	6	2	EAB, PB, D2, S2	4	-
6548	6548	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	6	1	EAB, D2, S1, BB, V	4	-
6549	6549	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6550	6550	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6551	6551	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	13	8	3	EAB, PB, D2, S2	4	-
6552	6552	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	7	2	EAB, D1, PB	3	-
6553	6553	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	7	2	EAB, PB, D2, S2	4	-
6554	6554	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	6	1	EAB, D1, PB	3	-
6555	6555	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	7	4	1	EAB, D1, PB	3	-
6556	6556	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	7	1	EAB, PB, D2, S2	4	-
6557	6557	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	12	7	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6558	6558	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	EAB, BB, Le	3	-
6559	6559	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	3	1	EAB, PB, D2, S2	4	-
6560	6560	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	4	1	EAB, PB, D2, S2	4	-
6561	6561	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6562	6562	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6563	6563	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	FC, S1, D1	2	-
6564	6564	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, PB, D2, S2	4	-
6565	6565	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	4	1	EAB, PB, D2, S2	4	-
6566	6566	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	5	1	EAB, PB, D2, S2	4	-
6567	6567	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6568	6568	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	13	5	1	EAB, PB, D2, S2	4	-
6569	6569	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	5	1	EAB, D2, S2, BB, Le	4	-
6570	6570	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	4	1	EAB, D2, S2, PB, Le	4	-
6571	6571	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	9	3	1	EAB, PB, D2, S2	4	-
6572	6572	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	14	4	1	EAB, PB, D2, S2	4	-
6573	6573	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6574	6574	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6575	6575	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	5	1	EAB, PB, D2, S2	4	-
6576	6576	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6577	6577	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6578	6578	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6579	6579	Syringa reticulata	Silk Lilac	SYRRETI	5	6	3	1	-	1	-
6580	6580	Syringa reticulata	Silk Lilac	SYRRETI	7	7	4	1	BB, D1, S1	2	-
6581	6581	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	3	1	EAB, PB, D2, S2	4	-
6582	6582	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	10	7	EAB, PB, D2, S2	4	-
6583	6583	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6584	6584	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6585	6585	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	11	5	1	EAB, D2, S2, BB, Le	4	-
6586	6586	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	4	4	1	S1	2	-
6587	6587	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	3.5	3	1	S1	2	-
6588	6588	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	10	3	EAB, PB, D2, S2	4	-
6589	6589	Acer rubrum	Red Maple	ACERUBR	27	13	5	1	FC, E	1	-
6590	6590	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6591	6591	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6592	6592	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6593	6593	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	12	3	1	EAB, E, PB, D3	4	-
6594	6594	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6595	6595	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	3	2	EAB, E, PB, D3	4	-
6596	6596	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	flagged as 6567 in field
6597	6597	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	6	-
6598	6598	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6599	6599	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6600	6600	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6601	6601	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	3	1	EAB, E, PB, D3	4	-
6602	6602	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6603	6603	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6604	6604	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	3	5	4	NL, Le, EAB, PB, D2	4	-
6605	6605	Acer negundo	Manitoba Maple	ACENEGU	4	4	4	4	BB, D1	2	-
6606	6606	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	13	7	2	EAB, E, PB, D3	4	-
6607	6607	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	20	3	1	EAB, E, PB, D3	4	-
6608	6608	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	7	3	1	EAB, E, PB, D3	4	-
6609	6609	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6610	6610	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	15	5	3	EAB, E, PB, D3	4	-
6611	6611	Juglans nigra	Black Walnut	JUGNIGR	6	7	5	5	BB, S1	2	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6612	6612	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	4	1	EAB, PB	4	-
6613	6613	Acer negundo	Manitoba Maple	ACENEGU	6	10	4	1	BB, D2, S2, Le	4	-
6614	6614	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6615	6615	Acer ginnala	Amur Maple	ACEGINN	10	5	5	1	NL	4	-
6616	6616	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6617	6617	Acer negundo	Manitoba Maple	ACENEGU	6	6	2	1	Le	1	-
6618	6618	Syringa reticulata	Silk Lilac	SYRRETI	7	4	5	1	T-P, BB, D1	2	-
6619	6619	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	4	1	EAB, D2, S2, PB, Le	4	-
6620	6620	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	4	1	EAB, E, PB, D3	4	-
6621	6621	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, E, PB, D3	4	-
6622	6622	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6623	6623	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, E, PB, D3	4	-
6624	6624	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	EAB, E	3	-
6625	6625	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	4	1	EAB, E, PB, D3	4	-
6626	6626	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	3	1	EAB, E, PB, D3	4	-
6627	6627	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	5	3	1	Le, EAB, D3, E	4	-
6628	6628	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	5	10	4	EAB, E	3	-
6629	6629	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6630	6630	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	5	1	EAB, E, PB, D3	4	-
6631	6631	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	3	1	EAB, E, PB, D3	4	-
6632	6632	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6633	6633	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	7	1	EAB, PB, D2, S2	4	-
6634	6634	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6635	6635	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6636	6636	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6637	6637	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6638	6638	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, E	3	-
6639	6639	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	4	1	-	1	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6640	6640	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	3	1	BB, D1, S1	2	-
6641	6641	Fraxinus pennsylvanica	Green Ash	FRAPENN	11.5	15	8	2	EAB, E, PB, D3	4	-
6642	6642	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
6643	6643	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	4	1	EAB, E	3	-
6644	6644	Acer negundo	Manitoba Maple	ACENEGU	3.5	5	3	2	-	1	-
6645	6645	Acer negundo	Manitoba Maple	ACENEGU	15	7	8	1	Le	1	-
6646	6646	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	8	2	EAB, E, PB, D3	4	-
6647	6647	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6648	6648	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	1	-	1	-
6649	6649	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	4	1	BB, D1, S1	2	-
duplicate	6649	Syringa reticulata	Silk Lilac	SYRRETI	5.5	7	5	2	-	1	-
6650	6650	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	13	5	1	BB, D1, S1	2	-
6651	6651	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	12	2	1	EAB, E, PB, D3	4	-
6652	6652	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	2	1	EAB, E, PB, D3	4	-
6653	6653	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	3	1	EAB, E	3	-
6654	6654	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6655	6655	Syringa reticulata	Silk Lilac	SYRRETI	7	8	4	1	-	1	-
6656	6656	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, E, PB, D3	4	-
6657	6657	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, E, PB, D3	4	-
6658	6658	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6659	6659	Syringa reticulata	Silk Lilac	SYRRETI	6	8	4	1	-	1	-
6660	6660	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6661	6661	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	5	1	EAB, E, PB, D3	4	-
6662	6662	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	5	2	EAB, E, PB, D3	4	-
6663	6663	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6664	6664	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	2	1	S1, D1, BB	2	-
6665	6665	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	9	2	1	EAB, E	3	-
6666	6666	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	13	4	1	EAB, E	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6667	6667	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6668	6668	Syringa reticulata	Silk Lilac	SYRRETI	5	7	2	1	-	1	-
6669	6669	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	15	3	1	EAB, E, PB, D3	4	-
6670	6670	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6671	6671	Acer negundo	Manitoba Maple	ACENEGU	5.5	5	5	3	-	1	-
6672	6672	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6673	6673	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6674	6674	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	17	8	2	EAB, E, PB, D3	4	-
6675	6675	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	3	1	EAB, E, PB, D3	4	-
6676	6676	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6677	6677	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6678	6678	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6679	6679	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6680	6680	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6681	6681	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	4	1	EAB, E, PB, D3	4	-
6682	6682	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	3	1	EAB, E	3	-
6683	6683	Acer negundo	Manitoba Maple	ACENEGU	7	10	3	1	BB, S1	2	-
6684	6684	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	13	5	1	EAB, E	3	-
6685	6685	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	12	6	1	EAB, E, PB, D3	4	-
6686	6686	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	12	5	1	EAB, E, PB, D3	4	-
6687	6687	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	6	1	EAB, E, PB, D3	4	-
6688	6688	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6689	6689	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6690	6690	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	5	1	EAB, E, PB, D3	4	-
6691	6691	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6692	6692	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6693	6693	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
6694	6694	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6695	6695	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6696	6696	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6697	6697	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6698	6698	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	15	8	1	EAB, E, PB, D3	4	-
6699	6699	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6700	6700	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	9	10	1	EAB, E, PB, D3	4	-
6701	6701	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	6	1	EAB, E, PB, D3	4	-
6702	6702	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	14	7	1	EAB, E, PB, D3	4	-
6703	6703	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6704	6704	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	4	1	EAB, E, PB, D3	4	-
6705	6705	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	11	5	1	EAB, E, PB, D3	4	-
6706	6706	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6707	6707	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6708	6708	Acer negundo	Manitoba Maple	ACENEGU	5	7	4	1	BB, E, S1	3	-
6709	6709	Acer negundo	Manitoba Maple	ACENEGU	4	5	3	1	E, S1, Le	3	-
6710	6710	Syringa reticulata	Silk Lilac	SYRRETI	5	5	3	1	-	1	-
6711	6711	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6712	6712	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	3	1	EAB, E, PB, D3	4	-
6713	6713	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
6714	6714	Acer negundo	Manitoba Maple	ACENEGU	3	5	2	1	-	1	-
6715	6715	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
not documented	6770	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
not documented	6806	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
not documented	6811	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	2	1	EAB, E, PB, D3	4	-
not documented	6812	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	F
8000	8000	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	SAME AS 5280
8001	8001	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8002	8002	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8003	8003	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8004	8004	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8005	8005	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8006	8006	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8007	8007	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8008	8008	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8009	8009	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8010	8010	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8011	8011	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8012	8012	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8013	8013	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8014	8014	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8015	8015	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8016	8016	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8017	8017	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8018	8018	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8019	8019	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8020	8020	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8021	8021	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8022	8022	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8023	8023	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8024	8024	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8025	8025	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8026	8026	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8027	8027	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	3	1	EAB, E, PB, D3	4	-
8028	8028	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8029	8029	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	
8030	8030	Fraxinus pennsylvanica	Green Ash	FRAPENN	12.5	12	5	2	EAB, PB	3	-
8031	8031	Fraxinus pennsylvanica	Green Ash	FRAPENN	12.5	11	6	2	EAB, E, PB, D3	4	-
8032	8032	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8033	8033	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	10	5	EAB, E, PB, D3	4	-
8034	8034	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	6	2	EAB, E, PB, D3	4	-
8035	8035	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	5	2	EAB, E	3	-
8036	8036	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	6	2	EAB, E, PB, D3	4	-
8037	8037	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	13	5	2	EAB, E, PB, D3	4	-
8038	8038	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	15	6	2	EAB, E, PB, D3	4	-
8039	8039	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8040	8040	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8041	8041	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8042	8042	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8043	8043	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8044	8044	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8045	8045	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8046	8046	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8047	8047	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8048	8048	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8049	8049	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8050	8050	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	4	1	EAB, E, PB, D3	4	-
8051	8051	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	11	3	1	EAB, E, PB, D3	4	-
8052	8052	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8053	8053	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8054	8054	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8055	8055	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8056	8056	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	1	-	1	-
8057	8057	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8058	8058	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8059	8059	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8060	8060	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8061	8061	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8062	8062	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8063	8063	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8064	8064	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8065	8065	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8066	8066	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8067	8067	Acer ginnala	Amur Maple	ACEGINN	TS	-	-	-	-	-	-
8068	8068	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8069	8069	Acer ginnala	Amur Maple	ACEGINN	6	5	7	5	-	1	-
8070	8070	Acer ginnala	Amur Maple	ACEGINN	TS	-	-	-	-	-	-
8071	8071	Acer ginnala	Amur Maple	ACEGINN	TS	-	-	-	-	-	-
8072	8072	Acer ginnala	Amur Maple	ACEGINN	4.5	5	4	4	Le, S1, BB	2	-
8073	8073	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	3	3	D1	2	-
8074	8074	Acer ginnala	Amur Maple	ACEGINN	TS	-	-	-	-	-	-
8075	8075	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8076	8076	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8077	8077	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8078	8078	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	12	6	2	EAB, PB, D2, S2	4	-
8079	8079	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	6	3	EAB, E, BB	3	-
8080	8080	Acer ginnala	Amur Maple	ACEGINN	3	3	4	2	IB, BB, Le	3	-
8081	8081	Acer ginnala	Amur Maple	ACEGINN	3	5	5	2	-	1	-
8082	8082	Acer ginnala	Amur Maple	ACEGINN	3	3	5	2	-	1	-
8083	8083	Acer ginnala	Amur Maple	ACEGINN	4	4	4	1	-	1	-
8084	8084	Acer ginnala	Amur Maple	ACEGINN	3	3	3	1	-	1	-
8085	8085	Acer ginnala	Amur Maple	ACEGINN	5	5	5	1	-	1	-
8086	8086	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	8088 GROWING INTO IT
8087	8087	Acer ginnala	Amur Maple	ACEGINN	10	7	3	1	-	3	-
8088	8088	Acer ginnala	Amur Maple	ACEGINN	9	6	8	5	BB, S2, D1	3	-
8089	8089	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8090	8090	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8091	8091	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8092	8092	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8093	8093	Acer ginnala	Amur Maple	ACEGINN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8094	8094	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8095	8095	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, E	3	-
8096	8096	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	7	3	1	EAB, E, PB, D3	4	-
8097	8097	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8098	8098	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8099	8099	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	5	1	EAB, E, PB, D3	4	-
8100	8100	Acer negundo	Manitoba Maple	ACENEGU	7	5	3	1	Le, NL	3	-
8101	8101	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8102	8102	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8103	8103	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8104	8104	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8105	8105	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8106	8106	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8107	8107	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8108	8108	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	4	2	Le, EAB, D3, E	4	-
8109	8109	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	4	1	EAB, E, PB, D3	4	-
8110	8110	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8111	8111	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8112	8112	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	2	1	EAB, E, PB, D3	4	-
8113	8113	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, E, PB, D3	4	-
8114	8114	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8115	8115	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8116	8116	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8117	8117	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	6	3	1	EAB, PB, D2, S2	4	-
8118	8118	Tilia cordifolia	Littleleaf Linden	TILCORD	3	4	2	1	-	1	-
8119	8119	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8120	8120	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8121	8121	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	11	4	1	EAB, E, PB, D3	4	-
8122	8122	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8123	8123	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8124	8124	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	3	1	EAB, E, PB, D3	4	-
8125	8125	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8126	8126	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8127	8127	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8128	8128	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8129	8129	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	3	2	EAB, E	3	-
8130	8130	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	4	2	1	EAB, E	3	-
8131	8131	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8132	8132	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	4	1	EAB, E	3	-
8133	8133	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8134	8134	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	EAB, E, PB, D3	4	-
8135	8135	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8136	8136	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8137	8137	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8138	8138	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	4	1	EAB, E	3	-
8139	8139	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8140	8140	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8141	8141	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8142	8142	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8143	8143	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	11	4	2	EAB, E, PB, D3	4	-
8144	8144	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8145	8145	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8146	8146	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	7	2	1	EAB, E, PB, D3	4	-
8147	8147	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8148	8148	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8149	8149	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	8	2	EAB, E, PB, D3	4	-
8150	8150	Acer negundo	Manitoba Maple	ACENEGU	3	1	2	1	Le	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8151	8151	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8152	8152	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8153	8153	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8154	8154	Acer negundo	Manitoba Maple	ACENEGU	5	7	2	1	-	1	-
8155	8155	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8156	8156	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	4	1	EAB, E, PB, D3	4	-
8157	8157	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
8158	8158	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8159	8159	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	3	1	EAB, E, PB, D3	4	-
8160	8160	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	3	1	EAB, E, PB, D3	4	-
8161	8161	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8162	8162	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	15	10	2	EAB, E, PB, D3	4	-
8163	8163	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8164	8164	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, E	3	-
8165	8165	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8166	8166	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8167	8167	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8168	8168	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8169	8169	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8170	8170	Acer negundo	Manitoba Maple	ACENEGU	3	3	3	1	-	3	-
8171	8171	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8172	8172	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	S1, D1	2	-
8173	8173	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8174	8174	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8175	8175	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	9	3	1	EAB, E	3	-
8176	8176	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	14	2	1	EAB, E, PB, D3	4	-
8177	8177	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	5	1	EAB, E, PB, D3	4	-
8178	8178	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8179	8179	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8180	8180	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8181	8181	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	6	1	EAB, E, PB, D3	4	-
8182	8182	Acer negundo	Manitoba Maple	ACENEGU	3	3	2	1	D1, BB, Le	4	-
duplicate	8182	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	-	5	-
8183	8183	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8184	8184	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8185	8185	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8186	8186	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-
8187	8187	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	15	4	1	EAB, E, PB, D3	4	-
8188	8188	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8189	8189	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8190	8190	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8191	8191	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8192	8192	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8193	8193	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8194	8194	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8195	8195	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	4	1	EAB, PB, D2, S2	4	-
8196	8196	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, E, PB, D3	4	-
8197	8197	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8198	8198	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8199	8199	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	15	4	1	EAB, E, PB, D3	4	-
8200	8200	Ulmus americana	White Elm	ULMAMER	8	9	4	1	D1	2	-
8201	8201	Acer negundo	Manitoba Maple	ACENEGU	14	13	5	1	BB, Le, D1, S1, E	3	-
8202	8202	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	3	1	EAB, E, PB, D3	4	-
8203	8203	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	3	1	EAB, E, PB, D3	4	-
8204	8204	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	15	8	1	EAB, E, PB, D3	4	-
8205	8205	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	4	1	EAB, E, PB, D3	4	-
8206	8206	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	6	5	1	Le, EAB, D3, E	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8207	8207	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	5	1	EAB, E, PB, D3	4	-
8208	8208	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	14	3	1	EAB, E, PB, D3	4	-
8209	8209	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8210	8210	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	EAB, E	3	-
8211	8211	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8212	8212	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	14	5	1	EAB, E	3	-
8213	8213	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8214	8214	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	2	EAB, E, PB, D3	4	-
8215	8215	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	4	4	1	Le, EAB, E	3	-
8216	8216	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8217	8217	Celtis occidentalis	Hackberry	CELOCCI	3	4	1.5	1	-	1	-
8300	8300	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8301	8301	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8302	8302	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8303	8303	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8304	8304	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8305	8305	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8306	8306	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8307	8307	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8308	8308	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8309	8309	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8310	8310	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8311	8311	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8312	8312	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8313	8313	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8314	8314	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8315	8315	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8316	8316	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8317	8317	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8318	8318	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8319	8319	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8320	8320	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8321	8321	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8322	8322	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8323	8323	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	10	5	2	EAB, PB, D2, S2	4	-
8324	8324	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8325	8325	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8326	8326	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8327	8327	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8328	8328	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
8329	8329	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	3	1	EAB, E, PB, D3	4	-
8330	8330	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8331	8331	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8332	8332	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8333	8333	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	13	6	1	E, S2, D2, EAB	4	-
8334	8334	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8335	8335	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8336	8336	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8337	8337	Unknown species	Unknown species	UNKNOWN	TS	-	-	-	-	-	-
8338	8338	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8339	8339	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	14	6	1	EAB, E, PB, D3	4	-
8340	8340	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8341	8341	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	9	10	1	EAB, E, PB, D3	4	-
8342	8342	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	9	4	1	EAB, E, PB, D3	4	-
8343	8343	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8344	8344	Fraxinus pennsylvanica	Green Ash	FRAPENN	13.5	20	8	2	EAB, E, PB, D3	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8345	8345	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	13	4	3	EAB, E, BB	4	-
8346	8346	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8347	8347	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	13	4	1	EAB, E, D2, S2	4	-
8348	8348	Acer negundo	Manitoba Maple	ACENEGU	16	12	10	1	D2, Le, S2, BB	4	-
8349	8349	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8350	8350	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8351	8351	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	14	6	1	EAB, E, PB, D3	4	-
8352	8352	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8353	8353	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8354	8354	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	3	1	EAB, E, PB, D3	4	-
8355	8355	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8356	8356	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8357	8357	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	14	8	2	EAB, E, PB, D3	4	-
8358	8358	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	16	8	1	EAB, E	3	-
8359	8359	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	5	5	1	EAB, D1, E	2	-
8360	8360	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8361	8361	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8362	8362	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	8	3	EAB, E, PB, D3	4	-
8363	8363	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8364	8364	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	4	1	EAB, E	3	-
8365	8365	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8366	8366	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8367	8367	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	3	1	EAB, E, PB, D3	4	-
8368	8368	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8369	8369	Fraxinus pennsylvanica	Green Ash	FRAPENN	19	15	8	1	EAB, E, PB, D3	4	-
8370	8370	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8371	8371	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8372	8372	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8373	8373	Prunus serotina	Black Cherry	PRUSERO	24	10	4	1	T-P, PB, D3, S3	4	
8374	8374	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	9	2	2	EAB, PB	4	-
8375	8375	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	8	10	1	EAB, E, PB, D3	4	-
8376	8376	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8377	8377	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8378	8378	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8379	8379	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8380	-	Not Found	-	-	-	-	-	-	-	-	-
8381	8381	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8382	8382	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	13	5	1	EAB, E, PB, D3	4	-
8383	8383	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	12	2	EAB, E, PB, D3	4	-
8384	8384	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-
8385	8385	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8386	8386	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	4	1	EAB, E, PB, D3	4	-
8387	8387	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8388	8388	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	9	10	1	EAB, E, PB, D3	4	-
8389	8389	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8390	8390	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8391	8391	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8392	8392	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	10	3	1	EAB, PB, D2, S2	4	-
8393	8393	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8394	8394	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8395	8395	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8396	8396	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8397	8397	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8398	8398	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8399	8399	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8400	8400	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8401	8401	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8402	8402	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	5	7	1	EAB, PB, D2, S2	4	-
8403	8403	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8404	8404	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8405	8405	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8406	8406	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8407	8407	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8408	8408	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8409	8409	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8410	8410	Acer negundo	Manitoba Maple	ACENEGU	3	5	3	1	Le	1	-
8411	8411	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8412	8412	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8413	8413	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8414	8414	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8415	8415	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	3	1	EAB, PB, D2, S2	4	-
8416	8416	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	6	5	2	EAB, BB, S2	3	-
8417	8417	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8418	8418	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8419	8419	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8420	8420	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	4	1	EAB, S1, BB	3	-
8421	8421	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8422	8422	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8423	8423	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8424	8424	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	S1, BB	2	-
8425	8425	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8426	8426	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8427	8427	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8428	8428	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	4	1	EAB, PB, D2, S2	4	-
8429	8429	Acer negundo	Manitoba Maple	ACENEGU	TS	-	-	-	-	-	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8430	8430	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	15	4	1	EAB, PB, D2, S2	4	-
8431	8431	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8432	8432	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	2	1	EAB, PB, D2, S2	4	-
8433	8433	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8434	8434	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8435	8435	Fallopia japonica	Japanese Knotweed	FALJAPO	TS	-	-	-	-	-	-
8436	8436	Unknown species	Unknown species	UNKNOWN	TS	-	-	-	-	-	-
8437	8437	Fraxinus pennsylvanica	Green Ash	FRAPENN	18	18	9	1	EAB, PB, D2, S2	4	-
8438	8438	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8439	8439	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8440	8440	Fraxinus pennsylvanica	Green Ash	FRAPENN	13.5	18	8	2	EAB, PB, D2, S2	4	-
8441	8441	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8442	8442	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8443	8443	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8444	8444	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	9	10	1	EAB, PB, D2, S2	4	-
8445	8445	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	8	1	EAB, PB, D2, S2	4	-
8446	8446	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8447	8447	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8448	8448	Fallopia japonica	Japanese Knotweed	FALJAPO	TS	-	-	-	-	-	-
8449	8449	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	5	1	EAB, PB, D2, S2	4	-
8450	8450	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8451	8451	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8452	8452	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	13	8	1	EAB, PB, D2, S2	4	-
8453	8453	Fallopia japonica	Japanese Knotweed	FALJAPO	TS	-	-	-	-	-	-
8454	8454	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8455	8455	Fallopia japonica	Japanese Knotweed	FALJAPO	TS	-	-	-	-	-	-
8456	8456	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	2	1	EAB, PB, D2, S2	4	-
8457	8457	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8458	8458	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8459	8459	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8460	8460	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8461	8461	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	15	10	2	EAB, PB, D2, S2	4	-
8462	8462	Acer negundo	Manitoba Maple	ACENEGU	5	8	5	2	Le, E, D1	3	-
8463	8463	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8464	8464	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	8	3	EAB, PB, D2, S2	4	-
8465	8465	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8466	8466	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	3	1	EAB, PB, D2, S2	4	-
8467	8467	Fallopia japonica	Japanese Knotweed	FALJAPO	TS	-	-	-	-	-	-
8468	8468	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	15	10	4	EAB, D2, S2, PB, Le	4	-
8469	8469	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	5	2	EAB, BB, S2	3	-
8470	8470	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	5	3	1	EAB, D2, S2, BB, Le	4	-
8471	8471	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	4	1	IB, S2, EAB	3	-
8472	8472	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8473	8473	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	18	6	3	EAB, PB, D2, S2	4	-
8474	8474	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8475	8475	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	2	1	S1	3	-
8476	8476	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	3	2	S1, BB, D2	3	-
8477	8477	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	4	1	1	EAB, PB, D2, S2	4	-
8478	8478	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8479	8479	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	6	2	EAB, PB, D2, S2	4	-
8480	8480	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8481	8481	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8482	8482	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8483	8483	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8484	8484	Acer negundo	Manitoba Maple	ACENEGU	5.5	5	2	1	-	1	-
8485	8485	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
8486	8486	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8487	8487	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8488	8488	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8489	8489	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8490	8490	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	13	4	1	EAB, PB, D2, S2	4	-
8491	8491	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8492	8492	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8493	8493	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8494	8494	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8495	8495	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8496	8496	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	3	EAB, PB, D2, S2	4	-
8497	8497	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8498	8498	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	3	1	E, S1, D1, BB	3	-
8499	8499	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	7	2	EAB, PB, D2, S2	4	-
8500	8500	Acer negundo	Manitoba Maple	ACENEGU	8	15	3	1	-	4	-
duplicate	8500	Fraxinus pennsylvanica	Green Ash	FRAPENN	17	18	5	1	EAB, PB, D2, S2	4	-
8501	8501	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	20	8	2	EAB, PB, D2, S2	4	-
8502	8502	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	10	8	1	E, BB, D1, S1	3	-
8503	8503	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8504	8504	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8505	8505	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	4	1	E, S1, BB	3	-
8506	8506	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8507	8507	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	3	1	EAB, PB, D2, S2	4	-
8508	8508	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	18	6	1	EAB, PB, D2, S2	4	-
8509	8509	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8510	8510	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	10	4	1	BB, S2, D1	3	-
8511	8511	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8512	8512	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	-	SAME AS 8513
8513	8513	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	2	1	EAB, PB, D2, S2	4	-
8514	8514	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8515	8515	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	6	1	EAB, PB, D2, S2	4	-
8516	8516	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8517	8517	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	EAB, PB, D2, S2	4	-
8518	8518	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	10	2	1	EAB, PB, D2, S2	4	-
8519	8519	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8520	8520	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	E, BB, S1, D1	3	-
8521	8521	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	E, BB, S1, D1	3	-
8522	8522	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	3	1	E, S1, BB	3	-
8523	8523	Tilia cordifolia	Littleleaf Linden	TILCORD	4.5	5	5	1	Le	1	-
8524	8524	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	11	3	2	E, S1, BB	3	-
8525	8525	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	20	6	2	EAB, PB, D2, S2	4	-
8526	8526	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	-	SAME AS 8527
8527	8527	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	20	7	2	EAB, PB, D2, S2	4	-
8528	8528	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	20	5	1	EAB, PB, D2, S2	4	-
8529	8529	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	5	1	EAB, PB, D2, S2	4	-
8530	8530	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	5	1	E, BB, S1	3	-
8531	8531	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8532	8532	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8533	8533	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8534	8534	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8535	8535	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8536	8536	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8537	8537	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8538	8538	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	4	1	EAB, D2, S2, BB, Le	4	-
8539	8539	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	5	3	1	E, S1, D2	3	-
8540	8540	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	9	4	1	EAB, PB, D2, S2	4	-
8541	8541	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8542	8542	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	2	1	EAB, PB, D2, S2	4	-
8543	8543	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8544	8544	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8545	8545	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	12	5	1	EAB, PB, D2, S2	4	-
8546	8546	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8547	8547	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	14	4	1	EAB, PB, D2, S2	4	-
8548	8548	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8549	8549	Acer platanoides	Norway Maple	ACEPLAT	4.5	4	6	4	FC, T-P, D1, BB	3	-
8550	8550	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	3	1	EAB, PB, D2, S2	4	-
8551	8551	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
8552	8552	Acer negundo	Manitoba Maple	ACENEGU	7	4	6	1	BB, S1, E, IB	2	-
8553	8553	Acer negundo	Manitoba Maple	ACENEGU	4	6	2	1	-	1	-
8554	8554	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8555	8555	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	13	6	1	EAB, E, PB, D3	4	-
8556	8556	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8557	8557	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8558	8558	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	8	1	EAB, E, PB, D3	4	-
8559	8559	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	5	3	1	-	1	-
8560	8560	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8561	8561	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8562	8562	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8563	8563	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	13	6	1	EAB, E, PB, D3	4	-
8564	8564	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8565	8565	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8566	8566	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8567	8567	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8568	8568	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
8570	8570	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8571	8571	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8572	8572	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	3	1	EAB, E, PB, D3	4	-
8573	8573	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8574	8574	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
8575	8575	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8576	8576	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8577	8577	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8578	8578	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	3	1	EAB, E	3	-
8579	8579	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8580	8580	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	6	1	EAB, E, PB, D3	4	-
8581	8581	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8582	8582	Fraxinus pennsylvanica	Green Ash	FRAPENN	20	18	10	1	EAB, E	3	-
8583	8583	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	13	4	1	EAB, E, PB, D3	4	-
8584	8584	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8585	8585	Acer negundo	Manitoba Maple	ACENEGU	3.5	4	2	3	V	1	-
8586	8586	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8587	8587	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8588	8588	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8589	8589	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8590	8590	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8591	8591	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8592	8592	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8593	8593	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8594	8594	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8595	8595	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
8596	8596	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	10	3	1	EAB, E, PB, D3	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
not documented	8597	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
not documented	8819	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	5	1	EAB, E, PB, D3	4	-
not documented	8908	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
not documented	8909	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
not documented	8915	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	11	4	1	EAB, E, PB, D3	4	-
not documented	8916	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	4	1	EAB, E, PB, D3	4	-
not documented	8917	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9000	9000	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	6	8	1	EAB, E, PB, D3	4	-
9001	9001	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	14	6	1	EAB, E, PB, D3	4	-
9002	9002	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9003	9003	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9004	9004	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9005	9005	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9006	9006	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	6	1	EAB, E, PB, D3	4	-
9007	9007	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	6	1	EAB, E, PB, D3	4	-
9008	9008	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9009	9009	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9010	9010	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9011	9011	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9012	9012	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9013	9013	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9014	9014	Acer negundo	Manitoba Maple	ACENEGU	4	7	2	1	-	1	-
9015	9015	Acer negundo	Manitoba Maple	ACENEGU	4	5	7	2	S2, D2, Le, E	3	-
9016	9016	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9017	9017	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9018	9018	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9019	9019	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9020	9020	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9021	9021	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9022	9022	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9023	9023	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9024	9024	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9025	9025	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9026	9026	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	3	1	EAB, PB, D2, S2	4	-
9027	9027	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	4	1	EAB, PB, D2, S2	4	-
9028	9028	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9029	9029	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	17	6	1	EAB, E, PB, D3	4	-
9030	9030	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9031	9031	Syringa reticulata	Silk Lilac	SYRRETI	5	1	3	1	-	1	-
9032	9032	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9033	9033	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9034	9034	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	6	4	1	EAB, PB, D1, Le	3	-
9035	9035	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9036	9036	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	4	1	BB, D2	3	-
9037	9037	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9038	9038	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9039	9039	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	16	6	2	EAB, PB, D2, S2	4	-
9040	9040	Fraxinus pennsylvanica	Green Ash	FRAPENN	3	2	5	1	Le, E, BB	3	-
9041	9041	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9042	9042	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9043	9043	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9044	9044	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9045	9045	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9046	9046	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9047	9047	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	14	4	1	S2, D2, Le	3	-
9048	9048	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9049	9049	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	18	8	1	EAB, PB, D2, S2	4	-
9050	9050	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9051	9051	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	6	1	EAB, PB, D2, S2	4	-
9052	9052	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	11	3	1	E, D2, S2	3	-
9053	9053	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	7	10	1	EAB, PB, D2, S2	4	-
9054	9054	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9055	9055	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	12	1	Le, S1, D1	3	-
9056	9056	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9057	9057	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9058	9058	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9059	9059	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9060	9060	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9061	9061	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9062	9062	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	7	3	1	EAB, PB, D2, S2	4	-
9063	9063	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9064	9064	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9065	9065	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	4	1	EAB, PB, D2, S2	4	-
9066	9066	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	13	3	1	EAB, E, PB, D3	4	-
9067	9067	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	10	8	1	EAB, E, PB, D3	4	-
9068	9068	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9069	9069	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9070	9070	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	6	1	EAB, PB, D2, S2	4	-
9071	9071	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9072	9072	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9073	9073	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9074	9074	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	13	4	1	EAB, PB, D2, S2	4	-
9075	9075	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9076	9076	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9077	9077	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	16	6	2	EAB, PB, D2, S2	4	-
9078	9078	Fallopia japonica	Japanese Knotweed	FALJAPO	TS	-	-	-	-	-	-
9079	9079	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9080	9080	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9081	9081	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9082	9082	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	13	2	1	EAB, PB, D2, S2	4	-
9083	9083	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	17	4	4	EAB, PB, D2, S2	4	-
9084	9084	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	18	3	1	EAB, PB, D2, S2	4	-
9085	9085	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9086	9086	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	3	1	EAB, PB, D2, S2	4	-
9087	9087	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9088	9088	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	4	1	EAB, PB, D2, S2	4	-
9089	9089	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9090	9090	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9091	9091	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9092	9092	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	NL	5	-
9093	9093	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9094	9094	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	4	1	EAB, PB, D2, S2	4	-
9095	9095	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9096	9096	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	6	1	EAB, PB, D2, S2	4	-
9097	9097	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	15	6	1	EAB, PB, D2, S2	4	-
9098	9098	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9099	9099	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9100	9100	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9101	9101	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9102	9102	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9103	9103	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9104	9104	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9105	9105	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	2	1	EAB, PB, D2, S2	4	-
9106	9106	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	18	10	1	EAB, PB, D2, S2	4	-
9107	9107	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9108	9108	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9109	9109	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	6	1	BB, S1, D1	3	-
9110	9110	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	15	10	1	EAB, PB, D2, S2	4	-
9111	9111	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
9112	9112	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9113	9113	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9114	9114	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	13	4	1	EAB, PB, D2, S2	4	-
9115	9115	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9116	9116	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	9	3	1	EAB, PB, D2, S2	4	-
9117	9117	Fraxinus pennsylvanica	Green Ash	FRAPENN	5.5	9	10	2	PB	3	-
9118	9118	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	10	2	1	EAB, PB, D2, S2	4	-
9119	9119	Syringa reticulata	Silk Lilac	SYRRETI	12	8	5	1	BB, S2, D2	3	-
9120	9120	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	6	7	1	EAB, S2, D2	4	-
9121	9121	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, PB, D2, S2	4	-
9122	9122	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9123	9123	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	8	10	1	EAB, PB, D2, S2	4	-
9124	9124	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	3	6	1	EAB, D2, S2, BB, Le	4	-
9125	9125	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	4	1	Le, D2, BB	3	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9126	9126	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9127	9127	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	8	7	1	S2, D2, BB, E	3	-
9128	9128	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9129	9129	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	9	7	1	E, S1, D1, BB	3	-
duplicate	9129	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	8	4	1	EAB, PB, D2, S2	4	-
9130	9130	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	10	4	1	E, BB, D2	3	-
9131	9131	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9132	9132	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	8	8	1	EAB, D2, S2, BB, Le	4	-
9133	9133	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	14	5	1	EAB, PB, D2, S2	4	-
9134	9134	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9135	9135	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	12	12	1	EAB, PB, D2, S2	4	-
9136	9136	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9137	9137	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9138	9138	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9139	9139	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	7	1	EAB, PB, D2, S2	4	-
9140	9140	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9141	9141	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	4	1	E, BB, D2	3	-
9142	9142	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9143	9143	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9144	9144	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9145	9145	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9146	9146	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9147	9147	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	18	5	1	EAB, PB, D2, S2	4	-
9148	9148	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9149	9149	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9150	9150	Acer platanoides	Norway Maple	ACEPLAT	5	6	2	1	FC, S1	2	-
9151	9151	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9152	9152	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	8	2	1	S2, D2, BB, E	3	-
9153	9153	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9154	9154	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9155	9155	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9156	9156	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	3	1	EAB, PB, D2, S2	4	-
9157	9157	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	20	7	2	EAB, PB, D2, S2	4	-
9158	9158	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	20	5	1	EAB, PB, D2, S2	4	-
9159	9159	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	12	3	1	EAB, PB, D2, S2	4	-
9160	9160	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	4	1	EAB, PB, D2, S2	4	-
9161	9161	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	13	4	1	E, BB, S2	3	-
9162	9162	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9163	9163	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	5	1	EAB, PB, D2, S2	4	-
9164	9164	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	20	5	1	EAB, PB, D2, S2	4	-
9165	9165	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	5	2	1	Le, BB, D2	3	-
9166	9166	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9167	9167	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	18	6	1	EAB, PB, D2, S2	4	-
9168	9168	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	18	5	1	EAB, PB, D2, S2	4	-
9169	9169	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	3	1	EAB, PB, D2, S2	4	-
9170	9170	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	5	3	1	EAB, D2, S2, BB, Le	4	-
9171	9171	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	3	1	EAB, PB, D2, S2	4	-
9172	9172	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	20	3	1	EAB, PB, D2, S2	4	-
9173	9173	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9174	9174	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	20	5	1	EAB, PB, D2, S2	4	-
9175	9175	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	20	5	1	EAB, PB, D2, S2	4	-
9176	9176	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	15	5	1	Le, E, BB	3	-
9177	9177	Fraxinus pennsylvanica	Green Ash	FRAPENN	10.5	10	10	2	EAB, D2, S2, PB, Le	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9178	9178	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	6	5	1	Le, D2, BB	3	-
9179	9179	Vitis riparia	Wild grape	VITRIPA	TS	-	-	-	-	-	-
9180	9180	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9181	9181	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	6	3	1	EAB, D2, S2, PB, Le	4	-
9182	9182	Fraxinus pennsylvanica	Green Ash	FRAPENN	3.5	4	5	1	Le, S2, BB	3	-
9183	9183	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	8	7	2	EAB, D2, S2, BB, Le	4	-
9184	9184	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	15	5	1	EAB, PB, D2, S2	4	-
9185	9185	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	8	3	1	EAB, PB, D2, S2	4	-
9186	9186	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	12	3	1	EAB, D2, S2, BB, Le	4	-
9187	9187	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9188	9188	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	15	5	1	EAB, PB, D2, S2	4	-
9189	9189	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	20	8	1	EAB, PB, D2, S2	4	-
9190	9190	Fraxinus pennsylvanica	Green Ash	FRAPENN	7.5	20	4	1	EAB, PB, D2, S2	4	-
9191	9191	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	7	3	1	EAB, PB, D2, S2	4	-
9192	9192	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	12	3	1	E, BB, D2	3	-
9193	9193	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	4	3	1	EAB, D2, S2, PB, Le	4	-
9194	9194	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	10	3	1	E, BB, D2	3	-
9195	9195	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9196	9196	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9197	9197	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9198	9198	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	3	1	EAB, D2, S2, BB, Le	4	-
9199	9199	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9200	9200	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9201	9201	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9202	9202	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	15	5	2	EAB, PB, D2, S2	4	-
9203	9203	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	20	5	1	EAB, PB, D2, S2	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9204	9204	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	20	5	1	EAB, PB, D2, S2	4	-
9205	9205	Fraxinus pennsylvanica	Green Ash	FRAPENN	6	9	4	1	EAB, PB, D2, S2	4	-
9206	9206	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	8	4	1	EAB, PB, D2, S2	4	-
9207	9207	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	18	6	1	EAB, PB, D2, S2	4	-
9208	9208	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	8	4	1	EAB, PB, D2, S2	4	-
9209	9209	Fraxinus pennsylvanica	Green Ash	FRAPENN	11	20	10	3	EAB, PB, D2, S2	4	-
9210	9210	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	7	4	2	EAB, E, PB, D3	4	-
9211	9211	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9212	9212	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	8	3	1	E, BB, D2	3	-
9213	9213	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9214	9214	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9215	9215	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	20	8	1	EAB, PB, D2, S2	4	-
9216	9216	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	3	1	EAB, PB, D2, S2	4	-
9217	9217	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9218	9218	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	15	5	1	EAB, PB, D2, S2	4	-
9219	9219	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	4	1	EAB, PB, D2, S2	4	-
9220	9220	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	20	5	1	EAB, PB, D2, S2	4	-
9221	9221	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	17	15	3	EAB, D2, S2, PB, Le	4	-
9222	9222	Fraxinus pennsylvanica	Green Ash	FRAPENN	14	20	6	1	EAB, PB, D2, S2	4	-
9223	9223	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	18	4	2	EAB, PB, D2, S2	4	-
9224	9224	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9225	9225	Fraxinus pennsylvanica	Green Ash	FRAPENN	10	20	8	3	EAB, PB, D2, S2	4	-
9226	9226	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	7	3	1	EAB, PB, D2, S2	4	-
9227	9227	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	15	6	1	E, BB, D2	3	-
9228	9228	Fraxinus pennsylvanica	Green Ash	FRAPENN	5	5	3	1	E, BB, D2	3	-
9229	9229	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9230	9230	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
9231	9231	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	7	3	1	-	1	-
9232	9232	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	10	6	2	EAB, D2, S2, PB, Le	4	-
9233	9233	Fraxinus pennsylvanica	Green Ash	FRAPENN	12	20	8	4	EAB, PB, D2, S2	4	-
9234	9234	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9235	9235	Acer negundo	Manitoba Maple	ACENEGU	3.5	4	2	1	-	1	-
9236	9236	Fraxinus pennsylvanica	Green Ash	FRAPENN	6.5	7	5	2	E, BB, D2	3	-
9237	9237	Fraxinus pennsylvanica	Green Ash	FRAPENN	13	18	9	3	E, BB, D2	4	-
9238	9238	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	8	7	2	EAB, PB, D2, S2	4	-
9239	9239	Acer negundo	Manitoba Maple	ACENEGU	5	5	4	1	-	1	-
9240	9240	Fraxinus pennsylvanica	Green Ash	FRAPENN	8	15	5	1	E, BB, D2	3	-
9241	9241	Acer negundo	Manitoba Maple	ACENEGU	5	5	4	1	-	1	-
9242	9242	Acer negundo	Manitoba Maple	ACENEGU	5	5	5	1	-	1	-
9243	9243	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9244	9244	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
9245	9245	Acer negundo	Manitoba Maple	ACENEGU	6	6	5	2	-	1	-
9246	9246	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9247	9247	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
9248	9248	Fraxinus pennsylvanica	Green Ash	FRAPENN	4.5	8	4	1	E, BB, S1	3	-
9249	9249	Acer negundo	Manitoba Maple	ACENEGU	4	5	4	1	-	1	-
9250	9250	Syringa reticulata	Silk Lilac	SYRRETI	5	1	3	1	-	1	-
9251	9251	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9252	9252	Syringa reticulata	Silk Lilac	SYRRETI	3	5	3	1	S1, D1	2	-
9253	9253	Acer negundo	Manitoba Maple	ACENEGU	6	5	5	2	S1, Le	2	-
9254	9254	Acer negundo	Manitoba Maple	ACENEGU	9	7	4	1	Le, RF-D	2	-
9255	9255	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	SAME AS 4821
not documented	9300	Ulmus pumila	Siberian Elm	ULMPUMI	8	7	4	2	-	1	SAME AS 4822
not documented	9303	Ulmus species	Elm	ULMU SP.	-	-	-	-	-	5	-
not documented	9304	Ulmus americana	White Elm	ULMAMER	-	-	-	-	-	5	-
not documented	9305	Ulmus species	Elm	ULMU SP.	-	-	-	-	-	5	-
9306	9306	Acer negundo	Manitoba Maple	ACENEGU	14	5	4	1	S1, D1, T-P	3	-
9307	9307	Syringa reticulata	Silk Lilac	SYRRETI	9.5	8	6	3	BB, V, S1	3	-
9308	9308	Syringa reticulata	Silk Lilac	SYRRETI	14	7	3	1	T-P, BB, D2	3	-
9309	9309	Syringa reticulata	Silk Lilac	SYRRETI	5	9	7	4	S3, D3, BB	4	-

AOV Tree #	MH Tree #	Species Scientific Name	Species Common Name	Species Code	DBH (cm)	Height (m)	Crown Diameter (m)	# Stems	Health Notes	Health Condition	Remarks
9310	9310	Syringa reticulata	Silk Lilac	SYRRETI	8	6	4	3	S1, BB	2	-
9311	9311	Ulmus rubra	Slippery Elm	ULMRUBR	18	12	7	1	-	1	-
9312	9312	Syringa reticulata	Silk Lilac	SYRRETI	12	10	8	1	-	1	-
9314	9314	Syringa reticulata	Silk Lilac	SYRRETI	4	6	2	1	-	1	-
9315	9315	Syringa reticulata	Silk Lilac	SYRRETI	6	9	4	1	-	1	-
9316	9316	Acer negundo	Manitoba Maple	ACENEGU	31	15	5	2	S1, D1, PB, RF-D	2	-
9317	9317	Syringa reticulata	Silk Lilac	SYRRETI	4	5	3	1	-	1	-
9318	9318	Acer negundo	Manitoba Maple	ACENEGU	35	13	8	1	S3, D2, BB, PB	4	-
9319	9319	Syringa reticulata	Silk Lilac	SYRRETI	3	6	4	2	-	1	-
9320	9320	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	12	8	3	EAB, E, D2, S2	4	-
9321	9321	Rhamnus frangula	Glossy Buckthorn	RHAFRAN	TS	-	-	-	-	-	-
9322	9322	Fraxinus pennsylvanica	Green Ash	FRAPENN	7	7	4	2	EAB, PB, D2, S2	4	-
9323	9323	Fraxinus pennsylvanica	Green Ash	FRAPENN	8.5	9	6	2	EAB, PB, D2, S2	4	-
9324	9324	Fraxinus pennsylvanica	Green Ash	FRAPENN	4	6	3	1	EAB, PB, D2, S2	4	-
9325	9325	Acer platanoides	Norway Maple	ACEPLAT	30	11	10	1	EAB, D1, S1, BB	2	-
9326	9326	Lonicera species	Honeysuckle	LONI SP.	TS	-	-	-	-	-	-
9327	9327	Fraxinus pennsylvanica	Green Ash	FRAPENN	15	13	8	1	EAB, D2, BB	3	-
9328	9328	Rhamnus cathartica	Common Buckthorn	RHACATH	TS	-	-	-	-	-	-
9329	9329	Fraxinus pennsylvanica	Green Ash	FRAPENN	16	13	7	1	EAB, D1, BB	3	-
9330	9330	Pinus strobus	Eastern White Pine	PINSTRO	4	4	4	2	-	1	-
9331	9331	Picea glauca	White Spruce	PICGLAU	4	3.5	3	1	V, D1	2	-
9332	9332	Pinus strobus	Eastern White Pine	PINSTRO	8.5	7	6	1	-	1	-
9333	9333	Pinus strobus	Eastern White Pine	PINSTRO	7	5	5	1	-	1	-
9334	9334	Picea pungens	Colorado Blue Spruce	PICPUNG	3.5	3	3	1	D2, BB	3	-
9335	9335	Picea pungens	Colorado Blue Spruce	PICPUNG	5.5	4	3	1	D1	2	-
9336	9336	Picea pungens	Colorado Blue Spruce	PICPUNG	5	4	3	1	D2, BB	3	-
not documented	9382	Fraxinus pennsylvanica	Green Ash	FRAPENN	-	-	-	-	-	5	-
not documented	9517	Fraxinus pennsylvanica	Green Ash	FRAPENN	9	20	8	2	EAB, PB, D2, S2	4	-

Appendix G: Requirements and Specifications

- Requirements and Specifications

Excerpt from Feasibility Study for a Surface Stormwater Management Facility at Baseline Road and Woodroffe Avenue, J.F. Sabourin and Associates Inc. June 2015

1. REQUIREMENTS AND SPECIFICATIONS

The SWMP specifications have been determined by J. F. Sabourin and Associates In (JFSA) as part of the 2015 Feasibility Study. These specifications have been dictated in part by the hydrology of the tributary area, existing sewershed infrastructure and by the SWM objectives the facility is to meet. This includes standard SWMP specifications set out by Ontario's Ministry of the Environment and Climate Change (MOECC) (formerly the Ministry of the Environment) and the results of the fluvial geomorphic analyses. The main components outlined are the wet pond requirements, the pond inlet and outlets, the forebay, the active storage characteristics, and maintenance and operations.

Additionally, the requirements for in-stream works and a description of how the interface between the proposed SWMP and the existing creek will look is provided (JFSA, 2015). This description from the 2015 Feasibility Study considers the physical and fluvial geomorphological characteristics of Pinecrest Creek given it is the receiving watercourse from the proposed pond.

1.1 SWMP Engineering Requirements and Specifications (JFSA, 2015)

Pond Inlet: The proposed SWMP would have one inlet allowing for stormwater, from frequent events to enter the pond from the creek. Two components would be required at the inlet: the culvert entry to the pond and a grade control riffle in the creek just downstream from the culvert entry point. The culvert inlet would be located approximately 10 m downstream of the Baseline Trunk sewer outlet, where the daylighted reach of Pinecrest Creek beings. The grade control riffle begins approximately 20 m downstream from the inlet.

The specifications for these components are as follows (JFSA, 2015):

- A grade control riffle with a crest elevation at 79.61 m (0.6 m above the Baseline Trunk sewer outlet invert) to direct frequent flows to the pond inlet culvert is required within the existing Pinecrest Creek channel at the existing bend in the channel (approximately 30 m downstream from the Baseline Trunk Sewer outlet). This riffle would be in a pool-riffle crest formation. The riffle crest would direct low-flows into the pond for quality treatment.
- At the low point, upstream of the riffle crest, a pipe/culvert will act as the inlet to the pond.
    - The pipe/culvert needs to be of a sufficient size to convey un-attenuated flows for the quality treatment to the pond at a shallow depth. The allowable flow depth in the inlet pipe is controlled by the grade control riffle, which has been set at 79.61 m based on geomorphological considerations. An inlet equivalent to a 5 m wide by 1 m high, and approximately 20 m long, culvert is used in this study's design options (JFSA, 2015).
    - The pipe/culvert could be replaced by an open channel, but this raises maintenance considerations.
- The invert elevation of the inlet pipe where it discharges to the pond should be located at, or above, the permanent pool elevation to avoid scour and clogging. The pond bottom and side slopes need to be properly protected/armoured at the discharge point, also to avoid scouring of settled particles.

Permanent Pool: The permanent pool of a wet pond is the bottom portion of the pond which contains a permanent volume of water. When untreated stormwater flows into a wet pond, the clean permanent volume of water will be forced out of the pond first while the influent water will be detained in the facility for a pre-determined length of time, allowing suspended sediment time to settle between storm events. The sizing of the permanent pool is an integral part of the SWMP design that enables the facility to meet the water quality objectives.

Based on the estimated flows from 435 ha of developed lands with an average of 40% imperviousness, the specifications for this SWMP's permanent pool are as follows (JFSA, 2015).

- A permanent volume of 10,273 m^3 is required to meet the 60% TSS removal; 23,854 m^3 is required to meet 70% removal; and a volume of 48,754 m^3 is required to meet 80% TSS removal as per the MOE Manual (MOE, 2003).
- The permanent pool elevation will be constant through the pond, regardless of the number of storage cells. The permanent pool must be located between and elevation of 77.70 and 78.90 m, the invert elevations of the existing Woodroffe Avenue culvert downstream and the Baseline Trunk sewer outlet upstream, respectively. The higher elevation will require less elevation and therefore represents the lower cost option. For the 2015 JFSA analysis, a permanent pool elevation of 78.90 m was selected.
- Minimum/maximum and preferred criteria regarding pond side slopes are as specified in the MOE manual. The MOE requirements for minimum/maximum side slopes are stricter than the steepest allowable slopes from a geotechnical safety point.
- The results of the 2015 JFSA study's hydrologic and hydraulic analysis indicate that a small portion of the flow during the 25 mm 4-hour Chicago design storm would flow directly over the grade control riffle. The pond may not function precisely as assumed in the MOE manual for the specifications noted above. However, as the facility captures the majority of the 25 mm storm runoff a TSS removal rate in excess of 60% would be achieved.

Forebay: A SWMP forebay is generally the first cell in a wet pond located near the inlet of the pond where the water first flows into the facility. Forebays are designed as "up front" storage areas to trap and settle out sediment and heavy pollutants before they reach the pond's main basin. Therefore, sediment forebays are pretreatment features in a pond and the location where the majority of sediment will settle out. From the forebay, water flows into the main pond.

The specifications for this SWM pond's forebay are as follows:

- The facility needs to be equipped with a forebay as the first pond cell. This cell will act as primary treatment, as it dissipates energy from the incoming flows and significant portion of the sediment settling will occur.
- The forebay may only make up 33% of the total permanent pool area; the physical requirements with respect to depth and length to width rations are as provided in the MOE manual.
- The forebay needs to have a deep pool to collect sediments, and this deep pool needs to be sized for a desired removal frequency as per the City of Ottawa guidelines.
- The forebay requires a berm, with a top elevation located 20 cm below the permanent pool elevation (i.e., 78.70 m), to ensure that settlement takes place within the forebay.

Active Storage Characteristics: The active storage volume of a SWMP is used to store water during and after a storm. Unlike the water in the permanent pool, the water collected in the active storage area drains out of the pond between the storm events. The active storage areas is considered to be multi-functional. Active storage volume is needed particularly to store the runoff from larger storms. If this runoff volume is uncontrolled it may contribute to erosion and flooding of the receiving water course. The specifications for this SWMP's active storage volume are as follows:

- All of the runoff from frequents events, up to between 10 and 15 mm, will be conveyed into the facility while a variable portion of flows from events in excess of the 15 mm up to the 100-year will pass through the pond.
- To meet MOE quality targets, regardless of TSS removal targets, 40 m^3/ha * 435 ha = 17,400 m^3 will be detained and released between 24 and 48 hours. This storage volume will be used frequently (i.e., many times per annum). This extended detention storage volume is provided at an elevation of approximately 79.75 masl.

- The active storage (above the permanent pool and extended detention volumes) will fluctuate from 79.75 m to an elevation of 80.15 m during events in excess of the 25 mm storm up to the 100-year storm.
- At an elevation of 80.15 m, the available active storage volume within the facility must be equal to or greater than 27,500 m^3 in order to provide sufficient quantify control.
- The pond must be designed in such a way as to prevent 'short-circuiting' of any water up to the quality control volume (i.e. 79.75 m).

Outlet: SWMP outlets are typically designed to detain stormwater in the pond to allow enough time for the suspended sediment to settle out and to reduce peak flows, thereby alleviating erosion and flooding concerns. Multiple outlets can provide the detention for water quality, erosion, and flooding control storage volumes by allowing the stored water to empty from different elevations and at different rates. The proposed SWMP has two outlets and the specifications for these outlets are as follows:

- The two outlets proposed are:
    - A reverse graded pipe to convey frequent (low) flows back to Pinecrest Creek on the downstream side of the crest of the grade control riffle. This pipe shall be sized to convey the attenuated flows from a 15 mm design storm (i.e., 148 L/s). This outlet will be referred to as the "low flow/quality outlet". (The "low flow/quality outlet" has been modelled as a bottom outlet 315 mm diameter orifice, the physical outlet design should be re-assessed at the detailed design phase and could include any hydraulically equivalent outlet).
    - A positive graded pipe to convey flows in excess of 148 L/s up to the attenuated 5-year flow of 1.74 m^3/s to Pinecrest Creek between the downstream side of the riffle crest and the upstream side of the Woodroffe Avenue culvert crossing. This outlet will be referred to as the "quantity outlet" (the "quantity outlet" has been modelled as a 2 m wide by 1 m high, 60 m long, concrete box pipe with a 1.4% slope, the physical

outlet design should be re-assessed at the detailed design phase and could include any hydraulically equivalent outlet).

- Runoff flows from storm events in excess of the 15 mm will flow partially into the facility with the balance flowing down the creek over the riffle crest. In events up to the 2-year storm, the facility will receive the majority of flow from the Baseline Trunk sewer outlet, while the larger portion of the runoff for events in excess of the 2-year will overtop the riffle crest and continue down the creek by-passing the pond. During major events (greater than the 5-year) the inlet will act as an outlet relief structure. Alternately, an outlet channel could be included in the design.

Maintenance and Operations: The design needs to include the following for the on-going maintenance and operation of the SWMP.

- The bottom of the forebay will need to be covered with a hard surface (typically granular B) to allow heavy equipment access for maintenance activities.
- An access route for a dump truck and backhoe is required, including a truck turn-around to allow the vehicles to turn around for their exit from the facility, as is a sediment drying area.
- To conduct maintenance activities the permanent pool will need to be emptied via pumps. During this time the facility needs to be hydraulically isolated from Pinecrest Creek. Pipe/culvert inlet and outlet configurations will need to be fitted with “shut-offs”, such as stop logs or plates, to disconnect the pond from the creek. Open channels can be blocked off, but this requires greater effort (i.e., with sheet piles).
- A sediment drying area will need to be provided in the detailed design of the facility. Sediments can be expected to accumulate in the pond’s forebay at a rate of approximately 241 m^3/yr. This sediment build-up rate is based on an assumed sediment removal rate of 60%, a drainage area of 435 ha and the Annual Sediment Loadings Table from the MOE’s 2003 design guidelines. The table indicates a loading rate of 0.92 m^3/ha/year for catchment with an average imperviousness of 39.8%. Based on an assumed tri-axle dump truck volume of

8.4 m^3 (11 cubic yards), this sediment deposition is equivalent to approximately 29 dump truck loads per year.

1.2 SWMP Outlet Requirements and Specifications (JFSA, 2015)

Redirection of untreated flows from the Baseline Trunk Sewer to the proposed SWMP via Pinecrest Creek will be accomplished by a grade control riffle in the creek and a box culvert type inlet pipe to the pond. The inlet pipe will be located just upstream of the riffle and the crest of the riffle will be located approximately 33 m downstream of the Baseline Trunk Sewer culvert (outlet O4305). The riffle will have the following dimensions (JFSA, 2015):

- Crest height off the bed of Pinecrest Creek: 0.60 m
- Foreslope: 6:1 (slope distance = 3.60 m)
- Crest width = 0.40 m
- Backslope: 15:1 (slope distance = 9.0 m)
- Total riffle length as designed = 13.0 m
- Actual riffle length when placed on undulating bed of Pinecrest Creek: 17.64 m

A profile of the proposed grade control riffle is shown in Figure 1.

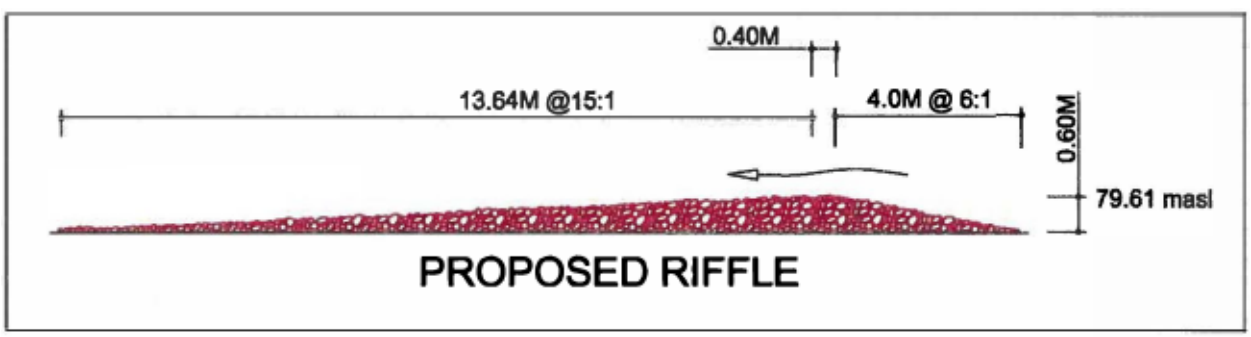


Figure 1: Profile view of proposed grade control riffle (JFSA, 2015)

The riffle is comprised of angular stone material with a gradation of stone as follows:

- 50% = 250 mm
- 20% = 100 mm
- 10% = 50 mm
- 10% = 10 mm
- 10% = Granular A

The substrate is to be pre-mixed and approved prior to application in Pinecrest Creek. The mix is based on peak flows in the creek and is developed with long-term stability as a constraint.

Low flows in Pinecrest Creek will be conveyed into the SWMP inlet upstream of the riffle. Low flows will be conveyed out of the pond to the creek via the pond's quality control/low flow outlet located at the toe of the downstream side of the riffle. Storm runoff from up to the 10 mm design storm will be entirely redirected to the pond inlet by the riffle. Under these low flow conditions the creek will have water flowing to the upstream side of the riffle and from the toe of riffle downstream. Under low flow conditions there will be no overtopping of the riffle, with no flow over the crest and riffle backslope.

Runoff from storms in excess of the 15 mm design storm will be split, with a portion of the flows being directed into the pond and the balance flowing over the grade control riffle and down the creek. For a 25 mm event, 75% of the peak flow in Pinecrest Creek will be directed into the pond to meet the water quality objectives of the facility.

As described above, the SWMP will have two outlet pipes to Pinecrest Creek. The first is the low flow/quality outlet which returns a low flow volume back to the base of the grade control riffle, allowing low flow volumes to pass through as much of the creek as possible. The second is the quantity outlet which returns pond discharge for events up to the 100-year. This connection is made at an angle between 30 and 60 degrees to the creek flow and it occurs approximately 139 m downstream of the Baseline culvert. This means that for a distance of approximately 90 m Pinecrest Creek will have a low flow

response during less-than 15 mm storms whereas it currently receives all flow discharged, uncontrolled and untreated, from the Baseline Trunk Sewer.

The connection between the quantity pipe and Pinecrest Creek will be made using a rocky ramp (angular stone structure) to provide roughness; the purpose of this is to slow velocities from the pipe as they enter the creek.

Given the predicted velocities at the maximum pipe outflow (2.041 m/s at the 5-year return flow), the ramp should have the following composition:

- 50% = 200 mm
- 20% - 100 mm
- 10% = 50 mm
- 10% = 10 mm
- 10% = Granular A

The substrate, which is to be angular material, is to be pre-mixed and approved prior to application in the ramp.

Appendix H: Bird Hazard Risk Assessment

- Memorandum: Bird Hazard Risk Assessment, Beacon Environmental, April 26, 2017

Memorandum

To: Ms. Darlene Conway, Senior Project Manager, City of Ottawa

cc: Ms. Karyn Cornfield, Project Engineer, Stage 2 LRT

From: Ron Huizer and Kristi Quinn

Date: April 26, 2017

Ref: BEL 217128

Re: Proposed Stormwater Management Facility within Ottawa International Airport Bird Hazard Zone

Background

Beacon Environmental has been retained by the City of Ottawa to provide assessment and comment regarding the potential bird hazard and risk to aircraft operating at Ottawa MacDonald Cartier International Airport (the Airport) with respect to a proposed stormwater management pond (SWM Pond) to be located at the northeast corner of Baseline Road and Woodroffe Avenue in the west end of Ottawa. The proposed location of the SWM Pond lies within an area that is identified by the Airport as a Primary Bird Hazard Zone (PBHZ). The PBHZ includes airspace in which aircraft are at or below altitudes of 1,500' AGL and extends out as an expanding cone of airspace from the button of the Airport runways outward for approximately 9 km.

The proposed location of the SWM Pond was identified during the Pinecrest Creek/Westboro Retrofit Study that was initiated by the City of Ottawa in 2009, and completed in 2011. Following the retrofit study, in 2015 the City completed a feasibility study for a SWM Pond at the location of Baseline Road and Woodroffe Avenue. The completion of the study produced initial concept design options for the facility. At this time a 30% design of the SWM Pond has been completed as part of the City's Ottawa Light Rail Transit (LRT) Project.

The following provides an assessment of the potential bird hazard and risk associated with the location and design of the SWM Pond, as well as initial comments on design elements that can be incorporated to mitigate the use of the facility by birds. This memo has been prepared to promote further discussions amongst stakeholders with respect to design and mitigation measures for the pond in order to minimize attractiveness to hazardous bird species so as not to impact the safe operation of aircraft at the Airport.

Regulatory Framework

Ottawa MacDonald-Cartier International Airport Zoning Regulations (AZRs) – *Aeronautics Act*

Pursuant to subsection 5.5(1) of the *Aeronautics Act* a notice of the proposed Ottawa Macdonald-Cartier International Airport Zoning Regulations, was published in two successive issues of the Canada Gazette, Part I, on March 15 and March 22, 2008, and issues of the Ottawa Citizen and Le Droit on March 26 and 29, 2008 and May 2 and 3, 2008, and a reasonable opportunity was thereby afforded to interested persons to make representations to the Minister of Transport, Infrastructure and Communities with respect to the proposed Regulations.

A purpose of the proposed Regulations is to prevent lands adjacent to or in the vicinity of an airport or airport site from being used or developed in a manner that is, in the opinion of the Minister of Transport, Infrastructure and Communities, incompatible with the safe operation of an airport or aircraft.

With respect to the proposed stormwater management facility, the following Bird Hazard Clause would apply:

> ***(6)*** *No owner or lessee of land within the limits of the bird hazard zone shall permit any part of that land to be used for activities or uses attracting birds that create a hazard to aviation safety.*

City of Ottawa Official Plan (Office Consolidation)

With respect to the proposed construction of the Stormwater Management Facility within the Primary Bird Hazard Zone of the Ottawa MacDonald Cartier International Airport (as shown in Annex A), the following policies apply.

Section 4.8.6 - Land-Use Constraints Due to Airport and Aircraft Operations states that:

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;

Developing land uses and managing activities in a manner that will not increase wildlife presence and elevate risks to aviation operations.

The following policies specifically apply to the proposed Stormwater Management Facility:

> *8. Proposed development in the vicinity of the Ottawa International Airport will comply with the Ottawa Airport Zoning regulations (*see above*), enacted under the Aeronautics Act, The zoning regulations can be examined at the Land Registry Office. [Amendment #36, November 30, 2005] [Amendment #76, September 09, 2011]; and,*

> *9. Proposed land uses, municipal infrastructure projects and activities in the vicinity of the Ottawa International Airport will be reviewed against the OMCIAA's Wildlife Management Plan. Development conditions and best practices may be required to reduce the risk of wildlife conflict with airport operations. [Amendment #76, September 09, 2011]*

Ottawa MacDonald Cartier International Airport Wildlife Management Plan (2006)

Transport Canada requires certified airports that receive more than 2,800 movements annually to comply with the *Airport Wildlife Planning and Management* regulation under the Canadian Aviation Regulations (CARs), which came-in-to-force on December 30, 2006. This applies to the Ottawa MacDonald-Cartier International Airport. The regulation calls for the airport to prepare an Airport Wildlife Management Plan that is based on a site specific risk assessment. Through the risk assessment process the airport has identified any potentially hazardous land uses that could attract birds or other wildlife.

With respect to land use outside of the airport boundaries but within the primary and secondary bird hazard zones, the plan indicates:

Any ponds necessary for storm water management in the designated Bird Hazard Zones, as identified in the AZRs should be discussed with City planners and be subject to design and exclusion methods to limit their attractiveness to wildlife.

Any ponds outside of the designated bird hazard zones that could create a hazard to aircraft should be discussed with City planners and a request will be made for the ponds to be designed to limit the attractiveness to wildlife.

Bird Hazard and Risk Assessment

A hazard is a condition or circumstance that can lead to damage to an aircraft from a collision with wildlife.

For a wildlife risk assessment, a hazard can be of two general categories. (1) A 'wildlife hazard' refers to the one or more birds or mammals that might be struck by an aircraft. (2) A 'habitat hazard' refers to the land-use that attracts birds or mammals to areas through which aircraft operate. It is an antecedent condition of a wildlife hazard. Habitat hazards have a direct effect on the exposure of aircraft to birds or mammals.

Risk is the consequence of a wildlife hazard, measured in terms of severity and likelihood. The severity of a risk is determined by examining two circumstances. The first is the damage experienced during the wildlife strike - damage to the airframe, engine or one or more aircraft systems. The damage can range from none to catastrophic, depending on the location of the impact(s) on the aircraft, the wildlife species, the aircraft type and aircraft speed. The second includes any additional damage incurred after the strike.

This damage can range from negligible to catastrophic, depending on the location and speed of the aircraft at the time of the strike; and the aircraft's flight worthiness after the strike. As examples: post-bird strike damage will usually be negligible when the crew rejects the take-off of a slow-moving aircraft; or the damage could be catastrophic if the strike occurs just as the aircraft gets airborne, and the strike causes sufficient damage for the crew to lose control of the aircraft, causing it to impact the ground.

In 2006 Beacon Environmental completed an Airport Wildlife Risk Assessment for the Ottawa International Airport Authority. This study identified the Airport's Bird Hazard Zones and the highly critical species for management at and in the vicinity of the Airport. The two primary bird species that pose the greatest hazard and risk to aircraft operating at the Airport are gulls, primarily Ring-billed Gull, and Canada Geese. These two species are also known to be attracted to stormwater management ponds as feeding and loafing sites, as well as breeding sites for geese. Gulls and geese pose the greatest hazard to aircraft due to their large size, tendency to occur in flocks, and high altitude movements through the landscape. These species have high population numbers in the urban and rural environs within the Ottawa area.

The risk for bird-aircraft interactions, a bird strike, with these species increases when the birds occur in airspace that is frequently used by aircraft operating to and from the airport. The greatest risk occurs when birds occur on airside lands at the Airport, particularly within the area of the runways. The 2006 Beacon study identified gulls as high risk species as they frequently occur on airport lands and frequently transit airspace around the Airport. Canada Geese are infrequent visitors to the Airport lands, but represent a high risk during the spring and fall migration period when movements of flocks occur through the airspace of aircraft on approach and departure from the Airport. Movements of local breeding geese tend to be short transit flights below 500' AGL, and are infrequent.

The proposed location of the proposed SWM Pond is approximately 6.6 km from the 14 button of Runway 14-32. It is only 1.5 km to the west of the direct approach-departure line for aircraft operating at Runway 14. At a typical 3% glide approach to Runway 14 commercial jet aircraft will operate at or above 1000' AGL at the location of the proposed SWM Pond. As a result of the steeper incline of the takeoff, aircraft will operate at higher altitude above the SWM Pond on departure from Runway 14.

Daily movements of local gulls and geese typically occur below 500' AGL and therefore local bird movements at the location of the SWM Pond would not put birds in the airspace used by aircraft operating at Runway 14. However, movements to and from roosting sites that are regularly used by geese and gulls do occur at higher altitudes, up to 1,500' AGL. Roost sites for gulls and geese in the City are known and occur at Shirley's Bay, Dow's Lake and Mooney's Bay. The SWM Pond is located 9 km directly east from Shirley's Bay and bird movements to and from the SWM Pond would not cross the approach-departure path of aircraft operating at Runway 14. However, birds at the SWM moving to and from roosts at Dow's Lake and Mooney's Bay (5-6 km to the west) would cross the approach-departure path of Runway 14. With respect to local daily movements, both gulls and geese will frequently move from SWM Ponds to rivers, lakes, parks and golf courses to feed. Most local movements within 3- 4 km of a SWM Pond are typically below 500' AGL and are not within the airspace of aircraft. Based on the location of the proposed SWM Pond a flightline 5-6 km south east to the Hunt Club Golf course could become established that is directly to the north of the airport and would cross approach-departure path of Runway14-32, as would a flight line to the Hylands Golf Club directly to the

south of the Airport lands. As these bird movements would occur in close proximity to the Airport lands, they would occur in the airspace of aircraft operating at the Airport's runways.

With respect to the number of birds that can occur at the new SWM Pond, generally the larger the surface water area of a facility the greater number of birds can be expected to occur. SWM Ponds that have a pond surface area of 5 or more hectares can support hundreds of roosting gulls and geese. Numbers of breeding pairs of geese that can be associated with a SWM Pond depends on two factors, the area of adjacent open space that can be used as nesting and feeding sites, and the surface area of shallow water associated with a pond. Most SWM Ponds that support a 2-3 ha permeant pond can support up to 10 breeding pairs of geese, with 50 to 60 juvenile birds in the late summer early fall. Ponds with a permanent surface area below 2 ha are preferred by Transport Canada as they generally support fewer birds.

In summary;

- Gulls and Canada Geese represent the primary bird hazard that could be associated the new SWM Pond.
- Though the SWM Pond is located within the airports PBHZ, it is located significantly distant from Runway 14-32 so that aircraft operating at this runway would be above 1,000' AGL. when over the location the SWM Pond, an airspace that is not frequently inhabited by local movements of birds. Therefore, the likelihood or risk of a bird strike with birds at the SWM Pond is significantly reduced.
- The SWM Pond in this location does not pose a ***significant*** increase in the risk of a bird strike occurring for aircraft operating at the airport.
- To mitigate the potential for increased risk, the design would need to avoid creating a SWM Pond that would be an attractive area for overnight roosting by Gulls and Geese. If a roosting area was created, daily bird movements to and from the SWM Pond would occur at a higher altitude with a larger number of birds.
- To mitigate the potential for increased risk, it is necessary to design the pond such that it avoids creating a SWM Pond that functions as a highly attractive feeding and breeding site for gulls and geese. If a feeding or breeding area were created there could be potential to result in increased movements of a greater number of birds to the airport lands, Rideau River, parks, golf courses and other SWM Ponds that occur in the vicinity of the airport.

Design Elements for Reducing SWM Use by Geese and Gulls

Both gulls and geese are attracted to SWM Ponds directly due to the presence of permanent standing water conditions. They are used as feeding sites, breeding sites, safe day time loafing sites, and overnight roost sites. Therefore design elements of a SWM Pond that reduce or eliminate access to large areas of open water can significantly reduce the presence of birds at the SWM pond. Gulls typically

do not use SWM Ponds as breeding sites, as this occurs in large colonies which would not be supported by a SWM pond. However, SWM Ponds are highly attractive breeding sites for Canada Geese.

The following design mitigation measures have been incorporated into the proposed SWM Pond.

Permanent Pond

Based on review of existing documentation, it is understood that maintaining a permanent depth of water (a wet pond) is a required design feature for achieving the water quality goals of the facility. Therefore a dry pond design is not feasible.

When a dry pond is not possible, the surface area of the permanent pond should be made as small as possible, and/or as narrow and linear as possible, a length to width ratio of 3:1 or greater. The current 30% design complete has a permanent pond with a total surface area of 2.7 ha over 3 cells. This size is very close to the area of 2 ha preferred by Transport Canada. The design should limit the physical surface area water in the pond to the extent possible while meeting the water quality requirements.

Gulls and geese will only loaf and roost on ponds where the area of open water provides sufficient physical distance from potential predators. Therefore, a large surface area in a circular or square pond is much more attractive than narrow linear ponds. A review of the 30% design complete for the SWM Pond finds that it has a narrow linear design with respect to the permanent standing pond, with much of pond being only 25 m or less in width. This is an important design feature that will ensure that the pond does not become established as an overnight roosting site, and it will also have limited function as a day time loafing site.

Combined the two key design features that are known to reduce the use of SWM Ponds by gulls and geese, a small physical surface area with a narrow linear shape, have been incorporated into the proposed SWM Pond design.

In addition to limiting the physical surface area and creating a linear feature, in order to reduce feeding habitat deep standing water is better than shallow water, and steep, deep shorelines are better than shallow littoral zones. Where possible water depth should be as deep as possible, 2 m or greater deep. The current design has identified a 3.0 m depth for the forebay and a depth of 1.5 m in Cells 1 and 2 of the pond. This depth is sufficient to limit the growth of vegetation in these areas.

A shoreline depth of 1 m or greater is recommended to reduce the growth of submergent and emergent aquatic vegetation as this can make a SWM Pond less attractive to gulls and geese. However, it is our understanding that this SWM Pond design must provide a shoreline aquatic bench of 0.3 m and/or flatter sloping above and below the permanent water level which is required by the City and the MOECC for public safety purposes.

In-water Berms

In-pond berms and dykes are highly attractive as nesting sites for Canada Geese and are used as loafing sites by both geese and gulls. Where an in-water berm is required to address water flow requirements through a pond, as is the case with this design, the physical makeup of the berm should be made to be as less attractive as possible; high steep banks with dense planting with shrubs on the berm.

Upslope Nearshore Environment

Making the upslope near shore of a SWM Pond as unattractive to geese and gulls as possible is a critical design feature for reducing use of a site by birds. The more uncomfortable the shoreline is within 20 m of the pond edge the better. The current landscaping design for the pond edge will create a natural littoral zone and riparian vegetation which could be attractive to birds. A nearshore landscape design has been incorporated around the pond edge. This area should be comprised of a dense planting of shrubs to prevent birds from walking into the pond (ex. Common Blackberry (*Rubus allegheniensis*) and Smooth Wild Rose (*Rosa blanda*). This planting area should be a minimum of 5 m in width from the pond's edge.

Open Space Block

The SWM Pond will be located within a relatively large open space area, over 10 ha, through which the Experimental Farm pathway currently runs. Due to public use of the lands the current landscaping design for the open space is to create a natural park like area with the plantings of trees, shrubs and grass meadows. Both geese and gulls are highly attracted to maintained park lawns for feeding and loafing. Therefore the area of maintained lawn will be limited to the 1.5 m mow strips along the pathway. This is an important design element which has been applied to reduce use of the SWM Pond by both species.

Public Facilities

As noted the Experimental Farm pathway currently runs through the lands, and the design concept of the pond and open space is to promote public use. High numbers of gulls can be attracted to areas such parks where there is an opportunity to feed on food waste. Therefore as part of the facility, wildlife proof garbage containers should be provided throughout and no food vending should be permitted. In addition signage should be placed to discourage the feeding of geese and gulls.

Summary and Recommendations

As noted, the distant location of the SWM Pond from the Airport runways significantly reduces the risk associated with bird strikes for aircraft operating at the Airport. At the proposed location of the SWM Pond the aircraft will be operating at an altitude above the airspace where local bird movements occur. In addition primary design features have been incorporated that will reduce the use of the facility by the gulls and geese, the primary bird hazard species. Additional secondary design features have also been incorporated to further reduce geese and gull use of the site.

Primary Design Features

- The current design of a pond that will have a small surface area and a narrow linear shape will significantly limit the use of the site by geese and gulls.
- Design has also identified that much of the pond will be 1.5 m or greater in depth and this will also significantly limit the use of the site by geese and gulls.

Other Secondary Design Features

- The creation of a berm/peninsula should be reviewed with respect to steep shorelines. Landscaping will include dense plantings of shrubs to prevent loafing and nesting opportunities.
- The nearshore landscape design around the pond edge will be comprised of a 5m dense planting of shrubs.
- Landscape design for the open space block limits areas of maintained lawn to areas directly adjacent to pathways.
- As the space will promote public use, the control of food waste and feeding of birds is required though signage and covered waste bins.

Contingencies

To confirm low use of the facility by gulls and geese, a 2-3 year monitoring program could be established. Baseline data is being collected in the 2017 breeding season and will also occur in the summer and fall prior to the pond being constructed. Beginning in the second season of the final completion and full operation of the facility monitoring should commence. The monitoring would need to establish bird numbers during the spring and fall migration period as well as summer breeding/feeding/loafing numbers.

In the event that the hazard level and associated risk to aircraft associated with the SWM Pond reaches an unsatisfactory level (i.e. there is hazardous bird activity reported by a pilot/airport personnel in the vicinity of the pond or a birdstrike or near miss occurs in proximity to the SWM Pond),a number of contingency measures could be considered for implementation including the following:

Design

- Additional landscape hardening of pond shore in specific areas.
- Specific alternate landscape planting to reduce use of specific areas.

Wildlife Control

- Egg oiling
- Capture-Release
- Harassment (effigies/dogs etc.)