# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT - PROJECT PLAN REPORT

**Prepared for: Mississippi Valley Conservation Authority**

**Prepared by: Egis Canada Ltd.**

**November 12, 2024**

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**Prepared for:**

Mississippi Valley Conservation Authority

10970 Highway 7
Carleton Place, ON, K7C 3P1

**Prepared by:**

115 Walgreen Road
Carp, ON, K0A 1L0

November 12, 2024

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| Prepared by: | Reviewed by: |
| Lisa Marshall | Jeff King |
| Environmental Assessment Lead | Biologist/Environmental Planner |
| Egis | Egis |

# EXECUTIVE SUMMARY

The Mississippi Valley Conservation Authority (MVCA) initiated a Conservation Ontario Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, which is located on the main channel of the Mississippi River, about 8 km east of Fernleigh. The dam is situated on Lot 21, Concession 9, Clarendon Ward, within North Frontenac Township. Access to the site is via Road 506, turning onto Gutheinz Road, and proceeding along a private access road.

This project described herein has been undertaken in accordance with the process for Conservation Ontario's Class EA for Remedial Flood and Erosion Control Projects under the Environmental Assessment Act. The Class EA is an 'approved' Class EA under the Environmental Assessment Act (EAA), allowing Conservation Authorities (CAs) to undertake remedial flood and erosion control projects without requiring formal approval under the EAA.

The Kashwakamak Lake Dam, constructed in 1910, includes an overflow weir spillway, sluices, and a small concrete saddle dam. A 2020 Risk Assessment Study identified the need for structural interventions within five years to manage flooding and drought effectively. A 2022 Dam Safety Review (DSR) by Hatch found the overflow weir deteriorating, requiring significant concrete repairs to prevent further degradation. The dam has exceeded its design life and shows signs of deterioration. This assessment aims to determine whether the dam should be decommissioned, repaired, or replaced, balancing public safety with environmental, socio-economic, and cultural considerations.

A comprehensive consultation program was developed at the onset of the project, involving public notices, a project website, and meetings with the key stakeholders, Community Liaison Committee (CLC), First Nations and the public. Key concerns included maintaining water levels, construction timelines, and potential impacts on local natural heritage features and recreational activities were identified and discussed throughout consultation.

To add in the development and evaluation of alternative solutions for the Kashwakamak Lake Dam and the identification of potential impacts and mitigating measures, several studies and assessment were undertaken to inventory the existing natural, socio-economic, and cultural environments of the Kashwakamak Lake Dam. An Environmental Assessment revealed the presence of diverse wildlife, including fish spawning habitats and species at risk (SAR) such as bats and turtles. Based on background review, it was identified that the Kashwakamak Lake features over 577 cottages and residences, along with resorts and marinas, supporting a vibrant local community. The lake is upstream of culturally significant wild rice crops for the Ardoch Algonquin First Nation and other First Nations. The surrounding landscape is predominantly undeveloped, characterized by forests, lakes, and wetlands. The Kashwakamak Lake Dam plays a crucial role in maintaining water levels, providing flood and drought control, and supporting local recreational and tourism activities. The lake's open water season runs from May to October, attracting high public activity with boating, fishing, hiking, hunting, resorting, and camping. During the off-season from November to April, the area supports ice fishing, snowmobiling, and other outdoor activities. A Geotechnical Investigation highlighted the existing subsurface conditions and the need for the foundation of the dam to be placed on sound bedrock.

Past Recovery Archaeological Services Inc. conducted Stage 1 & 2 and Stage 3 Archaeological Assessments for the proposed replacement of the Kashwakamak Lake Dam, covering 1.49 hectares. The Stage 1 assessment (July 25, 2023) identified potential archaeological resources, leading to a Stage 2 assessment (May 2, 2024). The Stage 2 assessment revealed a potential archaeological site, suggesting a short-term campsite for lithic reduction practices, necessitating a Stage 3 assessment. The Stage 3 assessment confirmed high cultural heritage value, warranting Stage 4 mitigation. The MVCA recommends "avoidance and protection of the site" as the Stage 4 strategy, ensuring the archaeological site is preserved during the dam replacement.

A comprehensive hydraulic analysis of the Kashwakamak Lake Dam was conducted, considering various scenarios including normal conditions, probable maximum flood events, and projections for climate change. This analysis aimed to evaluate the potential impacts on life safety, property, environmental factors, and cultural heritage assets, as well as to assess the extent of potential impacts on the surrounding area in the event of a dam failure.

The findings of this assessment confirmed the Hazard Potential Classification (HPC) of the Kashwakamak Lake Dam. According to the Ministry of Natural Resources (MNR) Technical Bulletin for Classification and Inflow Design Flood Criteria (2011), the minimum Inflow Design Floods (IDF) based on the dam's HPC to inform the dam's design. The HPC for the Kashwakamak Lake Dam was determined to be moderate, while the saddle dam was classified as low. Consequently, the IDF for the main dam is set to range from the 100-year flood to the 1000-year flood, or regulatory flood events, whichever is greater. As a conservative measure, the most severe scenario of the 1000-year flood was selected as the IDF for the main dam, while the 100-year flood was chosen for the saddle dam.

Five alternative solutions were evaluated based on criteria such as hydraulic function, geomorphology, dam safety, environmental impact, socio-economic factors, and implementation feasibility:

1. Do Nothing
2. Decommission Dam and Construct Passive Control System
3. Rehabilitation of Existing Dam
4. Replace Existing Dam in Same Location
5. Construct New Dam Downstream

Following a comprehensive evaluation process that incorporated expertise and input from various disciplines, agencies, stakeholders, First Nations, the CLC, and the public, the Technically Preferred

Alternative is Alternative 4. This involves replacing the existing Kashwakamak Lake Dam at the same location with a new dam aligned similarly to the existing structure. The Saddle Dam will also be replaced within a similar alignment to that of the existing dam. The type of structure and function is dependent on the Kashwakamak Lake Dam replacement design and will be further assessed during detailed design.

Alternative 4 effectively addresses the Problem Statement outlined in this study while preserving the integrity of the Mississippi River Watershed Plan. The new dam will be engineered to handle larger flood events, be resilient to climate change, and comply with current dam safety standards. Constructing the new dam at the existing site will avoid additional areas of disturbance, have no permanent impacts on property, and minimize socio-economic disruptions, including no long-term effects on First Nation Lands (Manòmin).

On September 9th, 2024, the MVCA Board of Directors endorsed Alternative 4 as the selected Technically Preferred Alternative.

The project will proceed with preliminary and detailed design, tendering, and construction, subject to regulatory approvals and stakeholder feedback. The implementation phase will include rigorous monitoring to ensure compliance with environmental standards and effective mitigation of potential impacts.

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# 1.0 INTRODUCTION

The Mississippi Valley Conservation Authority (MVCA) has initiated a Conservation Ontario Class Environmental Assessment for the Kashwakamak Lake Dam on the main channel of the Mississippi River. The existing Kashwakamak Lake Dam, constructed over 100 years ago (in 1910), has surpassed its design life. According to the 2022 Dam Safety Review, the dam is showing signs of deterioration, particularly in the overflow weir. A decision must be made regarding whether to decommission, repair, or replace the dam.

This project is being carried out in accordance with the process for Conservation Ontario's Class EA for Remedial Flood and Erosion Control Projects under the Environmental Assessment Act. The Class EA is an 'approved' Class EA under the Environmental Assessment Act (EAA), allowing Conservation Authorities (CAs) to undertake remedial flood and erosion control projects without requiring formal approval under the EAA.

## 1.1 Project Purpose

In 2020, MVCA conducted a Risk Assessment, followed by a Dam Safety Review (DSR) in 2022, which concluded that structural issues at the dam needed to be addressed within 5 years. MVCA incorporated this work into its 10-year capital plan and secured grants from both the Federal Government (Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF)) and the Provincial Government (Water and Erosion Control Infrastructure (WECI)) to support planning, design, and construction activities. In March 2023, MVCA initiated the Class EA process to determine the best approach to address the dam deficiencies.

This Project Plan has been prepared in accordance with the Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Class EA), January 2002, as amended in February 2024. The Class EA involves characterizing the study area, identifying alternative solutions, assessing the potential impacts of each alternative on physical, biological/natural, cultural, socio-economic, and engineering/technical aspects, and outlining measures to mitigate any adverse effects. The Class EA process ensures that agencies, stakeholders, First Nations, community members, and the public are consulted at critical stages of the study and are given the opportunity to share comments and concerns.

This Draft Project Plan Report summarizes the Class EA process and provides a record of stakeholder consultation. The Project Plan Report is available for agency, stakeholder, and public review during a 30-day review period. Subject to the comments received on this Project Plan and the receipt of necessary approvals and funding, MVCA is expected to proceed with the implementation of the project. The implementation phase will involve preparing detailed design, tendering, and construction.

## 1.2 Project Background

The Kashwakamak Lake Dam is owned and operated by the MVCA. The dam is one of six (6) major dams in the Mississippi River that is used to alleviate flooding and drought. The dam structure consists of an overflow weir, two sluices that each contains 10 timber stop logs (0.3 m high x 0.3 m wide x 3.43 m long) and a small concrete saddle dam.

The Kashwakamak Lake Dam was designed and constructed initially as a lumber dam in the 1860s; however, in 1910 the dam was reconstructed and is now over 100 years old with a deteriorating concrete structure in several areas. The dam was originally owned and operated by the Mississippi River Improvement Company. Ownership and operation of the dam were transferred to the MVCA in 1991. Throughout the lifespan of the dam, several maintenance programs have been undertaken to reduce seepage and improve dam safety, including:

- 1986-1987: Concrete repairs to the weir, last documented maintenance before the transfer of ownership to MVCA.
- 1995-1996: A grouting program was undertaken along the northern embankment to inhibit seepage through the embankment. It was noted to be effective at lower water levels, however, was not effective at preventing seepage at normal operating levels.
- 2000: A grouting program for the weir and abutments was undertaken and was noted to be successful at temporarily reducing seepage. Subsequent inspections have noted further seepage through the structure.
- 2001-2003: A new wooden deck was installed at the structure.
- 2005: An overhead gantry system was installed.

Based on the findings of the 2022 Dam Safety Review, the dam was identified as showing signs of deterioration, especially the overflow weir and was stated to be in poor to fair condition. Following the outcome of the safety review, MVCA proactively updated the 10-year Capital Plan to include provisions for the environmental assessment and subsequent renewal or replacement of the dam.

## 1.3 Project Study Area

The Kashwakamak Lake Dam is located on the main channel of the Mississippi River, about 8 km east of Fernleigh. It is located on Lot 21, Concession 9, Clarendon Ward, within North Frontenac Township. Access to the site is via Road 506, turning onto Gutheinz Road, and proceeding along a private access road (see Figure 1-1).

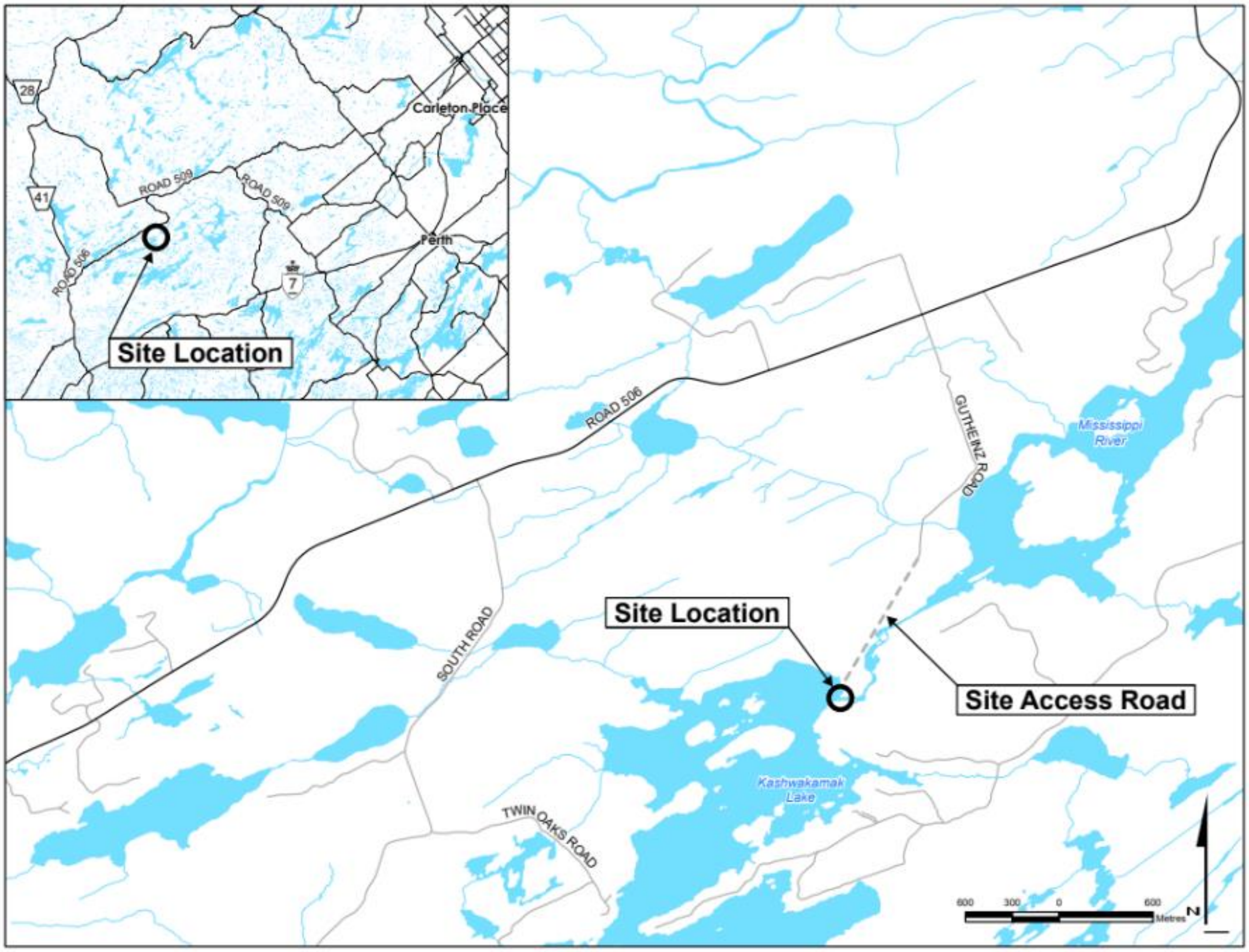

*Figure 1-1: Key Plan*

## 1.4 Project Problem Statement

The existing Kashwakamak Lake Dam was built more than 100 years ago (built in 1910) and is well beyond its design life. Based on the findings of the 2022 Dam Safety Review, the dam is showing signs of deterioration, especially the overflow weir. A decision needs to be made on whether to decommission, repair, or replace the dam. Given the age and condition of the structure, its natural heritage features, and its function as one of the six major dams managed to alleviate flooding and drought along the Mississippi River, the future of the dam must consider several constraints and opportunities such as public safety, riverine processes, flooding, climate change, cultural heritage, Indigenous rights, natural habitat, public uses and aesthetics. The Preferred Alternative must address the problem while balancing study area constraints and opportunities, in order to best meet the needs of the various stakeholder groups and interested parties.

# 2.0 ENVIRONMENTAL ASSESSMENT PROCESS

## 2.1 Ontario Environmental Assessment Act

Ontario's Environmental Assessment Act (EAA) was passed in 1975 and was proclaimed in 1976. The EAA requires proponents to examine and document the environmental effects that could result from major projects or activities and their alternatives. The EAA's comprehensive definition of the environment is:

- Air, land or water;
- Plant and animal life, including human life;
- The social, economic and cultural conditions that influence the life of humans or community;
- Any building, structure, machine or other device or thing made by humans;
- Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities, and
- Any part of a combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

The purpose of the EAA is the betterment of the people as a whole, or any part of Ontario, by providing for the protection, conservation and wise management of the environment (RSO 1990, c.18, s.2). It is the objective of the EAA proponents to ensure that decisions result from a rational, objective, transparent, replicable, and impartial planning process.

To meet the requirements of Ontario's EAA, class environmental assessments were approved by the Minister of the Environment in 1987 as a means of obtaining project-specific approval under the Ontario EAA. The Class EA approach streamlines the planning and approvals process for projects that are:

- Recurring;
- Similar in nature;
- Usually limited in scale;
- Predictable in the range of environmental impacts, and
- Responsive to mitigation.

## 2.2 Conservation Authority Class Environmental Assessment Process

The Conservation Ontario Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Class EA), originally issued in January 2002 and amended in February 2024, outlines a structured process for evaluating and managing the environmental impacts of flood and erosion control projects. This Class EA provides a streamlined, standardized framework for addressing environmental concerns associated with such projects while ensuring compliance with regulatory requirements. This Study has been completed in accordance with the planning and design process as outlined in Figure 2-1. Key aspects of the Class EA Process:

1. Pre-Planning and Screening:
    - Initial Screening: Projects are initially screened to determine if they fall within the scope of the Class EA. This involves assessing whether the project has potential environmental impacts that need to be addressed.
    - Preliminary Assessment: A preliminary assessment is conducted to identify the potential environmental effects and the level of assessment required.
2. Public and Agency Consultation:
    - Engagement: The process includes a consultation phase where input is sought from the public and relevant agencies. This helps in identifying concerns and incorporating stakeholder feedback into the planning process.
    - Review Period: A specified review period allows stakeholders to provide comments on the proposed project and its potential impacts.
3. Detailed Assessment:
    - Environmental Impact Assessment (EIA): If required, a detailed environmental impact assessment is carried out. This involves a thorough analysis of potential environmental effects, including impacts on natural resources, habitats, and communities.
    - Mitigation Measures: The assessment identifies mitigation measures to address and minimize adverse environmental impacts.
4. Decision-Making and Approval:
    - Final Review: Based on the assessment and stakeholder feedback, a final review is conducted to ensure all environmental concerns have been addressed.
    - Approval: The project proceeds to the approval stage, where necessary permits and authorizations are obtained before implementation.
5. Implementation and Monitoring:
    - Project Implementation: Once approved, the project moves to the implementation phase, which includes detailed planning, contractor selection, and construction.

- Monitoring: Post-implementation monitoring ensures that the project meets environmental standards and that any unforeseen impacts are managed effectively.

The Class EA process ensures that flood and erosion control projects are developed with a clear understanding of their environmental implications, incorporating public input and regulatory compliance throughout the project lifecycle.

## 2.3 Section 16 Orders

Upon completion of the Project Plan, the report is placed on public record for a minimum of 30 calendar days to allow for reviewing. A Notice of Study Completion is circulated and advertised to inform agencies, stakeholders, First Nations, interested parties, and the public that the report has been finalized and is available for viewing and providing final comments. The Notice also informs the public and other stakeholders of their right to request a Section 16 Order, including details on how and when such a request should be submitted.

Section 16 order request can be submitted to the "Minister of Environment, Conservation and Parks on the grounds that the order may prevent, mitigate or remedy adverse impacts on the existing Aboriginal and treaty rights". The Minister will not consider any requests that are not based on these grounds. The Section 16 Order process has been replaced with an additional 30-day window for the Ministry to decide if the Minister should take any action. During the additional 30 days the Minister will decide if the project will be elevated (Section 16 Order granted) or if it will be approved with conditions. If the Minister advises the proponent that the project will be approved but with conditions, the Minister has more time to draft these conditions. If there is no response from the Minister within the additional 30-days, the proponent may proceed with the project.

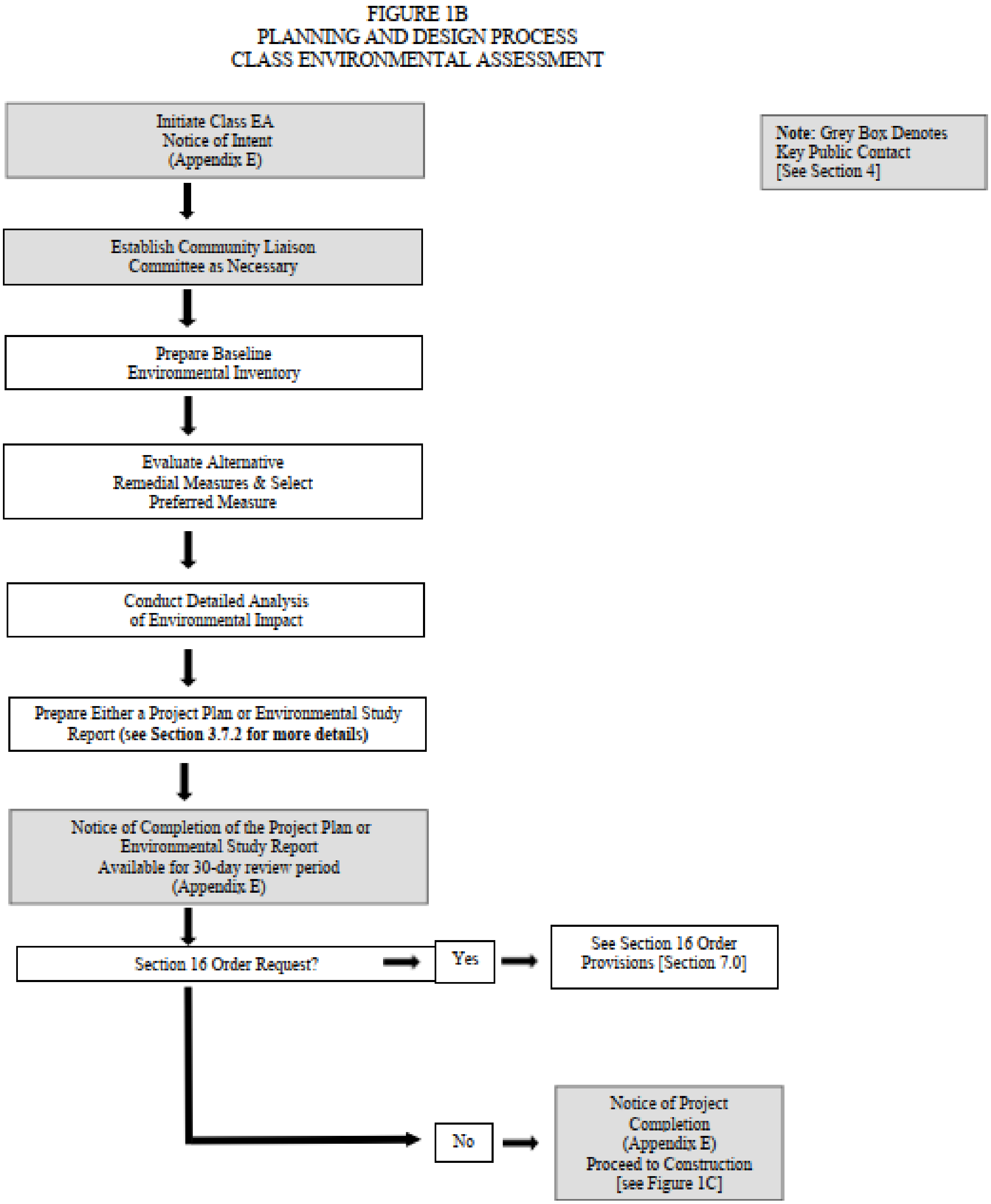

***Figure 2-1: Planning and Design Process for Class Environmental Assessments***

# 3.0 PUBLIC CONSULTATION

## 3.1 Public Consultation Approach

Consultation is a key component of the Class EA process. It is important for members of the community and stakeholders to provide balanced and objective information and consulting them to obtain feedback on the study process, alternatives, and recommended technically preferred alternative.

A consultation program was developed specifically for this study under the following basis:

- Present clear and concise information at key stages of the study process;
- Solicit community, regulatory and municipal staff input;
- Identify concerns related to the undertaking;
- Consider stakeholder comments when developing the technically preferred alternative; and
- Meet Class EA consultation requirements.

Consultation early and throughout the Class EA process attempts to meet the growing expectation on the part of the public that they will be consulted regarding decisions made by public decision-making bodies.

A Project Contact List was developed at the initiation of this study and was updated regularly throughout the project to add, remove or revise information as necessary. The Project Contact list includes government ministries/agencies, municipal staff, municipal elected officials, emergency services, businesses, potentially affected pubic, members of provincial parliament, First Nations and key interest groups. The Project Contact List can be found in ***Appendix A***.

Throughout the Class EA study, all notices were sent out via email and/or mailout through Canada Post, as required. Notices were also posted on the MVCA website and other social media platforms, as well as advertised in the North Frontenac News.

### *3.1.1 Project Website*

A project website (Kashwakamak Lake Dam Class EA – MVCA) was created for the study and launched in March 2023, coinciding with the issuance of the Notice of Intent. The website was updated throughout the course of the study and provided information on the study background, notifications, links to related studies, Public Information Centre (PIC) presentations, and contact details for those interested in reaching out to the project team.

### *3.1.2 First Nations Consultation*

Engaging with First Nations is a crucial aspect of acknowledging their stewardship of heritage. MVCA and Egis worked collaboratively with First Nations throughout this study to provide information and seek their input and perspectives on the evaluation of alternatives and the development of environmental mitigation measures.

First Nations with potential interest in the study area were identified by MVCA and confirmed through correspondence from the Ministry of the Environment, Conservation and Parks (MECP) response letter to the Notice of Intent. This project falls within the Traditional and/or Treaty Territories of the Algonquin of Ontario, Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Mississaugas of Scugog Island First Nation, Algonquins of Pikwàkanagàn First Nation, Huron-Wendat, Ardoch Algonquin First Nation, Kawartha Nishnawbe, Mohawks of the Bay of Quinte, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, and Beausoleil First Nation. The Métis Nation of Ontario was also included on the project notification list.

Consultation with First Nations was carried out at key milestones throughout the Class EA process directly by MVCA. First Nations were included on the contact list and received notifications of the study intent, invitations to join the Community Liaison Committee (CLC), and information about the PIC via email and mail. They were encouraged to participate in the study by providing input through direct correspondence with the project team and by participating in the online PIC

Additionally, MVCA extended invitations to First Nations to participate in the Stage 2 and 3 Archaeological Assessments and marine archaeological field investigations.

## 3.2 Notifications and Consultation

Key consultations undertaken throughout the study with key agencies, stakeholders, and the public are listed in Table 3-1 and Table 3-2 for First Nations. All notifications have been appended to ***Appendix B***, and all consultation responses, including emails received and sent by the project team, along with a summary table, are enclosed in ***Appendix C*** for Agencies and Stakeholders and ***Appendix D*** for First Nations.

**Table 3-1: Agencies, Stakeholders and Public Consultation Events**

| Consultation Event | Date |
|---|---|
| Notice of Intent | May 25, 2023 |
| North Frontenac News – Notice of Intent | May 25 and June 1, 2023 |
| CLC Expression of Interest | August 25, 2023 |
| CLC Expression of Interest Response | September 29, 2023 |
| Selection of CLC Members | October 6, 2023 |

| Consultation Event | Date |
|---|---|
| CLC Meeting # 1 | February 26, 2024 |
| Notice of PIC | May 2, 2024 |
| North Frontenac News – PIC Notification | May 2 and 9, 2024 |
| Virtual PIC | May 23, 2024 |
| Community Liaison Meeting # 2 | August 13, 2024 |
| Notice of Completion | November 14, 2024 |
| North Frontenac News – Notice of Completion | November 14, 2024 |

**Table 3-2: First Nations Consultation Events**

| Consultation Event | Date |
|---|---|
| Notice of Intent | May 25, 2023 |
| CLC Expression of Interest | August 25, 2023 |
| CLC Expression of Interest Response | September 29, 2023 |
| Selection of CLC Members | October 6, 2023 |
| CLC Meeting # 1 | February 26, 2024 |
| Project Notification – Stage 2 Archaeological Assessment | April 18, 2024 |
| Stage 2 Archaeological Assessment Field Visit<br>(First Nation attendees: Alderville First Nation and Algonquins of Pikwàkanagàn) | May 2, 2024 |
| Notice of PIC | May 2, 2024 |
| North Frontenac News – PIC Notification | May 2 and 9, 2024 |
| Virtual PIC | May 23, 2024 |
| Project Notification – Stage 3 Archaeological Assessment | August 12, 2024 |

| Consultation Event | Date |
|---|---|
| CLC Meeting # 2 | August 13, 2024 |
| Stage 3 Archaeological Assessment Field Visit<br>(First Nation attendees: Algonquins of Pikwàkanagàn) | August 20-22, 2024 |
| Notice of Completion | November 14, 2024 |
| North Frontenac News – Notice of Completion | November 14, 2024 |

### 3.2.1 Notice of Intent

The Notice of Intent was distributed by Egis on May 25th, 2023, to the project Contact List. The Notice of Intent was posted to MVCA's website. The Notice of Intent materials can be found in ***Appendix B***.

Responses received from various stakeholders as a result of the Notice of Intent, including emails received and sent by the project team and comment summary table, are included in ***Appendix C*** and ***Appendix D***.

### 3.2.2 Community Liaison Committee

#### 3.2.2.1 Expression of Interest

On August 25th, 2023, MVCA and Egis contacted various organizations and advertised an opportunity for individuals to join a CLC. The CLC was established to engage interested members, gather diverse perspectives, and obtain early input at key points in the study process before reaching out to the broader public through more traditional consultation methods. The members of the CLC consisted of:

- Three (3) members of the public who expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam;
- One (1) member representing the Township of North Frontenac;
- One (1) member representing the Kashwakamak Lake Association (KLA), and
- One (1) member representing each of the identified Indigenous Communities.

Two (2) meetings occurred during the EA process:

- To provide an overview of the project, objectives and process, and
- To consider proposed alternative solutions and provide feedback into the evaluation and selection of the Technically Preferred Alternative.

#### *3.2.2.2 CLC Meeting #1*

MVCA and Egis hosted the first virtual CLC meeting on February 26th, 2024 from 2:00 to 4:00 p.m. All six members, including the representative from Hiawatha First Nation, were in attendance. During the meeting, Egis presented an overview of the project, which included details on the study area, project understanding, and scope, the Class EA process, and the team's engagement and consultation activities undertaken to date. Additionally, Egis presented the current findings from the natural heritage, archaeology, and cultural heritage investigations, as well as the proposed alternative solutions, evaluation criteria and matrix, and the recommended technically preferred alternative.

Key feedback from CLC Meeting #1 is summarized in the table below (Table 3-3). For complete meeting minutes from CLC Meeting #1, please refer to ***Appendix E***.

**Table 3-3: Summary of Key Comments from CLC Meeting #1**

| Comment Received | MVCA/Egis Response |
|---|---|
| Will the water levels be maintained at the same level? | The new dam will ensure that water levels and the water management plans be maintained and even improve as a result of the new structure functioning and operating more efficiently. |
| When will construction start on the dam? | Construction on the dam will likely start in 2-3 years (fall 2026 or 2027) after the completion of the EA, the design, the tendering process, and obtaining permits. |
| What are the potential impacts of the dam on Manòmin? | MVCA responded that the data collected cannot be correlated since they do not typically survey the downstream area and they do not have data from before the dams were built to establish a baseline condition.<br>However, there is another dam located between Kashwakamak Lake Dam and the Ardoch community to allow for buffering and additional protection of the Manòmin.<br>MVCA also noted that in the structure operating plan, there are certain times of year when there needs to be stable flow and water levels to maintain the rice crop populations, and the dam is operated accordingly. |
| How the water level will be controlled during the replacement of the dam? | MVCA noted that the installation of temporary coffer dams with a staged construction plan to maintain water levels during replacement or other construction works would mitigate impacts. |

#### *3.2.2.3 CLC Meeting #2*

MVCA and Egis hosted the second virtual CLC meeting on August 13th, 2024, from 1:00 to 3:00 p.m. Four of the six members attended, but unfortunately, the Mayor of the Township of North Frontenac and the representative from Hiawatha First Nation were unable to attend. During the meeting, Egis provided an update on the Class EA process, presented the findings from the Stage 2 Archaeological Assessment (Stage 2 AA), and outlined the requirements for a Stage 3 AA. Additionally, an overview of the comments received during the PIC was provided, along with a summary of the responses from MVCA and Egis. The presentation also identified the recommended technically preferred alternative, which will be presented to the MVCA Board of Directors for approval.

Key feedback from CLC Meeting #2 is summarized in the table below (Table 3-4). For complete meeting minutes from CLC Meeting #2, please refer to ***Appendix E***.

**Table 3-4: Summary of Key Comments from CLC Meeting #2**

| Comment Received | MVCA/Egis Response |
|---|---|
| Will the water levels be maintained at the same level? | The new dam will ensure that water levels and the water management plans be maintained and even improved as a result of the new structure functioning and operating more efficiently. |
| Cottagers have expressed concerns about lowering the lake's water level too much, as it could cause the pumps that draw water from the lake to freeze. Some cottages rely on this water source. | MVCA noted that they will follow up with the lake association to get further information to determine a feasible plan to address the impacts. |
| Is there a contingency plan in place if the dam is not completed on schedule or if the water levels rise earlier than expected? | Egis PM confirmed that there will be a contingency plan, however it will be developed during detailed design. MVCA also confirmed that it is too early in the project to provide details on construction planning, but a contingency plan will be developed in the coming stages of the project. |
| Is there an immediate risk of the dam failing and which downstream communities could be impacted? | The dam is continuously observed and monitored by the MVCA as part of a monthly monitoring program. MVCA noted that the community of Ardoch is the closest downstream and that any breach wave impact would be mitigated by the Farm Lake dam. Dam failure during construction is not anticipated, and the construction process, |

| Comment Received | MVCA/Egis Response |
|---|---|
|  | which will be carried out in stages, is not expected to increase the risk of failure. |

### *3.2.3 Public Information Centre*

MVCA and Egis hosted a virtual PIC via Zoom on May 23rd, 2024, from 4:00 to 6:00 p.m. The event featured a formal presentation by Egis, followed by an open question-and-answer period.

The Notice of PIC was distributed via email and Canada Post on May 2nd, 2024 to agencies, stakeholders, First Nations, interest groups, and the public. It was also posted on the MVCA website and advertised in the North Frontenac News on May 2nd and 9th, 2024.

Fourteen attendees participated in the PIC, including the Mayor of the Township of North Frontenac and one representative from Hiawatha First Nation. A total of 15 comments were received during the PIC, with three additional email responses received afterward.

The purpose of the PIC was to share information related to the study background, the Class EA process, existing study area conditions, project overview and understanding, evaluation of alternative solutions, identification of the recommended alternative, and next steps in the Class EA process, as well as to provide an opportunity for attendees to share comments and concerns pertaining to the study.

The Notice of PIC requested that all comments be submitted by June 20th, 2024. Following the PIC, the presentation and recording were made available on the MVCA's website (Kashwakamak Lake Dam Class EA – MVCA) to provide information and allow further opportunity for the public to review and comment.

The Notice of PIC and presentation materials are available in ***Appendix F***. Formal written comments and responses are included in ***Appendix C***.

Key feedback received during the PIC is summarized in the table below (Table 3-5).

**Table 3-5: Summary of Key Comments and Responses from PIC**

| Comment Received | MVCA/Egis Response |
|---|---|
| Will the water levels be maintained at the same level? | The new dam will ensure that water levels and the water management plans be maintained and even improved as a result of the new structure functioning and operating more efficiently. |

| Comment Received | MVCA/Egis Response |
|---|---|
| What mitigation measures will be implemented during construction? | The mitigation measures will be further outlined and assessed during the design stage. However, it is anticipated that it will include the implementation of a temporary bypass system to dewater and reroute the water prior to construction, and a sediment and erosion plan to mitigate erosion impacts during construction. From a Natural Heritage perspective, timing windows and a few other mitigation measures will be implemented to protect fish, bats, turtles, vegetation and other species. |
| What are "temporary impacts"? | Temporary impacts could be during construction an earlier drawdown of the lake may be required around September-October. |
| Will notification be given prior to change in water levels? | It was acknowledged that the lake is widely used for many recreational and tourist activities. MVCA will try to choose the timing that will have the least impact and accommodate the users of the lake. MVCA will have a plan in place to inform everyone affected by the earlier changes in water level. Adequate notification will also be provided to local marinas prior to reducing water levels, so they are prepared for the surge of boats at that time. |
| Is there an immediate risk of the dam failing? | There is no immediate risk of dam failure. The existing dam has significant deficiencies due to its age, which, if not addressed, would pose a greater risk of dam failure. The dam is continuously observed and monitored by the MVCA as part of a monthly monitoring program. |
| What is the timeline for the whole project getting underway, including the demolition and lowering of lake levels? | The next phase of the project will be preliminary and detailed design, which MVCA will be initiating in 2025-2026. Following the design phase, permits will need to be acquired. Therefore, construction is currently expected to occur in the Fall of 2026 at the earliest. |
| How will this project be funded, and will there be additional impact on the municipality in terms of | MVCA noted that they were successful in securing both federal and provincial funding for the project:<br>• Granted federal funding through the Disaster, Mitigation, and Adaptation Fund program, which is run |

| Comment Received | MVCA/Egis Response |
|---|---|
| additional pressure on their budgets? | by Infrastructure Canada. Federal funding is provided for up to 40% of eligible project costs.<br>- Granted provincial funding through the Water, Erosion, and Control Infrastructure program, which is delivered through a municipal-provincial-conservation authority partnership. Provincial funding is provided for up to 50% of the remaining project balance.<br>The remainder of the project costs are assumed by the MVCA. The project is eligible for Category 1 funding, meaning that all of the member municipalities within the jurisdiction contribute towards the reconstruction of the dam to some level. |

Full meeting minutes were prepared for the PIC, and can be found in ***Appendix E***.

### *3.2.4 Notice of Completion*

A Notice of Completion was distributed on November 14, 2024, to the project contact list (***Appendix A***). The Notice of Completion was posted on the MVCA's website and advertised in the North Frontenac News on November 14, 2024. The Notice of Completion can be found in ***Appendix E***.

The Notice of Completion was issued to announce the start of the 30-day public review period for the Project Plan Report prepared as part of this Class EA. It informed interested parties that they could submit comments to the project team within 30 calendar days from the beginning of the review period. The notice also indicated that a Section 16 Request could be made to the MECP to seek an order for a more detailed study (i.e., an individual or comprehensive EA approval) or to impose conditions (e.g., requiring additional studies). Such requests would only be considered on the grounds that it may prevent, mitigate or remedy adverse impacts to constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

Responses received during the 30-day public review period will be summarized in the Project File Report following the review period.

# 4.0 INVENTORY OF EXISTING CONDITIONS

This section provides an overview of the background information (secondary sources) and the results of the field investigations conducted specifically for this study. The following sections summarize the existing natural, socio-economic, and cultural environments of the Kashwakamak Lake Dam. This information will support the development and evaluation of alternative solutions and the identification of potential impacts and mitigating measures.

## 4.1 Existing Kashwakamak Lake Dam

### *4.1.1 Watershed Management*

In 2006, the Ministry of Natural Resources (MNR), along with hydro power producers and the MVCA, developed the Mississippi River Water Management Plan (MRWMP) in line with the Lakes and Rivers Improvement Act. This plan outlines the operating ranges (upper and lower water level/flow targets) and management strategies for the primary water control structures throughout the river system. Under the Conservation Authorities Act, the MVCA is responsible for flood and erosion control, flood forecasting and warnings, and providing expertise on land use planning issues related to flood risks and other hazards.

The Mississippi River Watershed Plan (MRWP), developed by MVCA in 2021, provides a strategic framework for the management and conservation of the Mississippi River watershed in eastern Ontario. This plan addresses key issues such as water quality, flood and drought control, power generation, natural habitat protection and supports recreational/tourism, with a focus on maintaining ecological health and enhancing community resilience. It integrates scientific data, stakeholder engagement, and policy guidance to tackle challenges related to land use, climate change, and resource management. By fostering collaborative efforts among local governments, conservation groups, and residents, the plan aims to ensure the sustainable use and preservation of the watershed’s resources, promoting a balanced approach that supports both environmental sustainability and regional development.

The Kashwakamak Lake Dam study area lies within Kashwakamak Lake which is located in the upper reaches of the Mississippi River, within the Township of North Frontenac. The Mississippi River Watershed is composed of a complex network of rivers, streams, rapids and over 250 lakes located in Eastern Ontario and has an overall watershed catchment area of 3,765 km$^2$ (Figure 4-1).

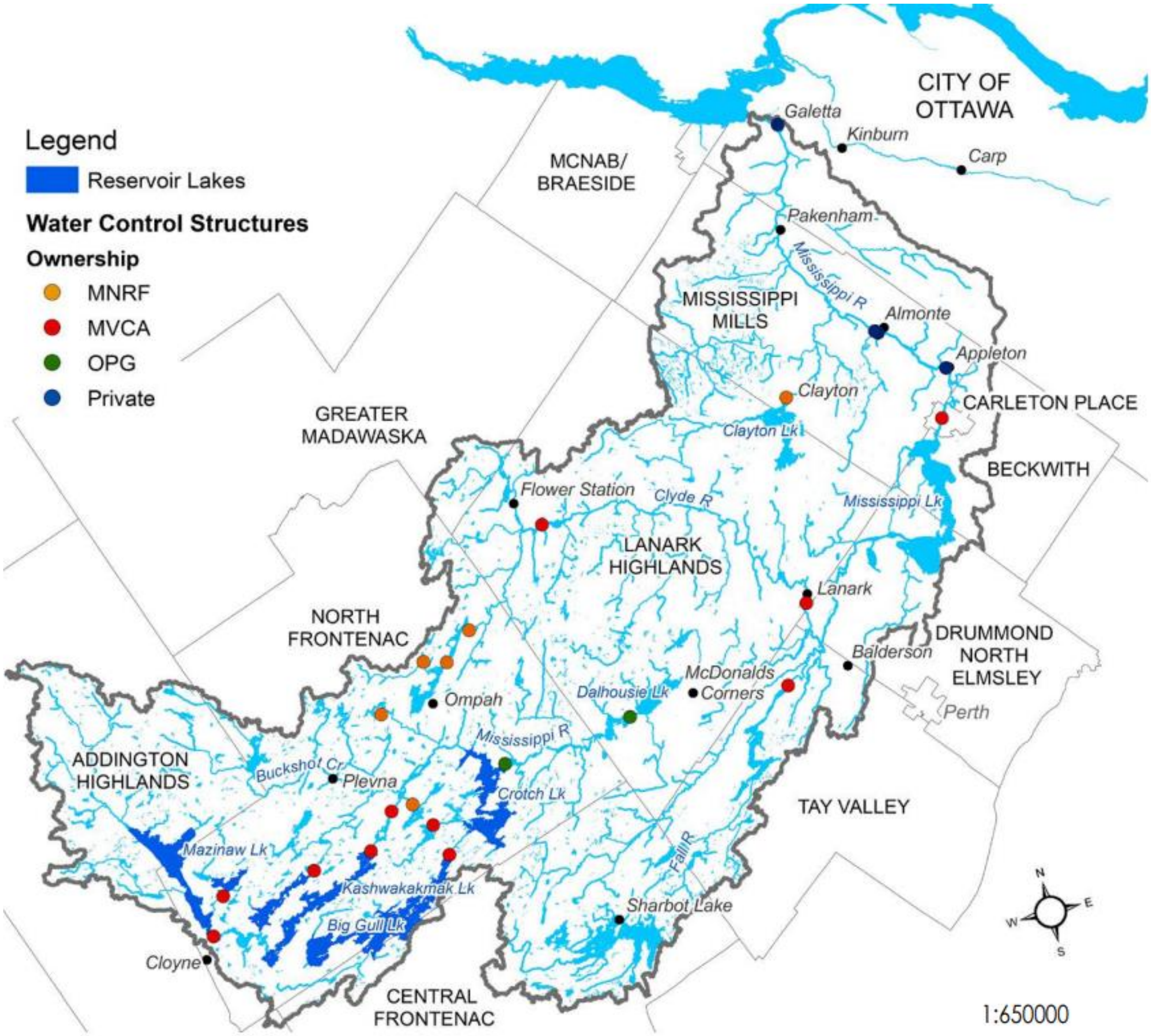

*Figure 4-1: Water Control Structures and Reservoir Lakes (source: MRWP, 2021)*

The key function of the Kashwakamak Lake Dam within the Mississippi River Watershed Plan, managed by the MVCA, is to regulate water levels and manage flow within the Mississippi River watershed. This dam plays a crucial role in controlling water storage and release to mitigate flood risks, ensure stable water levels for ecological health, and provide reliable water resources for local communities. Additionally, it helps to maintain water quality and supports recreational activities by balancing the water flow throughout the watershed, which is vital for sustaining both the environmental and socio-economic aspects of the region.

For comprehensive details regarding the Mississippi River Watershed Plan (MRWP, 2021) and the Mississippi River Water Management Plan (MRWMP, 2006, and as amended), please refer to the MVCA website where reports can be viewed separately.

### 4.1.2 Dam Configuration and Operation

The Kashwakamak Lake Dam is a concrete structure consisting of two sluices with each containing 10 timber stop logs (0.30 m x 0.30 m x 3.43 m) and an overflow weir with a crest elevation of 261.06 m, as well as a small concrete saddle dam that is located approximately 60 m to the north of the main dam and runs adjacent to the access road. The main dam controls a drainage area of 415 sq. km with a total storage volume of 3,822 ha. m (38,220 $m^3$). Immediately upstream of the dam there is a safety boom, and downstream there are existing rock embankments and outcrops.

The dam is one of the major dams along the Mississippi River that is used to alleviate flooding and drought. The dam has manually operated gates with elevations ranging between 258.22 m to 261.22 m. The dam is operated throughout the year. During the spring freshet, the dam is operated to gradually increase lake levels to meet summer requirements while minimizing shoreline damage caused by ice movement. The objective is to raise the reservoir to summer levels before the walleye spawning period. Throughout the summer, lake levels are maintained between 261.00 m and 261.22 m, with a minimum baseline flow ensured at all times. In the fall, drawdown begins after the Thanksgiving weekend and continues until 14 of the 20 stoplogs are removed. Winter lake levels are typically achieved by December (range from 259.55 m to 259.70 m), with a gradual decline following until the spring freshet.

**Photos**: Overflow weir of main dam (left), Kashwakamak Lake Dam (overflow weir and two sluices gates, middle), and saddle dam (right).

### 4.1.3 Dam Condition

In 2022, Hatch conducted a Dam Safety Review (DSR) of the Kashwakamak Lake Dam, encompassing an assessment of the geotechnical, hydrotechnical, and structural components of the water-retaining structures. This review represented the second DSR performed by Hatch on the dam; the initial review was completed by Trow in 2006, followed by a Conditions Assessment of Concrete Structure by Cleland Jardine Engineering Limited in 2016 and a Dam Safety Risk Assessment by Hatch in 2020 to evaluate the dam and its associated structures.

The results of the 2022 site inspection indicated that the Kashwakamak Lake overflow weir is deteriorating and in poor condition. While there were no indications that the structural integrity of the weir or adjacent sluiceway has been compromised, repairs should be made to correct the concrete deterioration evident at the overflow weir to prevent further deterioration and loss of sections within the planned five-year time period. In particular, substantial concrete repairs are necessary for the overflow structure, which has long displayed significant spalling on the upstream face and a heavily deteriorated horizontal joint at the toe, where previous repairs have been ineffective.

**Photos:** South abutment wall (left), overflow weir (middle), and saddle dam (right).

Based on previous dam inspection (2016) and the Dam Safety Inspection Report (2022), a few key deficiencies were noted:

- The dam abutments have insufficient freeboard. Freeboard acts as a safety margin to accommodate fluctuations in water levels caused by wind and wave action without risking overtopping of the structure;
- The overflow weir and abutments do not meet current standards for ice loading from the lake;
- The dam was originally constructed using outdated methods and materials, which may present significant challenges for rehabilitation;
- All concrete structures are observed to be deteriorating, with conditions rated as poor to fair; and
- Given the dam's age (over 100 years), it was designed according to outdated Hazard Potential Classification and Inflow Design Flood criteria.

For further details pertaining to the condition of the existing dams, refer to the Dam Safety Assessment (Trow, 2006), Dam Safety Risks Assessment (Hatch, May 2020), Dam Safety Review (Hatch, March 2022), and MVCA’s annual Dam Safety Inspections prepared under separate cover.

### 4.1.4 Hydrologic and Hydraulic Assessment

#### 4.1.4.1 Hydrology Review

Hydrologic data for this study was acquired through a review of the reports and models provided by the MVCA at the onset of this assignment:

- Pre-Engineering Study, Kashwakamak Lake Dam (Terraprobe, January 1997);
- Kashwakamak Lake Dam Study (Terraprobe, July 1998);
- Kashwakamak Lake Dam Feasibility Study (EGA, August 1998);
- Kashwakamak Lake Dam Operation, Maintenance & Surveillance Manual (MVCA, October 2013);
- Dam Safety Assessment, Kashwakamak Lake Dam (Trow, November 2006);
- Kashwakamak Lake Dam Condition Assessment of Concrete Structure (Cleland Jardine, February 2016);
- Kashwakamak Lake Dam Structural Assessment (Hatch, May 2020);
- Kashwakamak Lake Dam Safety Review (Hatch, March 2022);
- HEC-HMS Model for the Mississippi River (J. Perdikaris, May 2023), and
- Hydrology Memorandum (Innovative Defensive Options, September 2023).

A comprehensive hydrologic study for the Mississippi River was completed using HEC-HMS software by J. Perdikaris in May 2023. Various combinations of input for the modelling approaches were developed in the hydrologic model (event-based or continuous storms, Green-Ampt or soil moisture accounting soil infiltration, and outflow curve or specified release method for downstream conditions). After a review of hydrology data, it was noted that additional scenarios would be required to complete the hydraulic analyses for the Kashwakamak Lake Dam EA study.

Additional scenarios for input to the hydraulic models were provided, and hydrographs for storm events with 2- to 1000-year return periods and the probable maximum flood (PMF) were developed and validated in the Hydrology Memorandum by Innovative Defense Options (September 2023). Simulations accounting for the climate change impact were also completed and provided. Hydrographs for the storm events referred to as 1/3 PMF and 2/3 PMF (the 1000-year storm plus 1/3 of the difference between the 1000-year event and the PMF, and the 1000-year storm plus 2/3 of the difference between the 1000-year event and the PMF) were derived from the 1000-year and PMF hydrographs.

The MVCA hourly lake level data ranging from December 1993 to October 2023 was obtained to perform a statistical analysis. As a result, the mode of the lake level data was calculated to be 261.15 m. Additionally, it was noted from the data that the lake level is maintained between 261.10 m to

261.20 m approximately 39% of time. Therefore, the initial lake level was taken to be 261.15 m, as this can be considered the most representative operational water level for Kashwakamak Lake.

#### *4.1.4.2 Hydraulic Analysis*

Egis undertook a hydraulic analysis of the Kashwakamak Lake Dam using HEC-RAS software. MVCA provided a hydraulic model developed by Hatch for the Kashwakamak Lake Dam Safety Review (March, 2022). A LIDAR survey and a bathymetric survey (2023) was conducted by MVCA. The elevation data was then incorporated into the hydraulic model. The model extends from the Kashwakamak Lake Dam to 12.5 km downstream. There are two sharp elevation changes along the river course with a drop of approximately 17 m over the model extent. The dam was modelled as an inline structure with gated sections. The crest elevation of the saddle dam was indicated by previous reports and design drawings to be 261.66 m. Therefore, the saddle dam will be overtopped during any scenario where the Kashwakamak Lake water surface elevation exceeds the crest.

The hydraulic analysis of the Kashwakamak Lake Dam was conducted for several scenarios, including normal conditions, the probable maximum flood, and climate change projections. This analysis aimed to evaluate potential impacts on life safety, property, environmental factors, and cultural heritage assets. Furthermore, the extent of potential impacts on the surrounding area in the event of a failure was evaluated. This assessment helped confirm the Hazard Potential Classification (HPC) of the Kashwakamak Lake Dam.

HEC-RAS base condition plans were initially created for 100-year, 1000-year, 1/3 PMF, 2/3 PMF, and PMF scenarios. These plans were then expanded with the climate change scenario, dam break scenario (DBS), and a combination of climate change plus dam break. The lake level, inflow, and outflow data for Kashwakamak Lake and Kashwakamak Lake Dam were taken directly from the HEC-RAS model results from the above noted scenarios.

For the analyses of the impacted properties, in addition to the scenarios described above, the ‘normal’ event was modelled to represent the lake and dam on a day with no flooding events. A peak inflow of 10 $m^3$/s for Kashwakamak Lake was assumed to model the normal event. This value was taken as it is large enough to stabilize the model while still representing a scenario without other flood events.

The floodplains for these events (normal, 100-year, 1000-year, 1/3 PMF, 2/3 PMF, and PMF) without climate change were created to evaluate the impacts. No permanent residences were identified to intersect the floodplain limits. Although other structures such as boathouses and sheds were found to be impacted, only the seasonal residences impacted were considered in the hazard potential classification evaluations.

As described in the MNR Technical Bulletin for Classification and Inflow Design Flood Criteria (2011), the range of minimum Inflow Design Floods (IDF) based on the dam HPC are summarized in the table below (Table 4-1) and are used in the design of the dam. The HPC for Kashwakamak Lake Dam and saddle dam were determined to be moderate and low, as described in the following Section 4.1.5, and thus the IDF for the dam should range from the 100-year flood to the 1000-year flood or regulatory flood events, whichever is greater. Therefore, as a conservative approach, the worst case of the 1000-year and 100-year flood event was selected as the IDF for the main dam and the saddle dam, respectively.

**Table 4-1: Range of Minimum Inflow Design Floods (Adapted from MNR, 2011)**

<table>
<tr><th rowspan="2">Hazard Potential Classification</th><th colspan="4">Range of Minimum Inflow Design Floods</th></tr>
<tr><th colspan="2">Life Safety</th><th>Property and Environment</th><th>Cultural – Built Heritage</th></tr>
<tr><td>Low</td><td colspan="4">25-year Flood to 100-year Flood</td></tr>
<tr><td>Moderate</td><td colspan="4">100-year Flood to 1000-year Flood or Regulatory Flood whichever is greater</td></tr>
<tr><td>High</td><td>Potential loss of life of 1-10</td><td>1/3 between the 1000-year Flood and PMF</td><td>1000-year Flood or Regulatory Flood which ever is greater to 1/3 between the 1000-year Flood and PMF</td><td rowspan="3">1000-year Flood or Regulatory Flood whichever is greater</td></tr>
<tr><td rowspan="2">Very High</td><td>Potential loss of life of 11-100</td><td>2/3 between the 1000-year Flood and PMF</td><td rowspan="2">1/3 between the 1000-year Flood and PMF to PMF</td></tr>
<tr><td>Potential loss of life of 100 or more persons</td><td>PMF</td></tr>
</table>

Freeboard calculations were completed considering wind and wave impacts, as is generally done for dams and per MNR requirements. Wind setup and wave runup for the site are calculated separately and combined to compare the existing crest elevation of the structures. A minimum freeboard of 0.60 m was adopted based on the fetch distance of 780 m, as per the MNR Technical Bulletin for Spillways and Flood Control Structures (August, 2011) and the provincial guidelines applicable to this site. The freeboard calculations, water surface elevations (WSE), and flow information for the climate change scenarios are presented in the table below (Table 4-2).

Based on the calculations, the minimum freeboard requirements for the abutments and saddle dam are not met. The south abutment, north abutment, and saddle dam are required to be raised by 0.36 m (to an elevation of 261.99 m), 0.32 m (to an elevation of 261.99 m) and 0.19 m (to an elevation of

261.85 m), respectively. However, it is recommended to adjust the saddle dam crest elevation to 261.99 m (or approximately 262.0 m) to be consistent with the abutment walls.

An existing natural channel east of the saddle dam and access roadway would function as an overflow channel when the saddle dam is overtopped. Under the proposed conditions, converting the saddle dam to an emergency spillway could be considered to maintain the existing conditions. The future access roadway should be designed to allow the overflow and convey it towards the downstream channel during flood events.

**Table 4-2: Summary of Freeboard Calculations**

| Features | Weir | Stop Logged Gates | South Abutment | North Abutment | Saddle Dam |
|---|---|---|---|---|---|
| Dam Hazard Potential Classification[1] | F: Moderate, NF: Moderate | | | | F: Low,<br>NF: Low |
| Inflow Design Flood (IDF) Selection Criteria (MNR 2011) | 100-year to the 1000-year or Regulatory Flood whichever is greater | | | | 25-year to the 100-year |
| IDF Selected | 1000-year | | | | 100-year |
| IDF (1000-year) ($m^3/s$)<br>(With Climate Change) | 99<br>(123) | | | | 73<br>(91) |
| Maximum Design Earthquake (MDE) AEP | 1000-year | | | | 500-year |
| Structure Crest Elevation (m) | 261.06 | 262.62 | 261.63 | 261.67 | 261.66 |
| Winter Drawdown Level (m) | 259.59 | | | | |
| Maximum Normal Lake Operating Level (m) | 261.20 | | | | |
| IDF Level (m)<br>(With Climate Change) | 261.39<br>(261.47) | | | | 261.25<br>(261.33) |
| Stop Log Status | n/a | All Removed | n/a | n/a | n/a |
| Peak Inflow ($m^3/s$) | 99 | | n/a | n/a | n/a |
| Peak Inflow Volume (1000 $m^3$) | 17.9 | | n/a | n/a | n/a |
| Peak Outflow ($m^3/s$) | 48 | | n/a | n/a | n/a |
| Peak Outflow Volume (1000 $m^3$) | 15.2 | | n/a | n/a | n/a |
| Fetch (m) | 780 | | | | |
| Minimum Freeboard Criteria (m) (MNR 2011) | 0.60 | | | | |
| Wind Set-up IDF<br>(Normal) (m) | 0.01<br>(0.02) | | | | |
| Wave Run-up IDF<br>(Normal) (m) | 0.34<br>(0.59) | | | | |

| Features | Weir | Stop Logged Gates | South Abutment | North Abutment | Saddle Dam |
|---|---|---|---|---|---|
| Total Wind Setup & Wave Runup IDF (Normal) (m) | 0.35<br>(0.61) | | | | |
| Freeboard Normal Conditions (m) | n/a | n/a | -0.17 | -0.13 | -0.14 |
| Freeboard IDF Conditions (m) As per MNR 0.60 m minimum [2] criterion | n/a | n/a | *-0.36* | *-0.32* | *-0.19* |
| Assessment of Freeboard (Normal) | n/a | n/a | Inadequate | Inadequate | Inadequate |
| Assessment of Freeboard (IDF) | n/a | n/a | Inadequate | Inadequate | Inadequate |

Notes:

1. F refers to "Flooding" in a dam-break scenario, whereas NF is "non-Flooding" in the same context.
2. Due to the calculated freeboard (0.36 m) is smaller than the MNR minimum requirement, the minimum is applied in the calculations.

For further details pertaining to the hydraulic analysis, refer to the Hydraulic Analysis Memorandum (Egis, May 8, 2024, Rev.2) appended in ***Appendix G***.

### *4.1.5 Dam Classification*

The Ontario MNR has developed the Hazard Potential Classification (HPC) system to evaluate the potential hazards caused by the uncontrolled release of a reservoir, due to failure of the dam structure or appurtenances, such as gates or stoplogs. Additionally, the MVCA prepared a Methodology for Determining Environmental Losses & Classification memorandum in March 2024, which provided further details to supplement the MNR criteria.

The HPC is determined by assessing the greatest incremental losses that could occur in the event of a dam failure and is split into four categories: (1) life safety, (2) property losses, (3) environmental losses, and (4) cultural / built heritage losses. An incremental loss is defined as losses from dam failure in excess of losses from a similar event (flood, earthquake, etc.) but without failure of the dam.

The final Hazard Potential Classifications for the given categories are summarized in the below table (Table 4-3).

### Table 4-3: Hazard Potential Classification Assessment

| Hazard Potential | Life Safety | Property Losses | Environmental Losses | Cultural and Built Heritage Losses |
|---|---|---|---|---|
| **Class** | Moderate | Moderate | Moderate<br>(Fish and Fish Habitat) | Low |
| | | | Low<br>(SAR, Wildlife, and Manòmin) | |

The overall hazard potential class for the existing Kashwakamak Lake Dam structure, including the overflow weir, sluiceway (gated section), and the north and south abutments is concluded to be moderate, as per the MNR Technical Bulletin (2011). The proposed design options for replacing or rehabilitating the Kashwakamak Lake Dam will be consistent with the current conditions. Therefore, the HPC will be maintained, and the future structure will also have a moderate hazard potential.

The hazard potential class for the saddle dam is assessed to be low due to its location, height, length, and functionality. The saddle dam is not used for any operational purposes and is located immediately west of the access road. Any incremental impact due to the saddle dam failure would be none to low.

For further details pertaining to the HPC, refer to the Hydraulic Analysis Memorandum (Egis, May 8, 2024, Rev.2) and the Methodology for Determining Environmental Losses & Classification Memorandum (MVCA, March 2024) appended in ***Appendix G***.

## 4.2 Natural Heritage Environment

Egis staff conducted a field investigation on June 6th, 2023, to inspect the study area for any natural environmental features (e.g., fish habitat, ecological land classification, SAR bat habitat, etc.). Conditions were warm (20 °C) and cloudy with 100% smog/cloud cover. The field investigations included a walkthrough of the study area to document existing conditions (i.e., Ecological Land Classification (ELC)) and document SAR and their habitat. Areas within the study area, where access was not permitted, or inaccessible, were observed using binoculars. The study area was inspected for hollow and snag trees that may be suitable for bat maternity roosting habitat, as well as Butternut and Black Ash within 25 m of the Kashwakamak Lake Dam.

The vegetation communities observed within the study area were characterized using the ELC protocol (Lee et al., 1998) and delineated on an aerial photograph. During the field investigations, observations of wildlife species were made through sight, sound, and physical evidence.

For full details pertaining the findings of the natural heritage investigation, refer to the Kashwakamak Lake Dam Natural Heritage Existing Conditions Memorandum prepared by Egis (February 20, 2024) enclosed in ***Appendix H***.

### 4.2.1 Fish and Aquatic Systems

Land Information Ontario (MNR 2023b) identifies Kashwakamak Lake as having a cool - warmwater thermal regime with fish present. The lake, and the Mississippi River downstream of the dam, provides permanent fish habitat where potentially suitable spawning habitat may be present both upstream and downstream of the study area. Spawning habitat is potentially present for Walleye, White Sucker, and bait fish (i.e., minnow sp.) downstream within the Mississippi River, with spawning habitat potentially present for Largemouth Bass, Smallmouth Bass, Sunfish species (Lepomis sp.), and bait fish species upstream (Figure 4-2).

There is a large population of Walleye that are known to occur at Kashwakamak Lake, where spawning takes place at the main inlet at Whitefish Rapids (flowing from Marble Lake) and several other locations along the north shore of the lake (MRWMP, amended 2020). Whitefish Rapids is approximately 14 km upstream of the Kashwakamak Dam structure. Additional species that are known to spawn in the lake include Bass and Northern Pike. Bass have been observed to spawn throughout the lake in shallow bays, while Northern Pike are known to spawn at two locations in the extreme eastern end of the lake (MRWMP, amended 2020). As such, water levels must be maintained high enough in the early spring for successful Walleye spawning (260.5 m) and Bass spawning (261.1 m) in June. Northern Pike do not require operational constraints (MRWMP, amended 2020).

The Department of Fisheries and Oceans (DFO) does not identify any aquatic SAR or SAR habitat within the study area.

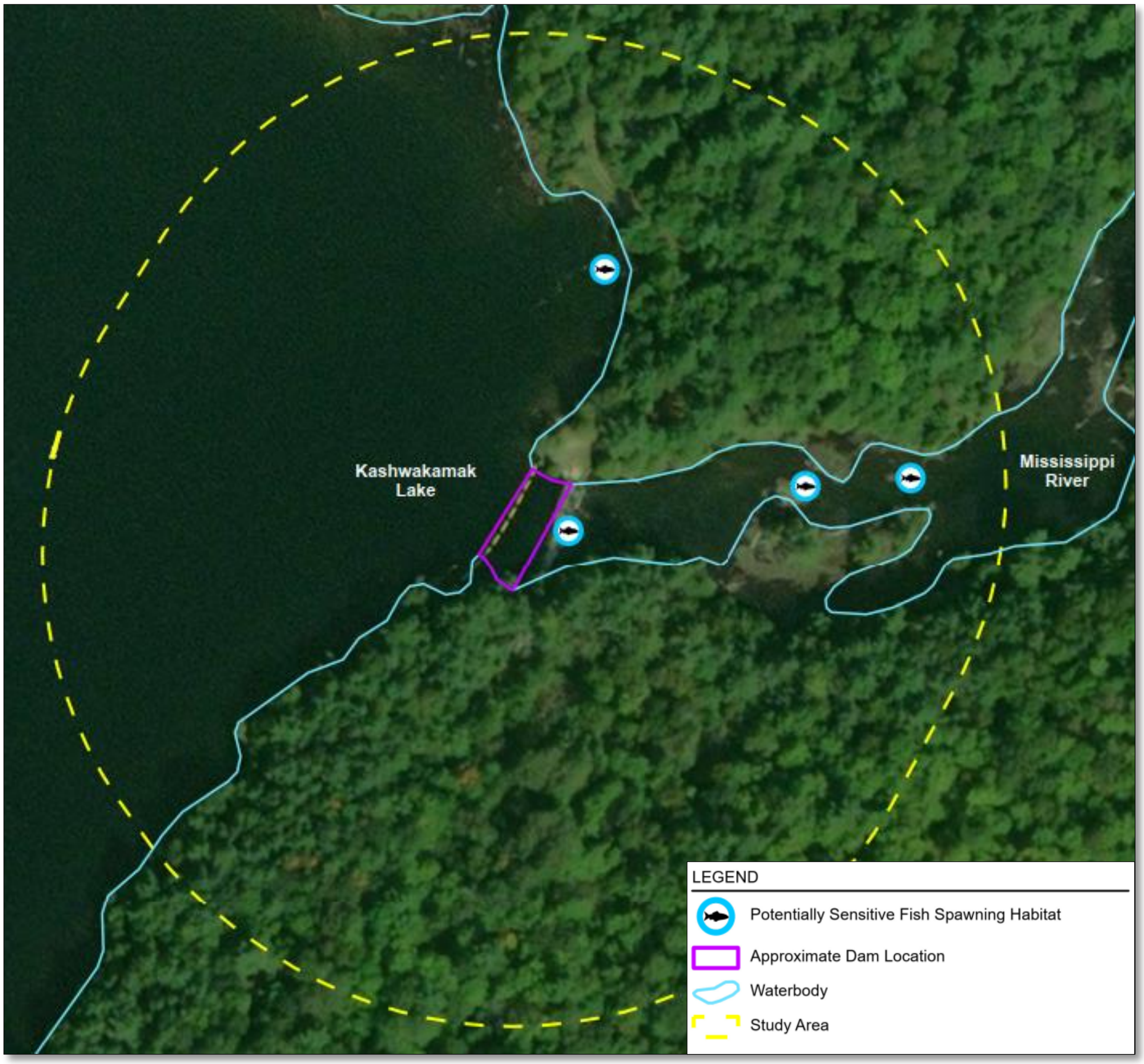

**Figure 4-2: Fish Spawning Habitat**

### 4.2.2 Terrestrial Ecosystems

Terrestrial ecosystems involve the interaction of land, air, water, and biotic components (e.g., vegetation, wildlife) functioning as an ecological unit over space and time (MTO, 2013a). Existing vegetation and wildlife within the study area was observed to be characteristic of the Eastern Ontario landscape.

### 4.2.3 Vegetation

The vegetation cover within the study area consisted of one vegetation community surrounding the dam, which was a Mixed Forest (FOM) that is characteristic of Ecodistrict 5E-11. The dominant tree species that were observed were Eastern hemlock (*Tsuga canadensis*) and Eastern white cedar (*Thuja occidentalis*) with American elm (*Ulmus americana*), American beech (*Fagus grandifolia*), white pine (*Pinus strobus*), red oak (*Quercus rubrum*), and paper birch (Betula papyrifera) occurring occasionally.

The area immediately surrounding the dam has been cleared for the access road and has a trail that runs along it for portaging, where herbaceous species such as common dandelion (*Taraxacum officinale*), Canada columbine (*Aquilegia canadensis*), cow vetch (*Vicia cracca*), Philadelphia fleabane (*Erigeron philadelphicus*), red clover (*Trifolium pratense*), Mayflower (*Maianthemum canadense*), grass species (Poa sp.) and royal fern (*Osmunda regalis*) were commonly encountered. Occasionally occurring herbaceous species were blue cohosh (*Caulophyllum thalictroides*), wild strawberry (*Fragaria vesca*), common milkweed (*Asclepias syriaca*), indian tobacco (*Lobelia inflata*), and northern bugleweed (*Lycopus uniflorus*).

#### *4.2.3.1 Invasive and Noxious Plant Species*

There were no plant species listed as Restricted under the Invasive Species Act (2015) observed to be present within the study area during the 2023 field investigation.

#### *4.2.3.2 Significant Woodlands*

There are no significant woodlands present within the study area. Though the provincial NHIC (2023a) database, as well as the Townships' Official Plan (2017), the identifies woodlands as being present within the study area, this layer, however, does not identify the woodlands as being significant.

#### *4.2.3.3 Significant Wetlands*

There are no significant wetlands present within the study area based on background review and field truthing. However, there are several small wetlands around the perimeter of the lake and downstream of the dam (i.e., Mud Lake Provincially Significant Wetland, Figure 4-3).

#### *4.2.3.4 Culturally Significant Plant Species*

Manòmin, or wild rice, is an aquatic annual species of grass of cultural significance to the Algonquin First Nations. The species grows in brackish marshes, lacustrine, riverine, or along shored habitats where the water depth ideally ranges from 15 – 90 cm with a soft soil layer on the bottom (OMAFRA, 2012). The species is sensitive to changes in temperature and water levels, with an ideal temperate range of between 17 – 21 °C. Wild rice is also important for several different species, as it provides food for waterfowl and habitat for furbearing mammals, snails and insects (MRWMP, amended 2020).

Manòmin, although not present in Kashwakamak Lake, is found growing in Mud Lake which is approximately 7 km downstream from Kashwakamak Lake and subsequently affected by alterations to water levels (MRWMP, amended 2020). Manòmin is sensitive to changes in water levels, as low levels can cause them to dry out and destroy seed beds, with high water levels causing them to drown.

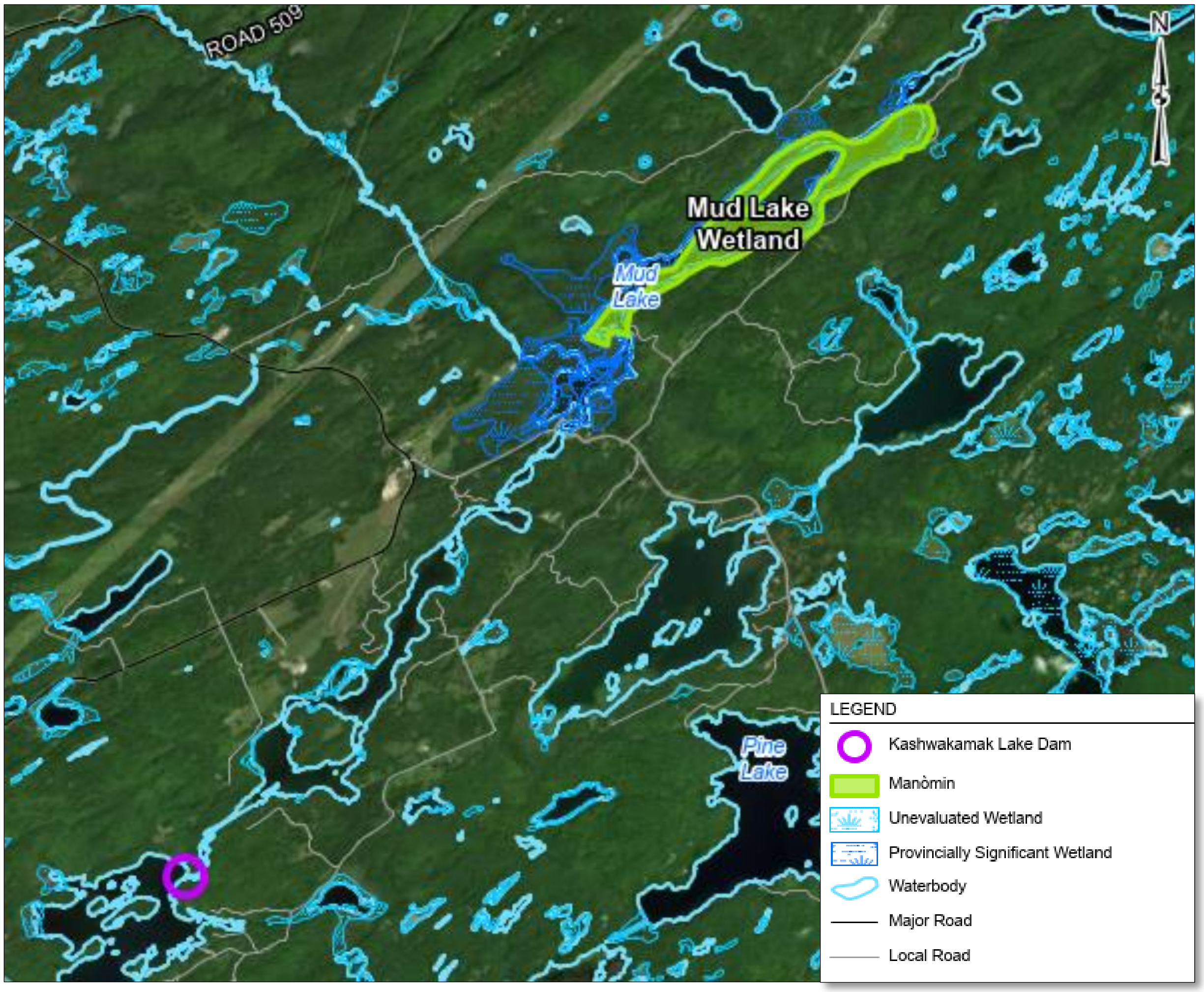

*Figure 4-3: Location of Manòmin*

### 4.2.4 Wildlife and Migratory Birds

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (MNR 2015) provide descriptions of wildlife habitats and guidance on criteria for determining the presence of candidate and confirmed wildlife habitats. Candidate significant wildlife habitat identified as being potentially present within the study area consisted of Bat Maternity Colonies, Turtle Wintering Area, Turtle and Lizard Nesting Area, and Special Concern and Rare Wildlife Species.

#### 4.2.4.1 Bat Maternity Colonies

Candidate Bat Maternity Colonies are present within the study area. SAR bat species utilize large diameter breast height (DBH) snag and dead trees that have potential cavities in which to roost and breed (i.e., maternity colonies). These trees can be found in forested habitat adjacent to suitable foraging areas such as open wetlands and waterbodies. The FOM community had several potentially suitable SAR bat maternity roosting trees. These species are not heavily dependent on large cavity or snag trees as they often roost singly or in small groups during the maternity period. In addition, they are generally considered to utilize forested habitats at the landscape scale and often move maternity roosts between years.

#### *4.2.4.2 Turtle Wintering Area*

Candidate turtle wintering areas are present within the study area. Kashwakamak Lake likely provides overwintering habitat, as the lake is deep enough to not freeze completely overwinter. Background review identified that there were many observations of Snapping Turtle, Blanding’s Turtle, and Midland Painted Turtle within and near the study area. It is not anticipated that overwintering would occur immediately upstream of the dam due to flows and the habitat downstream is not considered to be conducive.

#### *4.2.4.3 Turtle and Lizard Nesting Area*

Candidate Turtle and Lizard (i.e., Five-lined skink) Nesting Areas were observed to be present in the study area. During the 2023 site visit, a hatched/predated turtle nest was also observed to present immediately adjacent to the Kashwakamak Dam structure. Additionally, several rocky outcroppings, rock features and open deciduous-mixed forests were observed to be present.

#### *4.2.4.4 Special Concern and Rare Wildlife Species*

Candidate Special Concern and Rare Wildlife Species are present within the study area. During the 2023 site visit, a Snapping Turtle and nesting feature (Figure 4-4) were observed to be present. Additionally, during the background review it was found that the following species were observed to potentially occur within a 2 km radius of the study area: Eastern Whip-poor-will, Blanding’s Turtle, Butternut, Eastern Ribbonsnake and a restricted species.

### ***4.2.5 Species at Risk***

Background information obtained from sources indicate that SAR and their habitat are potentially present within the study area.

#### *4.2.5.1 Vascular Plants*

No tree or herbaceous SAR were observed within the study area.

### *4.2.5.2 Herptiles*

The study area is located on Kashwakamak Lake where there are many observations from Ontario Nature, NHIC and iNaturalist for several SAR herptiles.

***Figure 4-4: Location of Turtle Observations and Nests***

*Blanding's Turtles* are largely aquatic and inhabit shallow lakes, ponds, slow moving creeks, and wetlands with soft organic substrates with abundant submergent vegetation. Upland habitats are used as migratory corridors between summer, winter, breeding, and nesting habitats. Adults regularly travel several kilometers between habitats. Blanding's Turtles nest in open habitat with low vegetation cover and loose, sandy and/or gravelly soil above the waterline in natural and developed habitats (COSEWIC 2016a). No Blanding's turtles were observed during the 2023 site visit, however, there were several verified observations on iNaturalist from as recent as June 2023, and Kashwakamak Lake provides suitable nesting and overwintering habitat. Immediately adjacent habitat is not as conducive for their summer habitat needs as there was not an abundance of aquatic vegetation. They may use the Mississippi River as a migration corridor.

*Midland Painted Turtles* inhabit slow moving, relatively shallow and well-vegetated wetlands including swamps, marshes, ponds, fens, bogs, lakes, rivers, and creeks with abundant basking sites and organic substrate. Nesting habitat is usually within 1,200 m of aquatic habitat and in an open, south-facing area with sandy-loamy and/or gravely substrate (COSEWIC 2018a). No Midland painted turtles were observed during the 2023 site visit, however, there were several verified observations on iNaturalist from as recent as 2021. Kashwakamak Lake provides suitable nesting and overwintering habitat.

*Snapping Turtles* inhabit a wide range of wetland habitats including ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, soft bottoms, and dense aquatic vegetation. Adults will use streams to move between waterbodies especially during the mating season. Nesting sites are in open habitat with sandy or gravelly substrate and are often found in road shoulders (COSEWIC 2008). During the 2023 site visit, a Snapping Turtle was observed to be present within the northern log catchment bay near the dam’s structure. Additionally, a previous turtle nest was observed to be present with 5 m of the dam’s structure in sandy loose soil at the lake’s edge. Turtle eggs can be challenging to identify once they have hatched, but it is believed to have been a Snapping Turtle nest.

Overall, there is potential suitable nesting and overwintering habitat for Blanding’s Turtle, Midland Painted Turtle and Snapping Turtle to occur within the study area (Open Aquatic/ Kashwakamak Lake). Any work done on the construction and replacement of the existing Kashwakamak Dam should occur outside of the active turtle nesting season for Central & Northern Ontario of April 15 – October 15 or protection measures be put in place to reduce the risk of harm.

#### *4.2.5.3 Reptiles and Amphibians*

*Eastern Milksnakes* are habitat generalists, but prefer open areas such as pastures, meadows, prairies, rock outcrops, rights-of-way, and agricultural land near forest habitat. They commonly feed around old buildings and barns, where rodent populations are high. Milksnakes hibernate in mammal burrows, old building foundations, old wells, hollow logs, and rock crevices (COSEWIC 2014). No Milksnakes were observed during the 2023 site visit. However, there are reports from iNaturalist of Milksnakes within ~1 km of the site as recent as 2022. No suitable habitat for hibernation was observed within the study area.

The *Five-lined Skink* (Great Lakes/ St. Lawrence Population) is the most widely distributed lizard species in North America, where the species prefers rocky outcroppings, sand dunes, and open deciduous – mixed forest types (COSEWIC 2007). Individuals are known to spend most of their time under rocks, woody debris and other forms of cover/ Individuals of the Great Lakes/ St. Lawrence Population are known to occur in the Canadian Shield where they hide under rocks from the open bedrock. No Five-lined skinks were observed during the 2023 site visit, however, there are many observations on iNaturalist from as recent as 2022.

Given the location of the study area (i.e., within Frotenac Arch) and the presence of rock features on the edge of Kashwakamak Lake, the presence of Milksnakes and Five-lined skink cannot be eliminated as suitable habitat is present. However, dam replacement activities are not anticipated to impact Milksnakes or Five-lined skink.

#### *4.2.5.4 Birds*

*Eastern Wood-pewee* are found in the mid-canopy layer of deciduous and mixedwood forests with open understories and is commonly associated with edges and clearings. Forest size does not seem to be a critical factor in habitat selection; however, breeding numbers decrease with increasing development in surrounding habitat. Eastern Wood-pewee hunts aerial insects from a perch in the subcanopy (COSEWIC 2012a). No Eastern Wood-pewee individuals were observed during the 2023 site visit, however, they may be present with the FOM community.

*Eastern Whip-poor-will* are nocturnal aerial insectivores in the nightjar family that nests in most early successional forest types, where the species prefers semi-open/ patchy forests such as rock barrens or regenerating forests (COSEWIC 2009). Common tree associations for Eastern Whip-poor-will nesting habitat include pine, oak, aspen and birch, all of which were observed to be present within the FOM community. No Eastern Whip-poor-will individuals were observed during the 2023 site visit, however, species-specific surveys were not completed. The access road and lake provide openings in the canopy that Eastern Whip-poor-will are known to utilize.

The *Red-headed Woodpecker* is considered a habitat generalist, but prefers open woodlands and forest edges, often found in disturbed areas such as cemeteries, parks, golf courses, sparsely treed pastures, and agricultural areas. Preferred nesting habitat typically requires dead limbs or snags with an open canopy (COSEWIC 2018b). No Red-headed Woodpecker were observed to be present during the 2023 site visit, however, may use the FOM community for breeding habitat.

*Wood Thrush* breeds in deciduous or mixed upland forest habitat with a moderate subcanopy and open forest floor. Wood Thrush are sensitive to habitat fragmentation but will nest in forest patches as small as 3 ha. Nests are constructed in young trees or shrubs and adults primarily forage for invertebrates on the ground (COSEWIC 2012b). No Wood Thrush were observed to be present during the 2023 site visit, however, may use the FOM community for breeding habitat.

Overall, no SAR birds were observed during the 2023 site visit. The forested area within the study area could provide potentially suitable breeding habitat (i.e., nesting) for both Red-headed Woodpecker and Wood Thrush.

#### *4.2.5.5 Bats*

There were several high-quality potentially suitable bat maternity roosting habitat trees (i.e., cavities, large DBH, peeling bark, etc.) observed within or adjacent to the study area suitable for *Little Brown Myotis, Northern Myotis & Tri-colored Bat*. This was observed to be present within the FOM community within the study area. During the removal and replacement of the Kashwakamak Lake dam structure, there is potential for SAR bats and their habitat to be impacted should the removal of trees be required to accommodate better accessibility for construction vehicles and laydowns for vehicle parking and material storage.

Little Brown Myotis, Northern Myotis & Tri-colored Bat are SAR bat species that share similar habitat preferences during their active season and are described together. They have been observed using trees as small as 10 cm DBH, but typically exhibiting early stages of decay, with cavities (usually >10 m high), loose bark, and/or leaves within forested habitats for maternity roosting purposes. Additionally, these species are known to use anthropogenic structures (e.g., houses, barns) for roosting as well (COSEWIC 2013, ECCC 2018).

## 4.3 Geotechnical

Egis conducted a geotechnical investigation to support the Class EA for the Kashwakamak Lake Dam. The purpose of the investigation was to explore the subsurface conditions at the site and to provide borehole location plans, records of borehole logs, and laboratory test results. This report outlines the anticipated geotechnical conditions that will influence the design and construction of the proposed replacement and rehabilitation of the dam structure, along with recommendations for foundation design.

The fieldwork was conducted between September 18 and 25, 2023 and involved four (4) boreholes advanced into the bedrock to a maximum depth of 9 m below the existing ground surface (mbgs) (El. 253.1 m), drilled at the north (left) dam abutment. Three additional boreholes were drilled downstream to a maximum depth of 6.3 mbgs (El. 252.9 m). The site stratigraphy at the drilled borehole locations consisted of a thin layer of topsoil, encountered only in BH23-4, underlain by bedrock. In all other boreholes, bedrock was observed at the ground surface and was cored and sampled to the bottom of the boreholes.

Based on the retrieved rock cores from the boreholes, the bedrock was identified as Carbonate Metasedimentary bedrock, with diagonal veins of marble. It was observed to be slightly weathered and slightly fractured, with moderately close, horizontal to diagonal joints. The Carbonate Metasedimentary bedrock was noted to be strong, grey to dark grey, with white bands of marble, and medium to thinly bedded.

Groundwater was not observed during the site investigation in three of the open boreholes. However, minor artesian pressure was observed in BH23-1, which dissipated shortly after drilling was completed. Groundwater was measured at an elevation of 260.6 meters in the installed monitoring well at the northern (left) abutment, which approximately corresponds to the water level in the upstream lake. The groundwater level was recorded in the well on September 26, 2023. Groundwater levels are expected to fluctuate due to extreme weather events and seasonal changes.

Should the existing dam be replaced in its current location, the existing structure will need to be demolished to allow for the construction of the new proposed dam. The demolition of the existing structure and the construction of the new dam shall be conducted within the confines of a temporary cofferdam or a secant pile wall, designed and installed in accordance with OHSA. The excavations for the proposed dam replacement should extend down to sound bedrock. Based on the borehole results, sound bedrock is expected to be encountered at a shallow depth near the ground surface.

For detailed information on the geotechnical investigation conducted for this study, please refer to the Geotechnical Investigation and Design Report for the Kashwakamak Lake Dam Replacement (Egis/McIntosh Perry, June 2024, Rev.2), which is included in ***Appendix M***.

## 4.4 Socio-Economic Environment

A socio-economic review was conducted to analyze the Kashwakamak Lake Dam, surrounding land uses, and possible staging areas. The study area is situated within the Township of North Frontenac, with the site located along Kashwakamak Lake on Lot 21, Concession 9.

### *4.4.1 Land Use/Composition*

According to the Township of North Frontenac's Official Plan (2017), the shores of the lake are zoned as Waterfront Area, Crown Land, and Rural. The lands immediately surrounding the work area consist of private property, the Township shoreline allowance, and Crown Land.

The shores of Kashwakamak Lake also accommodate over 577 cottages and residences, as well as resorts and marinas. Additionally, Kashwakamak Lake is upstream of Manòmin (Zizania palustris), wild rice crops, which hold cultural significance for the Ardoch Algonquin First Nation and other First Nations. The landscape is characterized by forests, lakes, and wetlands (both evaluated and unevaluated) and remains largely undeveloped.

### *4.4.2 Recreation and Tourism*

The Kashwakamak Lake Dam is essential for maintaining water levels, providing not only flood and drought control but also supporting local recreational and tourism activities in the surrounding area. The open water season for Kashwakamak Lake is from May to October which experiences the highest public activity around the lake and dam, with activities such as recreational boating, fishing, hiking, hunting, resorting and camping. In the off-season (November to April), activities include ice fishing, snowmobiling and other outdoor pursuits.

A portage trail is situated on the north side of the dam, which is a popular canoe route frequented by large groups.

## 4.5 Cultural Heritage – Built Heritage & Archaeology

### *4.5.1 Archaeological*

Past Recovery Archaeological Services Inc. (Past Recovery) conducted a Stage 1 assessment in support of the Class EA for the proposed replacement of the Kashwakamak Lake Dam. The study area for the proposed replacement was approximately 1.49 hectares (3.69 acres) in size.

The purpose of the Stage 1 investigation was to evaluate the archaeological potential of the study area and present recommendations for the mitigation of any significant known or potential archaeological resources. To this end, historical, environmental, and archaeological research was conducted to assess archaeological potential. A property inspection was completed on July 25, 2023, to determine current conditions and record factors that could affect the assessment of archaeological potential within the study area. The results indicated that the subject property retains potential for pre-Contact and post-Contact archaeological resources.

The results of the Stage 1 AA documented the following:

1. Portions of the study area have been determined to exhibit archaeological potential should be subject to Stage 2 AA prior to the initiation of below-grade soil disturbances or other alterations, and
2. Future Stage 2 AA should be undertaken by a licensed consultant archaeologist, in compliance with Standards and Guidelines for Consultant Archaeologists (MCM 2011). As the study area is non-agricultural land, all portions.

A Stage 2 AA was completed on May 2nd, 2024. Fieldwork was conducted according to the archaeological fieldwork standards outlined in the Standards and Guidelines for Consultant Archaeologists (MCM 2011). The purpose of the Stage 2 assessment was to determine whether the property contained archaeological resources requiring further assessment, and if so, to recommend an appropriate Stage 3 assessment strategy. The assessment involved the use of shovel test pits across all parts of the study area determined to retain archaeological potential.

The results of the Stage 2 AA documented the following:

1. The property survey resulted in the identification of one previously unrecorded potential archaeological site. The artifacts recovered suggested that the site was the location of a short-term campsite where the inhabitants engaged in late-stage lithic reduction practices, using both locally available and imported lithic raw materials.
2. A Stage 3 site-specific AA should be undertaken for the small potential archaeological site. The assessment should be undertaken by a licensed consultant archaeologist in compliance with Standards and Guidelines for Consultant Archaeologists (MCM 2011).

A Stage 3 AA was completed over three days, from August 20th to August 22nd, 2024. The findings indicate that the site possesses a high level of cultural heritage value or interest, which warrants Stage 4 mitigation of development impacts. During the assessment, Past Recovery identified a cluster of lithic detritus centrally located within the site limits established during the Stage 2 assessment. The artifact assemblage consists of 44 pieces of lithic material and three fragments of small mammal bone.

For Stage 4 mitigation of development impacts, there are two potential approaches: “avoidance and protection of the site” or “excavation and recording.” To support the “avoidance and protection of the site” approach, a strategy will be developed that considers both short- and long-term measures to ensure the site's protection, including a required 10-meter protective buffer (see Map 5 from the Stage 3 report). If avoidance and protection of the Kashwakamak Lake Dam site is not feasible, the second approach, “excavation and recording”, would involve the excavation of archaeological artifacts and documentation of the areas of the site that will be impacted.

Given the location of the archaeological findings in relation to the recommended preferred alternative for the replacement of the Kashwakamak Lake Dam at the same location, the MVCA is recommending that “avoidance and protection of the site” be adopted as the appropriate Stage 4 mitigation of development impacts. Through careful design of the new dam and strategic placement of staging areas, we are confident that the archaeological site will be fully preserved and will not be impacted by the proposed replacement. MVCA has developed a proposed protection strategy for the archaeological site, which is included as an appendix to the Stage 3 Archaeological Assessment Report.

For detailed information on the archaeological assessments conducted for this study, please refer to the Stage 1 & 2 Archaeological Assessment and Stage 3 Archaeological Assessment Reports for the Kashwakamak Lake Dam Replacement (Past Recovery, May 11, 2024, and October 3, 2024), which is included in ***Appendix I & J***, respectively.

### 4.5.2 Marine Archaeological

Archaeological Research Associates (ARA) conducted a Marine Archaeological Assessment (Marine AA) for the Kashwakamak Lake Dam Class EA. This assessment comprised background research, similar to a land-based Stage 1 AA, and an in-water marine evaluation, equivalent to a land-based Stage 2 AA

The marine archaeological assessment was conducted on September 11th, 2023 under ideal conditions, with visibility extending to the bottom in both upstream and downstream areas. A snorkel survey was performed despite the sluice gates being closed, as the water depth in the study area required this method. The riverbed, both upstream and downstream, consisted of bedrock scattered with unmodified trees and loose rock. The snorkel survey was carried out in intervals of two to three meters, while extremely shallow areas were assessed by personnel along the shoreline.

Wooden notched logs from a previous log boom were discovered along both edges of the upstream study area but were located outside the primary study area. These logs, replaced by the current safety boom in 2006, are believed to date from 20 to 40 years ago and are not considered to have heritage significance or value. No other artifacts, aside from modern refuse such as broken glass, were found in the study area, which was thus deemed free of archaeological concerns.

For detailed information on the marine archaeological assessment conducted for this study, please refer to the Marin AA Report prepared for the Kashwakamak Lake Dam Replacement (ARA, May 13, 2024), which is included in ***Appendix K.***

### 4.5.3 Built Heritage Resources and Cultural Heritage Landscape

Egis conducted a Cultural Heritage Evaluation Report (CHER) to support the Class EA for the Kashwakamak Lake Dam. The purpose of the CHER was to assess whether the Kashwakamak Lake Dam holds any cultural heritage value or interest (CHVI) under the Ontario Heritage Act. This evaluation followed the methodology recommended in the Ontario Heritage Toolkit, which involved background research, a site visit to document current conditions, and an assessment of the property's cultural heritage value based on the criteria specified in Ontario Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest under the Ontario Heritage Act.

The Kashwakamak Lake Dam, constructed in 1910, features a simple concrete sluice dam with two sluiceways, each equipped with ten stoplogs, and an earthen embankment. The main structure includes two bulkhead walls, three concrete piers forming the sluiceways, and a broad-crested concrete weir. After conducting background research, a site investigation, and applying the criteria from O. Reg. 9/06, it was concluded that the Kashwakamak Lake Dam does not possess CHVI. Therefore, no further cultural heritage reporting is required.

Refer to the Cultural Heritage Assessment Report, Kashwakamak Lake Dam Replacement (Egis/Mcintosh Perry, November 16th, 2023) for greater detail on the cultural heritage findings within the study area, which is included in ***Appendix L***.

## 4.6 Climate Change

MECP finalized a ‘guide,’ *Consideration of Climate Change in Environmental Assessment In Ontario* (updated August 11, 2021), which, together with their code of practices, sets out the MECP’s expectations for considering climate change in the preparation, execution, and documentation of environmental assessment studies and processes. The guide defines "climate consideration" in a project as incorporating methods to reduce greenhouse gas emissions, develop a resilient design, and preserve local ecological integrity amidst changing climates.

As per Section 4.1.4, a hydraulic analysis of the Kashwakamak Lake Dam and Saddle Dam was conducted for various scenarios during the environmental assessment process, including the determination of climate change impacts on life safety, properties, the environment, and cultural-built heritage features. Recommendations have been made for the detailed design to ensure that the preferred alternative effectively accounts for climate change adaptation.

# 5.0 ALTERNATIVE SOLUTIONS AND EVALUATION

The main objective of the Class EA process is to identify and evaluate possible alternative solutions to address the Problem Statement identified in Section 1.4. The following sections describe the evaluation methodology for identifying and reviewing alternative solutions, as well as the identification of the recommended Technically Preferred Alternative.

## 5.1 Identification of Alternative Solutions

The following alternative solutions have been developed for the Kashwakamak Lake Dam and Saddle Dam (Table 5-1). These solutions were evaluated based on the results of various studies and consultations completed during this Class EA process.

Table 5-1: Proposed Alternative Solutions for Kashwakamak Lake Dam and Saddle Dam

| Alternative Solution No. | Alternative Solution | Alternative Solution Description | |
|---|---|---|---|
| | | Kashwakamak Lake Dam | Saddle Dam |
| 1 | Do Nothing | No change made within the Study Area (status quo). No improvements are made, and no measures are proposed to address the deteriorated structural condition of the dam. | |
| 2a | Decommission the Existing Dam and Construct Passive Control System | This alternative involves decommissioning of the dam and creating a passive water control system (such as an overflow weir). | Saddle Dam would need to be repaired or replaced under this scenario to aid in flood and drought control. Failure of the Saddle Dam would result in overtopping of the access road which limits access to the main dam to perform emergency maintenance or operations during a significant storm event. |
| 2b | Decommission the Existing Dam and Reinstate Natural Watercourse | This alternative involves decommissioning/full removal of the existing dam and reinstating a natural watercourse/channel. | Saddle Dam would be decommissioned as access to the Kashwakamak Lake Dam would no longer be required. |
| 3 | Rehabilitation of the Existing Dam | Rehabilitation of the Dam would consist of salvaging elements of the existing dam and preserving the structure in a stable state similar to the existing condition. | Rehabilitation of the Saddle Dam would consist of salvaging elements of the existing dam and preserving the structure in a stable state similar to the existing condition. |
| 4 | Replace the Existing Dams at the Same Location | Construction of a new dam within a similar alignment to that of the existing dam. For the purpose of this evaluation, the removal of the existing dams in its entirety was considered, with new footings and anchors installed at bedrock. | Replacement of the Saddle Dam within a similar alignment to that of the existing dam. The type of structure and function is dependent on the Kashwakamak Lake Dam replacement design. |
| 5 | Construct New Dam Downstream | Construct a new dam immediately downstream of the existing dam. This alternative will allow the existing Kashwakamak Lake dam to remain in place during construction to aid in the management of flow. | Replacement of the Saddle Dam within a similar alignment to that of the existing dam. The type of structure and function is dependent on the Kashwakamak Lake Dam replacement design. |

## 5.2 Evaluation Methodology

The evaluation of alternative solutions was undertaken to address the Problem Statement identified for this project (Section 1.4) and to consider all aspects of the Class EA study. The overall assessment and evaluation process followed two basic concepts:

1. Assessment of Alternatives: the potential benefits of each alternative are assessed against a comprehensive set of criteria for Function, Biological/Natural Environment, Socio-Economic and Cultural Environment and Implementation.
2. Evaluation of Alternatives: A comparative evaluation of alternatives to identify a recommended technically preferred alternative.

An evaluation framework was developed by the Project Team, including technical considerations and environmental components that address the broad definition of the environment as described in the Class EA and Environmental Assessment Act (EAA), as well as based on comments received from relevant agencies, stakeholders, First Nations, CLC, interested parties (Kashwakamak Lake Association), and the public. Five categories were established to aid in the evaluation of Alternative Solutions: Physical, Natural, Social, First Nations and Cultural Heritage Environment, and Economic (Table 5-2). The criteria for each category were established based on the key objectives outlined in the MRWP, which serve to support planning and decision-making processes for sustainable watershed management. The key objectives of the MRWP are as follows:

1. **Water Management:** Implementing strategies to mitigate flood and drought, stormwater management, and ice conditions, as well as enable sustainable power generation.
2. **Climate Change Adaptation:** Implements strategies to enhance local resilience and adapt to shifting climate patterns and extreme weather events.
3. **Natural Hazards:** To reduce risks to human life and property from flooding, erosion, and unstable slopes and soils.
4. **Natural Systems and Land Conservation:** Focusing on the overall protection, enhancement of natural features and the management of flood and drought within the systems to protect aquatic and terrestrial ecosystems, including the Manòmin (rice crops).
5. **Water Quality:** To maintain or enhance current water quality for all users.
6. **Growth and Development:** Considering the social and economic factors that shape the community's relationship with the watershed and its resources. This includes enhancing

opportunities for recreational and tourist activities (such as fishing, boating, and camping) while preserving the aesthetic beauty of the watershed.

Table 5-2 identifies the evaluation criteria and rationale, as well as the criteria measures and corresponding descriptions. The evaluation of the alternative solutions (Table 5-3) was carried out using the Reasoned Argument method of comparing differences in impacts and provides a clear rationale for the selection of the technically preferred alternative. The evaluation of alternative solutions considers the positive and negative potential impacts associated with each of the alternative solutions in consideration of the criteria listed in Table 5-2. This evaluation is a relative comparison to be used to determine which alternative is technically preferred.

Each criterion evaluated was summarized using the following rankings from Not Preferred to Preferred:

**Not Preferred** – Fails to address the Problem Statement; consequently, it does not achieve the MVCA's objectives for this assignment.

**Less Preferred** – Partially addresses the Problem Statement; ultimately falls short of meeting the MVCA's objectives for this assignment.

**Preferred** – Addresses the Problem Statement and aligns with the MVCA's objectives for this assignment.

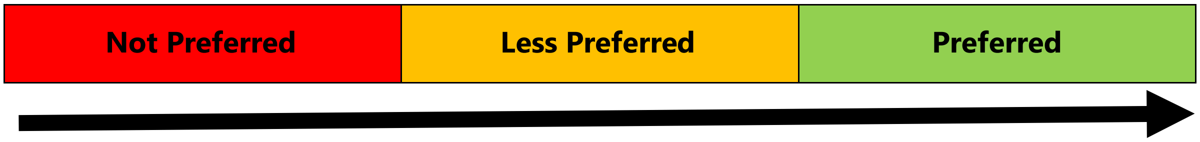

**Table 5-2: Proposed Evaluation Criteria**

| Criterion/ Weighted | Criteria Measure | Description of Criteria Measures |
|---|---|---|
| **Functional/ Physical** | Hydraulic Function/ Flooding and Drought | Effectiveness of the alternative in achieving the target levels outlined in the current MRWMP for mitigating flood and drought, managing stormwater, and addressing ice conditions. |
|  | Geomorphology/ Sediment Transport | Effectiveness of the alternative to promote dynamic stability of channel processes and mitigate sediment impacts. |

| Criterion/ Weighted | Criteria Measure | Description of Criteria Measures |
|---|---|---|
| | Dam Safety | Effectiveness of the alternative to meet Dam Safety Guidelines, reduce risk of failure, and avoid any damage to property and loss of life. |
| | Service Life | Anticipated length of service life. |
| | Climate Change Adaptation | The ability of the structure and/or design to effectively adapt to shifting climate patterns, extreme weather events including ice conditions, and environmental changes. |
| | Implementation/ Constructability | Potential to implement the alternative, based on site conditions and common accepted construction practise. |
| **Natural Environment** | Fisheries/Aquatic Habitat | Potential temporary and long-term impacts to fish communities and aquatic habitats. Effectiveness of the alternative to enhance fisheries resources; fish diversity, food source, and fish passage. |
| | Terrestrial Habitat (Wildlife and Vegetation) | Potential temporary and long-term impact to wildlife habitats and movement corridors and vegetation communities (i.e., vegetation and tree removal). |
| | Species-at-Risk Impacts | Potential temporary and long-term impact and/or enhancement to existing SAR and their habitat in the project area. |
| | Existing Watercourses Quality | Potential temporary and long-term impact to existing watercourses or waterbodies including Kashwakamak Lake and its tributaries from a water and habitat quality perspective. |
| **Social Environment** | Private Property Impacts | Measure of the impact to adjacent private property during construction/ commissioning. |
| | Temporary/ Permanent Property Agreements/ Acquisitions | Anticipated requirements for temporary and/or permanent property agreements/acquisitions with adjacent privately owned properties. |

| Criterion/ Weighted | Criteria Measure | Description of Criteria Measures |
|---|---|---|
| | Recreational Impacts | Ability to achieve target water levels set in MRWMP to minimize impacts to existing recreation activities. |
| | Tourism Impacts | Potential financial impacts to local tourism attractions (i.e., camping, resorts, fishing, boating, etc.). |
| **First Nations/ Cultural Environment** | Lands and Harvesting Rights | Potential impacts to Indigenous Communities lands and harvesting rights (i.e., Manòmin, walleye, and other fish harvesting uses or potential for use, and portage routes). |
| | Built Heritage and Cultural Heritage Features | Potential impact to cultural and/or heritage features in the project area. |
| | Marine Archaeological Features | Potential impact to marine archaeological features in the project area. |
| | Archaeological Features | Potential impact to land archaeological features in the project area. |
| **Economic** | Capital Costs | Relative measure of the initial costs to install/construct the proposed works, including environmental mitigation, sediment management, etc. |
| | Operational and Maintenance Costs | Relative measure of the ongoing maintenance and operational costs following implementation. |

At the onset of the Class EA, each alternative was assessed and assigned a preliminary ranking under each criterion. The evaluation was then updated and finalized (Table 5-3) following consultation with various project members (i.e., MVCA, Township, Community Liaison Committee, First Nations) based on their knowledge of their study area, as well as governing agencies and public input received through the PIC.

Alternative 2b, Decommission the Existing Dam and Reinstate Natural Watercourse, involves the complete decommissioning of the existing dam structure and the reinstatement of a natural, unrestricted watercourse. The full removal of the existing dam without installing a weir system would make it extremely difficult to achieve the objectives of the MRWMP. This alternative would have significant implications for flood and drought control, recreational access, erosion control, as well as notable impacts on the natural and social environment, as well as First Nations lands and harvesting rights. Therefore, Alternative 2b, Decommission the Existing Dam and Reinstate Natural Watercourse, was not carried forward into the detailed evaluation.

**Table 5-3: Proposal Alternative Solution Evaluation**

| Criteria Measure | Description of Criteria Measures | Alternative 1 Do Nothing | Alternative 2 Decommission Dam and Construct Passive Control System | Alternative 3 Rehabilitation of the Existing Dam | Alternative 4 Replace Existing Dam in Same Location | Alternative 5 Construct New Dam Downstream |
|---|---|---|---|---|---|---|
| | | Rationale | | | | |
| **FUNCTIONAL/PHYSICAL** | | | | | | |
| Hydraulic Function/ Flooding and Drought | Effectiveness of the alternative in achieving the target levels outlined in the current MRWMP for mitigating flood and drought, managing stormwater, and addressing ice conditions. | - Seepage issue through the north embankment wall and overflow weir of the main dam will continue. Seepage and settlement will also continue along the Saddle Dam and the access road.<br>- No changes to structural elements and dimensions of dams and therefore it will not meet current guidelines.<br>- Will not meet climate change adaptation requirements and will likely be susceptible to overtopping during larger storm events. | - Significant impact upstream and downstream.<br>- Downstream will experience higher water levels/flooding during the storms/wet season and lower water levels during the dry season.<br>- Storage loss in the overall Mississippi River system, which will impact the downstream dams/structures and flood control.<br>- Considering the function of Kashwakamak Lake and the overall watershed, implementing this alternative would be challenging, ultimately hindering efforts to achieve MRWMP objectives related to flood and drought mitigation, erosion control, ice management, and other initiatives. | - No changes to the size of the spillway means less resiliency to larger storm events (climate change).<br>- Rehabilitation of structure will also not address freeboard deficiencies and may not provide sufficient capacity to safely pass the updated IDF (inflow design flood).<br>- Seepage issue through the north embankment will continue. | - Water levels and the MRWMP will be maintained and enhanced due to the structure's ability to provide more efficient service.<br>- Seepage issues will be addressed.<br>- No change in floodplain extent.<br>- A larger overflow structure can be installed to accommodate larger storm events (climate change).<br>- Decommissioning or converting the saddle dam into an emergency spillway can be considered. | - Seepage issues will be addressed.<br>- A larger overflow structure can be installed to accommodate larger storm events (climate change).<br>- Minor changes anticipated to the lake extent between the existing dam and downstream dam.<br>- The area between the existing dam and the proposed dam will experience increased water levels.<br>- Will require larger structure.<br>- Decommissioning or converting the saddle dam into an emergency spillway can be considered. |
| Geomorphology/ Sediment Transport | Effectiveness of the alternative to promote dynamic stability of channel processes and mitigate sediment impacts. | - Downstream geomorphology will be maintained.<br>- In the event of dam failure, it is anticipated that the downstream geomorphology would be altered, as well as a large quantity of material and sediment would be transported downstream. | - A passive control system can foster a more dynamic and resilient geomorphological environment, enhancing sediment transport, habitat diversity, and ecosystem stability.<br>- However, a passive system would not fulfill the requirements of the | - Downstream geomorphology will be maintained.<br>- Minor impacts to soil and sediment quality may result from construction activities; these impacts are temporary and can be mitigated. | - Downstream geomorphology will be maintained.<br>- Minor impacts to soil and sediment quality may result from construction activities; these impacts are temporary and can be mitigated. | - Downstream geomorphology will be slightly impacted immediately downstream with the construction of a wider and larger dam; however, the remainder of channel's geomorphology will be maintained. |

| Criteria Measure | Description of Criteria Measures | Alternative 1<br>Do Nothing | Alternative 2<br>Decommission Dam and Construct Passive Control System | Alternative 3<br>Rehabilitation of the Existing Dam | Alternative 4<br>Replace Existing Dam in Same Location | Alternative 5<br>Construct New Dam Downstream |
|---|---|---|---|---|---|---|
| | | Rationale | | | | |
| | | | MRWMP, including flood and drought mitigation, as well as ice control. | - The new dam can incorporate sediment management strategies that help maintain sediment transport, which is crucial for habitat maintenance both upstream and downstream. This ensures that spawning grounds and other essential habitats remain intact. | - A new dam can incorporate sediment management strategies that help maintain sediment transport, which is crucial for habitat maintenance both upstream and downstream. This ensures that spawning grounds and other essential habitats remain intact. | - Minor impacts to soils and sediment quality may result due to construction; these impacts are temporary and can be mitigated. |
| Dam Safety | Effectiveness of the alternative to meet Dam Safety Guidelines, reduce risk of failure and avoid any damage to property and loss of life. | - Both structures have insufficient freeboard.<br>- The overflow weir structure and abutments will continue to not meet requirements for ice loading.<br>- Concrete structures are in a deteriorated state and in poor to fair condition. Structures will continue to deteriorate and will be at risk of failure.<br>- Risk of dam failure will increase.<br>- A failure of the Saddle Dam would hinder access to the dam, particularly for emergency maintenance or operations during a major storm event.<br>- This alternative poses a severe safety risk to local residents/cottagers and downstream communities. | - There is no way to control flows during a significant storm event.<br>- Low head dams can pose a danger to the public during high tailwater conditions due to submerged hydraulic jump.<br>- New passive water control structure would be designed to current dam safety guidelines. | - Both structures would continue to have insufficient freeboard.<br>- Temporarily lowers the risk of failure but necessitates additional inspections and surveillance.<br>- This alternative still poses a potential risk to public safety as the dam will continue to deteriorate. | - It will meet the dam safety guidelines including minimum freeboard.<br>- Risk of dam failure significantly decreased. | - It will meet the dam safety guidelines including minimum freeboard.<br>- Risk of dam failure significantly decreased. |

| Criteria Measure | Description of Criteria Measures | Alternative 1 Do Nothing | Alternative 2 Decommission Dam and Construct Passive Control System | Alternative 3 Rehabilitation of the Existing Dam | Alternative 4 Replace Existing Dam in Same Location | Alternative 5 Construct New Dam Downstream |
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| | | Rationale | | | | |
| Service Life | Anticipated length of service life. | - The existing dam was built in 1910 and has a limited remaining service life. | - Full service life. | - The service life of the existing dam will be extended; however, is dependent on the rehabilitation work undertaken. | - Full service life. | - Full service life. |
| Climate Change Adaptation | The ability of the structure and/or design to effectively adapt to shifting climate patterns, extreme weather events including ice conditions, and environmental changes. | - No structural changes will occur, limiting climate change adaptation efforts.<br>- The dam will struggle to effectively respond to changing flow patterns associated with climate change, hindering its ability to adjust the timing and extent of freshets or droughts. This may negatively impact aquatic habitats by altering water quality, temperatures, and sediment deposition. | - Limited ability to control flows especially in response to changing weather patterns, such as increased flooding or prolonged droughts.<br>- Without active flow control, managing water levels to respond to extreme weather events becomes challenging, potentially leading to habitat degradation upstream or downstream.<br>- Passive systems may lack mechanisms to regulate water temperatures, which can negatively affect sensitive aquatic species during periods of warming.<br>- These systems can support natural sediment transport and deposition processes, which are vital for maintaining healthy aquatic habitats., as well as improving water quality through natural filtration processes. | - No major structural changes will take place, which will restrict climate change adaptation efforts. The dam will not be able to effectively respond to changing flow patterns associated with climate change which will hinder the ability to adjust the timing and extent of freshets or droughts.<br>- Rehabilitated dam may struggle to control water temperatures, putting aquatic and sensitive species at risk during warm periods. | - A modern dam can be equipped with advanced control systems that adjust flow rates based on real-time environmental conditions. This adaptability allows for better management of freshet timing and extent, ensuring that high flows are released in a controlled manner to reduce erosion, and habitat disruption upstream and downstream of the dam.<br>- During a drought, a new dam can be designed to store water more efficiently, allowing for controlled releases to maintain downstream flow levels which will help sustain aquatic habitats and preserve water quality by minimizing concentration of pollutants being released.<br>- By controlling water releases from various depths, a new dam can help regulate water temperature which means during warmer months, cooler water from the lower layers can be released, offering protection to sensitive | - A modern dam can be equipped with advanced control systems that adjust flow rates based on real-time environmental conditions. This adaptability allows for better management of freshet timing and extent, ensuring that high flows are released in a controlled manner to reduce erosion, and habitat disruption upstream and downstream of the dam.<br>- During a drought, a new dam can be designed to store water more efficiently, allowing for controlled releases to maintain downstream flow levels which will help sustain aquatic habitats and preserve water quality by minimizing concentration of pollutants being released.<br>- By controlling water releases from various depths, a new dam can help regulate water temperature which means during warmer months, cooler water from the lower layers can be released, offering protection to sensitive |

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| | | Rationale | | | | |
| | | | | | aquatic species from thermal stress. | aquatic species from thermal stress. |
| Implementation/ Constructability | Potential to implement the alternative, based on site conditions and common accepted construction practise. | - No construction work undertaken. | - It can be implemented in stages.<br>- A portion of the existing dam can be utilized as a bypass during decommissioning.<br>- Cofferdam required. | - The effectiveness of concrete repairs may be limited, as noted by Cleland Jardine Engineering in the 2016 Structural Assessment, due to outdated methods.<br>- The materials originally used to construct the dam may pose significant challenges because of a lack of cohesion and differences in material properties at the interfaces of new and existing concrete.<br>- Ongoing seepage at the north abutment is unlikely to be resolved without substantial work, such as installing a new concrete abutment and grouting, as the effectiveness of previous grout treatments has been limited.<br>- Cofferdam will be required to undertake construction. | - Feasible for construction. Needs diversion, possibly using the saddle dam.<br>- Cofferdam will be required to undertake construction. | - Cofferdam required to remove existing dam, however during construction the existing dam can remain in place to help manage flows.<br>- Using the existing dam as a cofferdam would be ideal; however, from a hydraulic perspective, it could result in additional properties flooding due to elevation differences and topography at other possible dam locations downstream.<br>- Additional property requirements such as; tree removal and access road construction required. |
| **Functional/Physical Evaluation** | | **Not Preferred** | **Less Preferred** | **Less Preferred** | **Preferred** | **Preferred** |

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| | | Rationale | | | | |
| **NATURAL ENVIRONMENT** | | | | | | |
| Fisheries/Aquatic Habitat | Potential temporary and long-term impacts to fish communities and aquatic habitats. Effectiveness of the alternative to enhance fisheries resources; fish diversity, food source, and fish passage. | - Leaving a deteriorating dam in place can lead to both immediate and lasting negative effects on fish communities and aquatic habitats, ultimately hindering efforts to meet MRWP objectives for enhancing fisheries resources.<br>- In the event of a dam failure, fish habitat located immediately downstream has the potential of being destroyed whether it is through transportation of the larger materials downstream, vegetation removal, or sedimentation. However, it is anticipated that fish habitat could be restored and that the fish habitat function and populations affected by the dam breach would recover with time.<br>- The timing of the dam failure could have a greater impact on fish populations and spawning, as spring and summer months are critical for spawning, feeding, and rearing activities.<br>- Fish habitat upstream of the dam is expected to be restored within one year of a dam failure and would reestablish itself almost immediately once the water levels are restored. | - By promoting natural flow conditions and habitat variety, a passive system can enhance fish diversity, helping to create resilient populations and foster the growth of vegetation and invertebrates, which provide vital food sources for fish and can improve population dynamics.<br>- With a passive control system, aquatic species such as turtles would be able to move freely upstream and downstream providing long term benefits for fish and aquatic habitat. | - During rehabilitation activities, sediment disturbance can temporarily disrupt local habitats, potentially displacing fish populations and affecting spawning areas.<br>- In addition, changes to the dam's operations during rehabilitation may lead to temporary shifts in flow patterns, affecting how water moves through the ecosystem and impacting fish behavior.<br>- While this alternative will maintain the MRWMP, it doesn't provide opportunities to incorporate strategies that improve fish passage. | - During the construction phase, activities may temporarily disrupt local fish and fish habitat. Construction activities can lead to temporary alteration to fish habitat upstream from measures put in place (i.e. cofferdam) to construct the new structure while maintaining flow. However, long term impacts are not anticipated, and fish habitat would return to natural functions shortly after construction is completed. Mitigation measures will be implemented in the design and during construction.<br>- The new dam will help maintain/create a stable reservoir that will continue to support aquatic vegetation and invertebrate populations, which serve as critical food sources for fish.<br>- The new dam presents potential temporary challenges during construction; however, its long-term impacts can be positive if properly designed and managed to enhance fish communities and aquatic habitats, ultimately supporting the objectives of the MRWMP. | - During the construction phase activities may temporarily disrupt local habitats. Construction activities can lead to temporary changes in water quality, such as increased turbidity or fluctuations in temperature and oxygen levels, which may stress fish populations. Mitigation measures will be implemented in the design and during construction.<br>- Permanent displacement and destruction of significant fish habitat in the form of sport fish and baitfish spawning immediately downstream of existing the Dam may occur pending the placement of the new dam.<br>- As per the objectives of the MRWMP, the new dam will help maintain/create a stable reservoir that will continue to support aquatic vegetation and invertebrate populations, which serve as critical food sources for fish, positively influencing population dynamics. |

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| | | Rationale | | | | |
| Terrestrial Habitat (Wildlife and Vegetation) | Potential temporary and long-term impact to wildlife habitats, wildlife movement corridors and vegetation communities (i.e., vegetation and tree removal). | - No impacts anticipated as a result of this alternative.<br>- In the event of a failure, the sudden release of water can lead to both immediate and long-term negative impacts on wildlife habitats, movement corridors, and vegetation communities, ultimately affecting ecosystem health and resilience.<br>- Water can flood nearby habitats, displacing wildlife and disrupting movement corridors, making it challenging for animals to reach food, breeding, and migration areas.<br>- Changes in vegetation communities, including potential loss of tree cover and shifts in plant diversity, can impact local species that rely on specific habitats. | - Moderate impacts to the surrounding woodlands, riparian vegetation, local habitat, displacing wildlife and altering ecosystem dynamics are anticipated during the construction of the new passive system, resulting in loss of wildlife habitat.<br>- No long-term impacts are anticipated as a result of this alternative on wildlife and vegetation. Site restoration will be required prior to completing construction. | - The presence of construction equipment and personnel can disrupt local habitats, temporarily displacing wildlife and affecting their nesting and foraging areas.<br>- Short term impacts to the surrounding woodlands and riparian vegetation are anticipated.<br>- No long-term impacts are anticipated as a result of this alternative on wildlife and vegetation. Site conditions will be restored prior to completing construction. | - Minor/moderate impacts anticipated on local habitat during construction that may lead to the displacement of wildlife and removal of vegetation to complete the dam replacement work.<br>- No long-term impacts on wildlife and vegetation are expected from this alternative, as there is an abundance of similar habitat adjacent to the study area. Site conditions will be restored before construction is completed.<br>- The design of the new dam could potentially incorporate enhancements to improve ecosystem services, such as better water quality, flood control, and habitat connectivity, ultimately benefiting wildlife communities. To be considered during detailed design. | - Higher potential impacts anticipated on local habitat during construction that may lead to the displacement of wildlife and removal of vegetation to construct the new dam and access road.<br>- No long-term impacts on wildlife and vegetation are expected from this alternative, as there is abundant similar habitat adjacent to the study area. Site conditions will be restored before construction is completed.<br>- The design of the new dam could potentially incorporate enhancements to improve ecosystem services, such as better water quality, flood control, and habitat connectivity, ultimately benefiting wildlife communities. To be considered during detailed design. |
| Species-at-Risk (SAR) Impacts | Potential temporary and long-term impact and/or enhancement to existing SAR and their habitat in the project area. | - No impacts anticipated as a result of this alternative.<br>- In the event of dam failure, potential impacts are anticipated to surrounding SAR and their habitat present within and around the shores of Kashwakamak Lake, as well as downstream terrestrial and aquatic habitats. | - Construction may have some short-term effects on species at risk (SAR) or their habitats. However, in the long run, the passive system would enable SAR turtles, like the Blanding's Turtle and Snapping Turtle, to use the watercourse as a migration corridor between the lake and downstream wetland habitats, allowing for unobstructed travel. | - Minor vegetation removal will be necessary during construction to access the dam and establish staging areas, which could potentially affect SAR or their habitats (e.g., birds, bats) during this period.<br>- Potential to impact SAR turtles or their habitat during construction of the dam along shoreline and within the watercourse. | - Minor to moderate vegetation removal will be needed during construction to access the dam and set up staging areas, which could potentially impact SAR or their habitats (e.g., birds, bats) during construction.<br>- Potential to impact SAR turtles or their habitat during construction of the dam along shoreline and within the watercourse. | - Additional vegetation removal will be necessary in comparison to other alternatives during construction to access the new dam location and establish staging areas, which could potentially affect SAR or their habitats (e.g., birds, bats).<br>- Potential to impact SAR turtles or their habitat during construction |

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| | | Rationale | | | | |
| | | - SAR turtles within the lake will be able to move/relocate. If the dam were to breach during their more vulnerable period of hibernation there could be impacts to species such as the Map Turtle which hibernates in lakes. | | - Mitigation measures (i.e., time windows, avoidance, etc.) should be implemented during construction to reduce potential impacts. | - Mitigation measures (i.e., time windows, avoidance, etc.) should be implemented during construction to reduce potential impacts. | of the dam along shoreline and within the watercourse.<br>- Mitigation measures (i.e., time windows, avoidance, limit areas of disturbance, etc.) should be implemented during construction to reduce potential impacts. |
| Existing Watercourses Quality | Potential temporary and long-term impact to existing watercourses or waterbodies including the Kashwakamak Lake and its tributaries from a water and habitat quality perspective. | - No changes anticipated to water and habitat quality.<br>- In the event of dam failure, a sudden influx of sediment, debris, and pollutants into the water, resulting in increased turbidity and decreased oxygen levels, which can harm aquatic life.<br>- Although immediate water quality may suffer from the dam failure, natural processes can help restore water quality over time. However, the recovery period can be prolonged, depending on the extent of the damage. | - Over time, a passive control system can enhance water quality by promoting natural flow regimes and reducing pollutant accumulation.<br>- A well-designed passive control system can enhance habitat connectivity, facilitating the movement of aquatic organisms between Kashwakamak Lake and the Mississippi River. This is essential for maintaining healthy aquatic habitats and improving conditions for fish and other wildlife.<br>- However, a passive system ultimately hindering efforts to achieve MRWP objectives related to flood and drought mitigation, ice management, and other initiatives. | - During rehabilitation, construction activities may increase sedimentation and turbidity in the water, leading to short-term declines in water quality, which can negatively affect aquatic organisms.<br>- In addition, rehabilitation work may necessitate changes in water management, potentially leading to temporary fluctuations in flow levels that can disrupt habitats and aquatic life.<br>- In the long term, the rehabilitation of the dam will have limited potential to enhance water and habitat quality and quantity. | - During construction, sediment disturbance and runoff can temporarily degrade water quality by increasing turbidity and introducing pollutants, which can harm aquatic habitat.<br>- The process of replacing the dam may also lead to temporary changes in flow regimes, impacting water levels in adjacent watercourses and potentially disrupting habitats for fish and other aquatic organisms.<br>- However, long-term enhancements in water quality and flow can result in healthier aquatic ecosystems, fostering biodiversity and resilience to environmental changes. | - During construction, sediment disturbance and runoff can temporarily degrade water quality by increasing turbidity and introducing pollutants, which can harm aquatic habitat.<br>- The process of replacing the dam may also lead to temporary changes in flow regimes, impacting water levels in adjacent watercourses and potentially disrupting habitats for fish and other aquatic organisms.<br>- However, long-term enhancements in water quality and flow can result in healthier aquatic ecosystems, fostering biodiversity and resilience to environmental changes. |
| | **Natural Environment Evaluation** | **Not Preferred** | **Preferred** | **Less Preferred** | **Less Preferred** | **Not Preferred** |
| **SOCIAL ENVIRONMENT** | | | | | | |

| **Criteria Measure** | **Description of Criteria Measures** | **Alternative 1 Do Nothing** | **Alternative 2 Decommission Dam and Construct Passive Control System** | **Alternative 3 Rehabilitation of the Existing Dam** | **Alternative 4 Replace Existing Dam in Same Location** | **Alternative 5 Construct New Dam Downstream** |
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| | | **Rationale** | | | | |
| Private Property Impacts | Measure of the impact to adjacent private property during construction/ commissioning. | - No direct impacts to private property.<br>- In the event of dam failure, there is a risk of permanently impacting both upstream and downstream shoreline residents (full time and seasonal cottagers), as well as the potential loss or damage to property. | - With the removal of the dam, the shoreline will be affected permanently by the loss of the ability to control water levels.<br>- This alternative has the potential to cause shoreline erosion and permanent loss of private property.<br>- There will be impacts due to construction and commissioning related activities. These impacts are temporary and unavoidable. | - There will be impacts due to construction and commissioning related activities. These impacts are temporary and unavoidable. | - There will be impacts due to construction and commissioning related activities. These impacts are temporary and unavoidable. | - There will be impacts due to construction and commissioning related activities. These impacts are temporary and unavoidable. |
| Temporary/ Permanent Property Agreements/ Acquisitions | Anticipated requirements for temporary and/or permanent property agreements/ acquisitions with adjacent privately owned properties. | - None required. | - None deemed required at this time, however, further assessment of the proposed design would be required to fully assess property impacts. | - Temporary access/use of property may be required for staging areas.<br>- No permanent property impacts anticipated. | - No permanent property impacts anticipated.<br>- Temporary access/use of property may be required for staging areas. | - Permanent property agreements/acquisition will be required to construct the new dam and access road downstream.<br>- Temporary access/use of property will also be required for staging areas. |
| Recreational Impacts | Ability to achieve target levels set in MRWP to minimize impacts to existing recreation activities. | - No changes are anticipated as a result of this alternative.<br>- In the event of dam failure, there will be significant impacts on the recreational use of the lake and shoreline residents and cottagers, including alterations in dock access. | - A passive system would greatly affect recreational use such as shoreline properties and boating due to significant fluctuations in water levels.<br>- Reduction/limited ability to mitigate floods/droughts and maintain current WMP.<br>- Depending on the design, there may be considerable impacts on the recreational use of the lake | - No direct or indirect impacts to the recreational use of the lake.<br>- There may be some impacts to recreational use during construction such as rerouting a temporary portage route. These impacts are temporary and unavoidable. | - No long-term impacts are anticipated to occur on the recreational use of the lake.<br>- There may be some impacts to recreational use during construction such as requiring an earlier drawdown of the lake, these impacts are temporary and may be unavoidable.<br>- Depending on staging requirements and natural heritage timing windows, the | - No long-term impacts are anticipated to occur on the recreational use of the lake.<br>- There may be some impacts to recreational use during construction such as requiring an earlier drawdown of the lake, these impacts are temporary and may be unavoidable.<br>- Depending on staging requirements and natural heritage timing windows, the construction of the new dam and |

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| | | **Rationale** | | | | |
| | | | during the construction of the new passive system. | | dam replacement may need to be stagged over several seasons. | the decommissioning of the existing dam may need to be stagged over multiple seasons.<br>- Using the existing dam as a cofferdam would aid in maintaining lake levels for recreational purposes during construction. |
| Tourism Impacts | Potential financial impacts to local tourism attractions (i.e., camping, resorts, fishing, boating, etc.). | - No changes are anticipated as a result of this alternative.<br>- In the event of dam failure, significant impacts on the recreational use of the lake are anticipated, which may adversely affect local tourism and revenues (i.e., reduction in visitors to resorts, campsites, marina, etc.). | - The reduction or limited capacity to mitigate significant fluctuations in water levels will impact the recreational use of the lake, potentially adversely affecting local tourism and revenue, such as a decrease in visitors to resorts, campsites, and marinas. | - This alternative will have shorter construction timelines than alternative 4 & 5; however, construction may still discourage tourists from visiting Kashwakamak Lake due to concerns related to construction noise, visual impacts, and the temporary loss of amenities.<br>- Local businesses (e.g., resorts, campsites, marinas) that rely on tourism may experience fluctuations in revenue during the construction period. | - Longer construction timelines may discourage tourists from visiting Kashwakamak Lake due to concerns related to construction noise, visual impacts, and the temporary loss of amenities.<br>- Local businesses (e.g., resorts, campsites, marinas) that rely on tourism may experience fluctuations in revenue during the construction period. | - Longer construction timelines may discourage tourists from visiting Kashwakamak Lake due to concerns related to construction noise, visual impacts, and the temporary loss of amenities.<br>- Local businesses (e.g., resorts, campsites, marinas) that rely on tourism may experience fluctuations in revenue during the construction period. |
| **Social Environment Evaluation** | | **Less Preferred** | **Not Preferred** | **Preferred** | **Preferred** | **Less Preferred** |
| **FIRST NATIONS/ CULTURAL ENVIRONMENT** | | | | | | |

| Criteria Measure | Description of Criteria Measures | Alternative 1 Do Nothing | Alternative 2 Decommission Dam and Construct Passive Control System | Alternative 3 Rehabilitation of the Existing Dam | Alternative 4 Replace Existing Dam in Same Location | Alternative 5 Construct New Dam Downstream |
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| | | Rationale | | | | |
| Lands and Harvesting Rights | Potential impacts to Indigenous Communities lands and harvesting rights (i.e., Manòmin, walleye, and other fish harvesting uses or potential for use, and portage routes). | - In the event of dam failure, there is a risk that higher water levels could flood the wild rice fields, potentially damaging the annual crops. Additionally, changes in water levels could affect the temperatures of the watercourse and rice fields.<br>- Temporary impacts are expected on upstream fish habitat due to dam failure, along with more significant effects on downstream sport fish habitat, particularly for walleye. | Untouched lands, including the removal of vegetation and habitat, as well as the upstream and downstream watercourse, would need to be modified or destroyed to construct the new passive system. Mitigation would need to be implemented within detailed design to minimize impacts.<br>- Potential impacts to the Manòmin may occur if there is a reduction in water levels/water flow downstream.<br>- Changes in flow regime may also adversely affect walleye spawning and harvesting success.<br>- Mitigation measures will be implemented during construction, including temporary closures or rerouting of portage routes, temporary fishing restrictions, the implementation of bypass measures to maintain the flow regime for fish habitat and Manòmin, and implementation of timing windows, among other actions. | - No impacts anticipated on the Manòmin as water levels and temperatures will be maintained with the rehabilitation of the structure.<br>- Mitigation measures will be implemented during construction, including temporary closures or rerouting of portage routes, temporary fishing restrictions, the implementation of bypass measures to maintain the flow regime for fish habitat and Manòmin, and implementation of timing windows, among other actions. | - No impacts anticipated on the Manòmin and fish habitat/harvesting as flow regime will be maintained.<br>- Mitigation measures will be implemented during construction, including temporary closures or rerouting of portage routes, temporary fishing restrictions, the implementation of bypass measures to maintain the flow regime for fish habitat and Manòmin, and implementation of timing windows, among other actions. | - Untouched lands, including the removal of vegetation and habitat, as well as the upstream and downstream watercourse (sensitive fish habitat (Walleye)), would need to be modified or destroyed to construct the new dam downstream. Mitigation would need to be implemented within detailed design to minimize impacts.<br>- No impacts anticipated on the Manòmin as flow regime will be maintained. |

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| | | Rationale | | | | |
| Built Heritage and Cultural Heritage Features | Potential impact to cultural and/or heritage features in the project area. | - No impacts. | - CHER confirmed that the Dam **does not** retain cultural heritage value or interest (CHVI) under the Ontario Heritage Act. No impacts to cultural heritage resources anticipated. | - CHER confirmed that the Dam **does not** retain cultural heritage value or interest (CHVI) under the Ontario Heritage Act. No impacts to cultural heritage resources anticipated. | - CHER confirmed that the Dam **does not** retain cultural heritage value or interest (CHVI) under the Ontario Heritage Act. No impacts to cultural heritage resources anticipated. | - CHER confirmed that the Dam **does not** retain cultural heritage value or interest (CHVI) under the Ontario Heritage Act. No impacts to cultural heritage resources anticipated. |
| Marine Archaeological Features | Potential impact to marine archaeological features in the project area. | - No impacts. | - No impacts anticipated as Marine AA did not find any archaeological resources. | - No impacts anticipated as Marine AA did not find any archaeological resources. | - No impacts anticipated as Marine AA did not find any archaeological resources. | - No impacts anticipated as Marine AA did not find any archaeological resources. |
| Archaeological Features | Potential impact to land archaeological features in the project area. | - No impacts. | - Based on the findings from the Stage 1 and 2 AA, no archaeological impacts are expected for this alternative. The majority of the study area, including the existing dam locations, access road, and potential staging areas, has been cleared of archaeological resources.<br>- A small Indigenous site was identified along the water's edge in the eastern portion of the study area, leading to a Stage 3 assessment. A restricted area, along with a 10-meter buffer zone, was established. This alternative is not expected to impact the archaeological site. | - Based on the findings from the Stage 1 and 2 AA, no archaeological impacts are expected for this alternative. The majority of the study area, including the existing dam locations, access road, and potential staging areas, has been cleared of archaeological resources.<br>- A small Indigenous site was identified along the water's edge in the eastern portion of the study area, leading to a Stage 3 assessment. A restricted area, along with a 10-meter buffer zone, was established. This alternative is not expected to impact the archaeological site. | - Based on the findings from the Stage 1 and 2 AA, no archaeological impacts are expected for this alternative. The majority of the study area, including the existing dam locations, access road, and potential staging areas, have been cleared of archaeological resources.<br>- A small Indigenous site was identified along the water's edge in the eastern portion of the study area, leading to a Stage 3 assessment. A restricted area, along with a 10-meter buffer zone, was established. This alternative is not expected to impact the archaeological site. | - A small Indigenous site was identified along the water's edge in the eastern portion of the study area, leading to a Stage 3 assessment. A restricted area, along with a 10-meter buffer zone, was established.<br>- The archaeological site could influence the design and construction of this alternative, as it will need to be avoided. |
| **First Nations/ Cultural Environment Evaluation** | | **Preferred** | **Less Preferred** | **Preferred** | **Preferred** | **Less Preferred** |

| **Criteria Measure** | **Description of Criteria Measures** | **Alternative 1**<br>**Do Nothing** | **Alternative 2**<br>**Decommission Dam and Construct Passive Control System** | **Alternative 3**<br>**Rehabilitation of the Existing Dam** | **Alternative 4**<br>**Replace Existing Dam in Same Location** | **Alternative 5**<br>**Construct New Dam Downstream** |
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| | | **Rationale** | | | | |
| **ECONOMIC ENVIRONMENT** | | | | | | |
| Capital Costs | Relative measure of the initial costs to install/construct the proposed works, including environmental mitigation, sediment management, etc. | - No/low cost. | - Relatively moderate cost pending the proposed design.<br>- Approximate estimate of $1.0 – 1.5 Million; however, is heavily dependent on the design and therefore a more refined cost estimate can't be provided at this time. | - Moderate cost pending the proposed rehabilitation design.<br>- The 2022 Dam Safety Review (Hatch) estimated the value to be approximately $1.5 million. | - This alternative has the second highest cost, estimated at approximately $4.1 million.<br>- Additional costs due to shoring to complete work. | - This alternative has the highest anticipated cost as the banks are farther apart at this location. It will require a longer dam elevating the cost of the dam significantly.<br>- Estimated cost dependent on the placement of the dam downstream and proposed design. Estimated cost would be significantly higher than Alternative 4.<br>- Reduced cost of shoring by utilizing the existing dam during construction. |
| Operational and Maintenance Costs | Relative measure of the ongoing maintenance and operational costs following implementation. | - Ongoing and enhanced monitoring required to identify risk of failure and provide for early warning of downstream residents/communities. | - Low operational and maintenance costs. | - If repairs could even be completed, constant inspections/monitoring and ongoing maintenance would be required. Dam will eventually need to be replaced at the end of design life (approx. 20 years). | - Standard monitoring and maintenance costs for a new dam.<br>- Some additional maintenance training may be required pending the design. | - Standard monitoring and maintenance costs for a new dam.<br>- Some additional maintenance training may be required pending the design. |
| **Economic Environment Evaluation** | | **Less Preferred** | **Preferred** | **Not Preferred** | **Less Preferred** | **Not Preferred** |

## 5.3 Selection of the Preferred Alternative

Following a comprehensive evaluation process, incorporating the diverse expertise, knowledge, and input from various disciplines, agencies, stakeholders, First Nations, CLC and the public, the Technically Preferred Alternative is Alternative 4, replace the existing Kashwakamak Lake Dam at the same location with a similar alignment to that of the existing dam. Alternative 4 addresses the Problem Statement outlined in this study while preserving the integrity of the Watershed Management Plan. The new dam will be engineered to handle larger storm events, be resilient to climate change, and comply with current safety standards. Moreover, constructing the new dam at the existing site will not introduce additional areas of disturbance, is expected to have no permanent impacts on property, and will minimize socio-economic disruptions, including no long-term effects on First Nation Lands (Manòmin).

On September 9th, 2024, MVCA Board of Directors endorsed Alternative 4, replace the existing Kashwakamak Lake Dam at the same location, to be the selected Technically Preferred Alternative.

## 5.4 Detailed Environmental Analysis/Impact Assessment

To complete the detailed environmental analysis/impact assessment of the Technically Preferred Alternative, the information collected for the baseline environmental inventory, as well as the alternatives evaluation, was examined in greater detail to confirm potential impacts, refine mitigation and/or compensation measures, and identify any unforeseen impacts.

The screening criteria used were consistent with the criteria provided in the Conservation Ontario Class Environmental Assessment (amended February, 2024) guidelines. These criteria represented impacts on physical, biological, cultural, socio-economic, and engineering/technical considerations.

The environmental components where potential positive, negative, or neutral effects are likely were identified. The detailed consideration included potential effect ranking as Negative High (-H), Negative Medium (-M), Negative Low (-L), Neutral or None (N), Positive Low (+L), Positive Medium (+M), or Positive High (+H), based on the magnitude, geographic extent, duration, frequency, permanence or reversibility, and ecological context of the effect in question. Proposed mitigation and/or compensation measures, along with any residual effects, were also documented.

The results of the detailed environmental impact analysis of the Preferred Alternative are presented in ***Appendix N***. The criteria determined as “Not Applicable (NA)” and environmental components where no impacts are likely were omitted from further discussion. The proposed mitigation measures are further discussed and outlined in Section 6.0.

# 6.0 ENVIRONMENTAL MITIGATION MEASURES

To address potential impacts on the physical, biological, cultural, socio-economic, and engineering/technical environments identified in the Detailed Environmental Analysis (Section 5.4, ***Appendix N***), it is recommended that the following mitigation measures be integrated into the detailed design and executed during construction. These measures aim to minimize impacts and safeguard the Natural, Social, and First Nations Cultural Heritage Environment. In addition, it is recommended during construction that the regulation of water levels/dam activities follow restrictions and guidelines outlined in MRWMP (amended 2020) and MRWP (2021).

## 6.1 Physical

### *6.1.1 Air Quality*

Generation of fumes and odours may be created during construction by machinery working within the study area. Odour and fume impacts will be minimized by ensuring that all equipment is properly maintained and that all pollution control devices on the equipment are functional and well-maintained.

### *6.1.2 Noise and Vibration*

The potential negative effects on noise levels and vibration are expected to be minimal and confined to areas in close proximity to the construction site within the local study area. These impacts are attributed to the operation of construction equipment and a possible increase in truck traffic during peak hours. Mitigation measures may include:

- Conduct construction Monday to Friday during normal working hours;
- Enforcing the North Frontenac Noise By-Law;
- Performing regular equipment inspections and operations (e.g., restricting the swinging of truck tailgates to dislodge material during filling operations) to ensure noise levels are kept to a minimum, and
- Notifying the public in advance of works that may cause excessive vibration.

### *6.1.3 Water Flow Regime*

Effective water management and control will be essential before and during the dam replacement project. Water levels will vary based on excavation depths and the duration of open excavations. Additionally, lake water levels will change in response to extreme weather and seasonal variations. It will be the responsibility of the contractors to develop a dewatering plan that accounts for expected lake water levels and surficial and bedrock conditions. A specialized dewatering contractor will provide recommendations for suitable dewatering methods to effectively manage water levels.

To the greatest degree possible, all in-water works and associated dewatering activities should be scheduled and completed outside of the recreational tourism season (May long-weekend to September long-weekend.) Where it is necessary to drawdown water levels and conduct dewatering during the recreational tourism season, the duration should be limited and a minimum of 2-weeks notice should be given to waterfront property owners.

Groundwater disposal must be carried out in compliance with applicable regulations. A Dewatering Control Plan shall be prepared by the Contractor and submitted to MVCA for approval prior to commencing construction. Flows will be maintained at all times. Dewatering shall be carried out as per OPSS 517 – *Construction Specifications for Dewatering*.

Assessment of the dewatering requirements and the need for registration on the Environmental Activity and Sector Registry (EASR) or a Permit to take Water (PTTW) should be carried out by specialists experienced in this field.

### *6.1.4 Existing Surface Drainage and Groundwater Seepage*

Potential negative affects on existing surface drainage are expected to be minor and confined to the construction access and staging areas within the local study area. Where existing drainage paths cannot be maintained, mitigation may include the following:

- Minimizing vegetation removal and soil exposure during site preparation;
- Implementing sediment and erosion control measures (e.g., installing and maintaining a sediment fence along the boundaries of the construction access and/or staging areas) in accordance with the MVCA's erosion and sediment control requirements during construction, and
- Ensuring the Contractor takes appropriate measures for the collection and disposal of surface and groundwater runoff, including the use of an adequate pumping system.
- Restoring the site to a condition that provides for equivalent or improved pre and post-construction drainage and groundwater infiltration.

### *6.1.5 Water Quality*

Mitigation measures will be implemented by the contractors to prevent adverse impacts from contaminants, foreign objects, or sediment movement into surface waters and groundwater within the study area. The following actions will be taken to mitigate the affect of construction activities near watercourses associated with the study area:

- Appropriate erosion and sediment control measures will be installed prior to construction to prevent siltation of watercourses.

- The construction site and staging area will be monitored, and waste materials collected on a regular basis to prevent the accumulation of litter and construction debris in nearby woods, fields, watercourses, wetlands, and water bodies;
- Mobile equipment refueling will take place no closer than 30 m from any watercourse to prevent water contamination due to accidental fuel spills. For non-mobile equipment, refueling will be carried out in a controlled manner to prevent fuel spillage, and drip pans will be placed under parked equipment at all times;
- Equipment shall not be parked or operated within any drainage course. Equipment operating near any watercourse must be in good working condition, properly maintained, and free of excess oil and grease to reduce the risk of contaminant leakage, and
- Should a spill occur, proper containment, cleanup, and reporting in accordance with provincial and federal requirements must be completed to protect surface water resources. The Contractor is required to have a spill kit available on-site in the event of a spill. All spills that may have an adverse effect should be reported to the MECP) Spills Action Centre (1-800-268-6060) in accordance with provincial and federal legislation.

During detailed design, it will be determined whether a Permit to Take Water (for greater than 400,000 L/day) or an Environmental Activity Sector Registry (for 50,000 L/day to 400,000 L/day) will be required during construction.

### *6.1.6 Management of Excess Materials*

The proposed project is expected to generate excess soil. As a result, O.Reg. 406/19: On-Site and Excess Soil Management (as amended) regulations will be followed for all soil taken off site, which provides for the transportation and processing of hazardous and non-hazardous waste.

## 6.2 Biological

### *6.2.1 Wildlife and Migratory Birds*

Due to the sighting of migratory birds and their habitat within the study area. no tree or other habitat vegetation removal should occur during the core migratory bird breeding and nesting window of April 1 to August 31 of any year. A screening of the study area for the presence of migratory birds or their nests should be conducted by an avian specialist prior to any disturbance or removal of vegetation during this period. If migratory birds or their nests are encountered at any time of the year, work should not continue in the area of the nest until:

- It has been determined by an avian specialist that the young have fledged and vacated the nest and work area; or
- An avian specialist has established a suitable buffer distance to prevent disturbance to the birds; and

- If a buffer distance has been implemented, an avian specialist must monitor the construction to ensure that migratory birds and their eggs are not disturbed, destroyed, or taken.

The removal of vegetation during the proposed replacement of the dams may temporarily disturb wildlife habitat; however, this type of habitat is well represented outside the study area. Impacts to at-risk wildlife species listed on the Species at Risk in Ontario List (Ontario Regulation 230/08) (e.g., turtles, birds, etc.) are discussed below in Section 6.2.5.

### 6.2.2 Vegetation

To mitigate vegetation disturbance and prevent erosion and sediment transport, the following principles should be implemented during project design:

- Disturbance of riparian vegetation should be minimized where possible;
- Implement tree protection measures such as installing fencing around the root zones and to delineate construction zone;
- Embankments disturbed as a result of construction shall be restored to their pre-construction condition or improved (i.e., enhanced), and
- Disturbed vegetative cover should be replaced with native species appropriate to the Kashwakamak Lake study area. Areas of exposed soil shall be revegetated as soon as possible following disturbance. If there is insufficient time in the growing season for seeds to sprout, the site shall be stabilized with temporary erosion and sediment control measures and seeded in the following spring.

Field surveys did not document any provincially, federally, or regionally significant plant species. In addition, no SAR plants or rare plants were identified. Adverse impacts to SAR or rare plant/vegetation communities therefore are not anticipated to result from the project works.

#### 6.2.2.1 Invasive and Noxious Plant Species

During the 2023 field investigation, no plant species classified under the Weed Control Act (1990) or as an ‘Invasive Species’ under the Invasive Species Act (2015) were observed within the study area. However, the contractors should take the following measures during project implementation:

- Debris, including earth clods and invasive species material attached to the equipment's exterior, is prohibited from entering the working area. Equipment arriving on-site should be inspected near the entrance for debris, which must be completely removed and managed according to specified procedures before the equipment proceeds to the working area, ad
- Equipment must also be inspected for debris before leaving the working area. Any debris should be removed and managed according to specified guidelines to prevent further contact with standing, sprayed, or cut invasive species.

#### *6.2.2.2 Culturally Significant Plant Species*

Manòmin, although not present in Kashwakamak Lake, is found growing in Mud Lake which is approximately 7 km downstream from Kashwakamak Lake and subsequently affected by alterations to water levels (MRWMP).

During construction, guidelines and restrictions as outlined in the MRWMP should be implemented. This includes having outflow being controlled from June 1st – September 30th to maintain the growth of Manòmin crops and allow for harvest.

### *6.2.3 Fish and Fish Habitat*

Under Section 35 of the Fisheries Act, 2019, a key habitat protection provision prohibits any work, undertaking or activity that would result in the "harmful alteration, disruption or destruction of fish habitat" (HADD), unless authorized by DFO or through regulations outlined in the Fisheries Act. The activities outlined in this section, as they relate to the planned construction works, are not anticipated to result in HADD, provided the design considerations and mitigation measures are employed as recommended.

Restricted activity timing windows are applied to protect fish from impacts of works or undertakings in and around water during spawning migrations and other critical life history stages. These guidelines are set by the MNR based on location; the study area is in the MNR Southern Region. Given the known presence of the fish species, in-water work may only be permitted from July 16 – March 14.

Erosion and sediment control (ESC) measures shall be implemented to prevent sedimentation in the watercourses, as sediment can cause respiratory distress, reduced feeding efficiency and impairment to growth and reproduction in fish species. The following will be included in the Contract Documents to protect fish and fish habitat:

- OPSS 804 - Construction Specification for Temporary Erosion Control
- OPSS 805 - Construction Specification for Temporary Sediment Control, and
- OPSS 182 - General Specification for Environmental Protection for Construction in Waterbodies and Waterbody Banks

### *6.2.4 Species at Risk*

The following mitigation measures should be employed to protect SAR and their habitat during project work in order to maintain compliance with the ESA:

- SAR Awareness Training: This training shall be provided by the Contractor to all staff working on site. All employees involved in construction activities should be trained in the identification and life cycles of the SAR that may be encountered during construction. The training should focus on identification of SAR that may be observed within the study area (i.e. bats, turtles);

- Daily Site Inspections for SAR: For the duration of the project works, the Contractor shall perform a thorough sweep of the construction zone before works are to begin to encourage any SAR on-site to move away. Site inspections shall be undertaken throughout the workday to determine if SAR have entered the work area. The following mitigation measures are required if SAR enter the site and to prevent adverse impacts to the SAR:
    - Temporary Work Stoppage during SAR Encounter: If any SAR or their nest is observed during the site inspection or at any other time, the Contractor shall immediately halt construction within 10 m of the species. SAR that are encountered within the work zone should be allowed a reasonable amount of time to leave the work area. If a turtle is encountered appears to be moving through the area, the species shall be allowed to move out of the work area on their own, and,
    - Report SAR Observations within the Work Area to the MECP: The Contractor will contact MVCA's Contract Administration to notify them of SAR observations within the work area. Contract Administrator shall report the SAR observation to the MVCA in writing within 24 hours of the observation to seek advise on how to proceed if a SAR is encountered within or adjacent to the work area if required (i.e., need to consult MECP etc.). All SAR observations and any relocation shall be documented and reported to MECP/NHIC. SAR should only be handled by a qualified professional who have knowledge of the species and the correct approvals to undertake SAR handling.

#### *6.2.4.1 SAR Turtles*

There is potentially suitable nesting and overwintering habitat for Blanding's Turtle, Midland Painted Turtle, Map Turtle, and Snapping Turtle within the study area (OAO/Kashwakamak Lake). Any work related to the construction and replacement of the existing Kashwakamak Dam should take place outside the active turtle nesting season for Central and Northern Ontario, which is from April 15 to October 15, or protective measures, such as exclusion fencing, should be implemented to reduce the risk of harm.

#### *6.2.4.2 SAR Bats*

Given the presence of forests (i.e., FOM) and high-quality maternity roosting trees in the study area, little brown myotis, northern myotis, and tri-colored bat, have a moderate potential of occurring during their active season (April 1 – September 30). Bat presence surveys may be required during detailed design to determine use by SAR bats depending on vegetation removals.

#### *6.2.4.3 Birds*

No species-at-risk (SAR) birds were observed during the 2023 site visit. The forested area within the study site may offer potentially suitable breeding habitat for both the Red-headed Woodpecker and the Wood Thrush. Furthermore, any activities that could harm or kill SAR birds should be scheduled outside their active season. Therefore, it is recommended that tree removals be avoided from April 15 to August 31. If tree removal is required during this time period the area should be screened and cleared by an Avian Biologist. It is not expected that vegetation removed for these works will impact SAR birds, provided mitigation measures/timing windows are followed.

## 6.3 Cultural

The impacts of the project on land uses in the study area were assessed in accordance with the scope of the assignment. In general, it is not anticipated that the construction activities will have any long-term negative effects on adjacent land uses.

### *6.3.1 Recreational or Tourist Uses of a Water Body and/or Adjacent Lands*

Kashwakamak Lake is popular for recreational and tourist activities like boating, swimming, fishing, camping, resorts and cottage stays. The construction is anticipated to cause short-term effects on these activities, which may include an earlier drawdown of the lake and temporary closures or relocations of portage routes. Communications will be critical and a Communication Plan including communication protocols shall be developed to ensure timely and appropriate distribution of information to waterfront property owners. A minimum 2-weeks notice shall be given prior to any early drawdown of the lake.

### *6.3.2 Cultural Heritage – Archaeology*

Given the location of the archaeological findings in relation to the recommended preferred alternative for the replacement of the Kashwakamak Lake Dam at the same location, the MVCA is recommending that “avoidance and protection of the site” be adopted as the appropriate Stage 4 mitigation of development impacts. Through careful design of the new dam and strategic placement of staging areas, we are confident that the archaeological site will be fully preserved and will not be impacted by the proposed replacement. MVCA has developed a proposed protection strategy for the archaeological site, which is included as an appendix to the Stage 3 Archaeological Assessment Report.

Short-Term Protection:

- A temporary barrier, such as snow fencing, to be erected during construction immediately adjacent to the construction area to delineate the site limits. This will aid in the protection of the archaeological site, as well as maintaining the natural vegetated buffer of approximately 50 m from the site;

- Install clear and visible signs around the site and buffer zone that notify all personnel of the archaeological importance of the area and the prohibition of unauthorized entry;
- Delineate a “No Go Zone” area and issue instructions to all on-site construction personnel to avoid accidental damage to the site:
    - The “No Go Zone” shall not undergo any site alternations, either temporarily or permanently. This includes, but is not limited to, minor forms of soil disturbance such as tree removal, landscaping and regrading.
    - No construction equipment, personnel, or machinery may enter the “No Go Zone”.
    - The location of the “No Go Zone” will be clearly identified on the construction drawings, contract documents and reference will be made to avoid this area;
    - Temporary closure or relocation of the portage route on the north shore, and
    - Only trained archaeologists or designated personnel should be allowed access to the archaeological site, and only under appropriate conditions.
- Following construction, retain a licensed consultant archaeologist to complete a Stage 4 avoidance and protection report documenting the success of site avoidance after the completion of the work.

Long-Term Protection:

To ensure the long-term protection of the archaeological site, MVCA proposes the following mitigation measures:

- Establishment of a Permanent “No Go Zone” for Development: A permanent “No Go Zone” will be established for development of lands through the creation of a natural vegetation buffer, with a minimum offset of 10 meters from the archaeological site. No future development or alteration of natural features (i.e., minor forms of soil disturbance such as tree removal, landscaping, and regrading) will be permitted on MVCA lands, with the exception of the dam replacement. As a result, the existing heavily vegetated buffer around the archaeological site will be preserved to protect the archaeological site. This buffer zone will be clearly delineated on the design plans for the Kashwakamak Lake Dam and will be incorporated into MVCA’s legal documents for the site.
- On-Site Signage: MVCA will install permanent signage at the entrance to the dam site and along the shoreline portage route to clearly communicate the following:
    - The location of the archaeological site and the prohibition of access beyond this point ("No Go Zone"), except for authorized personnel.

  - A warning that any unauthorized alteration within the "No Go Zone" including soil disturbance, vegetation removal, or landscaping, may result in penalties under Section 69 of the Ontario Heritage Act or its associated regulations.

- Prohibition of Alterations without Authorization: No alterations to the archaeological site, whether temporary or permanent, including even minor soil disturbances (e.g., tree removal, landscaping, or excavation), will be permitted without prior approval from MVCA to access land and additional archaeological fieldwork by a licensed consultant archaeologist may be required before any such activities can take place. Any future archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) should involve continued engagement with First Nation communities/ organizations.
- Record-Keeping and Documentation: MVCA will maintain comprehensive records of any site assessments, discoveries, or protective measures undertaken to safeguard the archaeological site. These records will be kept up to date and accessible for future reference and compliance purposes.

During construction, there is always the chance of encountering buried archaeological material. If this occurs, the Contractor shall immediately stop all construction activities in the area and contact the Contract Administrator who will contact the Ministry of Citizenship and Multiculturalism (MCM) (416-314-7159). If unmarked human remains are uncovered, the provisions of the Ontario Cemeteries Act apply. The Contractor shall immediately stop all construction activities in the area and contact the Contract Administrator who will contact the office of the Heritage Operations Unit, MCM, the Registrar of Cemeteries (416-326-8394), the local Ontario Provincial Police (OPP), and the local Coroner.

### *6.3.3 Built and Cultural Heritage*

A marker recognizing the workers who built the dam is carved into the bedrock near the weir. The Contractor should provide and install suitable cover to protect the marker from construction impacts for the duration of the project. The remainder of the study area has been assessed and cleared of any built heritage or cultural heritage landscape resources.

## 6.4 Socio-Economic

### *6.4.1 Surrounding Neighbourhood or Community*

The Kashwakamak Lake Dam is accessed via private property and the lake is widely used by local residents/cottagers for recreational purposes. Regular communication with the landowner will be required throughout the duration of the project to confirm matters related to access, materials storage, and other planned and unplanned activities and their impacts on the landowner and tenants. Protocols shall be developed to ensure timely and appropriate communications with the landowner and other landowners in the immediate vicinity of the construction site.

### 6.4.2 Property Access & Traffic Management

The dam is accessed by a private road off of Gutheinz Road, with several privately owned properties adjacent to the site. In the lands surrounding the study area, there is a potential for increase in truck traffic and noise levels during construction. Mitigation measures may include:

- A Communication Plan shall be developed and implemented during detailed design and construction to ensure timely and appropriate communications with property owners regarding construction schedules, potential disruptions, and other matters;
- Coordinate and develop locking protocol for gate shared with Hydro One and local landowner.
- Implement a traffic management plan to ensure safe and efficient access around the construction area and that access to private properties is maintained throughout construction phase;
- Install appropriate measures (i.e., fencing, signage, etc.) that minimize traffic disruption;
- Provide adequate notification of potential disruptions to access, and
- Limit construction to Monday to Friday during normal working hours, if feasible.

## 6.5 Engineering/Technical

### 6.5.1 Erosion and Sediment Control

Project works can lead to the suspension of sediment in the watercourse. Also, exposed or stockpiled soils adjacent to the watercourse can lead to sedimentation during rain events. In order to prevent the entrainment of sediment in the watercourses, the detailed design and tender package shall include the following mitigation measures:

- An Erosion and Sediment (ESC) Control Plan shall be prepared by the Contractor and submitted to MVCA for approval;
- ESC measures shall be installed prior to starting work to prevent sediment from entering the watercourse and will be removed at the completion of construction;
- ESC measures shall be inspected for effectiveness regularly throughout construction and deficiencies corrected, and
- The installation, monitoring, maintenance, and removal of temporary ESC measures shall be according to OPSS 804 - Timing Constraints for Temporary Erosion Control Measures and OPSS 805 - Timing Constraints for Temporary Sediment Control Measures.

### 6.5.2 Geotechnical

The recommendations presented in this report assume that an adequate level of construction monitoring by qualified geotechnical personnel will be provided during construction. The bedrock quality should be confirmed by extending 1.5 m probe holes into the bedrock within the footing footprints. These holes will need to be reviewed by the geotechnical engineer to ensure that no significant mud seams or voids exist. The holes must be filled with grout after the inspection is completed. All bearing surfaces should be inspected and approved by experienced geotechnical personnel prior to placing the footings or lean mix concrete slabs.

Additionally, adequate construction monitoring should include laboratory and field testing during construction. This includes full-time compaction testing of backfill behind retaining walls and part-time compaction testing of general backfill, along with laboratory testing for the proposed fill soils for this site. Periodic testing of concrete is also required.

All backfilling shall comply with OPSS 501 for compaction requirements, unless the design recommendations included in this report exceed the provisions of OPSS 501.

# 7.0 PROJECT IMPLEMENTATION

This section provides an overview of the principal actives associated with implementing the Project, including general guidance for permitting and approvals, monitoring and commitments during detailed design.

## 7.1 Permitting and Approvals

The execution of all project activities is contingent upon securing all required federal, provincial, and municipal permits and approvals before commencing project work. The following permits and approvals will be required during the detailed design phase:

**MNR** - Approval to construct, alter, improve or repair dam infrastructure in Ontario is subject to Lakes and Rivers Improvement Act Authorization (LRIA). MNR is responsible for administering the LRIA and its associated regulations and processing applications under LRIA section 14 or 16. MNR's role is to review applications and provide an authorization on an application but the MNR does not provide design recommendations.

Crown land and shore lands are also regulated under the *Public Lands Act, Section 14*. Therefore, a Crown Land Work Permit will also be required to construct a structure and working within the water body.

**DFO** – The Fish and Fish Habitat Protection Program ensures compliance with relevant provisions under the *Fisheries Act* and the *Species at Risk Act*. The program reviews proposed scope of works, undertakings and activities that may impact fish and fish habitat. The program will review the proposed project to identify the potential risks to the conservation and protection of fish and fish habitat. The Fish and Fish Habitat Protection Program ensures that impacts are managed in the best way possible. During the review, DFO will determine if the project will need an authorization under the Fisheries Act. If it is determined that the project will cause the death of fish, and/or harmful alteration, disruption or destruction of fish habitat, an authorization is required. The authorization will include terms and conditions you must follow to avoid, mitigate, offset and monitor the impacts to fish and fish habitat resulting from the project. Based on the proposed scope of work, the proposed dam replacement does not follow a Code of Practice and therefore a Request for Review will need to be prepared and submitted to the DFO.

**Transport Canada (TC)** – Under the *Canadian Navigable Waters Act* (CNWA), owners of works who propose to construct, place, alter, rebuild, remove, or decommission works that are in, on, over, under, through or across any navigable water, may be required to apply for an approval from Transport Canada, or seek authorization through the public resolution process. The Navigation Protection

Program (NPP) is responsible for administering and processing applications for approval. The Minister of Transport has the authority to issues terms and conditions with an approval.

Kashwakamak Lake is not listed on the Scheduled Waterways list under the Canadian Navigable Waters Act (CNWA). It appears the watercourse is navigable based on the size of the watercourse, flow, and connectivity to Mississippi River. Kashwakamak Lake is popular for many activities including fishing, hiking, canoeing and other water sport activities.

Based on the size of the dam, the watercourse, and the fact that the watercourse is connected to the Kashwakamak Lake and Mississippi River which is used for recreational boating, a full application process will need to be completed in accordance with NPP. Permitting requirements to be confirmed during the detailed design.

**MECP** - A Permit to Take Water (PTTW) or Environmental Activity Sector Registry (EASR) will be required if dewatering activities will be greater than 50,000 + litres of water a day from the environment. During the detailed design, a review of water-taking activities will need to be completed to determine if there are any significant concerns with respect to short-term pumping of shallow groundwater.

The EASR regulation prescribes the takings of ground water and stormwater for the purpose of dewatering construction projects that require dewatering between 50,000 and 400,000 L/day. Activities required to be registered in the EASR do not require a PTTW for the water taking. An environmental compliance approval (ECA) under section 53 of the *Ontario Water Resources Act* (OWRA) is also not required for the discharge of stormwater.

A Permit-to-Take-Water regulation prescribes the takings of ground water and stormwater for the purpose of dewatering construction projects that require dewatering greater than 400,000 L/day. Applying for the permit involves the submission of an application and appropriate scientific evaluation/studies. MECP will review the permit application, measuring it against a number of requirements. Designated PTTW applications will be posted on the Environmental Registry in accordance with the Environmental Bill of Rights and consider public comments in its decision. The permit authorizes you to withdraw water from a water source(s) according to the terms and conditions on the permit.

For the Kashwakamak Lake Dam project, compliance with the Endangered Species Act (2007) may be necessary, particularly regarding the potential removal of forested areas. Depending on the extent of forest removal, SAR bat surveys during detailed design may need to be conducted, and an Information Gathering Form (IGF) submitted for review to MECP.

## 7.2 Monitoring Requirements

Environmental monitoring is essential to characterize and monitor the quality of the surrounding environment, identify potential negative effects and refine mitigation measures, ensure compliance with environmental regulations, and prevent long-term adverse impacts on the environment.

A comprehensive monitoring program will be developed in the detailed design phase for the replacement of the Kashwakamak Lake Dam. This program will be designed to monitor impacts to the environment during the various stages of construction and following construction completion. This will allow for an inclusive assessment of cumulative impacts. The key elements of the comprehensive monitoring program will include, but are not limited to, the following, described below:

- Construction work monitoring, and
- Environmental compliance monitoring.

The objective of the construction works monitoring program will be to assess the structural integrity of the construction and their effectiveness with respect to controlling environmental impacts during construction (i.e., erosion and sediment control, water management, etc.).

Construction-phase and post-construction monitoring may include recording of water levels, photographic record of the constructed works, and a review of constructed works by a qualified engineer. Post-construction monitoring may also be undertaken to monitor and maintain the dam replacement including site investigations to confirm no negative impacts are occurring upstream and downstream of the dam.

## 7.3 Detailed Design Commitments

During this study, the following items were noted for consideration in the Detailed Design phase:

- Fish Passage - During the detailed design of the Kashwakamak Lake Dam, further consideration should be given for improvements to fish passage. Enhancing fish passage will help ensure the continued movement of aquatic species between upstream and downstream habitats, promoting biodiversity and ecosystem health. This may involve the incorporation of fish ladders, bypass channels, or other innovative solutions to facilitate safe and effective passage for various fish species, thereby mitigating the potential impacts of the dam on aquatic life. However, there are currently no other dams within the watershed that fish passage capabilities either for upstream or downstream passage, within the MRW. With the exception of the American Eel, who has potential to occur in the lower reaches of the Mississippi River below Dalhousie Lake, none of the fish species in the Mississippi River (and specifically in proximity to the Kashwakamak Lake Dam) are large distance migrators and are usually not the intended target species of fish passage systems installed in other locations. While the feasibility of adding fish passage to the new dam may be considered as part of detailed design, it is anticipated it will be screened out based on the above noted.

- Permitting/Approvals - The execution of all project activities is contingent upon securing all required federal, provincial, and municipal permits and approvals (DFO, TC, MECP, MNR, etc.) before starting the project.
- Mitigation Measures – Detailed mitigation measures will be outlined and assessed during the design and tendering phases. Pending the detailed design, mitigation measures must be established to prevent potential impacts from water level fluctuations, sedimentation, and spills of harmful substances during construction activities. Protection of fish and fish habitat, species at risk, significant aquatic and terrestrial wildlife habitats, and downstream Manómin beds is essential during these activities.
- Dewatering Control Plan - A dewatering plan should be prepared during the detailed design phase to effectively manage surface/groundwater and ensure the stability of the construction site.
- Contingency Plan - A plan will be developed during the detailed design phase to address potential unforeseen circumstances (e.g., construction delays) and ensure the project remains adaptable.
- Tree Removal and Restoration Plan - A Tree Removal and Restoration Plan to be prepared during the detailed design phase. Impacts to trees as a result of construction will be minimized wherever possible. Environmental mitigation measures such as tree protection, proposed landscaping, plantings, restoration work, and mitigation measures during construction will be included in the plan and tender package.
- Erosion and Sediment Control (ESC) Plan - Temporary and permanent ESC measures are essential during construction and for the long-term. Site-specific temporary ESC measures to be determined during detailed design and included within Contract Drawings, following current Best Management Practices, Standard Drawings and Special Provisions, as well as conform to MVCA standards. Preventing erosion will be the preferred mitigation measure in efforts to eliminate and/or reduce sedimentation.
- Notification Protocol - The MVCA recognizes that the lake is heavily utilized for various recreational and tourism activities. Therefore, a plan will be established to inform stakeholders of any changes (e.g., early lake drawdown) and impacts related to construction, minimizing disruption to these activities.
    - The MVCA will aim to select timings that minimize impacts and accommodates lake users.
    - Adequate notification will be provided to the local marinas prior to lowering water levels, ensuring they are prepared for an influx of boats during that time.

- Stage 4 Mitigation of Development Impacts – Finalize the "avoidance and protection" strategy for the Stage 4 AA mitigation of development impacts. Ensure that the protection measures outlined in the Stage 3 AA are integrated into the detailed design, reflected in the tender documents, and implemented throughout construction and post-construction phases.
- Monitoring Program - A comprehensive monitoring program needs to be developed in the detailed design phase for the replacement of the Kashwakamak Lake Dam. The program should be designed to monitor impacts to the environment during the various stages: construction and post-construction.

# 8.0 REFERENCES

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# Appendix A – Contact List

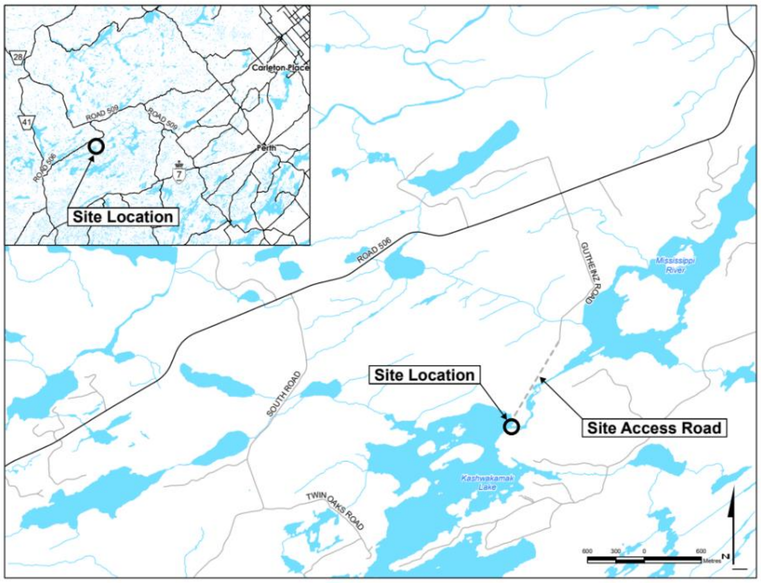
| Title | First Name | Last Name | Position | Department | Organization | Address | City | Prov | Postal Code | Telephone | Email |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Provincial & Federal Agency | | | | | | | | | | | |
| | Taslema | Khan | Senior Environmental Assessment and Approvals Officer | Environmental Assessment and Indigenous Consultation | Infrastructure Canada | 180 Kent Street, Suite 1100 | Ottawa | ON | K1P 0B6 | 343-551-0416 | taslema.khan@infc.gc.ca |
| | Claire | Hughson | Environmental Review Officer | Environmental Assessment and Indigenous Consultation | Infrastructure Canada | 180 Kent Street, Suite 1100 | Ottawa | ON | K1P 0B6 | 343-571-6260 | Claire.Hughson@infc.gc.ca |
| | Sara | Boyd | Policy Analyst | Climate Mitigation and Adaptation Community Programs | Infrastructure Canada | 180 Kent Street, Suite 1100 | Ottawa | ON | K1P 0B6 | 343-552-3423 | sara.boyd@infc.gc.ca |
| | Nadine | Nassrallah | Senior Analyst | Climate Mitigation and Adaptation Community Programs | Infrastructure Canada | 180 Kent Street, Suite 1100 | Ottawa | ON | K1P 0B6 | N/A | nadine.nassrallah@infc.gc.ca |
| | Rob | Dobos | Manager | Environmental Protection Operations | Environment and Climate Change Canada | 867 Lakeshore Road, 5th Floor, Office L509 | Burlington | ON | L7R 4A6 | 905-336-4953 | rob.dubos@ec.gc.ca |
| | | | | Fish and Fish Habitat Protection Program | Fisheries and Oceans Canada | 867 Lakeshore Road, P.O. Box 5050 | Burlington | ON | L7R 4A6 | 1-855-852-8320 | fisheriesprotection@dfo-mpo.gc.ca |
| | Kelly | Thompson | Inspection Officer | Navigation Protection Program | Transport Canada | 100 Front Street South | Sarnia | ON | N7T 2M4 | 519-333-6330 | kelly.thompson@tc.gc.cc |
| Sir/Madam | | | Class EA Form | | Ministry of the Environment, Conservation and Parks | | | | | | eanotification.eregion@ontario.ca |
| Mr. | Scott | Lee | Resource Operations Supervisor | | Ministry of Natural Resources and Forestry | Unit 1, 10 Campus Drive | Kemptville | ON | K0G 1J0 | 613-258-8230 | scott.lee@ontario.ca |
| Ms. | Jessica | Hill | Manager - Indigenous Relations Unit | | Ministry of Indigenous Affairs | 160 Bloor Street, Suite 400 | Toronto | ON | M7A 2E6 | 416-326-4744 | jessica.hill2@ontario.ca |
| | | | | | Ministry of the Environment, Conservation and Parks | | | | | | eanotification.eregion@ontario.ca; |
| | Jon | Orpana | Regional Environmental Planner | Environmental Assessment Branch | Ministry of the Environment, Conservation and Parks | 1259 Gardiners Rd. Unit 3 | Kingston | ON | K7P 3J6 | 613-548-6918 | jon.orpana@ontario.ca |
| | Roberto | Sacilotto | Compliance Supervisor | Environmental Assessment Branch | Ministry of the Environment, Conservation and Parks | 1259 Gardiners Rd. Unit 3 | Kingston | ON | K7P 3J6 | | Roberto.sacilotto@ontario.ca |
| | Vicki | Mitchell | Regional EA Coordinator | Eastern Ontario Region Office | Ministry of the Environment, Conservation and Parks | 1259 Gardiners Rd. Unit 3 | kingston | ON | K7P 3J6 | 613-540-6852 | vicki.mitchell@ontario.ca |
| | Sarah | Paul | Director | Environmental Approvals Access and Service Integration Branch | Ministry of the Environment, Conservation and Parks | 135 St. Clair Avenue West, 1st Floor | Toronto | ON | M4V 1P5 | 416-314-8171 | sarah.paul@ontario.ca |
| | Zeljko | Romic | Supervisor (Acting) | Environmental Approvals Access and Service Integration Branch | Ministry of the Environment, Conservation and Parks | | | | | 416-314-8204 | zeljko.romic@ontario.ca |
| | Jake | Noordhof | Senior Advisor | Aboriginal Affairs | Ministry of the Environment, Conservation and Parks | 4145 North Service Rd. Suite 300 | Burlington | ON | L7L 6A3 | 905-319-3374 | jake.noordhof@ontario.ca |
| | James | Mahoney | District Manager | Kingston District Office | Ministry of the Environment, Conservation and Parks | 1259 Gardiners Rd. Unit 3 | Kingston | ON | K7P 3J6 | 613-548-6902 | james.mahoney@ontario.ca |
| | Trevor | Harris | IRM Technical Specialist | Bancroft District Office | Ministry of Natural Resources and Forestry | 160 Monck St, PO Box 500 | Bancroft | ON | K0L 1C0 | 613-202-1283 | trevor.harris@ontario.ca |
| | David | Clark | Senior Project Engineer | Regional Engineering Services | Ministry of Natural Resources and Forestry | 300 Water Street | Peterborough | ON | K9J 3C7 | 705-755-3252 | david.c.clarke@ontario.ca |
| | Joyd | Marks | Regional Planner | Land Use Planning and Strategic Issues Section | Ministry of Natural Resources and Forestry | | | ON | | 249-733-1376 | jody.marks@ontario.ca |
| | Dan | Minkin | Heritage Planner, Culture Services Unit | Programs and Services Branch | Ministry of Tourism, Culture and Sport | 401 Bay Street, Suite 1700 | Toronto | ON | M7A 0A7 | 416-314-7147 | dan.minkin@ontario.ca |
| | Laura | Hatcher | Team Lead - Heritage Land Use Planning | | Ministry of Tourism, Culture and Sport | 401 Bay Street, Suite 1700 | Toronto | ON | M7A 0A7 | 416-314-3108 | laura.e.hatcher@ontario.ca |
| | Leslie | Rich | Policy and Planning Liaison | | Conservation Ontario | 120 Bayview Parkway | Newmarket | ON | L3Y 3W3 | 905-895-0716 | lrich@conservationontario.ca |
| | Nicholas | Fischer | Policy and Planning Coordinator | | Conservation Ontario | 120 Bayview Parkway | Newmarket | ON | L3Y 3W3 | 905-895-0716 | nfischer@conservationontario.ca |
| Ms. | Karla | Barboza | Team Lead, Heritage | | Ministry of Citizenship and Multiculturalism | | | | | 416-660-1027 | karla.barboza@ontario.ca |
| Municipal Agency and MPP | | | | | | | | | | | |
| Mr | John | Jordan | MPP | | Lanark—Frontenac—Kingston | Unit 207-91 Cornelia Street West | Smiths Falls | ON | K7A 5L3 | 613-284-1630 | John.jordan@pc.ola.org |
| Mr. | Gerry | Lichy | Mayor | | Township of North Frontenac | 6648 Road 506 | Plvna | ON | K0H 2M0 | 613-278-2381 | mayorlichtynorthfrontenac@gmail.com |
| | Sonya | Bolton | Manager | Community Planning, Planning and Economic Development | County of Frontenac | 2069 Battersea Road | Glenburnie | ON | K0H 1S0 | 613-548-9400 ext. 351 | sbolton@frontenaccounty.ca |
| | Tara | Mieske | Clerk/Planning Manager | Clerk/Planning | Township of North Frontenac | 6648 Road 506 | Plevna | ON | K0H 2M0 | 613-479-2231 ext. 225 | clerkplanning@northfrontenac.ca |
| | Roy | Huetl | | Councillor Ward 2 | Township of North Frontenac | 6648 Road 506 | Plevna | ON | K0H 2M0 | 613-812-9462 | royfhuetl@gmail.com <royfhuetl@gmail.com>; |
| | Vernon | Hermer | | Councillor Ward 2 | Township of North Frontenac | 6648 Road 506 | Plevna | ON | K0H 2M0 | 613-479-2789 | VernonHermerCouncillor@gmail.com <VernonHermerCouncillor@gmail.com>; |
| | Darwyn | Sproule | Manager | Public Works | Township of North Frontenac | 6648 Road 506 | Plevna | ON | K0H 2M0 | 613-479-2231 ext.230 | publicworks@northfrontenac.ca |
| | Jason | Lemke | Program Supervisor | North Frontenac Parklands | Township of North Frontenac | 6648 Road 506 | Plevna | ON | K0H 2M0 | 613-479-2231 ext.241 | officeassistant@northfrontenac.ca; parklands@northfrontenac.ca |
| Mr | Ron | Vandewal | Warden | | County of Frontenac | 2069 Battersea Road | Glenburnie | ON | K0H 1S0 | 613 548-9400 | rvandewal@southfrontenac.net |
| Community Organizations | | | | | | | | | | | |
| | Sue | MacGregor | President | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | president@kashwakamak.ca |
| | Lawrence | Flynn | Board Member | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | flynn_lawrence@hotmail.com |
| | Heather | Nowlan | Board Member | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | secretary@kashwakamak.ca |
| | Martin | Reid | Board Member | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | martin.reid@live.ca |
| | Jim | Vahrmeyer | Board Member | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | jimvahrmeyer@outlook.com |
| | Peter | Johnston | Board Member | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | lakesteward@kashwakamak.ca |
| | Andrew | Johnston | Board Member | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | directorAndrew@kashwakamak.ca |
| | Bert | Martin | Board Member | | | | | | | | markinspa@hotmail.com |
| | Alan | Dean | KLA Representative | | Kashwakamak Lake Association (KLA) | 1715C Kashwakamak Lake Road | Arden | ON | K0H 1B0 | 613-806-2355 | alanvdean44@gmail.com |
| | Bruce | Moore | President | | North Frontenac Lake Association Alliance | | | | | | info@nflaa.ca |
| EMS | | | | | | | | | | | |
| | Eric | Korhonen | Director of Emergency Services/Fire Chief | Emergency Services - Fire Department, Ward 2 &3 | Township of North Frontenac | 6648 Road 506 | Plevna | ON | K0H 2M0 | 613-479-2231 etx.232 | firechief@northfrontenac.ca |
| | | | | Sharbot Lake OPP Detachment | Ontario Provincial Police | 24586 Highway 7 | Sharbot Lake | ON | K0H 2P0 | 613-279-2195 | |
| | | | | Frontenac Paramedic Services | County of Frontenac | 5069 Battersea Road | Glenburnie | ON | K0H 1S0 | 613-548-9400 ext. 401 | |
| | | | | | | | | | | | |
| Utilities - to be confirmed | | | | | | | | | | | |
| | | | | | Hydro One | 483 Bay St. South Tower, 8th floor | Toronto | ON | M5G 2P5 | 1-888-664-9376 | |
| Local Landowners and Buisinesses | | | | | | | | | | | |

Indigenous Communities

| Organization | Title | First Name | Last Name | Position | Address | City | Prov | Postal Code | Telephone | Email |
|---|---|---|---|---|---|---|---|---|---|---|
| Alderville First Nation | Chief | Dave | Mowat | Chief | 11696 Second | Roseneath | ON | K0K 2X0 | | dmowat@alderville.ca |
| | Mr. | David | Simpson | Lands & Resource Coordinator | P.0 Box 46, 11696 Second Line Rd. | Alderville | ON | K0K 2X0 | | consultation@aldervillefirstnation.ca |
| Curve Lake First Nation | Chief | Emily | Whetung | Chief | 22 Winookeeda Road | Curve Lake | ON | K0L 1R0 | | EmilyW@curvelake.ca |
| | Ms. | Kaitlin | Hill | Lands Resource Consultation Liaison | 22 Winookeeda Road | Curve Lake | ON | K0L 1R0 | | KaitlinH@curvelake.ca |
| | Ms. | Julie | Kapyrka | Lands Resource Consultation Liaison | 22 Winookeeda Road | Curve Lake | ON | K0L 1R0 | | JulieK@curvelake.ca |
| | Ms. | Francis | Chua | Lands Resource Consultation Liaison | 22 Winookeeda Road | Curve Lake | ON | K0L 1R0 | | Francis@francischua.com |
| Hiawatha First Nation | Chief | Laurie | Carr | Chief | 123 Paudash Street | Hiawatha | ON | K9J 0E6 | | chiefcarr@hiawathafn.ca |
| | Mr. | Sean | Davison | Lands Resource Consultation Liaison | 197 Sopers Lane | Hiawatha | ON | K9J 0E6 | (705)-295-4421 Ext 215 | sdavison@hiawathafn.ca |
| | Ms | Mandy | McGonigle | Archaeological Liaison | | | | | (705)-295-4421 Ext 225 | mmcgonigle@hiawathafn.ca |
| Mississaugas of Scugog Island First Nation | Chief | Kelly | LaRocca | Chief | 22521 Island Road | Port Perry | ON | L9L 1B6 | | klarocca@scugogfirstnation.com |
| | Mr | Don | Richardson | | 22521 Island Road | Port Perry | ON | L9L 1B6 | | drichardson@scugogfirstnation.com & consultation@scugogfirstnation.com |
| | Mr | Thomas | Turoczi | Consultation Specialist | 22521 Island Road | Port Perry | ON | L9L 1B6 | | tturoczi@scugogfirstnation.com |
| | Ms | Samantha | Shrubsole | Consultation Advisor | 22521 Island Road | Port Perry | ON | L9L 1B6 | | sshrubsole@scugogfirstnation.com |
| | Sir/Madam | | | Public Works Unit | 22602 Island Road | Port Perry | ON | L9L 1B6 | (905)-985-5211 | worksinfo@scugogfirstnation.com |
| Chippewas of Georgina Island First Nation | Chief | Donna | Big Canoe | Chief | R.R. #2 Box N-13 | Sutton West | ON | L0E 1R0 | | donna.bigcanoe@georginaisland.com |
| | Ms | Natasha | Charles | Community Consultation Worker | R.R. #2 Box N-13 | Sutton West | ON | L0E 1R0 | | natasha.charles@georginaisland.com |
| | Mr. | James L. | Porte | Consultation Worker | R.R. #2 Box N-13 | Sutton West | ON | L0E 1R0 | 705-437-1337 | jl.porte@georginaisland.com |
| Chippewas of Rama First Nation | Chief | Ted | Williams | Chief | 5884 Rama Rd., Suite 200 | Rama | ON | L3V 6H6 | | chief@ramafirstnation.ca |
| | Mr. | Ben | Benson | Community Consultation Worker | 5884 Rama Rd., Suite 200 | Rama | ON | L3V 6H6 | (705)-325-3611 ext 1633 | Consultation@ramafirstnation.ca AND https://www.ramafirstnation.ca/rama-research-ethics-and-community-consultation/ (web portal) |
| Beausoleil First Nation | Chief | Joanne P | Sandy | Chief | 11 O'Gemaa Miikaan | Christian Island | ON | L9M 0A9 | | bfnchief@chimnissing.ca; tanyaroote@chimnissing.ca |
| | Ms. | Jane | Copegog | | 11 O'Gemaa Miikaan | Christian Island | ON | L9M 0A9 | (705) 247-8981 Ext. 256 or (705) 247-2051 | jcopegog@chimnissing.ca |
| Ardoch Algonquin First Nation | Ms. | Mirelle | Lapointe | Family Head's Council Spokesperson | 524 Centerville Road | Westport, Rideau Lakes | ON | K0G 1X0 | 613-273-3530 | aafn@bell.net |
| Huron-Wendat Nation | Sir/Madam | | | Ontario Consultation Team | 255 Rue Chef Michel-Laveau | Wendake | ON | G0A 4V0 | | |
| Metis Nation of Ontario | Sir/Madam | | | Regional Consultation Committee | Suite 1100-66 Slater Street | Ottawa | ON | K1P 5H1 | | |
| Kawartha Nishawbe | Sir/Madam | | | Kawartha Nishawbe Council | | | | | | kawarthanishnawbecouncil@outlook.com |
| | Councillor | Nodin | Webb | Kawartha Nishawbe Council | | | | | | nodin.webb@hotmail.com |
| | Councillor | Sam | Harvey | Kawartha Nishawbe Council | | | | | | samgharvey@live.com |
| | Councillor | Jack | Hoggarth | Kawartha Nishawbe Council | | | | | | giiwednang@hotmail.com |
| | Sir/Madam | | | Williams Treaty First Nations | | | | | | inquiries@williamstreatiesfirstnations.ca |
| Algonquins of Pikwàkanagàn | | Alanna | Hein | Manager, Political Operations | | | | | | chiefcouncil@pikwakanagan.ca |
| Mohawks of the Bay of Quinte | Chief | R. Donald | Maracle | | | | | | | rdonm@mbq-tmt.org |
| Algonquins of Ontario | Madam | Janette | Stabinga | Executive Director Consultations Office Algonquins of Ontario | 31 Riverside Drive Suite 101 | Pembroke | ON | K8A 8R6 | | |

# Appendix B – Notification Letters

# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT
## NOTICE OF INTENT



The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decomission, rehabilitate or replace the existing dam within the next five years.

The study team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects. The Class EA process includes public, governing agency, stakeholders and Indigeous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

Input received will be incorporated into the planning and design process for this project and will be received until **June 23rd, 2023.** If you wish to be involved in this study or receive information, please contact one of the project representatives identified below. Additional consultation opportunities will be made available as the study progresses. Subject to comments received and the receipt of necessary approvals, MVCA intends to proceed with the planning and design as defined in the Class Environmental Assessment process. For further details pertainig to the Kashwakamak Lake Dam and Class EA, please visit the MVCA website: https://mvc.on.ca/current-initiatives/kash-class-ea/.

For further information on this project please contact the following:

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

*Comments submitted to the MVCA for the purpose of providing feedback regarding this Class Environmental Assessment are collected under the authority of the Environmental Assessment Act. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.*

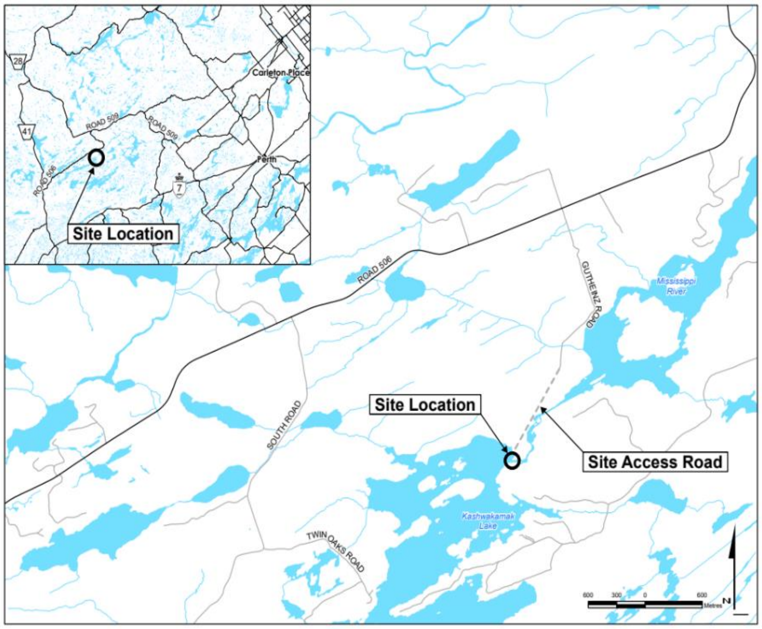
This notice issued **May 25th and June 1st, 2023**

Mississippi Valley
Conservation Authority

# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT
# NOTICE OF PUBLIC INFORMATION CENTRE

The Mississippi Valley Conservation Authority (MVCA) is undertaking a Class Environmental Assessment (EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decommission, rehabilitate or replace the existing dam within the next five years.

The study team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.



**Virtual Public Information Centre (PIC)**
**May 23, 2024**
**4 – 6 pm**

**Visit MVCA's website for the Zoom link and call in details:**
**[mvc.on.ca/current-initiatives/kash-class-ea](mvc.on.ca/current-initiatives/kash-class-ea)**

The purpose of the PIC is to share information and receive input from the public on study findings to date, including the EA study process, existing conditions, proposed alternative solutions, and identify the recommended Technically Preferred Alternative. The **presentation will commence at 4:10 pm** and will be followed by a question-and-answer period. The PIC presentation will be recorded and posted at **mvc.on.ca/current-initiatives/kash-class-ea** following the meeting.

Comments will be received until **June 20, 2024.**

For more information and to submit comments, contact:

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.
Project Manager
Egis
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
lisa.marshall@egis-group.com

*Comments submitted to the MVCA for the purpose of providing feedback regarding this Class Environmental Assessment are collected under the authority of the Environmental Assessment Act. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.*

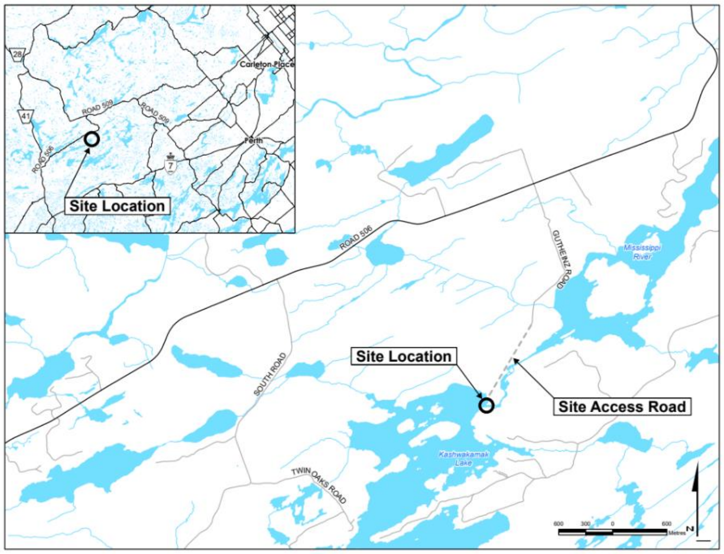
This notice was issued on **May 2nd, 2024.**

Mississippi Valley Conservation Authority

# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT
# NOTICE OF COMPLETION

The Mississippi Valley Conservation Authority (MVCA) has completed a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, located in the Township of North Frontenac along the main channel of the Mississippi River. A Project File Report (PFR) has been prepared in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Based on the findings of the study and extensive consultation with agencies, stakeholders, First Nations, the Community Liaison Committee, and the public, MVCA is proposing to replace the existing Kashwakamak Lake Dam at the same location, maintaining a similar alignment to that of the current dam. The new dam will be designed to handle larger flood events, be resilient to climate change, and comply with current dam safety standards.



The PFR is being placed on public record for a 30-day review period from November 14th to Decemeber 16th, 2024. The PFR is available for review through the MVCA website at: https://mvc.on.ca/current-initiatives/kash-class-ea/. You may provide written comments to the Project Team by December 16th, 2024 from the date of this notice.

Juraj Cunderlik, PhD., P.Eng., Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng., Consultant Project Manager
Egis
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
lisa.marshall@egis-group.com

In addition, a request to the Minister of the Environment, Conservation and Parks (MECP) may be made for: a) an order imposing additional conditions or b) declaring the project a Part II.3 project (i.e., requiring a comprehensive environmental assessment) on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests should include your full name and contact information. Requests should specify what kind of order is being requested (additional conditions or declaring the project a Part II.3 project), explain how an order may prevent, mitigate or remedy potential adverse impacts, and include any supporting information.

The request should be sent in writing or by email to MECP:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
77 Bay Street, 5th Floor
Toronto, ON M7A 2J3
Minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto, ON M4V 1P5
EABDirector@ontario.ca

Requests should also be sent to the MVCA by mail or e-mail. Please visit the Ministry's website for more information on requests for orders under section 16 of the Environmental Assessment Act at: https://www.ontario.ca/page/class-environmental-assessments-part-ii-order. Prior to making such a request, concerned parties are encouraged to speak with the MVCA to seek a resolution of their concerns. Subject to any Section 16 Orders or Section 16 Order requests, MVCA may proceed to implement the project without further public notice 30 days following the expiry date of the comment period specified in this notice.

Comments submitted to the MVCA for the purpose of providing feedback regarding this Class Environmental Assessment are collected under the authority of the Environmental Assessment Act. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

This notice issued **November 14th, 2024**

# Appendix C – Agencies and Stakeholders Consultation

**Lisa Marshall**

---

From: Juraj Cunderlik
Sent: May 29, 2023 2:06 PM
To: [redacted]Lisa Marshall
Subject: RE: Kashwakamak Dam project

Hello [redacted],

Thank you for your email and interest in this project, we will add your information to our project contact list.

Best Regards,

Juraj M. Cunderlik, Ph.D., P.Eng. | Director, Engineering
Mississippi Valley Conservation Authority | 10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 233 |  f. 613 253 0122 | jcunderlik@mvc.on.ca

---

From: [redacted]
Sent: May 27, 2023 7:44 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; l.marshall@mcintoshperry.com
Cc: [redacted]
Subject: Kashwakamak Dam project

I am interested in being informed of all developments on the Kashwakamak Lake dam project, including the ongoing class environmental assessment.

My background on Kash starts in 1962 when my family purchased from the crown 5 waterfront lots located on what is now Browns Bay Lane, I have been the owner of one of these lots since 1987, the other 4 properties are still owned by my family members.  I am very familiar with Kashwakamak Lake and have been fortunate enough to spend 60 years of my life affiliated with it.

I would like to be involved in this project and receive information on the Class EA.

Please forward any information to my email address: [redacted]

[redacted]

Sent from Outlook

**From:** Lisa Marshall
**Sent:** June 1, 2023 10:34 AM
**To:** [redacted]
**Cc:** Juraj Cunderlik; Ramy Saadeldin; Lauren Walker
**Subject:** RE: Kashwakamak Dam assessment/project

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

Hello Conor,

Thank you for your email and interest in this project, we will add your information to our project contact list.

Best Regards,
Lisa Marshall

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY
*Turning Possibilities Into Reality*

-----Original Message-----
From: [redacted]
Sent: May 31, 2023 1:27 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Kashwakamak Dam assessment/project

[redacted]

Hello,

I would like to receive information, when available, as this study and design plan progresses.

Best regards,
[redacted]

Sent from my iPhone

# Lisa Marshall

From: Lisa Marshall
Sent: June 5, 2023 8:59 AM
To: [redacted]
Cc: [redacted] Juraj Cunderlik; Ramy Saadeldin; Lauren Walker
Subject: RE: KLA Update: Important information about our dam – June 23 deadline

Follow Up Flag: Follow up
Flag Status: Flagged

Hello [redacted]

Thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment. We appreciate your input into this study.

As part of the Environmental Assessment process, we are required to identify and evaluate various alternative solutions for the Kashwakamak Lake Dam to ensure that MVCA has done their due diligence. During the evaluation, we are to identify all potential impacts such as changes in water elevations and ensure that each impact can be mitigated so that the preferred alternative does not cause an adverse impact to the surrounding environment. With respect to "decommissioning", this alternative could consist of decommissioning the existing dam and relocating downstream, creating a passive system, etc. Through this assignment, we will be required to undertake a hydraulic analysis of each alternative solution to verify the impacts on water elevations. However, there is a Provincial mandate that states that any viable dam decommissioning option cannot cause (or make worse) flooding on upstream or downstream properties. Our technical analysis will have to demonstrate that this is the case, regardless of the preferred alternative moving forward.

We are currently in the early stages of this assignment. We have added your information to our project contact list and will keep you updated as the project progresses.

Best Regards,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY
*Turning Possibilities Into Reality*

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From: [redacted]
Sent: June 1, 2023 9:38 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: [redacted]
Subject: FW: KLA Update: Important information about our dam – June 23 deadline

> You don't often get email from [redacted] Learn why this is important

Good morning

I received the communication below from [redacted] The links provided cited you as the appropriate contacts for input into the process going forward.

We have been cottaging on Kashwakamak Lake since 1989. We are members of the KLA and appreciate everything it does to support a healthy and safe environment on “Kash”. My purpose in writing to you is to request clarification on what exactly the mandate is pursuant to the Notice of Intent issued by the MVCA. The second link below (the “current initiatives” material) contains the following language:

“In 2021-22, a comprehensive Dam Safety Review (DSR) was carried out for the dam in accordance with the Canadian Dam Association (CDA) dam safety guidelines and best practices summarized in the technical bulletins of the Ministry of Natural Resources' Lakes and Rivers Improvement Act. The DSR concluded that the dam concrete structures are in poor condition and did not meet the current dam safety standards. The structures were determined to have inadequate freeboard under both Normal and Inflow Design Flood (IDF) conditions. The 2022 DSR study also increased the Hazard Potential Classification (HPC) for the Kashwakamak Lake Dam to HIGH.

In response, MVCA has initiated the multi-year, multi-phase dam replacement project for the Kashwakamak Lake Dam. The new dam will mitigate flood and drought risks to downstream communities, safeguard natural heritage features, and ensure recreational opportunities on Kashwakamak Lake are maintained under a changing climate.”

The Notice of Intent (the first link below), however, contains the following language:

“The deteriorating condition of the dam necessitates that a decision be made on whether to decommission (sic), rehabilitate or replace the existing dam within the next five years.”

The clarification I am looking for is to understand what is meant by the option to “decommission” the existing dam. If you are not replacing or rehabilitating it, then it would appear that “decommission” means shutting it down and no longer having a functional structure to control the lake levels during the year. If that is the case, and the water level is established at the current high-water mark throughout the year, hundreds of docks (including ours!) will be wiped out by ice breaking up in the spring. If the water level is established at the current low-water mark throughout the year hundreds of docks will no longer be functional and the lake will become hazardous to navigate. If the water level is established at somewhere between the current high and low-level marks, we will be faced with the worst of both worlds.

If you could provide some clarification on this, it would be much appreciated.

Sincerely,

[redacted]

---

From: [redacted]
Sent: Wednesday, May 31, 2023 10:52 PM
To: [redacted]
Subject: KLA Update: Important information about our dam – June 23 deadline

Dear Member,

Environmental Assessment of our Dam

We received this important information from the Mississippi Valley Conservation Authority (MVCA) regarding the Notice of Intent for an environmental assessment of our dam. We have until June 23 to give input.

Please go to this link on our website for more information:
https://kashwakamak.ca/kashwakamak-lake-dam-environmental-assessment-notice-of-intent/

https://mvc.on.ca/current-initiatives/kash-class-ea/

Save the date! AGM & BBQ – Saturday July 8

Mark your calendars and plan to attend our upcoming AGM – Saturday July 8 10:00 – 11:30 am at the Lions Hall. More information to follow.

Thank you for your continued support for the KLA. We appreciate it. As always, feel free to contact me with any questions or concerns. Any membership questions should go to [redacted]

Best regards,

[redacted]

[redacted]

The linked image cannot be displayed. The file may have been moved, renamed, or deleted. Verify that the link points to the correct file and location.

[redacted]

Kashwakamak Lake

membership@kashwakamak.ca

**416.704.9436 – home**

**613.336.2374 - cottage**

To unsubscribe from future KLA email messages, please reply to membership@kashwakamak.ca and put Unsubscribe in the title.

---

Virus-free.www.avast.com

From: [redacted]
Sent: June 6, 2023 9:29 AM
To: Juraj Cunderlik; Lisa Marshall
Cc: [redacted] Ramy Saadeldin; Lauren Walker
Subject: Re: KLA Update: Important information about our dam – June 23 deadline

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [redacted] Learn why this is important

Thank you Juraj.  That answers our question. We look forward to seeing how the process unwinds going forward.

Get Outlook for Android

From: Orpana, Jon (MECP)
Sent: June 14, 2023 3:17 PM
To: Juraj Cunderlik
Cc: Lisa Marshall; Sacilotto, Roberto (MECP)
Subject: KASHWAKAMAK LAKE DAM Notice of Intent
Attachments: fjo_CO_CA_EA_Mississippi Valley CA_Kashwakamak_LakeDam_2023.pdf; Supporting Attachment - Proponent's Intro to Delegation of Procedural Aspects of Consultation with Aboriginal Communities.docx; Supporting Attachment - Species at Risk Proponents Guide to Preliminary Screening (Draft May 2019).pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Juraj Cunderlik,

Please find MECP's preliminary comments on the above mentioned file.

Also enclosed and attached are some resources and hyperlinks for you to consider regarding the study and consultation phase of your EA.

Regards,

Jon

Jon K. Orpana hear name
Regional Environmental Planner
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
Kingston Regional Office
PO Box 22032, 1259 Gardiners Road
Kingston, Ontario
K7M 8S5

Phone: (613) 548-6918
Fax: (613) 548-6908
Email: jon.orpana@ontario.ca

| | |
|---|---|
| **Ministry of the Environment,<br>Conservation and Parks** | **Ministère de l’Environnement,<br>de la Protection de la nature<br>et des Parcs** |
| Environmental Assessment<br>Branch | Direction des évaluations<br>environnementales |
| 1st Floor<br>135 St. Clair Avenue W<br>Toronto ON  M4V 1P5<br>**Tel.**:   416 314-8001<br>**Fax**.:   416 314-8452 | Rez-de-chaussée<br>135, avenue St. Clair Ouest<br>Toronto ON  M4V 1P5<br>**Tél.** :   416 314-8001<br>**Téléc.** :  416 314-8452 |

June 14, 2023

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
jcunderlik@mvc.on.ca

BY EMAIL ONLY

Re:

**KASHWAKAMAK LAKE DAM**
**Class Environmental Assessment for Remedial Flood and Erosion Control Projects**
**Acknowledgement of Notice of Intent**

Dear Juraj Cunderlik,

This letter is in response to the Notice of Intent for the above noted project issued May 25th, 2023. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Conservation Authority (proponent) has indicated that the study is following the approved environmental planning process for a project under the Class Environmental Assessment (Class EA) for Remedial Flood and Erosion Control Projects under the Ontario *Environmental Assessment Act*.

The **updated (August 2022)** attached “Areas of Interest” document provides guidance regarding the ministry’s interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document**

**relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- **Alderville First Nation**
- **Curve Lake First Nation**
- **Hiawatha First Nation**
- **Mississaugas of Scugog Island First Nation**

**For the above Williams Treaties communities, please cc Karry Sandy McKenzie, William Treaties First Nations Process Co-ordinator, inquiries@williamstreatiesfirstnations.ca**

- **Algonquins of Ontario (AOO)**
- **Algonquins of Algonquins of Pikwàkanagàn First Nation (AOP)**
- **Kawartha Nishnawbe**
- **Mohawks of the Bay of Quinte**

**If the proponent has undertaken archeological studies and are required to undertake any work related to archeological resources, they should also include:**

- **Huron-Wendat**

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

**Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.**

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances after initial discussions with the communities identified by the MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an impasse; or
- A Section 16 Order (formerly Part II Order) request is expected based on impacts to Aboriginal or treaty rights.

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

**Please ensure a copy of the final notice is sent to the ministry's Eastern Region EA notification email account (eanotification.eregion@ontario.ca). Depending on the documentation process that is followed, a Project Plan or an Environmental Study Report will be prepared and the draft and final copies should be made available for the MECP upon request.**

Should you or any members of your project team have any questions regarding the material above, please contact me at jon.orpana@ontario.ca.

Sincerely,

Jon Orpana

Regional Environmental Planner – Eastern Region
Project Review Unit, Environmental Assessment Branch

Cc: Roberto Sacilotto, Compliance Supervisor, Kingston District Office, MECP
Eastern Region Roberto.sacilotto@ontario.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
l.marshall@mcintoshperry.com

Enclosed: Areas of Interest

Attached: Client's Guide to Preliminary Screening for Species at Risk

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

**AREAS OF INTEREST (v. August 2022)**

*It is suggested that you check off each section after you have considered / addressed it.*

## ☐ Planning and Policy

- Applicable plans and policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
    - Projects located in MECP Central, Eastern or West Central Region may be subject to **A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020)**.
    - Projects located in MECP Central or Eastern Region may be subject to the **Oak Ridges Moraine Conservation Plan (2017)** or the **Lake Simcoe Protection Plan (2014)**.
    - Projects located in MECP Central, Southwest or West Central Region may be subject to the **Niagara Escarpment Plan (2017)**.
    - Projects located in MECP Central, Eastern, Southwest or West Central Region may be subject to the **Greenbelt Plan (2017)**.
    - Projects located in MECP Northern Region may be subject to the **Growth Plan for Northern Ontario (2011).**

- The **Provincial Policy Statement (2020)** contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.

- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

## ☐ Source Water Protection

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e.

systems that are not municipal residential systems). Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.

- If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if this project is occurring within a vulnerable area, proponents can use Source Protection Information Atlas, which is an online mapping tool available to the public. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the “Map Legend” bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

☐ **Climate Change**

The document "Considering Climate Change in the Environmental Assessment Process" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

  1. Consider during the assessment of alternative solutions and alternative designs, the following:
     a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
     b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
  2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

☐ **Air Quality, Dust and Noise**

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**

- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:

    - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
    - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
    - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
    - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

☐ **Ecosystem Protection and Restoration**

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
    - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
    - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
    - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, for projects located in Central Region you may consider the provisions of the Rouge Park Management Plan if applicable.

☐ **Species at Risk**

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario’s Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at https://www.ontario.ca/page/species-risk.

- The Client’s Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to SAR consideration and subsequent permit requirements it is highly recommended that the consultant/proponent contact SAROntario@ontario.ca.

☐ **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

    - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
    - Watershed information, drainage conditions, and other relevant background information
    - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
    - Information on maintenance and monitoring commitments.

- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the *Ontario Water Resources Act* (OWRA) will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

☐ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.

- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

☐ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit https://www.ontario.ca/page/handling-excess-soil.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance document titled “Management of Excess Soil – A Guide for Best Management Practices” (2014).

- All waste generated during construction must be disposed of in accordance with ministry requirements

☐ **Contaminated Sites**

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the MECP’s D-4 guideline for land use considerations near landfills and dumps.
    - Resources available may include regional/local municipal official plans and data; provincial data on large landfill sites and small landfill sites; Environmental Compliance Approval information for waste disposal sites on Access Environment.

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada’s website).

- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry’s Spills Action Centre must be contacted in such an event.

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

☐ **Servicing, Utilities and Facilities**

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.

- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's environmental land use planning guides to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

☐ **Mitigation and Monitoring**

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section 3.9 of the Class EA for Remedial Flood and Erosion Control Projects parent document.

☐ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

☐ **Class EA Process**

- When it is determined that formal Conservation Authority involvement is required to address a problem involving existing development which is at risk from flooding or erosion, an evaluation of possible alternative solutions shall be completed, and the Conservation Authority will initiate the Class EA process. Once the preferred alternative method of carrying out the undertaking is selected, then it will be subjected to a more detailed study of the net impacts likely to be associated with implementation as previously determined.

    - A Project Plan (PP) is prepared for remedial works for which it has been demonstrated that there are no negative impacts or outstanding concerns held by the Conservation Authority or reviewers.

    - An Environmental Study Report (ESR) is prepared for projects for which it has been demonstrated that negative impacts will occur, and tradeoffs must be made, in choosing among alternative methods of carrying out the proposed remedial work. An ESR may also be prepared in response to concerns that arise in the preparation and/or review of a PP.

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.

- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and to reference any relevant information in the report.

**Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020**

Once the report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address.

The public can request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Section 16 Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16 Order requests on those matters should be addressed in writing to:

Minister David Piccini
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

# A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

## DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

**Aboriginal communities** – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

**Consultation** – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

**Crown** – the Ontario Crown, acting through a particular ministry or ministries.

**Procedural aspects of consultation** – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

**Proponent** – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

## I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

## II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

## III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

## IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

### a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;

- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

### b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;

- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

### c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

## V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;

- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

## VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

# *Client's Guide to Preliminary Screening for Species at Risk*

***Ministry of the Environment, Conservation and Parks***

***Species at Risk Branch, Permissions and Compliance***

***DRAFT - May 2019***

# Table of Contents

# 1.0 Purpose, Scope, Background and Context

## 1.1 Purpose of this Guide

This guide has been created to:

- help clients better understand their obligation to gather information and complete a preliminary screening for species at risk before contacting the ministry,
- outline guidance and advice clients can expect to receive from the ministry at the preliminary screening stage,
- help clients understand how they can gather information about species at risk by accessing publicly available information housed by the Government of Ontario, and
- provide a list of other potential sources of species at risk information that exist outside the Government of Ontario.

It remains the client's responsibility to:

- carry out a preliminary screening for their projects,
- obtain best available information from all applicable information sources,
- conduct any necessary field studies or inventories to identify and confirm the presence or absence of species at risk or their habitat,
- consider any potential impacts to species at risk that a proposed activity might cause, and
- comply with the *Endangered Species Act* (ESA).

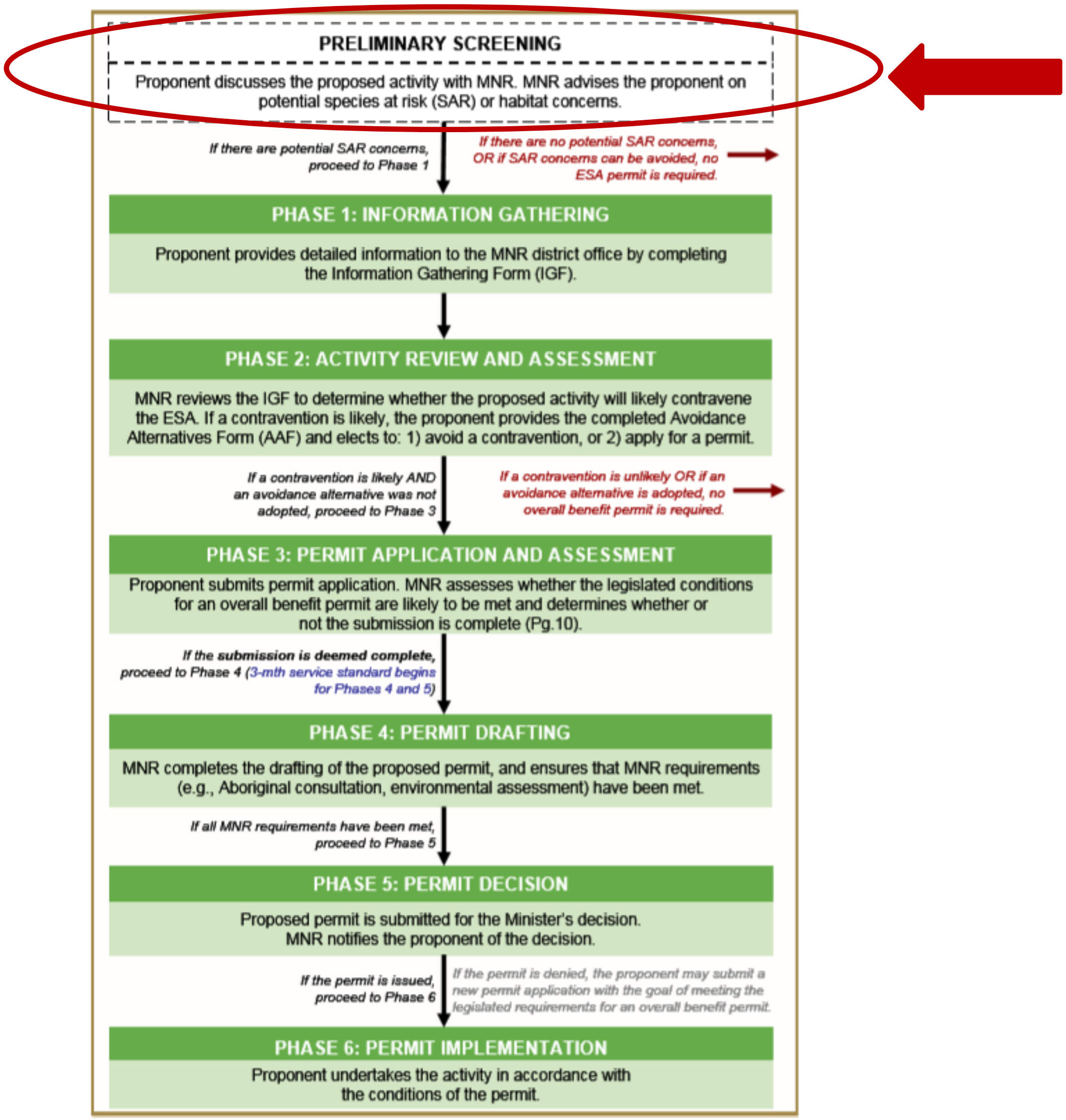
**To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide, at a minimum, prior to contacting Government of Ontario ministry offices for further information or advice.**

## 1.2 Scope

This guide is a resource for clients seeking to understand if their activity is likely to impact species at risk or if they are likely to trigger the need for an authorization under the ESA. It is not intended to circumvent any detailed site surveys that may be necessary to document species at risk or their habitat nor to circumvent the need to assess the impacts of a proposed activity on species at risk or their habitat. This guide is not an exhaustive list of available information sources for any given area as the availability of information on species at risk and their habitat varies across the province. This guide is intended to support projects and activities carried out on Crown and private land, by private landowners, businesses, other provincial ministries and agencies, or municipal government.

### 1.3 Background and Context

To receive advice on their proposed activity, clients must first determine whether any species at risk or their habitat exist or are likely to exist at or near their proposed activity, and whether their proposed activity is likely to contravene the ESA. Once this step is complete, clients may contact the ministry at SAROntario@ontario.ca to discuss the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. At this stage, the ministry can provide advice and guidance to the client about potential species at risk or habitat concerns, measures that the client is considering to avoid adverse effects on species at risk or their habitat and whether additional field surveys are advisable. This is referred to as the "Preliminary Screening" stage. For more information on additional phases in the diagram below, please refer to the *Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits* policy available online at https://www.ontario.ca/page/species-risk-overall-benefit-permits



**PRELIMINARY SCREENING**

Proponent discusses the proposed activity with MNR. MNR advises the proponent on potential species at risk (SAR) or habitat concerns.

*If there are potential SAR concerns, proceed to Phase 1*

*If there are no potential SAR concerns, OR if SAR concerns can be avoided, no ESA permit is required.*

**PHASE 1: INFORMATION GATHERING**

Proponent provides detailed information to the MNR district office by completing the Information Gathering Form (IGF).

**PHASE 2: ACTIVITY REVIEW AND ASSESSMENT**

MNR reviews the IGF to determine whether the proposed activity will likely contravene the ESA. If a contravention is likely, the proponent provides the completed Avoidance Alternatives Form (AAF) and elects to: 1) avoid a contravention, or 2) apply for a permit.

*If a contravention is likely AND an avoidance alternative was not adopted, proceed to Phase 3*

*If a contravention is unlikely OR if an avoidance alternative is adopted, no overall benefit permit is required.*

**PHASE 3: PERMIT APPLICATION AND ASSESSMENT**

Proponent submits permit application. MNR assesses whether the legislated conditions for an overall benefit permit are likely to be met and determines whether or not the submission is complete (Pg.10).

*If the **submission is deemed complete**, proceed to Phase 4 (3-mth service standard begins for Phases 4 and 5)*

**PHASE 4: PERMIT DRAFTING**

MNR completes the drafting of the proposed permit, and ensures that MNR requirements (e.g., Aboriginal consultation, environmental assessment) have been met.

*If all MNR requirements have been met, proceed to Phase 5*

**PHASE 5: PERMIT DECISION**

Proposed permit is submitted for the Minister's decision. MNR notifies the proponent of the decision.

*If the permit is issued, proceed to Phase 6*

*If the permit is denied, the proponent may submit a new permit application with the goal of meeting the legislated requirements for an overall benefit permit.*

**PHASE 6: PERMIT IMPLEMENTATION**

Proponent undertakes the activity in accordance with the conditions of the permit.

## 2.0 Roles and Responsibilities

To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide prior to contacting Government of Ontario ministry offices for further information or advice.

**Step 1:** Client seeks information regarding species at risk or their habitat that exist, or are likely to exist, at or near their proposed activity by referring to all applicable information sources identified in this guide.

**Step 2:** Client reviews and consider guidance on whether their proposed activity is likely to contravene the ESA (see section 3.4 of this guide for guidance on what to consider).

**Step 3:** Client gathers information identified in the checklist in section 4 of this guide.

**Step 4:** Client contacts the ministry at SAROntario@ontario.ca to discuss their preliminary screening. Ministry staff will ask the client questions about the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. Ministry staff will also ask the client for their interpretation of the impacts of their activity on species at risk or their habitat as well as measures the client has considered to avoid any adverse impacts.

**Step 5:** Ministry staff will provide advice on next steps.

**Option A:** Ministry staff may advise the client they can proceed with their activity without an authorization under the ESA where the ministry is confident that:

- no protected species at risk or habitats are likely to be present at or near the proposed location of the activity; or
- protected species at risk or habitats are known to be present but the activity is not likely to contravene the ESA; or
- through the adoption of avoidance measures, the modified activity is not likely to contravene the ESA.

**Option B:** Ministry staff may advise the client to proceed to Phase 1 of the overall benefit permitting process (i.e. Information Gathering in the previous diagram), where:

- there is uncertainty as to whether any protected species at risk or habitats are present at or near the proposed location of the activity; or
- the potential impacts of the proposed activity are uncertain; or
- ministry staff anticipate the proposed activity is likely to contravene the ESA.

## 3.0 Information Sources

Land Information Ontario (LIO) and the Natural Heritage Information Centre (NHIC) maintain and provide information about species at risk, as well as related information about fisheries, wildlife, crown lands, protected lands and more. This information is made available to organizations, private individuals, consultants, and developers through online sources and is often considered under various pieces of legislation or as part of regulatory approvals and planning processes.

The information available from LIO or NHIC and the sources listed in this guide should not be considered as a substitute for site visits and appropriate field surveys. Generally, this information can be regarded as a starting point from which to conduct further field surveys, if needed. While this data represents best available current information, it is important to note that a lack of information for a site does not mean that species at risk or their habitat are not present. There are many areas where the Government of Ontario does not currently have information, especially in more remote parts of the province. The absence of species at risk location data at or near your site does not necessarily mean no species at risk are present at that location. On-site assessments can better verify site conditions, identify and confirm presence of species at risk and/or their habitats.

Information on the location (i.e. observations and occurrences) of species at risk is considered sensitive and therefore publicly available only on a 1km square grid as opposed to as a detailed point on a map. This generalized information can help you understand which species at risk are in the general vicinity of your proposed activity and can help inform field level studies you may want to undertake to confirm the presence, or absence of species at risk at or near your site.

Should you require specific and detailed information pertaining to species at risk observations and occurrences at or near your site on a finer geographic scale; you will be required to demonstrate your need to access this information, to complete data sensitivity training and to obtain a Sensitive Data Use License from the NHIC. Information on how to obtain a license can be found online at https://www.ontario.ca/page/get-natural-heritage-information.

Many organizations (e.g. other Ontario ministries, municipalities, conservation authorities) have ongoing licensing to access this data so be sure to check if your organization has this access and consult this data as part of your preliminary screening if your organization already has a license.

## 3.1 Make a Map: Natural Heritage Areas

The Make a Natural Heritage Area Map (available online at http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US provides public access to natural heritage information, including species at risk, without the user needing to have Geographic Information System (GIS) capability. It allows users to view and identify generalized species at risk information, mark areas of interest, and create and print a custom map directly from the web application. The tool also shows topographic information such as roads, rivers, contours and municipal boundaries.

Users are advised that sensitive information has been removed from the natural areas dataset and the occurrences of species at risk has been generalized to a 1-kilometre grid to mitigate the risks to the species (e.g. illegal harvest, habitat disturbance, poaching).

The web-based mapping tool displays natural heritage data, including:

- Generalized Species at risk occurrence data (based on a 1-km square grid),
- Natural Heritage Information Centre data.

Data cannot be downloaded directly from this web map; however, information included in this application is available digitally through Land Information Ontario (LIO) at https://www.ontario.ca/page/land-information-ontario.

## 3.2 Land Information Ontario (LIO)

Most natural heritage data is publicly available. This data is managed in a large provincial corporate database called the LIO Warehouse and can be accessed online through the LIO Metadata Management Tool at https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home. This tool provides descriptive information about the characteristics, quality and context of the data. Publicly available geospatial data can be downloaded directly from this site.

While most data are publicly available, some data may be considered highly sensitive (i.e. nursery areas for fish, species at risk observations) and as such, access to some data maybe restricted.

## 3.3 Additional Species at Risk Information Sources

- The Breeding Bird Atlas can be accessed online at http://www.birdsontario.org/atlas/index.jsp?lang=en
- eBird can be accessed online at https://ebird.org/home
- iNaturalist can be accessed online at https://www.inaturalist.org/
- The Ontario Reptile and Amphibian Atlas can be accessed online at https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas
- Your local Conservation Authority. Information to help you find your local Conservation Authority can be accessed online at https://conservationontario.ca/conservation-authorities/find-a-conservation-authority/

  Local naturalist groups or other similar community-based organizations
- Local Indigenous communities
- Local land trusts or other similar Environmental Non-Government Organizations
- Field level studies to identify if species at risk, or their habitat, are likely present or absent at or near the site.
- When an activity is proposed within one of the continuous caribou ranges, please be sure to consider the caribou Range Management Policy. This policy includes figures and maps of the continuous caribou range, can be found online at https://www.ontario.ca/page/range-management-policy-support-woodland-caribou-conservation-and-recovery

## 3.4 Information Sources to Support Impact Assessments

- Guidance to help you understand if your activity is likely to adversely impact species at risk or their habitat can be found online at https://www.ontario.ca/page/policy-guidance-harm-and-harass-under-endangered-species-act and https://www.ontario.ca/page/categorizing-and-protecting-habitat-under-endangered-species-act
- A list of species at risk in Ontario is available online at https://www.ontario.ca/page/species-risk-ontario. On this webpage, you can find out more about each species, including where is lives, what threatens it and any specific habitat protections that apply to it by clicking on the photo of the species.

## 4.0 Check-List

Please feel free to use the check list below to help you confirm you have explored all applicable information sources and to support your discussion with Ministry staff at the preliminary screening stage.

- ✓ Land Information Ontario (LIO)
- ✓ Natural Heritage Information Centre (NHIC)
- ✓ The Breeding Bird Atlas
- ✓ eBird
- ✓ iNaturalist
- ✓ Ontario Reptile and Amphibian Atlas
- ✓ List Conservation Authorities you contacted:_____________________________________

  ______________________________________________________________________________
- ✓ List local naturalist groups you contacted:________________________________________

  ______________________________________________________________________________
- ✓ List local Indigenous communities you contacted:_________________________________

  ______________________________________________________________________________
- ✓ List any other local land trusts or Environmental Non-Government Organizations you contacted:___________________________________________________________________

  ______________________________________________________________________________
- ✓ List and field studies that were conducted to identify species at risk, or their habitat, likely to be present or absent at or near the site: ______________________________________

  ______________________________________________________________________________
- ✓ List what you think the likely impacts of your activity are on species at risk and their habitat (e.g. damage or destruction of habitat, killing, harming or harassing species at risk):_______________________________________________________________________

  ______________________________________________________________________________

| | |
|---|---|
| From: | Harvey, Joseph (MCM) <Joseph.Harvey@ontario.ca> |
| Sent: | June 14, 2023 2:29 PM |
| To: | marshall@mcintoshperry.com |
| Cc: | Juraj Cunderlik; Lauren Walker; Orpana, Jon (MECP) |
| Subject: | FW: File 0019272: Notice of Intent – Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, Township of North Frontenac |
| Attachments: | MVCA_Kashwakamak Dam Notice of Intent_Final May 2023.pdf; 2023-06-14-KashwakamakLakeDam-MCM-Ltr.pdf |
| Follow Up Flag: | Follow up |
| Flag Status: | Flagged |

Lisa Marshall,

Please find attached our initial advice on the above referenced undertaking.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please continue to send any notices, report and/or documentation to both Karla Barboza and myself.

Please do not hesitate to contact me with any questions or concerns.

Regards,

**Joseph Harvey | Heritage Planner**
**Citizenship, Inclusion and Heritage Division | Heritage Branch | Heritage Planning Unit**
**Ministry of Citizenship and Multiculturalism**
613.242.3743
**Joseph.Harvey@ontario.ca**

---

From: Lauren Walker <l.walker@mcintoshperry.com>
Sent: May-25-23 11:06 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Cc: Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Notice of Intent – Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, Township of North Frontenac

Good morning,

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. Study details and the study area are available in the enclosed notice.

The study team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

If you have any comments or questions regarding this study, please contact one of the project team members noted in the attached notice by June 23, 2023.

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

**Lauren Walker**

**Environmental Planner/Cultural Heritage Lead**
**C.** 226.791.2070
l.walker@mcintoshperry.com | www.mcintoshperry.com

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**Ministry of Citizenship and Multiculturalism**

Heritage Planning Unit
Heritage Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Tel.: 613.242.3743

**Ministère des Affaires civiques et du Multiculturalisme**

Unité de la planification relative au patrimoine
Direction du patrimoine
Division des affaires civiques, de l'inclusion et du patrimoine
Tél.: 613.242.3743

Ontario

June 14, 2023 EMAIL ONLY

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3 Carp,
Ontario, K0A 1L0
marshall@mcintoshperry.com

**MCM File : 0019272**
**Proponent : Mississippi Valley Conservation Authority (MVCA)**
**Subject : Class Environmental Assessment for Remedial Flood and Erosion Control Projects – Notice of Intent**
**Project : Kashwakamak Lake Dam**
**Location : Township of North Frontenac, Frontenac County**

---

Dear Lisa Marshall:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Intent for the above-referenced project.

MCM's interest in this project relates to its mandate of conserving Ontario's cultural heritage which includes archaeological resources, built heritage resources and cultural heritage landscapes.

This letter provides advice on how to adrress cultural heritage in the planning and design process of the above Class EA and outlines the technical studies required to address cultural heritage resources that could be impacted by the project.

**Project Summary**
The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decomission, rehabilitate or replace the existing dam within the next five years. The study is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Project.

## Identifying Cultural Heritage Resources

While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation.

Please note that the *Standards and Guidelines for Conservation of Provincial Heritage Properties* (S&Gs), prepared pursuant to Section 25.2 of the *Ontario Heritage Act* (*OHA*), came into effect on July 1, 2010. All Ontario government ministries and public bodies that are prescribed under Ontario Regulation 157/10 must comply with the S&Gs. They apply to property that is owned or controlled by the Crown in right of Ontario or by a prescribed public body.

## Archaeological Resources

The subject property meets the provincial criteria for archaeological potential because it is within 300m of Lake Kashwakamak. Please refer to the MCM's screening checklist: Criteria for Evaluating Archaeological Potential, particularly to question 9, regarding present or past water sources. We note that our review was limited to the above-mentioned question, and that the property may also meet other screening criteria (e.g., questions 4 and 5 regarding Indigenous knowledge, question 6 regarding burial sites and cemeteries).

An archaeological assessment of the entire project study area (including temporary storage, staging and working areas, temporary and working areas) is required. The assessment shall be undertaken by an archaeologist licensed under the *Ontario Heritage Act*, who will submit the report directly to MCM for review.

Please be aware that archaeological concerns have not been fully addressed until reports have been entered into the Ontario Public Register of Archaeological Reports where those reports recommend that:

1. the archaeological assessment of the project area is complete and
2. all archaeological sites identified by the assessment are either of no further cultural heritage value or interest (as per Section 48(3) of the *Ontario Heritage Act*) or that mitigation of impacts has been accomplished through excavation or an avoidance and protection strategy.

Proponents should wait to receive the MCM's review letter indicating that the report(s) has been entered into the Register before issuing a decision or proceeding with any ground disturbing activities.

The notice indicates that the dam may be decommissioned, rehabilitated, or replaced. Please be advised that a marine archaeological assessment would need to be undertaken in the case of future in-water construction activities. For more information, please refer to MCM's screening checklist: Criteria for Evaluating Marine Archaeological Potential.

## Built Heritage Resources and Cultural Heritage Landscapes

The notice indicates that the Kashwakamak Lake Dam is more than 100 years old. It is important to note that any structure which is 40 years or older may contain cultural heritage value or interest and be considered a built heritage resource. A Cultural Heritage Evaluation Report (CHER) is required and shall be undertaken by a qualified person.

If the Kashwakamak Lake Dam is determined to be of cultural heritage value or interest and alterations or development is proposed, a Heritage Impact Assessment (HIA), prepared by a qualified person, shall be completed to assess potential project impacts.

The CHER (and HIA, if recommended) will be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed.

Please submit the CHER (and HIA, if recommended) to MCM Heritage Planning Unit and other interested parties for review and comment.

**Environmental Assessment Reporting**

The proponent should summarize the findings of the above-mentioned studies, if any, and add all the documentation to the EA documentation as part of the planning and design process of the Class EA. The outcomes and recommendations of the technical cultural heritage studies should be included in the EA documentation and will form the basis for any future commitments.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please remove Laura Hatcher and Dan Minkin from your contact list and send any notices, report and/or documentation to both Karla Barboza and myself.

- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | karla.barboza@ontario.ca
- Joseph Harvey, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 613-242-3743 | joseph.harvey@ontario.ca

Thank you for consulting MCM on this project and please continue to do so throughout the EA process. Please provide a response to our letter, updating on the status of any technical cultural heritage studies (e.g., archaeological assessment, cultural heritage evaluation report, heritage impact assessment) being undertaken by August 14, 2023. If you have any questions or require clarification, please do not hesitate to contact me.

Sincerely,

Joseph Harvey
Heritage Planner
Heritage Planning Unit
joseph.harvey@Ontario.ca

Copied to: Juraj Cunderlik, Director, Engineering, Mississippi Valley Conservation Authority
Lauren Walker, Environmental Planner/Cultural Heritage Lead, McIntosh Perry Consulting Engineers Ltd.
Jon Orpana, Environmental Resource Planner & EA Coordinator, MECP

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

From: Juraj Cunderlik
Sent: June 14, 2023 10:34 AM
To: [redacted]
Cc: Lisa Marshall
Subject: RE: Kashwakamak Lake Dam

[redacted]

Decommissioning means that the dam would be replaced by a passive water control system (such as an overflow weir). While the Class EA will evaluate pros and cons of all alternatives (including decommissioning), it is important to understand that Kashwakamak Dam plays a key function in MVCA's water management program and consequently any alternative that cannot maintain current lake operation will most likely not be identified as the preferred solution for the project.

Hope this helps, please let me know if you have any other questions.

Juraj

Juraj M. Cunderlik, Ph.D., P.Eng. | Director, Engineering
Mississippi Valley Conservation Authority | 10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | t. 613 253 0006 ext. 233 | f. 613 253 0122 | jcunderlik@mvc.on.ca

From: [redacted]
Sent: June 14, 2023 10:16 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Subject: Re: Kashwakamak Lake Dam

Thank you for your response. I do have a general question about 'decommissioning' a dam - what does this involve?

[redacted]

On Wed, Jun 14, 2023 at 8:36 AM Juraj Cunderlik <jcunderlik@mvc.on.ca> wrote:

> Hello [redacted],

Comments on the Kashwakamak Class EA can be submitted to us in an email.

Please let us know if you have any questions about the project; we would be happy to provide you with additional information or discuss any concerns you may have.

Regards,

Juraj

From: [redacted]
Sent: June 14, 2023 8:25 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Subject: Kashwakamak Lake Dam

Hello:

I would like to submit comments regarding the environmental assessment of the Kashwakamak Lake Dam. Do I do that directly to you in an email, or is there a more formal process to capture my perspectives?

Thank you.

[redacted]

From: Lisa Marshall
Sent: June 13, 2023 1:11 PM
To: [redacted]
Cc: Juraj Cunderlik; [redacted] Lauren Walker
Subject: RE: Kashwakamak Dam Environmental Assessment

Follow Up Flag: Follow up
Flag Status: Flagged

Hello [redacted]

It was nice speaking with you yesterday afternoon and thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment.

We are currently in the early stages of this assignment and are in the process of completing preliminary studies and investigations. As the project progress, additional information will be posted on the MVCA web page for viewing, as well as other opportunities to provide comments. At this time, we are providing an opportunity to the public to provide any initial comments, concerns, or input into the study.

We have added your information to our project contact list and will keep you updated as the project progresses. You will be notified of future milestone events including the Notice of Public Information Centre and Notice of Study Completion.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
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-----Original Message-----
From: [redacted]
Sent: June 12, 2023 5:19 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca> [redacted]
Subject: Kashwakamak Dam Environmental Assessment

[redacted]

Hi Lisa,

Thank you for providing additional background on the Kashwakamak Dam EA and the stages for public input.

As mentioned, I am a long-time property owner at the east end of this lake and, like all the lake community, I am vitally interested in the future of this dam and its operations.

I am also a director of the Kashwakamak Lake Association. We will have the opportunity at a board meeting on Tuesday evening to discuss our initial concerns about the dam and how we can participate in this EA. That will give us ample time to prepare a response to your call for initial comments by June 23.

Best regards

[redacted]

## Lisa Marshall

From: Lisa Marshall
Sent: June 28, 2023 9:45 AM
To: [redacted]
Cc: [redacted] Lauren Walker; Juraj Cunderlik; Ramy Saadeldin
Subject: RE: KLA's Submission - Kashwakamak Lake Dam Environmental Assessment

Follow Up Flag: Follow up
Flag Status: Flagged

Hello [redacted]

Thank you for submitting the Kashwakamak Lake Association (KLA) formal comments pertaining to the Kashwakamak Lake Dam Environmental Assessment. MVCA and MP will ensure we take into consideration KLA three priorities as we progress through the Environmental Assessment process.

We are currently in the early stages of this assignment and are in the process of completing preliminary studies and investigations. As the project progress, additional information will be posted on the MVCA web page for viewing, as well as other opportunities to provide comments.

We have added the contacts provided in your response letter to our project contact list and will keep you updated as the project progresses. All parties will be notified of future milestone events including the Notice of Public Information Centre and Notice of Study Completion.

We would like to thank KLA for their assistance on continuing to share and post notices and in identifying others cottagers/property owners interested in receiving direct communications on this study.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
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From: [redacted]
Sent: June 23, 2023 12:17 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: [redacted]

[redacted]

Subject: KLA's Submission - Kashwakamak Lake Dam Environmental Assessment

> You don't often get email from suemacgregor48@gmail.com. Learn why this is important

Hi,

Please find attached the formal submission on behalf of the Kashwakamak Lake Association (KLA) in response to the Notice of Intent regarding the Class Environmental Assessment of the Kashwakmak Lake Dam.

Don’t hesitate to get back to me if you have any questions.

Best regards,

[redacted]

Kashwakamak Lake

Kashwakamak Lake

*June 22, 2023*

Ms. Lisa Marshall, P. Eng.

Project Manager

McIntosh Perry Consulting Engineers Ltd.

115 Walgreen Road, R.R.3

Carp, Ontario

K0A 1L0

**Re: Kashwakamak Lake Dam Environmental Assessment**

Dear Ms. Marshall,

The Mississippi Valley Conservation Authority (MVCA) is conducting a Class Environment Assessment (EA) of the future of the Kashwakamak Lake Dam to determine whether to "decommission, rehabilitate or replace" the existing dam within the next five years. I am writing as President of the Kashwakamak Lake Association (KLA) in response to the call by the MVCA for initial comments on the planning and design of this EA.

The KLA directly represents 367 properties on Kashwakamak Lake and is vitally interested in this study. Specifically, we have three priorities: (1) ensuring that the high-water level continues to be maintained for the recreational and transportation use of residents and businesses on the lake; (2) ensuring that the work process is managed in such a way as to minimize disruption to the lake's property owners; and (3) ensuring that the concerns of the members of our association and the broader lake community are communicated to the MVCA. These are discussed in more detail below.

**Maintaining the High-Water Level of the Lake**

The current high-water level on Kashwakamak Lake was established over 100 years ago when the original dam at the eastern end of the lake was rebuilt. This dam maintains the high-water "recreational" level from the May long weekend to October, making small adjustments as needed. The dam also allows the water level to be lowered by approximately 4 to 6 feet in late October and raised again in mid-April to provide the capacity to minimize spring flooding downstream.

Over the past century, residents and businesses on the lake have invested in the construction of residences, docks, water access routes and commercial opportunities based on the current high-water level. As a result, any material change in this high-water level would cause a great deal of hardship and material financial harm to these residents and businesses. Property owners abutting areas of the lake which flooded when the dam was originally built would be particularly affected by any substantial lowering of the lake since they would lose direct access to navigable water. The KLA believes that the dam is essential for maintaining the current high-water "recreational" level and therefore submits that the option of decommissioning the dam is not feasible.

## Minimizing Disruption during the Refurbishing or Rebuilding Process

Whether it is decided to rehabilitate or replace the dam, it is crucial that the work process be conducted in a way that minimizes disruption to lake residents and businesses who rely on the high-water level for boat access during the recreational season.

It is therefore preferable that work be conducted during the low water period from late October to mid April. If it is necessary to extend the low water period to permit work later in the spring or earlier in the fall, it is absolutely crucial that timely notice be provided.

## Participation in the Environmental Assessment

The MVCA has already reached out to the KLA by sending us its Notice of Intent dated June 1, 2023. This has been posted on the KLA's web site, emailed to our members and, discussed at a recent board meeting. This Notice and the KLA's initial response will also be discussed at the KLA's upcoming Annual General Meeting on July 8.

The KLA has also posted this Notice on its Facebook Site which reaches over 3018 people. Many are cottagers and permanent lake residents, local residents, local contractors and business owners in the area, visitors and family members of owners on the lake.

The KLA understands that the MVCA's call for submission by June 23, 2023 is only the first of a number of planned opportunities to comment on this EA. The KLA requests that it continue to receive further notices and reports on the study as it proceeds, as well as any other related information prepared by the MVCA. These should be directed to the following directors of the KLA: [redacted] The KLA will continue to share and post these notices and also seek to identify other interested lake residents wishing to receive direct communications on this study.

In conclusion, I would like to stress the high importance of this project to the Kashwakamak Lake community and emphasize the KLA's willingness to participate as fully as possible with the MVCA and its consultants, McIntosh Perry.

Yours sincerely,

[redacted]

Kashwakamak Lake

From: [redacted]
Sent: June 21, 2023 3:25 PM
To: Juraj Cunderlik; Lisa Marshall
Cc: [redacted]
Subject: FW: Kashwakamak Lake Dam Environmental Assessment

Importance: High

Follow Up Flag: Follow up
Flag Status: Completed

You don't often get email from [redacted] Learn why this is important

Hello Juraj and Lisa,

My sister, [redacted] and I co-own a cottage on Kashwakamak Lake and have just become aware of this environmental assessment. Although I have looked at the MVCA website, I can't seem to find anywhere to submit input or any survey for us to complete. Given that the deadline for input is June 23, If there are documents or links we can use to provide input, could you please direct me to them by forwarding the link ASAP or mailing any pertinent materials to my home address listed below. Thank you.

[redacted]

In the meantime, without having access to any additional information, our position would be that totally removing the dam would be disastrous for the lake. The current dam controls the water levels & maintains the water level for both the safety and the enjoyment of the hundreds of people who either live or own seasonal cottages on the lake. The environmental and economic ramifications of totally removing the dam would be huge. In addition, decommissioning it would eventually lead to similar outcomes so our assessment would be that the dam needs to be replaced.

Sincerely,

[redacted]

From: Info <info@mvc.on.ca>
Sent: June 21, 2023 3:46 PM
To: Juraj Cunderlik
Cc: Lisa Marshall
Subject: FW: Kashwakamak Lake Environmental Assessment

Importance: High

You don't often get email from info@mvc.on.ca. Learn why this is important

---

From: [redacted]
Sent: June 21, 2023 3:38 PM
To: Info <info@mvc.on.ca>
Cc: [redacted]
Subject: FW: Kashwakamak Lake Environmental Assessment
Importance: High

To Whom it May Concern,

I sent the time-sensitive message below to Juraj Cunderlik and have discovered he is unable to access email at this time. His automated reply gives your email address.

Please ensure that the input listed below is included in the assessment and any needed materials are forwarded to the home address provided, or the email listed above. I would like to register my concern that I suspect many people who own seasonal cottages on Kashwakamak Lake were unaware of this assessment & to truly give people time for input, it would have been best to mail something to all property owners on the lake. I'm sure the township office could have provided that information for you as we all pay hefty taxes.
Thank you.

PS Juraj has an incorrect email address listed on his automated response, so this is the second message I have tried to send. Other people may have the same problem. Perhaps you should extend the input period for the Kashwakamak Lake Assessment.

**Time Sensitive Message:**

Hello Juraj and Lisa,
My sister and I co-own a cottage on Kashwakamak Lake and have just become aware of this environmental assessment. Although I have looked at the MVCA website, I can't seem to find anywhere to submit input or any survey for us to complete. Given that the deadline for input is June 23, If there are documents or links we can use to provide input, could you please direct me to them by forwarding the link ASAP or mailing any pertinent materials to the address listed below.  Thank you.

[redacted]

In the meantime, without having access to any additional information, our position would be that totally removing the dam would be disastrous for the lake. The current dam controls the water levels & maintains the water level for both the safety and the enjoyment of the hundreds of people who either live or own seasonal cottages on the lake. The environmental and economic ramifications of totally removing the dam would be huge. In addition, decommissioning it would eventually lead to similar outcomes so our assessment would be that the dam needs to be replaced.

Sincerely,

[redacted]

From: Juraj Cunderlik
Sent: June 19, 2023 12:34 PM
To: [redacted]
Cc: Lisa Marshall
Subject: RE: Kashwakamak Lake Dam Class Environmental Assessment

Hell[redacted]

Thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment.

We are currently in the early stages of this assignment and are in the process of completing preliminary studies and investigations. As the project progress, additional information will be posted on the MVCA web page for viewing, as well as other opportunities to provide comments.

We have added your information to our project contact list and will keep you updated as the project progresses. You will be notified of future milestone events including the Notice of Public Information Centre and Notice of Study Completion.

Thank you,

Juraj

---

From: [redacted]
Sent: June 19, 2023 11:22 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Subject: Kashwakamak Lake Dam Class Environmental Assessment

Good morning,

As an individual cottage owner on Kashwakamak Lake, I would like to be involve in the study and/or receive information on the assessment. Please let me know if I can be of any assistance.

[redacted]

Sent from Mail for Windows

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From: Juraj Cunderlik
Sent: June 19, 2023 8:05 AM
To: [redacted]
Cc: Lisa Marshall
Subject: RE: KASHWAKAMAK LAKE DAM,CLASS ENVIRONMENTAL ASSESSMENT,NOTICE OF INTENT

Hello [redacted]

Thank you for your email and interest in this project, we will add your information to our contact list so that you can receive future project updates.

Best Regards,

Juraj

-----Original Message-----
From [redacted]
Sent: June 16, 2023 11:10 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Subject: KASHWAKAMAK LAKE DAM,CLASS ENVIRONMENTAL ASSESSMENT,NOTICE OF INTENT

Hi Juraj

I would like to receive any information related to this project as it becomes available.

[redacted]

From: Jane Cho <jcho@mvc.on.ca>
Sent: July 4, 2023 11:06 AM
To: Lisa Marshall
Cc: Lauren Walker
Subject: FW: KASHWAKAMAK LAKE DAM Notice of Intent

Hi Lisa,

My apologies, I did not include you in the correspondence with MECP. I reached out to Jon K. Orpana to clarify contact information and indigenous communication for additional indigenous groups (Algonquins of Pikwàkanagàn First Nation, Mohawks of the Bay of Quinte, Kawartha Nishnawbe) identified by MECP. Here is a response from MECP. Please let me know if you have any questions.

Thank you,
Jane

---

From: Dennie, Shannon (MECP) <Shannon.Dennie@ontario.ca>
Sent: June 21, 2023 2:46 PM
To: Jane Cho <jcho@mvc.on.ca>; Orpana, Jon (MECP) <Jon.Orpana@ontario.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Subject: RE: KASHWAKAMAK LAKE DAM Notice of Intent

Good afternoon Jane,

Thank you for your inquiry. With respect to the Williams Treaties First Nation's coordinator, what you have described below, to forward your previous correspondence would be sufficient. I would then just cc' them moving forward.
To note, you will most likely get a bounce back from the inquiries@williamstreatiesfirstnations.ca address. Sometimes emails get through, and for some unknown reason they don't. Ontario's direction is still to cc them, and so I would suggest you continue and include this information in your record of consultation.

With respect to Kawartha Nishnawbe, these are the most up-to-date contacts. There is currently no formal Chief for the community, but there still exists a collective leadership. Again, the recommendation would be that you keep a good record of consultation that demonstrates your attempts to share the information and follow-up.
I would advise to send the correspondence to the first email with a cc to the additional ones below:

Kawartha Nishawbe Council, kawarthanishnawbecouncil@outlook.com
Nodin Webb, Councilor, nodin.webb@hotmail.com
Sam Harvey, Councilor, samgharvey@live.com
Jack Hoggarth, giiwednang@hotmail.com

Let me know if you have any questions, I am always happy to discuss.
Thanks and happy National Indigenous Peoples Day!
Shannon

Shannon Dennie | Senior Advisor, Outreach and Program Support | Environmental Assessment and Permissions Division | Ministry of the Environment, Conservation and Parks | 705-280-5931 | Shannon.Dennie@ontario.ca

*Please note: If you have any accommodation needs or require communication supports or alternate formats, please let me know. Si vous avez des besoins en matière d'adaptation, ou si vous nécessitez des aides à la communication ou des médias substituts, veuillez me le faire savoir.*

---

From: Orpana, Jon (MECP) <Jon.Orpana@ontario.ca>
Sent: June 21, 2023 1:31 PM
To: Jane Cho <jcho@mvc.on.ca>; Dennie, Shannon (MECP) <Shannon.Dennie@ontario.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Subject: RE: KASHWAKAMAK LAKE DAM Notice of Intent

Hi there Jane,

By way of this email I have forwarded your enquiry to our Senior Indigenous Advisor who advises on such matters.

Thank you for your enquiry.

Jon

Jon K. Orpana hear name
Regional Environmental Planner
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
Kingston Regional Office
PO Box 22032, 1259 Gardiners Road
Kingston, Ontario
K7M 8S5

Phone: (613) 548-6918
Fax: (613) 548-6908
Email: jon.orpana@ontario.ca

---

From: Jane Cho <jcho@mvc.on.ca>
Sent: June 21, 2023 12:45 PM
To: Orpana, Jon (MECP) <Jon.Orpana@ontario.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Subject: RE: KASHWAKAMAK LAKE DAM Notice of Intent

Hi Jon,

I have some questions regarding the consultation to indigenous communities.

As per your letter dated June 14, 2023, nine (9) indigenous communities were identified for consultation. As part of our initial consultation process for Class Environmental Assessment, we circulated our Notice of Intent to six indigenous communities that are already identified in your letter. Specifically, for those Williams Treaties communities, we are asked to cc Karry Sandy McKenzie, William Treaties First Nations Process Co-ordinator. Would forwarding a copy of our initial email correspondences to Karry Sandy McKenzie be sufficient for now and cc her for future correspondences?

It seems that Kawartha Nishnawbe First Nation does not have their website. Could you please provide the contact information?

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

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From: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Sent: June 14, 2023 3:24 PM
To: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Cc: Jane Cho <jcho@mvc.on.ca>; Sally McIntyre <smcintyre@mvc.on.ca>
Subject: FW: KASHWAKAMAK LAKE DAM Notice of Intent

---

From: Orpana, Jon (MECP) <Jon.Orpana@ontario.ca>
Sent: June 14, 2023 3:17 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Cc: Lisa Marshall <l.marshall@mcintoshperry.com>; Sacilotto, Roberto (MECP) <Roberto.Sacilotto@ontario.ca>
Subject: KASHWAKAMAK LAKE DAM Notice of Intent

Dear Juraj Cunderlik,

Please find MECP’s preliminary comments on the above mentioned file.

Also enclosed and attached are some resources and hyperlinks for you to consider regarding the study and consultation phase of your EA.

Regards,

Jon

Jon K. Orpana hear name
Regional Environmental Planner
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks

Kingston Regional Office
PO Box 22032, 1259 Gardiners Road
Kingston, Ontario
K7M 8S5

Phone: (613) 548-6918
Fax: (613) 548-6908
Email: jon.orpana@ontario.ca

From: Ramy SaadeIdin <rsaadeldin@mvc.on.ca>
Sent: June 27, 2023 3:39 PM
To: Lisa Marshall; Juraj Cunderlik
Subject: Fwd: Hydro One Response: 20230627-NoticeOfCommence-Kashwakamak Lake Dam
Attachments: 20230627-NoticeOfCommence-Kashwakamak Lake Dam.pdf

Hi Lisa,

Not sure if you have received the attached response.

It would be great to pls provide a summary of the responses by our next progress meeting that can be updated as we receive more responses.

Thank you, Ramy

-----Original Message-----
From: SUN Hongxia <Susan.SUN@HydroOne.com> On Behalf Of SECONDARY LAND USE Department
Sent: June 27, 2023 10:17 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Cc: SECONDARY LAND USE Department <Department.SecondaryLandUse@hydroone.com>
Subject: Hydro One Response: 20230627-NoticeOfCommence-Kashwakamak Lake Dam

Please see the attached for Hydro One's Response.

Hydro One Networks Inc

SecondaryLandUse@HydroOne.com

**Hydro One Networks Inc.**

483 Bay Street
8th Floor South Tower
Toronto, Ontario M5G 2P5

HydroOne.com

June 27, 2023

Re: Kashwakamak Lake Dam

Attention:
Juraj Cunderlik, Ph.D., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority

Thank you for sending us notification regarding (Kashwakamak Lake Dam). In our preliminary assessment, we confirm there are no existing Hydro One Transmission assets in the subject area. Please be advised that this is only a preliminary assessment based on current information.

If plans for the undertaking change or the study area expands beyond that shown, please contact Hydro One to assess impacts of existing or future planned electricity infrastructure.

Any future communications are sent to Secondarylanduse@hydroone.com.

Be advised that any changes to lot grading and/or drainage within proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor.

Sent on behalf of,

***Secondary Land Use***
***Asset Optimization***
***Strategy & Integrated Planning***
***Hydro One Networks Inc.***

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**From:** Lisa Marshall
**Sent:** June 19, 2023 9:27 AM
**To:** [redacted]
**Cc:** Michael Fenton; Juraj Cunderlik; Lauren Walker
**Subject:** RE: Kashwakamak Dam project

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

Hello [redacted],

Thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment.

We are currently in the early stages of this assignment and are in the process of completing preliminary studies and investigations. As the project progress, additional information will be posted on the MVCA web page for viewing, as well as other opportunities to provide comments.

We have added your information to our project contact list and will keep you updated as the project progresses. You will be notified of future milestone events including the Notice of Public Information Centre and Notice of Study Completion.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
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-----Original Message-----
From: [redacted]
Sent: June 17, 2023 9:19 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: [redacted]
Subject: Kashwakamak Dam project

[redacted]

Hello
We are property owners on Lake Kashwakamak and would like to be involved in the current Class EA and/or receive information about activities underway.
Sincerely
[redacted]

---

From: Lisa Marshall
Sent: July 10, 2023 12:01 PM
To: Jody.Marks@ontario.ca
Cc: Ramy Saadeldin; Juraj Cunderlik; Lauren Walker
Subject: RE: Notice of Intent – Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, Township of North Frontenac

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Hi Jody,

Thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment.

We are currently in the early stages of this assignment and are in the process of completing preliminary studies and investigations. As the project progress, additional information will be posted on the MVCA web page for viewing, as well as other opportunities to provide comments.

We will ensure that MNRF is kept updated as the project progresses. You will be notified of future milestone events including the Notice of Public Information Centre and Notice of Study Completion.

Thank you.

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

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From: Marks, Jody (MNRF) <Jody.Marks@ontario.ca>
Sent: July 7, 2023 3:26 PM
To: l.walker@mcintoshperry.com; Juraj Cunderlik <jcunderlik@mvc.on.ca>
Subject: RE: Notice of Intent – Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, Township of North Frontenac

Hello Juraj Cunderlik,

Thank you for circulating the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment to the Ministry of Natural Resources and Forestry. We are interested in receiving future correspondence regarding consultation opportunities as the study progresses. Please update your project contact list to include my contact information as the lead MNRF staff.

I sincerely apologise for the tardiness of this reply.

Thank you.

Jody Marks *(her/she)*
Regional Planner
Land Use Planning and Strategic Issues Section | Southern Region |
Ministry of Natural Resources and Forestry (MNRF)
| (249) 733-1376 | jody.marks@ontario.ca

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From: Lauren Walker <l.walker@mcintoshperry.com>
Sent: May 25, 2023 11:06 AM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Cc: Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Notice of Intent – Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam, Township of North Frontenac

Good morning,

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. Study details and the study area are available in the enclosed notice.

The study team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

If you have any comments or questions regarding this study, please contact one of the project team members noted in the attached notice by June 23, 2023.

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

**Lauren Walker**
**Environmental Planner/Cultural Heritage Lead**
C. 226.791.2070
l.walker@mcintoshperry.com | www.mcintoshperry.com

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From: suemacgregor48@gmail.com
Sent: July 23, 2023 4:24 PM
To: Lisa Marshall
Cc: [redacted]
Subject: KLA's Follow-up response re: Kashwakamak Lake Dam Environmental Assessment
Attachments: Second KLA Response to Kash Dam EA_7.23.23.pdf

You don't often get email from [redacted] Learn why this is important

Hi Lisa,

I apologize for the delay in sending this to you. We had a Board change over after our AGM which took up a bit of time. Please find attached, our follow-up response to our initial letter regarding the Kashwakamak Lake Dam Environmental Assessment. In addition, a new [redacted] is also sitting on our "Dam Committee" and he would like to be added to your list, [redacted]

Many thanks,

[redacted]

Kashwakamak Lake

Kashwakamak Lake

*July 23, 2023*

Ms. Lisa Marshall, P. Eng.
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, Ontario
K0A 1L0

**Re: Kashwakamak Lake Dam Environmental Assessment**

Dear Lisa,

The Kashwakamak Dam EA and the initial response of the KLA were discussed at our Annual General Meeting on Saturday July 8, 2023. The members present expressed their great interest in this project and strongly endorsed our three priorities of maintaining the lake's high-water level, minimizing disruption during the work period and continued consultation throughout the study process.

One new point was made that we did not cover in initial response, is how the project would be funded. Given the importance of the Kashwakamak Lake dam to the entire Mississippi Valley water system, the project is of benefit to all the municipalities downstream. I would appreciate if you could let me know how this project would be funded.

Also, the following KLA members asked that they be added to your list for notices, reports and further communications:

[redacted]

Thank you once again for keeping us involved in this important study.

Yours sincerely,

[redacted]

**Lisa Marshall**

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| | |
|---|---|
| From: | Lisa Marshall |
| Sent: | June 6, 2023 1:03 PM |
| To: | [redacted] |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lauren Walker |
| Subject: | Kashwakamak Dam Class EA |

| | |
|---|---|
| Follow Up Flag: | Follow up |
| Flag Status: | Flagged |

Hello [redacted]

Thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment.

We are currently in the early stages of this assignment and are in the process of completing preliminary studies and investigations.  As the project progress, additional information will be posted on the MVCA web page for viewing, as well as other opportunities to provide comments. At this time, we are providing an opportunity to the public to provide any initial comments, concerns, or input into the study.

We have added your information to our project contact list and will keep you updated as the project progresses. You will be notified of future milestone events including the Notice of Public Information Centre and Notice of Study Completion.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
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From: [redacted]
Sent: June 6, 2023 7:29 AM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Kashwakamak Dam Class EA

> You don't often get email from karl.vankessel@amico.build. Learn why this is important

Hello Lisa,

I have a cottage on Kash and received notice of your Class EA through the KLA, including a link to the Notice of Intent and the MVCA project page. I note that the Notice requests input by June 23, but I could not find any documentation on the MVCA web page to review. Is there any information available for review? If so, please send it to me or direct me to where I can get it online. Thank-you.

I would appreciate if you could add me to your project mailing list.

Thank-you,

[redacted]

[redacted]

## Lisa Marshall

From: Lisa Marshall
Sent: August 16, 2023 8:28 AM
To: [redacted]
Cc: Lauren Walker
Subject: RE: Kashwakamak Dam Environmental Assessment

Hello [redacted],

Currently, we are still in the process of completing our existing conditions inventories. We are also hoping to circulate more information pertaining to the Community Liaison Committee within the week. Just finalizing a few details.

As for your below questions, I will need to defer back to MVCA. The MVCA Project Manager is currently on vacation, but I will follow up with him early next week to obtain responses to the below questions.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

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From: [redacted]
Sent: August 14, 2023 10:37 AM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Kashwakamak Dam Environmental Assessment

> You don't often get email from [redacted]

Hi Lisa,

As you suggested, while you were on holiday I reached out to your colleagues for an update on the Kash Dam study. Attached is the exchange I had subsequently with Lauren Walker.

The KLA Board is meeting August 22 and will select our representative and alternate for the proposed Community Liaison Committee.

Have there been any other developments I could share with the KLA board?

There are two questions that have raised by fellow cottagers which you may be able to answer at this time:

1. How will the project be financed and what portion of the cost will be allocated to the municipality of North Frontenac?

2. Will there be any additional improvements to the dam beyond restoring its basic function, such as improving the site around the dam or incorporating a small power generating station?

Thanks,

[redacted]

Begin forwarded message:

**From:** Lauren Walker <l.walker@mcintoshperry.com>
**Subject: RE: Kashwakamak Dam Environmental Assessment**
**Date:** August 2, 2023 at 10:22:55 AM EDT
**To:** [redacted]
[redacted]

Good morning [redacted]

Yes, absolutely. We will include the ability to send an alternate in the Terms of Reference.

Thanks again, and we will reach out soon,

-Lauren

**Lauren Walker**
**Environmental Planner/Cultural Heritage Lead**
**C.** 226.791.2070
l.walker@mcintoshperry.com | www.mcintoshperry.com

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From: [redacted]
Sent: August 2, 2023 9:55 AM
To: Lauren Walker <l.walker@mcintoshperry.com>
Cc: [redacted]
Subject: Re: Kashwakamak Dam Environmental Assessment

Hi Lauren

Thanks for the quick response.

The formation of a Citizens Liaison Committee is a great idea. The KLA board is meeting later this month and will appoint a representative.

One question: would it be possible to appoint an alternate as well?This would be helpful if our rep. cannot make a CLC meeting in person or on Zoom.

[redacted]

On Tue, Aug 1, 2023 at 3:56 PM Lauren Walker <l.walker@mcintoshperry.com> wrote:

> Good afternoon [redacted]
>
> Thank you for touching base and for your continued interest in the Kashwakamak Lake Dam Environmental Assessment.

Given the level of interest in this project, the MVCA has decided to form a Community Liaison Committee (CLC) to provide opportunities for stakeholders to meet with the project team, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. One member of the CLC will be chosen to represent the interests of Kashwakamak Lake Association. This could be you or another member chosen by the KLA.

We are currently in the process of preparing a Terms of Reference for the CLC, and will distribute it to everyone on the contact list once it is ready, in order to recruit participants.

If you have any further questions or concerns, please don't hesitate to reach out.

Please say hello to the cottaging community, and have a great weekend,

-Lauren

**Lauren Walker**
**Environmental Planner/Cultural Heritage Lead**
**C.** 226.791.2070
l.walker@mcintoshperry.com | www.mcintoshperry.com

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From: [redacted]
Sent: August 1, 2023 9:19 AM
To: Jeff King <j.king@mcintoshperry.com>; Jennifer Cavanagh <j.cavanagh@mcintoshperry.com>
Subject: Fwd: Kashwakamak Dam Environmental Assessment

Hi [redacted]

I am a cottager on Lake Kashwakamak and a director of our lake association. I have volunteered to keep our association up to date on the Kash Dam EA. I was in touch with Lisa Marshall in June and drafted our association's initial response which we sent you recently.

I just sent this note to Lisa asking for an update. She indicated she's on holiday till August 8 and suggested I reach out to you while she's away.

Is there anything you can tell me that I can share with my fellow cottagers when I see them this weekend?

Thanks,

[redacted]

Begin forwarded message:

**From:** [redacted]
**Subject: Kashwakamak Dam EA Study**
**Date:** August 1, 2023 at 8:31:50 AM EDT
**To:** Lisa Marshall <l.marshall@mcintoshperry.com>

Hi Lisa,

I will be seeing various cottagers on our lake this coming weekend. Have there been any developments on the Kash Dam study that I can share with them?

One question that arose at the KLA AGM in June was how the cost of the new work is to be allocated among the affected municipalities, particularly North Frontenac. Any initial observations on this point?

Thanks,

[redacted]

From: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Sent: March 11, 2024 12:37 PM
To: [redacted]
Cc: Lisa Marshall; MARSHALL Lisa; Jane Cho
Subject: RE: Kashwakamak Lake Dam Class EA

Follow Up Flag: Follow up
Flag Status: Flagged

Good Afternoon [redacted]

Thank you for reaching out and your interest in the Kashwakamak Class EA project. Your email comes in good timing as we are preparing a Public Information Centre (PIC) for the project later next month – a first major project milestone.

We will make sure to add you to our project contact list.

Lisa, Jane: FYI, please add Merrill to our list.

Regards,

Juraj

Juraj M. Cunderlik, Ph.D., P.Eng. | Director, Engineering
Mississippi Valley Conservation Authority | 10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 233 |  f. 613 253 0122 | jcunderlik@mvc.on.ca

Mississippi Valley Conservation Authority

-----Original Message-----
From: [redacted]
Sent: March 10, 2024 2:25 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Subject: Kashwakamak Lake Dam Class EA

Hello Juraj, wondering if there has been any update on the "EA" for the Kashwakamak lake dam.

Could I be put on a notification list once the web site has been updated.

As a member of the OFAH Fisheries Advisory Committee and the FMZ 18 council , I would be interested to see if there would be and impact on the fish and wildlife habitat .

thanks for your time

[redacted]

--
This email has been checked for viruses by Avast antivirus software.
www.avast.com

## Lisa Marshall

| | |
|---|---|
| From: | Lisa Marshall |
| Sent: | June 5, 2023 1:55 PM |
| To: | Lauren Walker |
| Subject: | FW: Voice Mail (1 minute and 1 second) |
| Attachments: | audio.mp3 |

Hi Lauren,

Can you log the below phone message. MVCA called [redacted] back today and left a message.

Thank you

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
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From: +1 613-301-4810 <+16133014810>
Sent: June 1, 2023 3:02 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Voice Mail (1 minute and 1 second)

Hello, this is a message for Lisa Marshall. It's [redacted] calling. I am one of the cottages on Lake Cash Mackinac, and we're at [redacted] So near the East End of the lake. And I understand from an e-mail that we got today that there's going to be a study on the dam at the East End of the lake. And I understand that there's three options. There's replace, rehabilitate or decommission. And I'm wondering if you could elaborate on what decommission, if that ends up being the direction that you go, if it's decommissioned, what does that mean and what are the implications of that particular decision if it comes to that? My cell phone number is my best point of contact, [redacted] Thank you.

You received a voice mail from [redacted]

---

**Lisa Marshall**

---

From: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Sent: August 29, 2023 2:12 PM
To: [redacted]
Cc: Lisa Marshall; Sally McIntyre; Jane Cho
Subject: RE: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members

Hi [redacted]

This is to confirm that your email has been received and thanks for expressing your interest in joining the CLC.

Cheers,
Ramy Saadeldin, Ph.D., P.Eng., PMP
Mississippi Valley Conservation Authority | 10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 236 | c. 905 394 0446 | f. 613 253 0122 | rsaadeldin@mvc.on.ca

Mississippi Valley
Conservation Authority

---

From: [redacted]
Sent: August 29, 2023 2:09 PM
To: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Cc: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: RE: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members

Hello Ramy,

As requested by Lisa, I am writing to express my interest in becoming a CLC member for the Kashwakamak Lake Dam Class EA.
I can meet all the obligations of the Terms of Reference.
Please let me know if you require any additional information.

Regards,

[redacted]

Sent from Mail for Windows

From: Lisa Marshall
Sent: August 25, 2023 12:54 PM
Subject: Kashwakamak Lake Dam Class EA - Call for Community Liaison CommitteeMembers

Hello [redacted],

The MVCA is establishing a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). The purpose of the CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. MVCA is seeking up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam to form part of the committee. More information regarding the role and responsibilities of the CLC can be found in the attached Terms of Reference.

Proposed Schedule:

Expression of Interest by: September 29th, 2023

MVCA/McIntosh Perry Inform Selected Members of Committee and next steps by: October 6th, 2023

CLC Meeting #1: Week of November 13th, 2023 (tentative)

- Present Problem/Opportunity Statement, Alternative Solutions, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Alternative Solution(s). Provide time for open discuss and comments.

Public Information Centres (PICs): Week of November 27th, 2023 (tentative)

CLC Meeting #2: Week of February 19th, 2024 (tentative)

- Present Review Preferred Solutions, Alternative Design Concepts, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Design Concept(s). Provide time for open discuss and comments.

If you are interested in becoming a member of the CLC, please contact Ramy Saadeldin at rsaadeldin@mvc.on.ca or the undersigned by September 29th, 2023.

Regards,

**Lisa Marshall,**P.Eng.
**Manager, Environmental Engineering**
**T.**613.714.0815|**C.**613.852.1148
l.marshall@mcintoshperry.com|www.mcintoshperry.com

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# Lisa Marshall

From: Lisa Marshall
Sent: August 30, 2023 10:38 AM
To: [redacted]
Cc: [redacted]
Subject: RE: CLC Representation + Updated List of Direct Contacts

Thanks [redacted]!

We will be in touch shortly to schedule upcoming CLC meetings. As indicated in the CLC circulation, we have given till September 29th for members to express interest in joining the CLC.

As for the additional contact information, we will ensure these members are added to our Contact List and provided notifications as the study progresses.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

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From: [redacted]
Sent: August 28, 2023 12:04 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: [redacted]
Subject: CLC Representation + Updated List of Direct Contacts

Hi Lisa,

At the the KLA Board Meeting last week, I advised the directors that the Mississippi Valley Conservation Authority has decided to form a Community Liaison Committee (CLC) for the Kashwakamak Dam Environmental Assessment Study.

The Board supported this decision and appointed me as the KLA representative on the CLC and Andrew Johnston, a fellow director, as my alternate. Please advise if we need to contact the MVCA directly on this matter.

For your information, attached is an updated list of the KLA members who wish to receive direct contact on this study.  Two names have been added to the list since Sue MAcGregor's last letter:  Andrew Johnston, who was elected to our Board at our July AGM, and Bert Martin, a former director.

Andrew and I look forward to participating on the CLC when it is formed.

Best regards

[redacted]

From: Lisa Marshall
Sent: September 7, 2023 10:00 AM
To: [redacted]
Cc: Lauren Walker
Subject: RE: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members

Thank you!

We will keep you posted on the selected members of committee by October 6th.

Lisa

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

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*Turning Possibilities Into Reality*

From: [redacted]
Sent: September 6, 2023 3:10 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Re: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members

Hi Lisa,
Yes I would be interested but I'll be in Florida for the winter beginning in early November.
[redacted]

Sent from my iPhone

> On Sep 6, 2023, at 9:40 AM, Lisa Marshall <l.marshall@mcintoshperry.com> wrote:
>
> Hello [redacted]

The MVCA is establishing a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). The purpose of the CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. MVCA is seeking up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam to form part of the committee. More information regarding the role and responsibilities of the CLC can be found in the attached Terms of Reference.

Proposed Schedule:

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1. Present Problem/Opportunity Statement, Alternative Solutions, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Alternative Solution(s). Provide time for open discuss and comments.

Public Information Centres (PICs): Week of November 27th, 2023 (tentative)

CLC Meeting #2: Week of February 19th, 2024 (tentative)

2. Present Review Preferred Solutions, Alternative Design Concepts, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Design Concept(s). Provide time for open discuss and comments.

If you are interested in becoming a member of the CLC, please contact Ramy Saadeldin at rsaadeldin@mvc.on.ca or the undersigned by September 29th, 2023.

Regards,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

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From: [redacted]
Sent: September 13, 2023 8:44 AM
To: Lisa Marshall; rsaadeldin@mvc.on.ca
Cc: [redacted]
Subject: Re: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members

In reply to your invitation to participate as a member of the Community Liaison Committee for the Kashwakamak Lake Dam Class Environmental Assessment I would be happy to be a participant and look forward to the opportunity to contribute to the project. I have no problems with the proposed schedule and have reviewed the terms of reference for the position.

Thank you for the opportunity and I look forward to hearing further details in early October.

[redacted]

Sent from Outlook

---

From: Lisa Marshall <l.marshall@mcintoshperry.com>
Sent: August 25, 2023 12:52 PM
To: [redacted]
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Sally McIntyre <smcintyre@mvc.on.ca>; Lauren Walker <l.walker@mcintoshperry.com>
Subject: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members
Hello [redacted]
The MVCA is establishing a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). The purpose of the CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. MVCA is seeking up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam to form part of the committee. More information regarding the role and responsibilities of the CLC can be found in the attached Terms of Reference.
Proposed Schedule:

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- Present Problem/Opportunity Statement, Alternative Solutions, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Alternative Solution(s). Provide time for open discuss and comments.

Public Information Centres (PICs): Week of November 27th, 2023 (tentative)

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- Present Review Preferred Solutions, Alternative Design Concepts, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Design Concept(s). Provide time for open discuss and comments.

If you are interested in becoming a member of the CLC, please contact Ramy Saadeldin at rsaadeldin@mvc.on.ca or the undersigned by September 29th, 2023.

Regards,

**Lisa Marshall,**P.Eng.

**Manager, Environmental Engineering**
**T.**613.714.0815|**C.**613.852.1148
l.marshall@mcintoshperry.com|www.mcintoshperry.com

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From: Lisa Marshall
Sent: September 20, 2023 8:26 AM
To: [redacted]
Cc: [redacted]
Subject: RE: involving our Politicians.

Hi [redacted],

The Township of North Frontenac including the mayor will receive all communication throughout the EA study, as well as they have been asked to sit on the Community Liaison Committee. They have yet to name a representative as it needs to got to Council.

The MPP will also receive all communication throughout the EA study and have a chance to comment and participate in Public Information Centre.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
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l.marshall@mcintoshperry.com | www.mcintoshperry.com
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From: [redacted]
Sent: September 19, 2023 11:22 AM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: [redacted]
Subject: Re: involving our Politicians.

Hi Lisa,
Yet another question: what is the process for keeping the Mayor of North Frontenac and other local politicians informed about and involved with the Kash Dam project?
Thanks
[redacted]
On Mon, Sep 18, 2023 at 9:37 AM Lisa Marshall <l.marshall@mcintoshperry.com> wrote:

Hello [redacted],

We are still in the process of completing investigations.  Marine Archaeological was done last week and Geotechnical is being undertaken this week.

As for schedule, an exact date for the first CLC meeting hasn't been set yet.  Based on the data collected during the investigation, we now need to complete our preliminary evaluation of alternatives prior to meeting.

Thank you for trying to get the Gutheinz family. I only have a partial mailing address for the Odessa residence.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

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Thanks,

[redacted]

On Sep 7, 2023, at 10:01 AM, Lisa Marshall <l.marshall@mcintoshperry.com> wrote:

Thank you

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

*Turning Possibilities Into Reality*

From: [redacted]
Sent: September 6, 2023 2:18 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Re: Public participation in the Kash Dam CLC

Hi Lisa,

I will be flying to Jamaica on Monday November 13. I could attend your meeting by ZOOM and day the rest of the week.

I'm on Toronto or at the cottage the weeks before and after.

I will try to get a contact for the [redacted].

Thanks

[redacted]

On Wed, Sep 6, 2023 at 9:03 AM Lisa Marshall <l.marshall@mcintoshperry.com> wrote:

> Hello [redacted]
>
> As I indicated the first workshop meeting is only tentatively scheduled for the week of November 13th at this time.  Please send me the periods you are not available to meet and I will try to work around it.
>
> Would you happen to have an email address or contact information for the Gutheinz family? We will ensure that the CLC request is sent to Bert Martin as well.
>
> Thank you,
>
> **Lisa Marshall,** P.Eng.
> **Manager, Environmental Engineering**
> **T.** 613.714.0815 | **C.** 613.852.1148
> l.marshall@mcintoshperry.com | www.mcintoshperry.com
>
> *Turning Possibilities Into Reality*
>
>
>
> ---
>
> From: [redacted]
> Sent: September 5, 2023 10:21 AM
> To: Lisa Marshall <l.marshall@mcintoshperry.com>
> Cc: [redacted]
> Subject: Public participation in the Kash Dam CLC

Hi Lisa,

Thank you for sending this to me.  It is a very helpful guide for what's to come.

I will be in Jamaica the week of November 13, travelling that Monday.  Do you have any idea when the ZOOM meeting would be and how long it will take?

Regarding the "3 members of the public" for the CLC, does that include the KLA?  I have two suggestions for property owners in the immediate vicinity of the dam who may be interested:

- the [redacted] who own the land on both sides of the dam and along the north shore of the "Dam Bay" (as we call it).

- [redacted] whose family owns the land on the east side of this bay as it enters the main lake.

[redacted] email address is on the list of contacts I sent you.

Best regards,

[redacted]

On Aug 30, 2023, at 12:20 PM, Lisa Marshall <l.marshall@mcintoshperry.com> wrote:

Hi [redacted],

My apologize, I just realized this didn't get sent to your attention as we were having other email discussion pertaining to the CLC. The following message has been sent to the Town of Frontenac, Indigenous Communities and members of the public who have shown interest in this study.

The MVCA is establishing a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). The purpose of the CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. MVCA is seeking up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam to form part of the committee. More information regarding the role and responsibilities of the CLC can be found in the attached Terms of Reference.

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MVCA/McIntosh Perry Inform Selected Members of Committee and next steps by: October 6th, 2023

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If you are interested in becoming a member of the CLC, please contact Ramy Saadeldin at rsaadeldin@mvc.on.ca or the undersigned by September 29th, 2023.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

*Turning Possibilities Into Reality*

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From: [redacted]
Sent: August 30, 2023 12:12 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Re: CLC Circulation

Hi Lisa,

In your e-mail, you mention a "CLC Circulation".

I don't recall seeing this. Can you send it to me?

Thanks

[redacted]

On Wed, Aug 30, 2023 at 10:38 AM Lisa Marshall <l.marshall@mcintoshperry.com> wrote:

> Thanks [redacted]
>
> We will be in touch shortly to schedule upcoming CLC meetings. As indicated in the CLC circulation, we have given till September 29th for members to express interest in joining the CLC.
>
> As for the additional contact information, we will ensure these members are added to our Contact List and provided notifications as the study progresses.
>
> Thank you,

**Lisa Marshall,** P.Eng.

**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

*Turning Possibilities Into Reality*

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From: [redacted]
Sent: August 28, 2023 12:04 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: [redacted]
[redacted]
Subject: CLC Representation + Updated List of Direct Contacts

Hi Lisa,

At the the KLA Board Meeting last week, I advised the directors that the Mississippi Valley Conservation Authority has decided to form a Community Liaison Committee (CLC) for the Kashwakamak Dam Environmental Assessment Study.

The Board supported this decision and appointed me as the KLA representative on the CLC and Andrew Johnston, a fellow director, as my alternate. Please advise if we need to contact the MVCA directly on this matter.

For your information, attached is an updated list of the KLA members who wish to receive direct contact on this study.  Two names have been added to the list since Sue MAcGregor's last letter:  Andrew Johnston, who was elected to our Board at our July AGM, and Bert Martin, a former director.

Andrew and I look forward to participating on the CLC when it is formed.

Best regards

[redacted]

<MVCA_Kashwakamak Dam EA_CLC TOR_ August 2023.pdf>

| | |
|---|---|
| From: | Ramy Saadeldin <rsaadeldin@mvc.on.ca> |
| Sent: | September 20, 2023 1:41 PM |
| To: | Lisa Marshall; Lauren Walker |
| Subject: | Fwd: North Frontenac Council Resolution re: Appointee to Kash Lake Dam Committee |

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From: Sonia McLuckie <officesupport@northfrontenac.ca>
Sent: Wednesday, September 20, 2023 1:38 PM
To: Sally McIntyre <smcintyre@mvc.on.ca>
Cc: Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Tara Mieske <Clerkplanning@northfrontenac.ca>; Brooke Drechsler <deputyclerk@northfrontenac.ca>; Gerry Lichty (mayorlichtynorthfrontenac@gmail.com) <mayorlichtynorthfrontenac@gmail.com>
Subject: North Frontenac Council Resolution re: Appointee to Kash Lake Dam Committee

Good Afternoon,

Please be advised that your email dated August 30, 2023 was presented to Council at their meeting held September 7, 2023 and the following Resolution was passed:

**Moved by Councillor Fowler, Seconded by Councillor Hermer Resolution #377-23**

**Be It Resolved That** Council receives for information an email dated August 30, 2023 from Mississippi Valley Conservation Authority, providing the Terms of Reference for a Community Liaison Committee being established for the Kashwakamak Lake Dam Replacement Environmental Assessment; and requesting the Township appoint a member of Council or staff to sit on the Committee;

**And That** Council appoints Mayor Lichty as a representative of North Frontenac on the Committee.

**Carried**

Thank you,
Sonia

**Sonia McLuckie, Dipl.M.A.**
Administrative Assistant to the Clerk/Planning Manager
and Fire Chief
**Township of North Frontenac**
6648 Road 506, Plevna, ON, K0H 2M0
1-800-234-3953 or 613-479-2231 Ext. 239
officesupport@northfrontenac.ca

Lisa Marshall

---

From: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Sent: September 25, 2023 12:59 PM
To: Tom Cowie; Jane Cho
Cc: Sean Davison; Sally McIntyre; Lisa Marshall; Lauren Walker
Subject: RE: Reminder: Call for Community Liaison Committee Members for the Kashwakamak Lake Dam Class EA

Hi Tom,

Your email has been received. Thanks very much for expressing the interest in the project.

Cheers,

Ramy Saadeldin, Ph.D., P.Eng., PMP
t. 613 253 0006 | c. 905 394 0446 ext. 236 | f. 613 253 0122 | rsaadeldin@mvc.on.ca

---

From: Tom Cowie <tcowie@hiawathafn.ca>
Sent: September 25, 2023 12:55 PM
To: Jane Cho <jcho@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Cc: Sean Davison <sdavison@hiawathafn.ca>
Subject: RE: Reminder: Call for Community Liaison Committee Members for the Kashwakamak Lake Dam Class EA

Aaniin Jane,

Hiawatha First Nation would be interested in being on the CLC for the Kashwakamak Lake Dam Class EA. I would be the lead contact, chi miigwech for the invite.

Gichi manaadendamowin

Tom Cowie

Tom Cowie
Lands/Resources Consultation
Hiawatha First Nation
431 Hiawatha Line,
Hiawatha, On
K9J 0E6
705 295-4421 Ext. 216
Email tcowie@hiawathafn.ca

*We, the Michi Saagiig of Hiawatha First Nation, are a vibrant, proud, independent and healthy people balanced in the richness of our culture and traditional way of life*

From: Jane Cho <jcho@mvc.on.ca>
Sent: Friday, September 22, 2023 4:17 PM
To: Tom Cowie <tcowie@hiawathafn.ca>
Cc: Sean Davison <sdavison@hiawathafn.ca>; Donna Paudash <dpaudash@HiawathaFN.ca>; Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Sally McIntyre <smcintyre@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Reminder: Call for Community Liaison Committee Members for the Kashwakamak Lake Dam Class EA

Aaniin Tom,

This is a reminder that MVCA is seeking members for a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment. If you are interested in becoming a member of the CLC, please let us know by next Friday, September 29th, 2023. Selected members of the CLC will be informed by October 6th, 2023.

Please note that I will be out of the office next week till October 13th, 2023. Ramy Saadeldin from MVCA will be the best point to contact. Please contact him at rsaadeldin@mvc.on.ca while I am away.

Miigwech,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

---

From: Jane Cho
Sent: August 24, 2023 2:59 PM
To: tcowie@hiawathan.ca
Cc: sdavison@hiawathafn.ca; Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Sally McIntyre <smcintyre@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Call for Community Liaison Committee Members for the Kashwakamak Lake Dam Class EA

Aaniin Tom,

The MVCA is establishing a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). The purpose of the CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. MVCA is seeking up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam to form part of the committee. More information regarding the role and responsibilities of the CLC can be found in the attached Terms of Reference. If you are interested in becoming a member of the CLC, please contact Ramy Saadeldin at rsaadeldin@mvc.on.ca (CC Jane Cho at jcho@mvc.on.ca) by September 29th, 2023.

The proposed schedule is as follows:

Schedule:
Circulate CLC Terms of Reference: August 24th, 2023
Expression of Interest: September 29th, 2023
MVCA/McIntosh Perry Inform Members of Committee that they have been selected and next steps: October 6th, 2023
CLC Meeting #1: Week of November 13th, 2023

- Present Problem/Opportunity Statement, Alternative Solutions, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Alternative Solution(s). Provide time for open discuss and comments.

Public Information Centres (PICs): Week of November 27th, 2023
CLC Meeting #2: Week of February 19th, 2024

- Present Review Preferred Solutions, Alternative Design Concepts, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Design Concept(s). Provide time for open discuss and comments.

Regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Sent: September 10, 2023 5:05 PM
To: [redacted]
Cc: Lisa Marshall
Subject: Re: Kashwakamak Lake Dam Class EA - Community Liaison Committee Members

Follow Up Flag: Follow up
Flag Status: Completed

Thanks for your email and interest. Your email has been received.

Ramy

---

From: [redacted]
Sent: Sunday, September 10, 2023 4:57 PM
To: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Cc: l.marshall@mcintoshperry.com <l.marshall@mcintoshperry.com>
Subject: Kashwakamak Lake Dam Class EA - Community Liaison Committee Members

Hello.

I am definitely interested in participating in the Community Liaison Committee for the Kashwakamak Lake Dam EA, but I was wondering if you could clarify a few points for me please?

1. I live in London, Ontario. Would I need to travel to be present for the meetings, or would I be able to attend virtually from home?
2. Our cottage is seasonal and will be closed at the times of both meetings. If I need to travel to attend in person, would there be any stipend to cover gas or accommodations?
3. How soon in advance would we be told the actual date/time/locations of the November and February meetings?
4. If I'm required to attend in person, and am unable to do so, is it still possible for me to have access to all the materials, even if I can't be a member of the committee?

Thanks so much.

[redacted]

From: Lisa Marshall
Sent: September 11, 2023 8:57 AM
To: Lauren Walker
Subject: FW: Kashwakamak Dam CLC

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

*Turning Possibilities Into Reality*

From: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Sent: September 10, 2023 5:06 PM
To: Lisa Marshall <l.marshall@mcintoshperry.com>
Subject: Fwd: Kashwakamak Dam CLC

FYi

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From: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Sent: Sunday, September 10, 2023 5:04 PM
To: [redacted]
Subject: Re: Kashwakamak Dam CLC

Hi [redacted] thanks for your email and interest. Your email has been received.

Thanks,
Ramy

---

From: [redacted]
Sent: Sunday, September 10, 2023 4:57 PM
To: Ramy Saadeldin <rsaadeldin@mvc.on.ca>
Subject: Kashwakamak Dam CLC

Dear Ramy

This email is in response to a request for CLC members for the Kashwakamak Lake Dam project. I would be happy to be a member of the CLC.

FYI - I received the email asking if I would like to be a member along with my wife Julie McShane. We have a cottage on Kashwakamak Lake which we have owned for 11 years. I am a Professional Engineer by trade and I think I could help with this process.

Sincerely

[redacted]

Sent from my iPhone

| | |
|---|---|
| From: | Lisa Marshall |
| Sent: | November 17, 2023 3:31 PM |
| To: | [redacted] |
| Cc: | Juraj Cunderlik; Lauren Walker; Jane Cho; Sally McIntyre |
| Subject: | Kashwakamak Lake Dam Class EA - Community Liaison Committee Update |

Hello [redacted]

The Mississippi Valley Conservation Authority (MVCA) has successfully completed the selection process for members of the Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (EA). The formation of the CLC marks a significant milestone in our ongoing commitment to ensure community engagement and input throughout the EA process. The CLC will provide members with the opportunity to engage with the project team beyond the mandatory consultation points. Through these meetings, members will be able to exchange views, offer insights, and contribute meaningfully to the EA process for the Kashwakamak Lake Dam.

Currently, McIntosh Perry is in the process of finalizing field investigation reports and is actively engaged in evaluating the proposed alternative solutions for the project. Once this preliminary evaluation has been completed, MVCA and McIntosh Perry will host the first CLC meeting in a virtual format to present the Problem/Opportunity Statement, proposed Alternative Solutions, Criteria, Evaluation, and review Preliminary Preferred Alternative Solution(s) for the Kashwakamak Lake Dam. During the CLC meeting, the committee will be provided an opportunity to ask questions and provide valuable input into the evaluation of the alternative solutions.

The first CLC meeting will be scheduled for the middle of December or potentially early January 2024, however, more detailed information about the meeting and the agenda will be provided shortly. We anticipate that it will be a virtual meeting.

Please note meeting dates may be adjusted based on availability. Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, McIntosh Perry Project Manager, at l.marshall@mcintoshperry.com.

We appreciate your commitment to this important initiative and look forward to your contributions to the CLC.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY
egis

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**MARSHALL Lisa**

---

From: Juraj Cunderlik <jcunderlik@mvc.on.ca>
Sent: June 13, 2024 12:19 PM
To: [redacted]
Cc: MARSHALL Lisa
Subject: RE: Kashwakamak Lake Dam Environmental Assessment - Notice of Public Information Centre

Dear [redacted],

Thank you for sharing your concerns. We would appreciate the opportunity to meet with you and discuss your concerns.

Would you have time in the upcoming weeks to meet with us in the Westport area if we were able to secure meeting space there?

Let us know what your availability is and we will follow-up with the local municipality to book space.

Regards,

Juraj

Juraj M. Cunderlik, Ph.D., P.Eng. | Director, Engineering
Mississippi Valley Conservation Authority | 10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 233 | f. 613 253 0122 | jcunderlik@mvc.on.ca

Mississippi Valley Conservation Authority

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From: [redacted]
Sent: June 1, 2024 1:38 PM
To: MARSHALL Lisa <Lisa.MARSHALL@egis-group.com>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Jane Cho <jcho@mvc.on.ca>
Subject: Re: Kashwakamak Lake Dam Environmental Assessment - Notice of Public Information Centre

Hi Lisa,

Thank you kindly for your previous email.

I was able to watch the latest PIC virtual presentation and found it very informative. Thank you for providing the link. I was unable to attend due to my job requirements as a police officer in Kingston on that date during which time I was being pulled in multiple directions.

Some concerns/comments that I have following the meeting are as follows:

-one attendee had asked if the walking path on the north side of the river and on our shoreline allowance could be improved. My great grandfather (who first owned the property dating back to 1913) and grandfather allowed canoe portagers to travel from Kashwakamak to Farm Lake, and beyond, on this south side trail however, there have been numerous previous instances of mischief, unauthorized camping and fires over the years and we do not wish to in any way promote additional tourism on the property. In saying this, we do not wish to have this new construction to be in any way  a travel/tourism destination for the many visitors and residents who come to the lake. Should we purchase the shoreline allowance in the future we do not want to have to rebuff Individuals who believe that they can access our property.

-another concern would be the impact to our property itself. Last year MVAC had forgotten a key to access our gate and our neighbour whose family owns my grandfather's old house at the gate had sent pictures showing that the gate had been removed and bent in places to allow them access. There were multiple instances last year like this and of locks being locked/linked improperly preventing not only myself but the cottagers/campers to our resort from accessing the property at all. This caused significant stress during the spring and summer months of last year, and I had to scramble on multiple occasions to drive up from Kingston and purchase bolt cutters to provide access to my lessees. It makes more sense now that it wasn't just the regular MVAC crew coming in and out to adjust the levels of the dam. I simply would want to ensure moving forward that all parties coming in and out of the property are instructed on how to properly access the private road and lock the gate so as not to incur any further financial losses or time-oriented impacts/stress.

-when it comes to the construction stage of the project I do have general concerns as well regarding our road and land which accessed the site. I have worked significantly on the road over the last number of years for our own simple recreational use and that of farm tractors and camper trailers however, any larger vehicles/machinery accessing the site will undoubtedly cause significant issues and stressors to the current infrastructure in place. Jennifer North had indicated that there would likely be plans to widen and improve the road for heavy machinery and we can discuss that whenever is suitable.

-I also have general concerns over the impact on our family and the families that attend our resort as well as the overall enjoyment of our property during these different phases of planning and construction. The land has been in our family for generations and it is where we have always gone for peace and solitude in nature (away from the craziness of life at home) so we do have concerns about the unknowns and on how this will impact our lives and that of our guests. Also, during the flooding a few years ago on the lake we incurred serious land/shoreline erosion and loss of trees along the shore as well as the losses caused by some of our docks floating away.

-One other thought for now that I wanted to address is that, during the presentation, the dam had been referred to by assessors as not retaining any cultural or heritage value or interest under the Ontario Heritage Act. When I previously spoke with Jennifer North, I provided her information regarding a monument that was on our property commemorating the 12 workers who died while constructing the original dam. This monument is a large flat rock along the road northwest of the second dam.  It has names inscribed on it of the workers who perished and although MVAC was not the proprietor of the dam over a hundred years ago I feel there is a need and responsibility, not unlike other cultural or heritage stakeholders interests, to ensure that these individuals are not forgotten. Our family has taken care of this monument all of these years and the names and inscriptions are now barely visible. It would be really nice if MVAC could somehow protect this monument and acknowledge it with a plaque or sign so that these poor souls are never forgotten. Soon the inscriptions will be gone forever from the stone. They are an instrumental part or why the dam and river system exists as it currently does and if we were to not bring this up then I am certain that no one else would. My Grandfather was employed to manage the levels at the dam for years and I know this is something that he would find truly important as well.

Thank you Lisa and I that you have a good weekend,

[redacted]

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From: MARSHALL Lisa <Lisa.MARSHALL@egis-group.com>
Sent: Wednesday, May 22, 2024 2:36:47 PM
To: [redacted]
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Jane Cho <jcho@mvc.on.ca>
Subject: RE: Kashwakamak Lake Dam Environmental Assessment - Notice of Public Information Centre

Hello [redacted]

At this time, you have received all correspondence pertaining to the Environmental Assessment currently being undertaken for the Kashwakamak Lake Dam. For additional information, you can also visit the MVCA website: https://mvc.on.ca/current-initiatives/kash-class-ea/.

For the upcoming PIC presentation on May 23rd, please note that if you are unable to attend it will be recorded and posted at mvc.on.ca/current-initiatives/kash-class-ea following the meeting. If you have any follow up questions or concerns, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, McIntosh Perry Project Manager, at lisa.marshall@egis-group.com and we can either address them via email or set up a meeting to further discuss.

With respect to the incorporation of a single lane vehicle crossing, it will be dependent on the future design constraints of the proposed dam replacement.

Thank you,
Lisa

egis
Lisa Marshall, P.Eng.
Manager, Environmental Engineering, North America
Phone: +1 613-714-0815, Mobile: +1 613-852-1148

---

From: [redacted]
Sent: Friday, May 10, 2024 4:23 PM
To: MARSHALL Lisa <Lisa.MARSHALL@egis-group.com>
Cc: Jane Cho <jcho@mvc.on.ca>; Juraj Cunderlik <jcunderlik@mvc.on.ca>; Alana Perez <APerez@mvc.on.ca>
Subject: Re: Kashwakamak Lake Dam Environmental Assessment - Notice of Public Information Centre

Hi Lisa,

Thank you so much for your correspondence. I will do my best to attend this next virtual meeting. It falls during my work hours however, I will do my best to endeavour to be there.

When I was talking to Jennifer North before she indicated that there had been quite a bit of correspondence that had gone back-and-forth to the stakeholders and the property owners over the last couple of years. If there was anything else that I did not receive, could you please forward it through to me.

[redacted] If all future mail and correspondence can be directed to me it would be greatly appreciated. My home address is [redacted] The postal code is [redacted] My work number is [redacted] and my personal cell number is [redacted] I can make myself available to discuss all things related to the project or otherwise. I had initially called Jennifer to discuss being picked out of our property due to a lock being fastened incorrectly to our gate. Jennifer was great with helping to rectify this. During that same conversation she informed me about the digging the crews would be completing by the dam and the subsequent project that was to be undertaken. It definitely came as a surprise to hear about the project as no correspondence had been received. I think the mail may have been sent to my [redacted]. [redacted]

I also spoke with Jennifer about my interest in the possibility of incorporating a single lane vehicle crossing in the new dam construction as we are landlocked to the 40+ acres on the south side of the structure currently and greatly wish to rectify this. She indicated she would pass this information along. If there was a possibility of discussing this matter further when time permits it would be greatly appreciated.

Thank you again for reaching out and I look forward to speaking with you in the future.

[redacted]

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From: MARSHALL Lisa <Lisa.MARSHALL@egis-group.com>
Sent: Thursday, May 2, 2024 3:38 PM
To: [redacted]
Cc: Jane Cho <jcho@mvc.on.ca>; Juraj Cunderlik <jcunderlik@mvc.on.ca>; Alana Perez <APerez@mvc.on.ca>
Subject: Kashwakamak Lake Dam Environmental Assessment - Notice of Public Information Centre

Good afternoon,

MVCA and Egis (formerly McIntosh Perry) would like to formally invite you to a Virtual Public Information Centre for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the EA study process, existing conditions, proposed alternative solutions, and identify the recommended Technically Preferred Alternative. The meeting will provide an opportunity for agencies, stakeholders and the public to participate in the project's planning process and provide valuable input/feedback into the evaluation of the alternative solutions. Please refer to the attached Notice for further details.

Meeting details:
Date: Thursday, May 23, 2024
Time: 4 – 6 pm, presentation will commence at 4:10 pm
Location: Virtual Meeting/Presentation (Visit MVCA's website for the Zoom link and call-in details mvc.on.ca/current-initiatives/kash-class-ea)

In addition, please find attached a copy of the Notice of Intent that was circulated at the onset of this study. Based on recent communication with MVCA, it is my understanding you didn't receive a copy.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, McIntosh Perry Project Manager, at lisa.marshall@egis-group.com.

Thank you,
Lisa

egis
Lisa Marshall, P.Eng.
Manager, Environmental Engineering, North America
Phone: +1 613-714-0815, Mobile: +1 613-852-1148

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# Appendix D – First Nations Consultation

*May 25th, 2023*

James L. Porte, Consultation Worker
Chippewas of Georgina Island First Nation
R.R. #2 Box N-13
Sutton West, Ontario
L0E 1R0
jl.porte@georginaisland.com:

Dear Mr. Porte:

**Re: Kashwakamak Lake Dam**
**Class Environmental Assessment**
**Notice of Intent**

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decommission, rehabilitate or replace the existing dam within the next five years.

The study team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

Input received will be incorporated into the planning and design process for this project. If you wish to be involved in this study or receive information, please contact one of the project representatives identified below. Additional consultation opportunities will be made available as the study progresses. For further details pertainig to the Kashwakamak Lake Dam and Class EA, please visit the MVCA website: https://mvc.on.ca/current-initiatives/kash-class-ea/.

Subject to comments received and the receipt of necessary approvals, MVCA intends to proceed with the planning and design as defined in the Class Environmental Assessment process.

For further information on this project please contact the following:

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.

McIntosh Perry Consulting Engineers Ltd.
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

Comments submitted to the MVCA and McIntosh Perry for the purpose of providing feedback regarding this Class Environmental Assessment are collected under the authority of the Environmental Assessment Act. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Pour des renseignements en français au sujet de ce projet, veuillez rejoindre Patrick Lelanc en composant le 613-714-4586 ou par courriel au p.leblanc@mcintoshperry.com

Thank you for your anticipated assistance and cooperation.

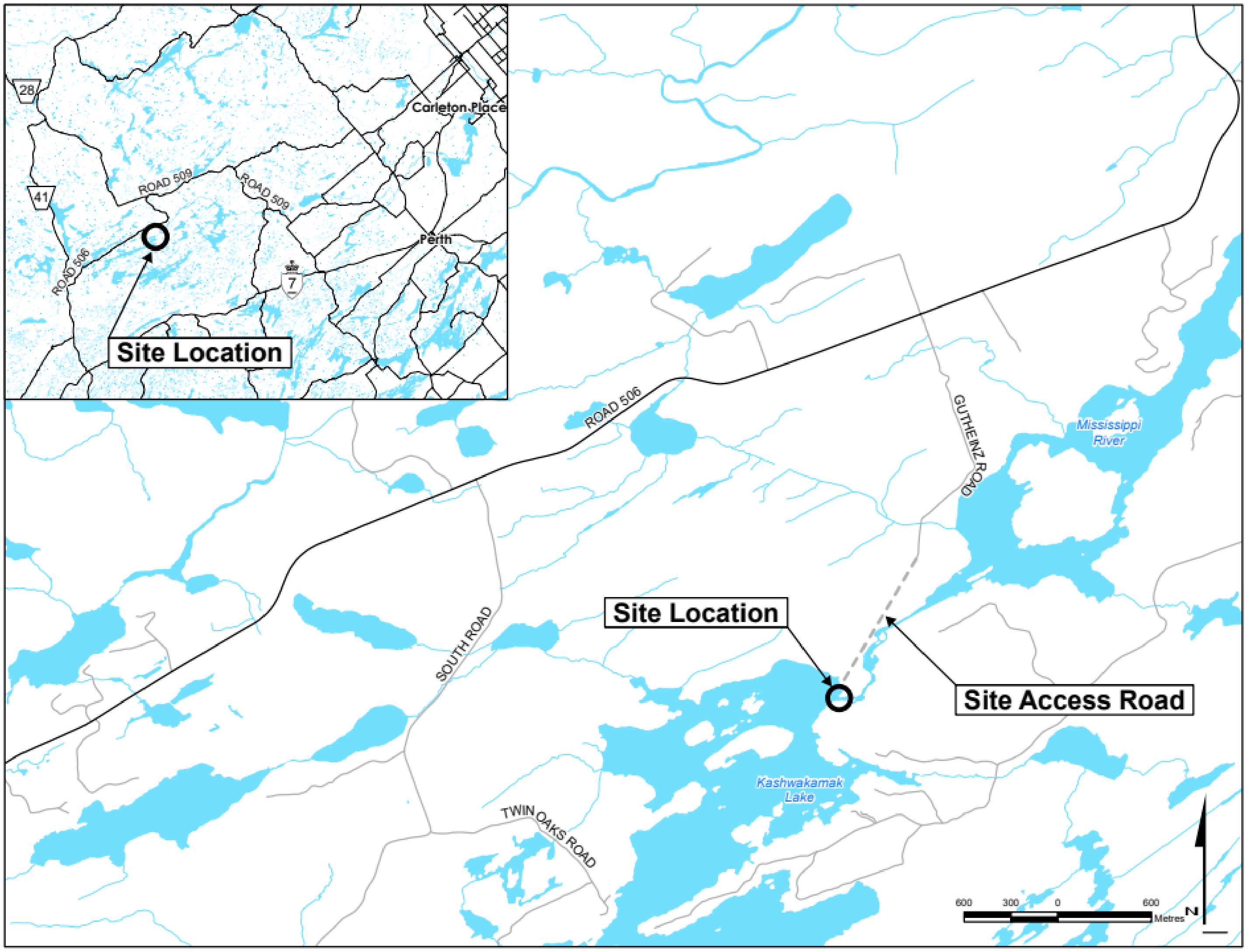
Sincerely,

**McIntosh Perry Consulting Engineers,**

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority

Encl. Study Area Key Map

Cc: Ramy Saadeldin, Mississippi Valley Conservation Authority
Lisa Marshall, McIntosh Perry Consulting Engineers Ltd.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Carleton Place
ROAD 509
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ROAD 506
Perth
7
Site Location
ROAD 506
GUTHEINZ ROAD
Mississippi River
Site Location
SOUTH ROAD
Site Access Road
Kashwakamak Lake
TWIN OAKS ROAD
600
300
0
600
Metres
N

Key Plan

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:48 AM |
| To: | Dave Mowat |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Alderville First Nation.pdf |

Dear Chief Mowat,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

|  |  |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:48 AM |
| To: | afnreception@alderville.ca |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Alderville First Nation__.pdf |

Dear Ms. Crowe,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

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Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

|  |  |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | June 22, 2023 10:48 AM |
| To: | consultation@pikwakanagan.ca |
| Cc: | assistant.consultation@pikwakanagan.ca; admin.reception@pikwakanagan.ca; Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Algonquins of Pikwakanagan First Nation (AOP).pdf |

Dear Amanda Two-Axe Kohoko,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

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Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:51 AM
To: jl.porte@georginaisland.com
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Chippewas of Georgina Island First Nation__.pdf

Dear Mr. Porte,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:51 AM
To: sylvia.mccue@georginaisland.com
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Chippewas of Georgina Island First Nation__.pdf

Dear Ms. Mccue,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
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Best regards,

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www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:51 AM |
| To: | chief@ramafirstnation.ca |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Chippewas of Rama First Nation.pdf |

Dear Chief Williams,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:51 AM
To: Consultation@ramafirstnation.ca
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Chippewas of Rama First Nation_.pdf

Dear Mr. Benson,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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Juraj Cunderlik, PhD., P.Eng.
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Mississippi Valley Conservation Authority
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Best regards,
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www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:51 AM |
| To: | chief@ramafirstnation.ca |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Chippewas of Rama First Nation.pdf |

Dear Chief Williams,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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Best regards,
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10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:50 AM
To: JulieK@curvelake.ca
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Curve Lake First Nation__.pdf

Dear Ms. Kapyrka,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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l.marshall@mcintoshperry.com

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Best regards,

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10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

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| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:51 AM |
| To: | EmilyW@curvelake.ca |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Curve Lake First Nation.pdf |

Dear Chief Whetung,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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Mississippi Valley Conservation Authority
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jcunderlik@mvc.on.ca

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Best regards,
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10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:51 AM |
| To: | KaitlinH@curvelake.ca |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Curve Lake First Nation_.pdf |

Dear Ms. Hill,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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Best regards,

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www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:50 AM
To: drichardson@scugogfirstnation.com; Consultation
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Mississaugas of Scugog Island First Nation_.pdf

Dear Mr. Richardson,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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Best regards,
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10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

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|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:50 AM |
| To: | Francis@francischua.com |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Curve Lake First Nation___.pdf |

Dear Ms. Chua,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

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Best regards,
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www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | June 22, 2023 10:48 AM |
| To: | kawarthanishnawbecouncil@outlook.com |
| Cc: | nodin.webb@hotmail.com; samgharvey@live.com; giiwednang@hotmail.com; Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Kawartha Nishnawbe First Nation.pdf |

Dear Sir/Madam,

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Mississippi Valley
Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:53 AM |
| To: | worksinfo@scugogfirstnation.com |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Mississaugas of Scugog Island First Nation___.pdf |

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The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

---

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:50 AM
To: sshrubsole@scugogfirstnation.com
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Mississaugas of Scugog Island First Nation__.pdf

Dear Ms. Shrubsole,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
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115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,

Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

|  |  |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:50 AM |
| To: | tturoczi@scugogfirstnation.com |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Mississaugas of Scugog Island First Nation__.pdf |

Dear Mr. Turoczi,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,

Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 11:50 AM |
| To: | drichardson@scugogfirstnation.com; Consultation |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Mississaugas of Scugog Island First Nation_.pdf |

Dear Mr. Richardson,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:50 AM
To: klarocca@scugogfirstnation.com
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Mississaugas of Scugog Island First Nation.pdf

Dear Chief LaRocca,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

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From: Jane Cho <jcho@mvc.on.ca>
Sent: June 22, 2023 10:48 AM
To: consultation@mbq-tmt.org
Cc: reception@mbq-tmt.org; Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)
Attachments: MVCA_Kashwakamak Dam EA_Notice of Intent_Mohawks of the Bay of Quinte.pdf

Dear Cassie Thompson,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,

Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

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| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | June 23, 2023 10:53 AM |
| To: | inquiries@williamstreatiesfirstnations.ca |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall |
| Subject: | FW: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| Attachments: | MVCA_Kashwakamak Dam EA_Notice of Intent_Alderville First Nation_.pdf; Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA); Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |

Dear Karry Sandy McKenzie,

Please note that a Notice of Intent for Kashwakamak Lake Dam Class Environmental Assessment (Class EA) was distributed to Alderville First Nation for consultation on May 25th, 2023. This is a copy of email in your record of consultation. Thank you.

Regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

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From: Jane Cho
Sent: May 25, 2023 11:48 AM
To: consultation@aldervillefirstnation.ca
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Mr. Simpson,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

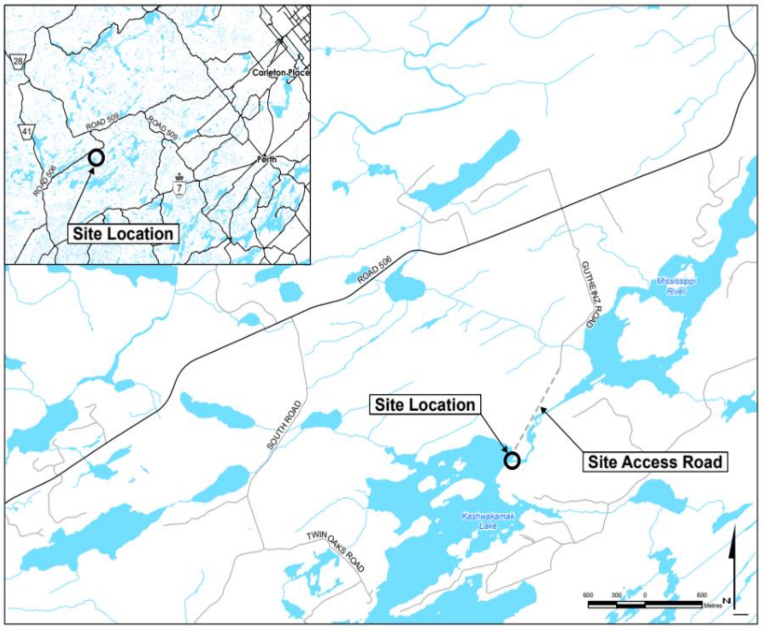
Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT
# NOTICE OF PUBLIC INFORMATION CENTRE

The Mississippi Valley Conservation Authority (MVCA) is undertaking a Class Environmental Assessment (EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decommission, rehabilitate or replace the existing dam within the next five years.

The study team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.



## Virtual Public Information Centre (PIC)
## May 23, 2024
## 4 – 6 pm

**Visit MVCA's website for the Zoom link and call in details:**

**mvc.on.ca/current-initiatives/kash-class-ea**

The purpose of the PIC is to share information and receive input from the public on study findings to date, including the EA study process, existing conditions, proposed alternative solutions, and identify the recommended Technically Preferred Alternative. The **presentation will commence at 4:10 pm** and will be followed by a question-and-answer period. The PIC presentation will be recorded and posted at mvc.on.ca/current-initiatives/kash-class-ea following the meeting.

Comments will be received until **June 20, 2024.**

For more information and to submit comments, contact:

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.
Project Manager
Egis
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
lisa.marshall@egis-group.com

*Comments submitted to the MVCA for the purpose of providing feedback regarding this Class Environmental Assessment are collected under the authority of the Environmental Assessment Act. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.*

This notice was issued on **May 2nd, 2024.**

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| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 2, 2024 1:15 PM |
| To: | jkapyrka@alderville.ca |
| Cc: | consultation@alderville.ca; Sally McIntyre; Juraj Cunderlik; Alana Perez |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC) |
| Attachments: | MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf |

Aaniin Julie,

MVCA would like to formally invite Alderville First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

If you are unable to attend the virtual meeting, the PIC presentation will be recorded and posted at mvc.on.ca/current-initiatives/kash-class-ea following the meeting and we can answer any follow up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Miigwech,

Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 2, 2024 1:15 PM
To: Knight, Melissa (Algonquins Of Ontario); Mitchell, Krystal (Algonquins Of Ontario)
Cc: algonquins@tanakiwin.com; ehuner@tanakiwin.com; Sally McIntyre; Juraj Cunderlik; Alana Perez
Subject: Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC)
Attachments: MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf

Good afternoon Melissa and Krystal,

MVCA would like to formally invite Algonquins of Ontario to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

If you are unable to attend the virtual meeting, the PIC presentation will be recorded and posted at mvc.on.ca/current-initiatives/kash-class-ea following the meeting and we can answer any follow up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274 f. 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

**From:** Jane Cho <jcho@mvc.on.ca>
**Sent:** May 2, 2024 1:15 PM
**To:** Karen Brethour
**Cc:** assistant.consultation@pikwakanagan.ca; admin.reception@pikwakanagan.ca; communications.consultation@pikwakanagan.ca; consultation@pikwakanagan.ca; Sally McIntyre; Juraj Cunderlik; Alana Perez
**Subject:** Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC)
**Attachments:** MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf

Kwey good afternoon Karen,

MVCA would like to formally invite Algonquins of Pikwàkanagàn First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

If you are unable to attend the virtual meeting, the PIC presentation will be recorded and posted at mvc.on.ca/current-initiatives/kash-class-ea following the meeting and we can answer any follow up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Meegwetch,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | t. 613 253 0006 ext. 274 f. 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 2, 2024 1:16 PM |
| To: | bfnconsultation@chimnissing.ca |
| Cc: | info@chimnissing.ca; Sally McIntyre; Juraj Cunderlik; Alana Perez |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC) |
| Attachments: | MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf |

Dear Lua,

MVCA would like to formally invite Beausoleil First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

If you are unable to attend the virtual meeting, the PIC presentation will be recorded and posted at mvc.on.ca/current-initiatives/kash-class-ea following the meeting and we can answer any follow up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

**From:** Jane Cho <jcho@mvc.on.ca>
**Sent:** May 2, 2024 1:16 PM
**To:** jl.porte@georginaisland.com
**Cc:** Natasha Charles; Sylvia McCue; Sally McIntyre; Juraj Cunderlik; Alana Perez
**Subject:** Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC)
**Attachments:** MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf

Dear Mr. Porte,

MVCA would like to formally invite Chippewas of Georgina Island First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

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We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 2, 2024 1:17 PM
To: Community Consultation
Cc: Sally McIntyre; Juraj Cunderlik; Alana Perez
Subject: Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC)
Attachments: MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf

Dear Mr. Benson,

MVCA would like to formally invite Chippewas of Rama First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

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Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 2, 2024 1:17 PM
To: ConsultationLead@curvelake.ca
Cc: delaneyj@curvelake.ca; paigew@curvelake.ca; Sally McIntyre; Juraj Cunderlik; Alana Perez
Subject: Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC)
Attachments: MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf

Dear Mr. Taylor,

MVCA would like to formally invite Curve Lake First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
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We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 2, 2024 1:17 PM |
| To: | Tom Cowie |
| Cc: | Sean Davison; Sally McIntyre; Juraj Cunderlik; Alana Perez |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC) |
| Attachments: | MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf |

Aaniin Tom,

MVCA would like to formally invite Hiawatha First Nation to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

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Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

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Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Miigwech,

Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 2, 2024 1:17 PM |
| To: | nodin.webb@hotmail.com |
| Cc: | samgharvey@live.com; giiwendnang@hotmail.com; lawreid@aol.com; kawarthanishnawbecouncil@outlook.com; Juraj Cunderlik; Sally McIntyre; Alana Perez |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC) |
| Attachments: | MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf |

Dear Nodin,

MVCA would like to formally invite Kawartha Nishnawbe to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
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We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,

Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 2, 2024 1:18 PM |
| To: | consultations@metisnation.org |
| Cc: | Sally McIntyre; Juraj Cunderlik; Alana Perez |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC) |
| Attachments: | MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf |

LRC Branch,

MVCA would like to formally invite Métis Nation of Ontario to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
Time: 4:00 – 6:00 pm
Location: Virtual Presentation/Meeting (mvc.on.ca/current-initiatives/kash-class-ea)

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Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,

Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 2, 2024 1:18 PM |
| To: | Consultation |
| Cc: | klarocca@scugogfirstnation.com; Sally McIntyre; Juraj Cunderlik; Alana Perez |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC) |
| Attachments: | MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf |

Dear Sam,

MVCA would like to formally invite Mississaugas of Scugog Island First Nation (MSIFN) to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: May 23, 2024
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Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, Egis Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,

Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274 f. 613 253 0122 | jcho@mvc.on.ca

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 2, 2024 1:16 PM
To: consultation@mbq-tmt.org; lisam@mbg-tmt.org
Cc: Sally McIntyre; Juraj Cunderlik; Alana Perez
Subject: Kashwakamak Lake Dam Class Environmental Assessment - Notice of Public Information Centre (PIC)
Attachments: MVCA_Kashwakamak Lake Dam Notice of PIC_Final_29April2023_v4.pdf

Dear Ms. Thompson and Ms. Maracle,

MVCA would like to formally invite Mohawks of the Bay of Quinte to the Public Information Centre (PIC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the draft evaluation results and preferred solution. The meeting will provide an opportunity to provide valuable input/feedback into the evaluation of the alternative solutions.

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We appreciate your commitment to this important initiative and your contributions during the meeting.

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274 f. 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Dr. Julie Kapyrka
Alderville First Nation
P.O. Box 45
Alderville, ON K0K 2X0

Dear Dr. Julie Kapyrka,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

The objective of the land-based Archaeological Assessment is to assess the study area that will be impacted by deconstruction/construction activities and determine if there are any archaeological resources present. The assessment will consist of background research to determine if there are known archaeological resources within the study area followed by a systematic shovel test pit survey to determine the presence of unknown archaeological sites/resources. The study area is approximately 1.48 hectares (3.65 acres) in size.

Past Recovery Archaeological Services Inc. (Past Recovery) has been contracted by Egis on behalf of MVCA to complete the assessment. Fieldwork has been scheduled for May 2, 2024. It has been assumed that the archaeological assessment will be completed in 1 day with a field crew of 6 people. The field investigation details are as follows:

- Location: Gutheinz Road, Township of North Frontenac, K0H 1K0
- Date/Duration: **May 2nd, 2024** (reserving May 3rd as a rain date.) Fieldwork will only take one day.
- Scope of Work: Stage 2 Shovel Test Pit Survey

If your community would be interested in providing a liaison to take part in the fieldwork please provide their name and contact information, and an estimate of fees to me and Jane Cho by **April 25, 2024** for review and approval.

Following completion of the field work, a report will be produced detailing the background research and field assessment, and providing appropriate recommendations should archaeological material/features be located during the archaeological assessment. Past

Recovery will conduct the archaeological assessment and subsequent reporting in compliance with the Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists.

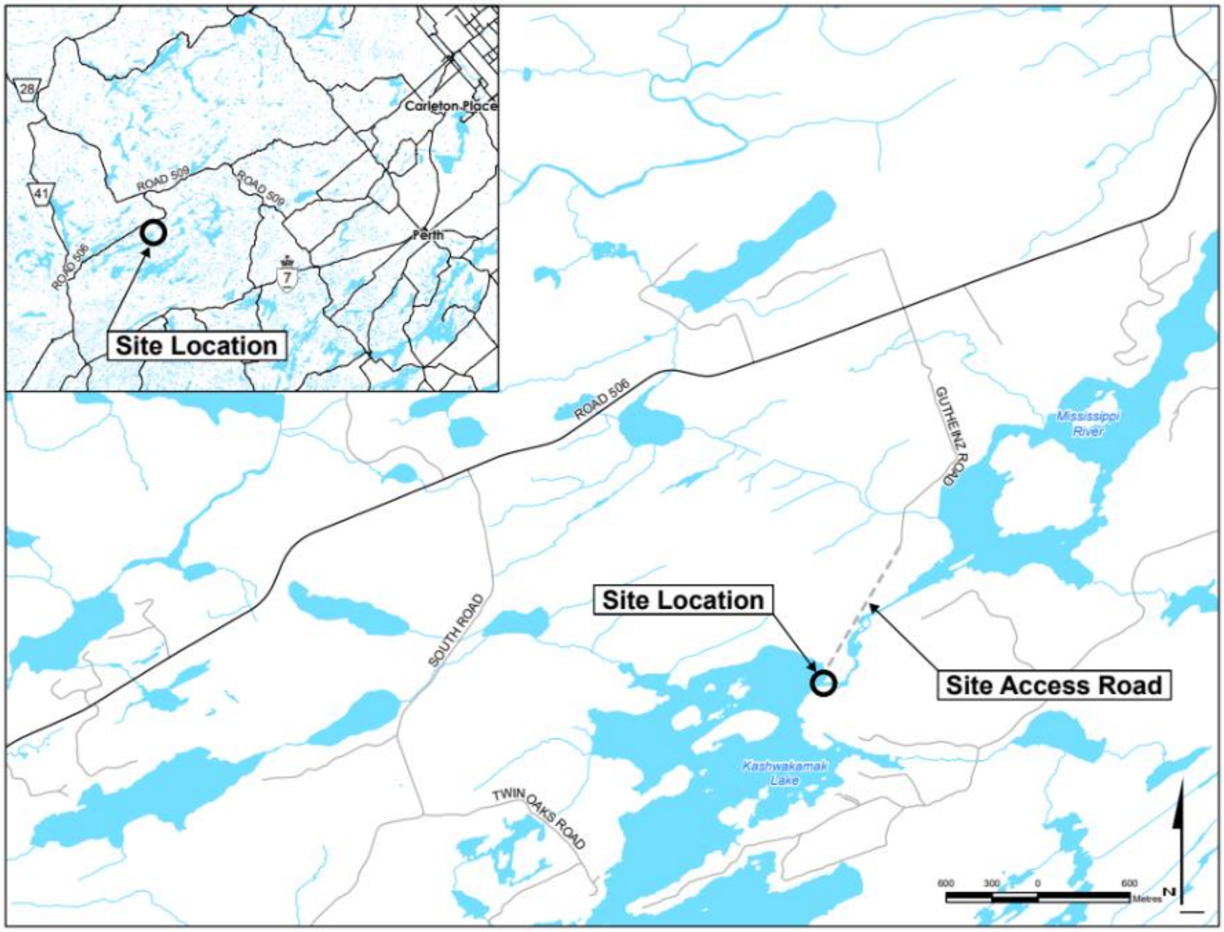
We welcome your contribution to the project and are available to address any concerns that may arise.

Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Melissa Knight
Algonquins of Ontario Consultation Office
31 Riverside Drive, Suite 101
Pembroke, ON K8A 8R6

Dear Melissa Knight,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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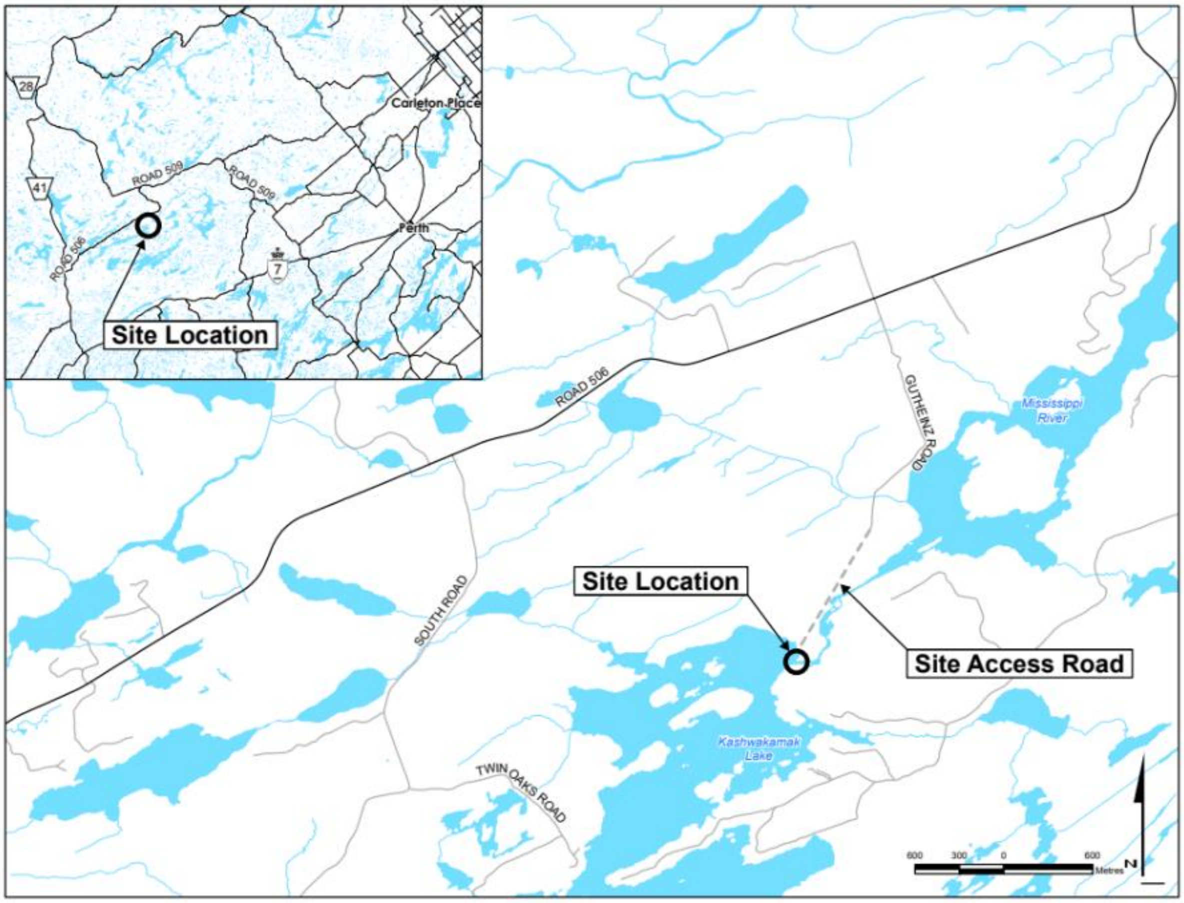
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

April 18, 2024

Amanda Two-Axe Kohoko
Algonquins of Pikwakanagan First Nation
Unit 3-469 Kokomis Inamo,
Pikwakanagan, ON, K0J 1X0

Dear Amanda Two-Axe Kohoko,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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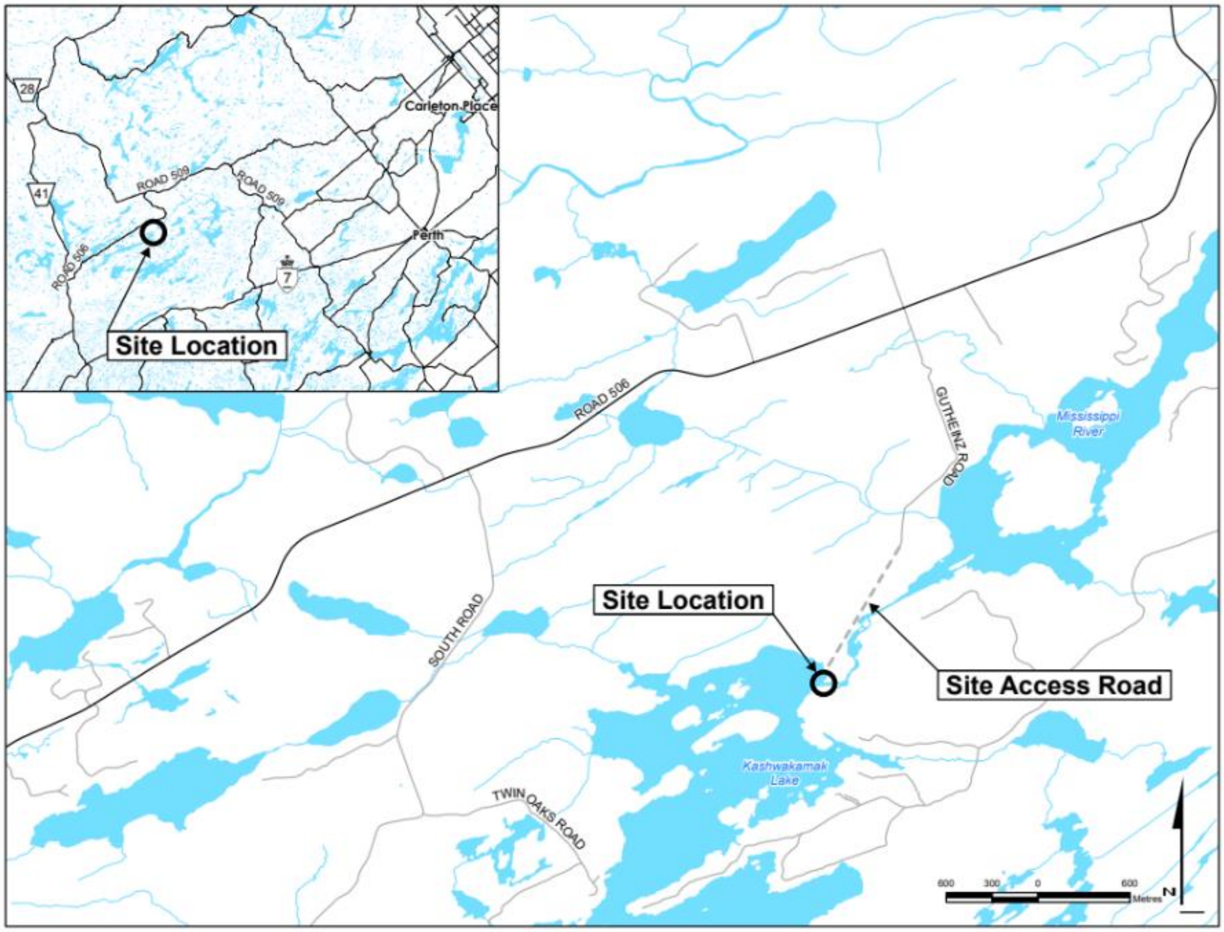
S McIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

April 18, 2024 E-01

Mireille Lapointe
Ardoch Algonquin First Nation
524 Centreville Road,
Westport, ON, K0G 1X0

Dear Mireille Lapointe,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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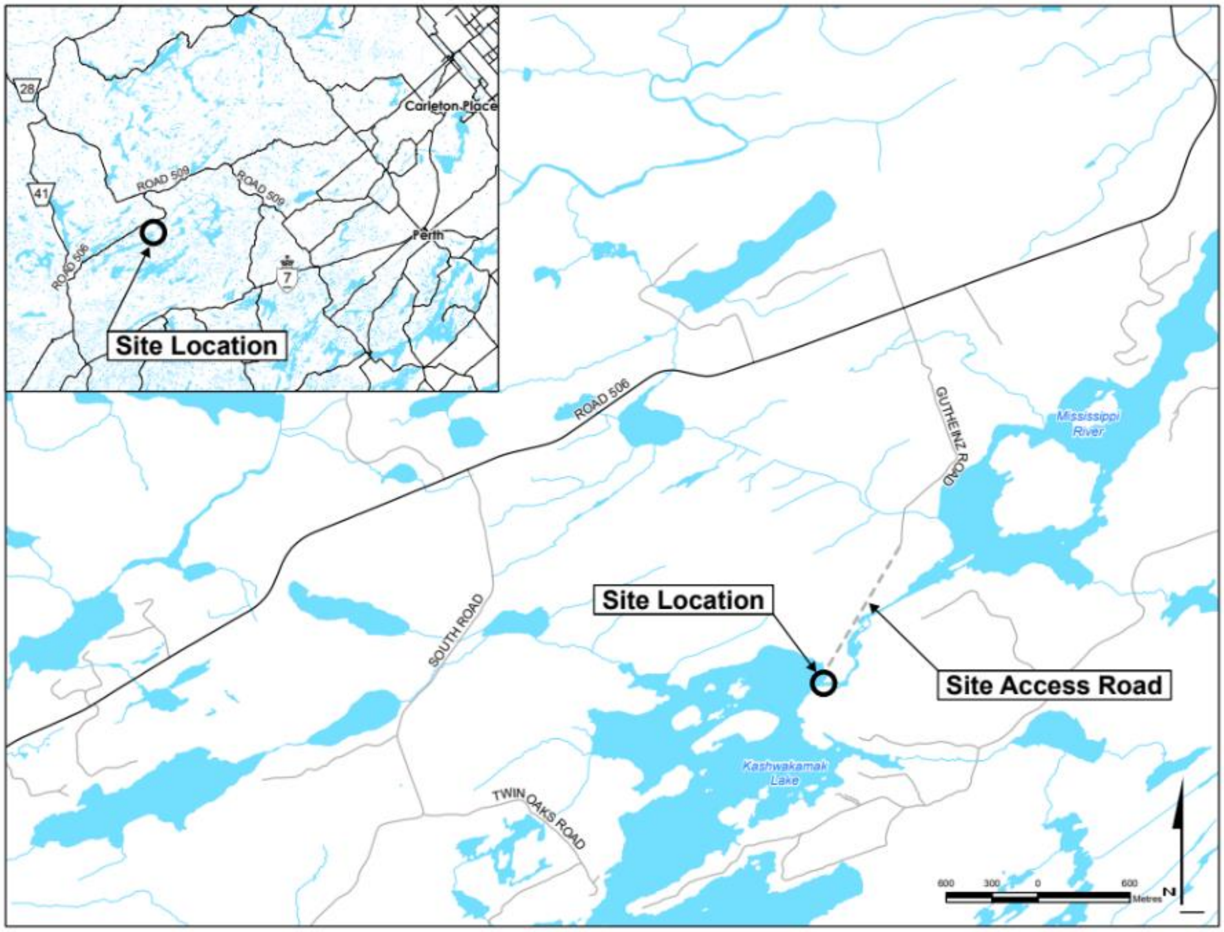
Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Lua
Chippewas of Beausoleil First Nation
11 Ogemaa Miikaan
Christian Island, ON L9M 0A9

Dear Lua,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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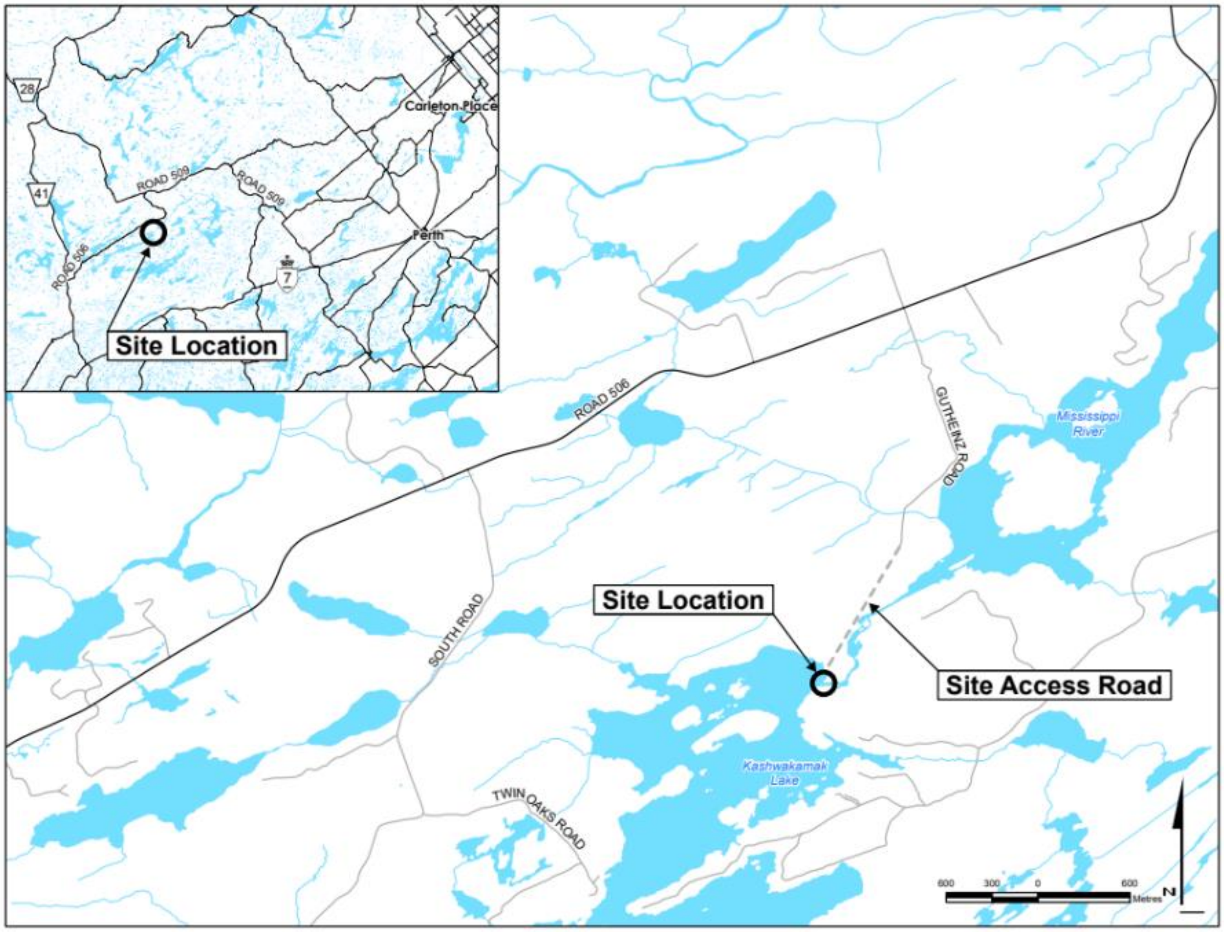
Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

April 18, 2024 E-01

Delaney Jacobs
Curve Lake First Nation
22 Winokeeda Road
Curve Lake, ON K0L 1R0

Dear Delaney Jacobs,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

The objective of the land-based Archaeological Assessment is to assess the study area that will be impacted by deconstruction/construction activities and determine if there are any archaeological resources present. The assessment will consist of background research to determine if there are known archaeological resources within the study area followed by a systematic shovel test pit survey to determine the presence of unknown archaeological sites/resources. The study area is approximately 1.48 hectares (3.65 acres) in size.

Past Recovery Archaeological Services Inc. (Past Recovery) has been contracted by Egis on behalf of MVCA to complete the assessment. Fieldwork has been scheduled for May 2, 2024. It has been assumed that the archaeological assessment will be completed in 1 day with a field crew of 6 people. The field investigation details are as follows:

- Location: Gutheinz Road, Township of North Frontenac, K0H 1K0
- Date/Duration: **May 2nd, 2024** (reserving May 3rd as a rain date.) Fieldwork will only take one day.
- Scope of Work: Stage 2 Shovel Test Pit Survey

If your community would be interested in providing a liaison to take part in the fieldwork please provide their name and contact information, and an estimate of fees to me and Jane Cho by **April 25, 2024** for review and approval.

Following completion of the field work, a report will be produced detailing the background research and field assessment, and providing appropriate recommendations should archaeological material/features be located during the archaeological assessment. Past

Recovery will conduct the archaeological assessment and subsequent reporting in compliance with the Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists.

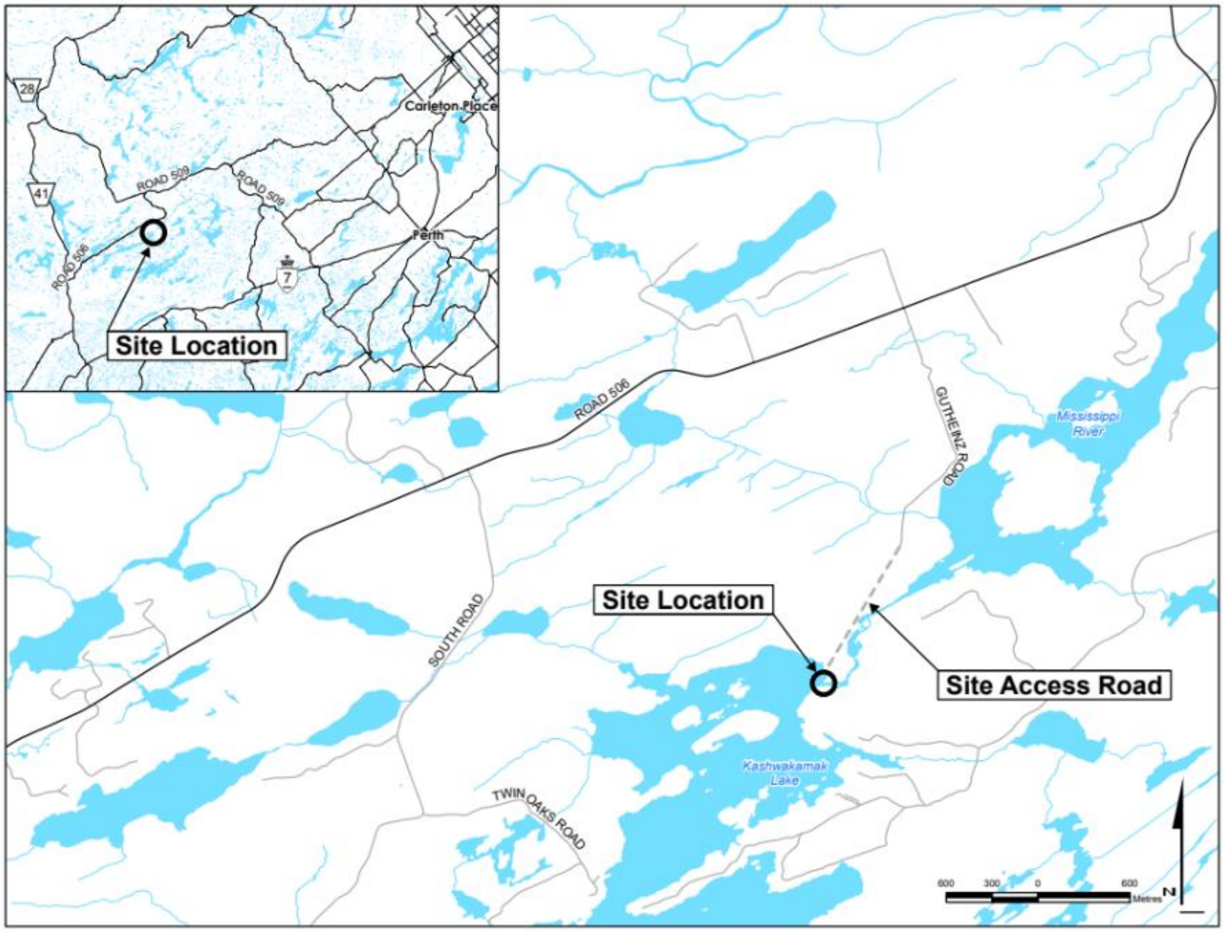
We welcome your contribution to the project and are available to address any concerns that may arise.

Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

JL Porte
Chippewas of Georgina Island First Nation
RR#2 Box N-13
Sutton West, ON L0E 1R0

Dear JL Porte,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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Sincerely,

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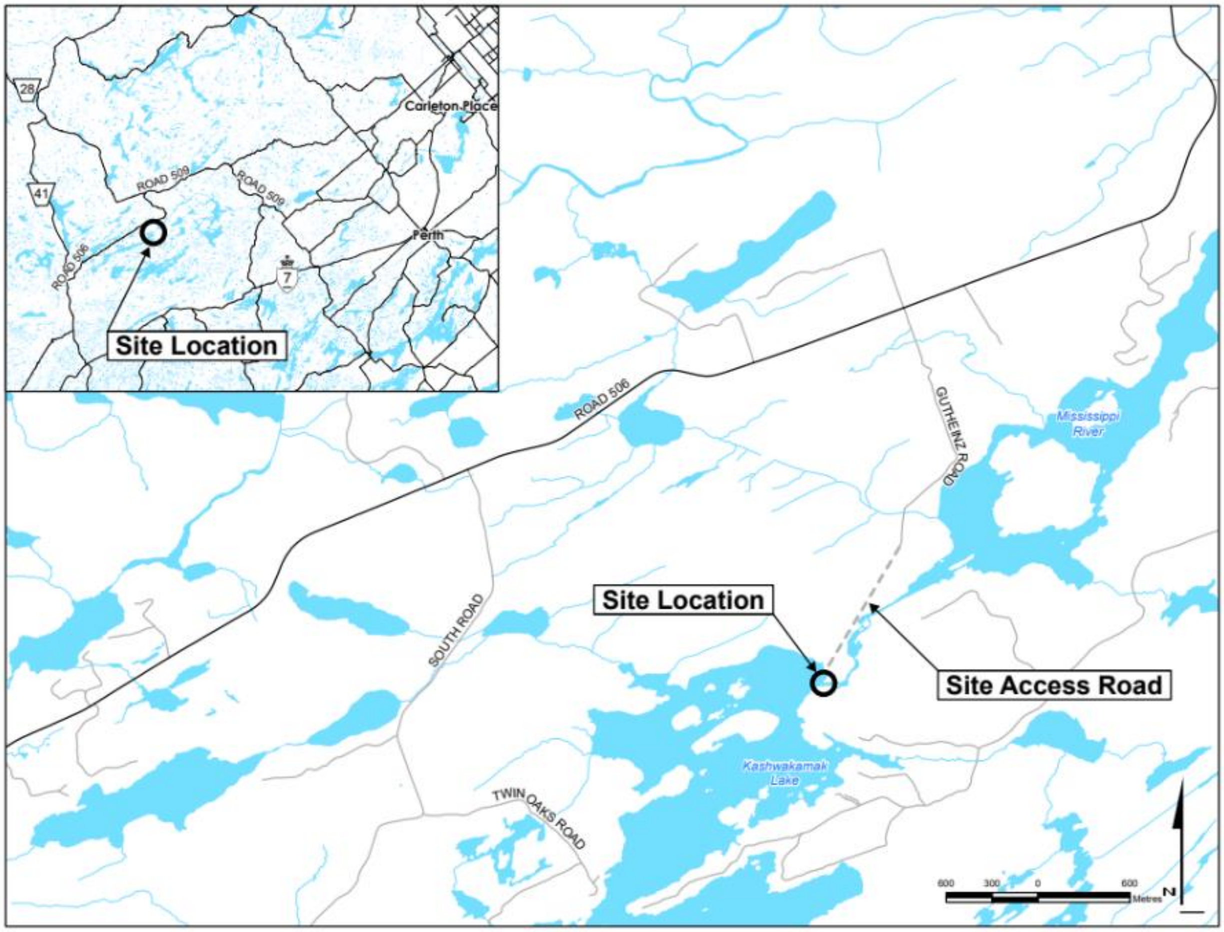
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Sean Davison
Hiawatha First Nation
123 Paudash Street
Hiawatha, ON KJ9 0E6

Dear Sean Davison,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

The objective of the land-based Archaeological Assessment is to assess the study area that will be impacted by deconstruction/construction activities and determine if there are any archaeological resources present. The assessment will consist of background research to determine if there are known archaeological resources within the study area followed by a systematic shovel test pit survey to determine the presence of unknown archaeological sites/resources. The study area is approximately 1.48 hectares (3.65 acres) in size.

Past Recovery Archaeological Services Inc. (Past Recovery) has been contracted by Egis on behalf of MVCA to complete the assessment. Fieldwork has been scheduled for May 2, 2024. It has been assumed that the archaeological assessment will be completed in 1 day with a field crew of 6 people. The field investigation details are as follows:

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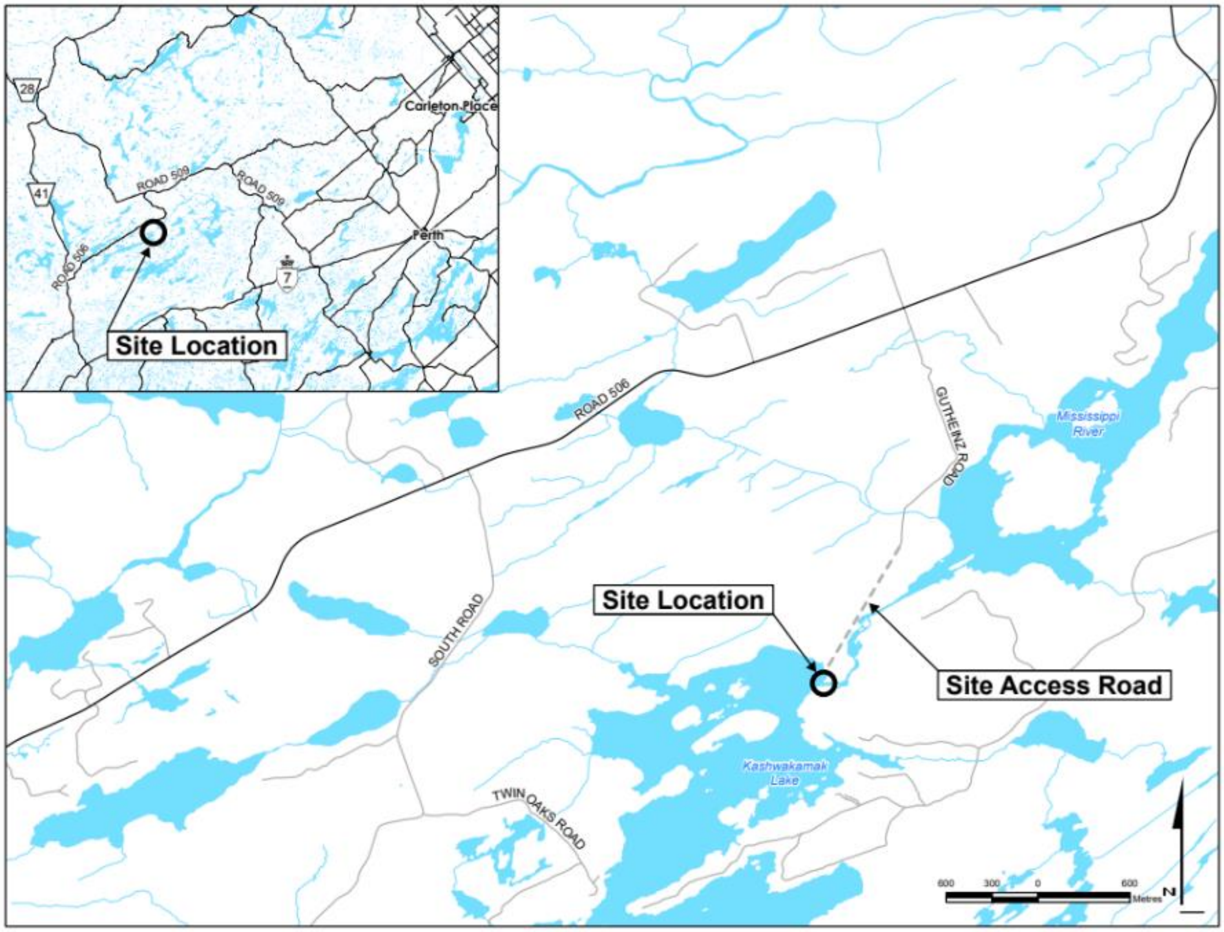
We welcome your contribution to the project and are available to address any concerns that may arise.

Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

April 18, 2024 E-01

Huron-Wendat Nation
255 Place Chef Michel-Leveau
Wendake, QC G0A 4V0

Dear Huron-Wendat Nation Consultation Coordinator,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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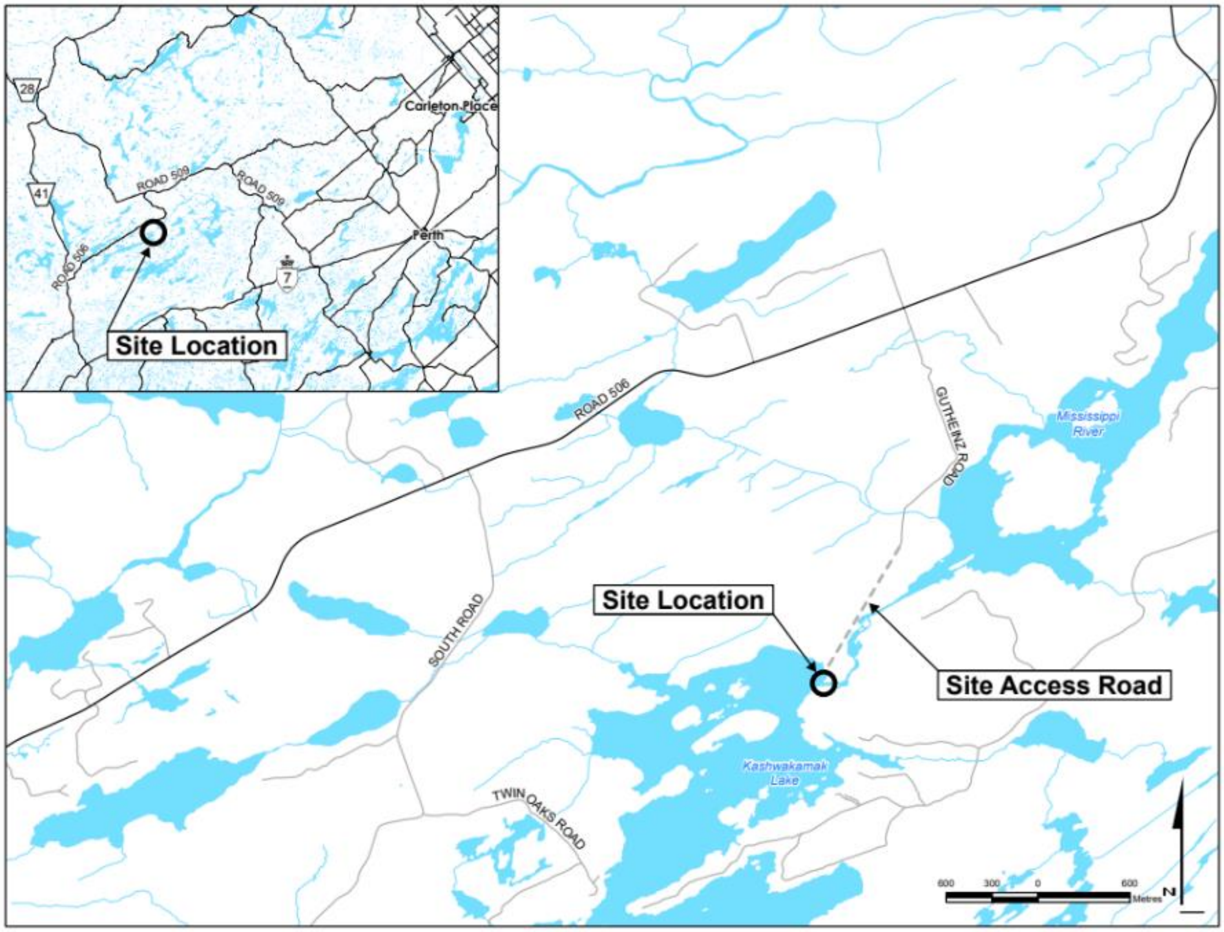
We welcome your contribution to the project and are available to address any concerns that may arise.

Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Kawartha Nishnawbe Council,
Kawartha-Nishnawbe First Nation
RR#4
Burleigh Falls, ON K0L 2H0

Dear Kawartha Nishnawbe Council,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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Recovery will conduct the archaeological assessment and subsequent reporting in compliance with the Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists.

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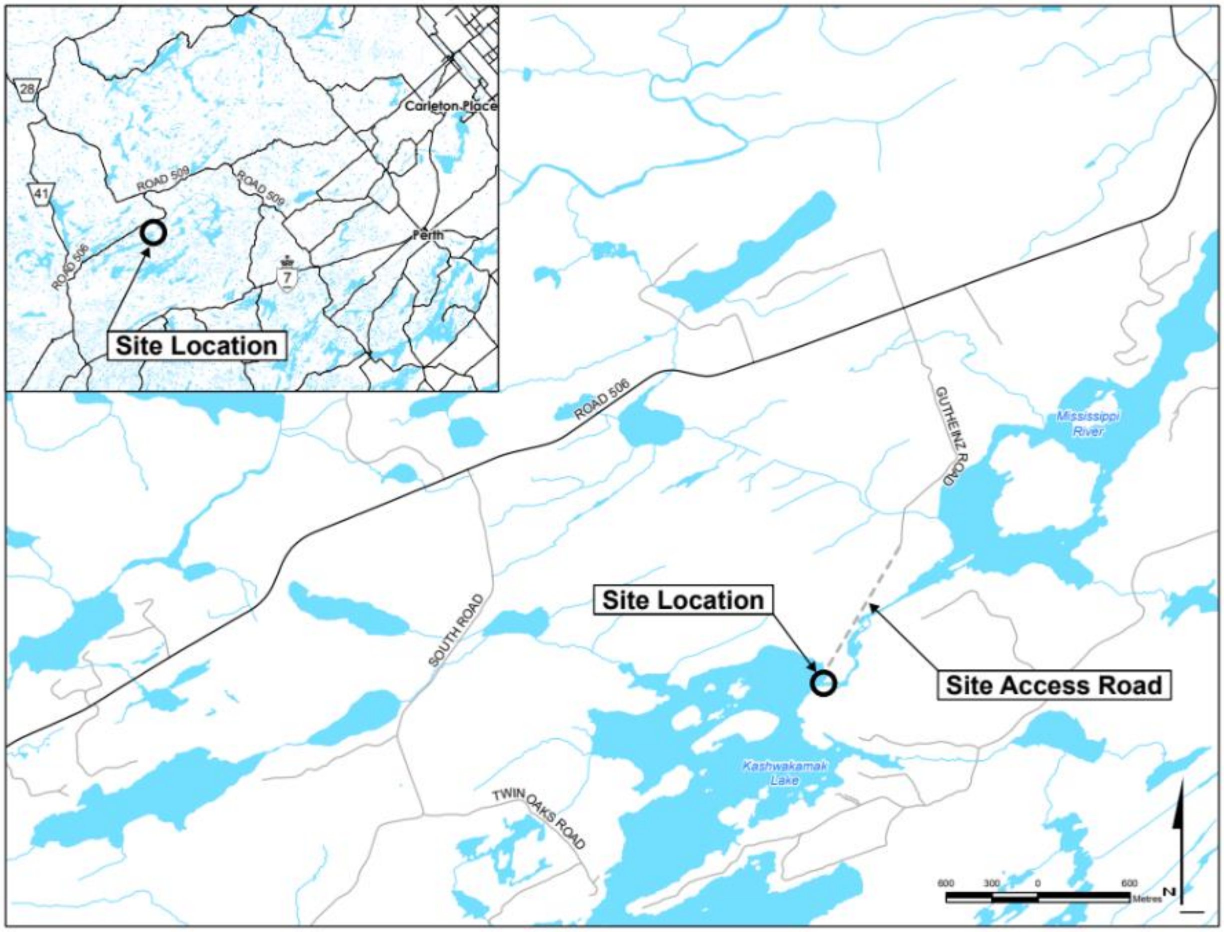
Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

April 18, 2024 E-01

Cassie Thompson,
Mohawks of the Bay of Quinte
24 Meadow Drive
Tyendinaga Mohawk Territory, ON K0K 1X0

Dear Cassie Thompson,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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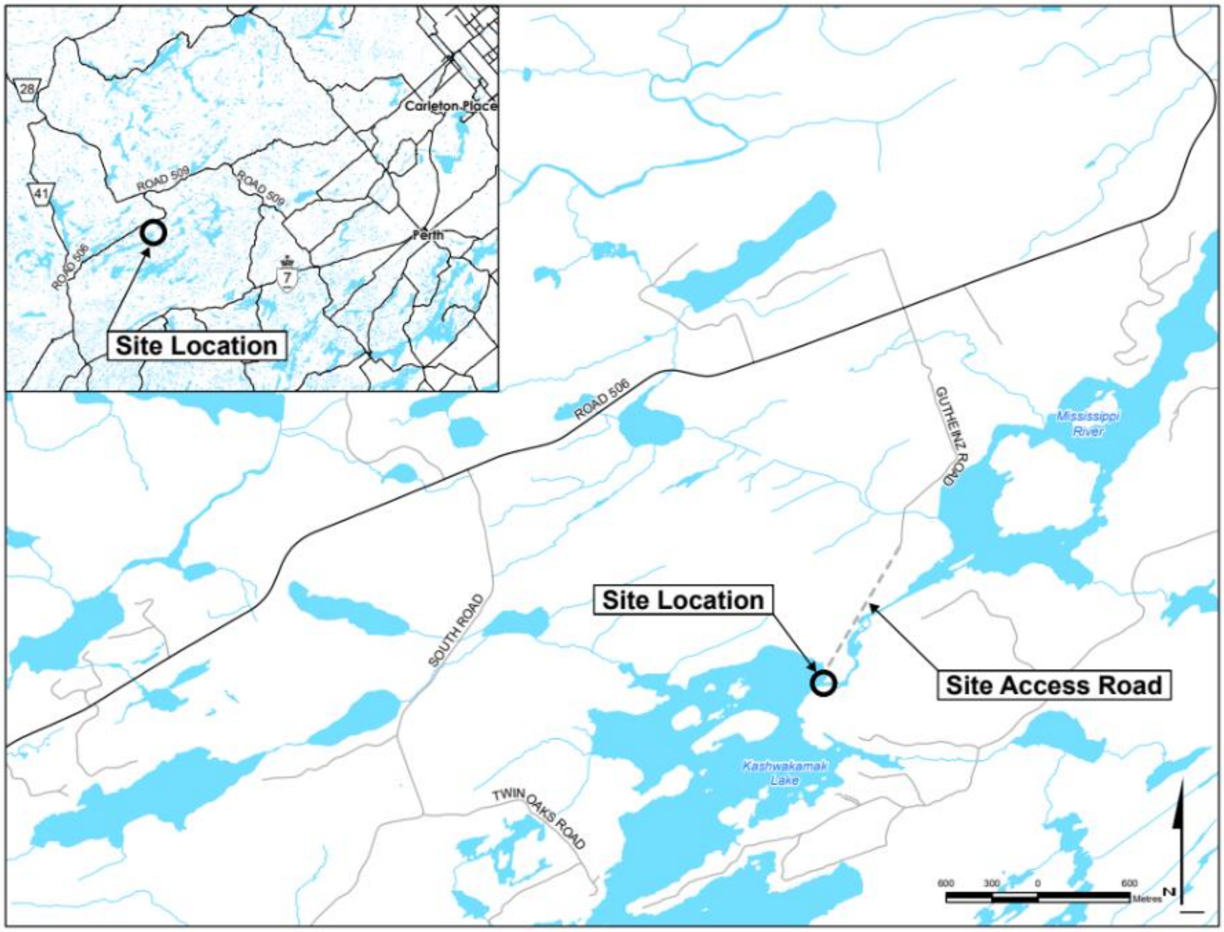
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Lands, Resources, and Consultations (LRC) Branch
Métis Nation of Ontario
Sault Ste. Marie, ON

Dear Métis Nation of Ontario LRC Branch,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

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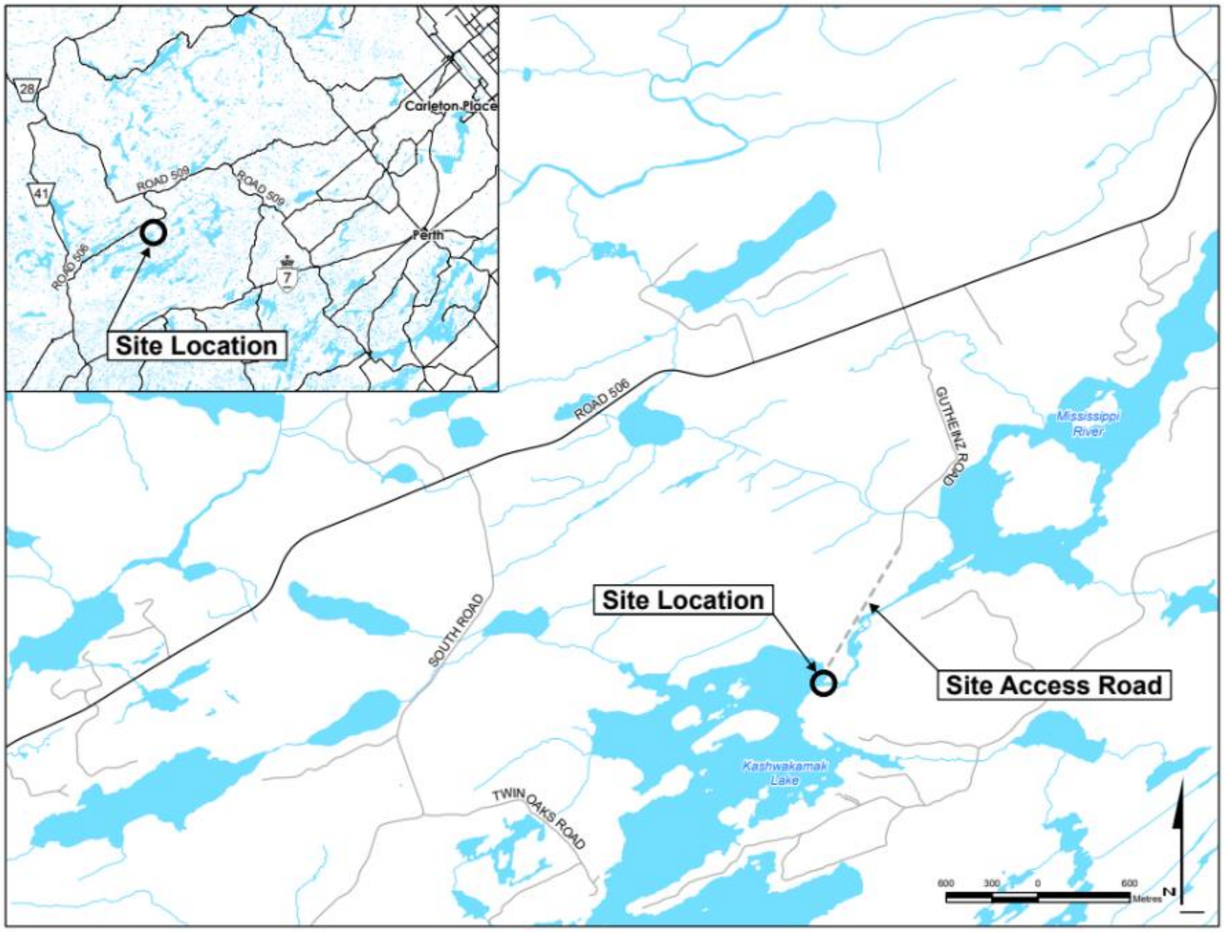
S McIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley
Conservation Authority

April 18, 2024 E-01

Chief Kelly LaRocca,
Mississaugas of Scugog Island
R.R.#5 22521 Island Road
Port Perry, ON L9L 1B6

Dear Chief Kelly LaRocca,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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Mississippi Valley Conservation Authority

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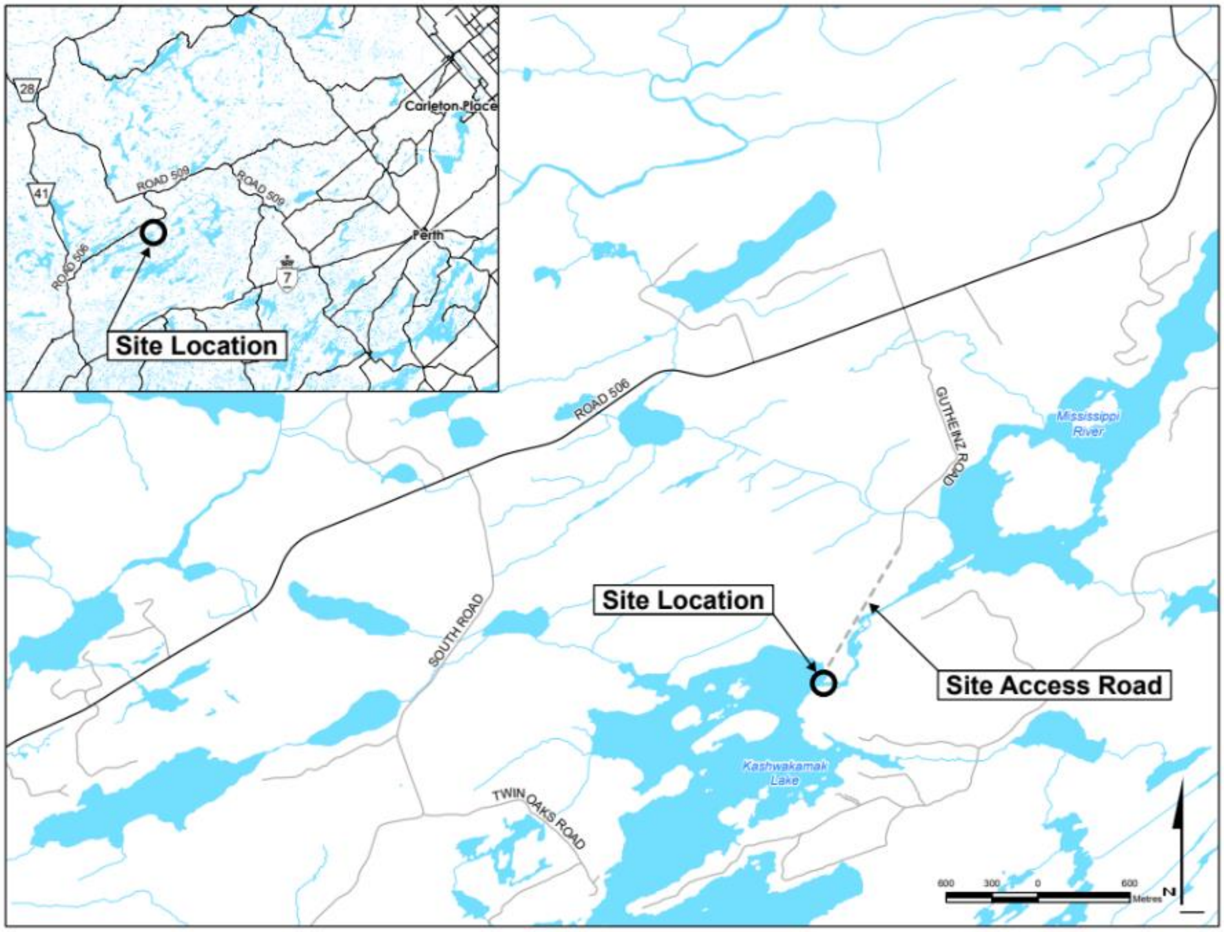
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

April 18, 2024 E-01

Ben Benson
Chippewas of Rama First Nation
5884 Rama Road, Suite 200
Rama, ON L3V 6H6

Dear Ben Benson,

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 2 Archaeological Assessment**

Mississippi Valley Conservation Authority (MVCA) has commissioned a Stage 2 Archaeological Assessment in support of a Class Environmental Assessment Study for replacement of the Kashwakamak Lake Dam. Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

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Mississippi Valley Conservation Authority

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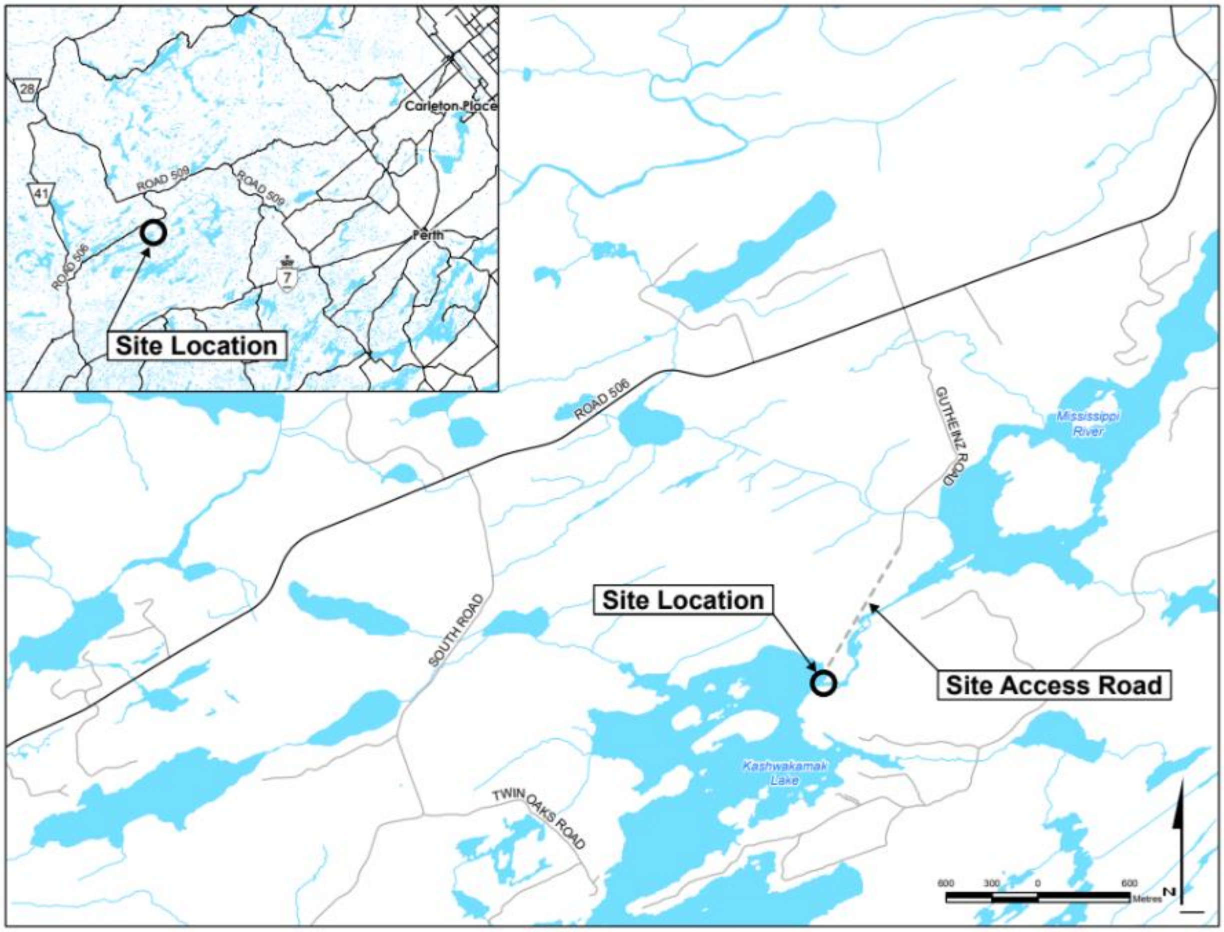
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.



Mississippi Valley Conservation Authority

August 12, 2024 E-01

To Whom It May Concern,

**Kashwakamak Lake Dam Environmental Assessment**
**NOTICE: Stage 3 Archaeological Assessment**

You are invited to send a representative to participate in fieldwork being carried out in association with a Stage 3 Archeological Assessment at the Kashwakamak Lake Dam. The field investigation is being undertaken by Past Recovery Archaeological Services Inc. (Past Recovery), subconsultant to Egis who is leading a Class Environmental Assessment on behalf of Mississippi Valley Conservation Authority (MVCA).

The field investigation details are as follows:

| | |
|---|---|
| **Location:** | Gutheinz Road, Township of North Frontenac, K0H 1K0 |
| **Date/Duration:** | August 20th to 22nd, 2024 (weather dependent). It has been assumed that the archaeological assessment will be completed in **3 days**. |
| **Scope of Work:** | Stage 3 Archaeological Assessment – 5m grid of 1m$^2$ test pits |

Kashwakamak Lake Dam is located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac on the main channel of the Mississippi River (refer to Figure 1).

A Stage 2 Archaeological Assessment of the study area in May 2024 resulted in the identification of an Indigenous archaeological site on the highest point of land overlooking the bend in the waterway. Though this site was quite small (confined to one test pit and a subsequent one-metre-square excavation unit), it exceeded minimum requirements in the Ontario Ministry of Citizenship and Multiculturalism's (MCM) Standards and Guidelines for Consultant Archaeologists (2011) to proceed to a Stage 3 Archaeological Assessment, which has been recommended. The location of the site is removed from the main planned activity area and likely will not be disturbed by the planned reconstruction of the dam; however, its protective buffers following Stage 2 (a 20 m no disturbance radius and a further 50 m protective buffer where monitoring of any soil disturbance would be required) extend into the area planned to be cleared for construction laydown and access road widening.

The objective of the land-based Archaeological Assessment is to assess the study area that will be impacted by deconstruction/construction activities and document/catalogue archaeological resources present. The assessment will consist of the excavation of one metre square test units on a 5 m grid over the area of the site in order to generate information on site stratigraphy, accurately define site limits, and assess the potential for significant archaeological artifacts.

Documentation of the Stage 3 fieldwork would include fieldnotes, site plans and digital photographs. After the completion of the fieldwork, all artifacts would be cleaned, labelled with the appropriate provenience, and catalogued. The Stage 3 report would present the results of the investigation and would meet the standards set out by Ministry of Citizenship and Multiculturalism's *Standards and Guidelines for Consultant Archaeologists*. (2011); as the work is to be undertaken imminently it will be combined with the Stage 1 and Stage 2 reporting.

If your community would be interested in providing a liaison to take part in the fieldwork please acknowledge your desire to send a liaison and provide an estimate of fees by **August 16th, 2024** for MVCA's review. Agreements for this project will be executed directly with the Mississippi Valley Conservation Authority. Please forward agreements to Sally McIntyre (smcintyre@mvc.on.ca), Juraj Cunderlik (jcunderlik@mvc.on.ca), and Alana Perez (aperez@mvc.on.ca) for review and approval. Please note that if MVCA receives multiple quotes, the field liaison role will be limited to two organizations due to budget constraints.

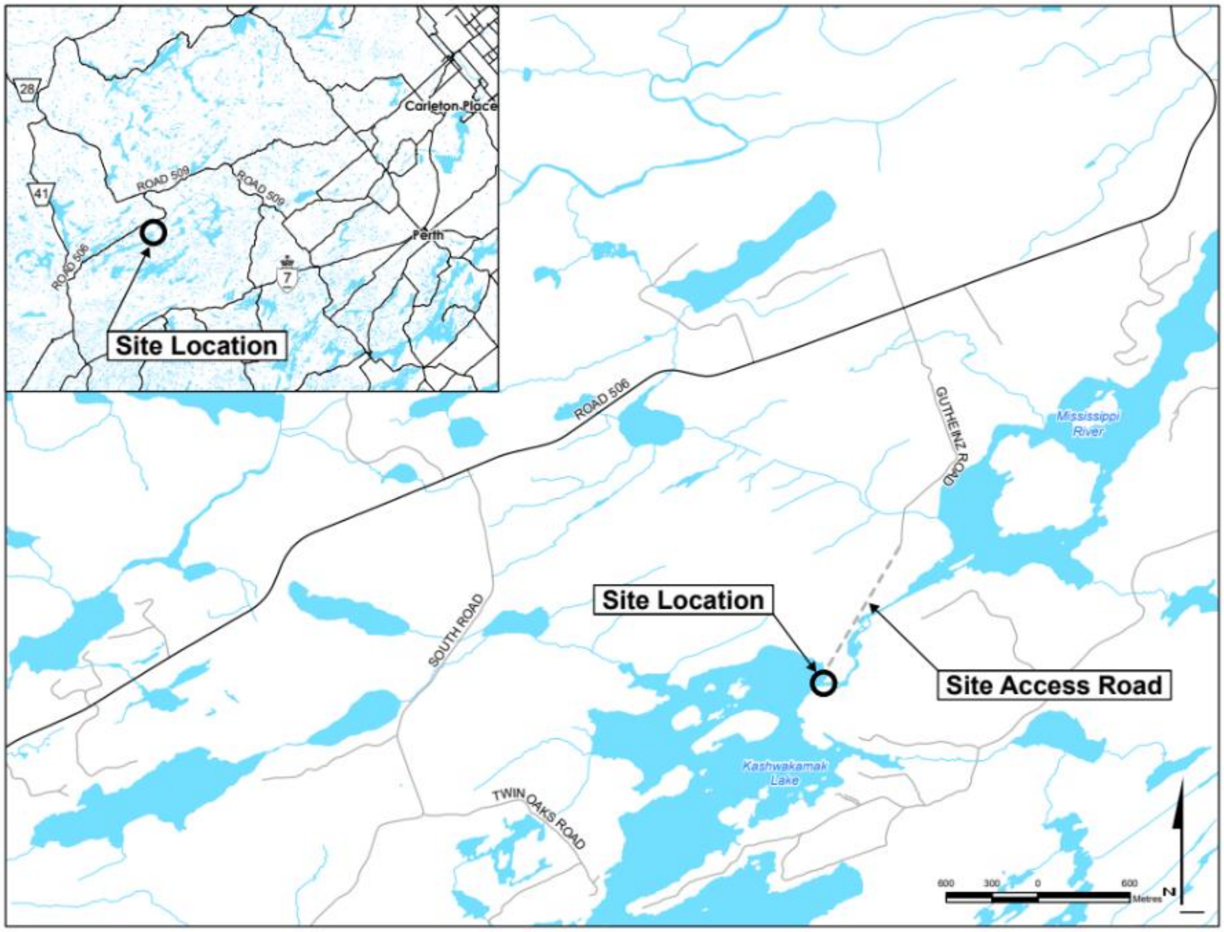
We welcome your contribution to the project and are available to address any concerns that may arise.

Sincerely,

SMcIntyre

Sally McIntyre, General Manager
Mississippi Valley Conservation Authority

C.C. Lisa Marshall, Consultant Project Manager, Egis
Caitlyn Howard, M.A., Indigenous Engagement Coordinator, Past Recovery Archaeological Services Inc.


28
Carleton Place
ROAD 509
ROAD 509
41
Perth
ROAD 506
7
Site Location
ROAD 506
GUTHEINZ ROAD
Mississippi
River
SOUTH ROAD
Site Location
Site Access Road
Kashwakamak
Lake
TWIN OAKS ROAD
600
300
0
600
Metres
N

| | |
|---|---|
| From: | Lisa Marshall |
| Sent: | May 26, 2023 1:03 PM |
| To: | Lauren Walker |
| Subject: | FW: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| | |
| Follow Up Flag: | Follow up |
| Flag Status: | Flagged |

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY
*Turning Possibilities Into Reality*

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From: Jane Cho <jcho@mvc.on.ca>
Sent: May 26, 2023 12:47 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>
Cc: tcowie@hiawathafn.ca; sdavison@hiawathafn.ca; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: FW: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Hi Tom,

Thank you very much for your email. I will recirculate your email with our project representatives, so your concerns are circulated with the project team. Also, we would like to keep you in the loop and ensure that your concerns will be addressed during the indigenous consultation process.

The following is the draft project schedule.
- May and June 2023: Circulation of Notice of Intent and address all inquires and public comments and concerns
- October 2023: Indigenous Communities Consultations with respect to Selection of Preferred Alternative, as required (via teleconference)
- January 2024: Indigenous Communities Consultations with respect to Environment Impact Analysis of the Preferred Alternative, as required (vial teleconference)
- March 2024: Anticipated Completion Date for the Class EA Project

Please let me know if you have any further questions/concerns regarding the proposed schedule.

Best regards,
Jane

---

From: Tom Cowie <tcowie@hiawathafn.ca>
Sent: May 26, 2023 11:15 AM

To: Jane Cho <jcho@mvc.on.ca>
Cc: Sean Davison <sdavison@hiawathafn.ca>
Subject: RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Aaniin Jane,

Chi miigwech for the information regarding Kashwakamak Lake Dam CEA and the condition of the dam. We would be interested in reviewing the CEA. We would also have archaeological concerns regarding the future of this project as well as the flora, fauna and species at risk.

Gichi manaadendamowin

Tom Cowie

Tom Cowie
Lands/Resources Consultation
Hiawatha First Nation
431 Hiawatha Line,
Hiawatha, On
K9J 0E6
705 295-4421 Ext. 216
Email tcowie@hiawathan.ca

*We, the Michi Saagiig of Hiawatha First Nation, are a vibrant, proud, independent and healthy people balanced in the richness of our culture and traditional way of life*

---

From: Donna Paudash <dpaudash@HiawathaFN.ca>
Sent: Thursday, May 25, 2023 12:17 PM
To: Sean Davison <sdavison@hiawathafn.ca>; Tom Cowie <tcowie@hiawathafn.ca>
Subject: FW: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

---

From: Jane Cho <jcho@mvc.on.ca>
Sent: Thursday, May 25, 2023 11:50 AM
To: Donna Paudash <dpaudash@HiawathaFN.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

**ALERT:** This message originated outside of HFN's network. **BE CAUTIOUS** before clicking any link or attachment.

Dear Ms. Paudash,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

As per the attached notice, the project team invites you to participate in the study, which is being completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

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| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | May 25, 2023 1:35 PM |
| To: | Consultation |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |

Dear Tom,

Thank you for your clarification. I will forward all correspondences from MVCA regarding consultations, project updates, etc to consultation@scugogfirstnation.com from now on.

Best regards,
Jane

---

From: Thomas Turoczi <tturoczi@scugogfirstnation.com>
Sent: May 25, 2023 12:59 PM
To: Jane Cho <jcho@mvc.on.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Jane,
Thank you for your message. It seems you sent out the same message separately to drichardson@scugogfirstnation.com and consultation@scugogfirstnation.com
Please note that Don Richardson is part of our MSIFN consultation correspondence team and the consultation email is our shared consultation inbox.

Moving forward please include us in the same email.
Many thanks,

Tom Turoczi
Consultation Specialist
Mississaugas of Scugog Island First Nation

---

From: Jane Cho <jcho@mvc.on.ca>
Sent: Thursday, May 25, 2023 11:50 AM
To: Thomas Turoczi <tturoczi@scugogfirstnation.com>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Mr. Turoczi,

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Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

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Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,

Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 1:35 PM
To: Consultation
Cc: Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Tom,

Thank you for your clarification. I will forward all correspondences from MVCA regarding consultations, project updates, etc to consultation@scugogfirstnation.com from now on.

Best regards,
Jane

---

From: Thomas Turoczi <tturoczi@scugogfirstnation.com>
Sent: May 25, 2023 12:59 PM
To: Jane Cho <jcho@mvc.on.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Jane,
Thank you for your message. It seems you sent out the same message separately to drichardson@scugogfirstnation.com and consultation@scugogfirstnation.com
Please note that Don Richardson is part of our MSIFN consultation correspondence team and the consultation email is our shared consultation inbox.

Moving forward please include us in the same email.
Many thanks,

Tom Turoczi
Consultation Specialist
Mississaugas of Scugog Island First Nation

---

From: Jane Cho <jcho@mvc.on.ca>
Sent: Thursday, May 25, 2023 11:50 AM
To: Thomas Turoczi <tturoczi@scugogfirstnation.com>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Mr. Turoczi,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

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Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

|  |  |
|---|---|
| From: | Community Consultation <consultation@ramafirstnation.ca> |
| Sent: | June 1, 2023 12:33 PM |
| To: | Jane Cho |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; Lisa Marshall; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca |
| Subject: | RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |

Aaniin,

Thank you for sending that to CRFN.
We have no additional comments or concerns with this project.

Miigwech,

-BB

**Ben Benson**
*Community Consultation Worker, Legal*
**Chippewas of Rama First Nation**
(ph) 705-325-3611, 1633
(cell) 705-238-7111
(fax)
(url) www.ramafirstnation.ca

From: Jane Cho <jcho@mvc.on.ca>
Sent: May 25, 2023 11:51 AM
To: Community Consultation <consultation@ramafirstnation.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Mr. Benson,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative. This study will investigate the potential environmental, social and economic impacts of the preferred alternative and identify measures to mitigate any adverse impacts.

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Input received will be incorporated into the planning and design process for this project and will be received until June 23rd, 2023. If you wish to be involved in this study or receive information, please contact one of the project team members identified below.

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please note that the Class EA study is being carried out with support from Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) with anticipated completion date in March 2024.

Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

Lisa Marshall

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| | |
|---|---|
| From: | Lisa Marshall |
| Sent: | June 14, 2023 9:16 AM |
| To: | Oralie George |
| Cc: | Juraj Cunderlik; Ramy Saadeldin; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca; Lauren Walker |
| Subject: | RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA) |
| | |
| Follow Up Flag: | Follow up |
| Flag Status: | Flagged |

Good Morning Miigwetch,

Thank you for your interest in the Kashwakamak Lake Dam Environmental Assessment.

At this time, we have circulated the Notice of Intent to the following Indigenous Communities:

Curve Lake First Nation
Hiawatha First Nation
Mississaugas of Scugog Island First Nation
Chippewas of Georgina Island First Nation
Chippewas of Rama First Nation
Beausoleil First Nation
Ardoch Algonquin First Nation
Huron-Wendat Nation
Metis Nation of Ontario
Algonquins of Ontario

Please let us know if you have any additional questions.

Thank you,

**Lisa Marshall,** P.Eng.
**Manager, Environmental Engineering**
**T.** 613.714.0815 | **F.** 613.836.3742 | **C.** 613.852.1148
l.marshall@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY
*Turning Possibilities Into Reality*

---

From: Oralie George <ogeorge@alderville.ca>
Sent: June 13, 2023 1:54 PM
To: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; Lisa Marshall <l.marshall@mcintoshperry.com>; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: RE: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Good Afternoon,

May I know the other indigenous communities involved in this assessment ?

Thank you,

Miigwetch,

Oralie George
Lands & Estate Administrator

11696 Second Line Road
Roseneath, ON K0K 2X0
905-352-2011  Ext. 241
ogeorge@alderville.ca

*Alderville First Nation*

---

From: AFN Reception <afnreception@alderville.ca>
Sent: Thursday, May 25, 2023 12:15 PM
To: Dave Mowat <dmowat@alderville.ca>; Joanne Smoke <jsmoke@alderville.ca>; Oralie George <ogeorge@alderville.ca>
Subject: FW: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

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From: Jane Cho <jcho@mvc.on.ca>
Sent: Thursday, May 25, 2023 11:48 AM
To: AFN Reception <afnreception@alderville.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; Ramy Saadeldin <rsaadeldin@mvc.on.ca>; l.marshall@mcintoshperry.com; dmaf-faac@infc.gc.ca; eaicon-eecaon@infc.gc.ca
Subject: Notice of Intent - Kashwakamak Lake Dam Class Environmental Assessment (Class EA)

Dear Ms. Crowe,

Attached is the Notice of Intent for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA).

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Ltd. to complete a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Class EA process includes public, governing agency, stakeholders and Indigenous Communities consultation, characterization of the study area and the identification and evaluation of alternatives using sound criteria to select the technically preferred alternative.

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Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3
Carp, ON, K0A 1L0
Phone: 613-714-0815
l.marshall@mcintoshperry.com

If you have accessibility requirements in order to participate in this project, please contact one of the project team members listed in the attached notice. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

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Best regards,
Jane Cho | Water Resources Engineering Intern (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 274| Fax: 613 253 0122 | jcho@mvc.on.ca

Mississippi Valley
Conservation Authority

| | |
|---|---|
| From: | Jane Cho <jcho@mvc.on.ca> |
| Sent: | June 20, 2024 3:24 PM |
| To: | Mitchell, Krystal (Algonquins Of Ontario) |
| Cc: | Sally McIntyre; Juraj Cunderlik; Alana Perez; Knight, Melissa (Algonquins Of Ontario); Meness, Jim (Algonquins Of Ontario) |
| Subject: | RE: Kashwakamak Lake Dam Class Environmental Assessment - May update |

Good afternoon Krystal,

Thank you for your comments/inputs on our PIC meeting information. Your comments/inputs are forwarded to project team to discuss and address them in the appropriate stage of the project.

MVCA would love to provide bi-monthly updates on project progress to the AOO. The next 8th update will be circulated in the last week of July 2024.

The next CLC meeting will be tentatively scheduled in mid July 2024. It will be a virtual meeting, and the meeting invite will be sent to the representatives from local First Nation (Hiawatha First Nation), Kashwakamak Lake Association, Township of North Frontenac, and local residents. We can include meeting minutes in our next update for your information. Please let us know if you would like to participate in the CLC meeting.

Please note that I will go on maternity leave in the mid-late July. Alana Perez (cc'd on this email) will be my replacement contact after mid-July. For further information/discussion, please reach out to our project team below:

Juraj Cunderlik, PhD., P.Eng.
Director, Engineering
Mississippi Valley Conservation Authority 10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

Lisa Marshall, P.Eng.,
Project Manager
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road, R.R.3 Carp, Ontario, K0A 1L0
Phone: 613-714-0815
Lisa.MARSHALL@egis-group.com

Best regards,
Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 274 f. 613 253 0122 | jcho@mvc.on.ca

---

From: Mitchell, Krystal (Algonquins Of Ontario) <kmitchell@tanakiwin.com>
Sent: June 18, 2024 11:41 AM
To: Jane Cho <jcho@mvc.on.ca>
Cc: Sally McIntyre <smcintyre@mvc.on.ca>; Juraj Cunderlik <jcunderlik@mvc.on.ca>; Alana Perez <APerez@mvc.on.ca>; Knight, Melissa (Algonquins Of Ontario) <mknight@tanakiwin.com>; Meness, Jim (Algonquins Of Ontario) <jmeness@tanakiwin.com>
Subject: RE: Kashwakamak Lake Dam Class Environmental Assessment - May update

Good Morning Jane,

Thank you for the update below regarding the Kashwakamak Lake Dam project. Thank you as well for the attached invitation to the May 23rd PIC meeting and the follow-up message from our April 17th meeting.

Due to capacity limitations, the AOO will be stepping back from consultation on this project at a Nation level, however, we would appreciate continued updates on project progress. We will also be passing along your contact information to the AOO communities if they are interested in engaging with the project at a community level. Are you able to confirm when the next CLC meeting is scheduled to take place?

Based on review of the PIC meeting recording and slides, the AOO wish to provide the following comments:

- The recommended Alternative 4 - "Replacing the Existing Dam at the Same Location" addresses the problem statement and avoids the environmental impacts associated with Alternative 5. The AOO wish to express concern with Alternative 5 due to the likely impacts to sensitive fish spawning habitat and unaltered lands and watercourse associated with this option.
- Alternatives 1, 2, and 3 do not address the problem statement and pose a threat to downstream AOO settlement lands and Manómin (wild rice) beds due to the continued risk of dam failure and/or reduced ability to support water management plan functions.
- Strong mitigation measures must be developed to prevent potential impacts resulting from water level fluctuations, sedimentation, and/or spills of deleterious substances during construction activities. Fish and fish habitat, species at risk, significant aquatic and terrestrial wildlife habitat, and downstream Manómin beds must be protected during construction activities.
- Dam replacement should consider improvements to fish passage within the structural design of the new dam.

Thank you again for working to incorporate AOO input into the Kashwakamak Dam Class EA process.

Kind Regards,

**Krystal Mitchell**
Fisheries and Wildlife Management Advisor

Algonquins of Ontario Consultation Office
31 Riverside Drive, Suite 101
Pembroke, ON K8A 8R6
Phone: 613-401-2678
Email: kmitchell@tanakiwin.com
General Inquiries: algonquins@tanakiwin.com
Website: www.tanakiwin.com

---

From: Jane Cho <jcho@mvc.on.ca>
Sent: Thursday, May 30, 2024 1:25 PM
To: Knight, Melissa (Algonquins Of Ontario) <mknight@tanakiwin.com>
Cc: Mitchell, Krystal (Algonquins Of Ontario) <kmitchell@tanakiwin.com>; Sally McIntyre <smcintyre@mvc.on.ca>; Juraj Cunderlik <jcunderlik@mvc.on.ca>; Alana Perez <APerez@mvc.on.ca>
Subject: Kashwakamak Lake Dam Class Environmental Assessment - May update

Good afternoon Melissa,

Here is our seventh update on the progress of the Kashwakamak Lake Dam project.

MVCA had one monthly progress meetings with Egis (formerly McIntosh Perry) on May 13th, 2024 since our sixth update in March 2024.

In summary,

- Egis finalized and distributed the Stage 1 Archaeological Assessment Report and Environmental Existing Conditions Report to the Ministry of Citizenship and Multiculturalism (MCM).
- Stage 2 Archaeological field work was completed on May 2, 2024. Alderville First Nation and Algonquins of Pikwàkanagàn sent their Liaisons to participate the field work. A small Indigenous site was encountered and a buffer area has been delineated. MVCA is investigating options for next steps.
- A virtual Public Information Centre (PIC) was held on May 23, 2024. A copy of the recorded PIC meeting and presentation slides is available on our website: Kashwakamak Lake Dam Class EA - Mississippi Valley Conservation Authority (mvc.on.ca).

Next Steps:

- Egis is currently working on the conceptual design.
- Community Liaison Committee (CLC) meeting #2 is tentatively scheduled for mid-late June, 2024.
- Project File Report and Notice of Filing will be issued in July.

Please feel free to reach out to me or project team members if you have any questions or concerns.

Jane Cho | Water Resources Engineer in Training (EIT) | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | t. 613 253 0006 ext. 274  f. 613 253 0122  | jcho@mvc.on.ca

Mississippi Valley Conservation Authority

**MARSHALL Lisa**

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| | |
|---|---|
| From: | Tom Cowie <tcowie@hiawathafn.ca> |
| Sent: | August 30, 2024 10:07 AM |
| To: | Alana Perez |
| Cc: | Juraj Cunderlik; MARSHALL Lisa |
| Subject: | RE: Kashwakamak Lake Dam Environmental Assessment - Notice of Community Liaison Committee Meeting #2 |

**/!** Courriel externe - Merci d'être prudent avec les liens et les pièces jointes **/!** External email - Please be careful with links and attachments **/!**

Aaniin Alana,

Chi miigwech for the information. At this time I have no questions or concerns. Have a great weekend.

Gichi manaadendamowin

Tom Cowie

Tom Cowie
Lands/Resources Consultation
Hiawatha First Nation
431 Hiawatha Line,
Hiawatha, On
K9J 0E6
705 295-4421 Ext. 216
Email tcowie@hiawathafn.ca

*We, the Michi Saagiig of Hiawatha First Nation, are a vibrant, proud, independent and healthy people balanced in the richness of our culture and traditional way of life*

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From: Alana Perez <APerez@mvc.on.ca>
Sent: Tuesday, August 27, 2024 8:58 AM
To: Tom Cowie <tcowie@hiawathafn.ca>
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; MARSHALL Lisa <Lisa.MARSHALL@egis-group.com>
Subject: RE: Kashwakamak Lake Dam Environmental Assessment - Notice of Community Liaison Committee Meeting #2

**ALERT:** This message originated outside of HFN's network. **BE CAUTIOUS** before clicking any link or attachment.

Good morning Tom,

The second Community Liaison Committee meeting for the Kashwakamak Lake Dam Environmental Assessment was held on August 13. I have attached the presentation and meeting minutes to this email.

Thanks,

Alana

Alana Perez, P.Eng. | Water Resources Engineer | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 252| Fax: 613 253 0122 | aperez@mvc.on.ca

Mississippi Valley Conservation Authority

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From: Alana Perez
Sent: Tuesday, July 9, 2024 4:04 PM
To: tcowie@hiawathafn.ca
Cc: Juraj Cunderlik <jcunderlik@mvc.on.ca>; MARSHALL Lisa <Lisa.MARSHALL@egis-group.com>; Jane Cho <jcho@mvc.on.ca>
Subject: Kashwakamak Lake Dam Environmental Assessment - Notice of Community Liaison Committee Meeting #2

Good afternoon Tom,

Firstly, I'd like to take this opportunity to introduce myself. My name is Alana Perez and I'm a Water Resources Engineer at MVCA. You have previously been in contact with Jane Cho about the Kashwakamak Lake Dam Environmental Assessment project – as Jane approaches her coming maternity leave, I will be her replacement contact for the project! Please don't hesitate to reach out to me if you have any questions.

In addition, MVCA and Egis would like to formally invite you to the final Community Liaison Committee (CLC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will provide an update on the Public Information Centre and Stage 3 Archaeological Assessment requirements, as well as identify the selected Preferred Alternative Solution(s). The meeting will provide an opportunity for the CLC members to participate in the project's planning process and provide valuable input/feedback.

**Meeting details:**
Date: August 13, 2024
Time: 1:00 - 3:00 pm
Location: Virtual Meeting/Presentation (Teams meeting invite to follow this email)

If you are unable to attend the virtual meeting, the presentation can be made available to you, and we can answer any follow-up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, McIntosh Perry Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and look forward to your contributions during the meeting.

Thank you,

Alana

Alana Perez, P.Eng. | Water Resources Engineer | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON  K7C 3P1
www.mvc.on.ca | Tel: 613 253 0006 ext. 252| Fax: 613 253 0122 | aperez@mvc.on.ca

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# Appendix E – Community Liaison Committee Meetings

From: Lisa Marshall
Sent: August 25, 2023 12:53 PM
To: [redacted]
Cc: Juraj Cunderlik; Ramy Saadeldin; Sally McIntyre; Lauren Walker
Subject: Kashwakamak Lake Dam Class EA - Call for Community Liaison Committee Members
Attachments: MVCA_Kashwakamak Dam EA_CLC TOR_ August 2023.pdf

Hello [redacted]

The MVCA is establishing a Community Liaison Committee (CLC) for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). The purpose of the CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam. MVCA is seeking up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam to form part of the committee. More information regarding the role and responsibilities of the CLC can be found in the attached Terms of Reference.

Proposed Schedule:

Expression of Interest by: September 29th, 2023

MVCA/McIntosh Perry Inform Selected Members of Committee and next steps by: October 6th, 2023

CLC Meeting #1: Week of November 13th, 2023 (tentative)

- Present Problem/Opportunity Statement, Alternative Solutions, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Alternative Solution(s). Provide time for open discuss and comments.

Public Information Centres (PICs): Week of November 27th, 2023 (tentative)

CLC Meeting #2: Week of February 19th, 2024 (tentative)

- Present Review Preferred Solutions, Alternative Design Concepts, Criteria, Evaluation, Impacts and Mitigation, and review Preliminary Preferred Design Concept(s). Provide time for open discuss and comments.

If you are interested in becoming a member of the CLC, please contact Ramy Saadeldin at rsaadeldin@mvc.on.ca or the undersigned by September 29th, 2023.

Regards,

Mississippi Valley Conservation Authority

# KASHWAKAMAK LAKE DAM CLASS EA COMMUNITY LIAISON COMMITTEE (CLC) TERMS OF REFERENCE

## PURPOSE

The *Class Environmental Assessment for Remedial Flood and Erosion Control Projects*, 2013 states that a Community Liaison Committee (CLC) may be established on a project-by-project basis for each undertaking in accordance with the Class EA. The purpose of a CLC is to provide opportunities for stakeholders to meet with the project team outside of mandatory points of consultation to discuss the project, hear each other's perspectives, and help inform the EA process for the Kashwakamak Lake Dam.

## SCOPE

The three key advisory functions of the Community Liaison Committee (CLC) will be:

- to review information and provide comments during the planning and design process;
- to identify items of public concern related to the impact and design of the project; and,
- to offer potential advice or solutions to resolve these concerns.

## MEMBERSHIP

The MVCA will strive to achieve a cross-section of stakeholders on the CLC. Stakeholder groups and individuals that have expressed an interest in the Kashwakamak Lake Dam Class EA will be contacted regarding potential participation. Membership shall be limited to the following:

- Up to 3 members of the public who have expressed an interest in the project and that own or lease property abutting or within 20 km of the Kashwakamak Lake Dam;
- One (1) member representing the Township of North Frontenac;
- One (1) member representing the Kashwakamak Lake Association (KLA), and
- One (1) member representing each of the identified Indigenous Communities.

The following sections summarize the roles and responsibilities of CLC members and proposed meeting format.

## CODE OF CONDUCT

CLC members must be committed to listening and engaging in discussions in a respective and constructive manner. While opinions and ideas may differ, all perspectives will be listened to and considered. Disrespectful language and behaviors towards others will not be tolerated and will result in dismissal from the CLC.

Members shall inform the Project Team of any situation that may be either a conflict of interest or a potential conflict of interest with their CLC obligations and if required recuse themselves from discussion of those matters.

Some information and findings being presented will be draft and not for public distribution. Participants will be expected to treat information as confidential unless informed otherwise.

## MEMBER ROLES AND RESPONSIBILITIES

CLC Members will be responsible for:

- Attending all CLC meetings (members may send one (1) alternate in their place if they are not able to attend a meeting);
- Listening to/reviewing and considering the information provided by the Project Team;
- Participating in discussions;
- Listening to and considering the opinions of other CLC members;
- Providing constructive feedback on Project Team suggestions for improvements:
- Preparing for meetings by reviewing any materials provided in advance by the Project Team;
- Participating in the evaluation of preliminary alternatives and preferred alternative; and
- Using community networks to share information and solicit broader feedback when requested.

## LENGTH OF TERM

Participation on the CLC will be for the duration of the Kashwakamak Lake Dam Class EA, which is expected to conclude no sooner than Spring 2024. Members may be released at any time during the term by written resignation or by expressing their intent at a CLC Meeting.

## MEETINGS & FORMAT

Two (2) meetings are planned during the EA process:

- To provide an overview of the project, objectives and process.
- To consider proposed solutions and preliminary design alternatives.

These meetings will be:

- Conducted in a local facility or using an on-line meeting tool;
- Scheduled at least two (2) weeks in advance of the proposed meeting date;
- Approximately two (2) hours in length, and
- Documented in minutes and published as part of the EA record.

| | |
|---|---|
| From: | MARSHALL Lisa |
| Sent: | February 8, 2024 9:17 AM |
| To: | [redacted] |
| Cc: | Juraj Cunderlik; Jane Cho; Lauren Walker |
| Subject: | Kashwakamak Lake Dam Environmental Assessment - Community Liaison Committee Meeting Notice |

Good morning,

MVCA and Egis (formerly McIntosh Perry) would like to formally invite you to the first Community Liaison Committee (CLC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will present the Problem Statement, identify proposed Alternative Solutions, review the evaluation, and identify the recommended Preferred Alternative Solution(s). The meeting will provide an opportunity for CLC members to participate in the project's planning process and provide valuable input/feedback into the evaluation of the alternative solutions.

Meeting details:
Date: February 26, 2024
Time: 2:00 - 4:00 pm
Location: Virtual Meeting/Presentation (Teams meeting invite to follow this email)

If you are unable to attend the virtual meeting, the presentation can be made available to you and we can answer any follow up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, McIntosh Perry Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and look forward to your contributions during the meeting.

Thank you,
Lisa

**Lisa Marshall, P.Eng.**
Manager, Environmental Engineering
Phone: +1.613.714.0815 I Mobile: +1.613.852.1148

# Meeting Minutes

Date and Time: February 26, 2024, 2:00 – 4:00 PM

Location: Teleconference Call via Teams

List of Attendees:

**Mississippi Valley Conservation Authority (MVCA)**
Juraj Cunderlik, Director, Engineering
Jennifer North, Water Resources Technologist
Jane Cho, Water Resources EIT
Alana Perez, Water Resources Engineer
Kelly Stiles, Biologist
Sally McIntyre, General Manager

**Egis**
Lisa Marshall, P.Eng., Project Manager (PM) Lead Environmental Planner
Mustafa Sasal, Lead Sr. Water Resources Engineer
Monika Orwin, Water Resources Engineering Intern

**Committee Members**
Mayor Gerry Lichy, Mayor, Township of North Frontenac
Tom Cowie, Hiawatha First Nation
[redacted]

Subject: Kashwakamak Lake Dam Class EA
Community Liaison Committee (CLC) Workshop Meeting #1

## 1.0 INTRODUCTION

- Introduction was provided for all MVCA, Egis, and CLC meeting participants.
- A brief overview of the project and site background was provided.
- Egis Project Manager (PM) provided overview of meeting agenda.

## 2.0 PROJECT OVERVIEW

- Egis PM provided presentation to CLC Members:
    - Review of Study Area
    - Conservation Authority Environmental Assessment (EA) Process
    - Consultation Program
    - Problem Statement
    - Field Investigations
        - Natural Environmental Assessment
        - Archaeological and Cultural Heritage – The area has archaeological potential and will progress to a Stage 2 assessment. No construction will take place until the study is completed.
        - Hydrology and Hydraulic Assessment
        - Geotechnical Investigation
    - Proposed Alternative Solutions
    - Proposed Evaluation Criteria and Evaluation Matrix
        - It was noted that Alternative 2b was not carried forward at this point as it does not meet the needs of the Watershed Management Plan (WMP) nor does it address the Problem Statement.
    - Recommended Preferred Alternative Solution
        - Alternative 4 – Replace Existing Dam at the same location.
    - Next Steps

## 3.0 OPEN DISCUSSION

- CLC member ([redacted]) – when will construction start on the dam?
    - Egis PM noted that following consultation and public input, the evaluation matrix will be updated accordingly, and the Technically Preferred Alternative (TPA) will be selected. Egis and MVCA will then prepare a Concept Design for the TPA and will place the Project File Report on public record for 30 days for review and comment by agencies, stakeholders, First Nations, the public, etc. Once the EA is completed (Summer 2024), MVCA will need to undertake the preliminary and detailed design.
    - MVCA noted that construction on the dam will likely start in 2-3 years (fall 2026 or 2027) after the completion of the EA, the design, the tendering process, and obtaining permits.

- CLC member (Tom C.) – when was the Species at Risk (SAR) investigation completed for this EA?
    - Egis PM noted that a desktop review was completed prior to undertaking a single field visit in the early spring/summer.
    - MVCA noted that they have completed monitoring programs over the past 20 years including sampling the lake for baitfish and near-shore species but no sample SAR such as turtles or bats.
- CLC member (Tom C.) – can MVCA and Egis expand on the potential impacts of the dam on Manòmin?
    - MVCA responded that the data collected cannot be correlated since they do not typically survey the downstream area and they do not have data from before the dams were built to establish a baseline condition.
    - However, there is another dam located between Kashwakamak Lake Dam and the Ardoch community to allow for buffering and additional protection of the Manòmin.
    - MVCA also noted that in the structure operating plan, there are certain times of year when there needs to be stable flow and water levels to maintain the rice crop populations, and the dam is operated accordingly.
    - Egis noted that the Manòmin is being considered as part of this assessment.
- CLC member (Tom C.) noted that the territory mentioned in the report should be reaffirmed.
    - MVCA and Egis will confirm and update the territory names accordingly.
- CLC member ([redacted]) - are butternut trees in the area?
    - Egis acknowledged that there are butternut trees, however, none were identified within the study area.
    - A CLC member added that they could still be impacted during construction due to the risk of spillage.
    - Egis will identify the species present and ensure the appropriate mitigation measures are in place.
- MVCA requested that Egis explain the current Kashwakamak Lake Dam conditions and operations.
    - Egis explained the current Kashwakamak Lake Dam conditions, including the elevations of the stop log gates, the overflow weir, the north and south embankments, the saddle dam, and the fluctuations of the water surface elevations between winter and summer settings (approximately 1.5 m).
    - In the case of overflow, it occurs through the weir and no overtopping of the saddle dam has been recorded. The saddle dam is built up from the low area near the dam to prevent spillage of the lake.
- CLC member ([redacted]) - how the water level will be controlled during the replacement of the dam?
    - Egis responded that a diversion plan for flow mitigation will be considered during later stages of the detailed design.

  - MVCA noted that the installation of temporary coffer dams with a staged construction plan to maintain water levels during replacement or other construction works would likely minimize impacts.

- CLC member ([redacted].)– The water levels this winter seem lower than normal?
  - MVCA noted that the levels are currently above the main target level, but that the fall was relatively dry which could have resulted in lower levels than normal. Construction works would likely take place after the fall drawdown to minimize impacts on the lake.

- CLC member ([redacted]) – has consideration been given to creating a power supply with the Kashwakamak Lake Dam which could become a revenue source?
  - MVCA noted there have been studies across the watershed to evaluate opportunities for power generation moving forward; however, Kashwakamak Lake Dam was determined to be not suitable due to the lack of infrastructure and hydro lines. MVCA will consider the option however do not think it will be feasible.

- Closing comments:
  - MVCA noted that any changes in the expected timeline for water level drawdowns will be communicated to the community so that plans can be made accordingly.
  - Egis confirmed there will be notification periods as part of the process. In addition to communicating directly with the members of the lake association and the Township.
  - KLA noted that there is a Facebook page and bulletin boards in the main lake cottages that can be used to provide updates to the public.
  - The Township of North Frontenac Mayor also added that there are periodic mailouts that can be used to distribute information.

## 4.0 NEXT STEPS

- Update the evaluation matrix based on input received from the CLC.
- Prepare the Public Information Centre (PIC) material and a Notice of PIC for MVCA for review and for public circulation. The meeting will likely take place in May 2024.
- Develop the proposed Alternative Design Concepts for the TPA. It will be updated based on the community input gathered from consultation and further assessment.
- Schedule CLC Meeting #2 – to review the proposed Alternative Design Concepts and environmental impact screening. The meeting will likely take place in May 2024.
- The presentation slides will be distributed to the meeting participants. However, it was asked that material not be further distributed to community members to minimize confusion.
- Egis and MVCA will provide continued opportunities for the public to comment on the EA process.

The meeting was adjourned at 3:35 pm.
For any errors or omissions, please contact the undersigned.

Lisa Marshall, P.Eng.
Project Manager
Email - lisa.marshall@egis-group.com

# Kashwakamak Lake Dam Class Environmental Assessment

# Community Liaison Committee Workshop #1

February 26, 2024

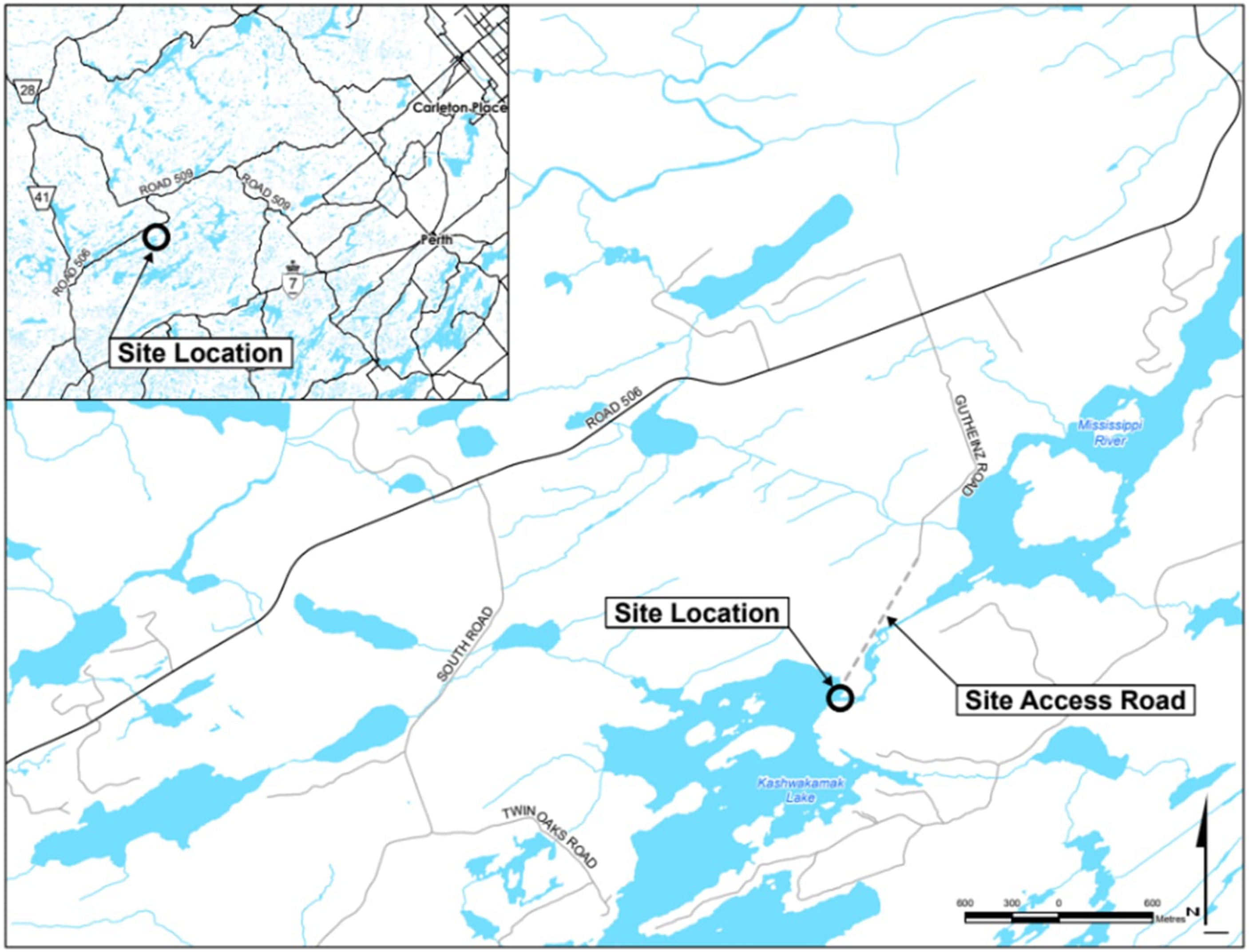
Mississippi Valley Conservation Authority

egis

# contents

Mississippi Valley Conservation Authority egis

# STUDY AREA


28
Carleton Place
ROAD 509
ROAD 509
41
ROAD 506
Perth
7
Site Location
ROAD 506
GUTHEINZ ROAD
Mississippi River
SOUTH ROAD
Site Location
Site Access Road
Kashwakamak Lake
TWIN OAKS ROAD
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# CLASS ENVIRONMENTAL ASSESSMENT PROCESS

This project is be completed in accordance with the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects.

| Stage 1 | Stage 2 | Can all Environmental Impacts be Avoided, Mitigated or Compensated? | | |
|---|---|---|---|---|
| Environmental Assessment Process | | | | |
| **Project Initiation** | **Alternative Solutions** | **Yes** | **Uncertain** | **No** |
| Technical Process | | | | |
| Prepare Rationale Statement<br>Establish Community Liaison Committee<br>Prepare Baseline Environmental Inventory | Identify and Evaluate Alternative Solutions<br>Identify Impacts and Mitigation Measures<br>Select Preferred Solution<br>Conduct Detailed Analysis of Environmental Impacts | Prepare Project Plan<br>Are all Concerns Addressed? (No Part II Order Requests) | Prepare Environmental Study Report (ESR)<br>Are Impacts Deemed Acceptable? | Prepare Individual Environmental Assessment OR Reassess Program Option |
| Consultation Process | | | | |
| Notice of Intent | Agencies, Stakeholder, First Nations and Public Workshops (as required)<br>Public Information Centre #1 | Provide Notice of Filing to Interested Persons/Parties<br>Provide Notice of Project Approval & Proceed to Construction | Publish Notice of Filing for Review | Continue Consultation as Required during Detail Design |

We Are Here

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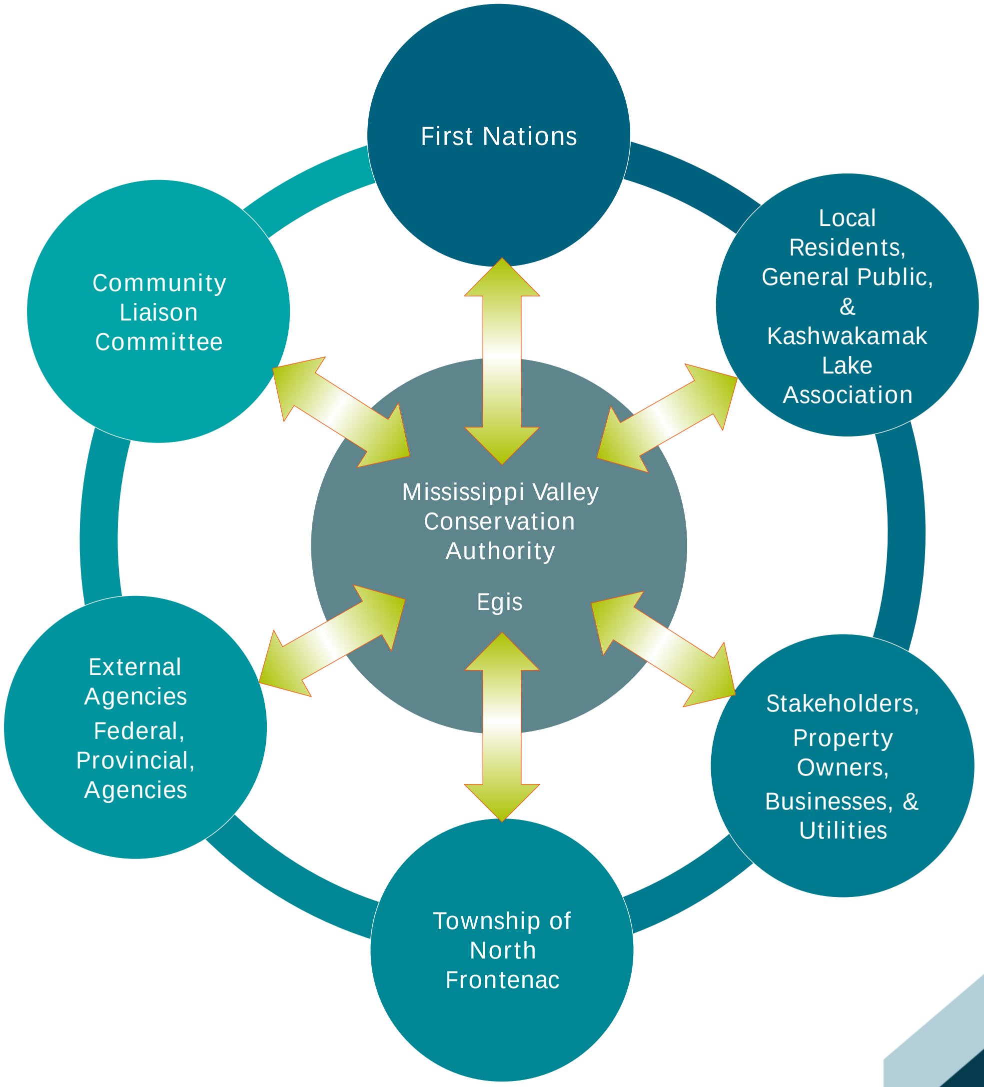
# CONSULTATION PROGRAM

Consultation completed to-date as part of the Environmental Assessment Process:

- Notice of Intent;
- Preliminary Consultation with fourteen (14) Indigenous Communities;
- Expression of Interest to Join Community Liaison Committee (CLC); and
- CLC Workshop Meeting.

General comments received have noted:

- Requests to stay involved with the study and be able to provide input;
- Request from Hiawatha First Nation and Mississaugas of Scugog Island First Nation to be involved in study and receive Archaeological Assessment reports;
- Alderville First Nation has requested to be involved in the Stage 2 Archaeological Assessment;
- Concerns pertaining to changes in water levels, as well as the ability of the proposed alternative to continue to mitigate flood and drought risk, and
- The current dam controls the water levels & maintains the water level for both the safety and recreational/tourism purposes for hundreds of people who either live or own seasonal cottages on the lake.



# PROJECT RATIONALE STATEMENT

The existing Kashwakamak Lake Dam was built more than 100 years ago (built in 1910) and is well beyond its design life. Based on the findings of the 2022 Dam Safety Review, the dam is showing signs of deterioration, especially the overflow weir. A decision needs to be made on whether to decommission, repair, or replace the dam. Given the age and condition of the structure, its natural heritage features, and its function as one of the six major dams managed to alleviate flooding and drought along the Mississippi River, the future of the dam must consider several constraints and opportunities such as public safety, riverine processes, flooding, climate change, cultural heritage, Indigenous rights, natural habitat, public uses and aesthetics. The Preferred Alternative must address the problem while balancing study area constraints and opportunities, in order to best meet the needs of the various stakeholder groups and interested parties.

# INVENTORY STUDIES

### Natural Environment Assessment

Existing Conditions Inventory to inspect and document the study area for any natural environmental features.

Environmental Impact Assessment - identification of potential environmental impacts and provide mitigation measure recommendations that are appropriate to the site features and landscape.

### Archaeological and Cultural Heritage

Land and Marine Archaeological Assessment – to determine if the site has any archaeological potential both on land and within the watercourse.

Cultural Heritage Evaluation Report - to determine if the dam retains any cultural heritage value or interest (CHVI) under the Ontario Heritage Act.

### Hydrology and Hydraulic Assessment

A hydrologic and hydraulic assessment was undertaken using an existing model made available from the MVCA. The assessment evaluated existing conditions and proposed alternative solutions to determine impacts on surface water flows, elevations and velocities.

### Geotechnical Investigation

A geotechnical investigation was undertaken to explore the subsurface conditions of the study area and provide design recommendations for the proposed alternative solutions for Kashwakamak Lake Dam.

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# NATURAL ENVIRONMENT

## Fish and Fish Habitat

- Kashwakamak Lake is identified as having a cool/warmwater thermal regime.
- The lake, and the Mississippi River downstream of the dam, provide permanent fish habitat and suitable spawning habitat.
- Significant fish habitat in the form of sport fish and baitfish spawning is located immediately downstream of the Dam: Walleye, White Sucker and several baitfish species.
- Kashwakamak Lake has a large population of Walleye, as well as Bass, Northern Pike, baitfish and non-sport fish species.

## Wetlands

- There are no significant wetlands present within the study area.
- Several small wetlands around the perimeter of the lake and downstream (Mud Lake Provincially Significant Wetland (PSW) which provide overwintering habitat for turtles such as the Blanding's Turtle.
- The Manòmin, wild rice crops, are located approximately 7.0 km downstream of the Kashwakamak Lake dam.
    - ➢ Manòmin is an aquatic annual species of grass and has a cultural significance to the Ardoch Algonquin First Nation, Alderville First Nation, and potentially other First Nations.
    - ➢ Changes in water elevations at certain times of the year can have potential impacts on the Manòmin.

# NATURAL ENVIRONMENT

## Wildlife Habitat

- Significant Wildlife Habitat (SWH): Bat Maternity Colonies, Turtle Wintering Area, Special Concern and Rare Wildlife Species, and Turtle and Lizard Nesting Habitat.
- Suitable habitat may be present within the Mixed Forest community for species such as Eastern Wood-pewee, Red-headed Woodpecker, Eastern-whip-poor and Wood Thrush;
  - These species are known to habitat in mid-canopy layer mixedwood forests, as well as open woodlands and forest edges.
- Rock structures (i.e., rocky outcroppings) may also be utilized by Milksnake and Five-lined Skink.

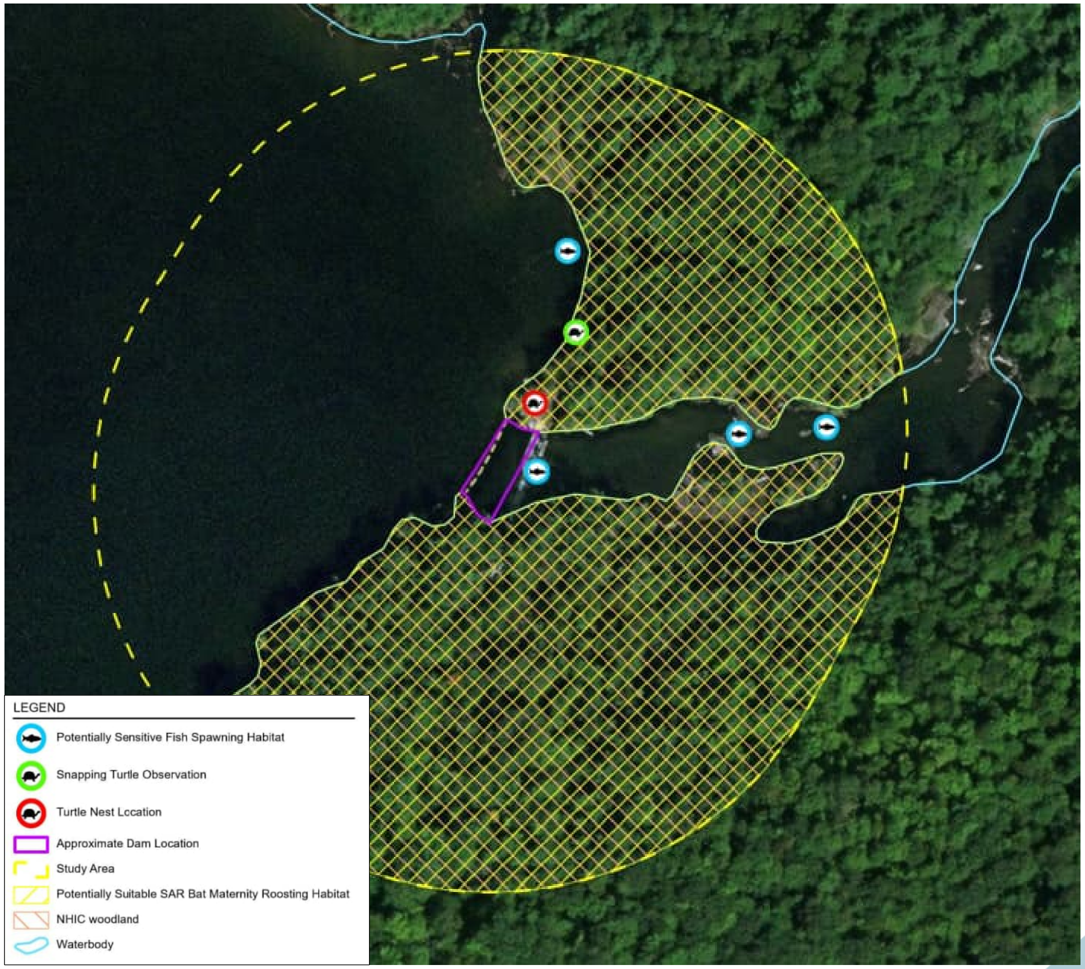
## Vegetation

- The study area consists mainly of Mixed Forest including species such as Eastern hemlock, Eastern white cedar American elm, American beech, white pine, red oak, and paper birch.
- NHIC (2023a) identifies woodlands as being present within the study area, however, does not identify the woodlands as being significant.
- No invasive and/or noxious plant species were observed on site.

# NATURAL ENVIRONMENT

## Species at Risk (SAR)

- Bats
  - Given the presence of forests, high-quality maternity roosting trees in the study area, Little Brown Myotis, Northern Myotis, and Tri-colored Bat, have a moderate potential of occurring during their active season (April - September 30).
- Herptiles:
  - Potentially suitable nesting and overwintering habitat for Blanding's Turtle, Midland Painted Turtle and Snapping Turtle to occur within the study area.
  - Given the location of the study area (i.e., within Frotenac Arch) and the presence of rock features on the edge of Kashwakamak Lake, Milksnake and Five-lined skink have the potential to occur within the study area as suitable habitat is present.
- Vegetation:
  - No Butternut or Black Ash were observed during the site visit.
- Birds
  - The forested area within the study area could provide potentially suitable breeding habitat (i.e., nesting) for Red-headed Woodpecker, Eastern Whip-poor-will and Wood Thrush.



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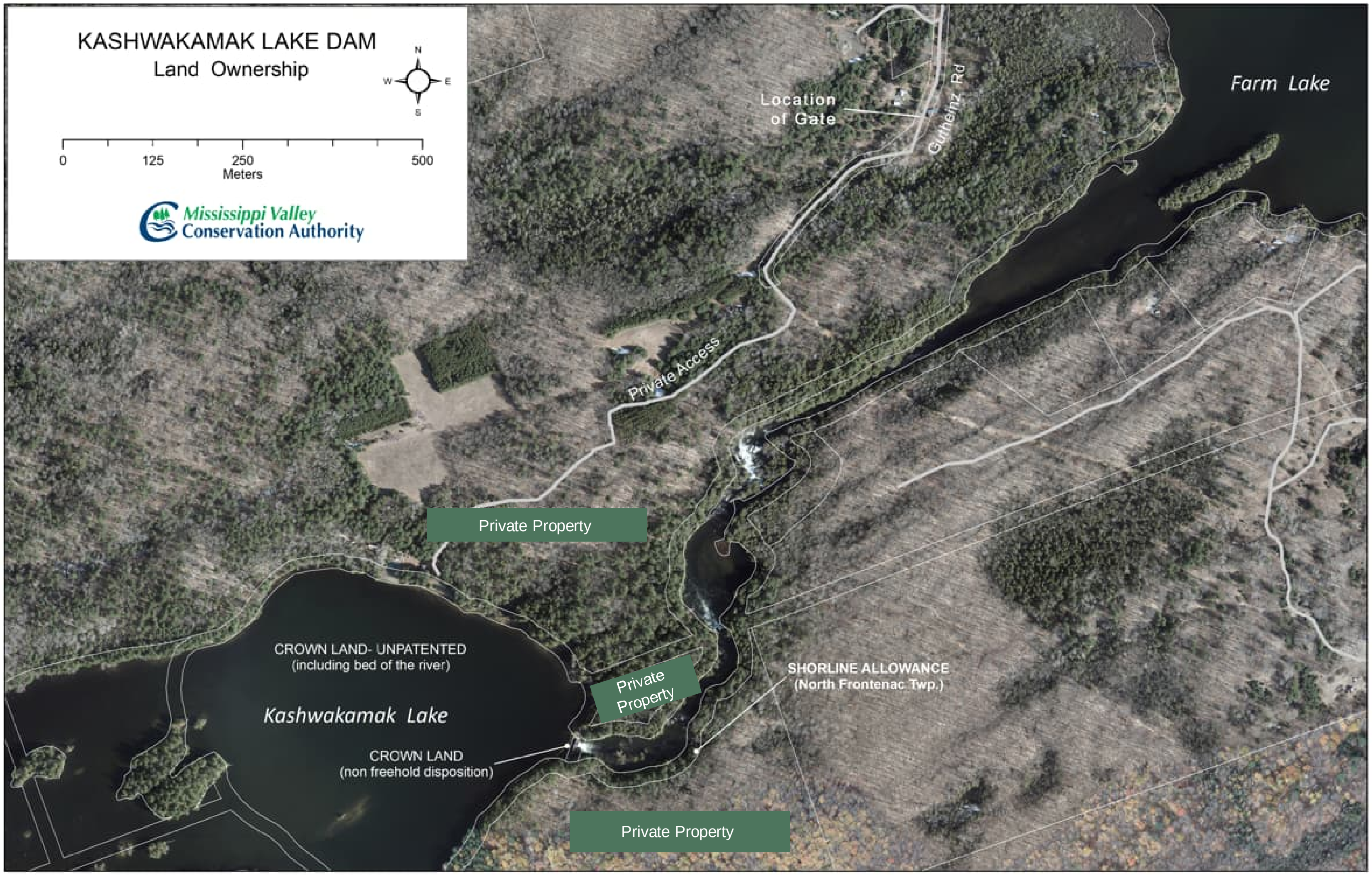
# SOCIO-ECONOMIC ENVIRONMENT



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# ARCHAEOLOGICAL & BUILT CULTURAL HERITAGE

## Land Archaeological

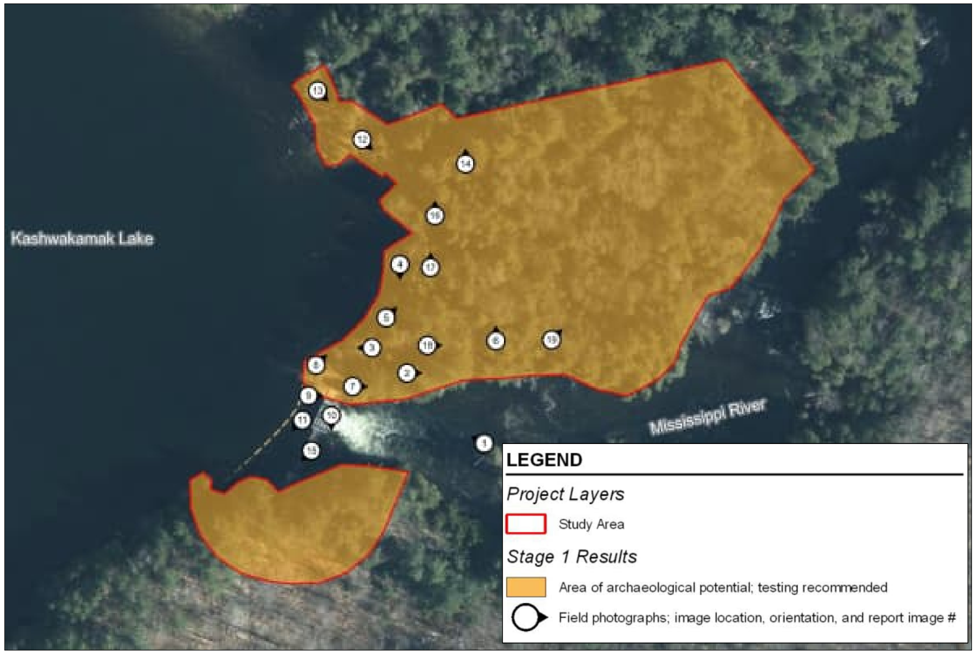
- Based on the findings of the Stage 1 Archaeological Assessment, the study area has been determined to exhibit archaeological potential.
- A Stage 2 Archaeological Assessment will be undertaken once the recommended preferred alternative solution has been identified and prior to the initiation of below-grade soil disturbances or other alterations.

## Marine Archaeological

- Through the archaeological assessment it was determined that the study area is considered to be free of any archaeological features and concerns.

## Built Cultural Heritage

- Kashwakamak Lake Dam was determined to not retain any cultural heritage value or interest (CHVI) under the Ontario Heritage Act.



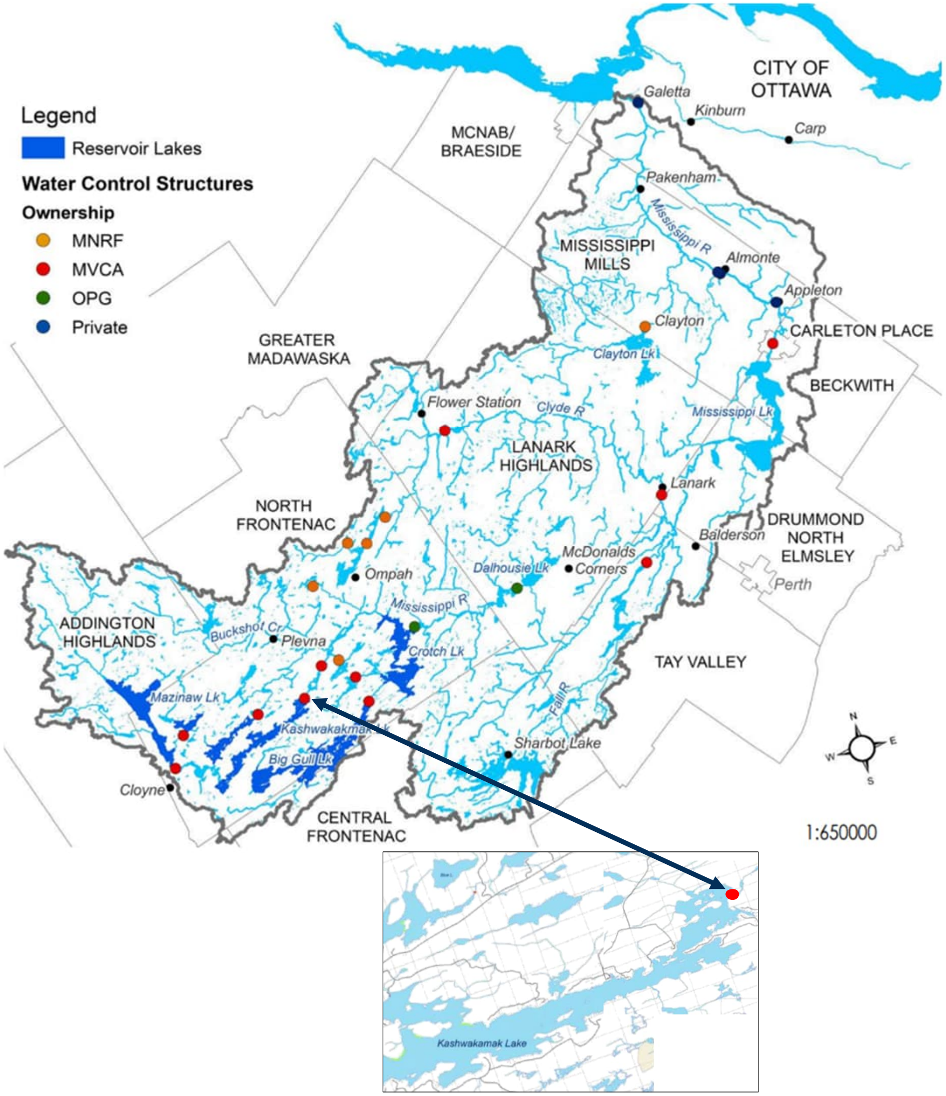
# Watershed Management

## Mississippi River

- The Mississippi River system is composed of a complex network of rivers, streams, rapids and over 250 lakes located in Eastern Ontario.
- The Mississippi River is a managed system with a watershed area of 3765 km$^2$.
- Several dams and weirs along the system regulate flows and manage water levels.
- The dams and weirs along the Mississippi River mitigate drought and flooding and maintain stable water levels for recreational activities.

## Kashwakamak Lake

- The Kashwakamak Lake dam is located in the upper reaches of the Mississippi River, within the Township of North Frontenac with a catchment area of 415 km$^2$.
- It is one of several reservoir lakes that serve a critical storage function along the Mississippi River, to alleviate flooding and drought.
- The Kashwakamak Lake Dam is essential to maintaining stable water surface elevations in Kashwakamak Lake, improving conditions for recreational activities at the lake.



Kashwakamak Lake Dam

Source: Mississippi River Watershed Plan (MVCA, 2021)

# EXISTING DAM STRUCTURES AND CONDITIONS

## Main Kashwakamak Lake Dam Structure

- The dam consists of two structures, the main control dam and a secondary side block dam.
- The main structure consists of two bulkhead walls, three concrete piers forming the two sluiceways, and a broad crested concrete weir.
- The crest elevation of the dam is 261.63 m.
- Based on previous dam inspections (2016) and the 2022 Dam Safety General Inspection Report, it was noted that the dam is in fair to poor condition.
- Outdated methods and materials used to originally construct the dam may pose significant challenges.

## Saddle Dam

- There is an existing Saddle dam located approximately 60 m to the north of the Kashwakamak Lake dam
- The site access road is located adjacent to the Saddle Dam.
- Failure of the Saddle Dam would result in overtopping of the access road which limits access to the Kashwakamak Lake dam to perform emergency maintenance or operations during a significant storm event.
- During a field investigation (June 2023), seepage was noted on the downstream (eastern) side of the access road, as well as evidence of settlement of the access road adjacent to the saddle dam.
- Outdated methods and materials used to originally construct the dam may pose significant challenges.

# PROPOSED ALTERNATIVE SOLUTIONS

| Alternative Solution No. | Alternative Solution | Alternative Solution Description | |
|---|---|---|---|
| | | **Kashwakamak Lake Dam** | **Saddle Dam** |
| 1 | Do Nothing | No change made within the Study Area (status quo). No improvements are made, and no measures are proposed to address the deteriorated structural condition of the dam. | No change made within the Study Area (status quo). No improvements are made, and no measures are proposed to address the deteriorated structural condition of the dam. |
| 2a | Decommission the Existing Dam and Construct Passive Control System | This alternative involves decommissioning of the dam and creating a passive water control system (such as an overflow weir). | Saddle Dam would need to be repaired or placed under this scenario to add in flood and drought control. Failure of the Saddle Dam would result in overtopping of the access road which limits access to the Kashwakamak Lake dam to perform emergency maintenance or operations during a significant storm event. |
| 2b | Decommission the Existing Dam and Reinstate Natural Watercourse | This alternative involves decommissioning/full removal of the existing dam and reinstating a natural watercourse/channel. | Saddle Dam would be decommissioned as access to the Kashwakamak Lake Dam would no longer be required. |
| 3 | Rehabilitation of the Existing Dam | Rehabilitation of the Dam would consist of salvaging elements of the existing dam and preserving the structure in a stable state similar to the existing condition. | Rehabilitation of the Saddle Dam would consist of salvaging elements of the existing dam and preserving the structure in a stable state similar to the existing condition. |
| 4 | Replace the Existing Dams at the Same Location | Construction of a new dam within a similar alignment to that of the existing dam. For the purpose of this evaluation, the removal of the existing dams in its entirety was considered, with new footings and anchors installed at bedrock. | Replacement of the Saddle dam within a similar alignment to that of the existing dam. The type of structure and function is dependent on the Kashwakamak Lake Dam replacement design which will be further evaluated upon selection of Preferred Alternative Solution. |
| 5 | Construct New Dam Downstream | Construct a new dam immediately downstream of the existing dam. This alternative will allow the existing Kashwakamak Lake dam to remain in place during construction to aid in the management of flow. | Replacement of the Saddle dam within a similar alignment to that of the existing dam. The type of structure and function is dependent on the Kashwakamak Lake Dam replacement design which will be further evaluated upon selection of Preferred Alternative Solution. |

# EVALUATION CRITERIA

| Function/Technical | Natural Environment | Social Environment |
|---|---|---|
| Criteria to evaluate the function, technical suitability and engineering characteristics of the alternative solutions, as well as adaptation to Climate Change. | Criteria to evaluate the proposed alternative solutions effects on the natural environment and habitat, and water quality within the study area | Criteria to evaluate the proposed alternative solutions effects on residents/cottagers, businesses and social features (i.e. recreational and tourism), as well as potential property impacts within the study area. |
| ▪ Hydraulic Function/Flooding and Drought<br>▪ Geomorphology/Sediment Transport<br>▪ Dam Safety<br>▪ Durability/ Service Life<br>▪ Climate Change Adaptation<br>▪ Implementation/Constructability | • Fisheries/Aquatic Impacts<br>• Terrestrial Habitat (Wildlife and Vegetation)<br>• Species at Risk<br>• Existing Watercourses Quality and Quantity | ▪ Private Property Impacts During Construction and Commissioning<br>▪ Temporary/Permanent Property Agreements/ Acquisitions<br>▪ Recreational Impacts/Enhancement<br>▪ Tourism Impacts |

| Cultural Environment | First Nations | Economic Environment |
|---|---|---|
| Criteria to evaluate the proposed alternative solutions effects on archaeological, built and cultural heritage features and resources within the study area. | Criteria to evaluate the proposed alternative solutions effects on First Nation and Harvesting Rights. | Criteria to evaluate the financial implications of the proposed alternative solutions. |
| ▪ Archaeological Resources<br>▪ Built Heritage Resources and Cultural Heritage Landscapes | ▪ Lands Rights<br>▪ Harvesting Rights (wild rice crops) | ▪ Capital Costs<br>▪ Operational and Maintenance Costs |

| Category | Alternative 1<br>Do Nothing | Alternative 2a<br>Decommission the Existing Dam and Construct Passive Control System | Alternative 3<br>Rehabilitation of the Existing Dam | Alternative 4<br>Replace the Existing Dam at the Same Location | Alternative 5<br>Construct New Dam Downstream |
|---|---|---|---|---|---|
| **Functional / Physical** | **Not Preferred** | **Less Preferred** | **Less Preferred** | **Preferred** | **Preferred** |
| **Natural Environment** | **Less Preferred** | **Less Preferred** | **Preferred** | **Preferred** | **Less Preferred** |
| **Social Environment** | **Less Preferred** | **Not Preferred** | **Preferred** | **Preferred** | **Less Preferred** |
| **First Nations/Cultural Environment** | **Preferred** | **Less Preferred** | **Preferred** | **Preferred** | **Less Preferred** |
| **Economic Environment** | **Less Preferred** | **Preferred** | **Not Preferred** | **Less Preferred** | **Not Preferred** |
| **Summary (Key Pros/Cons):**<br>***Abbreviation Legend:***<br>PS – Problem Statement<br>WMP - Watershed Management Plan<br>SAR – Species at Risk<br>***Ranking:*** | **Not Recommended – Does not address the PS.**<br>**Pros:**<br>• Existing conditions remain the same from a natural and social environment perspective until potential dam failure.<br>• No changes to First Nation lands.<br>**Cons:**<br>• No changes to the size in of the spillway means less resiliency to larger storm events (climate change).<br>• Condition of the dam will continue to deteriorate.<br>• Continued risk of dam failure which results in impacts to property, environment, shoreline, recreational, tourism and potential risk to public safety/loss of life.<br>• Will maintain current WMP until potential failure of the dam. | **Not Recommended – Does not address the PS.**<br>**Pros:**<br>• Relatively low/moderate cost pending the proposed design.<br>• Property acquisition most likely not required.<br>• A portion of the existing dam can be utilized as a bypass during construction.<br>**Cons:**<br>• Reduction/limited ability to mitigate floods/droughts and maintain current WMP.<br>• Limited ability to fully adapt to Climate Change.<br>• High fluctuation in water levels which will impact the environment (fish habitat and spawning, SAR shoreline, recreation, tourism, etc.).<br>• Potential impacts on Ardoch Algonquin First Nation's and the Manòmin with reduction in water levels/water flow downstream. | **Not Recommended – Does not address the PS.**<br>**Pros:**<br>• Maintains current WMP.<br>• Maintains existing conditions up and downstream from a natural and social environment perspective.<br>• No significant change to water elevation and volume in Kashwakamak Lake.<br>**Cons:**<br>• No changes to the size of the spillway means less resiliency to larger storm events (climate change).<br>• Temporary impacts to the natural and social environment during construction.<br>• This alternative still poses a potential risk to public safety as the dam will continue to deteriorate. | **Recommended – Addresses the PS.**<br>**Pros:**<br>• Maintains current WMP.<br>• Dam to be designed to accommodate larger storm events and adapt to climate change. Reduces the risk of downstream flooding.<br>• Downstream geomorphology will be maintained.<br>• New dam will meet safety guidelines.<br>• Sensitive fish spawning habitat will be maintained downstream.<br>• No long term impacts to First Nation Lands including Manòmin.<br>• No permanent property impacts anticipated.<br>**Cons:**<br>• There will be temporary impacts due to construction activities (i.e. property, recreational, tourism, etc.). | **Not Recommended – Addresses the PS; Undue impacts to natural environment, property and cost prohibitive.**<br>**Pros:**<br>• Maintains current WMP.<br>• Dam to be designed to accommodate larger storm events and adapt to climate change.<br>• New dam will meet safety guidelines.<br>• No direct or indirect impacts to the recreational/tourism use of the lake.<br>**Cons:**<br>• Larger structure would be required to extend across the wider channel cross-section.<br>• Significant cost.<br>• Additional property requirements/acquisition, tree removal, and access road construction required.<br>• Impacts to sensitive fish spawning habitat.<br>• Unaltered lands and watercourse will be impacted to construct the new dam downstream. |

# NEXT STEPS

- Continue consultation with governing agencies, CLC, First Nations, stakeholders, residents/cottagers and the public;
- Update evaluation criteria and matrix, and confirm selection of Recommended Technically Preferred Alternative Solution;
- Undertake Stage 2 Archaeological Assessment (Spring 2024);
- Conduct detailed analysis of environmental impacts and develop mitigation measures for Recommended Technically Preferred Alternative Solution;
- Public Information Centre - Selection of Preferred Alternative Solution, and
- Select the Technically Preferred Solution(s) to address the Problem Statement identified for this project.

## Thank you, your input is important to us!

**Lisa Marshall, P. Eng.**
Consultant Project Manager
Egis
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
Lisa.MARSHALL@egis-group.com

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✉

**Juraj Cunderlik, PhD., P.Eng.**
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

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|  |  |
|---|---|
| From: | MARSHALL Lisa |
| Sent: | July 9, 2024 3:52 PM |
| To: | [redacted] |
| Cc: | Juraj Cunderlik; Alana Perez |
| Subject: | Kashwakamak Lake Dam Environmental Assessment - Notice of Community Liaison Committee Meeting #2 |

Good afternoon,

MVCA and Egis would like to formally invite you to the final Community Liaison Committee (CLC) meeting for the Kashwakamak Lake Dam Environmental Assessment. During the meeting, we will provide an update on the Public Information Centre and Stage 3 Archaeological Assessment requirements, as well as identify the selected Preferred Alternative Solution(s). The meeting will provide an opportunity for the CLC members to participate in the project's planning process and provide valuable input/feedback.

Meeting details:
Date: August 13, 2024
Time: 1:00 - 3:00 pm
Location: Virtual Meeting/Presentation (Teams meeting invite to follow this email)

If you are unable to attend the virtual meeting, the presentation can be made available to you, and we can answer any follow-up questions you may have.

Should you have any questions or comments, please do not hesitate to reach out to Mr. Juraj Cunderlik, MVCA, Director of Engineering, at jcunderlik@mvc.on.ca, or Ms. Lisa Marshall, McIntosh Perry Project Manager, at lisa.marshall@egis-group.com.

We appreciate your commitment to this important initiative and look forward to your contributions during the meeting.

Thank you,
Lisa

egis
Lisa Marshall, P.Eng.
Manager, Environmental Engineering, North America
Phone: +1 613-714-0815, Mobile: +1 613-852-1148

# Kashwakamak Lake Dam Class EA
# Community Liaison Committee Meeting #2 Minutes

| | |
|---|---|
| Date and Time: | Tuesday August 13, 2024, 1:00 – 3:00 PM |
| Location: | Teleconference Call via Teams |
| List of Attendees: | **Mississippi Valley Conservation Authority (MVCA)**<br>Juraj Cunderlik, Director, Engineering<br>Jennifer North, Water Resources Technologist<br>Alana Perez, Water Resources Engineer<br>Kelly Stiles, Biologist<br>Sally McIntyre, General Manager<br><br>**Egis**<br>Lisa Marshall, P.Eng., Project Manager (PM) Lead Environmental Planner<br>Monika Orwin, Water Resources Engineering Intern<br><br>**Committee Members**<br>[redacted] |
| List of Regrets: | [redacted] |
| Subject: | Kashwakamak Lake Dam Class Environmental Assessment<br>Community Liaison Committee (CLC) Meeting #2 |

## 1.0 INTRODUCTION

- The Mississippi Valley Conservation Authority (MVCA) General Manager (GM) provided the land acknowledgment for the project.
- An introduction was provided for all MVCA, Egis, and CLC meeting participants.
- The Egis Project Manager (PM) provided a brief overview of the project, the site background, and the meeting agenda.

## 2.0 PROJECT OVERVIEW

- The Egis PM provided the Community Liaison Committee (CLC) presentation to meeting participants.

  ***Action:*** *Egis*

- As part of the Class Environmental Assessment processes, it has been determined that the impacts can be avoided, mitigated, or compensated. The technical process will now involve preparing a project plan and addressing concerns.
- A Notice of Completion will be circulated to interested persons/parties and will provide them with an opportunity to review and comment on the Project File Report.
- A summary of the comments received during the Public Information Centre (PIC) Meeting was provided as follows:
  - Will the water levels be maintained at the same level?
    - The new dam will ensure that water levels and the water management plans be maintained and even improved as a result of the new structure functioning and operating more efficiently.
  - What mitigation measures will be implemented during consultation?
    - The mitigation measures will be further outlined and assessed during the design stage. However, it is anticipated that it will include the implementation of a temporary bypass system to dewater and reroute the water prior to construction, and a sediment and erosion plan to mitigate erosion impacts during construction. From a Natural Heritage perspective, timing windows and a few other mitigation measures will be implemented to protect fish, bats, turtles, vegetation and other species.
    - Mitigation measures will be outlined in the Project File Report
  - What are "temporary impacts"?
    - One temporary impact during construction may include considering an earlier drawdown of the lake.
    - Earlier drawdown of the lake levels could occur in the fall around September-October.
  - Will notification be given prior to change in water levels?
    - We acknowledge that the lake is widely used for many recreational and tourist activities and therefore MVCA will have a plan in place to inform everyone affected by the earlier changes in water level.
    - MVCA will try to choose the timing that will have the least impact and accommodate the users of the lake.
    - We have also made note that adequate notification needs to be given to the local marina prior to reducing water levels, so they are prepared for the surge of boats at that time.
  - Is there an immediate risk of the dam failing?

    - The existing dams have significant deficiencies due to their age, which pose a greater risk of dam failure.
    - Proceeding with this project is a top priority for MVCA and is part of the 10-year capital plan to avoid the risk of losing the dam and lake.
    - As previously noted, the dam is continuously observed and monitored by the MVCA as part of a monthly monitoring program.

- Further consideration should be given to building new dam downstream of the existing one and use old dam as the cofferdam?
  - Alternative Solution 5 has some benefits with regards to construction, however, the channel downstream is considerably wider relative to where the current dam is placed. This would mean that the cost of the project would approximately double due to needing a larger/longer structure to accommodate the wider channel.
  - We acknowledge that using the existing dam as a cofferdam would be ideal, however from a hydraulic perspective, it <u>could</u> result in additional properties flooding due to elevation differences and topography at other possible dam locations downstream, as well as natural and socio-economic environmental impacts downstream of the structure.
- What is the timeline for the whole project getting underway, including the demolition and lowering of lake levels?
  - The next phase of the project will be preliminary and detailed design, which MVCA will be initiating in 2025-2026.
  - Following that there will be acquiring permits for the project. Therefore, construction is currently expected to occur in in the Fall of 2026 at the earliest.
- How will this project be funded, and will there be additional impact on the municipality in terms of additional pressure on their budgets?
  - MVCA noted that they were successful in securing both federal and provincial funding for the project and provided further explanation as follow;
    - MVCA has been granted federal funding through the *Disaster, Mitigation, and Adaptation Fund* program, which is run by Infrastructure Canada. Federal funding is provided for up to 40% of the project balance.
    - MVCA has also been granted provincial funding through the *Water, Erosion, and Control Infrastructure* program, which is delivered through a municipal-provincial-conservation authority partnership. Provincial funding is provided for up to 50% of the project balance.
    - The remainder of the project costs are assumed by the MVCA. The project is eligible for *Category 1* funding, meaning that all of the member municipalities within the jurisdiction contribute towards the reconstruction/rehabilitation of the dam to some level.

## 3.0 OPEN DISCUSSION

- CLC member ([redacted]) – will the saddle dam be raised and/or replaced?
    - Egis and MVCA confirmed that the saddle dam will be replaced and raised.
- CLC member ([redacted]) - noted that cottagers have expressed concerns about lowering the lake's water level too much, as it could cause the pumps that draw water from the lake to freeze. Some cottages rely on this water source and have already extended their pumps. Additionally, it would be ideal to minimize impacts on the fish populations in the lake.
    - MVCA noted that they will follow up with the lake association to get further information to determine a feasible plan to address the impacts.

***Action:*** *MVCA GM*

- Is there a contingency plan in place if the dam is not completed on schedule or if the water levels rise earlier than expected?
    - Egis PM confirmed that there will be a contingency plan, however it will be developed during detailed design. MVCA also confirmed that it is too early in the project to provide details on construction planning, but a contingency plan will be developed in the coming stages of the project.
- CLC member ([redacted] – will the existing dam and saddle dam be connected along the shoreline?
    - Egis PM noted that the current plan is not to connect them, but to have then remain within their current alignment.
- CLC member (Bernie H.) – is there a possibility that the saddle dam could be a canoe route?
    - MVCA noted that it will need to be looked into further. As part of the detailed design, options for how people can safely bypass the dam can be explored, however typical guidelines are for them to avoid the structure due to the associated safety risks.
- CLC member (Lawrence F.) – is there any movement towards Hydro One being a source of funding?
    - MVCA noted that they are currently developing a policy document that considers land-based assets and cost-recovery. Kashwakamak Lake Dam is one of five major structures that provide flood control, and because it is a flood-based issue, there currently is not an intention to change the funding for this project.
- CLC member [redacted].) – asked for clarification on the definition of freeboard.
    - Egis and MVCA noted that it is the additional height of the dam above the lake surface water level required for a safety factor and to prevent overtopping from wave and wind effects.
- CLC member ([redacted].) – Is there a plan in place to manage invasive species during construction?
    - Egis confirmed that mitigation for invasive species will be documented within the Project File Report.

- CLC member ([redacted].) – inquired about which downstream community would be most affected by a dam failure.
    - MVCA noted that the community of Ardoch is the closest downstream and that any breach wave impact would likely be mitigated by the Crotch Lake Dam. Dam failure during construction is not anticipated, and the construction process, which will be carried out in stages, is not expected to increase the risk of failure.

## 4.0 NEXT STEPS

- The next steps include:
    - Updating the evaluation matrix, and confirming the selection of Technically Preferred Alternative Solution based on consultation;
    - Conducting detailed analysis of environmental impacts and develop mitigation measures for Technically Preferred Alternative Solution;
    - Presenting to MVCA Board of Directors; and
    - Preparing Project Plan and issuing Notice of Completion (30-day review period).
- A third CLC meeting may be held before closing out the project. If it is not necessary, an email will be circulated to the CLC members to provide an update.

The meeting was adjourned at 2:00 pm.
For any errors or omissions, please contact the undersigned.

Lisa Marshall, P.Eng.
Project Manager
Email - lisa.marshall@egis-group.com

# MISSISSIPPI VALLEY CONSERVATION AUTHORITY

# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT

## COMMUNITY LIAISON COMMITTEE - WORKSHOP MEETING #2

August 13, 2024

Mississippi Valley Conservation Authority

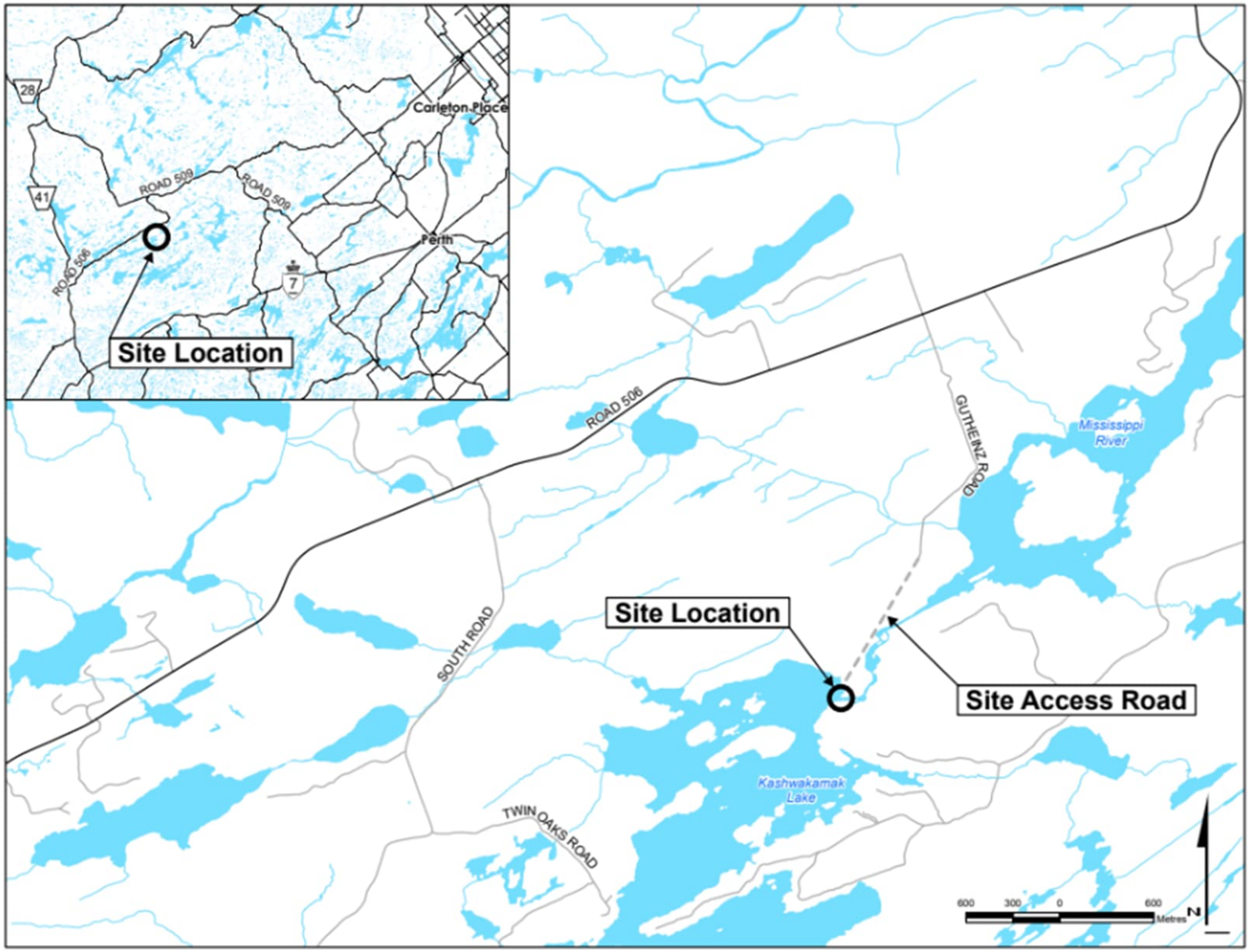
egis

# contents

Mississippi Valley Conservation Authority

egis

# STUDY AREA



Main Kashwakamak Lake Dam Structure

Saddle Dam

Mississippi Valley Conservation Authority

egis

# CLASS ENVIRONMENTAL ASSESSMENT PROCESS

Conservation Ontario’s Class Environmental Assessment for Remedial Flood and Erosion Control Projects

| **Stage 1** | **Stage 2** | **FINDINGS: Can Impacts be Avoided, Mitigated or Compensated?** | | |
|---|---|---|---|---|
| Environmental Assessment Process | | | | |
| **Project Initiation** | **Alternative Solutions** | **Yes** | **Uncertain** | **No** |
| Technical Process | | | | |
| ✓ Prepare Problem Statement<br>✓ Prepare Baseline Environmental Inventory | ✓ Identify and Evaluate Alternative Solutions<br>✓ Identify Impacts and Mitigation Measures<br>▪ Detailed Analysis of Environmental Impacts<br>▪ Select Preferred Alternative | ▪ Prepare Project Plan<br>▪ Are all Concerns Addressed? (No Section 16 Requests) | ▪ Prepare Environmental Study Report (ESR)<br>▪ Are Impacts Deemed Acceptable? | ▪ Prepare Comprehensive Environmental Assessment (former Individual Environmental Assessment)<br>OR<br>▪ Reassess Program Option |
| Consultation Process | | | | |
| ✓ Notice of Intent<br>✓ Establish Community Liaison Committee (CLC) | ✓ Host CLC meeting #1<br>✓ Engage public agencies, stakeholder, First Nations and general public<br>✓ Public Information Centre<br>✓ Host CLC meeting #2 | ▪ Notice of Completion to<br>▪ Provide Notice of Project Completion & Proceed to Construction | ▪ Notice of Completion | ▪ Consultation required with Ministry of the Environmental, Conservation and Parks |

Mississippi Valley Conservation Authority

egis

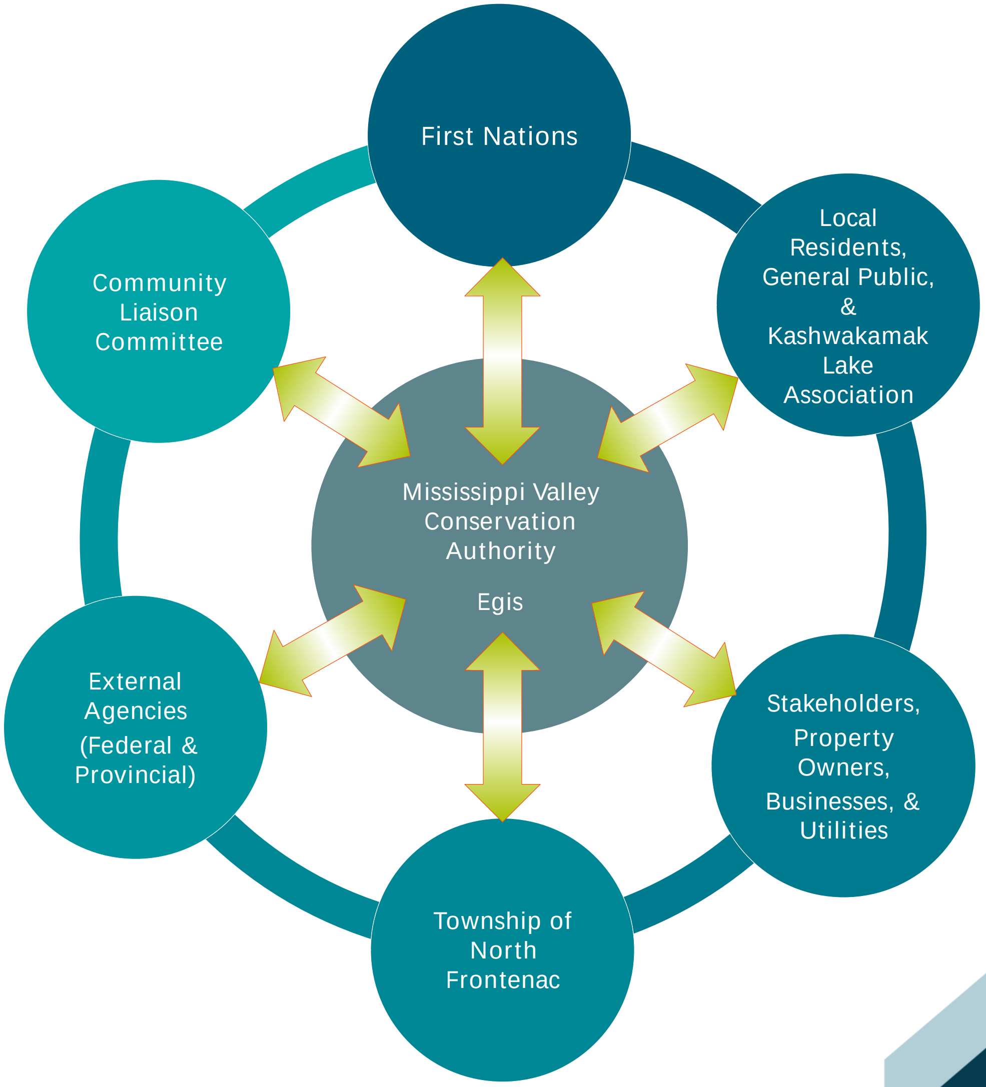
# PROJECT PROBLEM STATEMENT

- The existing Kashwakamak Lake Dam is well beyond its design life.
- The 2022 Dam Safety Review identified significant deterioration, especially the overflow weir.
- A decision needs to be made on whether to decommission, repair, or replace the dam.
- Selection of the Preferred Alternative must consider several constraints and opportunities such as public safety, riverine processes, flooding, climate change, cultural heritage, Indigenous rights, natural habitat, public uses and aesthetics.
- The Preferred Alternative must address the problem while balancing study area constraints and opportunities, in order to best meet the needs of the various stakeholder groups and interested parties.

# CONSULTATION SUMMARY

Consultation completed to-date:

- Notice of Intent – May 25, 2023
- Community Liaison Committee (CLC):
  - ➢ Expression of Interest to join – August 24, 2023
  - ➢ CLC Workshop Meeting #1 – February 26, 2024
  - ➢ CLC Workshop Meeting #2 – August 13, 2024
- Marine Archaeological Assessment:
  - ➢ Invitation sent to First Nations to participate – August 30, 2023
  - ➢ Field Investigation – September 11, 2023
- Stage 2 Archeological Assessment:
  - ➢ Invitation sent to First Nations to participate – April 18, 2024
  - ➢ Field Investigation – May 2, 2024
- Public Information Centre:
  - ➢ Notice Circulation – May 2, 2024
  - ➢ Published in the North Frontenac News – May 9 & 16, 2024
  - ➢ Virtual Meeting – May 23, 2024
- Kashwakamak Lake Association Annual General Meeting – July 13, 2024



# PUBLIC INFORMATION CENTRE SUMMARY

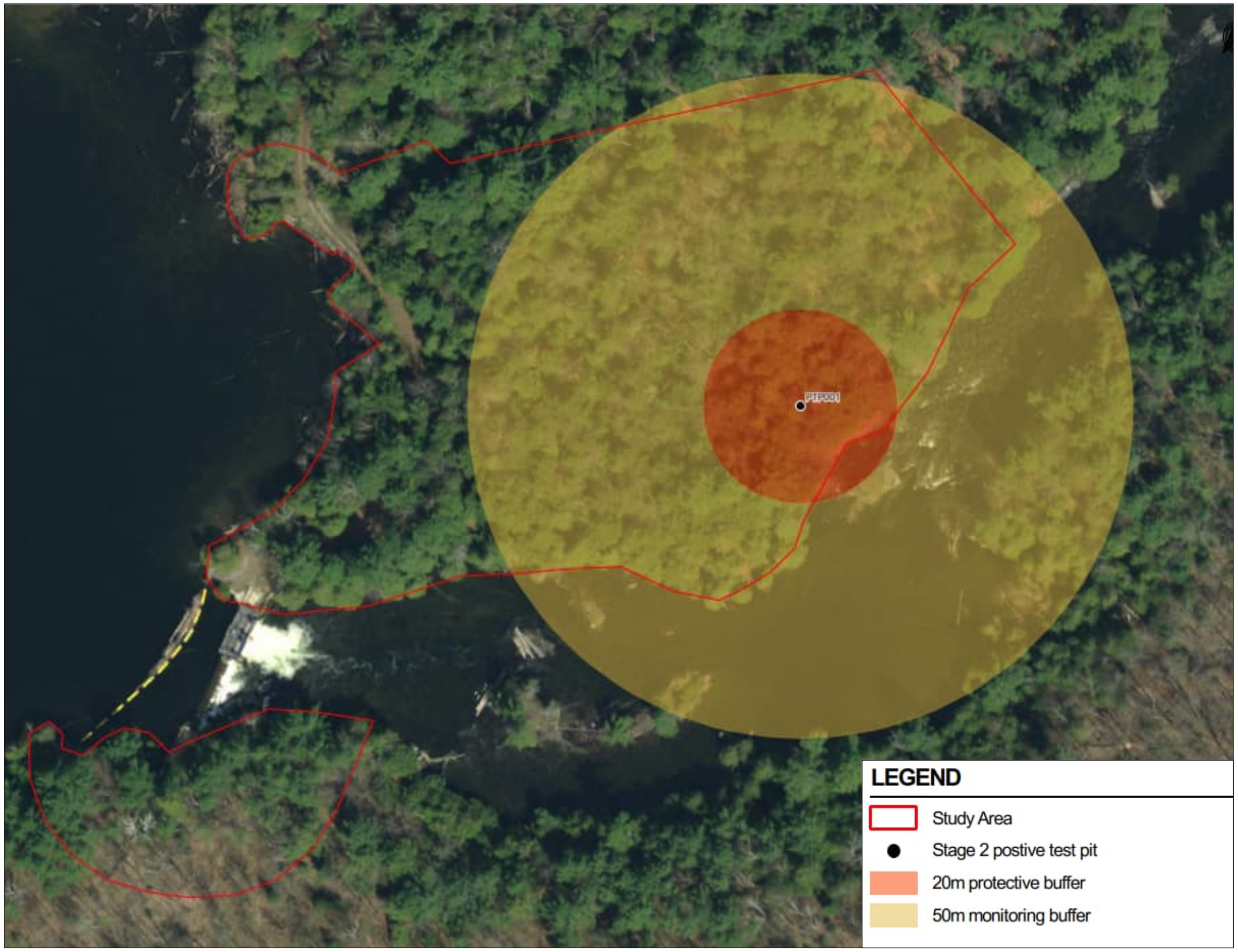
- Number of Attendees of virtual Public Information Centre (PIC) = Fourteen (14) Attendees
- Comment period expired – July 20, 2024
- Number of comments received:
  - Fifteen (15) comments during the PIC, and
  - Three (3) written comments following PIC.

## PIC Comments

- If the dam is replaced:
  - Will the water levels be maintained at the same level?
  - What mitigation measures will be implemented during consultation?
  - What are potential temporary impacts?
  - Will notification be given prior to change in water levels?
- Is there an immediate risk of the dam failing?
- Further consideration should be given to building new dam downstream of the existing one and use old dam as the cofferdam?
- What are the timeline for the whole project getting underway, including the demolition and lowering of lake levels?
- How will this project be funded, and will there be additional impact on the municipality in terms of additional pressure on their budgets?

# ARCHAEOLOGICAL ASSESSMENT

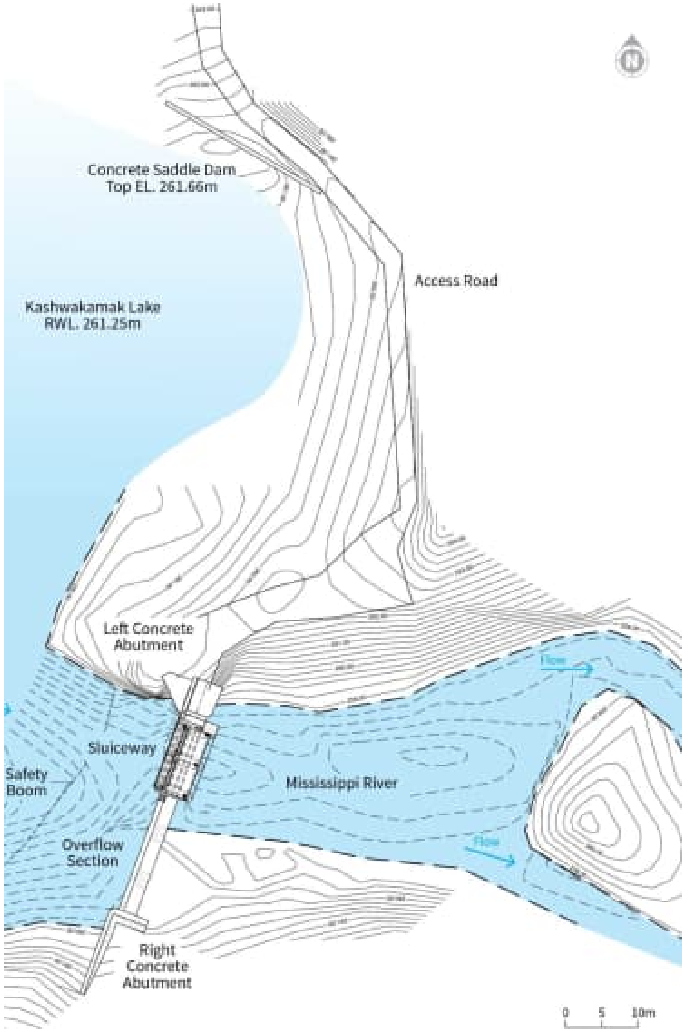
- Stage 1 Archaeological Assessment (June 6, 2023)
  - Study area exhibits archaeological potential.
- Stage 2 Archaeological Assessment (May 2, 2024)
  - Several First Nations showed interest in attending the field investigation.
  - A small Indigenous site along the water's edge was identified as requiring a Stage 3.
  - A request for Partial Clearance was submitted to Ministry of Citizenship and Multiculturalism (May 22, 2024)
- A Stage 3 Archaeological Assessment is scheduled for August 20 to 22, 2024.



# TECHNICALLY PREFERRED ALTERNATIVE

## Alternative 4 – Replace the Existing Dams at the Same Location

- Construction of a new main dam and saddle dam with similar alignments to that of the existing dams.
- The existing main dam will be removed in its entirety, with new footings and anchors installed at bedrock.
- New dams will be designed and constructed to current design and safety standards:
  - Design Storm:
    - Main Dam: 1000-year
    - Saddle Dam: 100-year
  - Freeboard will be increased to meet current standards, as well as take into consideration Climate Change.



# NEXT STEPS

- Undertake Stage 3 Archaeological Assessment;
- Confirm selection of technically preferred alternative;
- Detailed analysis of environmental impacts and mitigation measures for technically preferred alternative;
- Prepare Project File Report;
- Present to MVCA Board of Directors;
- Issue Notice of Completion (30-day review period), and
- Schedule 3rd and final CLC meeting (following the 30-day review period), if deemed required.

**Lisa Marshall, P. Eng.**
Consultant Project Manager
Egis
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
Lisa.MARSHALL@egis-group.com

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**Juraj Cunderlik, PhD., P.Eng.**
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

# Appendix F – Public Information Centre Material and Presentation

# Kashwakamak Lake Dam Class EA
# Public Information Centre Meeting Minutes

| | |
|---|---|
| Date and Time: | May 23, 2024, 4:00 – 5:35 PM |
| Location: | Teleconference Call via Zoom |
| List of Attendees: | **Mississippi Valley Conservation Authority (MVCA)**<br>Juraj Cunderlik, Director, Engineering<br>Jennifer North, Water Resources Technologist<br>Jane Cho, Water Resources EIT<br>Alana Perez, Water Resources Engineer<br>Kelly Stiles, Biologist<br>Sally McIntyre, General Manager<br>Christopher Stoddard, Civil-Geotechnical Engineer<br>Kelly Hollington, Executive Assistant<br>**Egis**<br>Lisa Marshall, P.Eng., Project Manager (PM), Lead Environmental Planner<br>Mustafa Sasal, Lead Sr. Water Resources Engineer<br>Monika Orwin, Water Resources Engineering Intern<br>**Public Information Centre Members – 14 Attendees** |
| Subject: | Kashwakamak Lake Dam Class EA<br>Public Information Centre Meeting #1 |

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## 1.0 INTRODUCTION

- Mississippi Valley Conservation Authority (MVCA) provided a brief overview of the project and meeting objectives.
- An introduction was provided for all MVCA and Egis project team members.

## 2.0 PUBLIC INFORMATION CENTRE PRESENTATION

- Egis PM provided the Public Information Centre (PIC) presentation to meeting participants. A copy of the PIC recording and presentation have been posted on the MVCA website: Kashwakamak Lake Dam Class EA - Mississippi Valley Conservation Authority

## 3.0 QUESTIONS AND OPEN DISCUSSION

- CLC member ([redacted]) – Could any new information relative to what was presented to the first CLC meeting on February 26, 2024 be highlighted?
  - Egis PM agreed to highlight new information as the presentation progressed.
- CLC member ([redacted]) – How is the project funded and will the cost of the dam improvement have an impact on the municipality (of North Frontenac and possibly others) in terms of additional pressure on their budgets?
  - MVCA noted that they were successful in securing both federal and provincial funding for the project and provided further explanation as follow;
    - MVCA has been granted federal funding through the *Disaster, Mitigation, and Adaptation Fund (DMAF)* program, which is run by Infrastructure Canada. Federal funding is provided for up to 40% of the project balance.
    - MVCA has been granted provincial funding through the *Water, Erosion, and Control Infrastructure (WECI)* program, which is delivered through a municipal-provincial-conservation authority partnership. Provincial funding is provided for up to 50% of the project balance.
    - The remainder of the project costs are assumed by the MVCA. The project is eligible for *Category 1* funding, meaning that all of the member municipalities within the jurisdiction contribute towards the reconstruction/rehabilitation of the dam to some level. The degree of financial contribution from each municipality is dictated through a formula based on the assessment value within the municipality and watershed. In this case, the City of Ottawa is a major contributor to the project. The Municipality of North Frontenac will be contributing but to a lesser degree.
- CLC member ([redacted]) – Is there an estimate for the overall cost of the project?
  - MVCA noted that the total cost has been estimated to be approximately $6 million.
- Mayor of North Frontenac (Gerry L.) – North Frontenac already has a funding agreement with the MVCA; approximately how much can this be expected to increase?
  - MVCA noted that the funding agreement is for *Category 3* programs, while this project is a *Category 1* program which is mandatory for the MVCA to deliver on. It goes on the main levy, which is established annually and has no impact, other than what the council has already accepted when the 2024 budget was put forth for both capital and operations.
  - MVCA noted that over the past few years, the capital levy to all municipalities has been increasing to help pay for the rehabilitation of both this dam, as well as other dams throughout the system

which are well in excess of their design life. Investment will need to be put into this infrastructure over the coming years. The 10-year capital plan currently allows for approximately $10 million - $11 million of investment in capital renewal.

- CLC member ([redacted]) – For many years, there has been an informal walkway running from the dam through the wooded area along the north side of the river down to the ponds below. Will this be maintained? Can it be improved/maintained considering that it is likely on private property?
  - MVCA noted that they are familiar with the walkway, and do not foresee construction works relating to the dam disturbing the walkway and should therefore be maintained. In regard to the walkway being improved, the land ownership would need to be evaluated as it may be private property or part of the North Frontenac shoreline allowance.
- CLC member ([redacted].) – What do the different colours represent on the watershed map (on the slide for Hydrologic and Hydraulic Assessment)?
  - The colours represent the ground level elevations, where the darker red corresponds to higher elevations while the green corresponds to lower elevations.
- CLC member ([redacted]) – Are there any climate-related hydrological changes expected in the near future?
  - Storms and weather events are definitely changing. MVCA noted that a climate change analysis was completed as part of the hydrological analysis to evaluate various scenarios and found that the future inflows to the lake may increase by approximately 20%. It is something that will need to be considered/accommodated in the design stage of the project to ensure an additional safety factor in the event that the flows increase due to the climate change impact.
- Member of the Public – If the dam is replaced, will the water levels be maintained at the same level?
  - MVCA confirmed that the water levels and water management plans will be maintained and even improved as a result of the structure providing more efficient service/function and the seepage issues being addressed.
- Egis PM noted that Alternative Solution 2b to decommission the existing dam and reinstate the natural watercourse was not carried forward to higher levels of evaluation as it does not address the problem statement or meet the needs of the watershed management plan.
- Member of the Public – For Alternative Solution 4 (the preferred solution), how would the project proceed? What do temporary impacts mean? Will a temporary dam be built ahead of the existing to hold the water in the lake?
  - MVCA noted that a temporary cofferdam will be built to remove water from the existing dam area to allow for the construction.
  - To accommodate the construction period, the temporary impacts would include considering an earlier drawdown of the lake, which typically happens in the fall around early October. MVCA may need to proceed with an earlier drawdown of the lake levels, such as in September, to allow for the construction.

- Member of the Public – Since water will continue to flow from upstream waterbodies, will mitigation be needed upstream of the Kashwakamak Lake Dam during this period as well to drop water levels and reduce incoming flows?
    - MVCA noted that the mitigation will be occurring at the site of the dam/construction, so a temporary bypass will be designed. However, it is too early in terms of the staging/construction of the project to provide details. Once the design stage begins, the potential alternative solutions for dewatering and bypassing the water will be evaluated but will occur at the construction site.
- CLC member ([redacted]) – Noted that most people who have their boats in the lake have them taken out at the end of the season in early October before the fall drawdown. The local marina should be notified about the timing for the reduced water levels, so they are prepared for the surge of boats at that time.
    - MVCA confirmed that they will have logistics in place to inform everyone affected by the earlier changes in water level. They will try to choose the timing that will have the least impact and accommodate the users of the lake.
- Mayor of North Frontenac (Gerry L.) – Is there an immediate risk of the dam failing?
    - MVCA noted that Alternative Solution 1 (the option to do nothing) has significant deficiencies due to the dam's age and would pose a greater risk of dam failure. Proceeding with this project is a top priority as part of the 10-year capital plan to avoid risking the loss of the dam and lake.
    - With respect to the dam failure, it is constantly being observed and monitored by the MVCA as part of a monthly monitoring program to evaluate the risks of failure, as well as assess the structure and seepage.
- Mayor of North Frontenac (Gerry L.) – Regarding Alternative Solution 5 where a new dam would be built just downstream of the existing one, could the new dam be built in the summer while the old dam acts as the cofferdam? There would be minimal impact on the lake residents, and the old dam could be taken out in the winter while water levels are at their lowest.
    - MVCA acknowledged that Alternative Solution 5 definitely has some benefits with regards to construction, however, the channel widens downstream relative to where the current dam is placed. This would mean that the cost of the project would approximately double due to needing a larger/longer structure to accommodate the wider channel.
    - For Alternative Solution 5, using the existing dam as a cofferdam would be ideal, however, it is also evaluated from a socio-economic and environmental perspective regarding the impacts on the downstream area. From a hydraulic perspective, it could result in additional properties flooding due to elevation differences and topography at other possible dam locations downstream.
    - The report including further details on the alternative solutions evaluation process will be developed and there will be time for the public to review it over a 30-day period.
- CLC member ([redacted]) – Is there an updated sense of timing for the next CLC meeting?
    - It is currently expected to occur in mid to late June 2024. The Notice of PIC has requested that all comments/concerns be submitted by no later than June 20th so that the information can be brought to the CLC meeting.

- CLC member ([redacted]) – Is there an updated sense of timing for the whole project getting underway, including the demolition and lowering of lake levels?
    - The next phase of the project will be preliminary and detailed design, which will take place in 2025-2026. Following that there will be acquiring permits for the project. Therefore, construction is currently expected to occur in in the Fall of 2026 at the earliest.
- Closing comments:
    - A copy of the recorded PIC presentation will be posted on the MVCA website.
    - MVCA team members will be attending the KLA AGM meeting in July.

## 4.0 NEXT STEPS

- Continue consultation with governing agencies, CLC, First Nations, stakeholders, residents/cottagers and the public;
- Update evaluation criteria and matrix, and confirm selection of Recommended Technically Preferred Alternative Solution based on consultation;
- Conduct detailed analysis of environmental impacts and develop mitigation measures for Technically Preferred Alternative Solution;
- Prepare Conceptual Design for Technically Preferred Alternative Solution;
- Community Liaison Committee Meeting #2; and
- Prepare Project Plan and issue Notice of Filling (30-day review period).

The meeting was adjourned at 5:35 pm.
For any errors or omissions, please contact the undersigned.

Lisa Marshall, P.Eng.
Project Manager
Email - lisa.marshall@egis-group.com

# MISSISSIPPI VALLEY CONSERVATION AUTHORITY

# KASHWAKAMAK LAKE DAM
# CLASS ENVIRONMENTAL ASSESSMENT

## PUBLIC INFORMATION CENTRE

May 23, 2024

# PUBLIC INFORMATION CENTRE

**Present the Study Area**

**Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control**

**Review existing conditions**

**Outline alternatives, evaluation and recommended preferred alternative solution**

***Seek <u>public input / comments</u> & provide opportunities for public to <u>ask questions</u>***

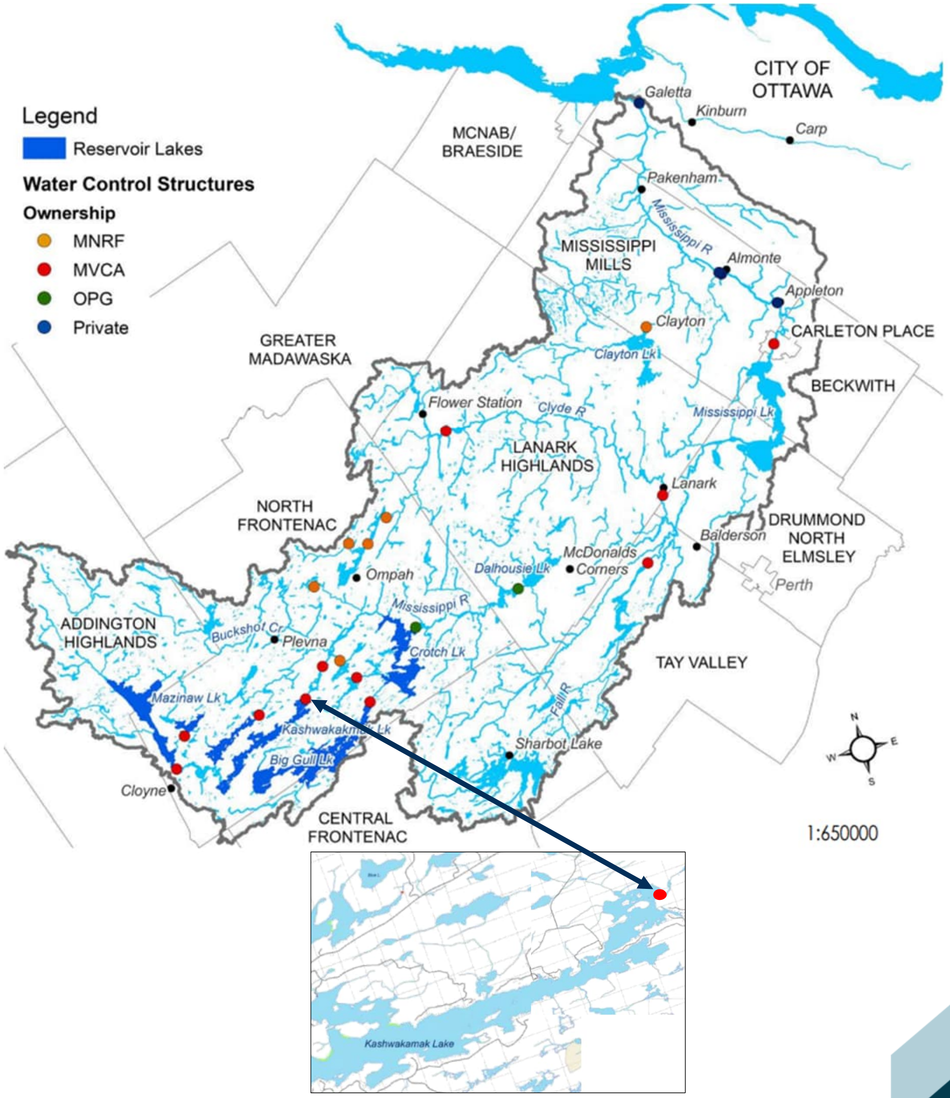
# WATERSHED MANAGEMENT

## Mississippi River

- The Mississippi River system is composed of a complex network of rivers, streams, rapids and over 250 lakes located in Eastern Ontario.
- Managed system with a watershed area of 3765 km$^2$.
- Several dams and weirs along the Mississippi River:
    - ➢ Mitigate drought and flooding (i.e., regulate flows and manage water levels); and
    - ➢ Maintain water levels throughout the watershed.

## Kashwakamak Lake

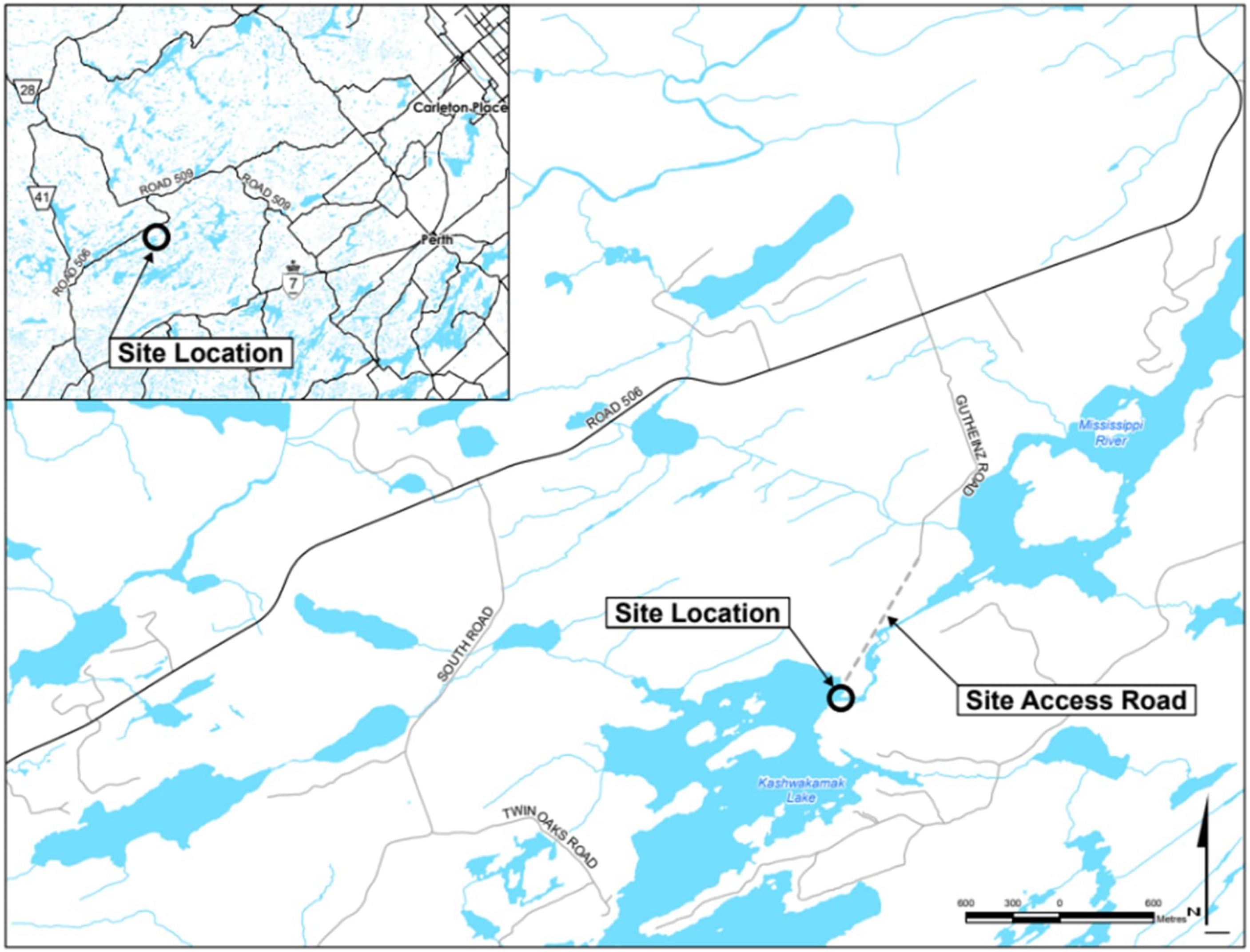
- Located in the upper reaches of the Mississippi River, within the Township of North Frontenac
    - ➢ Catchment area of 415 km$^2$.
- One of several reservoir lakes that serve a critical storage function:
    - ➢ Alleviate flooding and drought, and
    - ➢ Maintains stable water levels on the lake.



Kashwakamak Lake Dam

Source: Mississippi River Watershed Plan (MVCA, 2021)

# STUDY AREA



Main Kashwakamak Lake Dam Structure

Saddle Dam

# HISTORY OF KASHWAKAMAK LAKE DAM

- Designed and constructed as a lumber dam in the 1860s.
- Reconstructed in 1911 by private interests.
- Minor repairs completed between 1911 and 1988.
- MVCA assumed ownership in 1991.
- 1995-2016 various works carried out to reduce seepage and improve dam safety.
- In 2022, dam safety review identified the structure in deteriorated state and in poor to fair condition.
- 10-year Capital Plan updated to allow for the environmental assessment and dam renewal/replacement.

# CLASS ENVIRONMENTAL ASSESSMENT PROCESS

Conservation Ontario’s Class Environmental Assessment for Remedial Flood and Erosion Control Projects

| **Stage 1** | **Stage 2** | **FINDINGS: Can Impacts be Avoided, Mitigated or Compensated?** | | |
|---|---|---|---|---|
| Environmental Assessment Process | | | | |
| **Project Initiation** | **Alternative Solutions** | **Yes** | **Uncertain** | **No** |
| Technical Process | | | | |
| ✓ Prepare Problem Statement<br>✓ Prepare Baseline Environmental Inventory | ✓ Identify and Evaluate Alternative Solutions<br>✓ Identify Impacts and Mitigation Measures<br>▪ Select Preferred Solution<br>▪ Conduct Detailed Analysis of Environmental Impacts | ▪ Prepare Project Plan<br>▪ Are all Concerns Addressed? (No Part II Order Requests) | ▪ Prepare Environmental Study Report (ESR)<br>▪ Are Impacts Deemed Acceptable? | ▪ Prepare Individual Environmental Assessment<br>OR<br>▪ Reassess Program Option |
| Consultation Process | | | | |
| ✓ Notice of Intent<br>✓ Establish Community Liaison Committee (CLC) | ✓ Host CLC meeting<br>▪ Engage public agencies, stakeholder, First Nations and general public<br>✓ Public Information Centre | ▪ Notice of Filing to Interested Persons/Parties<br>▪ Provide Notice of Project Approval & Proceed to Construction | ▪ Publish Notice of Filing for Review | ▪ Continue Consultation as Required during Detail Design |

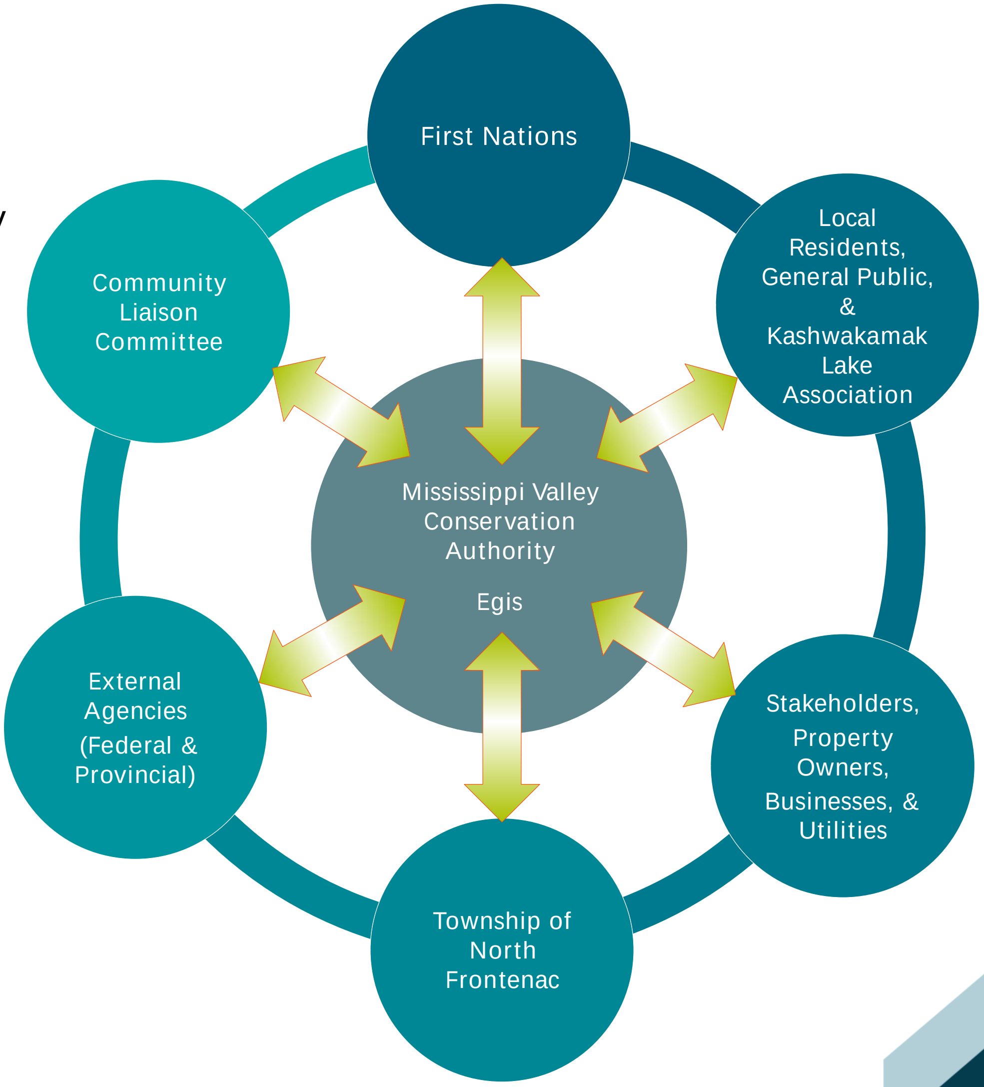
# PROJECT PROBLEM STATEMENT

- The existing Kashwakamak Lake Dam is well beyond its design life.
- The 2022 Dam Safety Review identified significant deterioration, especially the overflow weir.
- A decision needs to be made on whether to decommission, repair, or replace the dam.
- Selection of the Preferred Alternative must consider several constraints and opportunities such as public safety, riverine processes, flooding, climate change, cultural heritage, Indigenous rights, natural habitat, public uses and aesthetics.
- The Preferred Alternative must address the problem while balancing study area constraints and opportunities, in order to best meet the needs of the various stakeholder groups and interested parties.

# CONSULTATION PROGRAM

Consultation completed to-date:

- May 25, 2023: Notice of Intent;
- August 24, 2023: Expression of Interest to join the Community Liaison Committee (CLC); and
- February 26, 2024: CLC Workshop Meeting #1.
- August 30, 2023: Invitation sent First Nations to participate in Marine Archaeological Assessment;
- September 11, 2023: Marine Archaeological Assessment field investigation;
- May 2, 2024: Notice of Public Information Session
- May 9 & 16, 2024: Notice of Public Information Session published in the North Frontenac News;
- April 18, 2024: Invitation sent to First Nations to participate in Stage 2 Archeological Assessment, and
- May 2, 2024: Stage 2 Archeological Assessment field investigation.



First Nations

Local Residents, General Public, & Kashwakamak Lake Association

Community Liaison Committee

Mississippi Valley Conservation Authority

Egis

External Agencies (Federal & Provincial)

Stakeholders, Property Owners, Businesses, & Utilities

Township of North Frontenac

# COMMENTS AND CONCERNS RECEIVED

## Comments/Inquiries

- Requests to stay involved with the study and be able to provide input;
- The current dam controls and maintains water levels for both safety and recreational/tourism purposes for hundreds of people who either live or own seasonal cottages on the lake.
- Has consideration been given to creating a power supply with the Kashwakamak Lake Dam which could become a revenue source.

## Concerns

- Changes in water levels, as well as the ability of the proposed alternative to continue to mitigate flood and drought risk;
- When construction will commence and how water levels be impacted and controlled during the replacement of the dam, and
- Potential impacts of the dam on Manòmin (wild rice crops).

# INVENTORY STUDIES

## ↑ Natural Heritage Assessment

- ✓ Existing Conditions Inventory
- ✓ Environmental Impact Assessment

## ↑ Archaeological and Cultural Heritage

- ✓ Land Archaeological Assessment
- ✓ Marine Archaeological Assessment
- ✓ Cultural Heritage Evaluation Report

## ↑ Hydrology and Hydraulic Assessment

- ✓ Hydrology and Hydraulic Assessment (modeling)

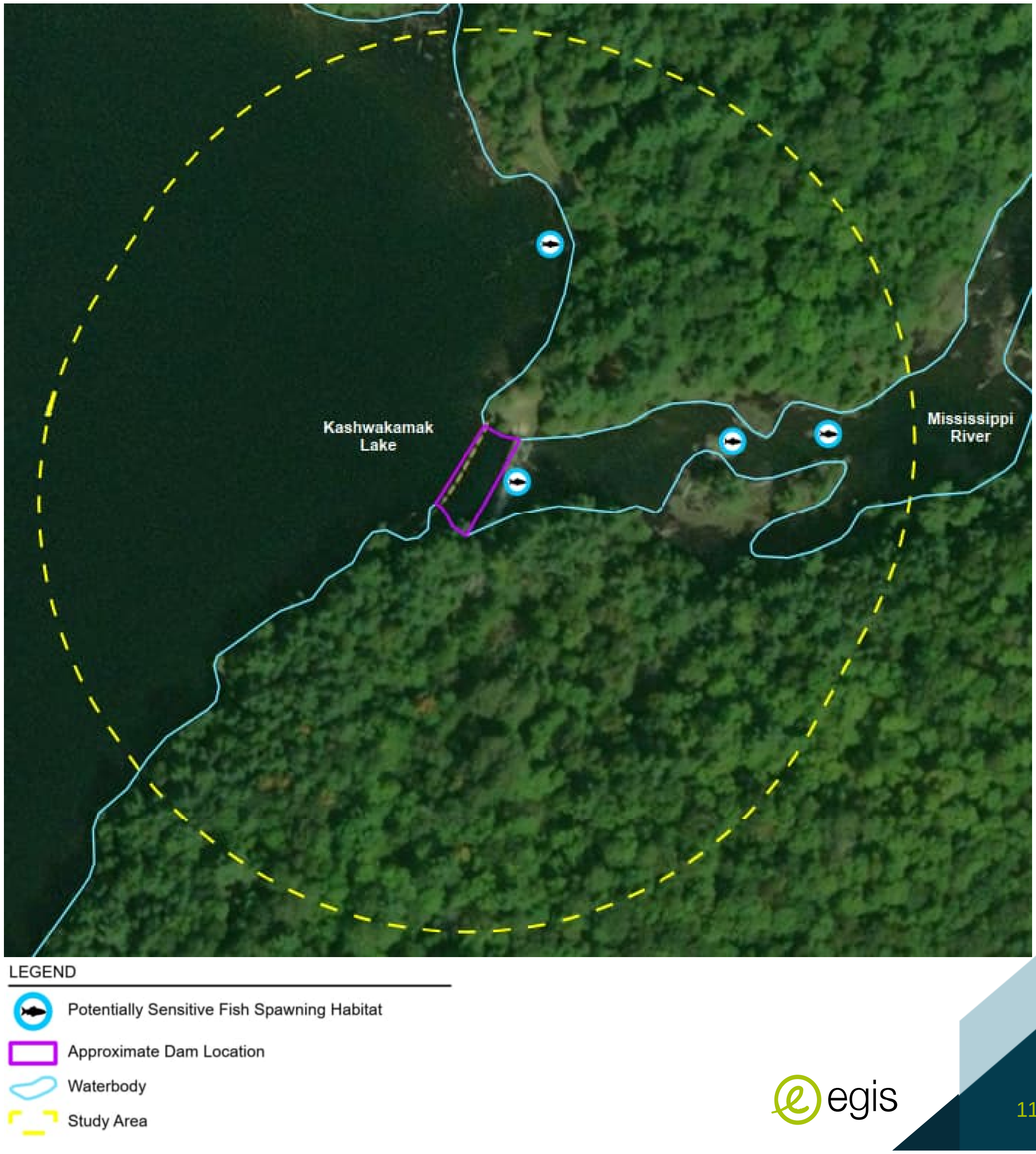
## ↑ Geotechnical Investigation

- ✓ Explore the subsurface conditions and documentation

# NATURAL ENVIRONMENT

## Fish and Fish Habitat

- Kashwakamak Lake is identified as having a cool/warmwater thermal regime.
- The lake, and the Mississippi River, provide permanent fish habitat and suitable spawning habitat.
- Significant fish habitat: sport fish and baitfish spawning immediately downstream of the Dam.
- Large population: Walleye, White Sucker, Bass, Northern Pike, baitfish and non-sport fish species.



# NATURAL ENVIRONMENT

## Wetlands

- No significant wetlands are present within the study area.
- Several small wetlands around the perimeter of the lake and downstream (Mud Lake Provincially Significant Wetland).
  - Overwintering habitat for turtles - Blanding's Turtle.
- The Manòmin (wild rice crops) - approximately 7.0 km downstream of the dam.
  - Aquatic annual species of grass;
  - Cultural significance: Ardoch Algonquin First Nation, Alderville First Nation, and potentially other First Nations.
  - Changes in water levels can have potential impacts on the wild rice crops.

# NATURAL ENVIRONMENT

## Vegetation

- Mixed Forest including species:
  - Eastern hemlock, Eastern white cedar American elm, American beech, white pine, red oak, and paper birch.
- Natural Heritage Information Centre identifies woodlands, however, does not identify the woodlands as being “significant”.
- No invasive and/or noxious plant species were observed on site.
- No Butternut or Black Ash (SAR) were observed.

# NATURAL ENVIRONMENT

## Wildlife Habitat

- Significant Wildlife Habitat:
    - Bat Maternity Colonies, Birds, Turtle Wintering Area, Special Concern and Rare Wildlife Species, and Turtle and Lizard Nesting Habitat.
    - Mixed Forest provides suitable habitat:
- Rock structures (i.e., rocky outcroppings) - snakes and lizards.

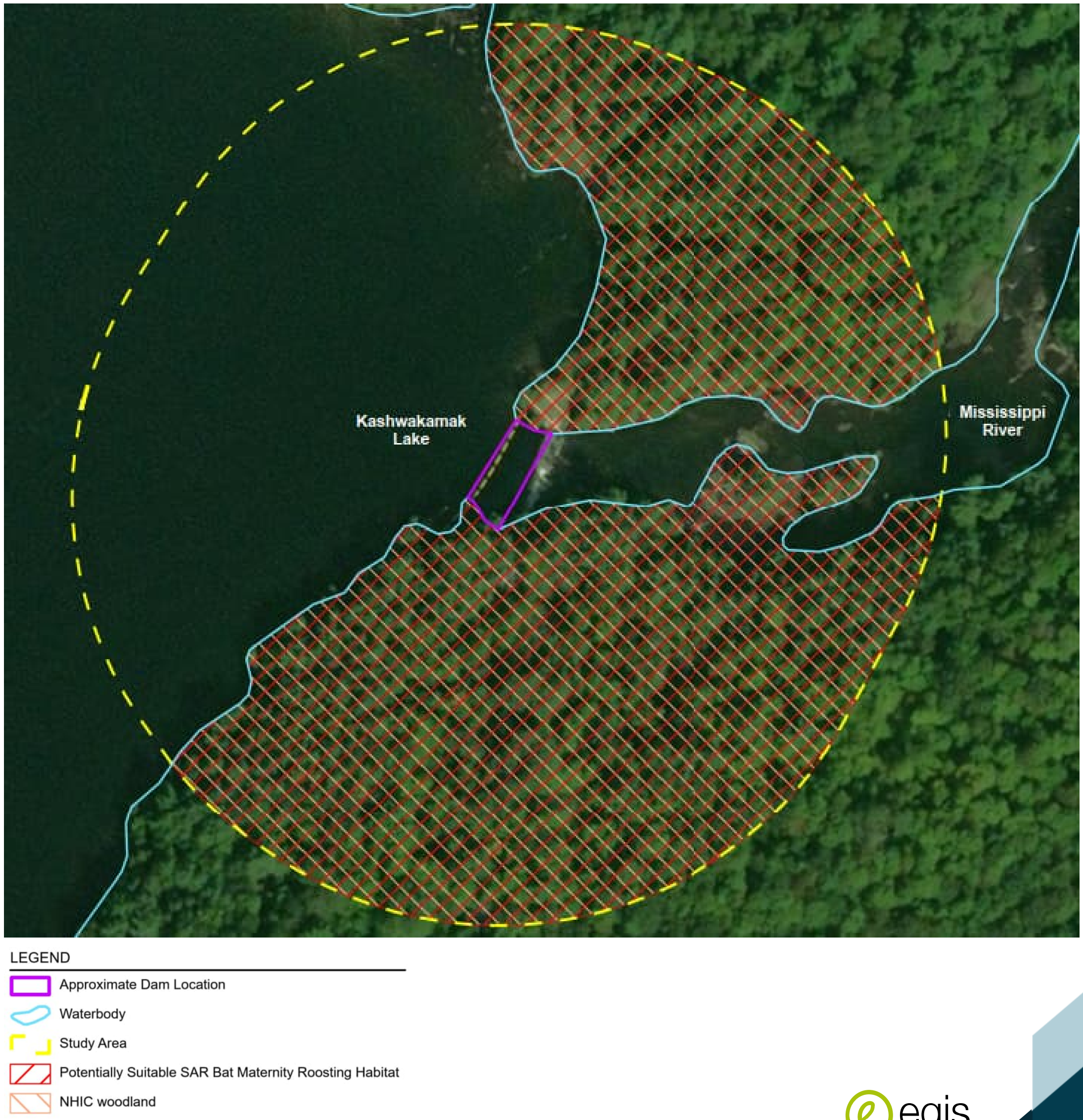
# SPECIES AT RISK (SAR)

## Bats

- High-quality maternity roosting trees (April - September 30):
  - ➢ Little Brown Myotis;
  - ➢ Northern Myotis, and
  - ➢ Tri-colored Bat.

## Birds

- Potentially suitable breeding habitat (i.e., nesting):
  - ➢ Red-headed Woodpecker;
  - ➢ Eastern Whip-poor-will, and
  - ➢ Wood Thrush.

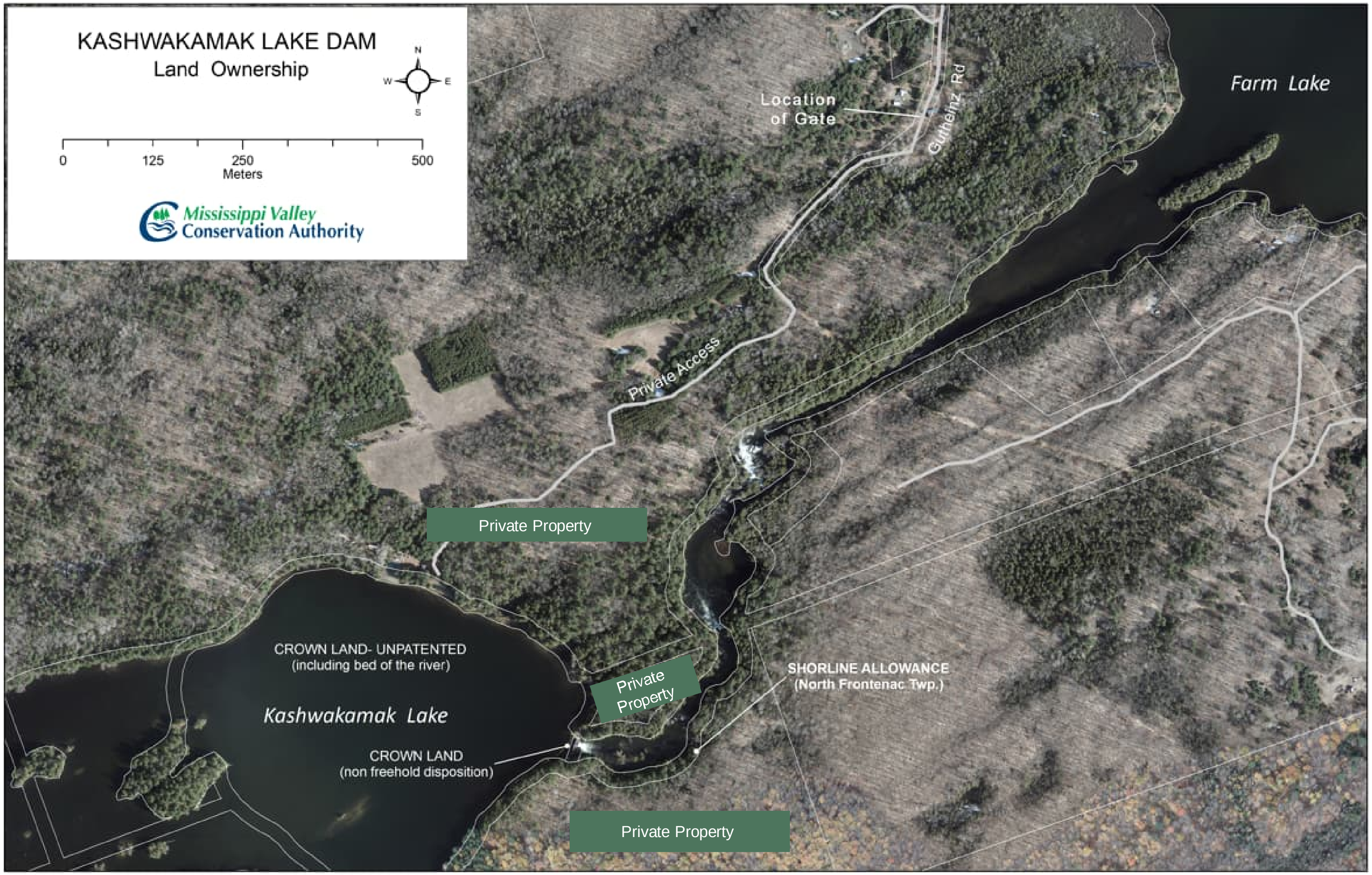


# SPECIES AT RISK (SAR)

## Herptiles

- Potentially suitable nesting and overwintering habitat:
  - Blanding's Turtle;
  - Midland Painted Turtle, and
  - Snapping Turtle.
- Rock features on the edge of lake provide suitable habitat:
  - Milksnake, and
  - Five-lined skink.

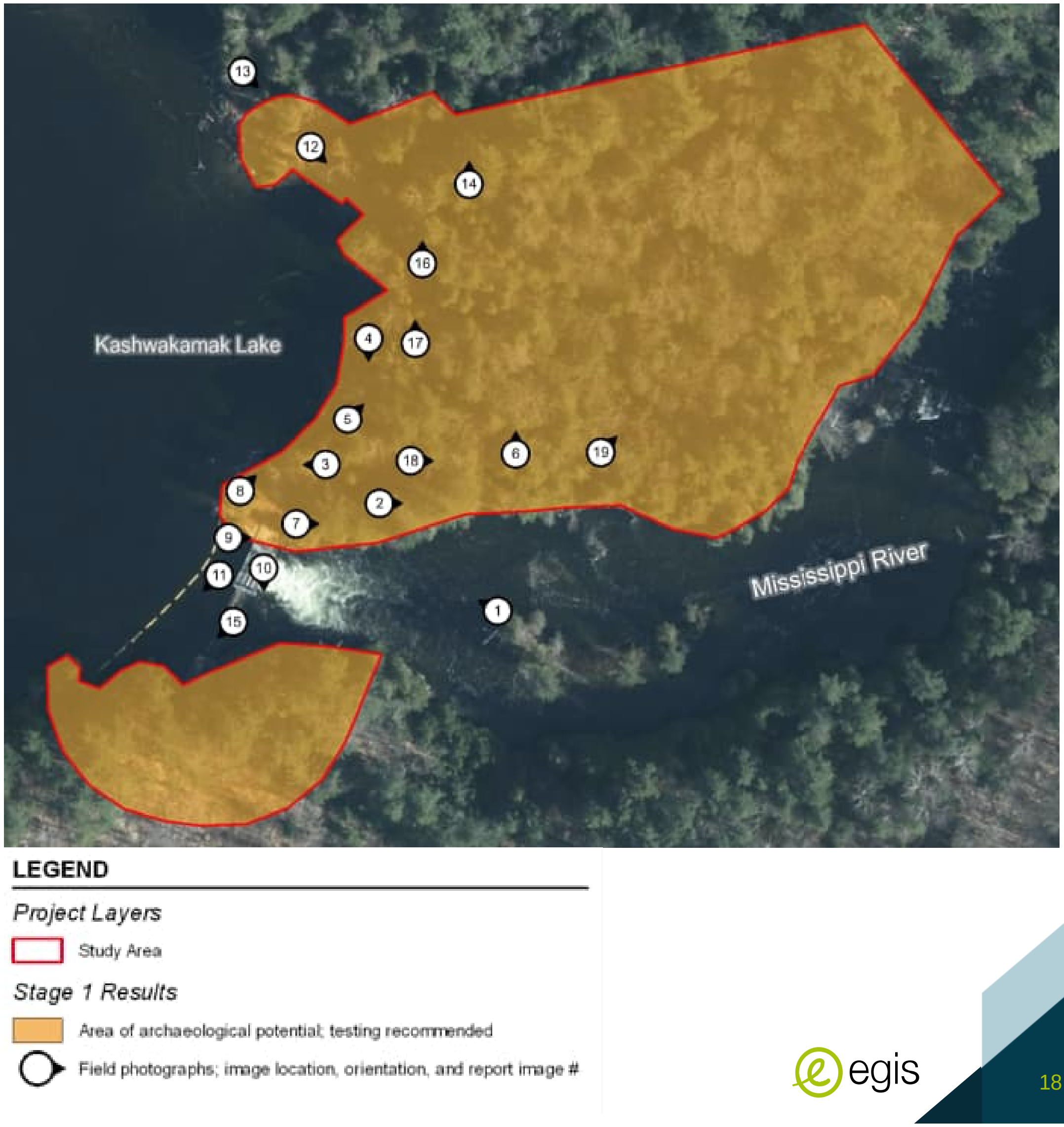
# SOCIAL ENVIRONMENT AND LAND USE



# ARCHAEOLOGICAL & BUILT CULTURAL HERITAGE

## Land Archaeological

- Stage 1 Archaeological Assessment (June 6, 2023)
  - ➢ Study area exhibits archaeological potential.
- Stage 2 Archaeological Assessment (May 2, 2024)
  - ➢ Several First Nations showed interest in attending the field investigation.
  - ➢ A small Indigenous site along the water's edge was identified.
  - ➢ A Stage 3 Archaeological Assessment is currently be considered.



# ARCHAEOLOGICAL & BUILT CULTURAL HERITAGE

## Marine Archaeological

- A Stage 1 & 2 in-water Marine Assessment (September 11, 2023);
- No registered archaeological sites within one kilometer of the study area.
- Study area free of any archaeological features and concerns.

## Built Cultural Heritage

- Dam does not retain any cultural heritage value or interest (CHVI) under the Ontario Heritage Act.

# GEOTECHNICAL INVESTIGATION

- Exploration of subsurface conditions (September 18 and 25, 2023)
  - Four (4) boreholes advanced into the subsurface;
  - Bedrock was observed at the ground surface and cored to the bottom of the boreholes;
  - Bedrock - Carbonate Metasedimentary bedrock, and
  - Slightly weathered and fractured with moderately close, horizontal to diagonal joints.
- Proposed design considerations:
  - Excavation for new dam to extend down to sound bedrock.
  - Appropriate dewatering measures to effectively control the water levels in the lake during construction are to be implemented.

# EXISTING DAM STRUCTURES AND CONDITIONS

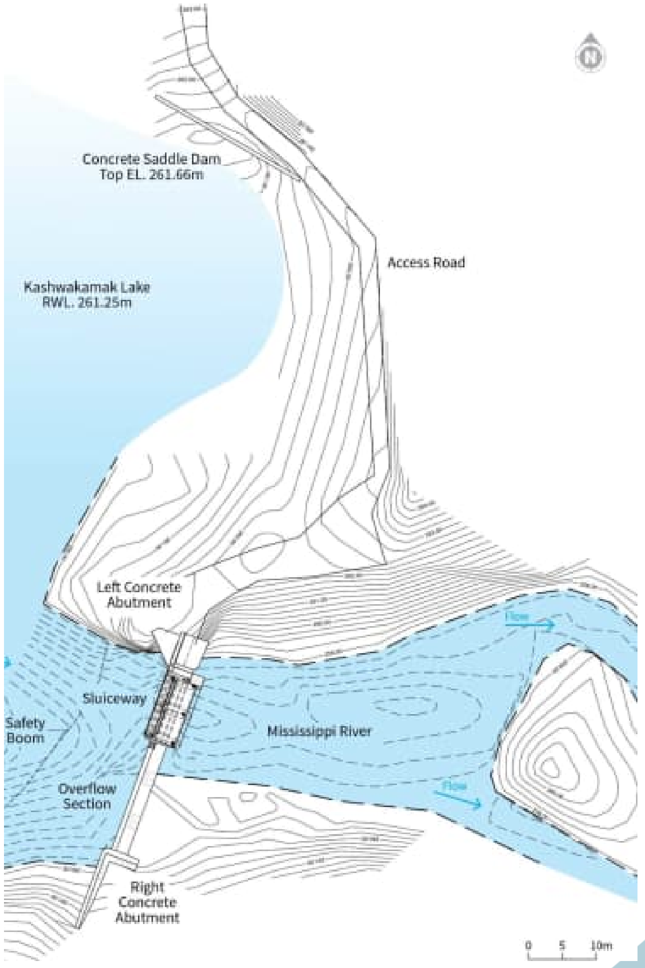
## Main Dam Structure

- Main Dam Structure: north and south abutment walls, three concrete piers forming the two sluiceways, and broad crested concrete weir.
- Based on previous dam inspection (2016) and the Dam Safety Inspection Report (2022):
  - Dam abutments have inadequate freeboard;
  - Overflow weir and abutments do not satisfy requirements for ice loading;
  - Outdated methods and materials;
  - All concrete structures are in a deteriorated state and in poor to fair condition, and
  - Designed to an outdated HPC/IDF.

# SADDLE DAM CONDITIONS

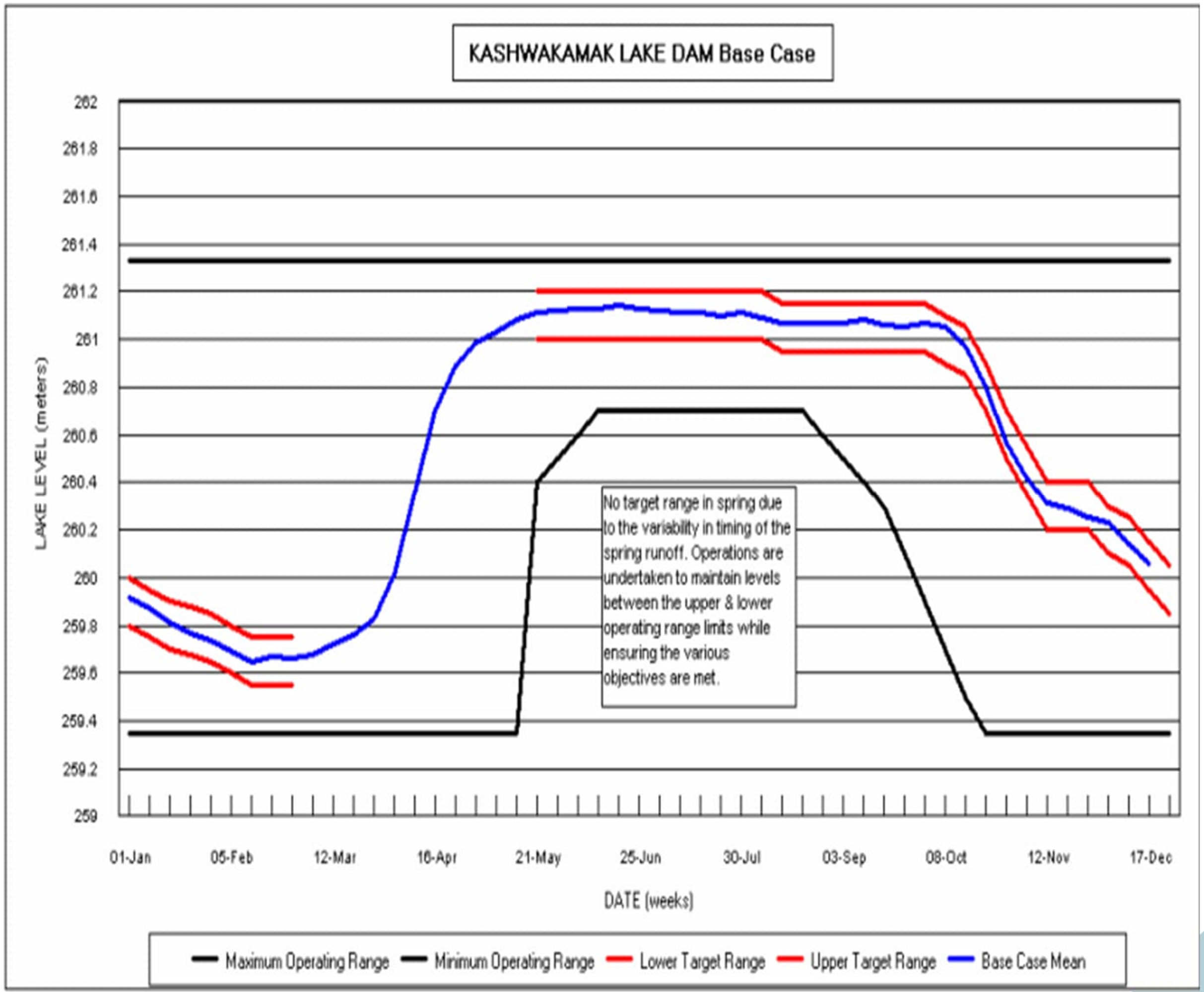
## Saddle Dam Structure

- Saddle Dam located approximately 60 m to the north of the main dam and runs adjacent to access road.
- Prevents spillage of the lake, however, has inadequate freeboard.
- Failure of the dam would result in:
  - Limits access to the Dam, and
  - Access to perform emergency maintenance or operations during a significant storm event.
- Seepage and settlement was noted along the access road.
- Outdated methods and materials used to originally construct the dam.



# OPERATION OF THE EXISTING DAM

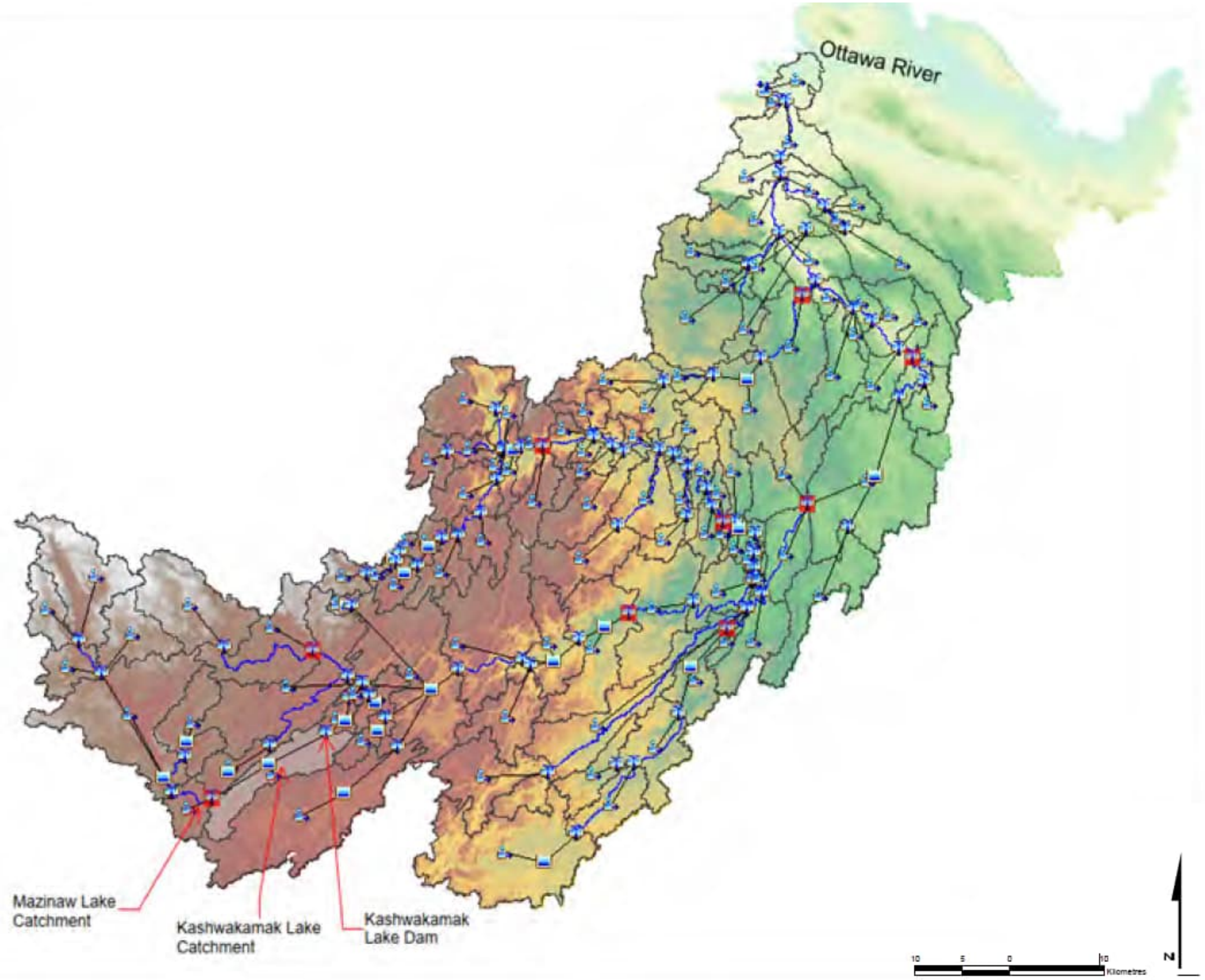
- 16.9 m long overflow structure at elevation of 261.06 m.
- Two gates (~3 m width each) with timber stoplogs (0.3 m x 0.3 m).
- Manually operated gates with elevations ranging between 258.22 m to 261.22 m.
- Target water level for spring and summer ranges from 260.98 m to 261.28 m
- Target water level for winter ranges from 259.5 m to 259.7 m.



# HYDROLOGIC AND HYDRAULIC ASSESSMENT

## Hydrologic Assessment

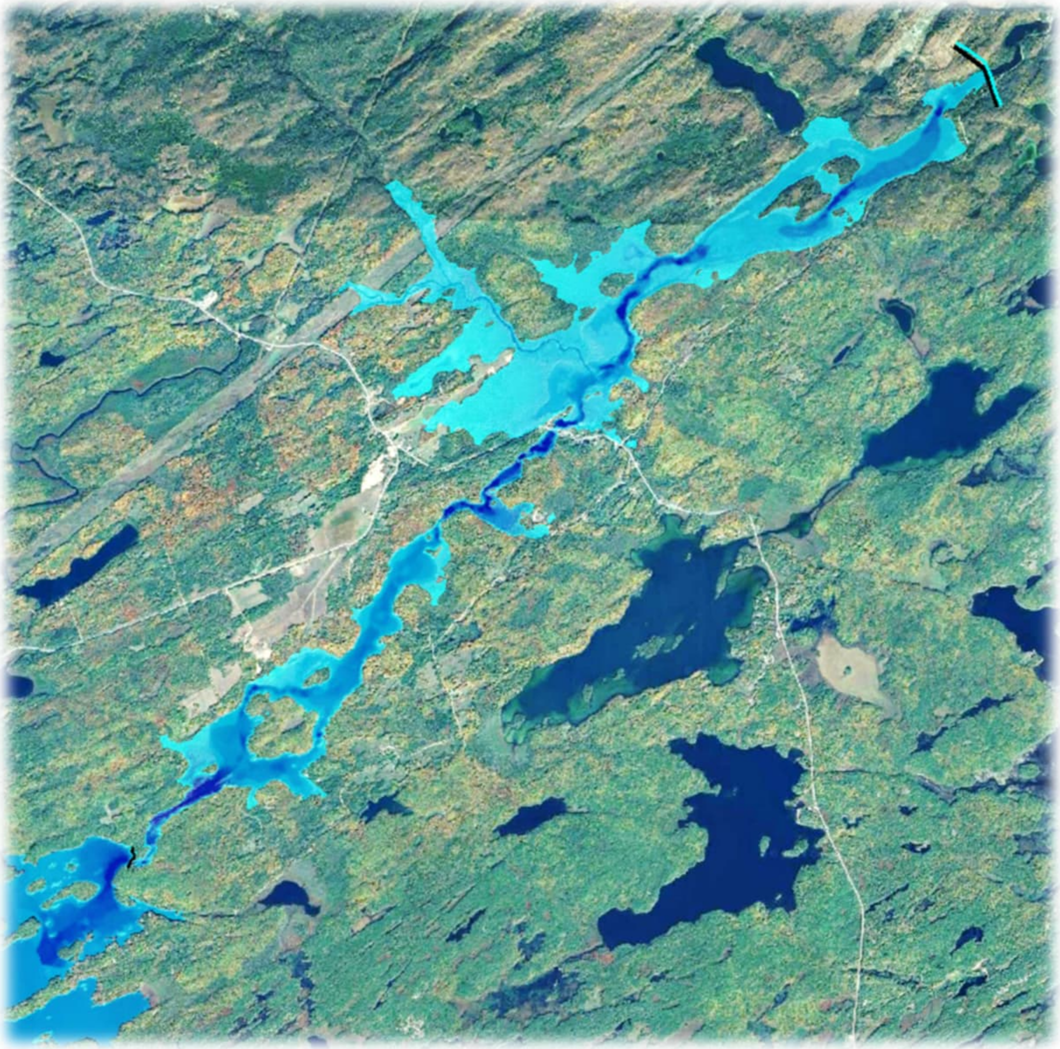
- HEC-HMS numerical model for the Mississipp watershed.
- Flood frequency flows for the Kashwakamak Dam.
- Inflow hydrographs to Kashwakamak Lake.
- Probable Maximum Precipitation (PMP) and Probable Maximum Flood (PMF) estimates.
- Inflow hydrographs under a climate change scenario.



# HYDROLOGIC AND HYDRAULIC ASSESSMENT

## Hydraulic Analysis

- HEC-RAS numerical model of the dam and Mississippi River.
- Latest topo-bathymetric data (2022 LiDAR, 2023 survey).
- Incremental flood inundation study for various flood scenarios without and with dam breach.
- Hazard Potential Classification (HPC) of the dam determined to be “Moderate”.
- Updated Inflow Design Flood (IDF).
- Updated freeboard for abutments and saddle dam.



# PROPOSED ALTERNATIVE SOLUTIONS

## Alternative 1 – Do Nothing

No change made within the Study Area (status quo). No changes to the existing dams within the study area. No changes to existing conditions.

## Alternative 2a – Decommission the Existing Dam and Construct Passive Control System

Decommissioning of the dam and creating a passive water control system (such as an overflow weir).

## Alternative 2b – Decommission the Existing Dam and Reinstate Natural Watercourse

Decommissioning/full removal of the existing dam and reinstating a natural watercourse/channel.

## Alternative 3 – Rehabilitation of the Existing Dam

Rehabilitation of the Dam would consist of salvaging elements of the existing dam and preserving the structure in a stable state similar to the existing condition.

## Alternative 4 – Replace the Existing Dams at the Same Location

Construction of a new dam within a similar alignment to that of the existing dam.

## Alternative 5 – Construct New Dam Downstream

Construct a new dam immediately downstream of the existing dam.

# EVALUATION CRITERIA

| Function/Technical | Natural Environment | Social Environment |
|---|---|---|
| ▪ Hydraulic Function/Flooding and Drought<br>▪ Geomorphology/Sediment Transport<br>▪ Dam Safety<br>▪ Durability/ Service Life<br>▪ Climate Change Adaptation<br>▪ Implementation/Constructability | ▪ Fisheries/Aquatic Impacts<br>▪ Terrestrial Habitat (Wildlife and Vegetation)<br>▪ Species at Risk<br>▪ Existing Watercourses Quality and Quantity | ▪ Private Property Impacts During Construction and Commissioning<br>▪ Temporary/Permanent Property Agreements/ Acquisitions<br>▪ Recreational Impacts/Enhancement<br>▪ Tourism Impacts |

| Cultural Environment | First Nations | Economic Environment |
|---|---|---|
| ▪ Archaeological Resources<br>▪ Built Heritage Resources and Cultural Heritage Landscapes | ▪ Lands Rights<br>▪ Harvesting Rights (wild rice crops) | ▪ Capital Costs<br>▪ Operational and Maintenance Costs |

| Category | Alternative 1<br>Do Nothing | Alternative 2a<br>Decommission the Existing Dam and Construct Passive Control System | Alternative 3<br>Rehabilitation of the Existing Dam | Alternative 4<br>Replace the Existing Dam at the Same Location | Alternative 5<br>Construct New Dam Downstream |
|---|---|---|---|---|---|
| **Functional / Physical** | **Not Preferred** | **Less Preferred** | **Less Preferred** | **Preferred** | **Preferred** |
| **Natural Environment** | **Not Preferred** | **Preferred** | **Less Preferred** | **Less Preferred** | **Not Preferred** |
| **Social Environment** | **Less Preferred** | **Not Preferred** | **Preferred** | **Preferred** | **Less Preferred** |
| **First Nations/Cultural Environment** | **Preferred** | **Less Preferred** | **Preferred** | **Preferred** | **Less Preferred** |
| **Economic Environment** | **Less Preferred** | **Preferred** | **Not Preferred** | **Less Preferred** | **Not Preferred** |
| **Summary (Key Pros/Cons):**<br>***Abbreviation Legend:***<br>PS – Problem Statement<br>WMP - Watershed Management Plan<br>SAR – Species at Risk<br>***Ranking:***<br>Not Preferred \| Less Preferred \| Preferred<br>→ | **Not Recommended – Does not address the PS.**<br>**Pros:**<br>• Existing conditions remain the same.<br>**Cons:**<br>• Less resiliency to larger storm events (climate change).<br>• Continue to deteriorate.<br>• Continued risk of dam failure.<br>• Maintains current WMP until potential failure of the dam. | **Not Recommended – Does not address the PS.**<br>**Pros:**<br>• Relatively low/moderate cost.<br>• Property acquisition most likely not required.<br>**Cons:**<br>• Reduction/limited ability to mitigate floods/droughts and maintain current WMP.<br>• Limited ability to fully adapt to Climate Change.<br>• High fluctuation in water levels.<br>• Potential impacts to the Manòmin.<br>• Temporary impacts due to construction activities (i.e. property, recreational, tourism, etc.). | **Not Recommended – Does not address the PS.**<br>**Pros:**<br>• Maintains current WMP.<br>• Maintains existing conditions.<br>• No significant change to water elevation and volume.<br>**Cons:**<br>• Less resiliency to larger storm events (climate change).<br>• Continued risk of dam failure.<br>• Temporary impacts due to construction activities (i.e. property, recreational, tourism, etc.). | **Recommended – Addresses the PS.**<br>**Pros:**<br>• Maintains current WMP.<br>• Designed to accommodate larger storm events and adapt to climate change.<br>• Meet safety guidelines.<br>• Sensitive fish spawning habitat maintained.<br>• No long-term impacts to First Nation Lands including Manòmin.<br>• No permanent property impacts anticipated.<br>**Cons:**<br>• Temporary impacts due to construction activities (i.e. property, recreational, tourism, etc.). | **Not Recommended – Addresses the PS.**<br>**Pros:**<br>• Maintains current WMP.<br>• Designed to accommodate larger storm events and adapt to climate change.<br>• Meet safety guidelines.<br>• No direct or indirect impacts to the recreational/tourism use of the lake.<br>**Cons:**<br>• Requires larger structure.<br>• Significant cost.<br>• Additional property requirements/acquisition.<br>• Environmental Impacts.<br>• Unaltered lands and watercourse impacted by construction.<br>• Temporary impacts due to construction activities (i.e. property, recreational, tourism, etc.). |

# NEXT STEPS

- Continue consultation - governing agencies, CLC, First Nations, stakeholders, residents/cottagers and the public;
- Update evaluation criteria and matrix, and confirm selection of Recommended Technically Preferred Alternative Solution based on consultation;
- Conduct detailed analysis of environmental impacts and develop mitigation measures for Technically Preferred Alternative Solution;
- Prepare Conceptual Design for Technically Preferred Alternative Solution;
- Community Liaison Committee Meeting #2, and
- Prepare Project Plan and issue Notice of Filling (30-day review period).

**Lisa Marshall, P. Eng.**
Consultant Project Manager
Egis
115 Walgreen Road, R.R.3
Carp, Ontario, K0A 1L0
Phone: 613-714-0815
Lisa.MARSHALL@egis-group.com

**Juraj Cunderlik, PhD., P.Eng.**
Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

# Appendix G – Hydraulic Analysis Memorandum

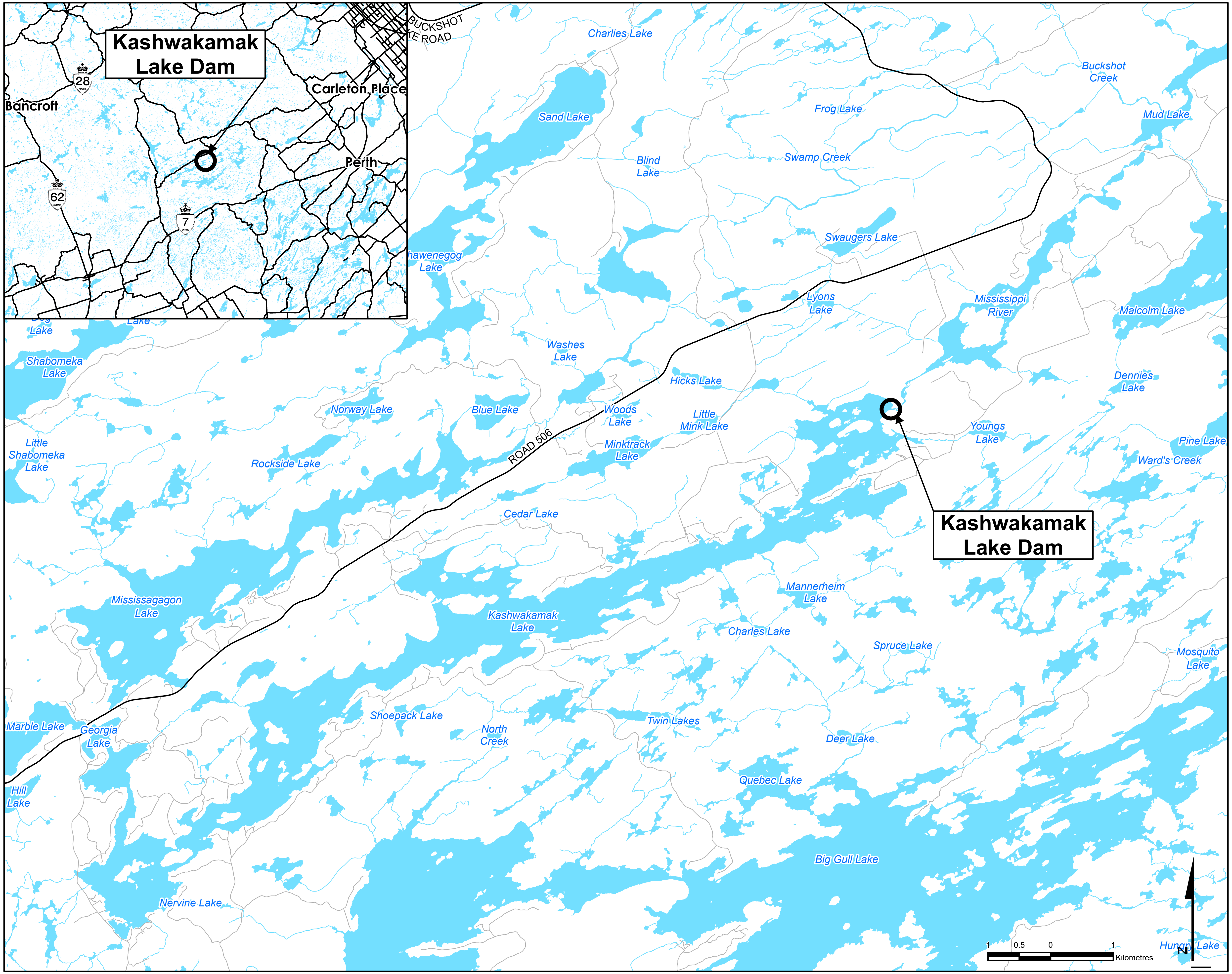
# KASHWAKAMAK LAKE DAM
# HYDRAULIC ANALYSIS MEMO

|  |  |
|---|---|
| To: | Mississippi Valley Conservation Authority |
| From: | Mustafa Sasal, P.Eng., Sr. Water Resource Engineer<br>Alex Ploughman, EIT, Engineering Intern<br>Monika Orwin, EIT, Engineering Intern<br>Egis Group Construction Engineering Company |
| c.c. | Lisa Marshall, P.Eng., Manager, Environmental Engineering<br>Egis Group Construction Engineering Company |
| Date: | December 22, 2023<br>Rev. 1 April 26, 2024<br>Rev. 2 May 8, 2024 |
| Re: | Kashwakamak Lake Dam – Hydraulic Analysis Memo |

## 1.0 INTRODUCTION

Egis Group Construction Engineering Company (Egis) has been retained by the Mississippi Valley Conservation Authority as part of a Class Environmental Assessment to review options pertaining to the replacement of the Kashwakamak Lake Dam, in North Frontenac Township. Kashwakamak Lake is located along the main channel of the Mississippi River in the Mississippi River watershed and the Upper Mississippi sub-watershed. The Kashwakamak Lake Dam (the dam) is situated at the northeast side of Kashwakamak Lake, as shown in Figure 1 below. It is owned and operated by the Mississippi Valley Conservation Authority (MVCA). The dam is one of the major dams along the Mississippi River that is used to alleviate drought and flooding. The dam structure consists of an overflow weir spillway, two sluices that each contains 10 timber stop logs (0.3 m high x 0.3 m wide x 3.43 m long) and a small concrete saddle dam.

The dam, originally constructed in 1910, is now over 100 years old with deteriorating concrete in several areas. The proposed project aims to replace the Kashwakamak Lake Dam to mitigate the risk of overtopping or failing. A hydraulic analysis of the dam was carried out for various scenarios, including normal conditions, the probable maximum flood, and climate change to determine the impacts it may have on life safety, properties, the environment, and cultural-built heritage features. Assessing the degree of the potential impacts on the surrounding area in the event of a failure will provide confirmation of the Hazard Potential Classification (HPC) of Kashwakamak Lake Dam.



CLIENT:

Mississippi Valley Conservation Authority

PROJECT:

HYDRAULIC ANALYSIS MEMORANDUM

TITLE:

SITE LOCATION

egis

115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

PROJECT NO:CCO-23-3603

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| Date | May., 07, 2024 |
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FIGURE:
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# 2.0 BACKGROUND

The Kashwakamak Lake Dam was constructed in 1910 and was originally owned and operated by the Mississippi River Improvement Company. Ownership and operation of the dam were transferred to the MVCA in 1991. Throughout the lifespan of the dam, several maintenance programs have been undertaken, including:

- 1986-1987: Concrete repairs to the weir, last documented maintenance before the transfer of ownership to MVCA.
- 1995-1996: A grouting program was undertaken along the northern embankment to inhibit seepage through the embankment. It was noted to be effective at lower water levels, however, was not effective at preventing seepage at normal operating levels.
- 2000: A grouting program for the weir and abutments was undertaken and was noted to be successful at temporarily reducing seepage. Subsequent inspections have noted further seepage through the structure.
- 2001-2003: A new wooden deck was installed at the structure.
- 2005: An overhead gantry system was installed.

The above history and hydrologic information were obtained through a review of the following reports, provided by the MVCA at the onset of this assignment:

- Pre-Engineering Study, Kashwakamak Lake Dam (Terraprobe, January 1997),
- Kashwakamak Lake Dam Study (Terraprobe, July 1998),
- Kashwakamak Lake Dam Feasibility Study (EGA, August 1998),
- Kashwakamak Lake Dam Operation, Maintenance & Surveillance Manual (MVCA, October 2013),
- Dam Safety Assessment, Kashwakamak Lake Dam (Trow, November 2006),
- Kashwakamak Lake Dam Condition Assessment of Concrete Structure (Cleland Jardine, February 2016),
- Kashwakamak Lake Dam Structural Assessment (Hatch, May 2020),
- Kashwakamak Lake Dam Safety Review (Hatch, March 2022),
- HEC-HMS Model for the Mississippi River (J. Perdikaris, May 2023),
- Hydrology Memorandum (Innovative Defensive Options, September 2023).

## 2.1 Field Investigations

McIntosh Perry staff conducted a field visit on June 6th, 2023, to inspect and confirm the existing conditions of the main Kashwakamak Lake Dam and gates, as well as the saddle dam. The existing conditions of all structures including overflow weir, sluiceway, saddle dam, abutments, as well as upstream and downstream features, such as high-water indications, leakage, erosions/sedimentations, cut banks, and channel conditions were investigated. Photographs of the dam and surrounding area were taken as shown in Figure 2 below, including (a) the downstream side of the dam structure, (b) the top of the dam structure, and (c) the surrounding area. Additional photographs from the site visit can be made available to the MVCA upon request. During the field investigation, cracking and deterioration of the concrete material was observed.

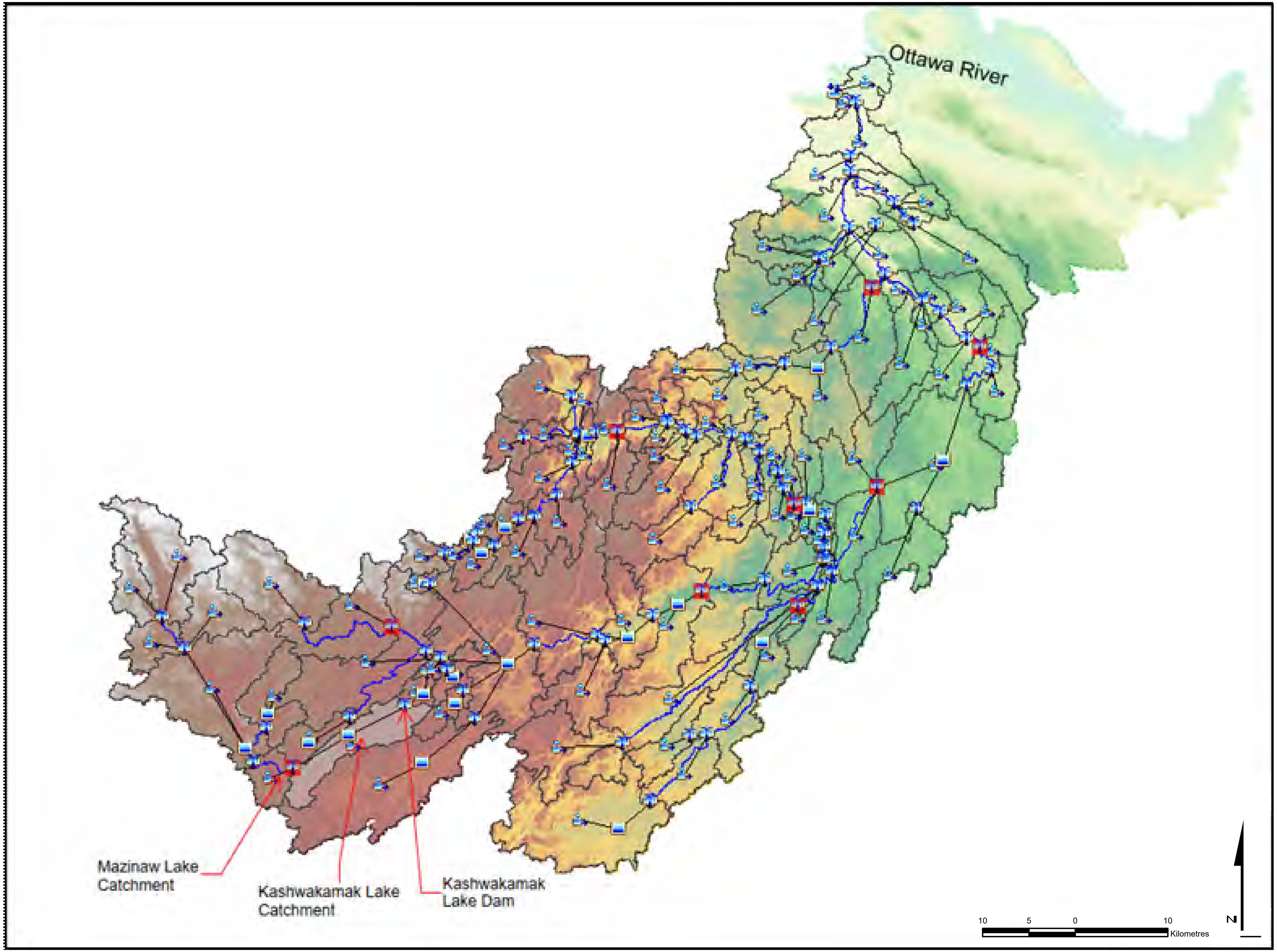
(a) (b) (c)

Figure 2. Dam Inspection Photos

# 3.0 HYDROLOGY

A comprehensive hydrologic study for the Mississippi River was completed using HEC-HMS software by J. Perdikaris in May 2023. The HEC-HMS models and report was provided by the MVCA. Various combinations of input for the modelling approaches were developed in the hydrologic model (event-based or continuous storms, Green-Ampt or soil moisture accounting soil infiltration, and outflow curve or specified release method for downstream conditions). Figure 3 below shows a general view of the Mississippi River HEC-HMS model. The results for different scenarios were summarized in a report. After a review of these submissions, it was noted that additional scenarios would be required to complete the hydraulic analyses for the Kashwakamak Lake Dam EA study.

Subsequently, additional scenarios that will go into the hydraulic models were requested. Results for the requested scenarios were summarized in a memo by Innovative Defensive Options Inc. (September 2023). Hydrographs for 2- to 1000-year return periods, 10-day intensity duration frequency snowmelt plus rainfall, and probable maximum flood (PMF) were developed and provided in an Excel spreadsheet. Simulations accounting for the climate change impact were also completed and provided. Calibration and validation of the hydrologic models were conducted through the streamflow gauge data for 12 Water Survey of Canada streamflow stations located within the Mississippi River watershed. Moderate and high emission climate change scenarios for Representative Concentration Pathway (RCP) 4.5 and 8.5 were applied for each event and hydrographs were accordingly developed. Two types of probable maximum precipitation (PMP) (winter/spring and summer) for two different storm centers (Dalhousie Lake-Point A and Ardoch-Point B) were simulated. After a review of the results, the winter/spring PMF at Ardoch (Point B) was recommended for the analyses. Table 1 summarizes the inflow hydrograph characteristics with and without climate change impacts that were used in the hydraulic modelling. Minor discrepancies were noted between the values reported in the Hydrology Memorandum (Innovative Defensive Options, September 2023) and the hydrologic model outputs.



CLIENT: Mississippi Valley Conservation Authority

PROJECT: HYDRAULIC ANALYSIS MEMORANDUM

TITLE:
HEC-HMS MODEL
VIEW OF MISSISSIPPI RIVER

egis
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

| | |
|---|---|
| PROJECT NO:CCO-23-3603 | |
| Date | May., 07, 2024 |
| GIS | AH |
| Checked By | MS |

FIGURE: 3

Table 1: Hydrograph Inputs to Hydraulic Model

| Event | No Climate Change | | With Climate Change | | Notes |
|---|---|---|---|---|---|
| | Peak Flow ($m^3/s$) | Volume (1000 $m^3$) | Peak Flow ($m^3/s$) | Volume (1000 $m^3$) | |
| 100-year | 72.70 | 13,304 | 90.60 | 16,656 | Hydrograph provided.<br>4 days with 6 mins time step. |
| 1000-year | 98.56 | 17,857 | 122.82 | 19,749 | Hydrograph provided.<br>4 days with 6 mins time step. |
| 1/3 PMF | 202.14 | 36,625 | 245.60 | 39,490 | Hydrograph manually developed using 1000-year and PMF [1000-year + 1/3*(PMF - 1000-year), herein referred to as 1/3 PMF].<br>4 days with 6 mins time step. |
| 2/3 PMF | 305.72 | 55,392 | 368.38 | 59,232 | Hydrograph manually developed using 1000-year and PMF [1000-year + 2/3*(PMF - 1000-year), herein referred to as 2/3 PMF].<br>4 days with 6 mins time step. |
| PMF | 409.20 | 217,547 | 491.04 | 261,056 | Hydrograph provided.<br>*25 days with 30 mins time step. |

* The hydrograph provided for the PMF scenario reaches a peak flow at 11 days and therefore could not be truncated to 4 days as done with the other scenarios. The PMF volumes should not be directly compared with those resulting from the 4-day hydrographs since the storm durations are different.

As noted in the above table, the 1/3 PMF and 2/3 PMF hydrographs were derived from the 1000-year and PMF hydrographs. The hydrographs with snowmelt plus rainfall were reviewed, however, they were observed to generate extremely large and unreasonable values and therefore were not used for the hydraulic modelling.

## 3.1 Stage-Storage Curve

Kashwakamak Lake is around 22 m deep at the lowest elevation point of 236.28 m, and covers approximately 13 $km^2$ in surface area. The lake is oriented from west to east with a 235 m span at the narrowest section and an approximate length of 15.5 km. The operational level (active storage) of the lake starts from 258.22 m, which is the sill elevation of the existing gates and the approximate bedrock outcrop elevation at the dam. The stage and storage data (from 258.22 m to 263.00 m) were provided by the MVCA and are summarized in Table 2 below. Minor differences were noted between the stage-storage data used in the HEC-HMS models (May 2023) and the Table 2 data provided by the MVCA.

Table 2: Kashwakamak Lake Stage-Storage Curve Data

| No | Elevation (m) | Volume (1000 $m^3$) | No | Elevation (m) | Volume (1000 $m^3$) | No | Elevation (m) | Volume (1000 $m^3$) | No | Elevation (m) | Volume (1000 $m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 258.22 | 0 | 8 | 259.27 | 13,377 | 15 | 260.32 | 26,754 | 22 | 261.22 | 38,220 |
| 2 | 258.37 | 1,911 | 9 | 259.42 | 15,288 | 16 | 260.47 | 28,665 | 23 | 261.37 | 40,131 |
| 3 | 258.52 | 3,822 | 10 | 259.57 | 17,199 | 17 | 260.62 | 30,576 | 24 | 261.52 | 42,042 |
| 4 | 258.67 | 5,733 | 11 | 259.72 | 19,110 | 18 | 260.77 | 32,487 | 25 | 261.67 | 43,953 |
| 5 | 258.82 | 7,644 | 12 | 259.87 | 21,021 | 19 | 260.92 | 34,398 | 26 | 262.00 | 50,323 |
| 6 | 258.97 | 9,555 | 13 | 260.02 | 22,932 | 20 | 261.06 | 36,182 | 27 | 262.50 | 56,693 |
| 7 | 259.12 | 11,466 | 14 | 260.17 | 24,843 | 21 | 261.07 | 36,309 | 28 | 263.00 | 63,063 |

The active storage capacity of the lake is approximately 63 million m$^3$ at an elevation of 263.00 m. Based on a review of the gauged water surface elevation data, the optimum summer operational level is 261.13 m as indicated in the MVCA Kashwakamak Lake Dam Operation, Maintenance & Surveillance Manual (October 2013). The highest recorded elevation is 261.53 m at which the storage available is approximately 42 million m$^3$.

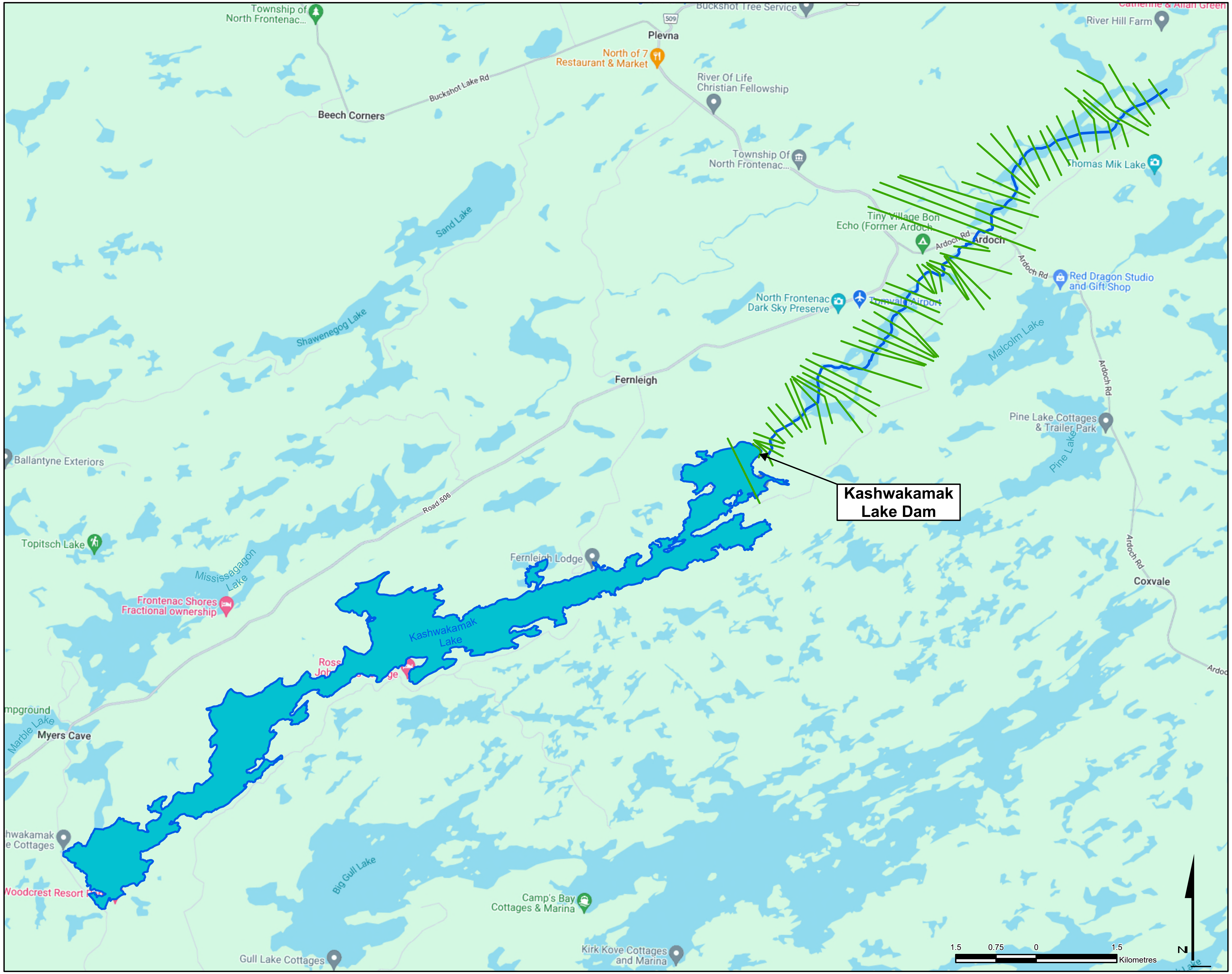
The hourly lake level data was downloaded from the MVCA website (Water Levels - Mississippi Valley Conservation Authority) and ranges from December 1993 to October 2023. Descriptive statistics and histogram analysis of the gauged data as well as the monthly summary of the lake levels are included in Appendix A. As a result of the statistical analysis, the mode of the lake level data was calculated to be 261.15 m. Additionally, as found in the histogram analysis, lake levels are maintained from 261.10 m to 261.20 m approximately 39% of time. Therefore, the initial lake level in the hydraulic analyses for all scenarios was taken as 261.15 m, as this level can be considered the most representative operational water level for Kashwakamak Lake.

# 4.0 HYDRAULICS

Hydraulic analyses of the Kashwakamak Lake Dam were completed using HEC-RAS software. MVCA provided a hydraulic model developed by Hatch for the Kashwakamak Lake Dam Safety Review (March 2022). A recent LIDAR survey (2023) and a bathymetric survey (2023) was conducted by the MVCA, and the resulting elevation data was also provided in DEM format. The received model was reviewed and revised with this newly obtained DEM data. The model extends from the Kashwakamak Lake Dam to 12.5 km downstream. There are two sharp elevation changes along the river course with a drop of approximately 17 m over the model extent. The dam was modelled as an inline structure with gated sections. Figure 4 below shows a general view of the HEC-RAS model. An electronic copy of the HEC-RAS model will be provided to the MVCA.

HEC-RAS base condition plans were initially created for 100-year, 1000-year, 1/3 PMF, 2/3 PMF, and PMF scenarios. These plans were then expanded with the climate change scenario, dam break scenario (DBR), and a combination of climate change plus dam break. The model was reviewed and adjusted upon this revision to confirm the results. The lake level, inflow, and outflow data for Kashwakamak Lake and Kashwakamak Lake Dam were taken directly from the HEC-RAS model results from the scenarios mentioned and are presented in Tables 3 to 6. For the analyses of the impacted properties, in addition to the described scenarios, the ‘normal’ event was modelled to represent the lake and dam on a day with no flooding events. The normal event with and without dam break cases were included in Tables 3 and 4, respectively. A peak inflow of 10 m$^3$/s for Kashwakamak Lake was assumed to model the normal event. This value was taken as it is large enough to stabilize the model while still representing a scenario without other flood events. Examples of the floodplain maps for the 100-year, 1000-year, and PMF scenarios without dam break are included in Appendix B.

The saddle dam is located north of the Kashwakamak Lake Dam and directly west of the access roadway. A natural channel is noted immediately east of the saddle dam as evident from the DEM, which is part of the shoreline allowance for the North Frontenac Township according to land ownership details. The crest elevation of the saddle dam was indicated by previous reports and design drawings to be 261.66 m. Therefore, the saddle dam will be overtopped during any scenario where the Kashwakamak Lake water surface elevation exceeds the crest. Further discussion on the saddle dam is provided in the Section 6.0.



CLIENT:

Mississippi Valley Conservation Authority

PROJECT:

HYDRAULIC ANALYSIS MEMORANDUM

TITLE:

PLAN VIEW OF HEC-RAS MODEL

egis

115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

| PROJECT NO:CCO-23-3603 | | FIGURE: |
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Table 3: Summary of Lake Level, Inflow and Outflow (Base Condition)

| Scenario | Kashwakamak Lake | | | Dam | |
|---|---|---|---|---|---|
| | Water Surface Elevation (m) | Inflow Peak ($m^3/s$) | Inflow Volume (1000 $m^3$) | Outflow Peak ($m^3/s$) | Outflow Volume (1000 $m^3$) |
| Normal | 261.17 | 10 | 828 | 40 | 3,080 |
| 100-year | 261.25 | 73 | 13,304 | 43 | 13,991 |
| 1000-year | 261.39 | 99 | 17,857 | 48 | 15,169 |
| 1/3 PMF | 262.14 | 202 | 36,625 | 99 | 25,021 |
| 2/3 PMF | 262.48 | 306 | 55,392 | 162 | 39,380 |
| PMF | 262.96 | 409 | 217,547 | 307 | 213,694 |

Table 4: Summary of Lake Level, Inflow and Outflow (Base Condition + DBR)

| Scenario | Kashwakamak Lake | | | Dam | |
|---|---|---|---|---|---|
| | Water Surface Elevation (m) | Inflow Peak ($m^3/s$) | Inflow Volume (1000 $m^3$) | Outflow Peak ($m^3/s$) | Outflow Volume (1000 $m^3$) |
| Normal | 261.17 | 10 | 828 | 94 | 5,773 |
| 100-year | 261.16 | 73 | 13,304 | 93 | 23,538 |
| 1000-year | 261.16 | 99 | 17,857 | 93 | 25,216 |
| 1/3 PMF | 261.38 | 202 | 36,625 | 112 | 35,195 |
| 2/3 PMF | 262.01 | 306 | 55,392 | 163 | 46,658 |
| PMF | 262.96 | 409 | 217,547 | 349 | 227,362 |

Table 5: Summary of Lake Level, Inflow and Outflow (Base Condition + Climate Change)

| Scenario | Kashwakamak Lake | | | Dam | |
|---|---|---|---|---|---|
| | Water Surface Elevation (m) | Inflow Peak ($m^3/s$) | Inflow Volume (1000 $m^3$) | Outflow Peak ($m^3/s$) | Outflow Volume (1000 $m^3$) |
| 100-year | 261.33 | 91 | 16,656 | 46 | 14,700 |
| 1000-year | 261.47 | 123 | 19,749 | 52 | 15,988 |
| 1/3 PMF | 262.19 | 246 | 39,490 | 107 | 27,174 |
| 2/3 PMF | 262.52 | 368 | 59,232 | 172 | 42,738 |
| PMF | 263.16 | 491 | 261,056 | 387 | 255,187 |

Table 6: Summary of Lake Level, Inflow and Outflow (Base Condition + Climate Change + DBR)

| Scenario | Kashwakamak Lake | | | Dam | |
|---|---|---|---|---|---|
| | Water Surface Elevation (m) | Inflow Peak ($m^3/s$) | Inflow Volume (1000 $m^3$) | Outflow Peak ($m^3/s$) | Outflow Volume (1000 $m^3$) |
| 100-year | 261.16 | 91 | 16656 | 93 | 24,581 |
| 1000-year | 261.16 | 123 | 19749 | 93 | 26,274 |
| 1/3 PMF | 261.47 | 246 | 39490 | 119 | 37,011 |
| 2/3 PMF | 262.09 | 368 | 59232 | 171 | 49,424 |
| PMF | 263.16 | 491 | 261056 | 414 | 268,728 |

The floodplains for these six (6) events were created and intersected with the buildings layer, which was provided by the MVCA. Table 7 summarizes the impacted buildings with no climate change. The provided buildings data was categorized into either seasonal residences or other structures, which includes boathouses, sheds, and any uncategorized buildings. No permanent residences were identified to intersect the floodplain limits.

Table 7: Impact to Buildings (No Climate Change)

| Flood Event | Dam Scenario | Impacted Buildings | | |
|---|---|---|---|---|
| | | *Seasonal Residence* | Other Structures | Total |
| Normal | No Dam Break | *1* | 7 | 8 |
| | With Dam Break | *3* | 9 | 12 |
| 100-year | No Dam Break | *1* | 7 | 8 |
| | With Dam Break | *4* | 9 | 13 |
| 1000-year | No Dam Break | *1* | 9 | 10 |
| | With Dam Break | *4* | 9 | 13 |
| 1/3 PMF | No Dam Break | *4* | 9 | 13 |
| | With Dam Break | *4* | 9 | 13 |
| 2/3 PMF | No Dam Break | *5* | 10 | 15 |
| | With Dam Break | *5* | 10 | 15 |
| PMF | No Dam Break | *10* | 15 | 25 |
| | With Dam Break | *11* | 17 | 28 |

The number of the total impacted buildings ranges from eight (8) to twenty-eight (28) from the normal to PMF dam break scenarios, respectively, while the number of seasonal residences impacted (habitable buildings) ranges from one (1) to eleven (11) from the normal to PMF dam break scenarios, respectively. Only the seasonal residences impacted were considered in the hazard potential classification evaluations for the risk to life safety.

The number of seasonal residences incrementally impacted, along with the corresponding building IDs (as labelled in the GIS layer) is provided in Table 8. There is no incremental impact for the 1/3 PMF and 2/3 PMF events, while three (3) seasonal residences are found to be impacted incrementally for the 100-year and 1000-year flood events, two (2) for the normal flood event, and one (1) for the PMF event. The depth and velocity values for the incrementally impacted seasonal residences resulting from each scenario are later explained and summarized in Table 10.

Table 8: Incremental Impact on Seasonal Residences

| Event | Dam Scenario | No Climate Change | | |
|---|---|---|---|---|
| | | Number of Seasonal Residences Impacted | Incremental Impact | Incrementally Impacted Building IDs |
| Normal | No Dam Break | 1 | 2 | 908, 814 |
| | With Dam Break | 3 | | |
| 100-year | No Dam Break | 1 | 3 | 908, 861, 814 |
| | With Dam Break | 4 | | |
| 1000-year | No Dam Break | 1 | 3 | 908, 861, 814 |
| | With Dam Break | 4 | | |
| 1/3 PMF | No Dam Break | 4 | 0 | None |
| | With Dam Break | 4 | | |
| 2/3 PMF | No Dam Break | 5 | 0 | None |
| | With Dam Break | 5 | | |
| PMF | No Dam Break | 10 | 1 | 749 |
| | With Dam Break | 11 | | |

# 5.0 HAZARD POTENTIAL CLASSIFICATION

The Ontario Ministry of Natural Resources and Forestry (MNRF) has developed the Hazard Potential Classification system to evaluate the potential hazards caused by the uncontrolled release of a reservoir, due to failure of the dam structure or appurtenances, such as gates or stoplogs. Additionally, the MVCA prepared a Methodology for Determining Environmental Losses & Classification memorandum in March 2024, which provided further details to supplement the MNRF criteria. The memo can be found in Appendix C. The HPC is determined by assessing the greatest incremental losses that could occur in the event of a dam failure and is split into four categories: (1) life safety, (2) property losses, (3) environmental losses, and (4) cultural / built heritage losses. An incremental loss is defined as losses from dam failure in excess of losses from a similar event (flood, earthquake, etc.) but without failure of the dam. Table 9 below defines the MNRF criteria for determining the dam HPC.

Table 9: Hazard Potential Classification: Technical Bulletin for Classification and Inflow Design Flood Criteria (Adapted from MNRF, 2011)

| Hazard Potential | Life Safety | Property Losses | Environmental Losses | Cultural – Built Heritage Losses |
|---|---|---|---|---|
| Low | No potential loss of life. | Minimal damage to property with estimated losses not to exceed $300,000 (1). | Minimal loss of fish and/or wildlife habitat with high capability of natural restoration resulting in a very low likelihood of negatively affecting the status of the population. | Reversible damage to municipally designated cultural heritage sites under the Ontario Heritage Act. |
| Moderate | No potential loss of life. | Moderate damage with estimated losses not to exceed $3 million (2) to agricultural, forestry, mineral aggregate and mining, and petroleum resource operations, other dams or structures not for human habitation, infrastructure, and services including local roads and railway lines. The inundation zone is typically undeveloped or predominantly rural or agricultural, or it is managed so that the land usage is for transient activities such as with day-use facilities. Minimal damage to residential, commercial, and industrial areas, or land identified as designated growth areas as shown in official plans. | Moderate loss or deterioration of fish and/or wildlife habitat with moderate capability of natural restoration resulting in a low likelihood of negatively affecting the status of the population. | Irreversible damage to municipally designated cultural heritage sites under the Ontario Heritage Act. Reversible damage to provincially designated cultural heritage sites under the Ontario Heritage Act or nationally recognized heritage sites. |
| High | Potential loss of life of 1-10 persons. | Appreciable damage with estimated losses not to exceed $30 million (3) to agricultural, forestry, mineral aggregate and mining, and petroleum resource operations, other dams or residential, commercial, industrial areas, infrastructure and services, or land identified as designated growth areas as shown in official plans. Infrastructure and services include regional roads, railway lines, or municipal water and wastewater treatment facilities and publicly owned utilities. | Appreciable loss of fish and/ or wildlife habitat or significant deterioration of critical fish and/ or wildlife habitat with reasonable likelihood of being able to apply natural or assisted recovery activities to promote species recovery to viable population levels. Loss of a portion of the population of a species classified under the Ontario Endangered Species Act as Extirpated, Threatened or Endangered, or reversible damage to the habitat of that species. | Irreversible damage to provincially designated cultural heritage sites under the Ontario Heritage Act or damage to nationally recognized heritage sites. |

| | | | | |
|---|---|---|---|---|
| Very High | Potential loss of life of 11 or more persons. | Extensive damage estimated losses in excess of $30 million (3) to buildings, agricultural, forestry, mineral aggregate and mining, and petroleum resource operations, infrastructure, and services. Typically includes destruction of, or extensive damage to, large residential, institutional, concentrated commercial and industrial areas and major infrastructure and services, or land identified as designated growth areas as shown in official plans. Infrastructure and services include highways, railway lines or municipal water and wastewater treatment facilities and publicly owned utilities. | Extensive loss of fish and/ or wildlife habitat or significant deterioration of critical fish and/ or wildlife habitat with very little or no feasibility of being able to apply natural or assisted recovery activities to promote species recovery to viable population levels. Loss of a viable portion of the population of a species classified under the Ontario Endangered Species Act as Extirpated, Threatened or Endangered or irreversible damage to the habitat of that species. | Irreversible damage to provincially designated cultural heritage sites under the Ontario Heritage Act or damage to nationally recognized heritage sites. |

Notes:

1. Dollar values associated with property losses are indexed to the Statistics Canada values for the year 2000. Current value (April 2024) would be approximately $506,000 according to the Bank of Canada Inflation Calculator.
2. Dollar values associated with property losses are indexed to the Statistics Canada values for the year 2000. Current value (April 2024) would be approximately $5,060,000 according to the Bank of Canada Inflation Calculator.
3. Dollar values associated with property losses are indexed to the Statistics Canada values for the year 2000. Current value (April 2024) would be approximately $50,600,000 according to the Bank of Canada Inflation Calculator.

## 5.1 Life Safety

Flooding as a threat to life is directly related to the depth and velocity of the flooding at a specific location. As depth increases, the buoyant forces acting upon a person within the floodplain increase, ultimately resulting in the person floating in the flood. As velocity increases, the lateral force of the water increases, and at significantly high velocities can knock a person off their feet. The MNRF has developed the 2 x 2 Rule, which is a method to assess the combined factors of depth and velocity as described in the Technical Guide – Rivers & Stream Systems: Flooding Hazard Limit (2002). The 2 x 2 Rule states that if the product of the depth and velocity is greater than 0.4 $m^2/s$, there is a risk to the life safety of people within the floodplain. Additionally, if the flood depth is greater than 0.8 m, or the flood velocity is greater than 1.7 m/s in the floodplain, there is a risk to life safety, regardless of the product of the depth and velocity.

Several scenarios were modelled to evaluate the life safety risk of the Kashwakamak Lake Dam, including dam breaches under normal conditions, during a 1000-year storm event, and during the PMF event. As noted later under the Section 5.6 of this report, the 1000-year storm event will be used in the design of the future dam according to MNRF criteria (2011). Therefore, the depth and velocity values resulting from the 1000-year storm event under the base and dam break scenarios will be used to determine the life safety HPC for the dam, although a summary of multiple storm event impacts are provided. Additionally, given that the 2 x 2 rule applies to the life safety of people in the floodplain and that the lake levels upstream of the dam will lower as a result of a dam breach, the life safety hazard potential upstream of the dam is not anticipated to be impacted however there could be economical losses due to loss of access to waterfront structures.

In order to determine the hazard to life safety, the depth and velocity values were extracted from the HEC-RAS hydraulic model at the location of the seasonal residences within the varying floodplains. One seasonal residence (ID# 577) was found to be impacted by all storm events. However, since it is within the floodplain of the events under both base and dam breach conditions, it is not considered to be incrementally impacted by the dam. As mentioned in Table 8, two seasonal residences (ID# 908 and 814) were incrementally impacted during the normal conditions dam breach. These and another seasonal residence (ID# 861) were incrementally impacted during the 1000-year dam breach scenario. The incrementally impacted seasonal residences for these storm events were found to have flood depth and velocity values less than the threshold values outlined within the 2x2 rule. Therefore, the life safety HPC for Kashwakamak Lake Dam was concluded to be moderate as no loss of life is anticipated as a direct result of the dam breaking. Table 10 below shows the impacted seasonal residences and the approximate depths and velocities associated with each scenario. Values of 0.0 indicate that the seasonal residence remains outside of the floodplain in that scenario.

A total of 13 seasonal residences were impacted by the worst-case storm – the PMF event – while one (ID# 749) was incrementally impacted. Since the remaining 12 seasonal residences were impacted by both the PMF event and the PMF with dam break event, their impacts were not considered as part of the life safety classification. Nonetheless, it should be noted that five seasonal residences (ID# 908, 861, 859, 814, and 577) were observed to fail the 2x2 rule under both no dam break and dam break conditions during the PMF event.

Table 10: 1D Hydraulic Model Results – Impacts on Downstream Seasonal Residences

| Event | 2x2 Criteria | Seasonal Residence ID | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 908 | 861 | 859 | 857 | 853 | 836 | 850 | 3047 | 749 | 747 | 814 | 586 | 577 |
| Normal (Base) | Average Velocity (m/s) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| | Approximate Depth (m) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 |
| | Depth x Velocity ($m^2/s$) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 |
| Normal (Dam Breach) | Average Velocity (m/s) | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.19 |
| | Approximate Depth (m) | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.34 |
| | Depth x Velocity ($m^2/s$) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| 1000-year (Base) | Average Velocity (m/s) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 |
| | Approximate Depth (m) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 |
| | Depth x Velocity ($m^2/s$) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 |
| 1000-year (Dam Breach) | Average Velocity (m/s) | 0.01 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.20 |
| | Approximate Depth (m) | 0.06 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.37 |
| | Depth x Velocity ($m^2/s$) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 |
| PMF (Base) | Average Velocity (m/s) | 0.05 | 0.13 | 0.21 | 0.19 | 0.22 | 0.07 | 0.49 | 0.44 | 0.00 | 0.46 | 0.05 | 0.22 | 0.41 |
| | Approximate Depth (m) | 1.39 | 1.32 | 0.95 | 0.05 | 0.30 | 0.64 | 0.62 | 0.31 | 0.00 | 0.67 | 1.44 | 0.07 | 1.00 |
| | Depth x Velocity ($m^2/s$) | 0.07 | 0.17 | 0.20 | 0.01 | 0.07 | 0.04 | 0.30 | 0.14 | 0.00 | 0.31 | 0.07 | 0.02 | 0.41 |
| PMF (Dam Breach) | Average Velocity (m/s) | 0.06 | 0.14 | 0.22 | 0.19 | 0.22 | 0.08 | 0.49 | 0.44 | 0.41 | 0.46 | 0.06 | 0.23 | 0.42 |
| | Approximate Depth (m) | 1.50 | 1.43 | 1.12 | 0.16 | 0.37 | 0.76 | 0.74 | 0.40 | 0.12 | 0.79 | 1.55 | 0.14 | 1.08 |
| | Depth x Velocity ($m^2/s$) | 0.09 | 0.20 | 0.25 | 0.03 | 0.08 | 0.06 | 0.36 | 0.18 | 0.05 | 0.36 | 0.09 | 0.03 | 0.45 |

Overall, failure of the Kashwakamak Lake Dam under normal conditions is unlikely to severely impact nearby residences, and failure of the dam during a large flood event is not expected to significantly impact the flooding extents or severity, as confirmed by the hydraulic model results.

The 1D HEC-RAS model was also converted into the 2D model and a copy of the 2D model will be submitted with this memorandum. When the models were compared, it was noted that the 2D models generate smaller flood extents that do not reach the seasonal residences impacted in the 1D model. Therefore, for the 2x2 rule evaluation, the velocity and depth values were derived from the 1D model, while the 2D model could be used during the detailed design stage for refined analyses at/around the dam or along the river.

The 1D HEC-RAS model was run for each storm event, which automatically generated maximum depth, velocity, and water surface elevation maps for the flood extents. These maps can be viewed in the RAS Mapper within HEC-RAS. The depth and velocity model outputs at each seasonal residence location intersecting with the floodplain of a given scenario were derived from the maps and are summarized in Table 10 above.

## 5.2 Property Losses

Under the MNRF HPC framework, property losses are evaluated based on the incremental losses incurred in the event of a dam failure and the estimated costs to restore impacted property. Based on the hydraulic modelling, there are no anticipated impacts to downstream infrastructure such as roads or bridges due to dam failure. The 1000-year storm event results in incremental losses due to dam failure at three seasonal residences. The depths and velocities shown in Table 10 above for these seasonal residences are a maximum of 0.12 m deep and 0.04 m/s in velocity, and thus the incremental losses associated with a dam failure scenario are not expected to result in the total loss of any seasonal residences. It is anticipated that these incremental losses would include landscape repairs and minor repairs to the seasonal residence structures. The cost of these repairs for the three incrementally impacted seasonal residences is unlikely to each exceed $1.0 million indexed to the year 2000, or the equivalent of approximately $1.7 million in 2024. Additionally, there are no other structures such as sheds or boathouses downstream of the dam that would be incrementally impacted due to a dam breach during the 1000-year design storm. Structures such as docks may be affected; however, they are located much closer to the channel compared to the seasonal residences and are therefore unlikely to be incrementally impacted.

The anticipated incremental impacts to infrastructure and property losses upstream of the dam were also considered. The dropping of lake levels resulting from dam failure has the potential to damage floating docks or boats what may become beached, thus requiring repairs. Additionally, economic losses for businesses may result from the lower lake levels until the dam can be reinstated. However, as the resulting economic losses are not included in the MNRF criteria for assessing property losses, it was not included in the property losses classification analysis.

Overall, it is not expected that the incremental property losses associated with the failure of the Kashwakamak Lake Dam would exceed $3.0 million (indexed to the year 2000) based on the high-level estimation explained above. Further, the inundation zone is mostly undeveloped, rural or agricultural, or is managed so that the land usage is for transient activities, and minimal damage to properties is anticipated. Therefore, since the risk to property losses is in line with the MNRF (2011) criteria for moderate property losses, it was concluded that the property losses component of the Kashwakamak Lake Dam HPC is moderate.

## 5.3 Environmental Losses

Significant fish habitat in the form of sport fish and baitfish spawning is located immediately downstream of Kashwakamak Lake Dam. It is anticipated that this would include species such as Walleye and White Sucker as well as several baitfish species. This type of habitat is limited in the watershed. Additionally, water levels upstream of Kashwakamak Lake Dam would be anticipated to drop for the entirety of the lake over several days to months.

The fish habitat located immediately downstream has the potential to be completely destroyed whether it be through transportation of the larger materials downstream or sedimentation with a dam breach. The area of most damage would be expected to be within the first kilometre downstream of the watercourse. Further downstream the potential impacts are expected to decrease and be significantly reduced. It is expected that the fish habitat downstream could be restored and that the fish habitat function and populations affected by the dam breach would recover with time.

Upstream of the dam, it is expected that several existing fish habitat types would be impacted for most of the species found within the lake and that spawn in depths under 6 feet. Depending on the timing, a dam breach could have more significant impact on fish population/spawning success than a breach at other times of the year (spring and summer months are more likely to affect spawning, feeding, and rearing). It is expected that the loss of fish habitat as a result of the breach would be only temporary and that there would be minimal requirements for restoration other than reestablishment of the historic water levels within the lake. The full impacts would be temporary and would naturally restore within a couple of years.

It is not anticipated that there would be significant impacts to Species at Risk (SAR) as a result of the dam breach. Any SAR that are known to the area, such as SAR turtles, are able to move/relocate. If the dam were to breach during their more vulnerable period of hibernation there could be impacts to species such as the Map Turtle which hibernates in lakes, however they are not completely dormant during the winter, and it is expected that they would be able to move locations as the lake slowly draws down. The wetland areas where species such as the Blanding’s Turtle would be hibernating appear to generally be isolated from the lake and are approximately 1 km downstream of the dam or greater. An influx of water with oxygenation is not likely to impact hibernating turtles downstream of the dam. Additionally, although there will be an increased sediment load from scour resulting from the increased flows, it is expected that the sediment load will settle out as it travels downstream. The impact of the influx in sediments will have a greater impact on downstream fish species and spawning area habitats, whereas turtles use the sediments to overwinter in. It is anticipated that the suspended sediments would be fully settled out before reaching the larger wetland area downstream. There will be some loss of wildlife habitat, however species and impacts cannot fully be understood at this time. It is expected that this will be temporary, and most impacts would naturally recovery.

To evaluate the potential impact on the fish and fish habitat and endangered species, several scenarios were modelled, including dam breaches under normal conditions, during a 1000-year storm event, and during the probable maximum flood storm event (PMF). Additionally, the climate-adjusted 1000-year and the climate-adjusted PMF storm events were modelled as a baseline to evaluate the incremental losses in the event of dam failure. Based on the hydraulic output related to the depth and velocity of the flooding both upstream and downstream of the Kashwakamak Lake Dam, it has been concluded that failure of the dam under normal conditions and during a large flood event is anticipated to have significant impact on fish and fish habitat and a negligible impact on SAR. Fish habitat will be temporarily impacted upstream with natural recovery expected and permanently impacted downstream with the potential for restoration efforts to return the habitat to original conditions once the dam is reinstated at the lake outlet.

The MVCA also prepared a Technical Review Memorandum in March 2024 in response to the Kashwakamak Lake Dam Hazard Potential Classification, has been included in Appendix D. It concluded that the likelihood of negatively impacting the status of fish population and significant deterioration of critical habitat on a watershed scale would be low to moderate. Additionally, the MVCA recommended that the overall HPC for the environmental losses be considered as moderate. Egis is in general agreement with the review by the MVCA that the overall risk should be considered moderate when the assessment is based on a review at the watershed level. There are no known species at risk that will be significantly impacted by a dam failure. Fish habitat upstream of the dam is expected to be restored within one year of a dam failure and would reestablish itself almost immediately once the water levels are restored. It is expected that depending on timing, the fish within Kashwakamak Lake may find new viable spawning habitat in the year of the dam breach. Downstream habitat, suitable for a highly sought after sport fish (Walleye), is likely to be significantly impacted and may require more extensive habitat rehabilitation to restore it to its existing conditions. Based on the documentation provided by the MVCA this could indicate that this impact would be considered moderate to high. However, based on the other factors, the overall risk can be considered moderate when based on a review of the watershed.

Therefore, it is recommended that the potential environmental loss associated with the Fish and Fish Habitat receive a “moderate” HPC for the Kashwakamak Lake Dam. This rating is based mainly on the impacts immediately following the dam breach event, however both the immediate and future impacts were considered. It is not expected that all areas will be restored once the dam is replaced. Permanent changes would include areas of scour of the riparian vegetation that may remove watercourse shading. The watercourse is a warm/cool water habitat and therefore does not rely on shading for thermal regulation. It is also recommended that SAR/Wildlife habitat impacts receive a “low” HPC for the Kashwakamak Lake Dam.

The Manòmin (wild rice) crops are located approximately 7.0 km downstream of the Kashwakamak Lake Dam. Manòmin is an aquatic annual species of grass of cultural significance to the Algonquin First Nations. The species grows in brackish marshes, lacustrine, riverine, or along shored habitats where the water depth ideally ranges from 15 – 90 cm with a soft soil layer on the bottom (OMAFRA, 2012). Stable and minimal outflows are required through the watershed from early June through end of September to ensure growth and harvest of wild rice crops. Wild rice is also important for several different species, as it provides food for waterfowl and habitat for furbearing mammals, snails, and insects (MVCA, 2018). High water levels have the potential to flood the wild rice fields and may destroy the annual crop, as well as low water levels can also dry out the crops. To evaluate the potential impact on the wild rice fields, several scenarios were modelled, including dam breaches under normal conditions, during a 1000-year storm event, and during the probable maximum flood storm event (PMF). Additionally, the climate-adjusted 1000-year and the climate-adjusted PMF storm events were modelled as a baseline to evaluate the incremental losses in the event of dam failure. Based on the hydraulic output related to the depth and velocity of the flooding at a specific location throughout the wild rice fields, it has been concluded that failure of the Kashwakamak Lake Dam under normal conditions and during a large flood event is not anticipated to have an impact on the Manòmin. There was a negligible increase in surface water elevation of 0.1-0.2 m and 0.1 m/s for velocities. Therefore, it is recommended that the potential environmental loss associated with the Manòmin receive a “low” HPC for the Kashwakamak Lake Dam.

## 5.4 Cultural and Built Heritage Losses

Under the MNRF HPC framework, cultural and built heritage losses are evaluated by the potential for damage to municipally designated and/or provincially designated cultural heritage sites under the Ontario Heritage Act and/or nationally recognized heritage sites. Accordingly, municipal, provincial, and federal heritage registers and inventories have been reviewed to identify known heritage properties within and adjacent to the area potentially impacted. Based on the hydraulic modelling, there are zero (0) municipal, provincial and federally recognized built heritage resources or cultural heritage landscapes within the potentially impacted area, and therefore there are no anticipated impacts to downstream built heritage resources or cultural heritage landscapes due to dam failure. Therefore, it is recommended that the cultural and built heritage losses component of the Kashwakamak Lake Dam HPC is low.

## 5.5 Hazard Potential Classification Summary

The final Hazard Potential Classifications for the given categories are summarized in Table 11 below.

Table 11: Hazard Potential Classification Assessment

| Hazard Potential | Life Safety | Property Losses | Environmental Losses | Cultural and Built Heritage Losses |
|---|---|---|---|---|
| Class | Moderate | Moderate | Moderate (Fish and Fish Habitat)<br>Low (SAR, Wildlife, and Manòmin) | Low |

The overall hazard potential class for the existing Kashwakamak Lake Dam structure, including the overflow weir, sluiceway (gated section), and the north and south abutments is concluded to be moderate, as per the MNRF Technical Bulletin (2011). The proposed design options for replacing or rehabilitating the Kashwakamak Lake Dam will be consistent with the current conditions. Therefore, the HPC will be maintained, and the future structure will also have a moderate hazard potential.

The hazard potential class for the saddle dam is assessed to be low due to its location, height, length, and functionality. The saddle dam is not used for any operational purposes and is located immediately west of the access road. Any incremental impact due to the saddle dam failure would be none to low.

## 5.6 Selection of Inflow Design Flood

As described in the MNRF Technical Bulletin for Classification and Inflow Design Flood Criteria (2011), the range of Inflow Design Floods (IDF) based on the dam HPC are summarized in Table 12 below.

Table 12: Range of Minimum Inflow Design Floods (Adapted from MNRF, 2011)

<table>
<tr><th rowspan="2">Hazard Potential Classification</th><th colspan="4">Range of Minimum Inflow Design Floods</th></tr>
<tr><th colspan="2">Life Safety</th><th>Property and Environment</th><th>Cultural – Built Heritage</th></tr>
<tr><td>Low</td><td colspan="4">25-year Flood to 100-year Flood</td></tr>
<tr><td>Moderate</td><td colspan="4">100-year Flood to 1000-year Flood or Regulatory Flood whichever is greater</td></tr>
<tr><td>High</td><td>1-10</td><td>1/3 between the 1000-year Flood and PMF</td><td>1000-year Flood or Regulatory Flood which ever is greater to 1/3 between the 1000-year Flood and PMF</td><td rowspan="3">1000-year Flood or Regulatory Flood whichever is greater</td></tr>
<tr><td rowspan="2">Very High</td><td>11-100</td><td>2/3 between the 1000-year Flood and PMF</td><td rowspan="2">1/3 between the 1000-year Flood and PMF to PMF</td></tr>
<tr><td>Greater than 100</td><td>PMF</td></tr>
</table>

The selection criteria of the inflow design flood were outlined by the MNRF (2011), as shown above, which will be used in the design of the dam. The greater the HPC, or impact to the surrounding area under the condition of a dam break, the greater the severity of the design storm. The HPC for Kashwakamak Lake Dam was determined to be moderate, and thus the IDF for the dam should range from the 100-year flood to the 1000-year flood or regulatory flood events, whichever is greater. Therefore, as a conservative approach, the worst case of the 1000-year and 100-Year flood event was selected as the IDF, respectively, for the main dam and appurtenant structures, and the saddle dam.

# 6.0 FREEBOARD CALCULATIONS

Freeboard calculations were completed considering wind and wave impacts, as is generally done for dams and per MNRF requirements. Wind setup and wave runup for the site are calculated separately and combined to compare the existing crest elevation of the structures. The fetch at the dam is estimated to be approximately 780 m. According to the MNRF Technical Bulletin for Spillways and Flood Control Structures (August 2011), a minimum freeboard is recommended based on the fetch distances and as per the provincial guidelines applicable to this site should be 0.6 m. Therefore, final calculations for the freeboard for the flood conditions are completed using the minimum criterion of 0.60 m. The freeboard calculations are presented in Table 13 below. Water surface elevation (WSE) and flow information for the climate change scenarios are also included in Table 13. The difference in WSE for base and climate change scenarios is 0.08 m.

Based on the calculations, the minimum freeboard requirements for the abutments and saddle dam are not met. The south abutment, north abutment, and saddle dam are required to be raised by 0.36 m (to an elevation of 261.99 m), 0.32 m (to an elevation of 261.99m) and 0.19 m (to an elevation of 261.85 m), respectively. The freeboard for the climate change scenario for both the abutments and saddle dam would be 0.52 m when the crests are adjusted to the proposed elevations. However, it is recommended to adjust the saddle dam crest elevation to 261.99 m (or approximately 262.0 m) to be consistent with the abutment walls.

As previously noted, the saddle dam located north of the Kashwakamak Lake Dam and west of the access roadway overtops when water levels of Kashwakamak Lake exceed its crest elevation of 261.66 m. An existing natural channel east of the saddle dam and access roadway would function as an overflow channel. Under the proposed conditions, converting the saddle dam to an emergency spillway should be considered to maintain the existing conditions. The future access roadway should be designed to allow the overflow and convey it towards the downstream channel during flood events. If converted to an emergency spillway, additional property may be required due to it currently being part of the shoreline allowance for the North Frontenac Township but is closely neighbouring private property, according to land ownership details.

Table 13: Summary of Freeboard Calculations

| Features | Weir | Stop Logged Gates | South Abutment | North Abutment | Saddle Dam |
|---|---|---|---|---|---|
| Dam Hazard Potential Classification | F: Moderate, NF: Moderate | | | | F: Low, NF: Low |
| Inflow Design Flood (IDF) Selection Criteria (MNRF 2011) | 100-year to the 1000-year or Regulatory Flood whichever is greater | | | | 25-year to the 100-year |
| IDF Selected | 1000-year | | | | 100-year |
| IDF (1000-year) ($m^3/s$)<br>(With Climate Change) | 99<br>(123) | | | | 73<br>(91) |
| Maximum Design Earthquake (MDE) AEP | 1000-year | | | | 500-year |
| Structure Crest Elevation (m) | 261.06 | 262.62 | 261.63 | 261.67 | 261.66 |
| Winter Drawdown Level (m) | 259.59 | | | | |
| Maximum Normal Lake Operating Level (m) | 261.20 | | | | |
| IDF Level (m)<br>(With Climate Change) | 261.39<br>(261.47) | | | | 261.25<br>(261.33) |
| Stop Log Status | n/a | All Removed | n/a | n/a | n/a |
| Peak Inflow ($m^3/s$) | 99 | | n/a | n/a | n/a |
| Peak Inflow Volume (1000 $m^3$) | 17.9 | | n/a | n/a | n/a |
| Peak Outflow ($m^3/s$) | 48 | | n/a | n/a | n/a |
| Peak Outflow Volume (1000 $m^3$) | 15.2 | | n/a | n/a | n/a |
| Fetch (m) | 780 | | | | |
| Minimum Freeboard Criteria (m) (MNRF 2011) | 0.60 | | | | |
| Wind Set-up IDF<br>(Normal) (m) | 0.01<br>(0.02) | | | | |
| Wave Run-up IDF<br>(Normal) (m) | 0.34<br>(0.59) | | | | |
| Total Wind Setup & Wave Runup IDF<br>(Normal) (m) | 0.35<br>(0.61) | | | | |
| Freeboard Normal Conditions (m) | n/a | n/a | -0.17 | -0.13 | -0.14 |
| Freeboard IDF Conditions (m)<br>As per MNRF 0.60 m minimum[1] criterion | n/a | n/a | *-0.36* | *-0.32* | *-0.19* |
| Assessment of Freeboard (Normal) | n/a | n/a | Inadequate | Inadequate | Inadequate |
| Assessment of Freeboard (IDF) | n/a | n/a | Inadequate | Inadequate | Inadequate |

Notes:

1. Due to the calculated freeboard (0.36 m) is smaller than the MNRF minimum requirement, the minimum is applied in the calculations.

# 7.0 CONCLUSION

The hydraulic analysis and Hazard Potential Classification was completed for the Kashwakamak Lake Dam for the Mississippi Valley Conservation Authority as part of a Class Environmental Assessment for Remedial Flood and Erosion Control Projects in support of the proposed dam replacement. The existing hydrologic models and documentation were reviewed and incorporated into the hydraulic models. The existing hydraulic model was also reviewed and updated with new data for additional scenarios to model the impacts of various events on Kashwakamak Lake and the downstream channel. The impacts were analyzed to determine the HPC for the risk to life safety, property losses, environmental losses, and cultural-built heritage losses. It was determined that the life safety, property loss, and environmental loss (pertaining to fish and fish habitat) components of the Kashwakamak Lake Dam HPC are moderate, while the environmental loss (pertaining to SAR, Wildlife, and Manòmin) and the cultural-built heritage components of the Kashwakamak Lake Dam

HPC are low. Therefore, the overall HPC of the Kashwakamak Lake Dam structure was concluded to be moderate. Furthermore, freeboard calculations were performed for the main dam components and saddle dam, and it is recommended that the crest elevations of the abutments and saddle dam be raised to meet MNRF freeboard requirements.

This report is respectfully submitted by Egis-Group.

| | | |
|---|---|---|
| Report Prepared By: | Report Prepared By: | Report Prepared By: |
| *On leave* | | LICENSED PROFESSIONAL ENGINEER<br>May 08 2024<br>M. SASAL<br>100151510<br>PROVINCE OF ONTARIO |
| Alex Ploughman<br>Engineering Intern, Water Resources | Monika Orwin<br>Engineering Intern, Water Resources | Mustafa Sasal, P.Eng.<br>Sr. Water Resource Engineer |

# APPENDIX A:
# STATISTICAL ANALYSIS OF GAUGED WATER LEVELS

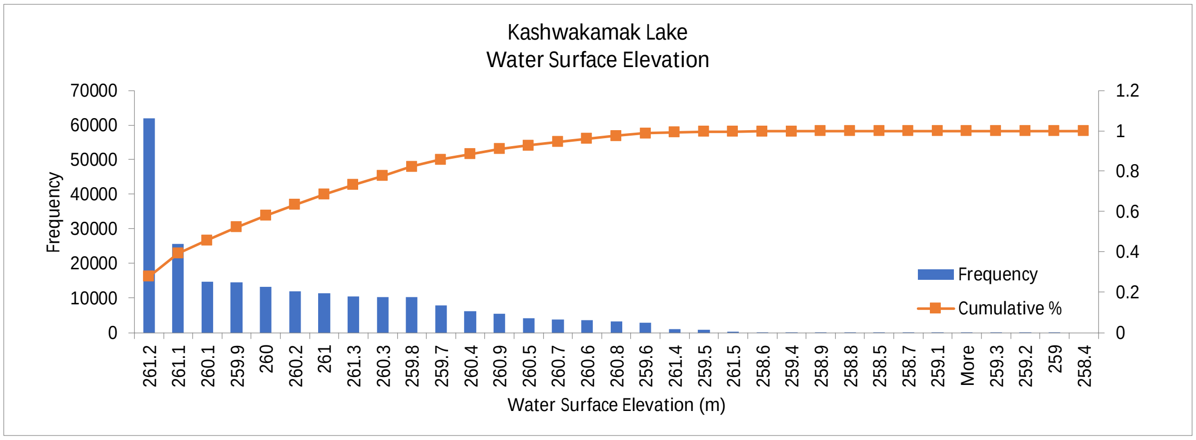
# STATISTICAL ANALYSES OF GAUGED WATER LEVELS
# KASHWAKAMAK LAKE

## Descriptive Statistics

| *Statistical Parameter* | *Value* |
|---|---|
| | |
| Mean | 260.60 |
| Standard Error | 0.00 |
| Median | 260.89 |
| Mode | 261.15 |
| Standard Deviation | 0.57 |
| Sample Variance | 0.33 |
| Kurtosis | -1.27 |
| Skewness | -0.42 |
| Range | 3.1 |
| Minimum | 258.4 |
| Maximum | 261.5 |
| Sum | 58364421.5 |
| Count | 223961 |
| Largest(1) | 261.53 |
| Smallest(1) | 258.42 |
| Confidence Level(95.0%) | 0.00238 |

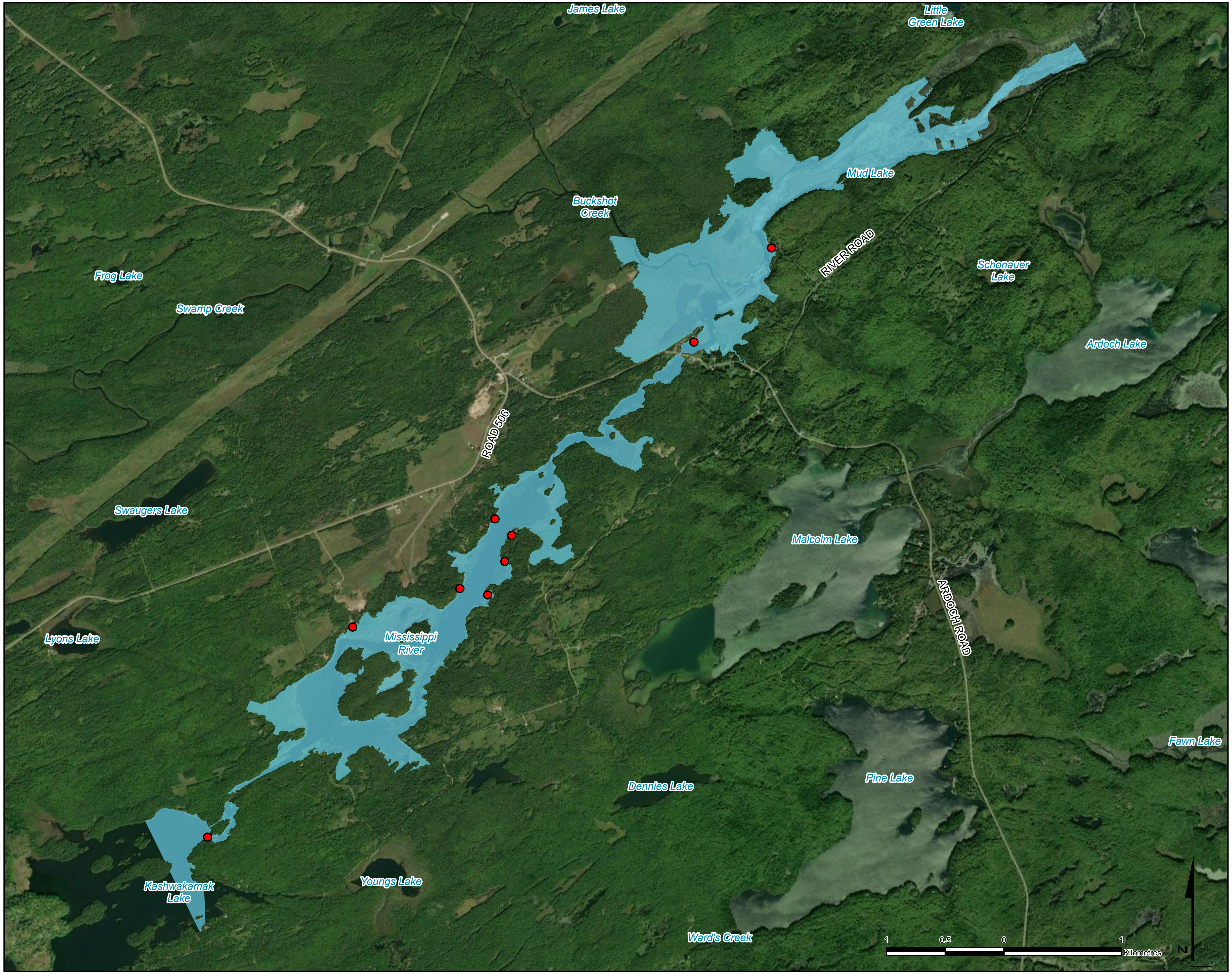
## Histogram

| *Elevation (m)* | *Number of Measurements* | *Percentage (%)* | *Cumulative Percentage (%)* |
|---|---|---|---|
| 258.4 | 0 | 0 | 0 |
| 258.5 | 92 | 0 | 0 |
| 258.6 | 119 | 0 | 0 |
| 258.7 | 71 | 0 | 0 |
| 258.8 | 94 | 0 | 0 |
| 258.9 | 112 | 0 | 0 |
| 259 | 2 | 0 | 0 |
| 259.1 | 62 | 0 | 0 |
| 259.2 | 20 | 0 | 0 |
| 259.3 | 33 | 0 | 0 |
| 259.4 | 119 | 0 | 0 |
| 259.5 | 778 | 0 | 1 |
| 259.6 | 2863 | 1 | 2 |
| 259.7 | 7842 | 4 | 5 |
| 259.8 | 10194 | 5 | 10 |
| 259.9 | 14570 | 7 | 17 |
| 260 | 13167 | 6 | 22 |
| 260.1 | 14689 | 7 | 29 |
| 260.2 | 11978 | 5 | 34 |
| 260.3 | 10202 | 5 | 39 |
| 260.4 | 6226 | 3 | 42 |
| 260.5 | 4191 | 2 | 44 |
| 260.6 | 3656 | 2 | 45 |
| 260.7 | 3699 | 2 | 47 |
| 260.8 | 3213 | 1 | 48 |
| 260.9 | 5377 | 2 | 51 |
| 261 | 11301 | 5 | 56 |
| 261.1 | 25608 | 11 | 67 |
| 261.2 | 61998 | 28 | 95 |
| 261.3 | 10476 | 5 | 99 |
| 261.4 | 896 | 0 | 100 |
| 261.5 | 270 | 0 | 100 |
| More | 43 | 0 | 100 |
| *Total* | 223961 | 100 | |



| | Jan | | Feb | | Mar | | Apr | | May | | Jun | | Jul | | Aug | | Sep | | Oct | | Nov | | Dec | | Total Max | Total Min |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | | |
| 1993 | | | | | | | | | | | | | | | | | | | | | | | 260.17 | 260 | 260.17 | 260 |
| 1994 | 260 | 259.72 | 259.74 | 259.67 | | | | | | | 261.15 | 261.02 | 261.24 | 261.08 | 261.3 | 260.68 | | | | | | | | | 261.3 | 259.67 |
| 1995 | | | | | | | | | | | | | | | | | 260.99 | 260.98 | 261.13 | 260.52 | 260.53 | 260.26 | 260.4 | 259.86 | 261.13 | 259.86 |
| 1996 | 259.99 | 259.61 | 260.14 | 259.98 | 260.16 | 259.85 | 261.16 | 260.16 | 261.17 | 261.07 | 261.16 | 261.06 | 261.1 | 261.07 | 261.15 | 261.06 | 261.16 | 261 | 261.14 | 260.45 | 260.45 | 260.17 | 260.31 | 260.12 | 261.17 | 259.61 |
| 1997 | 260.27 | 259.96 | 260.03 | 259.75 | 260.26 | 259.93 | 260.99 | 259.98 | 261.19 | 260.94 | 261.21 | 261.11 | 261.16 | 261.04 | 261.06 | 260.95 | 260.98 | 260.9 | 261.13 | 260.19 | 260.31 | 259.94 | 260.29 | 259.84 | 261.21 | 259.75 |
| 1998 | 260.04 | 259.88 | 259.88 | 259.6 | 260.16 | 259.62 | 261.29 | 260.17 | 261.19 | 261.13 | 261.21 | 261.14 | 261.16 | 261.14 | 261.14 | 261.03 | 261.07 | 260.97 | 261.17 | 260.39 | 260.39 | 260.1 | 260.21 | 259.76 | 261.29 | 259.6 |
| 1999 | 259.78 | 259.69 | 260.3 | 259.1 | 260.16 | 259.17 | 260.88 | 259 | | | 261.16 | 261.09 | 261.21 | 261.14 | | | 261.13 | 261.05 | 261.16 | 260.8 | 260.85 | 260.22 | 260.22 | 259.93 | 261.21 | 259 |
| 2000 | 259.93 | 259.78 | | | | | | | | | | | | | | | | | | | 260.28 | 260.15 | 260.16 | 259.85 | 260.28 | 259.78 |
| 2001 | 259.86 | 259.64 | 259.77 | 259.62 | 259.77 | 259.68 | 261.17 | 259.68 | 261.23 | 261.12 | 261.17 | 261.12 | 261.15 | 259.9 | 261.13 | 261.07 | 261.12 | 261.08 | 261.08 | 261.08 | | | 260.23 | 259.52 | 261.23 | 259.52 |
| 2002 | 260.01 | 259.68 | 259.7 | 259.59 | 260.42 | 259.59 | 261.08 | 259.14 | 261.21 | 261.05 | 261.42 | 261.12 | 261.3 | 261.1 | 261.12 | 259.76 | 261.06 | 260.97 | 261.09 | 260.6 | 260.6 | 260.05 | 260.05 | 259.64 | 261.42 | 259.14 |
| 2003 | 259.64 | 259.48 | 259.64 | 259.47 | 259.82 | 259.45 | 260.64 | 259.82 | 261.23 | 260.64 | 261.16 | 261.1 | 261.13 | 261.06 | 258.89 | 258.89 | 261.09 | 260.99 | 261.42 | 260.48 | 260.5 | 260.21 | 260.52 | 260.1 | 261.42 | 258.89 |
| 2004 | 260.11 | 259.66 | 259.66 | 259.55 | 261.08 | 259.6 | 260.94 | 260.01 | 261.18 | 260.94 | 261.49 | 261.09 | 261.15 | 261.03 | 261.19 | 261.07 | 261.25 | 261.11 | 261.14 | 260.38 | 260.27 | 260.09 | 260.35 | 260.01 | 261.49 | 259.55 |
| 2005 | 260.08 | 259.89 | 259.89 | 259.79 | 259.97 | 259.85 | 261.22 | 259.97 | 261.24 | 261.07 | 261.28 | 258.98 | 261.23 | 258.88 | 261.09 | 261.02 | 261.09 | 261.01 | 261.07 | 260.8 | 260.79 | 259.93 | 260.02 | 259.76 | 261.28 | 258.88 |
| 2006 | 260.04 | 259.06 | 259.86 | 259.78 | 260.41 | 259.78 | 261.03 | 260.41 | 261.2 | 261.03 | 261.5 | 260.83 | 261.53 | 261.09 | 261.3 | 258.42 | 261.07 | 260.93 | 261.2 | 260.55 | 260.55 | 260.18 | 260.56 | 258.83 | 261.53 | 258.42 |
| 2007 | 260.17 | 259.94 | 259.94 | 259.66 | 261.03 | 259.69 | 261.22 | 260.79 | 261.21 | 261.08 | 261.16 | 259.06 | 261.18 | 261.07 | 261.17 | 261.02 | 261.07 | 261 | 261.03 | 260.72 | 260.72 | 259.84 | 260.07 | 259.83 | 261.22 | 259.06 |
| 2008 | 260.4 | 260.05 | 260.34 | 259.87 | 259.93 | 259.81 | | | 261.16 | 261.07 | 261.23 | 261.11 | 261.19 | 261.1 | 261.22 | 260.64 | 261.16 | 261.09 | 261.14 | 260.28 | 260.53 | 259.72 | 260.2 | 260.01 | 261.23 | 259.72 |
| 2009 | 260.14 | 259.94 | 259.96 | 259.8 | 260.25 | 259.88 | 261.28 | 260.26 | 261.31 | 261.12 | 261.22 | 261.12 | 261.21 | 261.1 | 261.49 | 261.19 | 261.23 | 261.08 | 261.21 | 260.54 | 260.54 | 260.13 | 260.41 | 260.21 | 261.49 | 259.8 |
| 2010 | 260.23 | 260 | 260.08 | 258.74 | 260.57 | 259.73 | 260.86 | 260.56 | 261.25 | 260.85 | 261.24 | 261.18 | 261.21 | 261.12 | 261.16 | 261.1 | 261.21 | 261.14 | 261.15 | 260.51 | 260.51 | 260.21 | 260.64 | 260.22 | 261.25 | 258.74 |
| 2011 | 260.22 | 259.76 | 259.77 | 259.66 | 260.31 | 259.63 | 261.28 | 260.31 | 261.22 | 261.11 | 261.21 | 261.13 | 261.18 | 261.12 | 261.16 | 261.07 | 261.08 | 260.98 | 261.03 | 260.87 | 260.86 | 260.03 | 260.4 | 260.05 | 261.28 | 259.63 |
| 2012 | 260.33 | 260.12 | 260.12 | 259.97 | 260.97 | 259.86 | 261.15 | 260.92 | 261.2 | 261.11 | 261.21 | 261.12 | 261.12 | 260.97 | 260.99 | 260.76 | 260.93 | 260.88 | 260.93 | 260.83 | 260.83 | 260.08 | 260.13 | 260.07 | 261.21 | 259.86 |
| 2013 | 260.09 | 259.99 | 260.04 | 259.95 | 259.97 | 259.93 | 261.26 | 259.94 | 261.25 | 261.03 | 261.26 | 261.11 | 261.26 | 261.11 | 261.15 | 261.07 | 261.21 | 261.1 | 261.21 | 260.64 | 260.69 | 260.63 | | | 261.26 | 259.93 |
| 2014 | 259.9 | 259.86 | 259.89 | 259.8 | 259.84 | 259.81 | | | 261.3 | 261.12 | 261.25 | 261.14 | 261.19 | 261.1 | 261.16 | 261.07 | 261.17 | 261.09 | 261.2 | 260.59 | 260.59 | 260.02 | 260.24 | 259.85 | 261.3 | 259.8 |
| 2015 | 259.85 | 259.68 | 259.68 | 259.57 | 259.57 | 259.52 | 260.42 | 259.54 | 261.07 | 260.43 | 261.32 | 261.06 | 261.2 | 261.13 | 261.3 | 261.13 | 261.25 | 261.08 | 261.19 | 260.8 | 260.81 | 260.25 | 260.28 | 260.17 | 261.32 | 259.52 |
| 2016 | 260.27 | 260.03 | 260.15 | 260.07 | 260.99 | 260.05 | 261.2 | 260.99 | 261.17 | 261.11 | 261.23 | 261.15 | 261.16 | 261.05 | 261.08 | 261 | 261.01 | 260.93 | 260.95 | 260.4 | 260.4 | 259.88 | 260.14 | 259.94 | 261.23 | 259.88 |
| 2017 | 260.17 | 259.89 | 259.89 | 259.76 | 260.33 | 259.87 | 261.16 | 260.12 | 261.39 | 261.09 | 261.26 | 261.13 | 261.25 | 261.15 | 261.26 | 261.14 | 261.22 | 261.16 | 261.17 | 260.76 | 260.77 | 260.37 | 260.37 | 260 | 261.39 | 259.76 |
| 2018 | 260 | 259.9 | 260 | 259.9 | 260.08 | 259.95 | 261.08 | 260.08 | 261.28 | 261.1 | 261.26 | 261.11 | 261.16 | 261.02 | 261.17 | 261.13 | 261.18 | 261.1 | 261.21 | 260.55 | 260.55 | 260.13 | 260.32 | 260.2 | 261.28 | 259.9 |
| 2019 | 260.21 | 259.95 | 259.95 | 259.86 | 259.88 | 259.76 | 261.52 | 259.83 | 261.3 | 261.1 | 261.27 | 261.17 | 261.21 | 261.09 | 261.13 | 261.04 | 261.1 | 261.03 | 261.11 | 260.83 | 260.92 | 260.07 | 260.07 | 259.82 | 261.52 | 259.76 |
| 2020 | 260.01 | 259.75 | 259.98 | 259.71 | 260.4 | 259.69 | 261.16 | 260.41 | 261.32 | 261.13 | 261.26 | 261.15 | 261.17 | 261.11 | 261.2 | 261.11 | 261.2 | 261.11 | 261.23 | 260.91 | 260.91 | 260.2 | 260.32 | 260.18 | 261.32 | 259.69 |
| 2021 | 260.32 | 259.83 | 259.83 | 259.63 | 260.09 | 259.59 | 260.94 | 260.1 | 261.32 | 260.94 | 261.18 | 261.1 | 261.24 | 261.12 | 261.16 | 261.09 | 261.29 | 261.07 | 261.27 | 260.55 | 260.56 | 260.1 | 260.16 | 260.01 | 261.32 | 259.59 |
| 2022 | 259.97 | 259.78 | 259.77 | 259.65 | 260.3 | 259.68 | 261.04 | 260.3 | 261.19 | 261.04 | 261.36 | 261.14 | 261.17 | 261.1 | 261.21 | 261.11 | 261.18 | 261.14 | 261.16 | 260.95 | 260.96 | 260.15 | 260.21 | 260 | 261.36 | 259.65 |
| 2023 | | | 259.87 | 259.84 | 259.85 | 259.54 | 261.32 | 259.54 | 261.3 | 261.07 | 261.15 | 261 | 261.23 | 261.15 | 261.2 | 261.11 | 261.11 | 260.96 | 261.05 | 260.71 | | | | | 261.32 | 259.54 |
| Max/Min | 260.4 | 259.06 | 260.34 | 258.74 | 261.08 | 259.17 | 261.52 | 259 | 261.39 | 260.43 | 261.5 | 258.98 | 261.53 | 258.88 | 261.49 | 258.42 | 261.29 | 260.88 | 261.42 | 260.19 | 260.96 | 259.72 | 260.64 | 258.83 | 261.53 | 258.42 |

# APPENDIX B:
# FLOODPLAIN MAPS



LEGEND

🟦 100-Year Floodplain

● Building in Floodplain

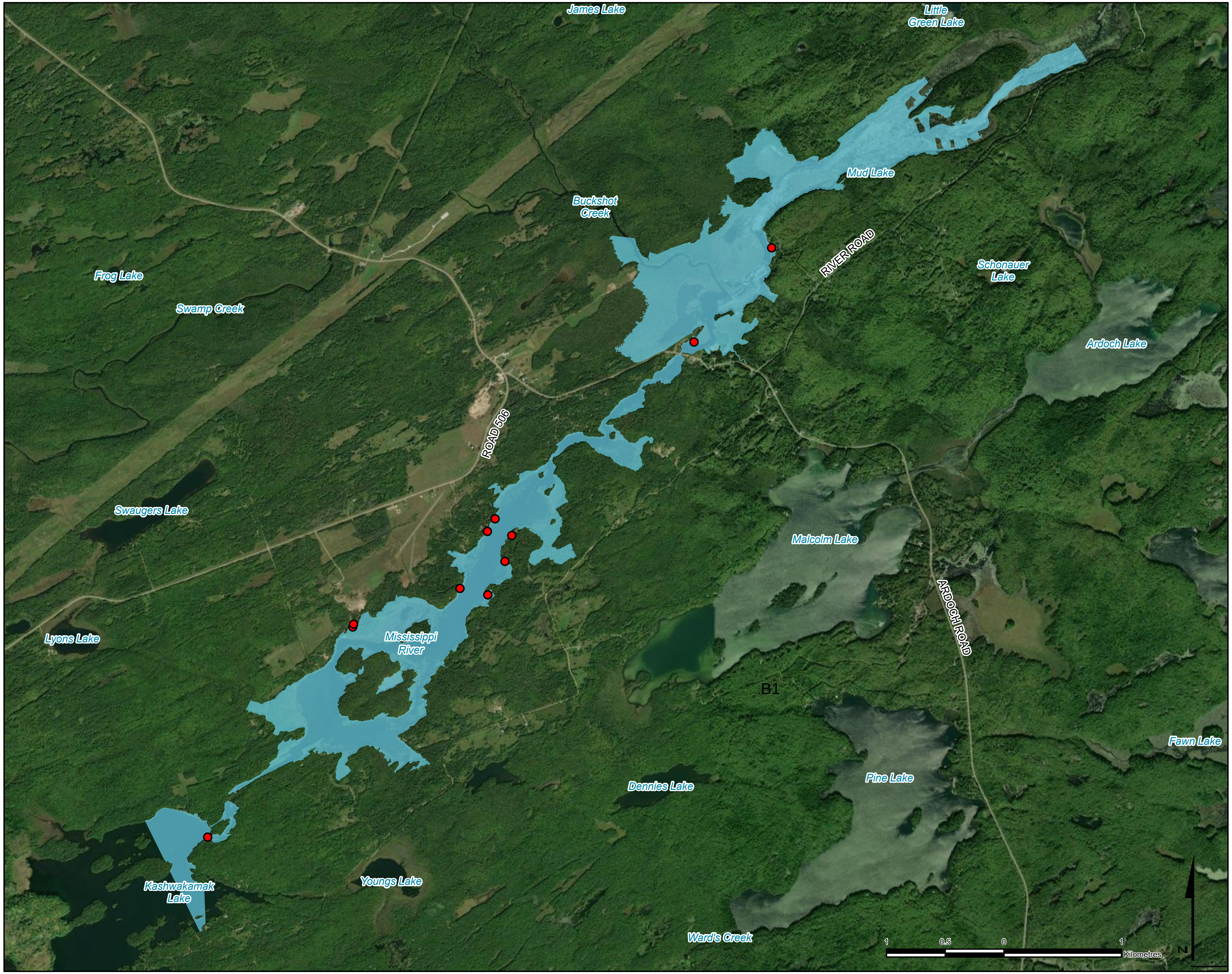
CLIENT:
Mississippi Valley Conservation Authority

PROJECT:
HYDRAULIC ANALYSIS MEMORANDUM

TITLE:
100-YEAR FLOODPLAIN

egis
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

| PROJECT NO:CCO-23-3603 | | FIGURE: |
|---|---|---|
| Date | May., 07, 2024 | B1 |
| GIS | CZ | |
| Checked By | MS | |



LEGEND

| | |
|---|---|
| 🟦 | 1000-Year Floodplain |
| ● | Building in Floodplain |

CLIENT:
Mississippi Valley Conservation Authority

PROJECT:
HYDRAULIC ANALYSIS MEMORANDUM

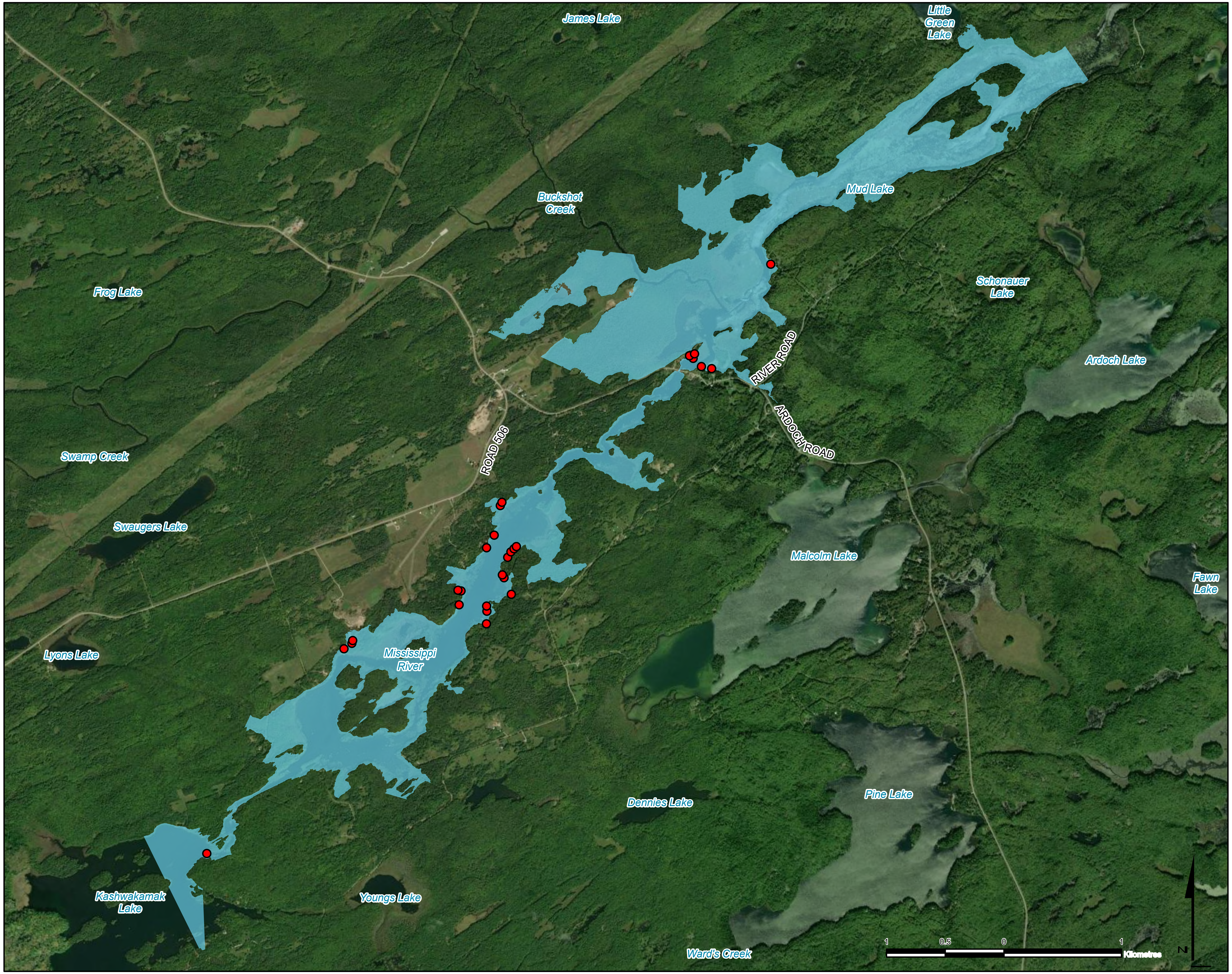
TITLE:
1000-YEAR FLOODPLAIN

egis
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

PROJECT NO:CCO-23-3603

| | |
|---|---|
| Date | May., 07, 2024 |
| GIS | CZ |
| Checked By | MS |

FIGURE:
B2



LEGEND

🟦 PMF Flood Scenario

● Building in Flood Extents

CLIENT:

Mississippi Valley Conservation Authority

PROJECT:

HYDRAULIC ANALYSIS MEMORANDUM

TITLE:

PMF FLOODPLAIN

egis

115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

| PROJECT NO:CCO-23-3603 | | FIGURE: |
|---|---|---|
| Date | May., 07, 2024 | B3 |
| GIS | CZ | |
| Checked By | MS | |

# APPENDIX C:
# MVCA METHODOLOGY FOR DETERMINING ENVIRONMENTAL LOSSES & CLASSIFICATION

**Dam Hazard Potential Classification (HPC)**

# Methodology for Determining Environmental Losses & Classification

March 13, 2024

## PURPOSE

The purpose of the document is to establish an approach and methodology for determining the environmental classification per Table 1 of the Technical Bulletin: *Classification and Inflow Design Flood Criteria*, OMNR, August 2011.[1,2,3]

## TECHNICAL FRAMEWORK

*Table 1 – Hazard Potential Classification* identifies four categories:

- Life Safety
- Property Losses
- Environmental Losses
- Cultural/Heritage Losses

Each is to be scored either Low, Moderate, High, or Very High. The highest score amongst the four categories determines the overall dam classification. For example, three of the four categories can score Low, but if the fourth category scores High, the HPC for the dam is High.

Assessed "losses" are to be based upon the environmental impacts of a flood, earthquake or other event, and consider two scenarios:

- Event with dam intact
- Event plus dam failure

The objective of the dam failure scenario is to determine the ultimate discharge and outcome of a flood peak or flood wave immediately downstream of the dam. A "flood induced" failure is an event that the dam cannot safely pass that leads to its failure. The key is to determine what incremental losses would occur if the existing dam were to fail during the prescribed event.

The HPC must be based on the worst-case scenario of failure of the dam and at the worst possible time thereby resulting in the highest HPC of all realistic failure scenarios. The combination of a seismic event with a flood event is not considered for determining the HPC.

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[1] https://www.ontario.ca/page/dam-management

[2] https://files.ontario.ca/technical-bulletin-classification-and-idf.pdf

[3] Other references used: 2007 CDA Tech Bulletin: Inundation, Consequences & Classification for Dam Safety; 2022 DSR for Carleton Plan Dam, Wills;

The assessment of environmental losses considers two main variables:

- Loss in species
- Loss of habitat

## PROPOSED APPROACH

### Competency

The evaluation of environmental losses should be carried out by a biologist, preferably a specialist in eastern Ontario aquatic species and habitats that is knowledgeable in federal and provincial species at risk legislation, no-net-loss and recovery methods, and who is familiar with recovery projects and their viability/success in comparable settings.

### Definitions

Table 1 of the 2011 Technical Bulletin refers to the following:

- the Ontario *Endangered Species Act*, 2007 and
- Critical Habitat (CH)
- Minimal, Moderate, Appreciable, and Extensive (loss of fish or habitat)
- Significant deterioration (of critical habitat)
- Reversible damage
- Viable population

There is no definition for "Critical Habitat" in the provincial legislation, but there is a definition in the federal *Species At Risk Act (SARA)*, S.C. 2002:

> "The habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species." [4]

None of the other terms are defined in either the provincial or federal legislation. Therefore, for the purpose of determining environmental losses at MVCA facilities:

- The evaluation should consider the "list of species" contained in the provincial *Endangered Species Act* and the federal *Species At Risk Act*. The species does *not* need to be listed in both.
- The presence of "critical habitat" is to be determined using the SARA definition, i.e. identified in an approved recovery strategy or action plan.
- Viable shall mean that proposed interventions will allow the specie to reach a self-sustaining population that no longer requires intervention.
- "Moderate loss" shall mean that the range, magnitude, and duration of impacts would not affect species viability in the watershed, and that species habitats will likely recover within a 5-year period.
- "Appreciable loss" shall mean that the range, magnitude, or duration of impacts to species numbers or their habitat may be apparent at a watershed level, but that the habitat and species will likely recover within a 5 to 10-year period.

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[4] https://laws.justice.gc.ca/eng/acts/s-15.3/page-1.html#h-434504

- “Extensive loss” shall mean that the range, magnitude, or duration of impacts to species numbers or their habitat will likely occur at a watershed level, and that a recovery period >10-year period will be required, with extensive intervention.
- “Significant deterioration” shall mean that the loss of “critical habitat” or “listed species” will be very difficult to recover to current levels, with a projected recovery period >10-years.
- “Viable” shall mean that the specie will likely reach a self-sustaining population that no longer requires intervention within 10-30 years.

## Methodology

1. Literature review and field investigations to identify presence of habitat type and species at the dam site, and as far downstream and upstream as would likely be directly affected by a dam failure.
2. Confirm the presence of “listed species”.
3. Assess environmental impacts of the “event” scenario with the dam intact.
    a. Range of habitats and species affected
    b. Scale of those impacts
    c. Duration of those impacts
4. Assess environmental impacts of the “event” scenario with a dam failure.
    a. Range of habitats and species affected
    b. Scale of those impacts
    c. Duration of those impacts
5. Determine if there is an incremental difference in the impacts.
6. Identify and assess efficacy of proposed recovery methods.
    a. Suitability/appropriateness of measure
    b. Time required to implement and see measurable habitat/specie recovery
    c. Time for specie population to recover to viable levels

The following table contains parameters to be considered.

| Technical Bulletin Classification / Description | Environmental Information Required | Environmental Score Indicators |
|---|---|---|
| **LOW** - Minimal loss of fish and/or wildlife habitat with high capability of natural restoration resulting in a very low likelihood of negatively affecting the status of the population. | • Species and species habitats at the dam and within broader watershed (both up and downstream)<br>• Status of population(s) and vulnerability in the watershed<br>• Summary of potential for Species at Risk (SAR) and SAR habitat (in the influence zone (both up and downstream)<br>• Significance of dam in habitat availability, species health and population recovery<br>•<br>• | • No species at risk<br>• Species and relevant habitats prevalent at other locations in the watershed<br>• Incremental impact of dam failure does not materially impact habitat or species populations at the watershed level.<br>• Incremental losses are unlikely to extend beyond one year. |
| **MODERATE** – Moderate loss or deterioration of fish and/or wildlife habitat with moderate capability of natural restoration resulting in a low likelihood of negatively affecting the status of the population. | *Above and,*<br>• Discussion of the likely recovery period assuming natural restoration<br>• Demonstrated evidence that the recovery methods will be successful | • No species at risk.<br>• Incremental impact of dam failure does not materially impact habitat or species populations at the watershed level.<br>• Natural recovery of viable populations and habitat in the dam’s zone of influence are feasible and likely with replacement of the dam. |
| **HIGH** - Appreciable loss of fish and/or wildlife habitat <u>or</u> significant deterioration of critical fish and/or wildlife habitat with reasonable likelihood of being able to apply natural or assisted recovery activities to promote species recovery to viable population levels.<br>Loss of a portion of the population of a species classified under the *Ontario Endangered Species Act* as Extirpated, Threatened or Endangered, or reversible damage to the habit of that species. | *Above and,*<br>• Delineation of “critical habitat” types, locations, and discussion on severity of impact<br>• Activities required to allow for habitat recovery and “viability” population levels.<br>• Likely recovery period assuming assisted recovery.<br>• Demonstrated evidence that damage is reversible and/or no net loss is viable.<br>• Demonstrated evidence that recovery methods will work, that damage is reversible, with good probability of recovering viable population. | • Incremental impacts of dam failure could materially impact habitat or species populations at the watershed level.<br>• Assisted recovery of viable populations and habitat in the dam’s zone of influence and at the watershed level are feasible and likely with replacement of the dam and other interventions.<br>• No-net-loss methods and sites are viable in the same watershed that can minimize permanent, irreversible damage to habitats and species at risk. |
| **VERY HIGH** - Extensive loss of fish and/or wildlife habitat <u>or</u> significant deterioration of critical fish and/or wildlife habitat with very little or no feasibility of being able to apply natural or assisted recovery activities to promote species recovery to viable population levels.<br>Loss of a viable portion of the population of a species classified under the *Ontario Endangered Species Act* as Extirpated, Threatened or Endangered or irreversible damage to the habitat of that species. | | • Assisted recovery of viable populations and habitat in the dam’s zone of influence and at the watershed level are NOT feasible.<br>• Significant, permanent, irreversible damage to habitats and species at risk. |

# APPENDIX D:
# MVCA TECHNICAL REVIEW MEMORANDUM

Mississippi Valley Conservation Authority

# Technical Review Memorandum

| | |
|---|---|
| **To:** | Juraj Cunderlik, Director of Engineering |
| **From:** | Kelly Stiles, Biologist |
| **RE:** | Kashwakamak Lake Dam HPC review |
| **MVCA File No.:** | Enter File No. |
| **Munic. Ref. ID.:** | |
| **Date:** | March 14, 2024 |

Mississippi Valley Conservation Authority (MVCA) has been circulated the following:

- "Kashwakamak Lake Dam – DRAFT Hydraulic Analysis Memo", by Egis (formally McIntosh Perry), December 22, 2023.
- "Classification and Inflow Design Flood Criteria, Technical Bulletin" by Ontario Ministry of Natural Resources, August, 2011.
- "Methodology for Determining Environmental Losses and Classification" by Mississippi Valley Conservation Authority, March, 2024.

MVCA generally concurs with the environmental site condition and losses summary for the areas up and downstream of the Kashwakamak Lake Dam provided in the Egis memo. We note that the OMNR Design Flood Criteria Technical Bulletin that ranks the potential environmental losses to be vague and further clarification is needed to address associated impacts in the local context.

The MVCA interpretation of the OMNR methodology assesses the dam and associated impact zones in the context of the Mississippi River watershed. MVCA provides the following summary of the site conditions and subsequent ranking.

Species composition:

- Any listed species identified in the Egis report as occurring in the area of the Kashwakamak Lake Dam will not be incrementally impacted by a flood + failure event.
- The fish species in the potential zone of impact are not listed as at risk provincially or federally.
- The fish species present up and downstream of the dam are found in other locations throughout the Mississippi River watershed.

Presence of critical habitat:

- The incremental damage to the fish spawning habitat from the dam failure + flood event vs solely the flood event is limited to the shallow water (less than 6 feet or 2 m) habitat within Kashwakamak Lake (as mentioned in the Egis report).

- The spawning habitat, noted above, that may be impacted by lake dewatering if the dam were to fail is not unique or at risk on the watershed scale.
- If the dam failed the impact would be temporary. It is anticipated repairs would be completed in a time frame that would minimize longer term seasonal impacts. Timely dam reinstatement should provide water depth sufficient for the successful spawning habitat use for the next year's generation.
- Restoration of habitat up and downstream of the dam would reasonably occur naturally with limited assisted efforts required to remove the dam debris from the river.

Conclusion on the incremental impact of flood event + dam failure on areas up and downstream of Kashwakamak Lake dam:

- The likelihood of "negatively affecting the status of the (fish) population" on the watershed scale is low to moderate.
- The likelihood of "significant deterioration of critical (fish) habitat" on the watershed scale is low to moderate.
- Natural and minor assisted recovery/restoration of fish and fish habitat is possible within one year after impact.

With those further clarifications in mind, MVCA recommends the Hazard Potential for the incremental environmental losses if the dam fails during a peak flood event be classed as moderate.

Kelly Stiles

Kelly Stiles
MVCA Biologist

# Appendix H – Natural Heritage Existing Conditions Memorandum

McINTOSH PERRY

# Existing Environmental Conditions Memo

To: Mississippi Valley Conservation Authority

From: Lindsay Bennett, Biologist
McIntosh Perry Consulting Engineers Ltd.

c.c. Lisa Marshall, Manager, Environmental Engineering
McIntosh Perry Consulting Engineers Ltd.

Date: February 20, 2024

Re: Kashwakamak Lake Dam– Existing Environmental Conditions Memo

---

## INTRODUCTION

The Kashwakamak Lake Dam (**Photo 1**) is located along the main channel of the Mississippi River and is owned and maintained by the Mississippi Valley Conservation Authority (MVCA). The structure is situated approximately 8 km east of Fernleigh on Lot 21, Concession 10, Clarendon Ward, in the North Frontenac Township. Kashwakamak Lake lies within the Georgian Bay Ecoregion and is located in the 5E-11 Ecodistrict of Bancroft and is part of the Mississippi River, western sub-watershed (Mississippi watershed is divided into three sub-watersheds). The Kashwakamak Lake Dam, hereafter referred to as the study area, is one of six (6) major dams in the Mississippi River that is used to alleviate drought and flooding. The dam structure consists of a small concrete saddle dam with an overflow weir spillway, and a two - sluices that each contain a 10 timber stop logs (0.3m high x 0.3m wide x 3.43m long).

The dam, originally constructed in 1910, is now over 100 years old with deteriorating concrete in several areas. The proposed project aims to completely replace the Kashwakamak Dam to mitigate the risk of the dam overtopping and failing.

L. Bennett of McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) conducted a site visit on June 6th, 2023 to identify and evaluate the significance of any natural heritage features, as defined in the Provincial Policy Statement (MMAH, 2020), on the subject property and within the broader study area.

# METHODOLOGY

## Background Review

As part of the background review, the following background documentation and related information sources were reviewed prior to McIntosh Perry conducting field investigations of the Study Area to identify natural heritage features and constraints:

- Township of North Frontenac Official Plan (2017);
- Mississippi Valley Conservation Authority's Public Mapping Tool (2023);
- The Land Information Ontario (LIO) Metadata Management Tool Aquatic Resource Area (ARA) database (MNRF, 2023a);
- The Fish ON-Line database (MNRF, 2023b);
- Department of Fisheries and Oceans Canada (DFO) SAR mapping tool (DFO, 2023);
- LIO was consulted for natural heritage information in the vicinity of the Study Area (MNRF, 2023c);
- Natural Heritage Information Centre (NHIC) Make a Map Data Tool (NHIC, 2023);
- The Atlas of the Breeding Birds of Ontario (OBBA) (Cadman et al., 2007);
- The Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature, 2023);
- The Ontario Butterfly Atlas Online (OBAO) (Toronto Entomologists' Association, 2023);
- iNaturalist (iNaturalist, 2023); and
- eBird (eBird, 2023).

## Field Investigations

McIntosh Perry staff conducted a single field investigation on June 6, 2023, to inspect the study area for any natural environmental features (e.g., fish habitat, ecological land classification, SAR bat habitat, etc.). Environmental conditions at the time were extremely smoggy with poor air quality from forest fires occurring in northern Ontario and Quebec. Conditions were warm (20°C) and cloudy with 100% smog/cloud cover. The field investigations included a walkthrough of the study area to document existing conditions (i.e., Ecological Land Classification) and document SAR and their habitat. Areas within the study area, where access was not permitted, or inaccessible, were observed using binoculars. The study area was inspected for hollow and snag trees that may be suitable for bat maternity roosting habitat, as well as Butternut and Black Ash within 25 m of each of the proposed alternative bridge structure locations.

The vegetation communities observed within the study area were characterized using the (ELC) protocol (Lee et al., 1998), and delineated on an aerial photograph. During the field investigations, observations of wildlife species were made through sight, sound, and physical evidence.

# DESCRIPTION OF THE NATURAL ENVIRONMENT

## Existing Land Use

The study area lies within the Township of North Frontenac, with the site itself located along Kashwakamak Lake on Lot 21, Concession 10. According to the Township of North Frontenac's Official Plan (2017) the shores of the lake are zoned as:

- Waterfront Area
- Crown Land
- Rural

The shores of Kashwakamak Lake are also home to over 500 cottages/ residences, as well as resorts and marinas. Kashwakamak Lake is also upstream of manomin (*Zizania palustris*) rice (or wild rice) crops, which are culturally important to the Ardoch Algonquin First Nation, Alderville First Nation, and potentially other First Nations. The landscape is dominated by forests, lakes, wetlands (both evaluated and unevaluated), and is largely undeveloped.

The study area itself is only accessible by a private road off North Frontenac Road 506, which is surrounded by Mixed Forest (FOM) and Open Aquatic [(OAO) i.e., Kashwakamak Lake) communities (see **Figure 1**).

The forest itself should be considered as potentially suitable high-quality bat maternity roosting habitat (**see Figure 2**).

No Butternut or Black Ash were observed during the site visit, however, the north side of the shoreline was not assessed due to there being no access.

A Snapping turtle (Special Concern under the ESA) was observed to be present within Kashwakamak Lake.

Photos from the field investigations have been included in **Appendix B** of this memo.

**Figure 1** illustrates the Ecological Land Classification features observed within the study area.

**Figure 2** illustrates natural heritage features of the Study Area based on the field investigations.

## Natural Heritage System Components

Using the provincial NHIC (2023a) database as well as the Townships's OP (2017), the following natural heritage features have been identified in the study area:

- Woodlands (NHIC 2023a)

No other natural heritage system components are identified as being present.

## Landscape, Soil and Geology

The Study Area is situated in the Bancroft Ecodistrict (5E-11) within the Georgian Bay Ecoregion. Over half of this ecodistrict is covered by mixed (35%), deciduous (14%), and coniferous forests (25%), with large areas characterized by base-rich (e.g., marble) Precambrian bedrock. Land use in 5E-11 is driven by timber harvest, mineral and aggregate extraction and mining. Other less significant land uses are settlement and associated infrastructure (1%) and protected areas (5%) (Henson and Brodribb 2005).

The Study Area is in the Upper St. Lawrence section of the Great Lakes-St. Lawrence Forest Region, characterized by predominantly deciduous forests, dominated by sugar maple, American beech, red maple, yellow birch, basswood, white ash, largetooth aspen, red oak, and bur oak. Other tree species occurring in the Upper St. Lawrence section include white oak, green ash, grey birch, rock elm, blue-beech, and bitternut hickory. White elm is typically prominent in contemporary settled landscapes. Less frequent species in this section include butternut, eastern cottonwood, slippery elm, black maple, silver maple, and black ash. Coniferous trees such as eastern hemlock, white spruce, and balsam fir occur frequently on shallow, acidic, or eroding materials. Eastern white pine, red pine, black spruce, and eastern white cedar may be found where soil conditions are favorable (Rowe 1972).

The geology of the area is influenced by the underlying Precambrian bedrock, which is found throughout Bancroft Ecodistrict 5E-11. The surficial geology of the Study Area is shown as being dominated by Paleozoic bedrock-rift complex (Ontario Geological Survey 2019).

Regional physiography is characterized by acidic morainal material (97%) covering a rolling landscape, with several areas of bare bedrock outcroppings (Henson and Brodribb 2005). Rowe (1972) shows the Study Area being located within a large area of Till Moraine. Additionally, the soils have good drainage due to the coarse texture of the deposit types.

## Groundwater, Surface Water and Fish Habitat

The study area lies within Kashwakamak Lake, where LIO (MNRF 2023b) identifies the lake as having a cool - warmwater water thermal regime with fish present (**Photos 2-4**). The lake, and the Mississippi River downstream of the dam, provides permanent fish habitat where potentially suitable spawning habitat may be present both upstream and downstream of the study area. Spawning habitat is potentially present for Walleye, White Sucker, and bait fish (i.e., minnow sp.) downstream within the Mississippi River, with spawning habitat potentially present for Largemouth Bass, Smallmouth Bass, Sunfish species (*Lepomis sp.)*, and bait fish species upstream (**Figure 2**).

### *Physical Characteristics of Kashwakamak Lake (MVCA, 2018)*

| | |
|---|---|
| **Elevation (m)** | 261 |
| **Emergency Spillway Elevation (m)** | 261.67 |
| **Surface Area (ha)** | 1191 |
| **Drainage Area (sq. km)** | 417 |
| **Maximum Depth (m)** | 22 |
| **Mean Depth (m)** | 8 |
| **Volume (m3)** | 9.7 x 10 |
| **Perimeter (km)** | 66 |
| **Elevation of Dam Deck (m)** | 262.06 |
| **Weir Elevation (m)** | 261.06 |
| **Total Storage Volume (ha. M)** | 3822 |
| **Hydraulic Capacity (cms)** | 65 |

The Department of Fisheries and Oceans (DFO) does not identify any aquatic SAR or SAR habitat within the study area.

The following species have been identified as occurring in Kashwakamak Lake (MNRF, 2023b):

- Banded Killifish *(Fundulus diaphanous)*
- Bluegill (*Lepomis macrochirus*)
- Bluntnose Minnow (*Pimephales notatus*)
- Brook Stickleback (*Culaea inconstans*)
- Brown Bullhead (*Ameiurus nebulosus*)
- Burbot (*Lota lota*)
- Cisco (*Coregonus artedi*)
- Common Shiner (*Luxilus cornutus*)
- Fallfish (*Semotilus corporalis*)
- Golden Shiner (*Notemigonus crysoleucas*)
- Iowa Darter (*Etheostoma exile*)
- Lake Whitefish (*Coregonus clupeaformis*)
- Largemouth Bass (*Micropterus salmoides*)
- Logperch (*Percina sp.)*
- Northern Pike (*Esox Lucius*)
- Pumpkinseed (*Lepomis gibbosus*)
- Rock Bass (*Ambloplites rupestris*)
- Slimy Sculpin (*Cottus cognatus*)
- Smallmouth Bass (*Micropterus dolomieu*)
- Spoonhead Sculpin (*Cottus ricei*)
- Spottail Shiner (*Notropis hudsonius*)
- Walleye (*Sander vitreus*)
- White Sucker (*Catostomus commersonii*)
- Yellow Perch (*Perca flavescens*)

### *Known Fish Spawning*

There is a large population of Walleye that are known to occur at Kashwakamak Lake, where spawning takes place at the main inlet at Whitefish Rapids (flowing from Marble Lake) and several other locations along the north shore of the lake (MVCA, 2018). Whitefish Rapids is approximately 14km upstream of the Kashwakamak Dam structure. Additional species that are known to spawn in the lake include Bass, and Northern Pike. Bass have been observed to spawn throughout the lake in shallow bays, while Northern Pike are known to spawn at two locations in the extreme eastern end of the lake (MVCA, 2018). As such water levels must be maintained high enough in the early spring for successful Walleye spawning (260.5 m) and Bass spawning (261.1 m) in June. Northern Pike do not require operational constraints (MVCA, 2018). It is recommended during construction activities that water levels/ dam activity follow restrictions and guidelines outlined in MVCA (2018) and follow the restricted activity timing window described below.

### *Restricted Activity Timing Windows*

Restricted activity timing windows are applied to protect fish from impacts of works or undertakings in and around water during spawning migrations and other critical life history stages. These guidelines are set by the MNRF based on location; the study area is in the MNRF Southern Region. Given the known presence of the fish species, the following Restricted Activity Timing Windows for the protection of fish and fish habitat should be followed:

**Spawning Period – Spring**

March 15 – July 15

Given the timing restriction, work may be permitted from July 16 – March 14.

## Vegetation Cover

The vegetation cover within the study area consisted of one vegetation community surrounding the dam, which was a Mixed Forest (FOM) that is characteristic of Ecodistrict 5E-11 (**Photo 5**). The dominant tree species that were observed were Eastern hemlock (*Tsuga canadensis*) and Eastern white cedar (*Thuja occidentalis*) with American elm (*Ulmus americana*), American beech (*Fagus grandifolia*), white pine (*Pinus strobus*), red oak (*Quercus rubrum*), and paper birch (*Betula papyrifera*) occurring occasionally.

The area immediately surrounding the dam has been cleared for the access road and has a trail that runs along it for portaging (**Photo 5**), where herbaceous species such as common dandelion (*Taraxacum officinale*), Canada columbine (*Aquilegia canadensis*), cow vetch (*Vicia cracca*), Philadelphia fleabane (*Erigeron philadelphicus*), red clover (*Trifolium pratense*), Mayflower (*Maianthemum canadense*), grass species (Poa sp.) and royal fern (*Osmunda regalis*) were commonly encountered. Occasionally occurring herbaceous species were blue cohosh (*Caulophyllum thalictroides*), wild strawberry (*Fragaria vesca*), common milkweed (*Asclepias syriaca*), indian tobacco (*Lobelia inflata*), and northern bugleweed (*Lycopus uniflorus*).

No tree or herbaceous SAR were observed.

### *Culturally Significant Plant Species – Manomin*

Manomin, or wild rice, is an aquatic annual species of grass of cultural significance to the Algonquin First Nations. The species grows in brackish marshes, lacustrine, riverine, or along shored habitats where the water depth ideally ranges from 15 – 90cm with a soft soil layer on the bottom (OMAFRA, 2012). The species is sensitive to changes in temperature and water levels, with an ideal temperate range of between 17 – 21 °C. Wild rice is also important for several different species, as it provides food for waterfowl and habitat for furbearing mammals, snails and insects (MVCA, 2018). Manomin, although not present in Kashwakamak Lake, is found growing in Mud Lake (**Figure 3**) which is downstream from Kashwakamak Lake and subsequently affected by alterations to water levels (MVCA, 2018). Manomin is sensitive to changes in water levels, as low levels can cause them to dry and destroy seed beds with high water levels causing them to drown.

Operational constraints during construction should follow the same guidelines and restrictions as outlined in MVCA (2018). This includes having outflow being controlled during June 1 – September 30th to maintain the growth of Manomin crops and allow for harvest.

### *Invasive and Noxious Plant Species*

There were no plant species listed as Restricted under the *Invasive Species Act (2015)* observed to be present within the study area during the 2023 field investigation.

## Significant Woodlands

There are no significant woodlands present within the study area. Though the NHIC (2023a) identifies woodlands as being present within the study area, this layer, however, does not identify the woodlands as being significant and it is recommended that this be used as a starting point for municipalities to help assess if woodlands are significant within their jurisdiction.

## Significant Wetlands

There are no significant wetlands present within the study area based on background review and field truthing.

## Significant Valleylands

There are no significant valleylands present within the study area based on background review and field truthing.

## Significant Wildlife Habitat

The *Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E* (MNRF 2015) provide descriptions of wildlife habitats and guidance on criteria for determining the presence of candidate and confirmed wildlife habitats. Presence or absence of candidate habitats in the Study Area is discussed below.

The natural heritage reference manual divides significant wildlife habitat into four broad categories:

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

The presence or absence of candidate habitats in the study area is assessed below in **Table 2**.

**Table 2: Significant Wildlife Habitat within the Study Area**

| Specialized Wildlife Habitat Category | Candidate Significant Wildlife Habitat (Y/N) | Confirmed Significant Wildlife Habitat (Y/N) |
|---|---|---|
| Waterfowl Stopover and Staging Areas (Terrestrial) | No | No |
| Waterfowl Stopover and Staging Areas (Aquatic) | No | No |
| Shorebird Migratory Stopover Area | No | No |
| Raptor Wintering Area | No | No |
| Bat Hibernacula | No | No |
| Bat Maternity Colonies | Yes | No |
| Bat Migratory Stopover | No | No |
| Turtle Wintering Area | Yes | No |
| Reptile Hibernaculum | No | No |
| Colonially-Nesting Bird Breeding Habitat (Bank and Cliff) | No | No |
| Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs) | No | No |

| Table 2: Significant Wildlife Habitat within the Study Area | | |
|---|---|---|
| **Specialized Wildlife Habitat Category** | **Candidate Significant Wildlife Habitat (Y/N)** | **Confirmed Significant Wildlife Habitat (Y/N)** |
| Colonially-Nesting Bird Breeding Habitat (Ground) | No | No |
| Migratory Butterfly Stopover Area | No | No |
| Landbird Migratory Stopover Area | No | No |
| Deer Yarding Area | No | No |
| Deer Winter Congregation Area | No | No |
| Cliff and Talus Slopes | No | No |
| Sand Barren | No | No |
| Alvar | No | No |
| Old Growth Forest | No | No |
| Tallgrass Prairie | No | No |
| Savannah | No | No |
| Other Rare Vegetation Communities | No | No |
| Waterfowl Nesting Area | No | No |
| Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat | No | No |
| Woodland Raptor Nesting Habitat | No | No |
| Turtle and Lizard Nesting Area | Yes | No |
| Seeps and Springs | No | No |
| Amphibian Breeding Habitat (Woodland) | No | No |
| Amphibian Breeding Habitat (Wetlands) | No | No |
| Area-sensitive Bird Breeding Habitat | No | No |
| Marsh Bird Breeding Habitat | No | No |
| Open Country Bird Breeding Habitat | No | No |
| Shrub/Early Successional Bird Breeding Habitat | No | No |
| Terrestrial Crayfish | No | No |
| Special Concern and Rare Wildlife Species | Yes | No |
| Amphibian Movement Corridors | No | No |
| Deer Movement Corridors | No | No |

Based on the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E* (MNRF, 2015), Candidate SWH was determined to be present within the study area for four categories: Bat Maternity Colonies, Turtle Wintering Area, Special Concern and Rare Wildlife Species, and Turtle and Lizard Nesting Habitat

### *Candidate Bat Maternity Colonies*

Candidate Bat Maternity Colonies are present within the study area. SAR bat species utilize large diameter breast height (DBH) snag and dead trees that have potential cavities in which to roost and breed (i.e., maternity colonies). These trees can be found in forested habitat adjacent to suitable foraging areas such as open wetlands and waterbodies. The FOM community had several potentially suitable SAR bat maternity roosting trees (**Photo 7**). These species are not heavily dependent on large cavity or snag trees as they often roost singly or in small groups during the maternity period. In addition, they are generally considered to utilize forested habitats at the landscape scale and often move maternity roosts between years. As described in the *Significant Wildlife Habitat Criteria Schedule for Ecoregion 5E's Technical Guide (2015)*, candidate bat maternity colonies have the following features:

- Maternity colonies can be found in tree cavities;
- Female bats prefer wildlife trees (snags) in early stages of decay (i.e., class 1-3);
- SAR bats prefer mixed – deciduous forest types.

These are all features that were observed to be present within the study area at the time of the field visit.

### *Candidate Turtle Wintering*

Candidate turtle wintering areas are present within the study area. Kashwakamak Lake likely provides overwintering habitat, as the lake is deep enough to not freeze completely overwinter. A Snapping turtle was observed to be present during the 2023 site visit, and during the background review there were many observations of Snapping Turtle, Blanding's Turtle, and Midland Painted Turtle within and near the study area. A hatched/predated turtle nest was also observed to present immediately adjacent to the Kashwakamak Dam structure (**Photo 9-10**). It is not anticipated that overwintering would occur immediately upstream of the dam due to flows and the habitat downstream is not considered to be conducive. However, the bays northeast of the dam and open water areas further upstream may be suitable. As described in the *Significant Wildlife Habitat Criteria Schedule for Ecoregion 5E's Technical Guide (2015)*, candidate turtle wintering areas are described as having the following features:

- Water that is deep enough to not freeze and have soft mud substrate.
- Permanent, and large bodies of water.

These are all features that were observed to be present within the study area during the time of the field visit.

### *Candidate Special Concern and Rare Wildlife Species*

Candidate Special Concern and Rare Wildlife Species are present within the study area. During the 2023 site visit, a Snapping Turtle, and nesting feature (see Figure 2) were observed to be present. Additionally, during the background review it was found that the following species were observed to potentially occur within a 2km radius of the study area: Eastern Whip-poor-will, Blanding's Turtle, Butternut, Eastern Ribbonsnake and a restricted species.

### *Candidate Turtle and Lizard Nesting Areas*

Candidate Turtle and Lizard Nesting Areas were observed to be present in the study area. During the 2023 site visit, a Snapping Turtle nest was observed to be present immediately adjacent to the Kashwakamak Lake dam structure (see Photos 9-10). Additionally, several rocky outcroppings, rock features and open deciduous-mixed forests were observed to be present. As described in *the Significant Wildlife Habitat Criteria Schedule for Ecoregion 5E's Technical Guide (2015)*, candidate turtle and lizard nesting areas are described as having the following features for turtles and Five-lined skink:

- Close to water and away from roads;
- Must provide sand and gravel that turtles are able to dig in and are located in open and sunny areas;
- Skinks will nest under logs, in stumps or under loose rock in partially wooded areas;

These are all features that were observed to be present within the study area during the time of the field visit.

## Habitat for Species at Risk

A search of the NHIC's database, using their 1 x 1 km squares in a 2km radius surrounding the study area identified the following species, protected under the ESA, where identified as potentially occurring:

- Eastern Whip-poor-will
- Blanding's Turtle
- Butternut
- Restricted Species

Further desktop background review resulted in a total of twenty (20) SAR, which are summarized below in **Table 3**, that have been previously documented as historically occurring or have the potential to occur within the study area. Thirteen (13) of these species have been considered to have suitable habitat within the study area.

| Table 3: Potential SAR habitat within the Study Area | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Common Name** | **Scientific Name** | **Provincial Status** | **Provincial Habitat Protection** | **Federal Status** | **Federal Protection of Individual and *Residence* outside of Federal lands** | **Other Applicable Legislation** | **Suitable Habitat Present Within General Study Area** |
| **Birds (suitable habitat for nesting or breeding only)** | | | | | | | |
| Barn Swallow[3] | *Hirundo rustica* | Special Concern (as of January 2023) | No | Threatened | Yes | MBCA | No. No suitable nesting habitat (i.e., old barns and bridges) observed to be present within the study area. May utilize the open water areas for feeding. |
| Bobolink[3] | *Dolichonyx oryzivorus* | Threatened | Yes | Threatened | Yes | MBCA | No. There is no suitable grassland habitat present within the study area. |
| Canada Warbler [3] | *Cardellina canadensis* | Special Concern | No | Threatened | Yes | MBCA | No. There is no suitable nesting habitat present within the study area. |
| Eastern Meadowlark[1,3] | *Sturnella magna* | Threatened | Yes | Threatened | Yes | MBCA | No. There is no suitable grassland habitat present within the study area. |
| Eastern Wood-pewee | *Contopus virens* | Special Concern | No | Special Concern | No | MBCA | Yes. Eastern Wood-pewee is considered a habitat generalist, and suitable habitat may be present within the FOM community, as Eastern Wood-pewee is known to occur in mid-canopy layer mixedwood forests (i.e., FOM). |
| Red-headed Woodpecker[1,3, 5] | *Melanerpes erythrocephalus* | Endangered | Yes | Threatened | Yes | MBCA | Yes. Suitable habitat may be present within the FOM community. This species was not observed during the 2023 field visit but is known to be a habitat generalist who prefers open woodlands and forest edges. There are also iNaturalist observations from as recent as 2019 in the area. |
| Eastern whip-poor-will[1,3,4] | *Antrostomus vociferus* | Threatened | Yes | Threatened | Yes | MBCA | Yes. Eastern-whip-poor-will may be present within the study area as the species nests in |

**Table 3: Potential SAR habitat within the Study Area**

| **Common Name** | **Scientific Name** | **Provincial Status** | **Provincial Habitat Protection** | **Federal Status** | **Federal Protection of Individual and *Residence* outside of Federal lands** | **Other Applicable Legislation** | **Suitable Habitat Present Within General Study Area** |
|---|---|---|---|---|---|---|---|
| | | | | | | | most early successional forest types, where the species prefers semi-open/ patchy forests such as rock barrens or regenerating forests. These conditions were observed to be present within the study area. |
| Wood Thrush[1, 2, 5] | *Hylocichla mustelina* | Special Concern | No | Threatened | Yes | MBCA | Yes. There is potentially suitable habitat present within the study area as the forested sections are large enough to support Wood Thrush breeding. |
| **Mammals** | | | | | | | |
| Eastern Small-footed Myotis[6] | *Myotis leibii* | Endangered | Yes | No status | No | FWCA | No. This species prefers to utilize rocky outcroppings, caves, rock barrens or cliff and talus slopes. During the 2023 site visit, there were no cliffs or caves observed to be present within the study area. |
| Little Brown Myotis[6] | *Myotis lucifugus* | Endangered | Yes | Endangered | No | FWCA | Yes. These bat species share similar habitat preferences during their active season and are described together. They have been observed using trees as small as 10 cm DBH, but typically exhibiting early stages of decay, with cavities (usually >10 m high), loose bark, and/or leaves within forested habitats for maternity roosting purposes. Additionally, these species are known to use anthropogenic structures (e.g., houses, barns) for roosting as well (COSEWIC 2013, ECCC 2018).<br>Most of the study area is considered to be a mixed forest where little brown myotis, |
| Northern Myotis[6] | *Myotis septentrionalis* | Endangered | Yes | Endangered | No | FWCA | |
| Tri-colored Bat[6] | *Perimyotis subflavus* | Endangered | Yes | Endangered | No | FWCA | |

| Table 3: Potential SAR habitat within the Study Area | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Common Name** | **Scientific Name** | **Provincial Status** | **Provincial Habitat Protection** | **Federal Status** | **Federal Protection of Individual and *Residence* outside of Federal lands** | **Other Applicable Legislation** | **Suitable Habitat Present Within General Study Area** |
| | | | | | | | northern myotis & tri-colored bat have a moderate potential of occurring during their active season (April – September). Additionally, there were several potentially suitable high-quality SAR bat maternity roosting trees observed to be present during the 2023 site visit. |
| **Reptiles** | | | | | | | |
| Eastern Milksnake[2,5] | *Lampropeltis triangulum triangulum* | No Status | No | Special Concern | No | FWCA | Yes. Eastern Milksnakes are habitat generalists, but prefer open areas such as pastures, meadows, prairies, rock outcrops, rights-of-way, and agricultural land near forest habitat. Potentially suitable rocky outcroppings were observed to be present in the study area. |
| Blanding's Turtle (Great Lakes/St. Lawrence population)[1,2,5] | *Emydoidea blandingii* | Threatened | Yes | Threatened | Yes | FWCA | Yes. Kashwakamak Lake and the surrounding area provides suitable nesting and overwintering habitat. There are also records on iNaturalist in the surrounding area from as recent as earlier this spring/ summer (2023). MVCA (2018) also confirms the presence of the species within pocketed wetlands in the lake. |
| Midland Painted Turtle [2,5] | *Chrysemys picta marginata* | No Status | No | Special Concern | No | FWCA | Yes. Kashwakamak Lake and the surrounding area provides suitable nesting and overwintering habitat. There are also records on iNaturalist from as recent as 2021. |
| Snapping Turtle[2,5] | *Chelydra serpentina* | Special Concern | No | Special Concern | No | FWCA | Yes. Kashwakamak Lake and the surrounding area provides suitable nesting and overwintering habitat. During the 2023 site |

| Table 3: Potential SAR habitat within the Study Area | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Common Name** | **Scientific Name** | **Provincial Status** | **Provincial Habitat Protection** | **Federal Status** | **Federal Protection of Individual and *Residence* outside of Federal lands** | **Other Applicable Legislation** | **Suitable Habitat Present Within General Study Area** |
| | | | | | | | visit an individual was also observed near the north log bay, as well as a previous turtle nest in a sandy patch of soil at the lakes edge that is also likely a Snapping Turtle nest.<br>There are also records on iNaturalist from as recent as 2022. |
| Five-lined Skink (Great Lakes/ St. Lawrence Population)[2,5] | *Plestiodon fasciatus* | Special Concern | No | Special Concern | No | FWCA | Yes. Five-lined Skink may be observed in the study area where the shoreline of Kashwakamak Lake was observed to have large rocks and rocky outcroppings, where individuals are known to spend most of their time. There are also several records on iNaturalist from as recent as 2022. |
| **Amphibians** | | | | | | | |
| Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population)[1,2] | *Pseudacris triseriata* | No Status | No | Threatened | No | N/A | No. There are no wetlands or ephemeral pools Western Chorus Frog rely on for breeding present within the study area. |
| **Insects** | | | | | | | |
| Monarch | *Danaus plexippus* | Special Concern | No | Special Concern | No | FWCA | Yes. Suitable habitat may be present within the study area. Though no Monarch individuals were observed during the site visit, common milkweed was observed which the Monarch relies during its larval stage. |
| **Vascular Plants** | | | | | | | |
| Butternut | *Juglans cinerea* | Endangered | Yes | Endangered | Yes | N/A | No. No Butternut individuals were observed to be present during the 2023 site visit. |

| Table 3: Potential SAR habitat within the Study Area | | | | | | | |
|---|---|---|---|---|---|---|---|
| Common Name | Scientific Name | Provincial Status | Provincial Habitat Protection | Federal Status | Federal Protection of Individual and *Residence* outside of Federal lands | Other Applicable Legislation | Suitable Habitat Present Within General Study Area |
| | | | | | | | Butternuts are shade intolerant and generally prefer open areas with well-drained soil, therefor, it is not believed that Butternut could survive under the FOD canopy. Butternuts are often associated with mid-successional forests, forest edges, and hedgerows (COSEWIC 2017). |

[1] NHIC

[2] Ontario Nature

[3] Ontario Breeding Bird Atlast (2001-2005)

[4] eBird

[5] iNaturalist

[6] Dobbyn 1994

### *SAR Bats*

#### *Little Brown Myotis, Northern Myotis & Tri-colored Bat*

There were several high-quality potentially suitable bat maternity roosting habitat trees (i.e., cavities, large DBH, peeling bark, etc.) observed within or adjacent to the study area (**Photo 7**) suitable for these three species. This was observed to be present within the FOM community within the study area.

During the removal and replacement of the Kashwakamak Lake dam structure, there is potential for SAR bats and their habitat to be impacted should the removal of trees be required to accommodate better accessibility for construction vehicles and laydowns for vehicle parking and material storage.

Little Brown Myotis, Northern Myotis & Tri-colored Bat are SAR bat species share similar habitat preferences during their active season and are described together. They have been observed using trees as small as 10 cm DBH, but typically exhibiting early stages of decay, with cavities (usually >10 m high), loose bark, and/or leaves within forested habitats for maternity roosting purposes. Additionally, these species are known to use anthropogenic structures (e.g., houses, barns) for roosting as well (COSEWIC 2013, ECCC 2018).

Given the presence of forests (i.e., FOM), high-quality maternity roosting trees in the study area, little brown myotis, northern myotis, and tri-colored bat, have a moderate potential of occurring during their active season (April 1 – September 30).

### *SAR Herptiles*

The study area is located on Kashwakamak Lake where there are many observations from Ontario Nature, NHIC and iNaturalist for several SAR herptiles, the likelihood of each SAR herptiles presence and mitigation are outlined below.

#### *Blanding's Turtle*

Blanding's Turtles are largely aquatic and inhabit shallow lakes, ponds, slow moving creeks, and wetlands with soft organic substrates with abundant submergent vegetation. Upland habitats are used as migratory corridors between summer, winter, breeding, and nesting habitats and adults regularly travel several km between habitats. Blanding's Turtles nest in open habitat with low vegetation cover and loose, sandy and/or gravelly soil above the waterline in natural and developed habitats (COSEWIC 2016a).

No Blanding's turtle were observed during the 2023 site visit, however, there were several verified observations on iNaturalist from as recent as June of 2023 and Kashwakamak Lake provides suitable nesting and overwintering habitat.  Immediately adjacent habitat is not as conducive for their summer habitats as there was not an abundance of aquatic vegetation.  They may use the Mississippi River as a migration corridor.

#### *Midland Painted Turtle*

Midland Painted Turtles inhabit slow moving, relatively shallow and well-vegetated wetlands including swamps, marshes, ponds, fens, bogs, lakes, rivers, and creeks with abundant basking sites and organic substrate. Nesting habitat is usually within 1,200 m of aquatic habitat and in an open, south-facing area with sandy-loamy and/or gravely substrate (COSEWIC 2018a).

No Midland painted turtle were observed during 2023 site visit, however, there were several verified observations on iNaturalist from as recent as 2021 and Kashwakamak Lake provides suitable nesting and overwintering habitat.

### *Snapping Turtle*

Snapping Turtles inhabit a wide range of wetland habitats including ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, soft bottoms, and dense aquatic vegetation. Adults will use streams to move between waterbodies especially during the mating season. Nesting sites are in open habitat with sandy or gravelly substrate and are often found in road shoulders (COSEWIC 2008).

During the 2023 site visit, a Snapping Turtle was observed to be present within the northern log catchment bay near the dam's structure (**Photo 8**). Additionally, a previous turtle nest was observed to be present with 5m of the dam's structure in sandy loose soil at the lake's edge (**Photo 9-10**). Turtle eggs can be challenging to identify once they have hatched, but it is believed to be a Snapping Turtle nest.

Overall, there is potentially suitable nesting and overwintering habitat for Blanding's Turtle, Midland Painted Turtle and Snapping Turtle to occur within the study area (OAO/ Kashwakamak Lake). Any work done on the construction and replacement of the existing Kashwakamak Dam should occur outside of the active turtle nesting season for Central & Northern Ontario of April 15 – October 15 or protection measures be put in place to reduce the risk of harm.

### *Milksnake*

Eastern Milksnakes are habitat generalists, but prefer open areas such as pastures, meadows, prairies, rock outcrops, rights-of-way, and agricultural land near forest habitat. They commonly feed around old buildings and barns, where rodent populations are high. Milksnakes hibernate in mammal burrows, old building foundations, old wells, hollow logs, and rock crevices (COSEWIC 2014)

No Milksnake were observed during the 2023 site visit. However, there are reports from iNaturalist of Milksnakes within ~1km of the site as recent as 2022. No suitable habitat for hibernation was observed within the study area.

### *Five-lined Skink*

The Five-lined Skink (Great Lakes/ St. Lawrence Population) is the most widely distributed lizard species in North America, where the species prefers rocky outcroppings, sand dunes, and open deciduous – mixed forest types (COSEWIC 2007). Individuals are known to spend most of their time under rocks, woody debris and other forms of cover, individuals of the Great Lakes/ St. Lawrence Population are known to occur in the Canadian Shield where they hide under rocks from the open bedrock.

No Five-lined skinks were observed during the 2023 site visit, however, there are many observations on iNaturalist from as recent as 2022.

Given the location of the study area (i.e., within Frotenac Arch) and the presence of rock features on the edge of Kashwakamak Lake, the presence of Milksnake and Five-lined skink cannot be eliminated as suitable habitat is present. However, dam replacement activities are not anticipated to impact Milksnake or Five-lined Skink.

### *SAR Birds*

#### *Eastern Wood-pewee*

Eastern Wood-pewee are found in the mid-canopy layer of deciduous and mixedwood forests with open understories and is commonly associated with edges and clearings. Forest size does not seem to be a critical factor in habitat selection; however, breeding numbers decrease with increasing development in surrounding habitat. Eastern Wood-pewee hunts aerial insects from a perch in the subcanopy (COSEWIC 2012a).

No Eastern Wood-pewee individuals were observed during the 2023 site visit, however they may be present with the FOM community.

#### *Eastern Whip-poor-will*

Eastern Whip-poor-will are nocturnal aerial insectivores in the nightjar family that nests in most early successional forest types, where the species prefers semi-open/ patchy forests such as rock barrens or regenerating forests (COSEWIC 2009). Common tree associations for Eastern Whip-poor-will nesting habitat include pine, oak, aspen and birch, all of which were observed to be present within the FOM community.

No Eastern Whip-poor-will individuals were observed during the 2023 site visit, however species-specific surveys were not completed. The access road and lake provide openings in the canopy that Eastern Whip-poor-will are known to utilize.

#### *Red-headed Woodpecker*

The Red-headed Woodpecker is considered a habitat generalist, but prefers open woodlands and forest edges, often found in disturbed areas such as cemeteries, parks, golf courses, sparsely treed pastures, and agricultural areas. Preferred nesting habitat typically requires dead limbs or snags with an open canopy (COSEWIC 2018b).

No Red-headed Woodpecker were observed to be present during the 2023 site visit, however, may use the FOM community for breeding habitat.

#### *Wood Thrush*

Wood Thrush breeds in deciduous or mixed upland forest habitat with a moderate subcanopy and open forest floor. Wood Thrush are sensitive to habitat fragmentation but will nest in forest patches as small as 3 ha. Nests are constructed in young trees or shrubs and adults primarily forage for invertebrates on the ground (COSEWIC 2012b).

No Wood Thrush were observed to be present during the 2023 site visit, however, may use the FOM community for breeding habitat.

Overall, no SAR birds were observed during the 2023 site visit. The forested area within the study area could provide potentially suitable breeding habitat (i.e., nesting) for both Red-headed Woodpecker and Wood Thrush. Additionally, any work that has the potential to harm or kill SAR birds should occur outside of their active season window, and therefore it is recommended that tree removals not be completed from April 15 – August 31. If tree removal is required during this time period the area should be screened and cleared by an Biologist.

### *SAR Insects*

#### *Monarch*

Monarchs are generally associated with open habitats such as meadows, fallow fields, roadside ditches, and wetlands where they forage on flowering plants. Foraging plants often include goldenrods (*Solidago* spp.), asters (*Aster* spp.), other plants in the Aster (*Asteraceae*) family, and milkweeds (*Asclepias* spp.). Flowering crops such as alfalfa (*Medicago* spp.) may also provide an important source of nectar. Breeding habitat is limited to areas with abundant milkweed plants, which are the sole food source for caterpillars (COSEWIC 2016b).

No Monarch individuals were observed during the 2023 site visit, however, their host plant common milkweed (i.e., suitable reproductive habitat) and foraging habitat (i.e., wildflower patches) were present.

## Conclusion

Overall, the study area has the potential to support several SAR, contains several candidate significant wildlife habitat features, as well as potentially sensitive fish spawning habitat that may be affected during the dam replacement activities. During the site visit potentially suitable SAR bat maternity roosting trees, SAR bird habitat within the FOM, SAR turtle and lizard nesting and overwintering habitat present within and around the shores of Kashwakamak Lake, rock structures (i.e., rocky outcroppings) that may be utilized by Milksnake and Five-lined Skink, the host plant (milkweed) for Monarch, and potentially suitable fish spawning habitat were observed.

It is anticipated that there will be impacts to the surrounding woodlands, however, the removal of a small portion of trees to complete the dam replacement will likely not be significant, nor will it affect ecological function.

Additionally, if the replacement of the dam occurs in the existing location, it will only temporarily affect fish and fish habitat, and is expected that any damage to existing fish habitat will be restored post- construction. If the dam replacement structure needs to be placed downstream, then sensitive fish spawning habitat (see **Figure 2**) will likely be impacted due to alterations in the habitat. This design alternative would impact approximately 100 m$^2$ of sensitive fish habitat and would need to be reviewed by DFO.

A better understanding of the Kashwakamak Lake Dam rehabilitation design and the trees, if any, that will be proposed to be removed to facilitate construction of the dam is required to accurately identify impacts on species at risk and their habitat. Once the dam's design has been selected and the limits of construction are confirmed, more appropriate impact assessment and mitigation measures, and any relevant seasonally surveys for SAR birds and SAR bats (i.e., spring/summer) will be recommended to determine if appropriate.

The rehabilitation/replacement of Kashwakamak Lake Dam will require consultation with regulatory agencies including, but not limited to the following:

- A *Request for Review* will be submitted to the DFO following the guidance documents on preparing the form;
- Any in-water work within the study area must be conducted during appropriate timing windows for fish approved by the Kingston District of the MNRF. The timing windows will be implemented to avoid harm to fish and fish habitat

- It is not anticipated at this time that consultation with MECP will be necessary. Further determination will be made upon selection of the Technically Preferred Alternative.

Please contact the undersigned if you have any questions.

Respectfully,
**McIntosh Perry Consulting Engineers Ltd.**

______________________________
Lindsay Bennett, M.Sc.
Biologist
Cell: 819-209-5081
l.bennett@mcintoshperry.com

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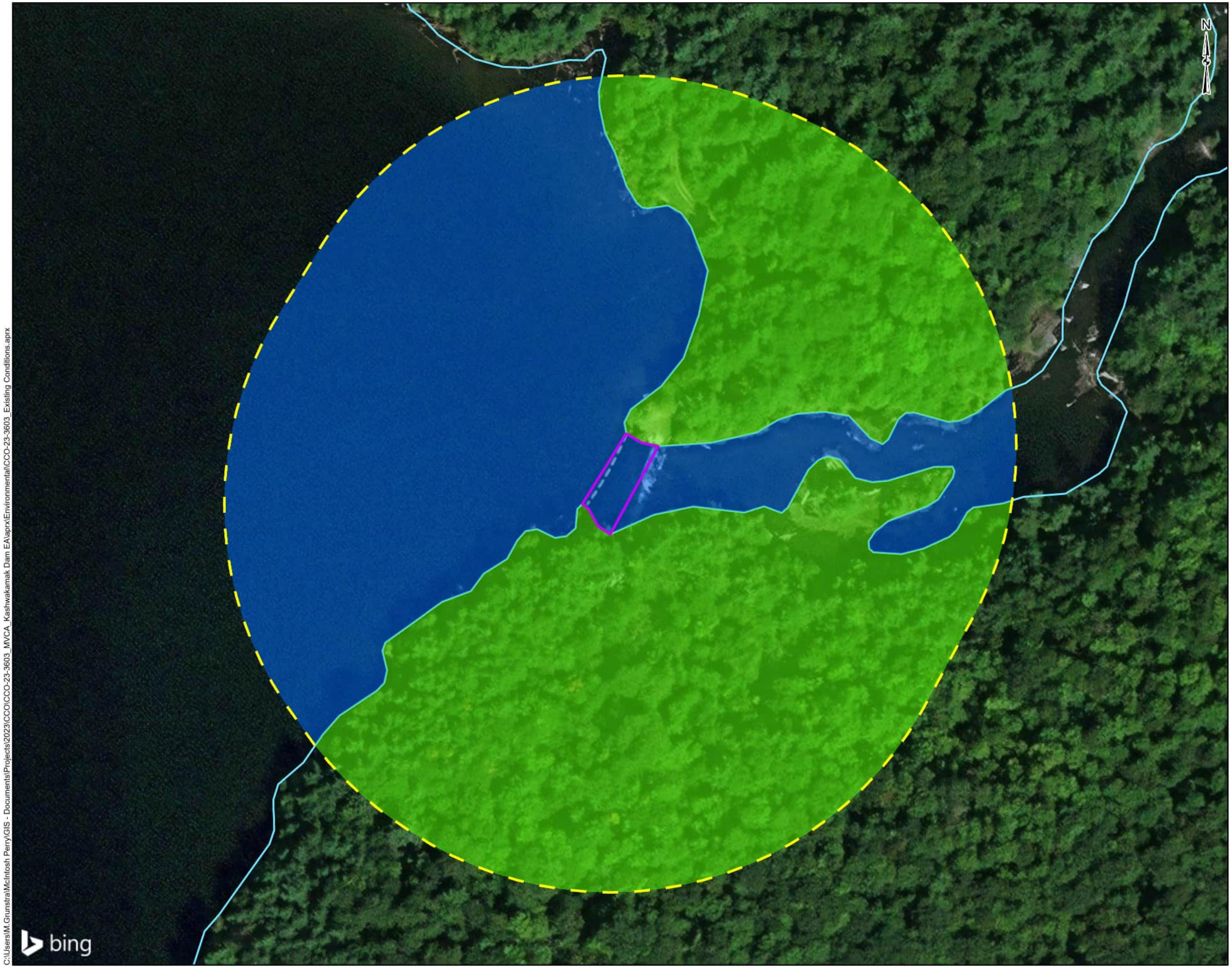
# APPENDIX A: STUDY AREA FIGURES



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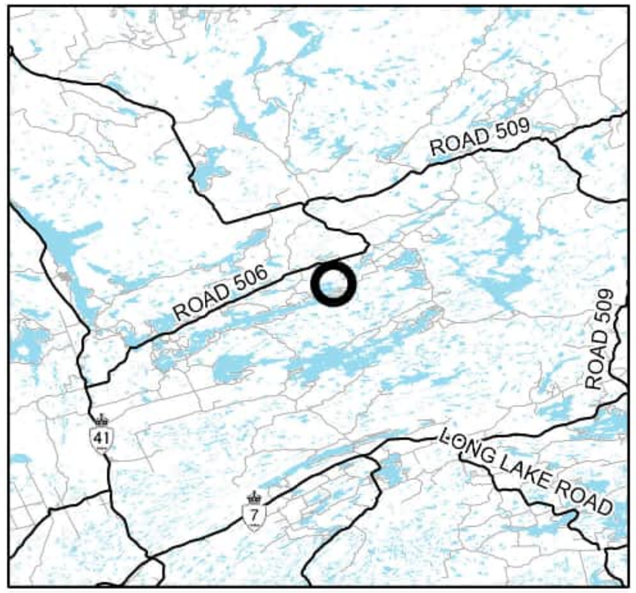
LEGEND

| | |
|---|---|
| ▭ | Approximate Dam Location |
| ⌜⌝ | Study Area |
| 🟦 | Open Aquatic (OAO) |
| 🟩 | Mixed Forest (FOM) |
| ◯ | Waterbody |



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GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.

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Metres

CLIENT:
MISSISSIPPI VALLEY
CONSERVATION AUTHORITY

PROJECT:
EXISTING CONDITIONS REPORT

TITLE:
ECOLOGICAL LAND CLASSIFICATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

| PROJECT NO: CCO-23-3603 | | FIGURE: |
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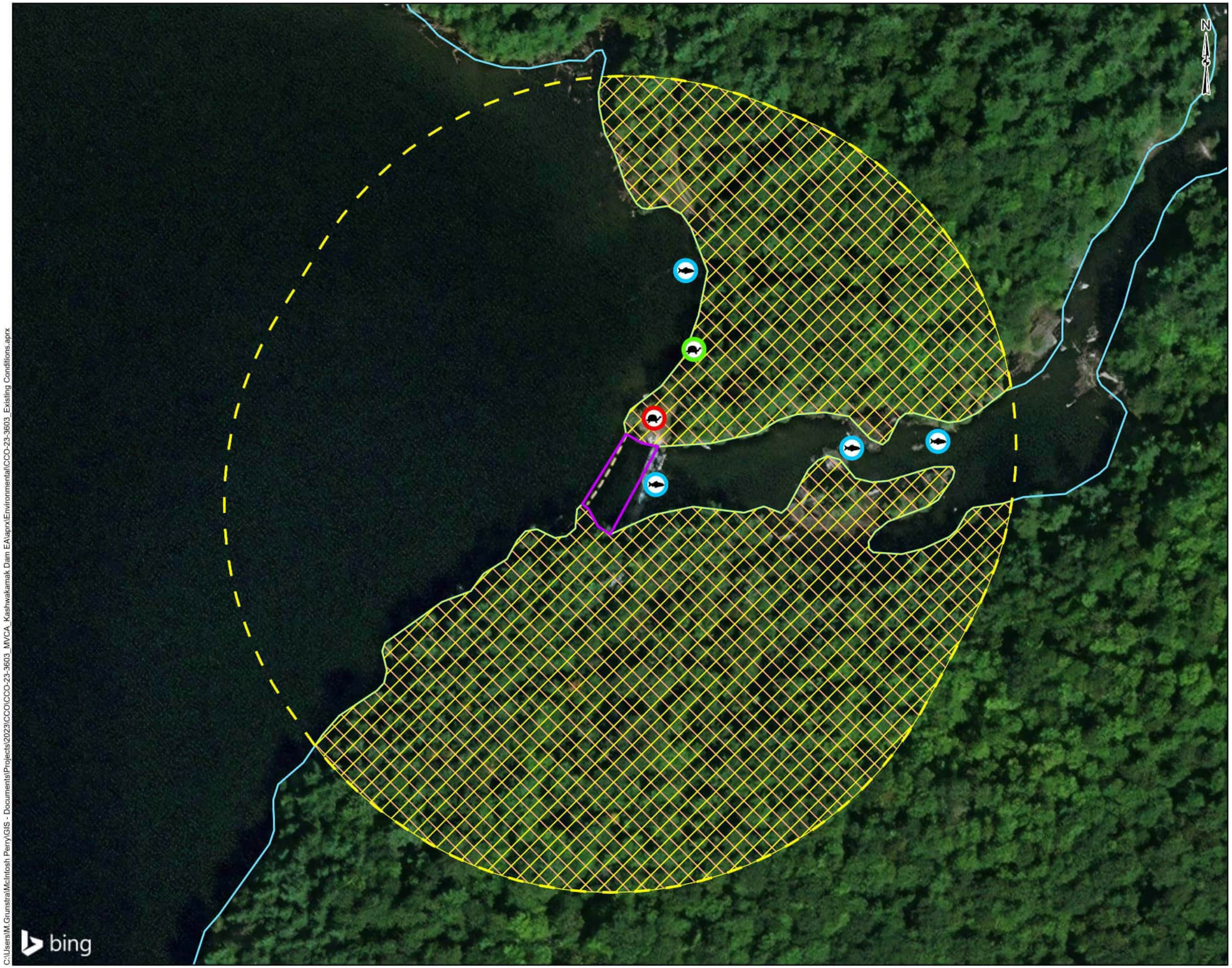
| Checked By | LB | |



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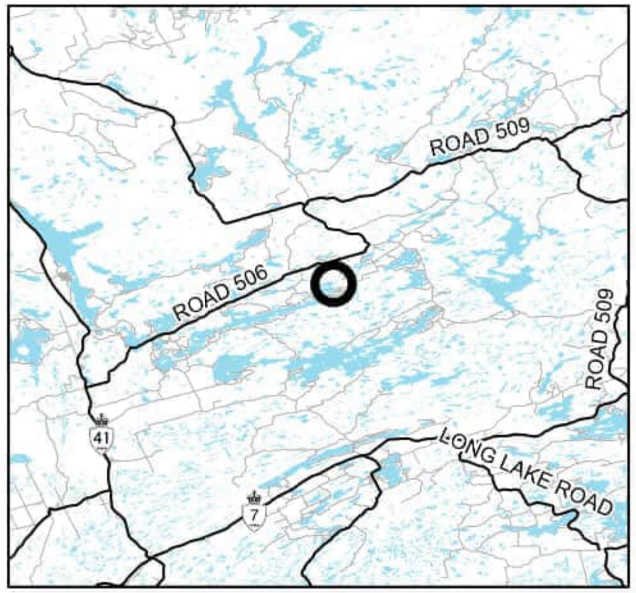
LEGEND

| | |
|---|---|
| ● | Potentially Sensitive Fish Spawning Habitat |
| ● | Snapping Turtle Observation |
| ● | Turtle Nest Location |
| ▭ | Approximate Dam Location |
| ⌜⌟ | Study Area |
| ▨ | Potentially Suitable SAR Bat Maternity Roosting Habitat |
| ▨ | NHIC woodland |
| ~ | Waterbody |



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CLIENT:
MISSISSIPPI VALLEY CONSERVATION AUTHORITY

PROJECT:
EXISTING CONDITIONS REPORT

TITLE:
NATURAL HERITAGE FEATURES

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PROJECT NO: CCO-23-3603

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| Checked By | LB |

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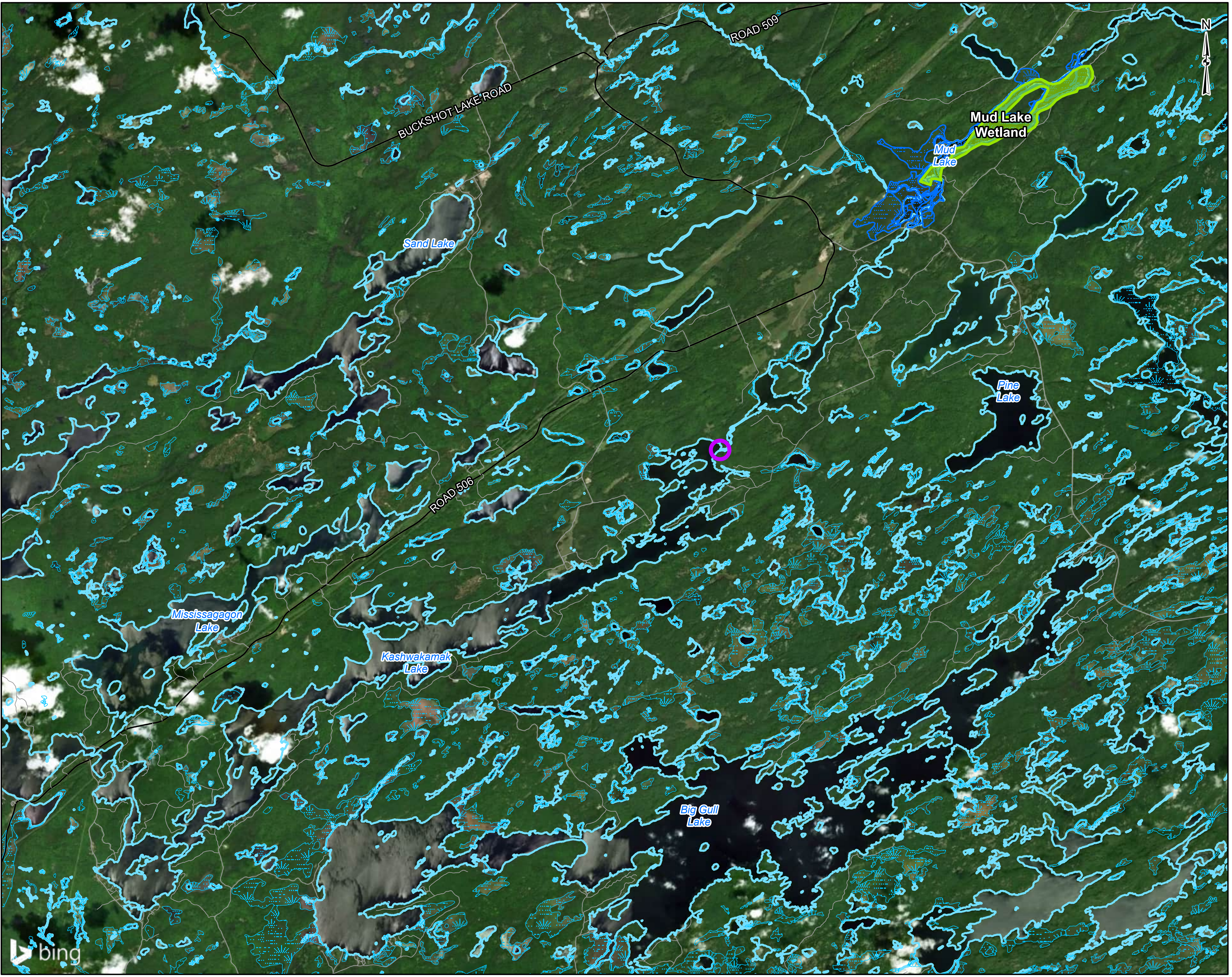
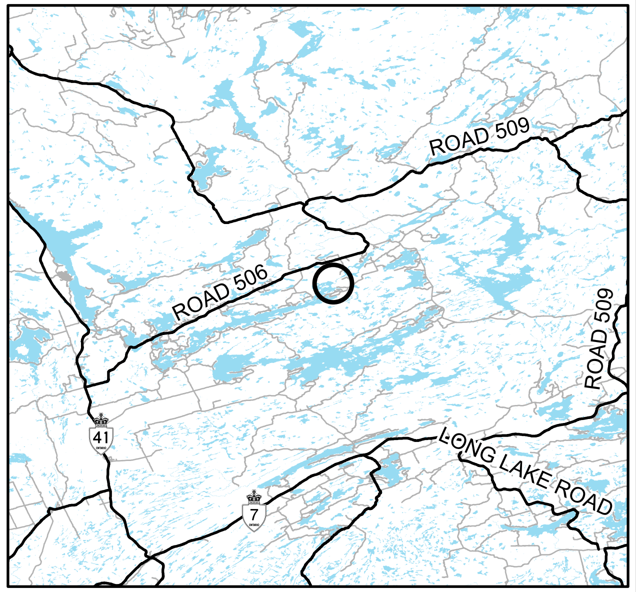


LEGEND

- ○ Kashwakamak Lake Dam
- 🟩 Manòmin
- ▨ Unevaluated Wetland
- ▨ Provincially Significant Wetland
- ○ Waterbody
- — Major Road
- — Local Road



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| PROJECT: | EXISTING CONDITIONS REPORT |
| TITLE: | LOCATION OF MANÒMIN |

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# APPENDIX B: STUDY AREA PHOTOS

Photo 1: Existing conditions of the Kashwakamak Lake Dam structure to be replaced, facing north.

Photo 2: Existing conditions of Kashwakamak Lake, downstream of the dam structure. Facing east

*Photo 3: Existing conditions of Open Aquatic ELC community observed at Kashwakamak Lake, facing west.*

*Photo 4: Existing conditions of log catchment bay, facing south.*

*Photo 5: Existing conditions of Mixed Forest (FOM) community observed and canoe portage pathway downstream of Kashwakamak Lake dam. Facing east.*

*Photo 6: Existing conditions of Canadian Shield/ rocky outcroppings located on the lake edge that be utilized by Milksnake or Five-lined Skink. Facing east.*

*Photo 7: Existing conditions illustrating a potentially suitable high-quality bat maternity roosting tree, with several cavities. Facing up*

*Photo 8: Existing conditions of log catchment bay, where a Snapping turtle was observed to be present. Facing south.*

*Photo 9: Existing conditions illustrating an old turtle nest within 2m of the Kashwakamak Lake dam structure. Facing south.*

*Photo 10: Existing conditions of observed turtle nest, likely that of a Snapping turtle. Facing down.*

# Appendix I – Stage 1 Archaeological Assessment Report

# STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENTS

## FOR THE KASHWAKAMAK LAKE DAM ENVIRONMENTAL ASSESSMENT

## PART OF LOT 20, CONCESSION 10
## GEOGRAPHIC TOWNSHIP OF CLARENDON
## NOW TOWNSHIP OF NORTH FRONTENAC
## COUNTY OF FRONTENAC, ONTARIO

Past Recovery
Archaeological Services Inc.

# STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENTS FOR THE KASHWAKAMAK LAKE DAM, ENVIRONMENTAL ASSESSMENT, PART OF LOT 20, CONCESSION 10, GEOGRAPHIC TOWNSHIP OF CLARENDON, NOW TOWNSHIP OF SOUTH FRONTENAC, COUNTY OF FRONTENAC, ONTARIO

| | |
|---|---|
| Prepared for: | Lisa Marshall, P. Eng.<br>Manager, Environmental Engineering<br>McIntosh Perry Consulting Engineers Ltd.<br>115 Walgreen Road, R.R.3<br>Carp, ON  K0A 1L0<br>Phone:  (613) 714-0815<br>Email:  l.marshall@mcintoshperry.com |
| Re: | MVCA Class EA |
| Prepared by: | Past Recovery Archaeological Services Inc.<br>99c Dufferin Street, Unit 1<br>Perth, ON  K7H 3A5<br>Phone:  (613) 267-7028<br>Email:  pras@pastrecovery.com |
| Project No.: | PR23-021 |
| Licensee: | Caitlyn Howard, M.A., P1074<br>Staff Archaeologist<br>Past Recovery Archaeological Services Inc. |
| P.I.F. No.: | 1074-0089-2023 |
| Date: | May 11th, 2024 |

Original Report

## ACKNOWLEDGMENTS

Ms. Lisa Marshall, P.Eng, Manager, Environmental Engineering, McIntosh Perry Consulting Engineers Ltd., provided project mapping, background information and logistical assistance. Ramy Saadeldin, Water Resources Engineer, MVCA, and Jennifer North, Water Resources Technologist, MVCA, were present during the site visit and provided information regarding the possible location for the lay down area.

## PROJECT PERSONNEL

| | |
|---|---|
| Project Manager | Stephanie Cleland, M.A., (P1201) |
| Licence Holder | Caitlyn Howard, M.A., (P1074) |
| Field Director | Jessalyn Miller, M.A. (P1111) |
| Field Crew | Gabryell Kurtzrock Belyea, M.A. (R1195)<br>Liam Bowman, B.A. (R1272)<br>Sara Lavigne, M.A. (R1369)<br>Becca Scott, B.A.<br>Riley Jones, B.A.<br>Nick van Beek, M.A.<br>Jeff Earl, M. Soc.Sc. |
| Indigenous Monitor | Tracy Yeo (Alderville)<br>Derrick Amikons (AOPFN) |
| Background Research | Stephanie Cleland |
| Report Writing | Stephanie Cleland |
| Report GIS/Drafting | Sara Lavigne, M.A., (R1369)<br>L. McGeer, M.A., (R1268) |
| Report Review | Jeff Earl |

## EXECUTIVE SUMMARY

Past Recovery Archaeological Services Inc. was retained by McIntosh Perry Consulting Engineers Ltd., on behalf of the Mississippi Valley Conservation Authority, to undertake a Stage 1 and 2 archaeological assessments in support of a larger *Class Environmental Assessment* for the Kashwakamak Lake Dam. The subject property was located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac (see Maps 1 and 2). The study area covered under the Environmental Assessment for the Kashwakamak Lake Dam was approximately 1.49 hectares (3.69 acres) in size.

The purpose of the Stage 1 investigation was to evaluate the archaeological potential of the study area and present recommendations for the mitigation of any significant known or potential archaeological resources. To this end, historical, environmental and archaeological research was conducted in order to make a determination of archaeological potential. A property inspection was completed on July 25th, 2023, to determine current conditions and to record factors that could affect the assessment of archaeological potential within the study area. The results of this study indicated that the subject property retains potential for pre-Contact and post-Contact archaeological resources (see Map 6).

The purpose of the Stage 2 assessment was to determine whether or not the property contained archaeological resources requiring further assessment, and if so to recommend an appropriate Stage 3 assessment strategy. The assessment was completed on May 2nd, 2024, conducted by means of shovel test pits across all parts of the study area determined to retain archaeological potential. The property survey resulted in the identification of one previously unrecorded potential archaeological site, identified as Findspot 1 (see Map 8).

The artifacts recovered from Findspot 1 suggests that the site was the location of a short-term campsite where the inhabitants undertook late-stage lithic reduction practices, using both locally available and imported lithic raw materials. As the lithic assemblage was comprised of non-diagnostic flakes, no further inferences may be drawn.

As the artifact assemblage exceeded three pre-19th century artifacts found within a 10 m radius, the site meets MCM requirements for registration as an archaeological site in the Ontario Archaeological Sites Database and was thus assigned Borden Number BfGf-3 (MCM 2011:160). The result of a Stage 2 property assessment met Standard 2.2.1c.ii(2) indicating a requirement for a Stage 3 assessment by recovering more than 5 non-diagnostic artifacts from within a 10m x 10m test pit survey area, including from both the positive test pit, as well as the test unit (MCM 2011:41).

The results of the Stage 2 archaeological assessment documented in this report form the basis for the following recommendations:

1) A Stage 3 site-specific archaeological assessment should be undertaken for Findspot #1 (BfGf-3) by means of the controlled hand excavation of one-metre-square units over the area of the site on a 5 m grid, with an additional 20 percent of the grid total focussing on areas of interest within the site extent. The assessment should be undertaken by a licensed consultant archaeologist in compliance with Standards and Guidelines for Consultant Archaeologists (MCM 2011).

2) In the event that future planning results in the identification of additional areas of impact beyond the limits of the present study area, further Stage 2 archaeological assessment may be required. It should be noted that impacts include all aspects of the proposed development causing soil disturbances or other alterations, including additional temporary property needs (i.e. access roads, staging/lay down areas, associated works etc.). Any future Stage 2 archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011).

The reader is also referred to Section 7.0 below to ensure compliance with relevant provincial legislation and regulations as may relate to this project. In the event that any artifacts of Indigenous interest or human remains are encountered during the development of the subject property, in addition to following the *Advice on Compliance with Legislation* (see Section 7.0), the Indigenous communities listed below should be contacted:

- Alderville First Nation
- Algonquins of Ontario
- Algonquins of Pikwakanagan First Nation
- Chippewas of Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat Nation
- Mississaugas of Scugog Island

Contact information for the above communities can be found in the Supplementary Document entitled "*Indigenous Community Contacts*."

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# 1.0 INTRODUCTION

Past Recovery Archaeological Services Inc. was retained by McIntosh Perry Consulting Engineers Ltd., on behalf of the Mississippi Valley Conservation Authority, to undertake Stage 1 and 2 archaeological assessments in support of a larger *Class Environmental Assessment* for the Kashwakamak Lake Dam. The subject property was located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac (see Maps 1 and 2).

The objectives of the Stage 1 archaeological assessment were as follows:

- To provide information concerning the geography, history, previous archaeological fieldwork and current land condition of the study area;
- To evaluate the potential for the subject property to contain significant archaeological resources; and,
- To recommend appropriate strategies for Stage 2 archaeological assessment in the event further assessment is warranted.

The objectives of the Stage 2 archaeological assessment were as follows:

- To document all archaeological resources on the property;
- To determine whether the property contains archaeological resources requiring further assessment; and,
- In the event that an archaeological site requiring further assessment is discovered, to recommend an appropriate Stage 3 assessment strategy.

# 2.0 PROJECT CONTEXT

This section of the report provides the context for the archaeological work undertaken, including a description of the study area, the related legislation or directives triggering the assessment, any additional development-related information, and the confirmation of permission to access the study area as required for the purposes of the assessment, and an acknowledgement of Indigenous territorial rights and interests.

## 2.1 Development Context

The Mississippi Valley Conservation Authority (MVCA) is proposing to replace the Kashwakamak Lake Dam, which is approaching the end of its expected lifespan. Given the proximity of the shoreline of Kashwakamak Lake, an archaeological assessment has been listed as one of several studies necessary to obtain approval for a *Class Environmental Assessment (Class EA)*. McIntosh Perry Consulting Engineers Ltd. was retained by the MVCA to complete the *Class EA*, with Past Recovery retained to undertake the archaeological work.

## 2.2 Property Description

The subject property was located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, and consisted of approximately 1.49 hectares (3.69 acres) of forested land sitting on either side of the extant Kashwakamak Lake Dam (see Maps 1 and 2). The property was thus comprised of two irregularly shaped parcels, with the smaller on the south side of the dam. The Kashwakamak Lake Dam consisted of two structures: the main control dam and a secondary saddle dam, separated by a section of land on the north side of the main structure. The focal point for this report, the main dam, was comprised of two bulkhead walls, three concrete piers forming the two sluiceways and a broad crested concrete weir. There was also an access road leading to the north side of the structure. The property was bordered to the north and to the south by additional forested lands and to the east and west by the waters of Kashwakamak Lake.

## 2.3 Access Permission

Permission to access the subject property and complete all aspects of the archaeological assessment, including photography, was granted by the MVCA.

## 2.4 Territorial Acknowledgement

The study area falls within the traditional territory of the Anishinaabeg, including the Anishinabe Algonquin, Michi Saagiig and the Chippewa nations. It is situated within the Treaty and traditional territories of the Williams Treaties First Nations - the Michi Saagiig and the Chippewa nations[1] and forms part of the Algonquins of Ontario (AOO) Settlement Area set out by the current Agreement-in-Principle between the AOO and the federal and provincial governments, signed in 2016.[2] It also lies within an area of primary interest to the Huron-Wendat Nation.

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[1] The Williams Treaties First Nations include the Chippewas of Beausoleil, Georgina Island, and Rama, as well as the Mississaugas of Alderville, Curve Lake, Hiawatha, and Scugog Island. These seven First Nations are signatories to various 18th and 19th century treaties that covered lands in different parts of south-central Ontario. Owing to poorly defined boundaries, disagreements over the interpretation of the wording of these agreements, and concerns over Crown title to large tracts of unceded lands, the governments of Ontario and Canada sought to broker two new treaties in 1923 known as the Williams Treaties. Continued disagreements over the terms of the treaties and off-reserve harvesting rights led to a number of legal disputes. In 2018, the Williams Treaties First Nations and the Governments of Ontario and Canada came to a final agreement involving a formal apology, recognition of treaty harvesting rights, and financial compensation.

[2] The Algonquins of Ontario are composed of ten communities: The Algonquins of Pikwakanagan First Nation, Antoine, Kijicho Manito Madaouskarini (Bancroft), Bonnechere, Greater Golden Lake, Mattawa/North Bay, Ottawa, Shabot Obaadjiwan (Sharbot Lake), Snimikobi (Ardoch), Whitney and Area. Federally unrecognized Algonquin communities, including Ardoch First Nation, also live in the territory but do not form part of the AOO (see Lawrence 2012). The Agreement-In-Principle is between the Algonquins of Ontario and the Governments of Ontario and Canada. Algonquins have sought recognition and protection of their traditional territory dating back to 1772 and in 1983 the Algonquins of Pikwàkanagàn First Nation (previously Algonquins of Golden Lake) formally submitted a petition to the Government of Canada, and in 1985 to the Government of Ontario. The claim was accepted for negotiations in 1991 and 1992, an Agreement-In-Principle was signed in 2016, and negotiations are on-going. For further information see www.tanakiwin.com.

# 3.0 HISTORICAL CONTEXT

This section of the report is comprised of an overview of human settlement in the region using information derived from background historical research. The purpose of this research is to describe the known settlement history of the local area, with the intention of providing a context for the evaluation of known and potential archaeological sites, as well as a review of property-specific information presenting a record of settlement and land use history.

## 3.1 Regional Pre-Contact Cultural Overview

While our understanding of the pre-Contact sequence of human activity in the region is limited, it is possible to provide a general outline of pre-Contact relationships with the land based on archaeological, historical, and environmental research conducted across what is now eastern Ontario.[3] Archaeologists divide the long sequence of Indigenous history into both temporal periods and regional groups based primarily on the presence and/or style of various artifact types. While this provides a means of discussing the past, it is an archaeological construct and interpretation based only on a few surviving artifact types; it does not reflect the generally gradual nature of change over time, nor the complexities of interactions between different Indigenous groups. It also does not reflect Indigenous world views and histories as detailed in the oral traditions of Indigenous communities who have long-standing relationships with the land. The following summary uses the generally accepted archaeological chronology for the pre-Contact period while recognizing its limitations.

Across the region, glaciers began to retreat around 15,000 years ago (Munson 2013:21). Archaeological evidence indicates that humans have inhabited what is now called Ontario for at least 13,500 years, beginning with the arrival of small groups of hunter-gatherers referred to by archaeologists as Paleo-Indigenous (Ellis 2013:35; Ellis and Deller 1990:39). These groups gradually moved northward as the glaciers and glacial lakes retreated. While very little is known about their lifestyle, it is likely that Palaeo-Indigenous groups travelled widely relying on the seasonal migration of caribou as well as small animals and wild plants for subsistence in a sub-arctic environment. They produced a variety of distinctive stone tools including fluted projectile points, scrapers, burins and gravers. Their sites are rare, and most are quite small (Ellis 2013:35-36). Palaeo-Indigenous peoples tended to camp along shorelines, and because of the changing environment, many of these areas are now inland. Indigenous settlement of much of eastern Ontario was late in comparison to other parts of Ontario as a result of the high-water levels associated with glacial Lake Algonquin, the early stages of glacial Lake Iroquois and the St. Lawrence Marine Embayment of the post-glacial Champlain Sea. In

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[3] Current common place names are used throughout this report while recognizing that the many Indigenous peoples who have lived in the region for thousands of years had, and often maintain, their own names for these places and natural features.

eastern Ontario, the old shoreline ridges of Lake Algonquin, Lake Iroquois, the Champlain Sea and of the emergent St. Lawrence and Ottawa river channels and their tributaries would be the most likely areas to find evidence of the Palaeo-Indigenous presence in the landscape (see AOO 2017; Ellis 2013; Ellis and Deller 1990; Watson 1999).

During the succeeding Archaic period (c. 10,000 to c. 3,000 B.P.), the environment of the region approached modern conditions and more land became habitable as water levels in the glacial lakes dropped. Populations continued to follow a mobile hunter-gatherer subsistence strategy, although there appears to have been a greater reliance on fishing and gathered food (e.g. plants and nuts) and more diversity between regional groups. The tool kit also became increasingly diversified, reflecting an adaptation to environmental conditions more similar to those of today. This included the presence of adzes, gouges and other ground stone tools believed to have been used for heavy woodworking activities such as the construction of dug-out canoes, grinding stones for processing nuts and seeds, specialized fishing gear including net sinkers, and a general reduction in the size of projectile points. The middle and late portions of the Archaic period saw the development of trading networks spanning the Great Lakes, and by 6,000 years ago copper was being mined in the Upper Great Lakes and traded into southern Ontario. There was increasing evidence of ceremonialism and elaborate burial practices and a wide variety of non-utilitarian items such as gorgets, pipes and ‘birdstones’ were being manufactured. By the end of this period populations had increased substantially over the preceding Palaeo-Indigenous period (Ellis 2013; Ellis et al. 1990).

More extensive Indigenous settlement of the region began during this period, sometime between 7,500 and 6,500 B.P. Artifacts from Archaic sites suggest a close relationship between these communities and what archaeologists refer to as the Laurentian Archaic stage peoples who inhabited the Canadian biotic province transition zone between the deciduous forests to the south and the boreal forests to the north. This region included northern New York State, the upper St. Lawrence Valley across southern Ontario and Quebec, and the state of Vermont (Ritchie 1969; Clermont et al. 2003). The ‘tradition’ associated with this period is characterized by a more or less systematic sharing of several technological features, including large, broad bladed, chipped stone and ground slate projectile points, and heavy ground stone tools. This stage is also known for the extensive use of cold-hammered copper tools including “*bevelled spear points, bracelets, pendants, axes, fishhooks and knives*” (Kennedy 1970:59). The sharing of this set of features is generally perceived as a marker of historical relatedness and inclusion in the same interaction network (Clermont et al. 2003). Cemeteries also appear for the first time during the Late Archaic. Evidence of Archaic inhabitation has been found across eastern Ontario (see Clermont 1999; Clermont et al. 2003; Ellis 2013; Kennedy 1962, 1970; Laliberté 2000; Watson 1990).

Archaeologists use the appearance of ceramics in the archaeological record to mark the beginning of the Woodland period (c. 3,000 B.P. to c. 350 B.P.). Ceramic styles and decorations suggest the continued differentiation between regional populations and are commonly used to distinguish between three periods: Early Woodland (2,900 to 2,300 B.P.), Middle Woodland (2,300 to 1,200 B.P.), and Late Woodland (1,200 to 400 B.P.). The introduction of ceramics to southern Ontario does not appear to have been associated with significant changes to lifeways, as hunting and gathering remained the primary subsistence strategy throughout the Early Woodland and well into the Middle Woodland. It does, however, appear that regional populations continued to grow in size, and communities continued to participate in extensive trade networks that, at their zenith c. 1,750 B.P., spanned much of the continent and included the movement of conch shell, fossilized shark teeth, mica, copper and silver; a large number of other items that rarely survive in the archaeological record would also have been exchanged, as well as knowledge.[4] Social structure appears to have become increasingly complex, with some status differentiation evident in burials. In southeastern Ontario, the first peoples to adopt ceramics are identified by archaeologists as belonging to the Meadowood Complex, characterized by distinctive biface preforms, side-notched points, and Vinette I ceramics which are typically crude, thick, cone-shaped vessels made with coils of clay shaped by cord-wrapped paddles. Meadowood material has been found on sites across southern Ontario extending into southern Quebec and New York State (Fox 1990; Spence et al. 1990).

In the Middle Woodland period increasingly distinctive trends or 'traditions' continued to evolve in different parts of Ontario (Spence et al. 1990). Although regional patterns are poorly understood and there may be distinctive traditions associated with different watersheds, the appearance of more refined ceramic vessels decorated with dentate or pseudo-scallop impressions have been used by archaeologists to distinguish the Point Peninsula Complex. These ceramics are identified as Vinette II and are typically found in association with evidence of distinct bone and stone tool industries. Sites exhibiting these traits are known from throughout south-central and eastern Ontario, northern New York, and northwestern Vermont, and are often found overlying earlier site components. Some groups appear to have practiced elaborate burial ceremonialism that involved the construction of large earthen mortuary mounds and the inclusion of numerous and often exotic materials in burials, construed as evidence of influences from northern Ontario and the Hopewell area to the south in the Ohio River valley. Archaeological evidence suggests that during this time period groups utilized a variety of resources within a home territory. Through the late fall and winter, small groups would coalesce at an inland 'family' hunting area. In the spring, these dispersed families would congregate at specific lakeshore sites to fish, hunt in the surrounding forest, and socialize. This gathering would last through to the late summer when large quantities of food would be stored up for the approaching winter (Spence et al. 1990).

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[4] For example, the recent discovery of a cache of charred quinoa seeds, dating to 3,000 B.P. at a site in Brantford, Ontario, indicates that crops were part of this extensive exchange network, which in this case travelled from the Kentucky-Tennessee region of the United States. Thus far, there is no indication that these seeds were locally grown (Crawford et al. 2019).

Towards the end of the Middle Woodland period (1200 B.P.), groups living in southern Ontario included horticulture in their subsistence strategy. Available archaeological evidence, which comes primarily from the vicinity of the Grand and Credit rivers, suggests that this development was not initially widespread. The adoption of maize horticulture instead appears to be linked to the emergence of the Princess Point Complex which is characterized by decorated ceramics combining cord roughening, impressed lines, and punctate designs; triangular projectile points; T-based drills; steatite and ceramic pipes; and ground stone chisels and adzes (Fox 1990).

Archaeologists have distinguished the Late Woodland period by the widespread adoption of maize horticulture by some Indigenous groups primarily across much of southern Ontario and portions of the southeast with favourable soils. Michi Saagiig oral histories recall that corn came to what is now Ontario with the arrival of the Wendat (Gitiga Migizi 2018:34). Initially only a minor addition to the diet, the cultivation of corn, beans, squash, sunflowers, and tobacco radically altered subsistence strategies and gained economic importance in the region over time. This change is associated with increased sedentarism, and with larger and more dense settlements focused on areas of easily tillable farmland. In some areas, semi-permanent villages, with communal 'longhouse' dwellings, appeared for the first time. These villages were inhabited year-round for 12 to 20 years until local firewood and soil fertility had been exhausted. Many were surrounded by defensive palisades, evidence of growing hostilities between neighbouring groups. Associated with these sites is a burial pattern of individual graves occurring within the village. Upon abandonment, the people of one or more villages often exhumed the remains of their dead for reburial in a large communal burial pit or ossuary outside of the village(s) (Wright 1966; Williamson 2014). More temporary habitations such as small hamlets, agricultural cabin sites, and hunting and fishing camps were also used. Throughout the parts of what is now Ontario situated on the Canadian Shield, however, the terrain limited horticulture and Indigenous groups continued to move frequently across their territories hunting, fishing, and gathering (Pilon 1999).

Along the St. Lawrence River valley from the east end of Lake Ontario to the Quebec City region and beyond, archaeologists have identified a distinctive material culture associated with what they refer to as the St. Lawrence Iroquoians. The material culture and settlement patterns of the fourteenth and fifteenth century St. Lawrence Iroquoian sites are directly related to the Iroquoian-speaking groups that Jacques Cartier and his crew encountered in 1535 at Stadacona (Quebec City) and Hochelaga (Montreal Island) (Jamieson 1990:386). Like those peoples inhabiting what would become southern and southcentral Ontario, the St. Lawrence Iroquoians practised horticulture and supplemented their diet with fishing, hunting and gathering. They lived in large semi-permanent villages as well as smaller camps. Numerous discrete settlement clusters have been identified across this large territory; however, the political and social relationships between these populations is unclear (Tremblay 2006).

By the late sixteenth century all of the St. Lawrence Iroquoian settlements appear to have been abandoned. Long characterized by archaeologists as a 'mysterious disappearance,' recent scholarship instead highlights several lines of evidence that suggest a series of planned migrations by St. Lawrence Iroquoian groups to other Indigenous populations, including the Huron-Wendat, during a period of coalescence and social realignment (Micon et al. 2021; Lesage and Williamson 2020).[5] Horticultural villages have also been recorded along the north shore of Lake Ontario and up the Trent River dating to c. 550 B.P. (c. 1400 C.E.). By c. 450 B.P. (c. 1500 C.E), the easternmost of these settlements were located between Balsam Lake and Lake Simcoe in the region that would become historic Huronia. These population movements are also reflected in the oral histories of the Michi Saagiig (Mississauga Anishinaabeg), which recall St. Lawrence Iroquois moving westwards into their territory around 1000 A.D. (Gitiga Migizi 2018:121).

While this significant population movement is not fully understood, it undoubtedly involved complex interactions between different cultural groups including the Anishinaabeg, the Huron-Wendat and, as noted above, may also have included St. Lawrence Iroquoians. As such, there are conflicting interpretations of the archaeological and historical records related to this period (see Gaudreau and Lesage 2016; Gitiga Migizi 2018; Gitiga Migizi and Kapyrka 2015; Lainey 2006; Richard 2016; Pendergast 1972).

Anishinaabe oral histories suggest a broad homeland extending far to the west of Ontario and include references to a migration from the Atlantic seaboard, as well as a subsequent return via the St. Lawrence River to the Great Lakes region, with the latter having occurred around 500 B.P. (Hessel 1993; Sherman 2015:27). Those who became known as the Anishinabe Algonquin[6] settled along the Ottawa River or Kichi-Sibi[7] and its tributaries in eastern Ontario and western Quebec; the Ojibwa and Nipissing were located further to the north and west. Living on and around the Canadian Shield, all Anishinaabeg maintained a more nomadic lifestyle than their agricultural neighbours to the south, and accordingly their presence is less visible in the archaeological record (Morrison 2005; Sherman 2015:28).

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[5] This period also saw the coalescence of horticultural communities associated with a northward territorial expansion and a concomitant abandonment of the north shore of Lake Ontario, changes that have been suggested to have been driven, in large part, by an increase in conflict with the Haudenosaunee over control of trade routes and access to European trade goods.

[6] The Anishinabe Algonquin of eastern Ontario increasingly use the Anishinaabemowin word Omàmiwinini to refer to themselves. Omàmiwinini describes the relationship with the land in the language, and though it was largely replaced by 'Algonquin' for many years, efforts are underway to reintroduce the term (Sherman 2008:77).

[7] The Anishinabe Algonquin have various names specific to each part of the Ottawa River. The lower part of the river from Mattawa down to Lake of Two Mountains is traditionally known as the Kichi-Sibi, also spelled Kiji Sibi, Kichisipi, Kichissippi, and Kichisippi (AOO 2020; Morrison 2005:9; Sherman 2015:27).

Finally, while the Iroquois or Haudenosaunee[8] homeland was initially south of Ontario in New York state, their oral histories suggest their hunting grounds extended along the north shore of Lake Ontario and the St. Lawrence River into southeastern Ontario and Quebec (Hill 2017). Archaeological data indicates some Haudenosaunee were living year-round in Ontario by the early seventeenth century (Konrad 1981).

The Indigenous population shifts and relationships of the late sixteenth and early seventeenth centuries through the period of initial contact with Europeans were complex and are not fully understood. They were certainly in part a result of the disruption of traditional trade and exchange patterns among all Indigenous peoples brought about by the arrival of the French, Dutch and British along the Atlantic seaboard the subsequent emergence of the lucrative St. Lawrence River trade route.

### 3.2 Regional Post-Contact Cultural Overview

The first Europeans to travel into eastern Ontario arrived in the early seventeenth century; predominantly French, they included explorers, fur traders and missionaries. While exploring eastern Ontario and the Ottawa River watershed between c. 1610 and 1613,[9] Samuel de Champlain and others documented encounters with different Indigenous groups speaking Anishinaabemowin, including the Matouweskarini along the Madawaska River, the Kichespirini at Morrison Island on the Ottawa River, the Otaguottouemin along the river northwest of Morrison Island, the Weskarini in the Petite Nation River basin,[10] and the Onontchataronon[11] living in the South Nation River basin as far west as the Gananoque River basin (Hanewich 2009; Hessel 1993; Sherman 2015:29). These extended family communities subsisted by hunting, fishing, and gathering, and undertook some horticulture (see also Pendergast 1999; Trigger 1987). The Anishinaabeg living in the Upper Ottawa Valley and northeastward towards the headwaters of the Ottawa River included the Nipissing, Timiskaming, Abitibi (Wahgoshig), and others. As the French moved inland, however, they referred to all these groups who spoke different dialects of Anishinabemowin as 'Algonquin' (Morrison 2005:18).

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[8] Sometime between A.D. 1142 and A.D. 1451 the Mohawk, Oneida, Onondaga, Cayuga, and Seneca united to form the Haudenosaunee Confederacy, also known as the League of Five Nations, and called the Iroquois by the French. When the Tuscarora Nation joined the confederacy in 1722, it became the League of Six Nations.

[9] From this section onwards all dates are presented as A.D.

[10] The Petite Nation River is in Quebec, with its mouth on the north side of the Ottawa River between Ottawa and Hawkesbury. It is sometimes confused with the South Nation River in eastern Ontario which empties into the south side Ottawa River opposite the Petite Nation River. Consequently, the Weskarini territory is sometimes associated with the South Nation River, but this appears to be an error (*cf.* Hessel 1993).

[11] This is a Haudenosaunee term and is, therefore, thought to be an Anishinabe Algonquin community that adopted Iroquoians who had been displaced from their territory along the St. Lawrence River near Montreal (Fox and Pilon 2016).

At the time of Champlain's travels, the Anishinabe Algonquin were already acting as brokers in the fur trade and exacting tolls from those using the Ottawa River waterway which served as a significant trade route connecting the Upper Great Lakes via Lake Nipissing and Georgian Bay to the west and the St. Maurice and Saguenay via the Rivières des Outaouais (the portion of the Ottawa River extending eastward into Quebec from Lake Timiskaming). These northern routes avoided the St. Lawrence River and Lower Great Lakes route and, therefore, potential conflict with the Haudenosaunee (Joan Holmes & Associates Inc. 1993:2-3). Access to this southern route and the extent of settlement in the region fluctuated with the state of hostilities (Joan Holmes & Associates Inc. 1993:3). As the fur trade in New France was Montreal-based, Ottawa River navigation routes were of strategic importance in the movement of goods inland and furs down to Montreal and, in the wake of Champlain's travels, the Ottawa River became the principal route to the interior for the French. The recovery of European trade goods (e.g., iron axes, copper kettle pieces, glass beads, etc.) from sites throughout the Ottawa River drainage basin provides some evidence of the extent of interaction between Indigenous groups and the French during this period (Kennedy 1970).

With Contact, major population disruptions were brought about by the introduction of European diseases against which Indigenous populations had little resistance; severe smallpox epidemics in 1623-24 and again between 1634 and 1640 resulted in drastic population decline among all Indigenous peoples living in the Great Lakes region (Konrad 1981). The expansion of hunting for trade with Europeans also accelerated decline in the beaver population, such that by the middle of the seventeenth century the centre of the fur trade had shifted northward from what became the northeastern states into southern Ontario. The French, allied with the Huron-Wendat, the Petun, and the Anishinaabeg, refused advances by the Haudenosaunee to trade with them directly. Seeking to expand their territory and disrupt the French fur trade, the Haudenosaunee launched raids into the region and established a series of winter hunting bases and trading settlements near the mouths of the major rivers flowing into the north shore of Lake Ontario and the St. Lawrence River.[12] The first recorded Haudenosaunee settlements were two Cayuga villages established at the northeastern end of Lake Ontario (Konrad 1981). Between 1640 and 1650 conflict with the Haudenosaunee Confederacy culminated in the near complete abandonment of what is now southern Ontario by Anishinaabeg and Huron-Wendat groups. In the face of continued harassment, resident Indigenous communities appear to have opted to disperse further afield or to join other communities, settling to the north and west of the Ottawa Valley,[13] and at the French posts of Montreal, Quebec City, Sillery, and Trois Rivières (Joan Holmes & Associates Inc.

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[12] These settlements included: Quinaouatoua near present day Hamilton, Teiaiagon on the Humber River, Ganatswekwyagon on the Rouge River, Ganaraske on the Ganaraska River, Kentsio on Rice Lake, Kente on the Bay of Quinte, and Ganneious, near Napanee (Adams 1986).

[13] Some Nipissing, for example, re-located to the Lake Nipigon region (Joan Holmes & Associates Inc. 1993:3).

1993:3; Trigger 1987:610, 637-638).[14] It should be noted, however, that available evidence suggests that segments of these groups either remained in their traditional territories or returned seasonally to hunt, fish and trap.

Fort Frontenac was established by the French at the present site of Kingston in 1673, and another fort was constructed at La Presentation (Ogdensburg, New York) in 1700. These forts served to solidify control of the fur trade and to enhance French ties with local Indigenous populations. To this end, the French also encouraged the establishment of Indigenous villages near their settlements (Adams 1986). The full extent of Indigenous settlement in eastern Ontario through to the end of the seventeenth century, however, is uncertain. The Odawa appear to have been using the Ottawa River for trade from c. 1654 onward and some Anishinabe Algonquin remained within the area under French influence, possibly having withdrawn to the headwaters of various tributaries in the watershed. In 1677 the Sulpician Mission of the Mountain was established near Montreal where the Ottawa River empties into the St. Lawrence River. While it was mostly a Mohawk community that became known as Kahnawake, some Anishinabe Algonquin who had converted to Christianity settled at the mission for part of the year and were known as the Oka Algonquin (Joan Holmes & Associates Inc. 1993).

As a result of increased tensions between the Haudenosaunee and the French, and declining population from disease and warfare, the Cayuga villages were abandoned in 1680 (Edwards 1984:17). Around this time, Anishinaabeg began to mount an organized counter-offensive against the Haudenosaunee who were pushed back to their traditional lands further south, leading to the return of the Michi Saagiig to southern and central Ontario from their winter hunting grounds in the north. This change saw Anishinaabeg gain wider access to European trade goods and allowed them to use their experience and strategic position to act as intermediaries in trade between the British and Indigenous communities to the north (Edwards 1984:10,17; Ripmeester 1995; Surtees 1982).

Following almost a century of warfare, the Great Peace was signed in Montreal in 1701 between New France and 39 Indigenous Nations, including the Anishinaabeg, Huron-Wendat and Haudenosaunee. This led to a period of relative peace and stability. During the first half of the eighteenth century, the Haudenosaunee appear to have been largely confined to south of the St. Lawrence River, while Mississauga and Ojibwa were living in southern and central Ontario, generally beyond the Ottawa River watershed (Joan Holmes & Associates Inc. 1993:3). Anishinabe Algonquin were residing along the Ottawa River and its tributaries, as well as outside the Ottawa River watershed at Trois-Rivières; Nipissing were located around Lake Nipissing and at Lake Nipigon. Reports from c. 1752 suggest that some non-resident Anishinabe Algonquin and Nipissing were trading at the

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[14] In the case of the 1649-1650 move of a group of Huron-Wendat from Gahoendoe (Christian) Island to the area of Quebec City, the relocation was the result of careful consideration and was planned well in advance, with a diplomatic mission having been sent in advance to discuss the move with their French allies (see Lesage and Williamson 2020).

mission at Lake of Two Mountains during the summer but returning to their hunting grounds "*far up the Ottawa River*" for the winter, and there is some indication that they may have permitted Haudenosaunee residents of the mission to hunt in their territory (Joan Holmes & Associates Inc. 1993:3; Heidenreich and Noël 1987:Plate 40).

In 1754, hostilities over trade and the territorial ambitions of the French and British led to the Seven Years' War, in which many Anishinaabeg fought on behalf of the French. With the French surrender in 1760, Britain gained control over New France, though in recognition of Indigenous title to the land the British government issued the Royal Proclamation of 1763. This created a boundary line between the British colonies on the Atlantic coast and the 'Indian Reserve' west of the Appalachian Mountains. This line then extended from where the 45th parallel of latitude crossed the St. Lawrence River near present day Cornwall northwestward to the southeast shore of Lake Nipissing and then northeastward to Lac St. Jean. The proclamation specified that "*Indians should not be molested on their hunting grounds*" (Joan Holmes & Associates Inc. 1993:4) and outlawed the private purchase of Indigenous land, instead requiring all future land purchases to be made by Crown officials "*at some public Meeting or Assembly of the said Indians*" living upon the land in question (cited in Surtees 1982: 9). In 1764, the post at Carillon on the Ottawa River was identified as the point beyond which traders could only pass with a specific licence to trade in "*Indian Territory.*" Petitions in 1772 and again in 1791 described Anishinabe Algonquin and Nipissing territory as the lands on both sides of the Ottawa River from Long Sault to Lake Nipissing. Settlers continued to trespass into this territory, however, cutting trees and driving away game vital to Indigenous lifeways (Joan Holmes & Associates Inc. 1993:5). Akwesasne, within the Haudenosaunee hunting territory, became a permanent settlement towards the middle of the eighteenth century.[15]

At first, the end of the French Regime brought little change to eastern Ontario. Between 1763 and 1776 some British traders traveled to the Kingston area, but the British presence remained sporadic until 1783 when Fort Frontenac was officially re-occupied. With the conclusion of the American Revolutionary War (1775 to 1783), however, the British sought additional lands on which to settle United Empire Loyalists fleeing the United States, disbanded soldiers, and the Mohawk who had fought with the British under Thayendanegea (Joseph Brant) and Chief Deserontyon and were, therefore, displaced from their lands in New York State. To this end, the British government undertook hasty negotiations with Indigenous groups to acquire rights to lands; however, these negotiations did not include Anishinabe Algonquin and Nipissing who were continuously ignored, despite much of the area being their traditional territory (Lanark County Neighbours for Truth and Reconciliation 2019). Initially the focus for settlement was the north shore of Lake Ontario and the St. Lawrence River, resulting in a series of 'purchases' and treaties beginning with the Crawford Purchases of 1783. As noted, these treaties did not include all of the Indigenous groups who lived and hunted in the region and the recording of the purchases – including the boundaries – and their execution were

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[15] www.firstbatuibs.info/akwesasne.html

problematic; they also did not extinguish Indigenous rights and title to the land (Joan Holmes & Associates Inc. 1993:5; Royal Commission on Aboriginal Peoples 1996). The *Crown Grant to the Mohawks of the Bay of Quinte* was issued in 1784 in recognition of the Six Nations' support during the American Revolutionary War. It included lands on the Bay of Quinte, originally part of the Crawford Purchases, on which Chief Deserontyon and other Haudenosaunee settled.[16]

Major Samuel Holland, Surveyor General for Canada, began laying out the land within the Crawford Purchases in 1784 with such haste that the newly established townships were assigned numbers instead of names. Euro-Canadian settlement along the north shore of the St. Lawrence River and the eastern end of Lake Ontario began in earnest about this time. By the late 1780s the waterfront townships were full and more land was required to meet both an increase in the size of grants to all Loyalists and grant obligations to the children of Loyalists who were now entitled to 200 acres in their own right upon reaching the age of 21 (H. Belden & Co. 1880:16). In 1792 John Graves Simcoe, Lieutenant Governor of the Province of Upper Canada, offered free land grants to anyone who would swear loyalty to the King, a policy aimed at attracting more American settlers. As government policy also dictated the setting aside of one seventh of all land for the Protestant Clergy and another seventh as Crown reserves, pressure mounted to open up more of the interior. As a result, between 1790 and 1800 most of the remainder of the Crawford Purchases was divided into townships (H. Belden & Co. 1880:16).

A number of other purchases during the late eighteenth century between representatives of the Crown and certain Anishinaabe covered lands immediately west of the Crawford Purchases, from the north shore of Lake Ontario northward to Lake Simcoe and Georgian Bay/Lake Huron. These included the John Collins Purchase of 1785, the Johnson-Butler Purchase[17] of 1787-88, and the 1798 Penetanguishene Purchase (Treaty 5) aimed at acquiring a harbour on Lake Huron for British vessels.[18] The lands purportedly covered by these purchases were often poorly defined and were thus included in the later Williams Treaties of 1923 (see below).

The *Constitution Act* of 1791, which created the provinces of Upper and Lower Canada (later Ontario and Quebec) used the Ottawa River as the boundary between the two. This effectively divided the Anishinabe Algonquin and Nipissing territories, both of which straddled the river. The Anishinabe Algonquin and Nipissing sent a letter to the Governor General of the Province of Canada in 1798, requesting that settlers be restricted to the banks of the Ottawa River and detailing the difficulties caused by encroaching settlement (Joan Holmes & Associates Inc. 1993:5; see also Lanark County Neighbours for

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[16] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

[17] Sometimes referred to as the 'Gunshot Treaty' as it reportedly covered the land as far back from the lake shore as a person could hear a gunshot (https://www.ontario.ca/page/map-ontario-treaties-and-reserves).

[18] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

Truth and Reconciliation 2019). In this letter the Chiefs noted the belt of wampum and map of their lands that was given to Governor Carleton some years earlier, pleading for no more of the encroachment that was driving away game and pushing them into infertile lands; however, there was no response. In the early 1800s, a few Anishinabe Algonquin and Nipissing settled on the shores of Golden Lake, known to them as 'Peguakonagang;' they called themselves 'Ininwezi,' which they translated as 'we people here along' (Johnson 1928; MacKay 2016).[19] The Golden Lake band, as they initially came to be known, resided in this area for at least part of the year, with various band members maintaining traplines, hunting territories, and sugar bushes.

The War of 1812 between the United States and Great Britain (along with its colonies in North America and its Indigenous allies) brought another period of conflict to the region. In 1815, at the conclusion of the war, the British government issued a proclamation in Edinburgh to further encourage settlement in British North America. The offer included free passage and 100 acres of land for each head of family, with each male child to receive his own 100 acre parcel upon reaching the age of 21 (H. Belden & Co. 1880:16). At the same time, the government was seeking additional land on which to resettle disbanded soldiers from the War of 1812. Demobilized forces could thereby act as a 'force-in-being' to oppose any possible future incursions from the United States. Veterans were encouraged to take up residence within a series of newly created 'military settlements' including those at Perth (1816) and Richmond (1818). The pressure to find more land was exacerbated by the sheer number of settlers moving into the region as a result of these initiatives, which began to push settlement beyond the acquired territory into what had formally been protected as 'Indian Land.'[20]

Additional 'purchases' were signed in the early nineteenth century between the Crown and certain Anishinaabe communities including the Lake Simcoe Purchase (Treaty 16) signed in 1815 and covering lands between Lake Simcoe and Georgian Bay, the Nottawasaga Purchase (Treaty 18) of 1818 to the south and west of the Lake Simcoe Purchase, and the Rice Lake Purchase or Treaty 20 of 1818 which covered a large area around Rice Lake.[21]

Further east, with the settlement of the region underway, Lieutenant Governor Gore ordered Captain Ferguson, the Resident Agent of Indian Affairs at Kingston, to arrange the purchase of additional lands from the chiefs of the Ojibwa and Mississauga or Michi Saagiig Nishnaabeg. The resulting Rideau Purchase (Treaty 27 and 27¼) extended from the rear of the earlier Crawford Purchases to the Ottawa River and was signed by the Michi Saagiig Nishnaabeg or Mississauga in 1819 and confirmed in 1822. This 'purchase'

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[19] The Algonquin of River Desert identified The Golden Lake Band using the name "Nozebi'wininiwag," translated as "Pike-Water People" (Speck in Johnson 1928:174).

[20] Between 1815 and 1850 over an estimated 800,000 Euro-Canadian settlers moved into the region (https://www. lanarkcountyneighbours.ca/the-petitions-of-chief-shawinipinessi.html).

[21] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

was also problematic and excluded the Anishinabe Algonquin whose traditional territory it covered (Canada 1891:62; Surtees 1994:115). As this purchase included lands within the Ottawa River watershed, the Anishinabe Algonquin and Nipissing protested in 1836 when they became aware of its terms (Joan Holmes & Associates Inc. 1993:6).

As Euro-Canadian settlement spread, Indigenous groups were increasingly pushed out of southern and eastern Ontario, generally moving further to the north and west, although some families remained in their traditional lands, at least seasonally. Records relating to the Hudson's Bay Company, the diaries of provincial land surveyors, the reports of geologists sent in by the Geological Survey of Canada, census returns,[22] store account books and settler's diaries all provide indications of the continued Indigenous settlement in the region, as does Indigenous oral history. In addition to their interactions with the Anishinabe Algonquin who remained in the area, the nineteenth century settlers found evidence of the former extent of Indigenous inhabitation, particularly as they began to clear the land. In 1819, Andrew Bell wrote from Perth:

> *All the country hereabouts has evidently been once inhabited by the Indians, and for a vast number of years too. The remains of fires, with the bones and horns of deers (sic) round them, have often been found under the black mound... A large pot made of burnt clay and highly ornamented was lately found near the banks of the Mississippi, under a large maple tree, probably two or three hundred years old. Stone axes have been found in different parts of the settlement.*
>
> (cited in Brown 1984:8)

While some Anishinabe Algonquin and Nipissing continued to spend part of the summer at Lake of Two Mountains through this period, most of the year appears to have been spent on their traditional hunting grounds, and by the 1830s there were specific claims for land by individuals such as Mackwa on the Bonnechere River and Constant Pennecy on the Rideau waterway. In 1842, Chief Pierre Shawinipinessi,[23] an Anishinabe Algonquin leader, petitioned the Crown for a land tract of 2,000 acres between the townships of Oso, Bedford and South Sherbrooke to enable his people to sustain themselves (Huitema 2001; Ripmeester 1995:164-166; Sherman 2008:32-33).[24] A licence of occupation for the 'Bedford Algonquin' was granted in 1844, with Mississauga (Michi Saagiig Nishnaabeg) from Alnwick reportedly also living at Bedford (Joan Holmes & Associates Inc. 1993:7-8). Illegal logging operations, however, interfered with life on the

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[22] While Indigenous peoples were clearly still residing in the area and making use of the land, they often do not appear in the 1851 to 1871 census records. Huitema (2001:129) notes that 'Algonquin' were sometimes listed in these records as 'Frenchmen' or 'halfbreeds' because they had utilized the mission at Lake of Two Mountains as their summer gathering place and, therefore, were thought of as being French.

[23] There are numerous variations in the spelling of Chief Shawinipinessi's name; he is also known by the name of Peter Stephens or Stevens).

[24] July 17, 1842 petition 115 addressed to Sir Charles Bagot, Governor General, Library and Archives Canada RG10, V186 part 2, as transcribed in Joan Holmes & Associates Inc. (1993) *Report on the Algonquins of Golden Lake Claim* Vol. 10-12:101.

reserve, and despite protests from Chief Shawinipinessi and legislation passed in 1838 and then later in 1850 to protect Indigenous lands,[25] it was allowed to continue, depleting the local food resources. In response to an 1861 petition to address the trespassing of settlers, the existence of the Bedford tract was denied (LAC microfilm reel C-13419). At this time some of the community moved to nearby lands while others joined the Anishinabe Algonquin at Kitigan Zibi, and at Pikwàkanagàn where the 'Golden Lake Reserve' was created in 1873 (Hanewich 2009; Joan Holmes & Associates Inc. 1993:9). Around 1836 some consideration was given to facilitating Anishinabe Algonquin and Nipissing settlement in the Grand Calumet Portage and Allumette Island area, but this was not pursued (Joan Holmes & Associates Inc. 1993).

Other treaties signed in the mid-nineteenth century included the St. Regis Purchase (Treaty 57) signed in 1847 between the Crown and the Mohawk and covering a narrow parcel of land, known as the 'Nutfield Tract' extending north of the St. Lawrence River at Cornwall towards the Ottawa River, and the Robson-Huron Treaty (Treaty 61) of 1850 between the Crown and certain Anishinaabeg for lands east of Georgian Bay and the northern shore of Lake Huron eastward to the Ottawa River.[26]

Through the early twentieth century, off-reserve Anishinabe Algonquin and Nipissing were told to move to established reserves at Golden Lake (Pikwàkanagàn), Maniwaki (Desert River) and at Gibson on Georgian Bay (which had been established for the re-settlement of both Anishinabe Algonquin and Mohawk from Lake of Two Mountains), but many remained in their traditional hunting territories. There is also evidence to suggest that Akwesasne Mohawk trapped and hunted north of their reserve as far as Smiths Falls and Rideau Ferry between c. 1924 and 1948 (Joan Holmes & Associates Inc. 1993:10-11; Sherman 2008:33).

The Williams Treaties of 1923 were signed between the Crown and seven Anishinaabe First Nations to address lands that had not been surrendered via a formal treaty process (see above).[27] These lands covered a large area from the north shore of Lake Ontario to Lake Nipissing and overlapped with a number of other treaties and 'purchases.' The Williams Treaties First Nations include the Chippewas of Beausoleil, Georgina Island and Rama, and the Mississaugas of Alderville, Curve Lake, Hiawatha and Scugog Island. To address further issues with a number of the pre-confederation purchases and treaties, the Williams Treaties First Nations ratified the Williams Treaties Settlement Agreement with Canada and Ontario in June, 2018. This agreement recognized harvesting rights in

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[25] Chapter XV. An Act for the protection of the Lands of the Crown in this Province, from Trespass and Injury. Thirteenth Parliament, 2nd Victoria, A.D. 1839. An Act for the Protection of the Indians in Upper Canada from Imposition and the Property Occupied or Enjoyed by Them from Trespass and Injury; passed by the government of Upper Canada on August 10, 1850. Available from https://bnald.lib.unb.ca/node/5342; United Canadas (1841-1857) 13 & 14 Victoria – Chapter 74:1409.

[26] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

[27] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

Treaties 5, 16, 18, 20, 27 and 27¼, the Crawford Purchase, the Gunshot Treaty and Lake Simcoe.[28]

As noted above, lands considered traditional Anishinabe Algonquin territory were included in various nineteenth century purchases from which they were excluded. Anishinabe Algonquin claims to these lands include a series of petitions to the Crown going back to 1772 that asserted rights to land and resources. An official land claim was made in the 1980s and, in 2016, an Agreement-in-Principle was signed by Ontario, Canada and the Algonquins of Ontario, a step towards a treaty recognizing Anishinabe Algonquin rights across much of eastern Ontario.[29]

### *Geographic Township of Clarendon*

Clarendon Township was officially surveyed by John Snow in 1862, though references to specific lots in the 1840s indicate that there had been at least a partial survey undertaken twenty years earlier. Furthermore, after the Frontenac Road had been constructed through the township settlement lots or ranges had been laid out to either side by Thomas Gibbs in 1859. Squatters, probably the result of lumbermen relocating their families closer to their working camps, are known to have applied for patents to land to the north and south of the east end of Kashwakamak Lake in the 1840s, including on Lots 25 and 26 in Concession 10. One petitioner for this property claimed to have been a resident since 1836. A claim was also filed by another settler on Lot 16, Concession 10, for reimbursement for timber removed from her property, on which she claimed her husband had settled in either 1840 or 1841 (Armstrong 1976:12).

Timber limits along the Mississippi River were first granted by the provincial government in the 1840s. Those in the Clarendon Township area were awarded to D.M. McMartin, Joseph Porteous and Ed McKay in 1847. A lumber shanty was recorded to the south of the east end of Kashwakamak Lake in 1848, though as stated above illegal settlement (probably related to the timber business) is known to have occurred in the area as early as 1840. In 1848 a group of settlers in this area petitioned to have a school erected on land claimed by Thomas Cline, indicating a fairly sizeable community in the vicinity. When Gibbs surveyed the Frontenac Road in 1852/1853 he noted a number of families residing approximately four miles east of settlement that would become Ardoch (Armstrong 1976:12-15).

With the completion of the land survey along the Frontenac Road, much of Clarendon Township was opened for settlement as free grant land. Many of the lots were taken up in the early 1860s, but the relatively late date or lack of a patent for a large number of lots points to the transient nature of early settlement in the township, much of which was unsuited to agriculture. An 1860/61 report listed a total population of 374; another report

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[28] www.williamstreatiesfirstnations.ca

[29] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

four years later showed an increase to 487 with a total of 99 houses and 72 barns or stables (Armstrong 1976:21). The Smith Road, running south towards Kashwakamak Lake from the Frontenac Road, had probably been constructed by 1864 when a number of settlers were awarded patents for land near its western end (Armstrong 1976:18).

The timber limits came under the control of Allan Gilmour of the Gilmour Lumber Company, in the 1850s, who in turn sold them to Gilles and McLaren in 1866 (Armstrong 1976:38-39). The Kashwakamak Lake Dam located at the outlet in the northeast corner of the lake was originally constructed in the 1850s, probably by Gilmour, to ease the transportation of cut timber through the area. This dam raised the water level of the lake by up to eight feet (2.44 m). The present dam was constructed in 1910 (Mississippi Valley Conservation Authority, personal communication, 2007).

### 3.3 Michi Saagiig Historical Context

The following is a summary of oral tradition provided by Curve Lake First Nation:

> *The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as "the people of the big river mouths" and were also known as the "Salmon People" who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months.*
>
> *The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the "Peacekeepers" among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.*
>
> *Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the "Old Ones" who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.*
>
> *The traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft*

*and north of the Haliburton highlands. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all of the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.*

*Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Gitiga Migizi and Kapyrka 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig.*

*The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people.*

*Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated.*

*The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear.*

*Michi Saagiig Elder Gitiga Migizi (2017) recounts:*

*"We weren't affected as much as the larger villages because we learned to paddle away for several years until everything settled down. And we came back and tried to bury the bones of the Huron but it was overwhelming, it was all over, there were bones all over – that is our story.*

*There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.*

*We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So we are very important in terms of keeping the balance of relationships in harmony.*

*Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis."*

*Often times, southern Ontario is described as being "vacant" after the dispersal of the Huron-Wendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation.*

*The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present day communities: Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation.*

*The Michi Saagiig have been in Ontario for thousands of years, and they remain here to this day.*

***This historical context was prepared by Gitiga Migizi, a respected Elder and Knowledge Keeper of the Michi Saagiig Nation.***

*Publication reference:*

*Gitiga Migizi and Julie Kapyrka*
*2015* ***Before, During, and After: Mississauga Presence in the Kawarthas.*** *In Peterborough Archaeology, Dirk Verhulst, editor, pp.127-136. Peterborough, Ontario: Peterborough Chapter of the Ontario Archaeological Society.*

### 3.4 Nation Huronne-Wendat Historical Context

The following is a summary of the history of the Nation Huronne-Wendat provided by the Huron Wendat Nation:

> *As an ancient people, traditionally, the Huron-Wendat, a great Iroquoian civilization of farmers and fishermen-hunter-gatherers and also the masters of trade and diplomacy, represented several thousand individuals. They lived in a territory stretching from the Gaspé Peninsula in the Gulf of Saint Lawrence and up along the Saint Lawrence Valley on both sides of the Saint Lawrence River all the way to the Great Lakes. Huronia, included in Wendake South, represents a part of the ancestral territory of the Huron-Wendat Nation in Ontario. It extends from Lake Nipissing in the North to Lake Ontario in the South and Île Perrot in the East to around Owen Sound in the West. This territory is today marked by several hundred archaeological sites, listed to date, testifying to this strong occupation of the territory by the Nation. It is an invaluable heritage for the Huron-Wendat Nation and the largest archaeological heritage related to a First Nation in Canada.*
>
> *According to our own traditions and customs, the Huron-Wendat are intimately linked to the Saint Lawrence River and its estuary, which is the main route of its activities and way of life. The Huron-Wendat formed alliances and traded goods with other First Nations among the networks that stretched across the continent.*
>
> *Today, the population of the Huron-Wendat Nation is composed of more than 4000 members distributed on-reserve and off-reserve.*
>
> *The Huron-Wendat Nation band council (CNHW) is headquartered in Wendake, the oldest First Nations community in Canada, located on the outskirts of Quebec City (20 km north of the city) on the banks of the Saint Charles River. There is only one Huron-Wendat community, whose ancestral territory is called the Nionwentsïo, which translates to "our beautiful land" in the Wendat language.*
>
> *The Huron-Wendat Nation is also the only authority that have the authority and rights to protect and take care of her ancestral sites in Wendake South.*

### 3.5 History of the Ojibway Nation

The following historical context was provided by the Chippewas of Rama First Nation:

> *The Chippewas of Rama First Nation are an Anishinaabe (Ojibway) community located at Rama First Nation, ON. Our history began with a great migration from the East Coast of Canada into the Great Lakes region. Throughout a period of several hundred years, our direct ancestors again migrated to the north and eastern shores of Lake Huron and Georgian Bay. Our Elders say that we made room in our territory for our allies, the Huron-Wendat Nation, during their times of war with the Haudenosaunee. Following the dispersal of the Huron-Wendat Nation from the region in the mid-1600s, our stories say that we again migrated to*

*our territories in what today is known as Muskoka and Simcoe County. Several major battles with the Haundenosaunee culminated in peace being agreed between the Anishinaabe and the Haudenosaunee, after which the Haudenosaunee agreed to leave the region and remain in southern Ontario. Thus, since the early 18th century, much of central Ontario into the lower parts of northern Ontario has been Anishinaabe territory.*

*The more recent history of Rama First Nation begins with the creation of the "Coldwater Narrows" reserve, one of the first reserves in Canada. The Crown intended to relocate our ancestors to the Coldwater reserve and ultimately assimilate our ancestors into Euro-Canadian culture. Underlying the attempts to assimilate our ancestors were the plans to take possession of our vast hunting and harvesting territories. Feeling the impacts of increasingly widespread settlement, many of our ancestors moved to the Coldwater reserve in the early 1830s. Our ancestors built homes, mills, and farmsteads along the old portage route which ran through the reserve, connecting Lake Simcoe to Georgian Bay (this route is now called "Highway 12"). After a short period of approximately six years, the Crown had a change of plans. Frustrated at our ancestors continued exploiting of hunting territories (spanning roughly from Newmarket to the south, Kawartha Lakes to the east, Meaford to the west, and Lake Nipissing to the north), as well as unsuccessful assimilation attempts, the Crown reneged on the promise of reserve land. Three of our Chiefs, including Chief Yellowhead, went to York under the impression they were signing documents affirming their ownership of land and buildings. The Chiefs were misled, and inadvertently allegedly surrendered the Coldwater reserve back to the Crown.*

*Our ancestors, then known as the Chippewas of Lakes Simcoe and Huron, were left landless. Earlier treaties, such as Treaty 16 and Treaty 18, had already resulted in nearly 2,000,000 acres being allegedly surrendered to the Crown. The Chippewas made the decision to split into three groups. The first followed Chief Snake to Snake Island and Georgina Island (today known as the Chippewas of Georgina Island). The second group followed Chief Aissance to Beausoleil Island, and later to Christian Island (Beausoleil First Nation). The third group, led by Chief Yellowhead, moved to the Narrows between Lakes Simcoe and Couchiching and eventually, Rama (Chippewas of Rama First Nation).*

*A series of purchases, using Rama's own funds, resulted in Yellowhead purchasing approximately 1,600 acres of abandoned farmland in Rama Township. This land makes up the core of the Rama Reserve today, and we have called it home since the early 1840's. Our ancestors began developing our community, clearing fields for farming and building homes. They continued to hunt and harvest in their traditional territories, especially within the Muskoka region, up until the early 1920's. In 1923, the Williams Treaties were signed, surrendering 12,000,000 acres of previously unceded land to the Crown. Once again, our ancestors were misled, and they were informed that in surrendering the land, they gave up their right to access their seasonal traditional hunting and harvesting territories.*

*With accessing territories difficult, our ancestors turned to other ways to survive. Many men guided tourists around their former family hunting territories in Muskoka, showing them places to fish and hunt. Others worked in lumber camps and mills. Our grandmothers made*

> *crafts such as porcupine quill baskets and black ash baskets, and sold them to tourists visiting Simcoe and Muskoka. The children were forced into Indian Day School, and some were taken away to Residential Schools. Church on the reserve began to indoctrinate our ancestors. Our community, along with every other First Nation in Canada, entered a dark period of attempted genocide at the hands of Canada and the Crown. Somehow, our ancestors persevered, and they kept our culture, language, and community alive.*
>
> *Today, our community has grown into a bustling place, and is home to approximately 1,100 people. We are a proud and progressive First Nations community.*

### 3.6 Property History

The following detailed review of archival research was conducted in order to develop a picture of the land-use history of the study area through the nineteenth and twentieth centuries, particularly as it relates to the archaeological potential of the property. Information was compiled from a variety of sources, including the 1862 John Snow plan of Clarendon Township, the 1880 Belden map, twentieth-century topographic maps and aerial photographs, directories, and survey plans.[30] Records at the Frontenac County Land Registry Office (or FCLRO) were also consulted.

*Lot 20, Concession 10*

The Crown patent for Lot 20, Concession 10 was awarded to Robert T. McDonnell in 1864, along with Lot 21, Concession 10 directly to the north. The 1862 plan of Clarendon Township produced by John Snow placed McDonnell on lot 21 to the north of the study area (Map 3). Just a few years later, a plan produced in 1865 illustrates Lot 20 with McDonnell's name (see Map 3).

Four years later (patent holders had to remain on their lots for at least 4 years prior to selling), the lands were deeded to Gilles and McLaren (FCLRO Instrument A121). The Gillies and McLaren Lumber Company, founded in 1853 by John Gilles and Peter McLaren, began buying up large logging limits on the upper Mississippi River in 1862. To increase the efficiency of their log drives, many improvements were made to the waterway: dredging shallow areas to create channels, as well as building dams to control water levels, timber slides around rapids and falls, and sluiceways and booms to corral

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[30] Historical maps and aerial photographs have been geo-referenced using Geographic Information Systems (GIS) software to generate the mapping contained in this report. Geo-referencing is the name given to the process of transforming a map or image by assigning X and Y coordinates to features, allowing the software to rotate, stretch, and in some cases warp the original image to best match the supplied coordinates. Owing to considerable variation in the scale, accuracy, and resolution of historical maps and aerial photographs, there is often an unknown degree of error introduced in the process of geo-referencing and, as for this reason, the location and extent of the study area overlain on these maps should be considered approximate.

logs.[31] The Kashwakamak Lake Dam, although originally constructed in the 1850s, probably by lumber baron Allan Gilmour, offers an example of the improvements made to ease the transportation of cut timber through the area. This dam raised the water level of the lake by up to eight feet (2.44 m; Armstrong 1976:38-39). Although the improvements were costly and time-consuming to undertake, it was still considered profitable, as other competitors had to pay tolls to use the improved river sections.

Although John Gilles sold his shares of the firm in 1871, various members of the McLaren family (Peter McLaren, James McLaren - John's eldest son, or Sophia McLaren - John's wife) held ownership of Lot 20 until 1884 when it was sold to the Canada Lands Company Limited (FCLRO Instruments A365, A376, A344). This was a large private chartered British land development company incorporated by an act of the British Parliament in 1825 to aid in the colonization of Upper Canada. They purchased undeveloped Crown and Clergy reserve lots from the province of Upper Canada to resell them to prospective settlers. That they acquired the lands is a good indication that up until this point, none of the former owners had resided on the property. The company held the lands until 1902 when Lot 20 was sold to James M. Brown and Alexander Brown *et ux.* (FCLRO Instrument B866). Brothers James Morton and Alexander Caldwell Brown had been operating the expanded four-storey Boulton Flour Mill in Carleton Place since 1885, when they took it over from their father Horace Brown. Coincidentally, their flour mill was located across the river from the Gillies and McLaren sawmill.[32] It is possible they purchased the lot to hold greater control over Kashwakamak Lake dam, and subsequently the waterpower used at their mill. It seems unlikely that they ever resided on the property.

In 1911, the brothers *s*old the lot and the right-of-way through the waterway to the Mississippi River Improvement Company Limited (MRIC; FCLRO Instrument C1196). Recognizing a need to manage the water flow on the Mississippi River between Mazinaw Lake and the Ottawa River, Mr. Jim Brown (likely another relative) of Carleton Place founded the company in 1909. Water users on the Mississippi River system joined the company which helped to build and maintain dams on the rivers and lakes that supplied the Mississippi. In 1910 the MRIC was chartered by provincial legislation to levy tolls, initially implemented to cover the cost of operating and maintaining the dams at Cross, Long and Gill Lakes, with other dams included as they were constructed. As the system expanded, the number of users (payees) increased. Tolls were collected in the form of flour, feed or textiles at sawmills and small hydro electric generating stations. The present dam at Kashwakamak Lake was constructed in 1910 as part of this process (Mississippi Valley Conservation Authority, personal communication, 2007).

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[31] McLeod, Susanna. 2018, "Lumberman Clashed for Waterway Rights" Whig Standard. https://www.thewhig.com/opinion/columnists/lumberman-clashed-for-waterway-rights

[32] https://www.communitystories.ca/v2/capt-a-roy-brown-reluctant-hero_heros-malgre-lui/story/the-brown-family/

In 1932 Clarence H. Brown (the son of James M. Brown) along with Alexander C. and Mary E. Brown granted part of the lot to William H. Martin (FCLRO Instrument E1654). Martin granted the land to Richard Guthering ten years later, who in turn granted the property to Carl Guthering in 1950 (FCLRO Instruments 348794 and F2018). A topographic map dating to the same year shows the dam, but little else within the study area, consistent with earlier depictions of the property (Map 4; see Map 3). The closest residence depicted was well to the north of the dam.

Through negotiations with the Mississippi Valley Conservation Authority (MVCA), the Ministry of Natural Resources and Ontario Hydro, in 1990 the lands that had previously been retained by the Mississippi River Improvement Company Limited were transferred to the Mississippi Valley Conservation Authority (FCLRO Instrument 544541). The extant Kashwakamak Lake Dam consists of two structures: the main control dam and a secondary saddle dam, separated by a section of land on the north side of the main structure. The main structures are comprised of two bulkhead walls, the concrete piers forming the two sluiceways and a broad crested concrete weir. The dam has undergone major repairs over the years to fix structural and seepage issues.

# 4.0 ARCHAEOLOGICAL CONTEXT

This section describes the archaeological context of the study area, including known archaeological research, known cultural heritage resources (including archaeological sites), and environmental conditions. In combination with the historical context outlined above, this provides the necessary background information to evaluate the archaeological potential of the property.

## 4.1 Previous Archaeological Research

In order to determine whether any previous archaeological fieldwork has been conducted within or in the immediate vicinity of the present study area, a search of the titles of reports in the *Public Register of Archaeological Reports* maintained by the Ministry of Citizenship and Multiculturalism (MCM) was undertaken. To augment these results, a search of the Past Recovery corporate library was also conducted.[33]

A prime source for unregistered archaeological finds is the initial series of *Annual Archaeological Reports for Ontario* (AARO), which were published as appendices to the report of the Minister of Education in the *Ontario Sessional Papers*. In these reports, dating between 1887 and 1928, staff of the provincial museum (which eventually became the Royal Ontario Museum) published articles by several of Ontario's most prominent collectors, amateur archaeologists, and museum staff. The articles provide a record of some of the earliest archaeological fieldwork to have taken place in the province, as well as documentation of the private collections that were donated to the museum. These articles report on extensive artifact collecting in Frontenac County in the late nineteenth and early twentieth centuries. There was only one reference to Clarendon Township in the AARO volumes, which was in reference to an earthen vessel found in conjunction with a stone enclosure on Lot 4, Concession 8, by renowned Canadian geologist and archaeologist, Sir John William Dawson, in 1859 (Annual Archaeological Reports for Ontario, 1889).

An archaeological survey of the Mississippi River from Mazinaw Lake to Dalhousie Lake was completed in 1977 by Phill Wright (Wright and Englebert 1978). The section of the Mississippi surveyed during 1977 yielded few new sites. The paucity of archaeological data recovered is likely the result of cottage development and raised water levels (Wright

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[33] In compiling the results, it should be noted that archaeological fieldwork conducted for research purposes should be distinguished from systematic property surveys conducted during archaeological assessments associated with land use development planning (generally after the introduction of the *Ontario Heritage Act* in 1974 and the *Environmental Assessment Act* in 1975), in that only those studies undertaken to current standards can be considered to have adequately assessed properties for the presence of archaeological sites with cultural heritage value or interest. In addition, it should be noted that the majority of the research work undertaken in the area has been focused on the identification of pre-Contact Indigenous sites, while current MCM requirements minimally require the evaluation of the material remains of occupations and or land uses pre-dating 1900.

and Englebert 1978:iv). To the knowledge of Past Recovery staff, no previous archaeological assessments have occurred within or within the immediate vicinity of the study area.

## 4.2 Previously Recorded Archaeological Sites

The primary source for information regarding known archaeological sites in Ontario is the *Archaeological Sites Database* maintained by the Ontario Ministry of Citizenship and Multiculturalism. The database largely consists of archaeological sites discovered by professional archaeologists conducting archaeological assessments required by legislated processes under land use development planning (largely since the late 1980s). A search of the *Sites Database* indicated that there is a single registered archaeological site located within a one-kilometre radius of the study area (Table 1).

**Table 1. Summary of Registered Archaeological Sites within a One-Kilometre Radius of the Study Area.**

| Borden Number | Site Name | Time Period | Inferred Agency | Inferred Function | Review Status |
|---|---|---|---|---|---|
| BfGf-1 | Logger's Rock | Post-Contact | Euro-Canadian | Memorial | Unknown |

### *Logger's Rock (BfGf-1)*

This site is represented by a bedrock outcrop north of the dam at the northeast end of Kashwakamak Lake. The rock is approximately 1.5 m x 0.75 m and is inscribed with the names of four to five log drivers killed in a driving accident, according to local legend. One of the names is clearly discernable, with the date immediately to the right: T. Maroney, 1881. Although weathering has taken its toll on the remaining names, the same date is visible in other places on the outcrop. The site was first registered in 1977.

## 4.3 Cultural Heritage Resources

The recognition or designation of cultural heritage resources (here referring only to built heritage features and cultural heritage landscapes) may provide valuable insight into aspects of local heritage, whether identified at the local, provincial, national, or international level. As some of these cultural heritage resources may be associated with significant archaeological features or deposits, the background research conducted for this assessment included the compilation of a list of cultural heritage resources that have previously been identified within or immediately adjacent to the current study area. The following sources were consulted:

- Federal Heritage Buildings Review Office online Directory of Heritage

Designations;[34]
- Canada's Historic Places website;[35]
- Ontario Heritage Properties Database;[36]
- An archived listing of Ministry of Citizenship and Multiculturalism's Heritage Conservation Districts;[37] and,
- Ontario Heritage Trust website.[38]

No designated cultural heritage sites were found within a 300 m radius from the study area.

### 4.4 Heritage Plaques and Monuments

The recognition of a place, person, or event through the erection of a plaque or monument may also provide valuable insight into aspects of local history, given that these markers typically indicate some level of heritage recognition. As with cultural heritage resources (built heritage features and/or cultural heritage landscapes), some of these places, persons, or events may be associated with significant archaeological features or deposits. Accordingly, this study included the compilation of a list of heritage plaques and/or markers in the vicinity of the study area. The following sources were consulted:

- The Ontario Heritage Trust Online Plaque Guide;[39]
- A listing of plaques transcribed at www.readtheplaque.com;
- Parks Canada Directory of Federal Heritage Designations;[40] and,
- A listing of historical plaques of Ontario maintained by Sarah J. McCabe.[41]

No plaques or monuments were found within a 300 m radius from the study area.

### 4.5 Cemeteries

The presence of historical cemeteries in proximity to a parcel undergoing archaeological assessment can pose archaeological concerns in two respects. First, cemeteries may be associated with related structures or activities that may have become part of the archaeological record, and thus may be considered features indicating archaeological potential. Second, the boundaries of historical cemeteries may have been altered over time, as all or portions may have fallen out of use and been forgotten, leaving potential for the presence of unmarked graves. For these reasons, the background research

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[34] https://www.pc.gc.ca/apps/DFHD/default_eng.aspx
[35] https://www.historicplaces.ca/en/rep-reg/search-recherche.aspx
[36] https://www.heritagetrust.on.ca/en/oha/advanced-search
[37] https://web.archive.org/web/20220325223537/http://www.mtc.gov.on.ca/en/heritage/heritage_conserving_list.shtml
[38] https://www.heritagetrust.on.ca/en/index.php/pages/tools/plaque-database
[39] https://www.heritagetrust.on.ca/en/index.php/pages/tools/plaque-database
[40] https://www.pc.gc.ca/apps/dfhd/default_eng.aspx
[41] https://ontarioplaques.omeka.net/

conducted for this assessment included a search of available sources of information regarding historical cemeteries. For this study, the following sources were consulted:

- An archived listing of all registered cemeteries in the province of Ontario maintained by the Consumer Protection Branch of the Ministry of Public and Business Service Delivery (last updated 06/07/2011);
- Field of Stones website;[42]
- Ontario Cemetery Locator website maintained by the Ontario Genealogical Society;[43]
- Ontario Headstones Photo Project website;[44] and,
- Available historical mapping and aerial photography

No known cemeteries were located within or adjacent to the study area.[45] The closest registered cemetery is St. John's Anglican Cemetery, located at 6161 Road 506 in Ardoch, approximately 4.5 km northeast of the study area.

### 4.6 Mineral Resources

The presence of scarce mineral resources on or near to a property may indicate potential for archaeological resources associated with both pre-Contact and post-Contact exploration and exploitation. For this reason, the background research conducted for the assessment includes a search of available sources of information on the locations of outcrops of rare and highly valued minerals, such as quartz, chert, ochre, copper, and soapstone, as well as minerals sought out by post-Contact prospectors and miners for more industrial-scale exploitation (i.e. gold, copper, iron, mica, etc.). Useful tools in this search are provided by databases maintained by the Ontario Geological Survey and the Ministry of Northern Development and Mines, including:

- *Abandoned Mines Information System* which contains a list of all known abandoned and inactive mine sites and associated features in the Province;
- *Mining Claims* which contains a list of all active claims, alienations, and dispositions;
- *Mineral Deposits Inventory* which contains a list of known mineral occurrences of economic value in the Province; and,
- *Bedrock Geology Data Set*, which shows the distribution of bedrock units and illustrates geologic rock types, major faults, iron formations, kimberlite intrusions, and dike swarms.

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[42] https://freepages.rootsweb.com/~clifford/history/

[43] https://vitacollections.ca/ogscollections/2818487/data?g=d

[44] https://canadianheadstones.ca/ wp/cemetery-lookup/

[45] It should be noted that the research undertaken as part of this Stage 1 archaeological assessment is unlikely to identify the potential for the presence of unrecorded burial plots, such as those of individual families on rural properties. See Section 7.0 of this report for information regarding compliance with provincial legislation in the event that human remains are identified during future development.

A review of the above-mentioned databases revealed no cases of mineral deposits within a 300 m radius of the study area.

## 4.7 Local Environment

The assessment of present and past environmental conditions in the region containing the study area is a necessary component in determining the potential for past occupation as well as providing a context for the analysis of archaeological resources discovered during an assessment. Factors such as local water sources, soil types, vegetation associations and topography all contribute to the suitability of the land for human exploitation and/or settlement. For the purposes of this assessment, information from local physiographic, geological and soils research has been compiled to create a picture of the environmental context for both past and present land uses.

The physiography and distribution of surficial material in this area are largely the result of glacial activity that took place in the Late Wisconsinan (Bajc 1994). This period, which lasted from approximately 23,000 to 11,000 years before present, was marked by the repeated advance and retreat of the massive Laurentide Ice Sheet. As the ice advanced, debris from the underlying sediments and bedrock accumulated within and beneath the ice. The debris, a mixture of stones, sand, silt, and clay, was deposited over large areas as till plains, drumlins, and moraines. During deglaciation, as the Late Wisconsinan ice margin receded to the north, massive inflows of glacial meltwater into the Huron-Georgian Bay-Lake Simcoe basin flooded adjacent lands, which had been depressed by the weight of the continental ice sheet, forming glacial Lake Algonquin by 11,500 years ago (Eshman and Karrow 1985 in Gao 2010). These waters created shoreline features that, with isostatic rebound, are now as much as 100 to 150 metres above the present water level in Georgian Bay. Where the northern limit of glacial Lake Algonquin was formed by the retreating ice sheet, new lake outlets developed as progressively lower sills were exposed, and water levels dropped to successively lower levels. About 10,100 B.P., during the Ottawa-Marquette Low Stand, Glacial Lake Algonquin drained away and a series of smaller lakes (called Hough and Stanley) occupied depressions in the Huron Basin below the present-day water level. While low-water conditions continued in the former Laurentide Lake basis for millennia, only c. 500 years later water volumes increased rapidly in the French-Nipissing-Mattawa basin. These changing conditions resulted in much higher water levels in the Mattawa Lowlands and Ottawa River Valley, creating a series of raised post-Algonquin relic shorelines. Modern water levels in the Great Lakes basins only developed sometime after 3,000 years ago, with only minor climate-related fluctuations since that time.

The study area is situated within the Algonquin Highlands physiographic region which is characterized by an extensive tract of shallow soil over granite or other hard Precambrian bedrock (Chapman and Putnam 1984:211). The relief is generally rough with rounded knobs and ridges, some up to 170 m high. Surficial geological mapping indicates that the study area is underlain by Precambrian bedrock (Map 5).

The soil survey of Frontenac County shows the survey property consists of the Tweed Sandy Loam complex, comprised of shallow, calcareous sandy loam till and acidic with low fertility, usually associated with rock outcrops, rough topography, stones and swamps. In general, these are not considered arable soils but are well draining (Hoffman et al. 1967; see Map 5). Topographic mapping at 2 m contours shows the study area consists of a gentle slope down to the water on either shoreline, with elevations ranging between 260 m and 264 m above sea level (masl; see Map 5).

The study area lies within the Mississippi Valley watershed, and more specifically the Crotch Lake-Mississippi River subwatershed. Kashwakamak Lake is a 15 km long, relatively narrow, freshwater lake running in an east-west direction. It is 0.74 km at its widest point with a maximum depth of 22 m. The primary inflow and outflow are both via the Mississippi River; upstream from Marble Lake over the White Fish rapids and downstream, controlled by the Kashwakamak Dam, towards Mud Lake. The damming of this lake raised the water levels up to eight feet (2.44 m; Armstrong 1976:38-39).

The study area is also within the Middle Ottawa sub-region of the Great Lakes-St. Lawrence Forest Region. Tree species within this area include sugar maple, beech, yellow birch, red maple, hemlock, white pine and red pine with lesser numbers of jack pine, white spruce, balsam fir, aspen, white birch, red oak and basswood. Hardwood and mixed wood swamps also can contain easter cedar, tamarack, black spruce, clack ash, red maple and elm. Other occasional species include butternut, bur oak, white ash and black cherry (Rowe 1972:48). The area would have been cleared of its original forest cover with the intensification of Euro-Canadian settlement and extensive logging in the nineteenth century.

# 5.0 STAGE 1 ARCHAEOLOGICAL ASSESSMENT

This section of the report includes an evaluation of the archaeological potential within the study area, in which the results of the background research described above are synthesized to determine the likelihood of the property to contain significant archaeological resources.

## 5.1 Optional Property Inspection

In addition to the above research, Past Recovery completed an optional site inspection on July 25th, 2023. The weather was sunny and warm with a high of 29 degrees Celsius. These conditions permitted adequate to excellent visibility for the identification and documentation of archaeological potential. The inspection was conducted according to archaeological fieldwork standards outlined in *Standards and Guidelines for Consultant Archaeologists* (MCM 2011), with field conditions and features influencing archaeological potential documented through digital photography, a field map, and field notes. The complete Stage 1 photographic catalogue is included as Appendix 1 and the locations and orientations of all photographs referenced in this section of the report are shown on Map 6. As per the *Terms and Conditions for Archaeological Licences* in Ontario, curation of all photographs generated during the Stage 1 archaeological assessment is being provided by Past Recovery pending the identification of a suitable repository. An inventory of the records generated during the inspection is provided below in Table 2. The property inspection has been used to supplement the background information to help inform the archaeological potential model developed below.

The site visit confirmed the conditions obvious in the 2019 aerial image used to define the study area (see Map 2) and noted other natural features or disturbances affecting the archaeological potential of the property (Images 2 to 19). The north side of the lake consisted of primarily rocky, hilly terrain with small, flat areas between (see Images 2 and 3). There were areas of exposed bedrock, and the appearance of thin soils elsewhere.

**Table 2. Inventory of the Stage 1 Documentary Record.**

| Type of Document | Description | Number of Records | Location |
|---|---|---|---|
| Photographs | Digital photographs (*.jpg) documenting the subject property and conditions at the time of the property survey | 72 digital photographs | On Past Recovery Server – file PR23-021 |
| Mapping Data | Shapefiles (*.shp) | 2 files | On Past Recovery Server – file PR23-021 |
| Field Notes | Field notes from the site visit (*.pdf) | 1 digital file | On Past Recovery Server – file PR23-021 |

The trees consisted of mature forest cover and the shoreline was rocky, sloping down towards the water (see Images 4 to 6).

As mentioned previously, the main control dam consisted of two bulkhead walls, three concrete piers forming the two sluiceways and a broad crested concreted weir. There was also a buoy line in place to catch any floating debris. The lower retaining wall was at the north end of the study area (see Image 7). There was concrete infill at the north end shoreline, to create a level area (see Images 8 and 9). The majority of the southern shoreline was rocky with many areas of bare stone (see Image 10) or very thin soils. The southern shoreline at the control dam had been lined with concrete abutment barriers, but was otherwise treed and flat (see Image 11). Further east of the dam, the shoreline was composed of bare rocks. As a result of the high water levels, the southern shoreline could not be reached on foot, as water was cresting the dam, preventing crossing. The assessment photographs were taken from the dam and the northern shoreline, but a more thorough look will be taken as part of the Stage 2 assessment.

There was a saddle dam located approximately 75 metres to the north-northeast of the main dam (see Image 12). This was an auxiliary dam constructed to confine the reservoir created by a primary dam either to permit a higher water elevation and storage or to limit the extent of the reservoir for increased efficiency. Saddle dams are generally constructed in a low spot or saddle through which the reservoir would otherwise escape. This saddle dam was a concrete, linear construction hugging the shoreline. It had rough concrete backfill on the landward side, both to support it and fill in the low-lying shoreline (see Image 13).

An access road ran through the western edge of the study area, roughly following the curve of the shoreline. It was gravel packed, and in some areas had clearly been artificially raised from the surrounding terrain through the addition of fill (see Images 14 and 15). Further to the north the road became a dirt track with older gravel fill (see Images 16 and 17).

Possible locations for the staging/laydown area were indicated to be on lands east of the access road. Although the topography was generally hilly between the control dam and the staging area (see Image 18), a relatively flat area was also included (see Image 19). These lands sloped gently down to the water with a slight rise at the western end.

### 5.2 Evaluation of Archaeological Potential

The evaluation of the potential of a particular parcel of land to contain significant archaeological resources is based on the identification of local features that have demonstrated associations with known archaeological sites. For instance, archaeological sites associated with pre-Contact settlements and land uses are typically found in close physical association with environmental features such as sources of potable water, transportation routes (navigable waterways and trails), accessible shorelines, areas of elevated topography (i.e. knolls, ridges, eskers, escarpments, and drumlins), areas of sandy and well-drained soils, distinctive land formations (i.e. waterfalls, rock outcrops, caverns, mounds, and promontories and their bases), as well as resource-rich areas (e.g. migratory routes, spawning areas, scarce raw materials, etc.). Similarly, post-Contact archaeological sites are often found in association with many of these same environmental features, though they are also commonly connected with known areas of early Euro-Canadian settlement, early historical transportation routes (e.g. roads, trails, railways, etc.), and areas of early Euro-Canadian industry (i.e. the fur trade, logging and mining). For this reason, assessments of the potential of a particular parcel of land to contain post-Contact archaeological sites rely heavily on historical and archival research, including reviews of available land registry records, census returns and assessment rolls, historical maps, and aerial photographs. The locations of previously discovered archaeological sites can also be used to shed light on the chances that a particular location contains an archaeological record of past human activities.

Archaeological assessment standards established in the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011) specify which factors, at a minimum, must be considered when evaluating archaeological potential. Licensed consultant archaeologists are required to incorporate these factors into potential determinations and account for all features on the property that can indicate the potential for significant archaeological sites. If this evaluation indicates that any part of a subject property exhibits potential for archaeological resources, the completion of a Stage 2 archaeological assessment is commonly required prior to the issuance of approvals for activities that would involve soil disturbances or other alterations.

The *Standards and Guidelines for Consultant Archaeologists* (MCM 2011) also establish minimum distances from features of archaeological potential that must be identified as exhibiting potential for sites. For instance, this includes all lands within 300 m of primary and secondary water sources, past water sources (i.e. glacial lake shorelines), registered archaeological sites, areas of early Euro-Canadian settlement, or locations identified as potentially containing significant archaeological resources by local histories or informants. It also includes all lands within 100 m of early historic transportation routes (e.g. roads, trails, and portage routes). Further, any portion of a property containing elevated topography, pockets of well-drained sandy soils, distinctive land formations, resource-rich/harvesting areas, and/or previously identified cultural heritage resources (i.e. built heritage properties and/or cultural heritage landscapes that may be associated with significant archaeological resources) must also be identified as exhibiting archaeological potential.

### 5.3 Analysis and Conclusions

The background research undertaken for this assessment indicates that all of the subject property exhibits potential for the presence of significant archaeological resources associated with pre-Contact settlement and/or land uses. Specifically:

- All of the study area lies within 300 m of Kashwakamak Lake/Mississippi River (a major pre-Contact transportation corridor), which offered a source of potable water and food, making the entire area a suitable location for camps for pre-Contact hunter-gatherer populations; and
- Soils in the study area are well-drained sandy loam, of a type preferred for pre-Contact campsites.

The study area also exhibits characteristics that indicate potential for the presence of archaeological resources associated with post-Contact settlement and/or land uses. Specifically:

- All of the study area lies within 300 m of Kashwakamak Lake/Mississippi River, a major post-Contact transportation corridor which continues to serve as a transportation corridor today; and,
- Nineteenth century logging activity occurred throughout the general area.

The evaluation of archaeological potential also included a review of available sources of information (i.e. high resolution aerial photographs and satellite imagery) to determine if part or all of the study area had been subject to deep and intensive soil disturbance (i.e. quarrying, road construction, major landscaping involving grading below topsoil, former building footprints, utility line and infrastructure development, etc.) in the recent past, as these activities would have severely damaged the integrity of or removed any archaeological resources that might have been present. Further, the review included an assessment of the property for additional factors that might limit archaeological potential such as land with permanent water saturation, exposed bedrock or steep slope of greater than 20 degrees in elevation. As has been noted above, a gravel-covered access road mirrored the shoreline of the lake, and the Kashwakamak Dam system consisted of the main control dam as well as the secondary saddle dam. Evidence for these attributes was clearly visible in the study area, confirming associated deep disturbance. The remainder of the property appeared to be unaltered, though there were clearly areas of steep slope.

Based on the historical sources and imagery reviewed and the site visit it has been determined that all of the study area retains potential for both pre-Contact and post-Contact archaeological resources, with the exceptions of the sloped areas, as well as the areas that have been disturbed through the construction of the dams and the creation of the access road. The extents of the disturbed areas will need to be confirmed during Stage 2 testing. The remainder of the study area should be subject to Stage 2 archaeological field assessment to determine whether or not there are archaeological resources prior to any future ground disturbance. The archaeological potential determination has been illustrated on Map 6.

## 5.4 Stage 1 Recommendations

The results of the background research discussed above have indicated that all of the study area exhibits potential for the presence of significant archaeological resources. Accordingly, it is recommended that:

1) The portions of the study area that have been determined to exhibit archaeological potential should be subject to Stage 2 archaeological assessment prior to the initiation of below-grade soil disturbances or other alterations (see Map 6).

2) Any future Stage 2 archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011). As the study area is non-agricultural land, all portions identified as exhibiting archaeological potential should be assessed by means of a shovel test pit survey conducted at 5 m intervals.

3) In the event that future planning results in the identification of additional areas of impact beyond the limits of the present Stage 1 study area, further archaeological assessment may be required. It should be noted that screening for impacts should include all aspects of the proposed development that may cause soil disturbances or other alterations (i.e. access roads, staging/lay down areas, associated works etc.), and that even temporary property needs should be considered.

4) Any future archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011).

# 6.0 STAGE 2 ARCHAEOLOGICAL ASSESSMENT

This section of the report describes the methodology used and results of the Stage 2 property survey conducted to determine whether the subject property contains significant archaeological resources.

## 6.1 Field Methods

The Stage 2 archaeological fieldwork was completed on May 2nd 2024, by a crew of eight people consisting of a licensed field director and seven field technicians. Fieldwork was conducted according to archaeological fieldwork standards outlined in *Standards and Guidelines for Consultant Archaeologists* (MCM 2011). Weather conditions were partially sunny and a high of 17 degrees C. These conditions permitted adequate to excellent visibility for the identification, documentation, and, where appropriate, recovery of archaeological resources.

In order to ensure full coverage during the Stage 2 property survey, the Past Recovery field crew used 'Mapit Pro' GIS software on a tablet loaded with detailed satellite imagery overlain with the study area. This digital mapping interface, along with a high accuracy, GIS-mapping-grade Global Navigation Satellite System (GNSS) receiver, allowed the field crew to accurately delimit the study area in relation to their 'real time' position and record features of interest. The GNSS unit employed for this purpose was a Trimble Catalyst DA1 antennae connected to a Samsung tablet running Trimble Mobile Manager software and receiving Trimble RTX corrections. While in use, the receiver reported accuracies within the range of plus or minus 1 m.

The study area was comprised primarily of open, mixed woodland, mostly deciduous trees, with rolling topography. As such the Stage 2 archaeological assessment consisted of a shovel test pit survey on a 5 m grid across the study area (Images 20 to 22; Map 7). Some sections of the study area were not tested because of a combination of steep slopes, low lying and wet areas, disturbances from dam construction and exposed bedrock. Survey methods and field conditions were recorded on project mapping and estimates of survey coverage are provided in Table 3.

The terrain across the undisturbed portions of study area consisted of rocky, hilly terrain with small, flat areas in between. There were areas of exposed bedrock, and the appearance of thin soils elsewhere. The trees consisted of mature forest cover and the shoreline was rocky, sloping down towards the water. The northern edge of the property ran along a former river, now dried up because of the saddle dam. This former riverbed had very steep slopes on either side and was permanently wet at the bottom. This area was not tested (Images 23 and 24; see Map 7)

**Table 3. Estimates of Survey Coverage during the Stage 2 Assessment.**

| Survey Type | Area Covered | Percentage of Study Area (Total = 62.0 ha) |
|---|---|---|
| Shovel test pit survey at 5 m intervals | 1.39 hectares | 95% |
| Area obvious extensive and deep recent land alterations visually assessed | 0.04 hectares | 3% |
| Low lying and wet areas with permanently saturated soils visually assessed | 0.02 hectares | 2% |
| Steeply sloped lands (greater than 20 degrees) visually assessed | 0.01 hectares | 1% |

The terrain across the undisturbed portions of study area consisted of rocky, hilly terrain with small, flat areas in between. There were areas of exposed bedrock, and the appearance of thin soils elsewhere. The trees consisted of mature forest cover and the shoreline was rocky, sloping down towards the water. The northern edge of the property ran along a former river, which is likely related to the placement of the saddle dam. This former riverbed had very steep slopes on either side and was permanently wet at the bottom. This area was not tested (Images 23 and 24; see Map 7)

Apart from where indicated, all test pit survey was completed at 5 m intervals using shovels and trowels, with back-dirt screened through 6 mm hardware mesh (see Images 20 to 22). Shovel test pits were at least 30 cm in diameter and excavation continued for 5 cm into sterile subsoil. All pits were examined for soil stratigraphy, cultural features, and/or evidence of deep and intensive disturbance. Sample test pits were documented with digital photographs and field notes. Once all required recording had been completed, all test pits were backfilled. Testing continued to within 1 m of built structures. Where archaeological resources were found, test pit intensification Strategy A was undertaken with eight additional test pits excavated within 2.5 m of the positive test pit, as well as a 1 m test unit placed over the positive test pit

Field activities were recorded through field notes, digital photographs, and digital mapping. A catalogue of the material generated during the Stage 2 property survey is included below in Table 4. The complete photographic catalogue is included as Appendix 1, and the locations and orientations of all photographs referenced in this section of the report are shown on Map 7. As per *Terms and Conditions for Archaeological Licences in Ontario*, curation of all photographs and field notes generated during the Stage 2 archaeological assessment is being provided by Past Recovery pending the identification of a suitable repository.

## Table 4. Inventory of the Stage 2 Documentary Record.

| Type of Document | Description | Number of Records | Location |
|---|---|---|---|
| Photographs | Digital photographs documenting the Stage 2 fieldwork | 129 photographs | On Past Recovery computer network – file PR23-021 |
| Mapping data | Shapefiles (*.shp) | 8 files | On Past Recovery computer network – file PR23-021 |
| Field Notes | Scanned and digital notes on the Stage 2 fieldwork; test pit forms | 8 pages (3 *.pdf files) | On Past Recovery computer network – file PR23-021 |

## 6.2 Laboratory Methods

Following the completion of the Stage 2 archaeological fieldwork, all artifacts recovered were cleaned, catalogued with their full provenience (surface find and findspot), and inventoried. The inventory used was based on a version of a database designed for post-Contact period sites by staff at Parks Canada. The Parks Canada database and associated *Artifact Inventory Guide* (Christianson and Plousos n.d.) identifies artifacts according to functional *Classes* intended to allow specific types of activities and behaviors to be separated for analysis. The 'Foodways' class, for example, is used to identify types of artifacts associated with all aspects of food preparation, storage, and consumption. In a similar way, the 'Architectural' class is a catch-all category for structural items such as bricks, nails, window glass, etc. These *Classes* are further subdivided into *Groups*, reflecting more specialized activities/behaviors. Artifacts are further categorized by *Object* and *Datable Attribute*, which are either functionally or temporally diagnostic. This type of artifact inventorying method facilitates the recognition of general trends in the dating and use of a site by allowing the assemblage to be conveniently organized for analysis. The pre-Contact artifact assemblage was catalogued using a modified version of the same Parks Canada database. Changes to the database included alterations to the artifact categories and types to better reflect meaningful categories of analysis for pre-Contact archaeological sites, while following a similar organization structure.

A complete inventory of the artifact assemblage is included as Appendix 2. Sample artifacts were photographed for inclusion in this report. As per the *Terms and Conditions for Archaeological Licences* in Ontario, curation of all artifacts generated during the Stage 2 archaeological assessment is being provided by Past Recovery pending the identification of a suitable repository. The artifact assemblage resulting from this archaeological assessment, consisting of 14 pre-Contact items, is housed in one standard banker's box (measuring 41.4 cm x 32.5 cm x 26.4 cm).

## 6.2 Fieldwork Results

The soil stratigraphy where there were undisturbed soils was comprised of shallow (between 5 cm to 15 cm) medium to dark brown sandy loam/humus over a yellow to orange sand subsoil (Images 25 to 27). The stratigraphy in the parking area showed a modern topsoil and gravel fill had been added over the natural topsoil, likely to create a more level surface (Image 28). Several disturbed areas were also encountered during the Stage 2 investigation. These included areas within and adjacent to the access road, the lands directly adjacent to the saddle dam, and the lands at the northern end of the control dam.

As a result of the inability to cross the control dam during the Stage 1 property inspection, a thorough look of this portion of the study area was also completed during the field work. Conditions were much the same as on the northern side of the dam with the terrain sloping up from the control dam, mixed hardwood vegetarian and a generally rocky shoreline (Images 29 to 31). On the southern side of the dam, a small area was visually assessed as disturbed (see Map 7). The test pits in this location contained the same stratigraphy as on the north side of the dam, mainly a thin layer of topsoil over subsoil, with a few directly onto bedrock at the south end (Image 32).

*Findspot* 1

Findspot 1 was encountered on the eastern half of the northern study area. The findspot consisted of one positive test pit containing a single chert flake and a 1x1 metre test unit, spread out over an area which measured approximately 5.5m north-south by 5.5m east-west (Map 8).

In accordance with Standard 2.1.3.2, dealing with test pit survey when archaeological resources are found, Intensification Strategy A was chosen to obtain additional information with regards to making it clear whether a Stage 3 archaeological assessment was necessary. In this case the intensification method selected dictated that eight additional test pits were dug at 2.5m from the positive test pit and a 1x1 metre unit was placed over the original positive test pit (Images 33 to 35). The stratigraphy in the test unit comprised of between 2 and 10 cm of dark brown sand topsoil with inclusions of roots and stones (Lot 1) over an orange sand subsoil (Lot 2). One additional flake was found in Lot 1, with 13 more flakes recovered from the top 30 cm of subsoil. Excavation continued into subsoil until 5 cm beyond where artifacts were recovered (Images 36 and 37; see Map 8).

No additional archaeological resources were encountered within the study area.

## 6.3 Record of Finds

The Stage 2 test pit survey yielded a total of 14 pieces of lithic material, and a fragment of calcined mammal bone. The lithic assemblage is composed solely of knapping debitage (tertiary and broken or partial flakes). Thirteen pieces of debitage are of Kichesippi chert, and one is a tertiary flake of Hudson Bay Lowland chert (Table 5). No temporally diagnostic artifacts were recovered; it is therefore not possible to assign a date to the lithic assemblage.

Several sources for the local Kichesippi chert are known in the Ottawa valley, including at Jessup's Rapids on the Bonnechere River, down river from Eganville, and on the Eardley escarpment near Gatineau (Fox 2009:359).

The cherts collectively known as Hudson Bay Lowland include cherts of the Silurian and Devonian Severn River, Ekwan, and Stooping River formations, which outcrop along the Severn and Albany rivers in the Hudson Bay Lowland basin in northern Ontario. Cherts commonly occur as large cobbles and pebbles, found in moraine deposits south of the primary sources, and were utilized by Pre-contact groups in the collection of high quality lithic raw material (Fox 2010: 355-357).

Most of the lithic artifacts are tertiary flakes (13), of which 12 are Kichesippi chert, and one Hudson Bay Lowland chert. One broken or partial flake of Kichesippi chert was also recovered. These results indicate that later stage reduction practices, such as tool finishing and maintenance, were taking place at the site.

Analysis of the lithic assemblage suggests that the site was the location of a short-term campsite where the inhabitants undertook late-stage lithic reduction practices, using both locally available and imported lithic raw materials.

**Table 5. Breakdown of the Pre-contact Lithic Artifacts by Material.**

| Material and Utilization | # | % of Total |
|---|---|---|
| **Kichesippi Chert** | **13** | **92.9** |
| *Tertiary Flake* | 12 | 85.8 |
| *Broken/Partial Flake* | 1 | 7.1 |
| **HBL Chert** | **1** | **7.1** |
| *Tertiary Flake* | 1 | 7.1 |
| **Total** | **14** | **100%** |

## 6.4 Analysis and Conclusions

The Stage 2 archaeological assessment consisted of a shovel test-pit survey at 5 m intervals across all portions of the study area determined to exhibit archaeological potential; the remaining areas were not tested having been determined to be of low archaeological potential as a result of deep disturbance, permanently wet areas or steeply sloped terrain (> 20 degrees; see Map 7). The property survey resulted in the identification of one previously unrecorded potential archaeological site, identified as Findspot 1 (see Map 8).

The artifacts recovered from Findspot 1 suggests that the site was the location of a short-term campsite where the inhabitants undertook late-stage lithic reduction practices, using both locally available and imported lithic raw materials. As the lithic assemblage was comprised of non-diagnostic flakes, no further inferences may be drawn.

As the artifact assemblage exceeded three pre-19th century artifacts found within a 10 m radius, the site meets MCM requirements for registration as an archaeological site in the Ontario Archaeological Sites Database and was thus assigned Borden Number BfGf-3 (MCM 2011:160). The result of a Stage 2 property assessment met Standard 2.2.1c.ii(2) indicating a requirement for a Stage 3 assessment by recovering more than 5 non-diagnostic artifacts from within a 10m x 10m test pit survey area, including from both the positive test pit, as well as the test unit (MCM 2011:41).

No other archaeological resources were found over the course of this assessment.

### 6.5 Stage 2 Recommendations

On the basis of the results of the Stage 2 property survey discussed above, it is recommended that:

1) A Stage 3 site-specific archaeological assessment should be undertaken for Findspot #1 (BfGf-3) by means of the controlled hand excavation of one-metre-square units over the area of the site on a 5 m grid, with an additional 20 percent of the grid total focussing on areas of interest within the site extent. The assessment should be undertaken by a licensed consultant archaeologist in compliance with Standards and Guidelines for Consultant Archaeologists (MCM 2011).

2) In the event that future planning results in the identification of additional areas of impact beyond the limits of the present study area, further Stage 2 archaeological assessment may be required. It should be noted that impacts include all aspects of the proposed development causing soil disturbances or other alterations, including additional temporary property needs (i.e. access roads, staging/lay down areas, associated works etc.). Any future Stage 2 archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011).

The reader is also referred to Section 7.0 below to ensure compliance with relevant provincial legislation and regulations as may relate to this project. In the event that any artifacts of Indigenous interest or human remains are encountered during the development of the subject property, in addition to following the *Advice on Compliance* *with Legislation* (see Section 7.0), the Indigenous communities listed below should be contacted:

- List to be provided in the Indigenous Content Doc

Contact information for the above communities can be found in the Supplementary Document entitled "*Indigenous Community Contacts.*"

## 7.0 ADVICE ON COMPLIANCE WITH LEGISLATION

In order to ensure compliance with relevant Provincial legislation as it may relate to this project, the reader is advised of the following:

1) This report is submitted to the Ministry of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2) It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

3) Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

4) The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

5) Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

## 8.0 LIMITATIONS AND CLOSURE

Past Recovery Archaeological Services Inc. has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the archaeological profession currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied, is made.

This report has been prepared for the specific site, design objective, developments and purpose prescribed in the client proposal and subsequent agreed upon changes to the contract. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the client in the design of the specific project.

Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sample and testing program may fail to detect all or certain archaeological resources. The sampling strategies in this study comply with those identified in the Ministry of Citizenship and Multiculturalism's *Standards and Guidelines for Consultant Archaeologists* (2011).

The documentation related to this archaeological assessment will be curated by Past Recovery Archaeological Services Inc. until such a time that arrangements for their ultimate transfer to an approved and suitable repository can be made to the satisfaction of the project owner(s), the Ontario Ministry of Citizenship and Multiculturalism and any other legitimate interest group.

We trust that this report meets your current needs. If you have any questions or if we may be of further assistance, please do not hesitate to contact the undersigned.

Jeff Earl

Jeff Earl, M.Soc.Sc.
Principal
Past Recovery Archaeological Services Inc.

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### Library and Archives Canada (LAC):

***National Map Collection (NMC):***

| | |
|---|---|
| NMC 11476 | *Map of the Frontenac County from actual surveys under the direction of H.F. Walling* (1860) |

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| | |
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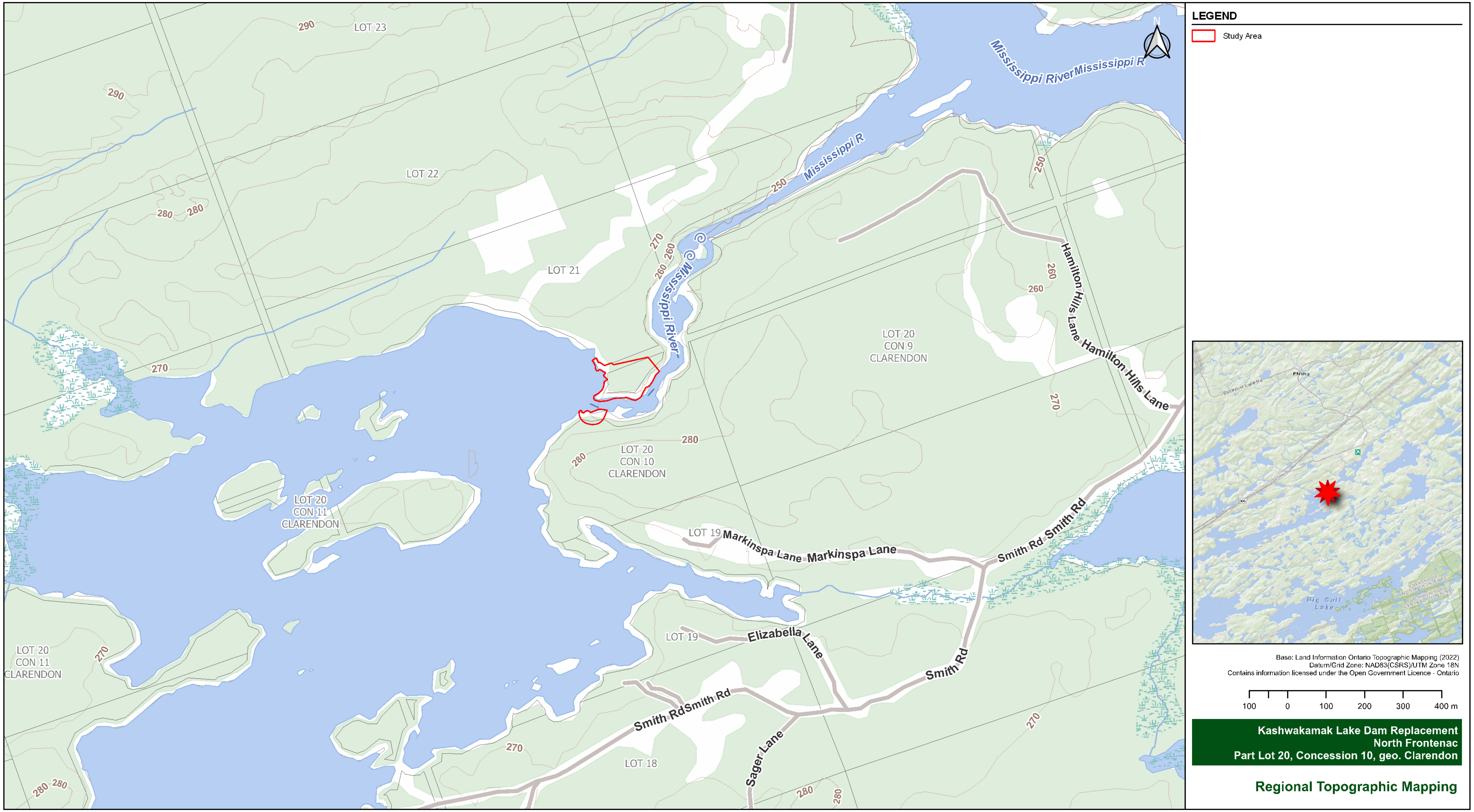
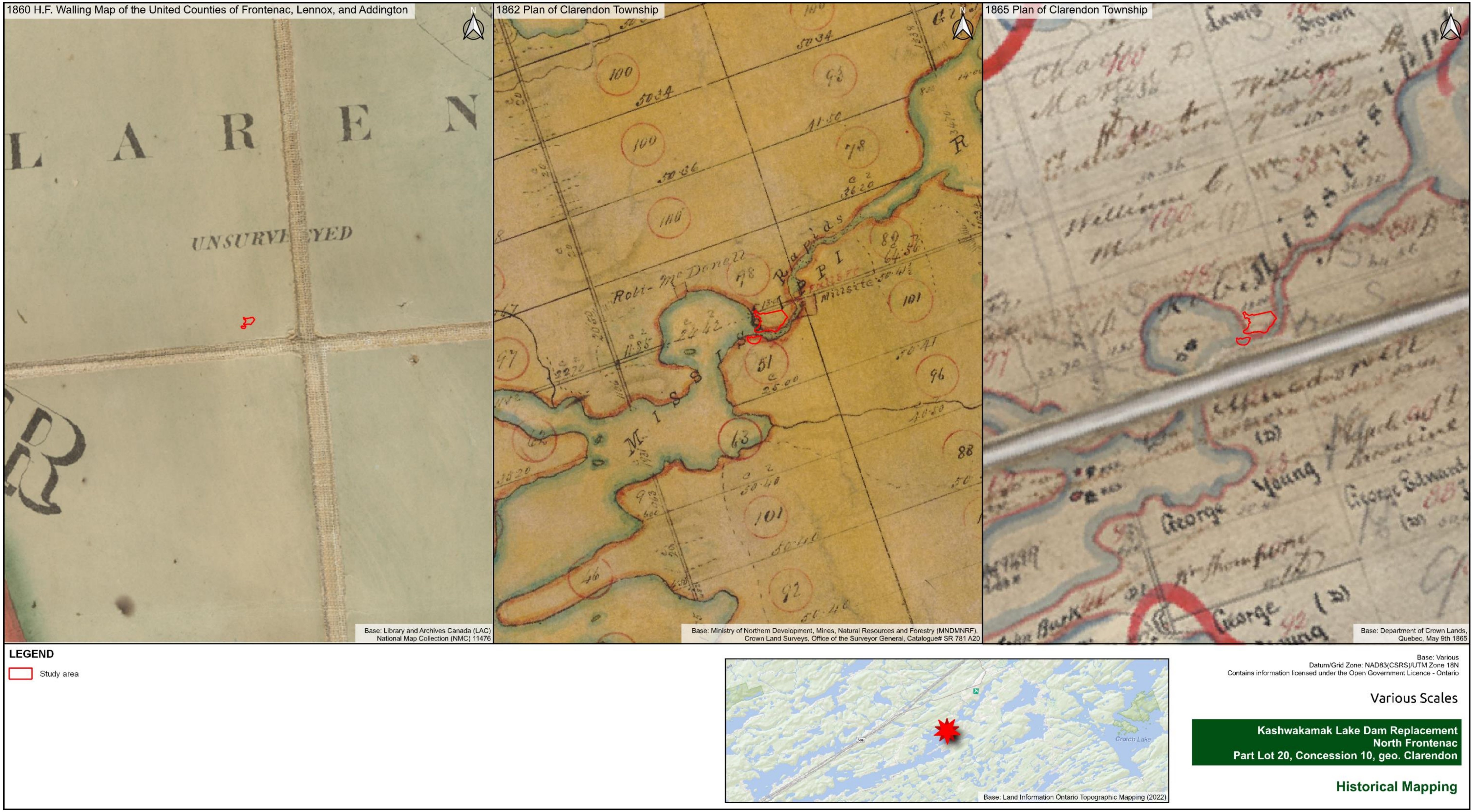
# 10.0 MAPS



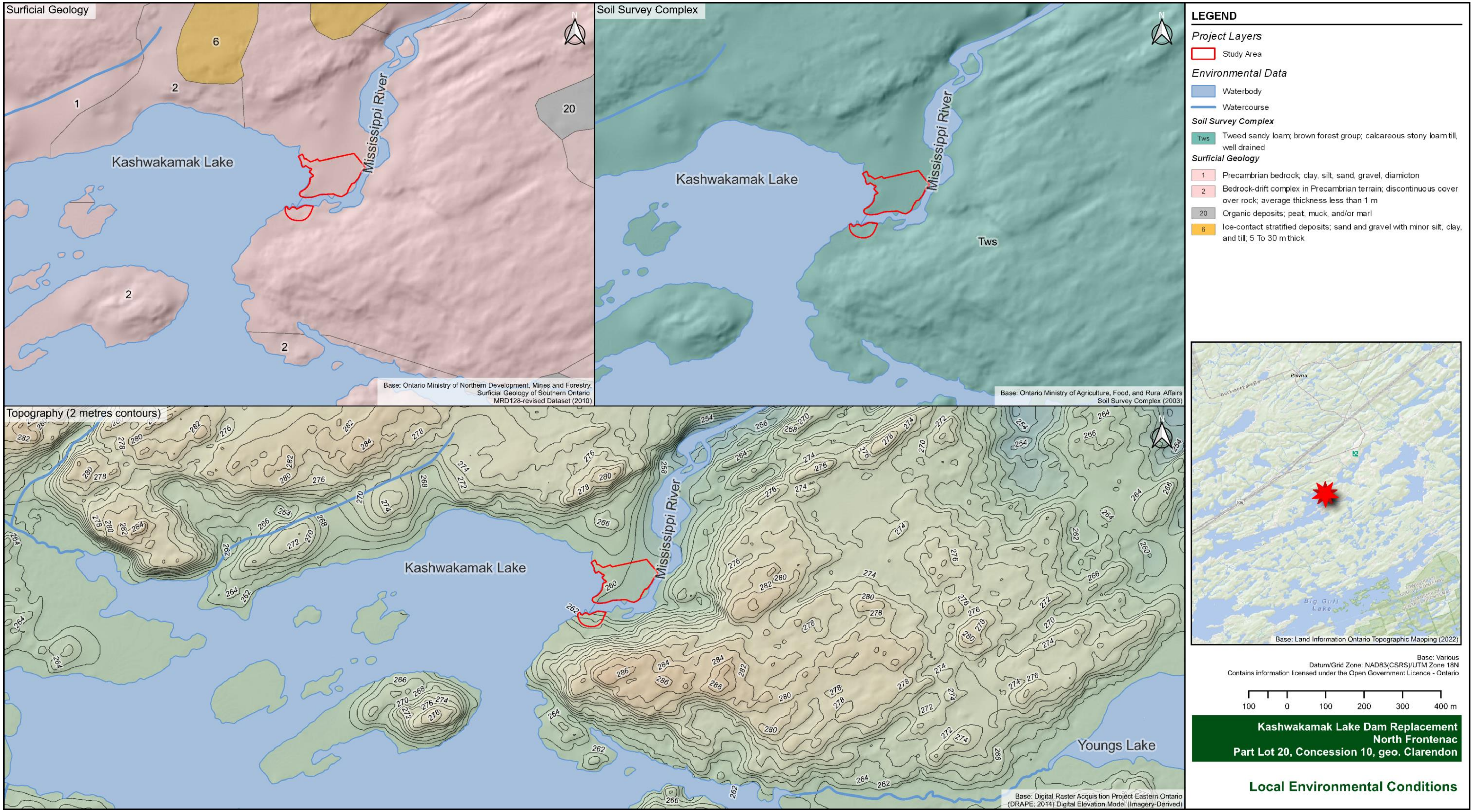
**Map 1. Location of the study area.**

**Map 2. Recent (2019) orthographic imagery showing the study area.**



**Map 3. Historical mapping showing the approximate location of the study area.**

**Map 4. Historical mapping and topographic mapping showing the study area.**



Base: Ontario Ministry of Northern Development, Mines and Forestry, Surficial Geology of Southern Ontario MRD128-revised Dataset (2010)

Base: Ontario Ministry of Agriculture, Food, and Rural Affairs Soil Survey Complex (2003)

Base: Digital Raster Acquisition Project Eastern Ontario (DRAPE; 2014) Digital Elevation Model (Imagery-Derived)

Base: Land Information Ontario Topographic Mapping (2022)

Base: Various
Datum/Grid Zone: NAD83(CSRS)/UTM Zone 18N
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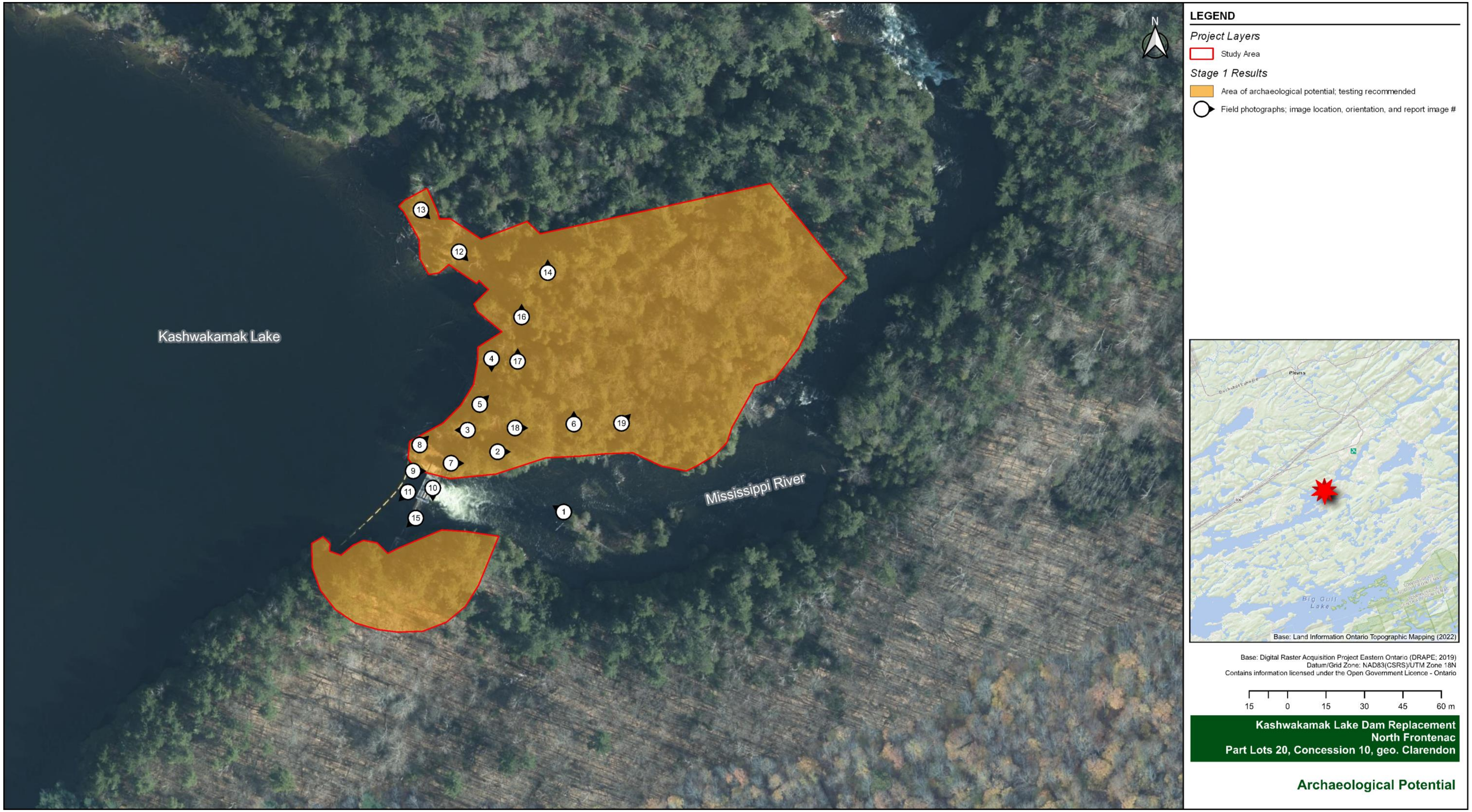
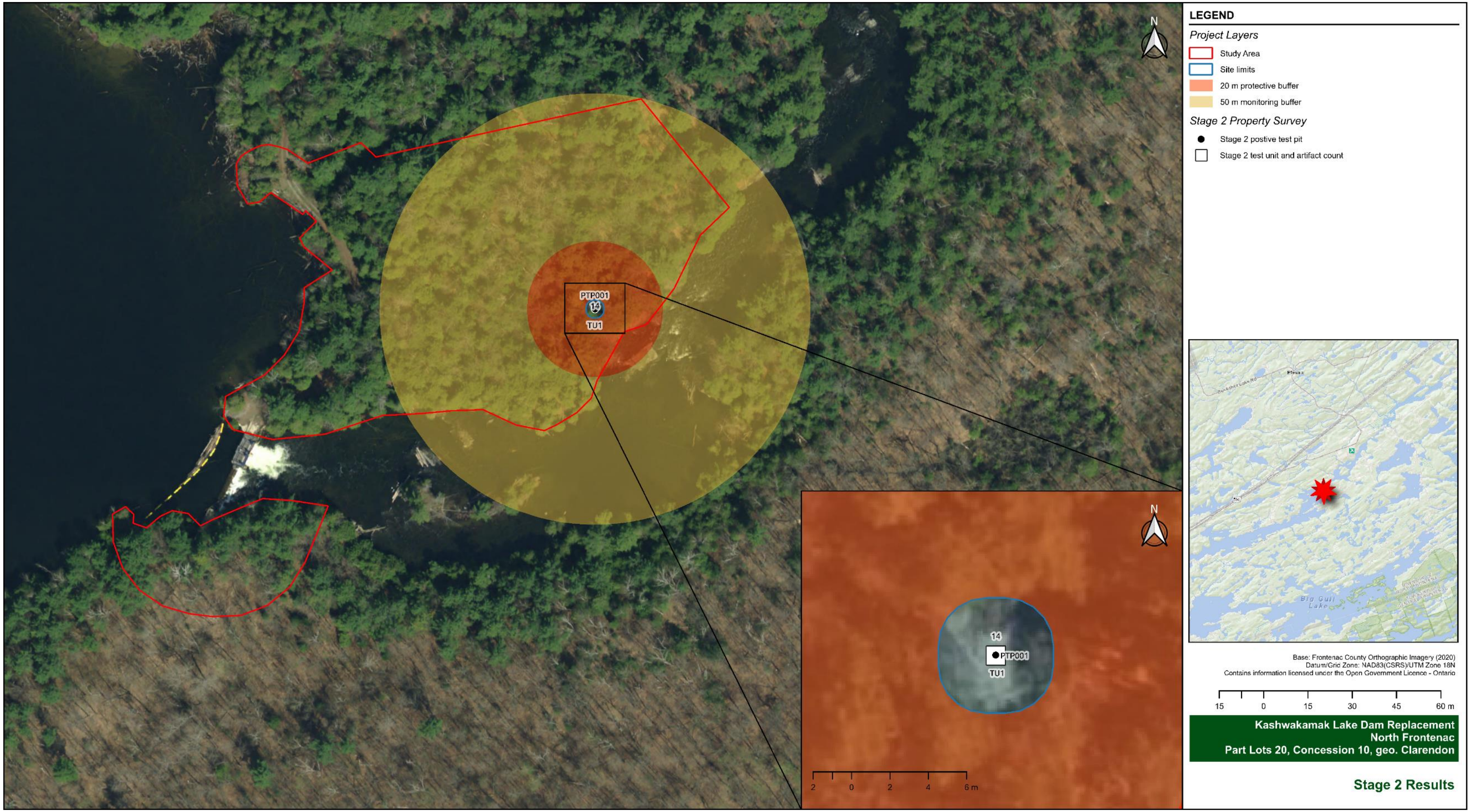
**Map 5. Environmental mapping showing the study area.**



**Map 6. Recent (2019) orthographic imagery showing the archaeological potential within the study area.**

**Map 7.** Recent (2020) orthographic imagery showing the Stage 2 methodology as well as field photography; location, orientation, and report image number.



**Map 8. Recent (2020) orthographic imagery showing the Stage 2 results.**

# 11.0 IMAGES

**Image 1. Photograph of the Kashwakamak Lake Dam, facing west-northwest.** (Courtesy of MVCA)

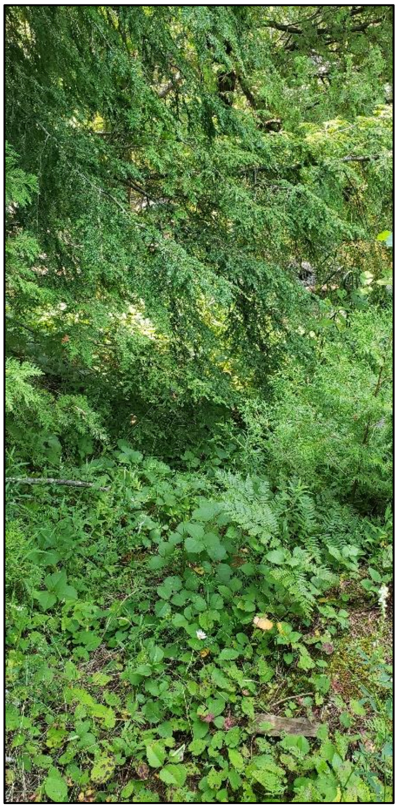


**Image 2. Overview of forest growth, facing east.** (PR23-021D015)

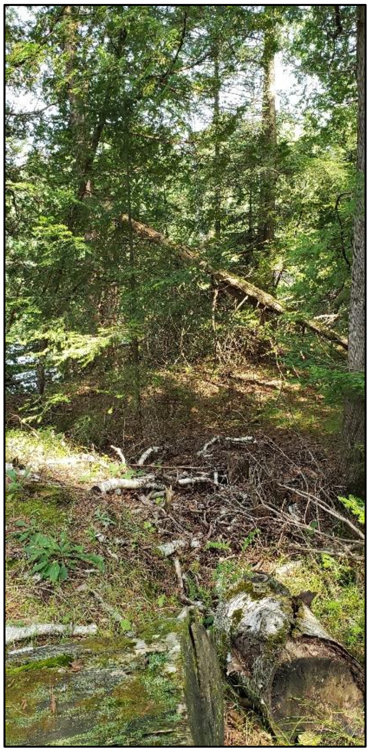


**Image 3. View of the hilly topography on the west side of the access road, facing north.** (PR23-021D020)

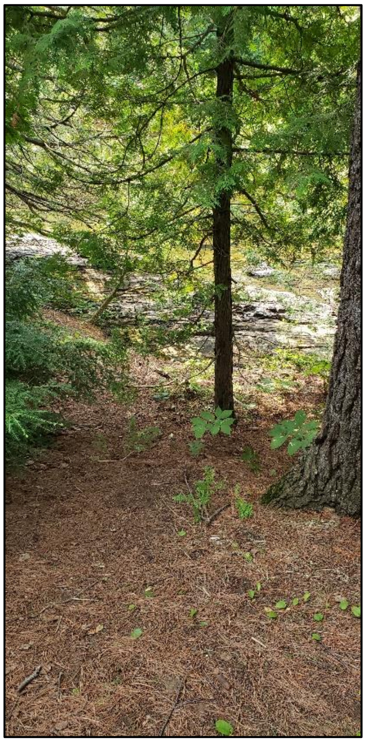


**Image 4. View of the slope down to the rocky shoreline, facing south.** (PR23-021D016)

**Image 5. View of the slope down to the shoreline, facing northeast.** (PR23-021D018)

**Image 6. View of the slope up from the shoreline near the proposed staging area, facing north.** (PR23-021D031)

**Image 7. View from above of the retaining wall at the north end of the control dam, facing east.** (PR23-021D013)

**Image 8. View of the main patch of concrete filling in the approach to the northern end of the control dam, facing northeast.** (PR23-021D012)

**Image 9. View of a secondary patch of concrete fill at the northern end of the control dam, facing east.** (PR23-021D014)

**Image 10. View of the southern shoreline at the control dam, facing south.** (PR23-021D008)

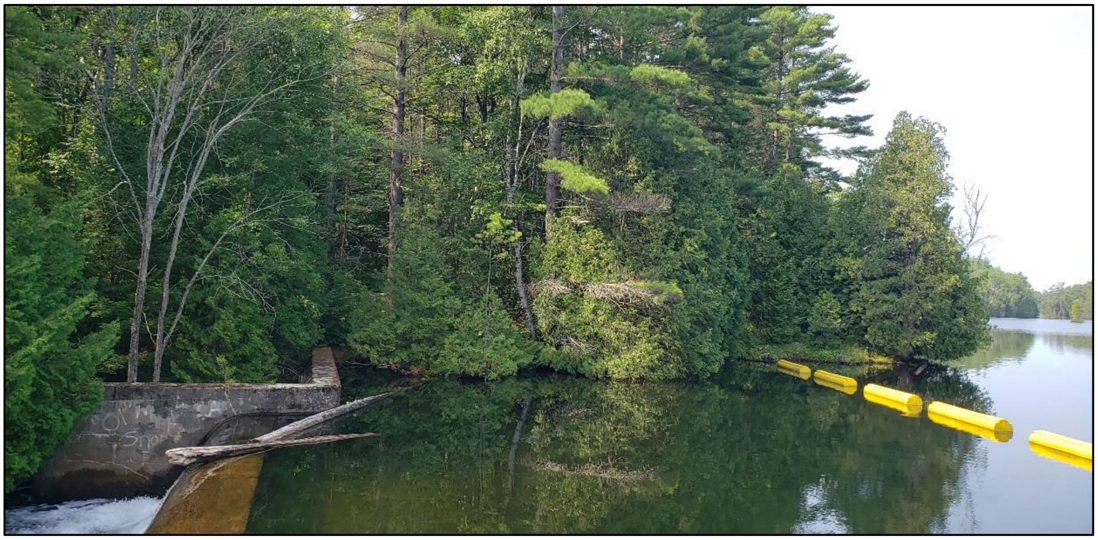


**Image 11. View of the southern shoreline at the control dam, facing southwest.** (PR23-021D007)

**Image 12. View of disturbance caused by construction activities in the northern portion of the study area, facing southeast.** (PR23-021D041)

**Image 13. View of disturbance caused by construction activities in the northern portion of the study area, facing southeast.** (PR23-021D052)

**Image 14. View of the access road and the change in elevation between the road and the natural topography, facing north.** (PR23-021D019)

**Image 15. View of the south half of the control dam and the south shore, facing southwest.** (PR23-021D005)

**Image 16. View of the access road near the saddle dam, facing north.** (PR23-021D044)

**Image 17. View of the access road fill near the saddle dam, facing north.** (PR23-021D047)

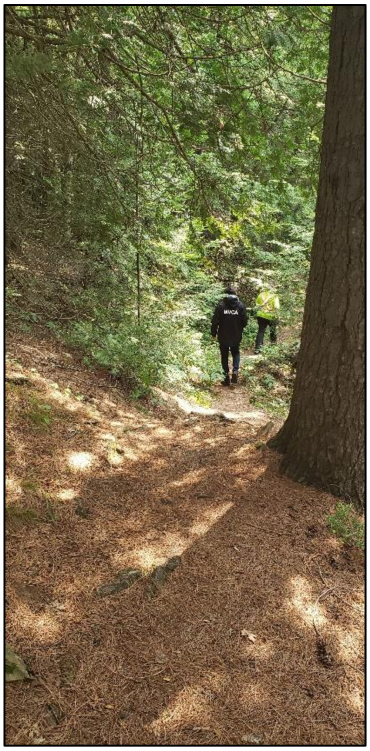


**Image 18. View of the hilly topography between the saddle dam and the proposed staging area, facing east.** (PR23-021D027)

**Image 19. View of the proposed staging area, facing northeast.** (PR23-021D033)

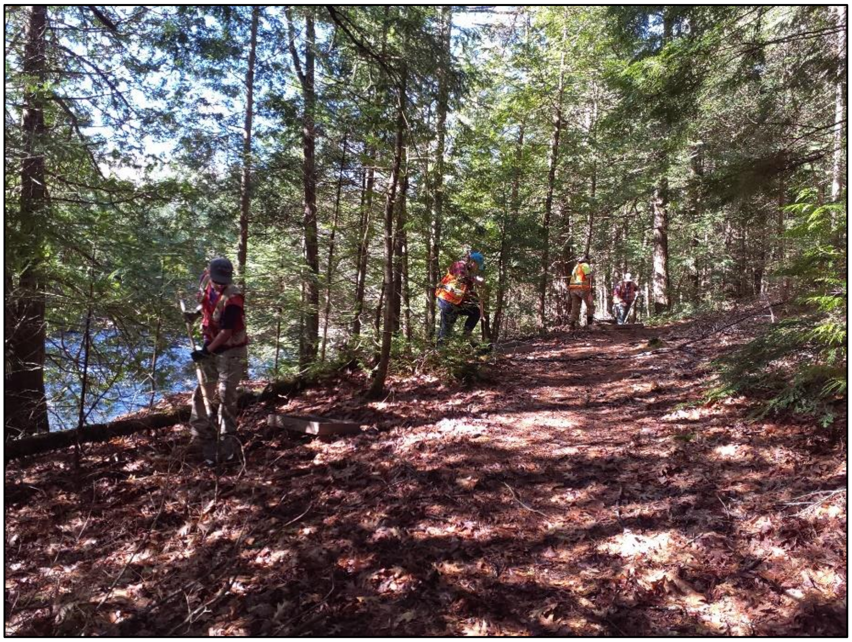


**Image 20. View of field crew shovel testing at 5m intervals I the eastern portion of the study area, facing southwest.** (PR23-021D073)

**Image 21. View of field crew shovel testing at 5m intervals in the northern portion of the study area, facing east-southeast.** (PR23-021D082)

**Image 22. View of the field crew shovel testing at 5m intervals in the southern study area, facing east-northeast.** (PR23-021D079)

**Image 23. View of the steep slope along the former riverbed in the north portion of the study area, facing east.** (PR23-021D109)

**Image 24. View of the standing water within the former riverbed, in the north portion of the study area, facing west-northwest.** (PR23-021D113)

**Image 25. View of sample test pit in the eastern portion of the study area showing natural soil stratigraphy, facing west.** (PR23-021D075)

**Image 26. View of sample test pit in the western portion of the southern study area showing natural soil stratigraphy, facing west.** (PR23-021D078)

**Image 27. View of sample test pit in the centre of the study area showing natural soil stratigraphy, facing north.** (PR23-021D092)

**Image 28. View of sample test pit in the southwestern portion of the study area showing imported parking lot fills over natural stratigraphy.** (PR23-021D121)

**Image 29. View of the south side of the control dam, facing southwest.** (PR23-021D086)

**Image 30. View of the rocky water edge within the southern study area, facing east-northeast.** (PR23-021D087)

**Image 31. View of the centre of the study area, facing east-southeast.** (PR23-021D096)

**Image 32. View of sample test pit in the southern portion of the southern study area showing natural soil stratigraphy over bedrock, facing west.** (PR23-021D093)

**Image 33. View of the field crew excavating intensification test pits at 2.5 m intervals around Test Unit 1, facing south.** (PR23-021D128)

**Image 34. View of the field crew excavating Test Unit 1 at Findspot 1, facing east.** (PR23-021D099)

**Image 35. View of the field crew excavating Test Unit 1 at Findspot 1, facing north.** (PR23-021D118)

**Image 36. View of Test Unit 1 showing the natural stratigraphy, facing north.** (PR23-021D124)

**Image 37. View of the north profile of Test Unit 1, showing natural stratigraphy, facing north.** (PR23-021D125)

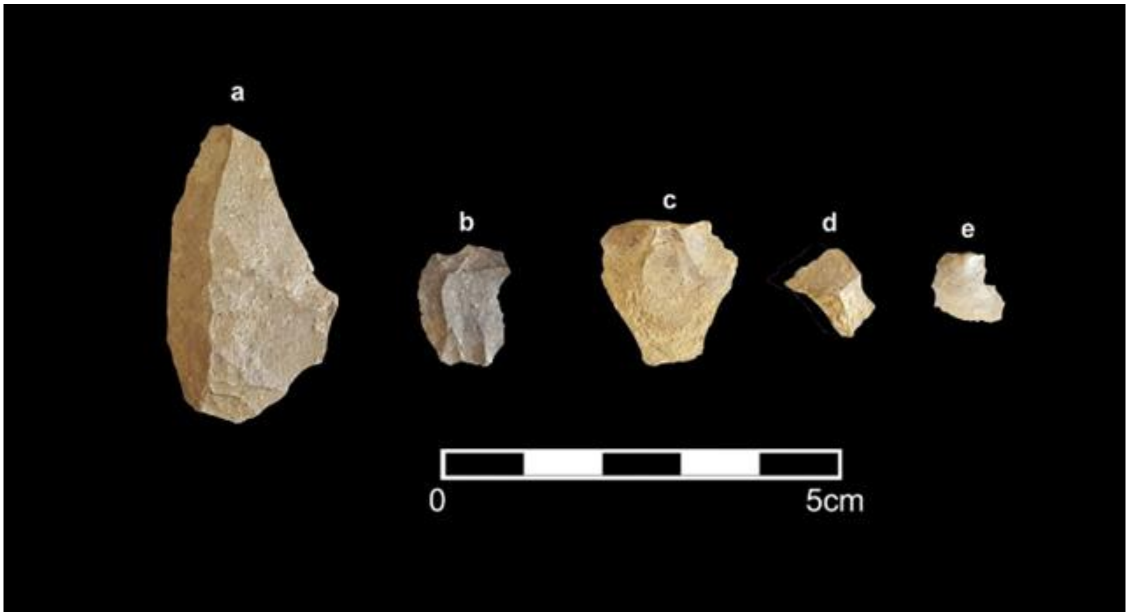


**Image 38. Sample of Lithic artifacts.**

a: Kichessippi chert chipped stone tertiary flake, PTP001:1 (#1000); b: Kichessippi chert chipped stone tertiary flake, TU1:1 (#1001); c: Kichessippi chert chipped stone tertiary flake, TU1:2 (#1002); d: Kichessippi chert chipped stone broken/partial flake, TU1:2 (#1003); e: Hudson Bay Lowland Chert chipped stone tertiary flake, TU1:2 (#1004)

# APPENDIX 1: Photographic Catalogue

Camera: Samsung S5

| Catalogue No. | Description | Dir. |
|---|---|---|
| PR23-021D001 | View of Kashwakamak Lake from the North shore | W |
| PR23-021D002 | North shore adjacent to the main dam | W |
| PR23-021D003 | View of the buoy line and south shore | W |
| PR23-021D004 | View of the rocky shoreline near the main dam | NW |
| PR23-021D005 | South half of the control dam and south shore | SW |
| PR23-021D006 | View of the southern shoreline at the control dam | SW |
| PR23-021D007 | View of the southern shoreline at the control dam | SW |
| PR23-021D008 | View of the southern shoreline at the control dam | S |
| PR23-021D009 | View of Kashwakamak Lake, downstream from the dam | E |
| PR23-021D010 | View of the northern shoreline at the control dam | NE |
| PR23-021D011 | View of the retaining wall at the north end shoreline of the control dam | NE |
| PR23-021D012 | Concrete filling in the approach to the north end of the control dam | NE |
| PR23-021D013 | Top down view of the retaining wall at the north end of the control dam | E |
| PR23-021D014 | Concrete fill material at the north end of the control dam | E |
| PR23-021D015 | Overview of forest growth | E |
| PR23-021D016 | View of slope down to the rocky shoreline | S |
| PR23-021D017 | View of the slope down to the rocky shoreline | S |
| PR23-021D018 | View of the slope down to the shoreline | NE |
| PR23-021D019 | View of the access road and change in elevation between the road and the natural topography | N |
| PR23-021D020 | View of the hilly topography, on west side of the access road | N |
| PR23-021D021 | View of the slope down to the shoreline | SW |
| PR23-021D022 | Rocky shoreline along the north shore | S |
| PR23-021D023 | View of the slope down to the shoreline | E |
| PR23-021D024 | Coniferous needle ground cover | W |
| PR23-021D025 | View of the shoreline along the north shore | S |
| PR23-021D026 | View of the hilly topography along the north shore | N |
| PR23-021D027 | View of the hilly topography between the control dam and the staging area | E |
| PR23-021D028 | Slope down to the shoreline near the staging area | S |
| PR23-021D029 | Rocky shoreline near the staging area | S |
| PR23-021D030 | Shoreline near the staging area | SW |
| PR23-021D031 | View of the slope up from the shoreline near the staging area | N |
| PR23-021D032 | Possible staging area | N |
| PR23-021D033 | Possible staging area | NE |
| PR23-021D034 | Possible staging area | E |
| PR23-021D035 | Shoreline near the staging area | E |
| PR23-021D036 | Eastern end of the staging area | E |

| Catalogue No. | Description | Dir. |
|---|---|---|
| PR23-021D037 | Rise at the west end of the possible staging area | N |
| PR23-021D038 | Possible staging area | N |
| PR23-021D039 | Possible staging area, with rise in the background | NW |
| PR23-021D040 | Possible staging area | N |
| PR23-021D041 | View of the saddle dam | NW |
| PR23-021D042 | View of the saddle dam | NW |
| PR23-021D043 | View of Kashwakamak Lake from the saddle dam | W |
| PR23-021D044 | Access road at the saddle dam | N |
| PR23-021D045 | View of the slope off from the saddle dam | E |
| PR23-021D046 | View of the shoreline at the saddle dam | NW |
| PR23-021D047 | View of the access road fill at the saddle dam | N |
| PR23-021D048 | View of the access road fill at the saddle dam | N |
| PR23-021D049 | View of the shoreline at the north end of the saddle dam | W |
| PR23-021D050 | Close up of the saddle dam and concrete back fill | S |
| PR23-021D051 | View of saddle dam and concrete back fill | NW |
| PR23-021D052 | View of the south end of the saddle dam | NW |
| PR23-021D053 | View of the shoreline at the south end of the saddle dam | W |
| PR23-021D054 | View of the shoreline at the south end of the saddle dam | W |
| PR23-021D055 | View of the access road at the south end of the saddle dam | SE |
| PR23-021D056 | View of the access road at the south end of the saddle dam | SE |
| PR23-021D057 | View of the woods on the east side of the access road | E |
| PR23-021D058 | View of the sloped terrain on the east side of the access road | E |
| PR23-021D059 | View of the terrain on the east side of the access road | NE |
| PR23-021D060 | View of the terrain on the east side of the access road | SE |
| PR23-021D061 | View of the terrain on the east side of the access road | NE |
| PR23-021D062 | View of the woods on the east side of the access road | E |
| PR23-021D063 | View of the shoreline between the control and saddle dam | W |
| PR23-021D064 | View of the access road between the control and saddle dam | S |
| PR23-021D065 | View of the hilly topography north of the control dam | E |
| PR23-021D066 | View of the hilly topography north of the control dam | E |
| PR23-021D067 | View of the shoreline between the control and saddle dam | E |
| PR23-021D068 | Sloped topography north of the control dam | NE |
| PR23-021D069 | View of the shoreline near the control dam | SW |
| PR23-021D070 | Sloped topography north of the control dam | E |
| PR23-021D071 | Sloped topography north of the control dam | N |
| PR23-021D072 | Shoreline north of the control dam | E |
| PR23-021D073 | View of field crew shovel testing at 5 m intervals in the eastern portion of the study area | SW |
| PR23-021D074 | View of sample test pit in the eastern portion of the study area showing natural soil stratigraphy | W |
| PR23-021D075 | View of sample test pit in the eastern portion of the study area showing natural soil stratigraphy | W |

| Catalogue No. | Description | Dir. |
|---|---|---|
| PR23-021D076 | View of sample test pit in the western portion of the southern study area showing natural soil stratigraphy | W |
| PR23-021D077 | View of sample test pit in the western portion of the southern study area showing natural soil stratigraphy | W |
| PR23-021D078 | View of sample test pit in the western portion of the southern study area showing natural soil stratigraphy | W |
| PR23-021D079 | View of field crew shovel testing at 5 m intervals in the southern study area | ENE |
| PR23-021D080 | View of field crew shovel testing at 5 m intervals in the northing portion of the study area | E |
| PR23-021D081 | View of field crew shovel testing at 5 m intervals in the northing portion of the study area | SW |
| PR23-021D082 | View of field crew shovel testing at 5 m intervals in the northing portion of the study area | ESE |
| PR23-021D083 | View of field crew shovel testing at 5 m intervals in the northing portion of the study area | ESE |
| PR23-021D084 | View of field crew shovel testing at 5 m intervals in the southern study area | SSW |
| PR23-021D085 | View of the south side of the control dam | NNW |
| PR23-021D086 | View of the south side of the control dam | SW |
| PR23-021D087 | View of the rocky water edge within the southern study area | ENE |
| PR23-021D088 | View of field crew shovel testing at 5 m intervals in the southern study area | NW |
| PR23-021D089 | View of sample test pit in the centre of the study area showing natural soil stratigraphy | N |
| PR23-021D090 | View of sample test pit in the centre of the study area showing natural soil stratigraphy | N |
| PR23-021D091 | View of sample test pit in the centre of the study area showing natural soil stratigraphy | N |
| PR23-021D092 | View of sample test pit in the centre of the study area showing natural soil stratigraphy | N |
| PR23-021D093 | View of sample test pit in the southern portion of the southern study area showing natural soil stratigraphy onto bedrock | W |
| PR23-021D094 | View of sample test pit in the southern portion of the southern study area showing natural soil stratigraphy onto bedrock | W |
| PR23-021D095 | View of sample test pit in the southern portion of the southern study area showing natural soil stratigraphy onto bedrock | W |
| PR23-021D096 | View of the centre of the southern study area | ESE |
| PR23-021D097 | View of the centre of the southern study area | ESE |
| PR23-021D098 | View of the centre of the southern study area | S |
| PR23-021D099 | View of field crew excavating test unit at Findspot 1 | E |
| PR23-021D100 | View of field crew excavating test unit at Findspot 1 | E |
| PR23-021D101 | View of sample test pit in the western portion of the study area showing natural soil stratigraphy | N |
| PR23-021D102 | View of sample test pit in the western portion of the study area showing natural soil stratigraphy | N |
| PR23-021D103 | View of sample test pit in the western portion of the study area showing natural soil stratigraphy | N |
| PR23-021D104 | View of sample test pit in the western portion of the study area showing natural soil stratigraphy | N |
| PR23-021D105 | View of disturbed road adjacent to the saddle dam | NNW |

| Catalogue No. | Description | Dir. |
|---|---|---|
| PR23-021D106 | View of disturbed road adjacent to the saddle dam | NW |
| PR23-021D107 | View of disturbed road adjacent to the saddle dam | SSE |
| PR23-021D108 | View of disturbed road adjacent to the saddle dam | S |
| PR23-021D109 | View of steep slope along former river in the north portion of the study area | E |
| PR23-021D110 | View of steep slope along former river in the north portion of the study area | E |
| PR23-021D111 | View of standing water in the former river in the north portion of the study area | N |
| PR23-021D112 | View of standing water in the former river in the north portion of the study area | N |
| PR23-021D113 | View of standing water in the former river in the north portion of the study area | NW |
| PR23-021D114 | View of steep slope along former river in the north portion of the study area | E |
| PR23-021D115 | View of standing water in the former river in the north portion of the study area | WNW |
| PR23-021D116 | View of standing water in the former river in the north portion of the study area | NW |
| PR23-021D117 | View of steep slope along former river in the north portion of the study area | E |
| PR23-021D118 | View of field crew excavating test unit at Findspot 1 | N |
| PR23-021D119 | View of field crew excavating test unit at Findspot 1 | N |
| PR23-021D120 | View of sample test pit in the southwestern portion of the study area showing imported parking lot fills over natural stratigraphy | W |
| PR23-021D121 | View of sample test pit in the southwestern portion of the study area showing imported parking lot fills over natural stratigraphy | W |
| PR23-021D122 | View of sample test pit in the southwestern portion of the study area showing imported parking lot fills over natural stratigraphy | W |
| PR23-021D123 | View of Test Unit 1 showing natural stratigraphy | NNW |
| PR23-021D124 | View of Test Unit 1 showing natural stratigraphy | NNW |
| PR23-021D125 | View of north profile of Test Unit 1 showing natural stratigraphy | NNW |
| PR23-021D126 | View of field crew shovel testing at 5 m intervals in the northwestern portion of the study area | SW |
| PR23-021D127 | View of field crew shovel testing at 5 m intervals in the northwestern portion of the study area | SW |
| PR23-021D128 | View of field crew excavating intensification test pits at 2.5 m intervals around TU1 | S |
| PR23-021D129 | View of field crew excavating intensification test pits at 2.5 m intervals around TU1 | S |

# APPENDIX 2: Glossary of Archaeological Terms

**Archaeology:**
The study of human past, both prehistoric and historic, by excavation of cultural material.

**Archaeological Sites:**
The physical remains of any building, structure, cultural feature, object, human event or activity which, because of the passage of time, are on or below the surface of the land or water.

**Archaic:**
A term used by archaeologists to designate a distinctive cultural period dating between 8000 and 1000 B.C. in eastern North America. The period is divided into Early (8000 to 6000 B.C.), Middle (6000 to 2500 B.C.) and Late (2500 to 1000 B.C.). It is characterized by hunting, gathering and fishing.

**Artifact:**
An object manufactured, modified or used by humans.

**B.P.:**
Before Present. Often used for archaeological dates instead of B.C. or A.D. Present is taken to be 1951, the date from which radiocarbon assays are calculated.

**Backdirt:**
The soil excavated from an archaeological site. It is usually removed by shovel or trowel and then screened to ensure maximum recovery of artifacts.

**Chert:**
A type of silica rich stone often used for making chipped stone tools. A number of chert sources are known from southern Ontario. These sources include outcrops and nodules.

**Contact Period:**
The period of initial contact between Indigenous and European populations. In Ontario, this generally corresponds to the seventeenth and eighteen centuries depending on the specific area.

**Cultural Resource / Heritage Resource:**
Any resource (archaeological, historical, architectural, artifactual, archival) that pertains to the development of our cultural past.

**Cultural Heritage Landscapes:**
Cultural heritage landscapes are groups of features made by people. The arrangement of features illustrate noteworthy relationships between people and their surrounding environment. They can provide information necessary to preserve, interpret or reinforce the understanding of important historical settings and changes to past patterns of land use. Cultural landscapes include neighbourhoods, townscapes and farmscapes.

**Diagnostic:**
An artifact, decorative technique or feature that is distinctive of a particular culture or time period.

**Disturbed:**
In an archaeological context, this term is used when the cultural deposit of a certain time period has been intruded upon by a later occupation.

**Excavation:**
The uncovering or extraction of cultural remains by digging.

**Feature:**
This term is used to designate modifications to the physical environment by human activity. Archaeological features include the remains of buildings or walls, storage pits, hearths, post moulds and artifact concentrations.

**Flake:**
A thin piece of stone (usually chert, chalcedony, etc.) detached during the manufacture of a chipped stone tool. A flake can also be modified into another artifact form such as a scraper.

**Fluted:**
A lanceolate shaped projectile point with a central channel extending from the base approximately one third of the way up the blade. One of the most diagnostic Palaeo-Indigenous artifacts.

**Historic:**
Period of written history. In Ontario, the historic period begins with European settlement.

**Lithic:**
Stone. Lithic artifacts would include projectile points, scrapers, ground stone adzes, gun flints, etc.

**Lot:**
The smallest provenience designation used to locate an artifact or feature.

**Midden:**
An archaeological term for a garbage dump.

**Mitigation:**
To reduce the severity of development impact on an archaeological or other heritage resource through preservation or excavation. The process for minimizing the adverse impacts of an undertaking on identified cultural heritage resources within an affected area of a development project.

**Multicomponent:**
An archaeological site which has seen repeated occupation over a period of time. Ideally, each occupation layer is separated by a sterile soil deposit that accumulated during a period when the site was not occupied. In other cases, later occupations will be directly on top of earlier ones or will even intrude upon them.

**Operation:**
The primary division of an archaeological site serving as part of the provenience system. The operation usually represents a culturally or geographically significant unit within the site area.

**Palaeo-Indigenous:**
The earliest human occupation of Ontario designated by archaeologists. The period dates between 9000 and 8000 B.C. and is characterized by small mobile groups of hunter-gatherers.

**Pre-Contact:**
Before written history. In Ontario, this term is used for the period of Indigenous occupation up until the first contact with European groups.

**Profile:**
The profile is the soil stratigraphy that shows up in the cross-section of an archaeological excavation. Profiles are important in understanding the relationship between different occupations of a site.

**Projectile Point:**
A point used to tip a projectile such as an arrow, spear or harpoon. Projectile points may be made of stone (either chipped or ground), bone, ivory, antler or metal.

**Provenience:**
Place of origin. In archaeology this refers to the location where an artifact or feature was found. This may be a general location or a very specific horizontal and vertical point.

**Salvage:**
To rescue an archaeological site or heritage resource from development impact through excavation or recording.

**Stratigraphy:**
The sequence of layers in an archaeological site. The stratigraphy usually includes natural soil deposits and cultural deposits.

**Sub-operation:**
A division of an operation unit in the provenience system.

**Survey:**
To examine the extent and nature of a potential site area. Survey may include surface examination of ploughed or eroded areas and sub-surface testing.

**Test Pit:**
A small pit, usually excavated by hand, used to determine the stratigraphy and presence of cultural material. Test pits are often used to survey a property and are usually spaced on a grid system.

**Woodland:**
The most recent major division in the prehistoric sequence of Ontario. The Woodland period dates from 1000 B.C. to A.D. 1550. The period is characterized by the introduction of ceramics and the beginning of agriculture in southern Ontario. The period is further divided into Early (1000 B.C. to A.D. 0), Middle (A.D. 0 to A.D. 900) and Late (A.D. 900 to A.D.1550).

# Appendix J – Stage 2 & 3 Archaeological Assessment Report

# STAGE 3 ARCHAEOLOGICAL ASSESSMENT
# FOR THE KASHWAKAMAK LAKE DAM
# ENVIRONMENTAL ASSESSMENT
## PART OF LOT 20, CONCESSION 10
## GEOGRAPHIC TOWNSHIP OF CLARENDON
## NOW TOWNSHIP OF NORTH FRONTENAC
## COUNTY OF FRONTENAC, ONTARIO

Past Recovery
Archaeological Services Inc.

# STAGE 3 ARCHAEOLOGICAL ASSESSMENT FOR THE KASHWAKAMAK LAKE DAM, ENVIRONMENTAL ASSESSMENT, PART OF LOT 20, CONCESSION 10, GEOGRAPHIC TOWNSHIP OF CLARENDON, NOW TOWNSHIP OF NORTH FRONTENAC , COUNTY OF FRONTENAC, ONTARIO

Prepared for:

Lisa Marshall, P. Eng.
Manager, Environmental Engineering
Egis Group Ltd.
115 Walgreen Road, R.R.3
Carp, ON K0A 1L0
Phone: (613) 714-0815
Email: l.marshall@mcintoshperry.com

Re: MVCA Class EA

Prepared by:

Past Recovery Archaeological Services Inc.
99c Dufferin Street, Unit 1
Perth, ON K7H 3A5
Phone: (613) 267-7028
Email: pras@pastrecovery.com

Project No.: PR24-040

Licensee:

Caitlyn Howard, M.A., P1074
Staff Archaeologist
Past Recovery Archaeological Services Inc.

P.I.F. No.: P1074-0171-2024

Date: November 12th, 2024 Original Report

## ACKNOWLEDGMENTS

Jennifer North, Water Resources Technologist, MVCA, and Christopher Stoddard, MVCA, were present during the excavation and background information and logistical assistance.

## PROJECT PERSONNEL

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|---|---|
| Project Manager | Stephanie Cleland, M.A., (P1201) |
| Licence Holder | Caitlyn Howard, M.A., (P1074) |
| Field Director | Jessalyn Miller, M.A. (P1111) |
| Field Crew | Sara Lavigne, M.A., (R1369)<br>Nic van Beek, M.A.<br>Lydia Spooner |
| Indigenous Monitor | Derrick Amikons (AOPFN) |
| Background Research | Stephanie Cleland |
| Report Writing | Sara Lavigne |
| Report GIS/Drafting | Sara Lavigne |
| Report Review | Stephanie Cleland |

## EXECUTIVE SUMMARY

Past Recovery Archaeological Services Inc. was retained by Egis Group Ltd. on behalf of the Mississippi Valley Conservation Authority, to undertake a Stage 3 archaeological assessment in support of a larger *Class Environmental Assessment* for the Kashwakamak Lake Dam. The subject property was located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac (see Maps 1 and 2). An archaeological site (BfGf-3) was identified during the Stage 2 archaeological assessment for the property (Past Recovery 2024; PIF: P1074-0089-2023).

The Stage 3 site-specific archaeological assessment was completed over the course of three (3) days between August 20th and August 22nd, 2024, by means of the hand excavation of 11 one-meter-square test units. The assessment identified a cluster of lithic detritus centrally located within the site limits established during the Stage 2 assessment. The artifact assemblage consisted of 44 pieces of lithic material and 3 fragments of small mammal bone. The nature of the artifacts recovered supports the Stage 2 interpretation that the site was the location of a short-term campsite. The inhabitants of the campsite undertook a variety of lithic reduction practices which were specific to the lithic raw material types being worked. As the lithic assemblage was comprised of non-diagnostic artifacts, no further inferences may be drawn.

The artifact assemblage met the required characteristics of a small or diffuse lithic scatter with cultural heritage value or interest (CHVI) as outlined in Section 3.4.1.1.a of the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011:58). The fulfilment of this requirement indicates that Stage 4 mitigation of development impacts is required for BfGf-3.

The results of the Stage 3 archaeological assessment documented in this report forms the basis for the following recommendations:

1) The Stage 3 archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) has resulted in a determination that the site possesses a high level of cultural heritage value or interest, warranting Stage 4 mitigation of development impacts.

2) The proponent has opted to address the outstanding concerns for the Kashwakamak Lake Dam site (BfGf-3) and a 10-metre protected buffer (hereafter the 'protected area') through the implementation of an avoidance and protection strategy that will ensure the protected area remains unaltered in both the short- and long-term:

   *Short-term Measures*

   In the event that grading or other soil disturbing activities will extend to the edge of the protected area, the following steps must be taken:

   a) A temporary barrier (snow fencing) must be erected around the protected area through the completion of development related activities.

   b) "No go" instructions must be issued to all on-site construction crews, engineers, architects, or others involved in day-to-day decisions during construction.

   c) The location and extent of the protected area must be added to any other contract drawings, when applicable, including explicit instructions or labelling to avoid that area.

   d) Any grading or soil disturbing activities immediately adjacent to the protected area must be monitored by a licensed consultant archaeologist to verify the effectiveness of the avoidance strategy. If impacts to the site are observed at any time, MCM is to be notified immediately.

e) A licensed consultant archaeologist must be retained to produce a Stage 4 mitigation avoidance and protection report to verify the effectiveness of the avoidance strategy and document that the site has not been disturbed throughout the development project.

*Long-term Measures*

The following measures have been or will be put in place to ensure the protected area is not impacted by future allowed activities on the property, or would be subject to further archaeological assessment by a licensed archaeologist in advance of a change that might allow for impacts.

a) Draft wording for a Development Agreement for the limits of the Kashwakamak Lake Dam site (BfGf-3) has been devised with the project proponent (a public land-holding body), including provisions for the short- and long-term avoidance and protection measures for the protected area. The draft Development Agreement has been included in the *Project Report Package*.

b) A letter from project proponent (a public land-holding body) confirming their knowledge of outstanding concerns for the protected area and affirming their commitment to ensure the protected area remains unaltered during and following construction-related activities in perpetuity has been included in the *Project Report Package*.

3) Any future archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) should involve continued engagement with interested Indigenous communities/organizations.

The reader is also referred to Section 6.0 below to ensure compliance with relevant provincial legislation and regulations that may relate to this project. In the event that artifacts of Indigenous interest or human remains are encountered during the development of the subject property, in addition to following the *Advice on Compliance with Legislation* (see Section 6.0), the Indigenous communities listed below should be contacted:

- Alderville First Nation
- Algonquins of Ontario
- Algonquins of Pikwakanagan First Nation
- Chippewas of Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat Nation
- Mississaugas of Scugog Island

Contact information for the above communities can be found in the Supplementary Document entitled "*Indigenous Community Contacts.*"

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# 1.0 INTRODUCTION

Past Recovery Archaeological Services Inc. was retained by Egis Group Ltd., on behalf of the Mississippi Valley Conservation Authority, to undertake a Stage 3 archaeological assessment in support of a larger *Class Environmental Assessment* for the Kashwakamak Lake Dam. The subject property was located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac, County of Frontenac (see Maps 1 and 2). An archaeological site (BfGf-3) was identified during the Stage 2 archaeological assessment for the property (Past Recovery 2024; PIF: P1074-0089-2023).

The objectives of the Stage 3 archaeological assessment were as follows:

- To determine the extent of the archaeological site and the characteristics of the artifacts;
- To collect a representative sample of artifacts from the archaeological site;
- To assess the cultural heritage value or interest of the archaeological site; and,
- To determine the need for mitigation of development impacts and recommend appropriate strategies for mitigation and future conservation.

# 2.0 PROJECT CONTEXT

This section of the report provides the context for the archaeological work undertaken, including a description of the study area, the related legislation or directives triggering the assessment, any additional development-related information, and the confirmation of permission to access the study area as required for the purposes of the assessment, and an acknowledgement of Indigenous territorial rights and interests.

## 2.1 Development Context

The Mississippi Valley Conservation Authority (MVCA) is proposing to replace the Kashwakamak Lake Dam, which is approaching the end of its expected lifespan. Given the proximity of the shoreline of Kashwakamak Lake, an archaeological assessment has been listed as one of several studies necessary to obtain approval for a *Class Environmental Assessment* (Class EA). Egis Group Ltd. was retained by the MVCA to complete the Class EA, with Past Recovery retained to undertake the archaeological work.

Given the study area contains a registered archaeological site (BfGf-3), an archaeological assessment was identified as a requirement by the MVCA, in accordance with the recommendations made within the previous Stage 2 archaeological assessment (Past Recovery 2024; PIF: P1074-0089-2023). As a result, a Stage 3 archaeological assessment has been requested. Past Recovery was retained to complete this work.

## 2.2 Property Description

The subject property was located on part of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac. The Stage 2 assessment area consisted of approximately 1.49 hectares (3.69 acres) of forested land sitting on either side of the extant Kashwakamak Lake Dam. The Stage 3 study area consisted of approximately 178.63 square meters (0.04 acres) along the northern shore of the Mississippi River, some 120 meters east of the dam. The majority of the study was situated on a terraced area north of the portage trail. The southern limits of the study area was situated on a low or gentle slope forming the portage trail which falls off more steeply as the slope erodes down toward the Mississippi River. The property was bordered to the north and to the south by additional forested lands and to the east and west by the waters of Kashwakamak Lake.

## 2.3 Access Permission

Permission to access the subject property and complete all aspects of the archaeological assessment, including photography, was granted by the MVCA.

## 2.4 Territorial Acknowledgement

The study area falls within the traditional territory of the Anishinaabeg, including the Anishinabe Algonquin, Michi Saagiig and the Chippewa nations. It is situated within the Treaty and traditional territories of the Williams Treaties First Nations - the Michi Saagiig and the Chippewa nations[1] and forms part of the Algonquins of Ontario (AOO) Settlement Area set out by the current Agreement-in-Principle between the AOO and the federal and provincial governments, signed in 2016.[2] It also lies within an area of primary interest to the Huron-Wendat Nation.

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[1] The Williams Treaties First Nations include the Chippewas of Beausoleil, Georgina Island, and Rama, as well as the Mississaugas of Alderville, Curve Lake, Hiawatha, and Scugog Island. These seven First Nations are signatories to various 18th and 19th century treaties that covered lands in different parts of south-central Ontario. Owing to poorly defined boundaries, disagreements over the interpretation of the wording of these agreements, and concerns over Crown title to large tracts of unceded lands, the governments of Ontario and Canada sought to broker two new treaties in 1923 known as the Williams Treaties. Continued disagreements over the terms of the treaties and off-reserve harvesting rights led to a number of legal disputes. In 2018, the Williams Treaties First Nations and the Governments of Ontario and Canada came to a final agreement involving a formal apology, recognition of treaty harvesting rights, and financial compensation.

[2] The Algonquins of Ontario are composed of ten communities: The Algonquins of Pikwakanagan First Nation, Antoine, Kijicho Manito Madaouskarini (Bancroft), Bonnechere, Greater Golden Lake, Mattawa/North Bay, Ottawa, Shabot Obaadjiwan (Sharbot Lake), Snimikobi (Ardoch), Whitney and Area. Federally unrecognized Algonquin communities, including Ardoch First Nation, also live in the territory but do not form part of the AOO (see Lawrence 2012). The Agreement-In-Principle is between the Algonquins of Ontario and the Governments of Ontario and Canada. Algonquins have sought recognition and protection of their traditional territory dating back to 1772 and in 1983 the Algonquins of Pikwàkanagàn First Nation (previously Algonquins of Golden Lake) formally submitted a petition to the Government of Canada, and in 1985 to the Government of Ontario. The claim was accepted for negotiations in 1991 and 1992, an Agreement-In-Principle was signed in 2016, and negotiations are on-going. For further information see www.tanakiwin.com.

## 3.0 HISTORICAL CONTEXT

This section of the report is comprised of an overview of human settlement in the region using information derived from background historical research. The purpose of this research is to describe the known settlement history of the local area, with the intention of providing a context for the evaluation of known and potential archaeological sites, as well as a review of property-specific information presenting a record of settlement and land use history.

### 3.1 Regional Pre-Contact Cultural Overview

While our understanding of the pre-Contact sequence of human activity in the region is limited, it is possible to provide a general outline of pre-Contact relationships with the land based on archaeological, historical, and environmental research conducted across what is now eastern Ontario.[3] Archaeologists divide the long sequence of Indigenous history into both temporal periods and regional groups based primarily on the presence and/or style of various artifact types. While this provides a means of discussing the past, it is an archaeological construct and interpretation based only on a few surviving artifact types; it does not reflect the generally gradual nature of change over time, nor the complexities of interactions between different Indigenous groups. It also does not reflect Indigenous world views and histories as detailed in the oral traditions of Indigenous communities who have long-standing relationships with the land. The following summary uses the generally accepted archaeological chronology for the pre-Contact period while recognizing its limitations.

Across the region, glaciers began to retreat around 15,000 years ago (Munson 2013:21). Archaeological evidence indicates that humans have inhabited what is now called Ontario for at least 13,500 years, beginning with the arrival of small groups of hunter-gatherers referred to by archaeologists as Paleo-Indigenous (Ellis 2013:35; Ellis and Deller 1990:39). These groups gradually moved northward as the glaciers and glacial lakes retreated. While very little is known about their lifestyle, it is likely that Palaeo-Indigenous groups travelled widely relying on the seasonal migration of caribou as well as small animals and wild plants for subsistence in a sub-arctic environment. They produced a variety of distinctive stone tools including fluted projectile points, scrapers, burins and gravers. Their sites are rare, and most are quite small (Ellis 2013:35-36). Palaeo-Indigenous peoples tended to camp along shorelines, and because of the changing environment, many of these areas are now inland. Indigenous settlement of much of eastern Ontario was late in comparison to other parts of Ontario as a result of the high-water levels associated with glacial Lake Algonquin, the early stages of glacial Lake Iroquois and the St. Lawrence Marine Embayment of the post-glacial Champlain Sea. In

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[3] Current common place names are used throughout this report while recognizing that the many Indigenous peoples who have lived in the region for thousands of years had, and often maintain, their own names for these places and natural features.

eastern Ontario, the old shoreline ridges of Lake Algonquin, Lake Iroquois, the Champlain Sea and of the emergent St. Lawrence and Ottawa river channels and their tributaries would be the most likely areas to find evidence of the Palaeo-Indigenous presence in the landscape (see AOO 2017; Ellis 2013; Ellis and Deller 1990; Watson 1999).

During the succeeding Archaic period (c. 10,000 to c. 3,000 B.P.), the environment of the region approached modern conditions and more land became habitable as water levels in the glacial lakes dropped. Populations continued to follow a mobile hunter-gatherer subsistence strategy, although there appears to have been a greater reliance on fishing and gathered food (e.g. plants and nuts) and more diversity between regional groups. The tool kit also became increasingly diversified, reflecting an adaptation to environmental conditions more similar to those of today. This included the presence of adzes, gouges and other ground stone tools believed to have been used for heavy woodworking activities such as the construction of dug-out canoes, grinding stones for processing nuts and seeds, specialized fishing gear including net sinkers, and a general reduction in the size of projectile points. The middle and late portions of the Archaic period saw the development of trading networks spanning the Great Lakes, and by 6,000 years ago copper was being mined in the Upper Great Lakes and traded into southern Ontario. There was increasing evidence of ceremonialism and elaborate burial practices and a wide variety of non-utilitarian items such as gorgets, pipes and 'birdstones' were being manufactured. By the end of this period populations had increased substantially over the preceding Palaeo-Indigenous period (Ellis 2013; Ellis et al. 1990).

More extensive Indigenous settlement of the region began during this period, sometime between 7,500 and 6,500 B.P. Artifacts from Archaic sites suggest a close relationship between these communities and what archaeologists refer to as the Laurentian Archaic stage peoples who inhabited the Canadian biotic province transition zone between the deciduous forests to the south and the boreal forests to the north. This region included northern New York State, the upper St. Lawrence Valley across southern Ontario and Quebec, and the state of Vermont (Ritchie 1969; Clermont et al. 2003). The 'tradition' associated with this period is characterized by a more or less systematic sharing of several technological features, including large, broad bladed, chipped stone and ground slate projectile points, and heavy ground stone tools. This stage is also known for the extensive use of cold-hammered copper tools including "*bevelled spear points, bracelets, pendants, axes, fishhooks and knives*" (Kennedy 1970:59). The sharing of this set of features is generally perceived as a marker of historical relatedness and inclusion in the same interaction network (Clermont et al. 2003). Cemeteries also appear for the first time during the Late Archaic. Evidence of Archaic inhabitation has been found across eastern Ontario (see Clermont 1999; Clermont et al. 2003; Ellis 2013; Kennedy 1962, 1970; Laliberté 2000; Watson 1990).

Archaeologists use the appearance of ceramics in the archaeological record to mark the beginning of the Woodland period (c. 3,000 B.P. to c. 350 B.P.). Ceramic styles and decorations suggest the continued differentiation between regional populations and are commonly used to distinguish between three periods: Early Woodland (2,900 to 2,300 B.P.), Middle Woodland (2,300 to 1,200 B.P.), and Late Woodland (1,200 to 400 B.P.). The introduction of ceramics to southern Ontario does not appear to have been associated with significant changes to lifeways, as hunting and gathering remained the primary subsistence strategy throughout the Early Woodland and well into the Middle Woodland. It does, however, appear that regional populations continued to grow in size, and communities continued to participate in extensive trade networks that, at their zenith c. 1,750 B.P., spanned much of the continent and included the movement of conch shell, fossilized shark teeth, mica, copper and silver; a large number of other items that rarely survive in the archaeological record would also have been exchanged, as well as knowledge.[4] Social structure appears to have become increasingly complex, with some status differentiation evident in burials. In southeastern Ontario, the first peoples to adopt ceramics are identified by archaeologists as belonging to the Meadowood Complex, characterized by distinctive biface preforms, side-notched points, and Vinette I ceramics which are typically crude, thick, cone-shaped vessels made with coils of clay shaped by cord-wrapped paddles. Meadowood material has been found on sites across southern Ontario extending into southern Quebec and New York State (Fox 1990; Spence et al. 1990).

In the Middle Woodland period increasingly distinctive trends or ‘traditions’ continued to evolve in different parts of Ontario (Spence et al. 1990). Although regional patterns are poorly understood and there may be distinctive traditions associated with different watersheds, the appearance of more refined ceramic vessels decorated with dentate or pseudo-scallop impressions have been used by archaeologists to distinguish the Point Peninsula Complex. These ceramics are identified as Vinette II and are typically found in association with evidence of distinct bone and stone tool industries. Sites exhibiting these traits are known from throughout south-central and eastern Ontario, northern New York, and northwestern Vermont, and are often found overlying earlier site components. Some groups appear to have practiced elaborate burial ceremonialism that involved the construction of large earthen mortuary mounds and the inclusion of numerous and often exotic materials in burials, construed as evidence of influences from northern Ontario and the Hopewell area to the south in the Ohio River valley. Archaeological evidence suggests that during this time period groups utilized a variety of resources within a home territory. Through the late fall and winter, small groups would coalesce at an inland ‘family’ hunting area. In the spring, these dispersed families would congregate at specific lakeshore sites to fish, hunt in the surrounding forest, and socialize. This gathering would last through to the late summer when large quantities of food would be stored up for the approaching winter (Spence et al. 1990).

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[4] For example, the recent discovery of a cache of charred quinoa seeds, dating to 3,000 B.P. at a site in Brantford, Ontario, indicates that crops were part of this extensive exchange network, which in this case travelled from the Kentucky-Tennessee region of the United States. Thus far, there is no indication that these seeds were locally grown (Crawford et al. 2019).

Towards the end of the Middle Woodland period (1200 B.P.), groups living in southern Ontario included horticulture in their subsistence strategy. Available archaeological evidence, which comes primarily from the vicinity of the Grand and Credit rivers, suggests that this development was not initially widespread. The adoption of maize horticulture instead appears to be linked to the emergence of the Princess Point Complex which is characterized by decorated ceramics combining cord roughening, impressed lines, and punctate designs; triangular projectile points; T-based drills; steatite and ceramic pipes; and ground stone chisels and adzes (Fox 1990).

Archaeologists have distinguished the Late Woodland period by the widespread adoption of maize horticulture by some Indigenous groups primarily across much of southern Ontario and portions of the southeast with favourable soils. Michi Saagiig oral histories recall that corn came to what is now Ontario with the arrival of the Wendat (Gitiga Migizi 2019:34). Initially only a minor addition to the diet, the cultivation of corn, beans, squash, sunflowers, and tobacco radically altered subsistence strategies and gained economic importance in the region over time. This change is associated with increased sedentarism, and with larger and more dense settlements focused on areas of easily tillable farmland. In some areas, semi-permanent villages, with communal 'longhouse' dwellings, appeared for the first time. These villages were inhabited year-round for 12 to 20 years until local firewood and soil fertility had been exhausted. Many were surrounded by defensive palisades, evidence of growing hostilities between neighbouring groups. Associated with these sites is a burial pattern of individual graves occurring within the village. Upon abandonment, the people of one or more villages often exhumed the remains of their dead for reburial in a large communal burial pit or ossuary outside of the village(s) (Wright 1966; Williamson 2014). More temporary habitations such as small hamlets, agricultural cabin sites, and hunting and fishing camps were also used. Throughout the parts of what is now Ontario situated on the Canadian Shield, however, the terrain limited horticulture and Indigenous groups continued to move frequently across their territories hunting, fishing, and gathering (Pilon 1999).

Along the St. Lawrence River valley from the east end of Lake Ontario to the Quebec City region and beyond, archaeologists have identified a distinctive material culture associated with what they refer to as the St. Lawrence Iroquoians. The material culture and settlement patterns of the fourteenth and fifteenth century St. Lawrence Iroquoian sites are directly related to the Iroquoian-speaking groups that Jacques Cartier and his crew encountered in 1535 at Stadacona (Quebec City) and Hochelaga (Montreal Island) (Jamieson 1990:386). Like those peoples inhabiting what would become southern and southcentral Ontario, the St. Lawrence Iroquoians practised horticulture and supplemented their diet with fishing, hunting and gathering. They lived in large semi-permanent villages as well as smaller camps. Numerous discrete settlement clusters have been identified across this large territory; however, the political and social relationships between these populations is unclear (Tremblay 2006).

By the late sixteenth century all of the St. Lawrence Iroquoian settlements appear to have been abandoned. Long characterized by archaeologists as a 'mysterious disappearance,' recent scholarship instead highlights several lines of evidence that suggest a series of planned migrations by St. Lawrence Iroquoian groups to other Indigenous populations, including the Huron-Wendat, during a period of coalescence and social realignment (Micon et al. 2021; Lesage and Williamson 2020).[5] Horticultural villages have also been recorded along the north shore of Lake Ontario and up the Trent River dating to c. 550 B.P. (c. 1400 C.E.). By c. 450 B.P. (c. 1500 C.E), the easternmost of these settlements were located between Balsam Lake and Lake Simcoe in the region that would become historic Huronia. These population movements are also reflected in the oral histories of the Michi Saagiig (Mississauga Anishinaabeg), which recall St. Lawrence Iroquois moving westwards into their territory around 1000 A.D. (Gitiga Migizi 2019:121).

While this significant population movement is not fully understood, it undoubtedly involved complex interactions between different cultural groups including the Anishinaabeg, the Huron-Wendat and, as noted above, may also have included St. Lawrence Iroquoians. As such, there are conflicting interpretations of the archaeological and historical records related to this period (see Gaudreau and Lesage 2016; Gitiga Migizi 2019; Gitiga Migizi and Kapyrka 2015; Lainey 2006; Richard 2016; Pendergast 1972).

Anishinaabe oral histories suggest a broad homeland extending far to the west of Ontario and include references to a migration from the Atlantic seaboard, as well as a subsequent return via the St. Lawrence River to the Great Lakes region, with the latter having occurred around 500 B.P. (Hessel 1993; Sherman 2015:27). Those who became known as the Anishinabe Algonquin[6] settled along the Ottawa River or Kichi-Sibi[7] and its tributaries in eastern Ontario and western Quebec; the Ojibwa and Nipissing were located further to the north and west. Living on and around the Canadian Shield, all Anishinaabeg maintained a more nomadic lifestyle than their agricultural neighbours to the south, and accordingly their presence is less visible in the archaeological record (Morrison 2005; Sherman 2015:28).

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[5] This period also saw the coalescence of horticultural communities associated with a northward territorial expansion and a concomitant abandonment of the north shore of Lake Ontario, changes that have been suggested to have been driven, in large part, by an increase in conflict with the Haudenosaunee over control of trade routes and access to European trade goods.

[6] The Anishinabe Algonquin of eastern Ontario increasingly use the Anishinaabemowin word Omàmiwinini to refer to themselves. Omàmiwinini describes the relationship with the land in the language, and though it was largely replaced by 'Algonquin' for many years, efforts are underway to reintroduce the term (Sherman 2008:77).

[7] The Anishinabe Algonquin have various names specific to each part of the Ottawa River. The lower part of the river from Mattawa down to Lake of Two Mountains is traditionally known as the Kichi-Sibi, also spelled Kiji Sibi, Kichisipi, Kichissippi, and Kichisippi (AOO 2020; Morrison 2005:9; Sherman 2015:27).

Finally, while the Iroquois or Haudenosaunee[8] homeland was initially south of Ontario in New York state, their oral histories suggest their hunting grounds extended along the north shore of Lake Ontario and the St. Lawrence River into southeastern Ontario and Quebec (Hill 2017). Archaeological data indicates some Haudenosaunee were living year-round in Ontario by the early seventeenth century (Konrad 1981).

The Indigenous population shifts and relationships of the late sixteenth and early seventeenth centuries through the period of initial contact with Europeans were complex and are not fully understood. They were certainly in part a result of the disruption of traditional trade and exchange patterns among all Indigenous peoples brought about by the arrival of the French, Dutch and British along the Atlantic seaboard the subsequent emergence of the lucrative St. Lawrence River trade route

### 3.2 Regional Post-Contact Cultural Overview

The first Europeans to travel into eastern Ontario arrived in the early seventeenth century; predominantly French, they included explorers, fur traders and missionaries. While exploring eastern Ontario and the Ottawa River watershed between c. 1610 and 1613,[9] Samuel de Champlain and others documented encounters with different Indigenous groups speaking Anishinaabemowin, including the Matouweskarini along the Madawaska River, the Kichespirini at Morrison Island on the Ottawa River, the Otaguottouemin along the river northwest of Morrison Island, the Weskarini in the Petite Nation River basin,[10] and the Onontchataronon[11] living in the South Nation River basin as far west as the Gananoque River basin (Hanewich 2009; Hessel 1993; Sherman 2015:29). These extended family communities subsisted by hunting, fishing, and gathering, and undertook some horticulture (see also Pendergast 1999; Trigger 1987). The Anishinaabeg living in the Upper Ottawa Valley and northeastward towards the headwaters of the Ottawa River included the Nipissing, Timiskaming, Abitibi (Wahgoshig), and others. As the French moved inland, however, they referred to all these groups who spoke different dialects of Anishinabemowin as 'Algonquin' (Morrison 2005:18).

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[8] Sometime between A.D. 1142 and A.D. 1451 the Mohawk, Oneida, Onondaga, Cayuga, and Seneca united to form the Haudenosaunee Confederacy, also known as the League of Five Nations, and called the Iroquois by the French. When the Tuscarora Nation joined the confederacy in 1722, it became the League of Six Nations.

[9] From this section onwards all dates are presented as A.D.

[10] The Petite Nation River is in Quebec, with its mouth on the north side of the Ottawa River between Ottawa and Hawkesbury. It is sometimes confused with the South Nation River in eastern Ontario which empties into the south side Ottawa River opposite the Petite Nation River. Consequently, the Weskarini territory is sometimes associated with the South Nation River, but this appears to be an error (*cf.* Hessel 1993).

[11] This is a Haudenosaunee term and is, therefore, thought to be an Anishinabe Algonquin community that adopted Iroquoians who had been displaced from their territory along the St. Lawrence River near Montreal (Fox and Pilon 2016).

At the time of Champlain's travels, the Anishinabe Algonquin were already acting as brokers in the fur trade and exacting tolls from those using the Ottawa River waterway which served as a significant trade route connecting the Upper Great Lakes via Lake Nipissing and Georgian Bay to the west and the St. Maurice and Saguenay via the Rivières des Outaouais (the portion of the Ottawa River extending eastward into Quebec from Lake Timiskaming). These northern routes avoided the St. Lawrence River and Lower Great Lakes route and, therefore, potential conflict with the Haudenosaunee (Joan Holmes & Associates Inc. 1993:2-3). Access to this southern route and the extent of settlement in the region fluctuated with the state of hostilities (Joan Holmes & Associates Inc. 1993:3). As the fur trade in New France was Montreal-based, Ottawa River navigation routes were of strategic importance in the movement of goods inland and furs down to Montreal and, in the wake of Champlain's travels, the Ottawa River became the principal route to the interior for the French. The recovery of European trade goods (e.g., iron axes, copper kettle pieces, glass beads, etc.) from sites throughout the Ottawa River drainage basin provides some evidence of the extent of interaction between Indigenous groups and the French during this period (Kennedy 1970).

With Contact, major population disruptions were brought about by the introduction of European diseases against which Indigenous populations had little resistance; severe smallpox epidemics in 1623-24 and again between 1634 and 1640 resulted in drastic population decline among all Indigenous peoples living in the Great Lakes region (Konrad 1981). The expansion of hunting for trade with Europeans also accelerated decline in the beaver population, such that by the middle of the seventeenth century the centre of the fur trade had shifted northward from what became the northeastern states into southern Ontario. The French, allied with the Huron-Wendat, the Petun, and the Anishinaabeg, refused advances by the Haudenosaunee to trade with them directly. Seeking to expand their territory and disrupt the French fur trade, the Haudenosaunee launched raids into the region and established a series of winter hunting bases and trading settlements near the mouths of the major rivers flowing into the north shore of Lake Ontario and the St. Lawrence River.[12] The first recorded Haudenosaunee settlements were two Cayuga villages established at the northeastern end of Lake Ontario (Konrad 1981). Between 1640 and 1650 conflict with the Haudenosaunee Confederacy culminated in the near complete abandonment of what is now southern Ontario by Anishinaabeg and Huron-Wendat groups. In the face of continued harassment, resident Indigenous communities appear to have opted to disperse further afield or to join other communities, settling to the north and west of the Ottawa Valley,[13] and at the French posts of Montreal, Quebec City, Sillery, and Trois Rivières (Joan Holmes & Associates Inc.

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[12] These settlements included: Quinaouatoua near present day Hamilton, Teiaiagon on the Humber River, Ganatswekwyagon on the Rouge River, Ganaraske on the Ganaraska River, Kentsio on Rice Lake, Kente on the Bay of Quinte, and Ganneious, near Napanee (Adams 1986).

[13] Some Nipissing, for example, re-located to the Lake Nipigon region (Joan Holmes & Associates Inc. 1993:3).

1993:3; Trigger 1987:610, 637-638).[14] It should be noted, however, that available evidence suggests that segments of these groups either remained in their traditional territories or returned seasonally to hunt, fish and trap.

Fort Frontenac was established by the French at the present site of Kingston in 1673, and another fort was constructed at La Presentation (Ogdensburg, New York) in 1700. These forts served to solidify control of the fur trade and to enhance French ties with local Indigenous populations. To this end, the French also encouraged the establishment of Indigenous villages near their settlements (Adams 1986). The full extent of Indigenous settlement in eastern Ontario through to the end of the seventeenth century, however, is uncertain. The Odawa appear to have been using the Ottawa River for trade from c. 1654 onward and some Anishinabe Algonquin remained within the area under French influence, possibly having withdrawn to the headwaters of various tributaries in the watershed. In 1677 the Sulpician Mission of the Mountain was established near Montreal where the Ottawa River empties into the St. Lawrence River. While it was mostly a Mohawk community that became known as Kahnawake, some Anishinabe Algonquin who had converted to Christianity settled at the mission for part of the year and were known as the Oka Algonquin (Joan Holmes & Associates Inc. 1993).

As a result of increased tensions between the Haudenosaunee and the French, and declining population from disease and warfare, the Cayuga villages were abandoned in 1680 (Edwards 1984:17). Around this time, Anishinaabeg began to mount an organized counter-offensive against the Haudenosaunee who were pushed back to their traditional lands further south, leading to the return of the Michi Saagiig to southern and central Ontario from their winter hunting grounds in the north. This change saw Anishinaabeg gain wider access to European trade goods and allowed them to use their experience and strategic position to act as intermediaries in trade between the British and Indigenous communities to the north (Edwards 1984:10,17; Ripmeester 1995; Surtees 1982).

Following almost a century of warfare, the Great Peace was signed in Montreal in 1701 between New France and 39 Indigenous Nations, including the Anishinaabeg, Huron-Wendat and Haudenosaunee. This led to a period of relative peace and stability. During the first half of the eighteenth century, the Haudenosaunee appear to have been largely confined to south of the St. Lawrence River, while Mississauga and Ojibwa were living in southern and central Ontario, generally beyond the Ottawa River watershed (Joan Holmes & Associates Inc. 1993:3). Anishinabe Algonquin were residing along the Ottawa River and its tributaries, as well as outside the Ottawa River watershed at Trois-Rivières; Nipissing were located around Lake Nipissing and at Lake Nipigon. Reports from c. 1752 suggest that some non-resident Anishinabe Algonquin and Nipissing were trading at the

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[14] In the case of the 1649-1650 move of a group of Huron-Wendat from Gahoendoe (Christian) Island to the area of Quebec City, the relocation was the result of careful consideration and was planned well in advance, with a diplomatic mission having been sent in advance to discuss the move with their French allies (see Lesage and Williamson 2020).

mission at Lake of Two Mountains during the summer but returning to their hunting grounds "*far up the Ottawa River*" for the winter, and there is some indication that they may have permitted Haudenosaunee residents of the mission to hunt in their territory (Joan Holmes & Associates Inc. 1993:3; Heidenreich and Noël 1987:Plate 40).

In 1754, hostilities over trade and the territorial ambitions of the French and British led to the Seven Years' War, in which many Anishinaabeg fought on behalf of the French. With the French surrender in 1760, Britain gained control over New France, though in recognition of Indigenous title to the land the British government issued the Royal Proclamation of 1763. This created a boundary line between the British colonies on the Atlantic coast and the 'Indian Reserve' west of the Appalachian Mountains. This line then extended from where the 45th parallel of latitude crossed the St. Lawrence River near present day Cornwall northwestward to the southeast shore of Lake Nipissing and then northeastward to Lac St. Jean. The proclamation specified that "*Indians should not be molested on their hunting grounds*" (Joan Holmes & Associates Inc. 1993:4) and outlawed the private purchase of Indigenous land, instead requiring all future land purchases to be made by Crown officials "*at some public Meeting or Assembly of the said Indians*" living upon the land in question (cited in Surtees 1982: 9). In 1764, the post at Carillon on the Ottawa River was identified as the point beyond which traders could only pass with a specific licence to trade in "*Indian Territory.*" Petitions in 1772 and again in 1791 described Anishinabe Algonquin and Nipissing territory as the lands on both sides of the Ottawa River from Long Sault to Lake Nipissing. Settlers continued to trespass into this territory, however, cutting trees and driving away game vital to Indigenous lifeways (Joan Holmes & Associates Inc. 1993:5). Akwesasne, within the Haudenosaunee hunting territory, became a permanent settlement towards the middle of the eighteenth century.[15]

At first, the end of the French Regime brought little change to eastern Ontario. Between 1763 and 1776 some British traders traveled to the Kingston area, but the British presence remained sporadic until 1783 when Fort Frontenac was officially re-occupied. With the conclusion of the American Revolutionary War (1775 to 1783), however, the British sought additional lands on which to settle United Empire Loyalists fleeing the United States, disbanded soldiers, and the Mohawk who had fought with the British under Thayendanegea (Joseph Brant) and Chief Deserontyon and were, therefore, displaced from their lands in New York State. To this end, the British government undertook hasty negotiations with Indigenous groups to acquire rights to lands; however, these negotiations did not include Anishinabe Algonquin and Nipissing who were continuously ignored, despite much of the area being their traditional territory (Lanark County Neighbours for Truth and Reconciliation 2019). Initially the focus for settlement was the north shore of Lake Ontario and the St. Lawrence River, resulting in a series of 'purchases' and treaties beginning with the Crawford Purchases of 1783. As noted, these treaties did not include all of the Indigenous groups who lived and hunted in the region and the recording of the purchases – including the boundaries – and their execution were

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[15] www.firstbatuibs.info/akwesasne.html

problematic; they also did not extinguish Indigenous rights and title to the land (Joan Holmes & Associates Inc. 1993:5; Royal Commission on Aboriginal Peoples 1996). The *Crown Grant to the Mohawks of the Bay of Quinte* was issued in 1784 in recognition of the Six Nations' support during the American Revolutionary War. It included lands on the Bay of Quinte, originally part of the Crawford Purchases, on which Chief Deserontyon and other Haudenosaunee settled.[16]

Major Samuel Holland, Surveyor General for Canada, began laying out the land within the Crawford Purchases in 1784 with such haste that the newly established townships were assigned numbers instead of names. Euro-Canadian settlement along the north shore of the St. Lawrence River and the eastern end of Lake Ontario began in earnest about this time. By the late 1780s the waterfront townships were full and more land was required to meet both an increase in the size of grants to all Loyalists and grant obligations to the children of Loyalists who were now entitled to 200 acres in their own right upon reaching the age of 21 (H. Belden & Co. 1880:16). In 1792 John Graves Simcoe, Lieutenant Governor of the Province of Upper Canada, offered free land grants to anyone who would swear loyalty to the King, a policy aimed at attracting more American settlers. As government policy also dictated the setting aside of one seventh of all land for the Protestant Clergy and another seventh as Crown reserves, pressure mounted to open up more of the interior. As a result, between 1790 and 1800 most of the remainder of the Crawford Purchases was divided into townships (H. Belden & Co. 1880:16).

A number of other purchases during the late eighteenth century between representatives of the Crown and certain Anishinaabe covered lands immediately west of the Crawford Purchases, from the north shore of Lake Ontario northward to Lake Simcoe and Georgian Bay/Lake Huron. These included the John Collins Purchase of 1785, the Johnson-Butler Purchase[17] of 1787-88, and the 1798 Penetanguishene Purchase (Treaty 5) aimed at acquiring a harbour on Lake Huron for British vessels.[18] The lands purportedly covered by these purchases were often poorly defined and were thus included in the later Williams Treaties of 1923 (see below).

The *Constitution Act* of 1791, which created the provinces of Upper and Lower Canada (later Ontario and Quebec) used the Ottawa River as the boundary between the two. This effectively divided the Anishinabe Algonquin and Nipissing territories, both of which straddled the river. The Anishinabe Algonquin and Nipissing sent a letter to the Governor General of the Province of Canada in 1798, requesting that settlers be restricted to the banks of the Ottawa River and detailing the difficulties caused by encroaching settlement (Joan Holmes & Associates Inc. 1993:5; see also Lanark County Neighbours for

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[16] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

[17] Sometimes referred to as the 'Gunshot Treaty' as it reportedly covered the land as far back from the lake shore as a person could hear a gunshot (https://www.ontario.ca/page/map-ontario-treaties-and-reserves).

[18] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

Truth and Reconciliation 2019). In this letter the Chiefs noted the belt of wampum and map of their lands that was given to Governor Carleton some years earlier, pleading for no more of the encroachment that was driving away game and pushing them into infertile lands; however, there was no response. In the early 1800s, a few Anishinabe Algonquin and Nipissing settled on the shores of Golden Lake, known to them as 'Peguakonagang;' they called themselves 'Ininwezi,' which they translated as 'we people here along' (Johnson 1928; MacKay 2016).[19] The Golden Lake band, as they initially came to be known, resided in this area for at least part of the year, with various band members maintaining traplines, hunting territories, and sugar bushes.

The War of 1812 between the United States and Great Britain (along with its colonies in North America and its Indigenous allies) brought another period of conflict to the region. In 1815, at the conclusion of the war, the British government issued a proclamation in Edinburgh to further encourage settlement in British North America. The offer included free passage and 100 acres of land for each head of family, with each male child to receive his own 100 acre parcel upon reaching the age of 21 (H. Belden & Co. 1880:16). At the same time, the government was seeking additional land on which to resettle disbanded soldiers from the War of 1812. Demobilized forces could thereby act as a 'force-in-being' to oppose any possible future incursions from the United States. Veterans were encouraged to take up residence within a series of newly created 'military settlements' including those at Perth (1816) and Richmond (1818). The pressure to find more land was exacerbated by the sheer number of settlers moving into the region as a result of these initiatives, which began to push settlement beyond the acquired territory into what had formally been protected as 'Indian Land.'[20]

Additional 'purchases' were signed in the early nineteenth century between the Crown and certain Anishinaabe communities including the Lake Simcoe Purchase (Treaty 16) signed in 1815 and covering lands between Lake Simcoe and Georgian Bay, the Nottawasaga Purchase (Treaty 18) of 1818 to the south and west of the Lake Simcoe Purchase, and the Rice Lake Purchase or Treaty 20 of 1818 which covered a large area around Rice Lake.[21]

Further east, with the settlement of the region underway, Lieutenant Governor Gore ordered Captain Ferguson, the Resident Agent of Indian Affairs at Kingston, to arrange the purchase of additional lands from the chiefs of the Ojibwa and Mississauga or Michi Saagiig Nishnaabeg. The resulting Rideau Purchase (Treaty 27 and 27¼) extended from the rear of the earlier Crawford Purchases to the Ottawa River and was signed by the Michi Saagiig Nishnaabeg or Mississauga in 1819 and confirmed in 1822. This 'purchase'

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[19] The Algonquin of River Desert identified The Golden Lake Band using the name "Nozebi'wininiwag," translated as "Pike-Water People" (Speck in Johnson 1928:174).

[20] Between 1815 and 1850 over an estimated 800,000 Euro-Canadian settlers moved into the region (https://www. lanarkcountyneighbours.ca/the-petitions-of-chief-shawinipinessi.html).

[21] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

was also problematic and excluded the Anishinabe Algonquin whose traditional territory it covered (Canada 1891:62; Surtees 1994:115). As this purchase included lands within the Ottawa River watershed, the Anishinabe Algonquin and Nipissing protested in 1836 when they became aware of its terms (Joan Holmes & Associates Inc. 1993:6).

As Euro-Canadian settlement spread, Indigenous groups were increasingly pushed out of southern and eastern Ontario, generally moving further to the north and west, although some families remained in their traditional lands, at least seasonally. Records relating to the Hudson's Bay Company, the diaries of provincial land surveyors, the reports of geologists sent in by the Geological Survey of Canada, census returns,[22] store account books and settler's diaries all provide indications of the continued Indigenous settlement in the region, as does Indigenous oral history. In addition to their interactions with the Anishinabe Algonquin who remained in the area, the nineteenth century settlers found evidence of the former extent of Indigenous inhabitation, particularly as they began to clear the land. In 1819, Andrew Bell wrote from Perth:

> *All the country hereabouts has evidently been once inhabited by the Indians, and for a vast number of years too. The remains of fires, with the bones and horns of deers (sic) round them, have often been found under the black mound... A large pot made of burnt clay and highly ornamented was lately found near the banks of the Mississippi, under a large maple tree, probably two or three hundred years old. Stone axes have been found in different parts of the settlement.*
>
> (cited in Brown 1984:8)

While some Anishinabe Algonquin and Nipissing continued to spend part of the summer at Lake of Two Mountains through this period, most of the year appears to have been spent on their traditional hunting grounds, and by the 1830s there were specific claims for land by individuals such as Mackwa on the Bonnechere River and Constant Pennecy on the Rideau waterway. In 1842, Chief Pierre Shawinipinessi,[23] an Anishinabe Algonquin leader, petitioned the Crown for a land tract of 2,000 acres between the townships of Oso, Bedford and South Sherbrooke to enable his people to sustain themselves (Huitema 2001; Ripmeester 1995:164-166; Sherman 2008:32-33).[24] A licence of occupation for the 'Bedford Algonquin' was granted in 1844, with Mississauga (Michi Saagiig Nishnaabeg) from Alnwick reportedly also living at Bedford (Joan Holmes & Associates Inc. 1993:7-8). Illegal logging operations, however, interfered with life on the

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[22] While Indigenous peoples were clearly still residing in the area and making use of the land, they often do not appear in the 1851 to 1871 census records. Huitema (2001:129) notes that 'Algonquin' were sometimes listed in these records as 'Frenchmen' or 'halfbreeds' because they had utilized the mission at Lake of Two Mountains as their summer gathering place and, therefore, were thought of as being French.

[23] There are numerous variations in the spelling of Chief Shawinipinessi's name; he is also known by the name of Peter Stephens or Stevens).

[24] July 17, 1842 petition 115 addressed to Sir Charles Bagot, Governor General, Library and Archives Canada RG10, V186 part 2, as transcribed in Joan Holmes & Associates Inc. (1993) *Report on the Algonquins of Golden Lake Claim* Vol. 10-12:101.

reserve, and despite protests from Chief Shawinipinessi and legislation passed in 1838 and then later in 1850 to protect Indigenous lands,[25] it was allowed to continue, depleting the local food resources. In response to an 1861 petition to address the trespassing of settlers, the existence of the Bedford tract was denied (LAC microfilm reel C-13419). At this time some of the community moved to nearby lands while others joined the Anishinabe Algonquin at Kitigan Zibi, and at Pikwàkanagàn where the 'Golden Lake Reserve' was created in 1873 (Hanewich 2009; Joan Holmes & Associates Inc. 1993:9). Around 1836 some consideration was given to facilitating Anishinabe Algonquin and Nipissing settlement in the Grand Calumet Portage and Allumette Island area, but this was not pursued (Joan Holmes & Associates Inc. 1993).

Other treaties signed in the mid-nineteenth century included the St. Regis Purchase (Treaty 57) signed in 1847 between the Crown and the Mohawk and covering a narrow parcel of land, known as the 'Nutfield Tract' extending north of the St. Lawrence River at Cornwall towards the Ottawa River, and the Robson-Huron Treaty (Treaty 61) of 1850 between the Crown and certain Anishinaabeg for lands east of Georgian Bay and the northern shore of Lake Huron eastward to the Ottawa River.[26]

Through the early twentieth century, off-reserve Anishinabe Algonquin and Nipissing were told to move to established reserves at Golden Lake (Pikwàkanagàn), Maniwaki (Desert River) and at Gibson on Georgian Bay (which had been established for the re-settlement of both Anishinabe Algonquin and Mohawk from Lake of Two Mountains), but many remained in their traditional hunting territories. There is also evidence to suggest that Akwesasne Mohawk trapped and hunted north of their reserve as far as Smiths Falls and Rideau Ferry between c. 1924 and 1948 (Joan Holmes & Associates Inc. 1993:10-11; Sherman 2008:33).

The Williams Treaties of 1923 were signed between the Crown and seven Anishinaabe First Nations to address lands that had not been surrendered via a formal treaty process (see above).[27] These lands covered a large area from the north shore of Lake Ontario to Lake Nipissing and overlapped with a number of other treaties and 'purchases.' The Williams Treaties First Nations include the Chippewas of Beausoleil, Georgina Island and Rama, and the Mississaugas of Alderville, Curve Lake, Hiawatha and Scugog Island. To address further issues with a number of the pre-confederation purchases and treaties, the Williams Treaties First Nations ratified the Williams Treaties Settlement Agreement with Canada and Ontario in June, 2018. This agreement recognized harvesting rights in

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[25] Chapter XV. An Act for the protection of the Lands of the Crown in this Province, from Trespass and Injury. Thirteenth Parliament, 2nd Victoria, A.D. 1839. An Act for the Protection of the Indians in Upper Canada from Imposition and the Property Occupied or Enjoyed by Them from Trespass and Injury; passed by the government of Upper Canada on August 10, 1850. Available from https://bnald.lib.unb.ca/node/5342; United Canadas (1841-1857) 13 & 14 Victoria – Chapter 74:1409.

[26] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

[27] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

Treaties 5, 16, 18, 20, 27 and 27¼, the Crawford Purchase, the Gunshot Treaty and Lake Simcoe.[28]

As noted above, lands considered traditional Anishinabe Algonquin territory were included in various nineteenth century purchases from which they were excluded. Anishinabe Algonquin claims to these lands include a series of petitions to the Crown going back to 1772 that asserted rights to land and resources. An official land claim was made in the 1980s and, in 2016, an Agreement-in-Principle was signed by Ontario, Canada and the Algonquins of Ontario, a step towards a treaty recognizing Anishinabe Algonquin rights across much of eastern Ontario.[29]

### *Geographic Township of Clarendon*

Clarendon Township was officially surveyed by John Snow in 1862, though references to specific lots in the 1840s indicate that there had been at least a partial survey undertaken twenty years earlier. Furthermore, after the Frontenac Road had been constructed through the township settlement lots or ranges had been laid out to either side by Thomas Gibbs in 1859. Squatters, probably the result of lumbermen relocating their families closer to their working camps, are known to have applied for patents to land to the north and south of the east end of Kashwakamak Lake in the 1840s, including on Lots 25 and 26 in Concession 10. One petitioner for this property claimed to have been a resident since 1836. A claim was also filed by another settler on Lot 16, Concession 10, for reimbursement for timber removed from her property, on which she claimed her husband had settled in either 1840 or 1841 (Armstrong 1976:12).

Timber limits along the Mississippi River were first granted by the provincial government in the 1840s. Those in the Clarendon Township area were awarded to D.M. McMartin, Joseph Porteous and Ed McKay in 1847. A lumber shanty was recorded to the south of the east end of Kashwakamak Lake in 1848, though as stated above illegal settlement (probably related to the timber business) is known to have occurred in the area as early as 1840. In 1848 a group of settlers in this area petitioned to have a school erected on land claimed by Thomas Cline, indicating a fairly sizeable community in the vicinity. When Gibbs surveyed the Frontenac Road in 1852/1853 he noted a number of families residing approximately four miles east of settlement that would become Ardoch (Armstrong 1976:12-15).

With the completion of the land survey along the Frontenac Road, much of Clarendon Township was opened for settlement as free grant land. Many of the lots were taken up in the early 1860s, but the relatively late date or lack of a patent for a large number of lots points to the transient nature of early settlement in the township, much of which was unsuited to agriculture. An 1860/61 report listed a total population of 374; another report

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[28] www.williamstreatiesfirstnations.ca
[29] https://www.ontario.ca/page/map-ontario-treaties-and-reserves

four years later showed an increase to 487 with a total of 99 houses and 72 barns or stables (Armstrong 1976:21). The Smith Road, running south towards Kashwakamak Lake from the Frontenac Road, had probably been constructed by 1864 when a number of settlers were awarded patents for land near its western end (Armstrong 1976:18).

The timber limits came under the control of Allan Gilmour of the Gilmour Lumber Company, in the 1850s, who in turn sold them to Gilles and McLaren in 1866 (Armstrong 1976:38-39). The Kashwakamak Lake Dam located at the outlet in the northeast corner of the lake was originally constructed in the 1850s, probably by Gilmour, to ease the transportation of cut timber through the area. This dam raised the water level of the lake by up to eight feet (2.44 m). The present dam was constructed in 1910 (Mississippi Valley Conservation Authority, personal communication, 2007).

### 3.3 Michi Saagiig Historical Context

The following is a summary of oral tradition provided by Curve Lake First Nation:

> *The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as "the people of the big river mouths" and were also known as the "Salmon People" who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months.*
>
> *The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the "Peacekeepers" among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.*
>
> *Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the "Old Ones" who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.*
>
> *The traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft*

*and north of the Haliburton highlands. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all of the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.*

*Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Gitiga Migizi and Kapyrka 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig.*

*The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people.*

*Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated.*

*The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear.*

*Michi Saagiig Elder Gitiga Migizi (2017) recounts:*

*"We weren't affected as much as the larger villages because we learned to paddle away for several years until everything settled down. And we came back and tried to bury the bones of the Huron but it was overwhelming, it was all over, there were bones all over – that is our story.*

*There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.*

*We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So we are very important in terms of keeping the balance of relationships in harmony.*

*Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis."*

*Often times, southern Ontario is described as being "vacant" after the dispersal of the Huron-Wendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation.*

*The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present day communities: Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation.*

*The Michi Saagiig have been in Ontario for thousands of years, and they remain here to this day.*

***This historical context was prepared by Gitiga Migizi, a respected Elder and Knowledge Keeper of the Michi Saagiig Nation.***

*Publication reference:*

*Gitiga Migizi and Julie Kapyrka*
*2015* ***Before, During, and After: Mississauga Presence in the Kawarthas.*** *In Peterborough Archaeology, Dirk Verhulst, editor, pp.127-136. Peterborough, Ontario: Peterborough Chapter of the Ontario Archaeological Society.*

### 3.4 Nation Huronne-Wendat Historical Context

The following is a summary of the history of the Nation Huronne-Wendat provided by the Huron Wendat Nation:

> *As an ancient people, traditionally, the Huron-Wendat, a great Iroquoian civilization of farmers and fishermen-hunter-gatherers and also the masters of trade and diplomacy, represented several thousand individuals. They lived in a territory stretching from the Gaspé Peninsula in the Gulf of Saint Lawrence and up along the Saint Lawrence Valley on both sides of the Saint Lawrence River all the way to the Great Lakes. Huronia, included in Wendake South, represents a part of the ancestral territory of the Huron-Wendat Nation in Ontario. It extends from Lake Nipissing in the North to Lake Ontario in the South and Île Perrot in the East to around Owen Sound in the West. This territory is today marked by several hundred archaeological sites, listed to date, testifying to this strong occupation of the territory by the Nation. It is an invaluable heritage for the Huron-Wendat Nation and the largest archaeological heritage related to a First Nation in Canada.*
>
> *According to our own traditions and customs, the Huron-Wendat are intimately linked to the Saint Lawrence River and its estuary, which is the main route of its activities and way of life. The Huron-Wendat formed alliances and traded goods with other First Nations among the networks that stretched across the continent.*
>
> *Today, the population of the Huron-Wendat Nation is composed of more than 4000 members distributed on-reserve and off-reserve.*
>
> *The Huron-Wendat Nation band council (CNHW) is headquartered in Wendake, the oldest First Nations community in Canada, located on the outskirts of Quebec City (20 km north of the city) on the banks of the Saint Charles River. There is only one Huron-Wendat community, whose ancestral territory is called the Nionwentsïo, which translates to "our beautiful land" in the Wendat language.*
>
> *The Huron-Wendat Nation is also the only authority that have the authority and rights to protect and take care of her ancestral sites in Wendake South.*

### 3.5 History of the Ojibway Nation

The following historical context was provided by the Chippewas of Rama First Nation:

> *The Chippewas of Rama First Nation are an Anishinaabe (Ojibway) community located at Rama First Nation, ON. Our history began with a great migration from the East Coast of Canada into the Great Lakes region. Throughout a period of several hundred years, our direct ancestors again migrated to the north and eastern shores of Lake Huron and Georgian Bay. Our Elders say that we made room in our territory for our allies, the Huron-Wendat Nation, during their times of war with the Haudenosaunee. Following the dispersal of the Huron-Wendat Nation from the region in the mid-1600s, our stories say that we again migrated to*

*our territories in what today is known as Muskoka and Simcoe County. Several major battles with the Haundenosaunee culminated in peace being agreed between the Anishinaabe and the Haudenosaunee, after which the Haudenosaunee agreed to leave the region and remain in southern Ontario. Thus, since the early 18th century, much of central Ontario into the lower parts of northern Ontario has been Anishinaabe territory.*

*The more recent history of Rama First Nation begins with the creation of the "Coldwater Narrows" reserve, one of the first reserves in Canada. The Crown intended to relocate our ancestors to the Coldwater reserve and ultimately assimilate our ancestors into Euro-Canadian culture. Underlying the attempts to assimilate our ancestors were the plans to take possession of our vast hunting and harvesting territories. Feeling the impacts of increasingly widespread settlement, many of our ancestors moved to the Coldwater reserve in the early 1830s. Our ancestors built homes, mills, and farmsteads along the old portage route which ran through the reserve, connecting Lake Simcoe to Georgian Bay (this route is now called "Highway 12"). After a short period of approximately six years, the Crown had a change of plans. Frustrated at our ancestors continued exploiting of hunting territories (spanning roughly from Newmarket to the south, Kawartha Lakes to the east, Meaford to the west, and Lake Nipissing to the north), as well as unsuccessful assimilation attempts, the Crown reneged on the promise of reserve land. Three of our Chiefs, including Chief Yellowhead, went to York under the impression they were signing documents affirming their ownership of land and buildings. The Chiefs were misled, and inadvertently allegedly surrendered the Coldwater reserve back to the Crown.*

*Our ancestors, then known as the Chippewas of Lakes Simcoe and Huron, were left landless. Earlier treaties, such as Treaty 16 and Treaty 18, had already resulted in nearly 2,000,000 acres being allegedly surrendered to the Crown. The Chippewas made the decision to split into three groups. The first followed Chief Snake to Snake Island and Georgina Island (today known as the Chippewas of Georgina Island). The second group followed Chief Aissance to Beausoleil Island, and later to Christian Island (Beausoleil First Nation). The third group, led by Chief Yellowhead, moved to the Narrows between Lakes Simcoe and Couchiching and eventually, Rama (Chippewas of Rama First Nation).*

*A series of purchases, using Rama's own funds, resulted in Yellowhead purchasing approximately 1,600 acres of abandoned farmland in Rama Township. This land makes up the core of the Rama Reserve today, and we have called it home since the early 1840's. Our ancestors began developing our community, clearing fields for farming and building homes. They continued to hunt and harvest in their traditional territories, especially within the Muskoka region, up until the early 1920's. In 1923, the Williams Treaties were signed, surrendering 12,000,000 acres of previously unceded land to the Crown. Once again, our ancestors were misled, and they were informed that in surrendering the land, they gave up their right to access their seasonal traditional hunting and harvesting territories.*

*With accessing territories difficult, our ancestors turned to other ways to survive. Many men guided tourists around their former family hunting territories in Muskoka, showing them places to fish and hunt. Others worked in lumber camps and mills. Our grandmothers made*

> *crafts such as porcupine quill baskets and black ash baskets, and sold them to tourists visiting Simcoe and Muskoka. The children were forced into Indian Day School, and some were taken away to Residential Schools. Church on the reserve began to indoctrinate our ancestors. Our community, along with every other First Nation in Canada, entered a dark period of attempted genocide at the hands of Canada and the Crown. Somehow, our ancestors persevered, and they kept our culture, language, and community alive.*
>
> *Today, our community has grown into a bustling place, and is home to approximately 1,100 people. We are a proud and progressive First Nations community.*

### 3.6 Historical Development of the Study Area

The following section has been excerpted from the relevant portions of the preceding Stage 1 and Stage 2 archaeological assessment report (Past Recovery 2024; PIF: P1074-0089-2023). Please see the Stage 1 and Stage 2 report for more detailed information.

During the mid nineteenth century the upper Mississippi River was used for the transportation of lumber in support of the burgeoning lumber industry in the Ontario interior. The course of the river was improved by the construction of channels, dams, slides, sluices, and booms. The Kashwakamak Lake Dam was originally constructed in the 1850s for this purpose and raised the water levels by up to eight feet. Lot 20 Concession 10 was, at the time, owned by the Gillies and McLaren Lumber Company. The lot was likely vacant of structures without its nineteenth century owners having resided on the property.

In 1911 the Mississippi River Improvement Company Limited, founded to mange the water flow on the river between Mazinaw Lake and the Ottawa River in 1909, acquired the lot and the right-of-way through the waterway. The present dam at Kashwakamak Lake was constructed in 1910 as part of the improvements to infrastructures along the river system stemming from provincial legislation to charter the company and allow for the levy of tolls. Proximately eighty year later, in 1990, the lands were transferred to the Mississippi Valley Conservation Authority. The extant Kashwakamak Lake Dam consists of two structures: the main control dam and a secondary saddle dam, separated by a section of land on the north side of the main structure. The main structures are comprised of two bulkhead walls, the concrete piers forming the two sluiceways and a broad crested concrete weir. The dam has undergone major repairs over the years to fix structural and seepage issues.

## 4.0 ARCHAEOLOGICAL CONTEXT

This section describes the archaeological context of the study area, including known archaeological research, known cultural heritage resources (including archaeological sites), and environmental conditions. In combination with the historical context outlined above, this provides the necessary background information to evaluate the archaeological potential of the property.

### 4.1 Previous Archaeological Research

In order to determine whether any previous archaeological fieldwork has been conducted within or in the immediate vicinity of the present study area, a search of the titles of reports in the *Public Register of Archaeological Reports* maintained by the Ministry of Citizenship and Multiculturalism (MCM) was undertaken. To augment these results, a search of the Past Recovery corporate library was also conducted.[30]

A prime source for unregistered archaeological finds is the initial series of *Annual Archaeological Reports for Ontario* (AARO), which were published as appendices to the report of the Minister of Education in the *Ontario Sessional Papers*. In these reports, dating between 1887 and 1928, staff of the provincial museum (which eventually became the Royal Ontario Museum) published articles by several of Ontario's most prominent collectors, amateur archaeologists, and museum staff. The articles provide a record of some of the earliest archaeological fieldwork to have taken place in the province, as well as documentation of the private collections that were donated to the museum. These articles report on extensive artifact collecting in Frontenac County in the late nineteenth and early twentieth centuries. There was only one reference to Clarendon Township in the AARO volumes, which was in reference to an earthen vessel found in conjunction with a stone enclosure on Lot 4, Concession 8, by renowned Canadian geologist and archaeologist, Sir John William Dawson, in 1859 (Annual Archaeological Reports for Ontario, 1889).

An archaeological survey of the Mississippi River from Mazinaw Lake to Dalhousie Lake was completed in 1977 by Phill Wright (Wright and Englebert 1978). The section of the Mississippi surveyed during 1977 yielded few new sites. The paucity of archaeological data recovered is likely the result of cottage development and raised water levels (Wright

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[30] In compiling the results, it should be noted that archaeological fieldwork conducted for research purposes should be distinguished from systematic property surveys conducted during archaeological assessments associated with land use development planning (generally after the introduction of the *Ontario Heritage Act* in 1974 and the *Environmental Assessment Act* in 1975), in that only those studies undertaken to current standards can be considered to have adequately assessed properties for the presence of archaeological sites with cultural heritage value or interest. In addition, it should be noted that the majority of the research work undertaken in the area has been focused on the identification of pre-Contact Indigenous sites, while current MCM requirements minimally require the evaluation of the material remains of occupations and or land uses pre-dating 1900.

and Englebert 1978:iv). To the knowledge of Past Recovery staff, no previous archaeological assessments have occurred within or within the immediate vicinity of the study area.

### 4.1.1 Summary of the Previous Stage 1 Archaeological Assessment

For a full account of the Stage 1 archaeological assessment please refer to the Stage 1 and Stage 2 combined report (Past Recovery 2024; PIF: P1074-0089-2023), not yet submitted to MCM.

Past Recovery was retained by Egis Group Ltd., on behalf of the Mississippi Valley Conservation Authority, to undertake a Stage 1 archaeological assessment of parts of Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac. In conjunction with a desk top assessment, a property inspection was carried out July 25th, 2023. The purpose of the assessment was to identify known heritage resources within the park, to determine the archaeological potential for the entire property, and to present recommendations for the mitigation of any significant known or potential archaeological resources.

*Evaluation of Archaeological Potential*

The Stage 1 assessment found that the subject property exhibited potential for both per-Contact settlement and/or land uses and post-Contact settlement and/or land uses. Specifically, the assessment determined that:

- All of the study area lies within 300 m of Kashwakamak Lake/Mississippi River (a major pre-Contact transportation corridor), which offered a source of potable water and food, making the entire area a suitable location for camps for pre-Contact hunter-gatherer populations;
- Soils in the study area are well-drained sandy loam, of a type preferred for pre-Contact campsites.
- All of the study area lies within 300 m of Kashwakamak Lake/Mississippi River, a major post-Contact transportation corridor which continues to serve as a transportation corridor today; and,
- Nineteenth century logging activity occurred throughout the general area.

Based on the historical sources and imagery reviewed and the site visit it was determined that all of the study area retains potential for both pre-Contact and post-Contact archaeological resources, with the exceptions of the sloped areas, as well as the areas that have been disturbed through the construction of the dams and the creation of the access road.

*Stage 1 Recommendations*

The results of the Stage 1 background research indicated that the study area retained potential for the presence of significant archaeological resources. Accordingly, it was recommended that:

1) The portions of the study area that have been determined to exhibit archaeological potential should be subject to Stage 2 archaeological assessment prior to the initiation of below-grade soil disturbances or other alterations (see Map 4 in the Stage 1 and Stage 2 report).

2) Any future Stage 2 archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011). As the study area is non-agricultural land, all portions identified as exhibiting archaeological potential should be assessed by means of a shovel test pit survey conducted at 5 m intervals.

3) In the event that future planning results in the identification of additional areas of impact beyond the limits of the present Stage 1 study area, further archaeological assessment may be required. It should be noted that screening for impacts should include all aspects of the proposed development that may cause soil disturbances or other alterations (i.e. access roads, staging/lay down areas, associated works etc.), and that even temporary property needs should be considered.

4) Any future archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011).

(Past Recovery 2024:36)

### 4.1.2 Summary of the Previous Stage 2 Archaeological Assessments

For a full account of the Stage 2 archaeological assessment please refer to the Stage 1 and Stage 2 combined report (Past Recovery 2024; PIF: P1074-0089-2023), not yet submitted to MCM.

Past Recovery was retained by Egis Group Ltd., on behalf of the Mississippi Valley Conservation Authority, to undertake a Stage 2 archaeological assessment within Lot 20, Concession 10 in the geographic Township of Clarendon, now within the Township of North Frontenac. The purpose of the assessment was to determine whether or not archaeological resources were present within the study area, and if so to recommend appropriate further archaeological work. The Stage 2 work took place on May 2nd, 2024.

*Stage 2 Field Methods*

The Stage 2 assessment was conducted via a shovel test pit survey on a 5 m grid across the study area. Some sections of the study area were shovel test pit surveyed at 5 m intervals where possible because of a combination of steep slopes and exposed bedrock. Shovel test pits were excavated to at least 30 cm in diameter using shovels and trowels and excavation continued for 5 cm into sterile subsoil. The back-dirt was screened through 6 mm hardware mesh. Sample test pits were recorded and all test pits were back filled. Testing continued to within 1 m of built structures and test pit intensification Strategy A was undertaken at Findspot 1, with a maximum of eight additional test pits dug within the intensification area and one test unit placed over the positive test pit.

The Stage 2 test pit survey yielded a total of 14 pieces of lithic material, and a fragment of calcined mammal bone. The lithic assemblage is composed solely of knapping debitage (tertiary and broken or partial flakes). Thirteen pieces of debitage are of Kichessippi chert, and one is a tertiary flake of Hudson Bay Lowland chert. No temporally diagnostic artifacts were recovered; it was therefore not possible to assign a date to the lithic assemblage

*Stage 2 Analysis and Conclusions*

The Stage 2 archaeological assessment consisted of a shovel test-pit survey at 5 m intervals across all portions of the study area determined to exhibit archaeological potential; the remaining areas were not tested having been determined to be of low archaeological potential as a result of deep disturbance, permanently wet areas or steeply sloped terrain (> 20 degrees). The property survey resulted in the identification of one previously unrecorded potential archaeological site, identified as Findspot 1.

The artifacts recovered from Findspot 1 suggests that the site was the location of a short-term campsite where the inhabitants undertook late-stage lithic reduction practices, using both locally available and imported lithic raw materials. As the lithic assemblage was comprised of non-diagnostic flakes, no further inferences may be drawn.

As the artifact assemblage exceeded three pre-19th century artifacts found within a 10 m radius, the site meets MCM requirements for registration as an archaeological site in the Ontario Archaeological Sites Database and was thus assigned Borden Number BfGf-3 (MCM 2011:160). The result of a Stage 2 property assessment met Standard 2.2.1c.ii(2) indicating a requirement for a Stage 3 assessment by recovering more than 5 non-diagnostic artifacts from within a 10m x 10m test pit survey area, including from both the positive test pit, as well as the test unit (MCM 2011:41).

*Stage 2 Recommendations*

Based on the results of the Stage 2 property survey discussed above, it was recommended that:

1) A Stage 3 site-specific archaeological assessment should be undertaken for Findspot #1 (BfGf-3) by means of the controlled hand excavation of one-metre-square units over the area of the site on a 5 m grid, with an additional 20 percent of the grid total focussing on areas of interest within the site extent. The assessment should be undertaken by a licensed consultant archaeologist in compliance with Standards and Guidelines for Consultant Archaeologists (MCM 2011).

2) In the event that future planning results in the identification of additional areas of impact beyond the limits of the present study area, further Stage 2 archaeological assessment may be required. It should be noted that impacts include all aspects of the proposed development causing soil disturbances or other alterations, including additional temporary property needs (i.e. access roads, staging/lay down areas, associated works etc.). Any future Stage 2 archaeological assessment should be undertaken by a licensed consultant archaeologist, in compliance with *Standards and Guidelines for Consultant Archaeologists* (MCM 2011).

(Past Recovery 2024:42)

### 4.2 Previously Recorded Archaeological Sites

The primary source for information regarding known archaeological sites in Ontario is the *Archaeological Sites Database* maintained by the Ontario Ministry of Citizenship and Multiculturalism. The database largely consists of archaeological sites discovered by professional archaeologists conducting archaeological assessments required by legislated processes under land use development planning (largely since the late 1980s). An updated search of the *Sites Database* indicated that there is one registered archaeological site located within a one-kilometre radius of the study area, in addition to BfGf-3 (Table 1).

**Table 1. Summary of Registered Archaeological Sites within a One-Kilometre Radius of the Study Area.**

| Borden Number | Site Name | Time Period | Inferred Agency | Inferred Function | Review Status |
|---|---|---|---|---|---|
| BfGf-1 | Logger's Rock | Post Contact | Euro-Canadian | | |
| BfGf-3 | Kashwakamak Lake Dam | Pre-Contact | Aboriginal | Scatter | Further CHVI |

CHVI – Cultural Heritage Value or Interest

## 4.3 Cultural Heritage Resources

The recognition or designation of cultural heritage resources (here referring only to built heritage features and cultural heritage landscapes) may provide valuable insight into aspects of local heritage, whether identified at the local, provincial, national, or international level. As some of these cultural heritage resources may be associated with significant archaeological features or deposits, the background research conducted for this assessment included the compilation of a list of cultural heritage resources that have previously been identified within or immediately adjacent to the current study area. The following sources were consulted:

- Federal Heritage Buildings Review Office online Directory of Heritage Designations;[31]
- Canada's Historic Places website;[32]
- Ontario Heritage Properties Database;[33]
- An archived listing of Ministry of Citizenship and Multiculturalism's Heritage Conservation Districts;[34] and,
- Ontario Heritage Trust website.[35]

No designated cultural heritage sites were found within a 300 m radius from the study area.

## 4.4 Heritage Plaques and Monuments

The recognition of a place, person, or event through the erection of a plaque or monument may also provide valuable insight into aspects of local history, given that these markers typically indicate some level of heritage recognition. As with cultural heritage resources (built heritage features and/or cultural heritage landscapes), some of these places, persons, or events may be associated with significant archaeological features or deposits. Accordingly, this study included the compilation of a list of heritage plaques and/or markers in the vicinity of the study area. The following sources were consulted:

- The Ontario Heritage Trust Online Plaque Guide;[36]
- A listing of plaques transcribed at www.readtheplaque.com;
- Parks Canada Directory of Federal Heritage Designations;[37] and,
- A listing of historical plaques of Ontario maintained by Sarah J. McCabe.[38]

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[31] https://www.pc.gc.ca/apps/DFHD/default_eng.aspx
[32] https://www.historicplaces.ca/en/rep-reg/search-recherche.aspx
[33] https://www.heritagetrust.on.ca/en/oha/advanced-search
[34] https://web.archive.org/web/20220325223537/http://www.mtc.gov.on.ca/en/heritage/heritage_conserving_list.shtml
[35] https://www.heritagetrust.on.ca/online-plaque-guide
[36] https://www.heritagetrust.on.ca/en/index.php/pages/tools/plaque-database
[37] https://www.pc.gc.ca/apps/dfhd/default_eng.aspx
[38] https://ontarioplaques.omeka.net/

No plaques or monuments were found within a 300 m radius from the study area.

### 4.5 Cemeteries

The presence of historical cemeteries in proximity to a parcel undergoing archaeological assessment can pose archaeological concerns in two respects. First, cemeteries may be associated with related structures or activities that may have become part of the archaeological record, and thus may be considered features indicating archaeological potential. Second, the boundaries of historical cemeteries may have been altered over time, as all or portions may have fallen out of use and been forgotten, leaving potential for the presence of unmarked graves. For these reasons, the background research conducted for this assessment included a search of available sources of information regarding historical cemeteries. For this study, the following sources were consulted:

- An archived listing of all registered cemeteries in the province of Ontario maintained by the Consumer Protection Branch of the Ministry of Public and Business Service Delivery (last updated 06/07/2011);
- Field of Stones website;[39]
- Ontario Cemetery Locator website maintained by the Ontario Genealogical Society;[40]
- Ontario Headstones Photo Project website;[41] and,
- Available historical mapping and aerial photography.

No known cemeteries were located within or adjacent to the study area.[42] The closest registered cemetery is St. John's Anglican Cemetery, located at 6161 Road 506 in Ardoch, approximately 4.5 km northeast of the study area.

### 4.6 Mineral Resources

The presence of scarce mineral resources on or near to a property may indicate potential for archaeological resources associated with both pre-Contact and post-Contact exploration and exploitation. For this reason, the background research conducted for the assessment includes a search of available sources of information on the locations of outcrops of rare and highly valued minerals, such as quartz, chert, ochre, copper, and soapstone, as well as minerals sought out by post-Contact prospectors and miners for more industrial-scale exploitation (i.e. gold, copper, iron, mica, etc.). Useful tools in this

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[39] https://freepages.rootsweb.com/~clifford/history/

[40] https://vitacollections.ca/ogscollections/2818487/data?g=d

[41] https://canadianheadstones.ca/ wp/cemetery-lookup/

[42] It should be noted that the research undertaken as part of this Stage 1 archaeological assessment is unlikely to identify the potential for the presence of unrecorded burial plots, such as those of individual families on rural properties. See Section 6.0 of this report for information regarding compliance with provincial legislation in the event that human remains are identified during future development.

search are provided by databases maintained by the Ontario Geological Survey and the Ministry of Northern Development and Mines, including:

- *Abandoned Mines Information System* which contains a list of all known abandoned and inactive mine sites and associated features in the province;
- *Mining Claims* which contains a list of all active claims, alienations, and dispositions;
- *Mineral Deposits Inventory* which contains a list of known mineral occurrences of economic value in the Province; and,
- *Bedrock Geology Data Set*, which shows the distribution of bedrock units and illustrates geologic rock types, major faults, iron formations, kimberlite intrusions, and dike swarms.

A review of the above-mentioned databases revealed no cases of mineral deposits within a 300 m radius of the study area.

### 4.7 Local Environment

The assessment of present and past environmental conditions in the region containing the study area is a necessary component in determining the potential for past occupation as well as providing a context for the analysis of archaeological resources discovered during an assessment. Factors such as local water sources, soil types, vegetation associations and topography all contribute to the suitability of the land for human exploitation and/or settlement. For the purposes of this assessment, information from local physiographic, geological and soils research has been compiled to create a picture of the environmental context for both past and present land uses.

The physiography and distribution of surficial material in this area are largely the result of glacial activity that took place in the Late Wisconsinan (Bajc 1994). This period, which lasted from approximately 23,000 to 11,000 years before present, was marked by the repeated advance and retreat of the massive Laurentide Ice Sheet. As the ice advanced, debris from the underlying sediments and bedrock accumulated within and beneath the ice. The debris, a mixture of stones, sand, silt, and clay, was deposited over large areas as till plains, drumlins, and moraines. During deglaciation, as the Late Wisconsinan ice margin receded to the north, massive inflows of glacial meltwater into the Huron-Georgian Bay-Lake Simcoe basin flooded adjacent lands, which had been depressed by the weight of the continental ice sheet, forming glacial Lake Algonquin by 11,500 years ago (Eshman and Karrow 1985 in Gao 2010). These waters created shoreline features that, with isostatic rebound, are now as much as 100 to 150 metres above the present water level in Georgian Bay. Where the northern limit of glacial Lake Algonquin was formed by the retreating ice sheet, new lake outlets developed as progressively lower sills were exposed, and water levels dropped to successively lower levels. About 10,100 B.P., during the Ottawa-Marquette Low Stand, Glacial Lake Algonquin drained away and a series of smaller lakes (called Hough and Stanley) occupied depressions in the Huron Basin below the present-day water level. While low-water conditions continued in the former Laurentide Lake basis for millennia, only c. 500 years later water volumes increased rapidly in the French-Nipissing-Mattawa basin. These changing conditions resulted in much higher water levels in the Mattawa Lowlands and Ottawa River Valley, creating a series of raised post-Algonquin relic shorelines. Modern water levels in the Great Lakes basins only developed sometime after 3,000 years ago, with only minor climate-related fluctuations since that time.

The study area is situated within the Algonquin Highlands physiographic region which is characterized by an extensive tract of shallow soil over granite or other hard Precambrian bedrock (Chapman and Putnam 1984:211). The relief is generally rough with rounded knobs and ridges, some up to 170 m high. Surficial geological mapping indicates that the study area is underlain by Precambrian bedrock.

The soil survey of Frontenac County shows the survey property consists of the Tweed Sandy Loam complex, comprised of shallow, calcareous sandy loam till and acidic with low fertility, usually associated with rock outcrops, rough topography, stones and swamps. In general, these are not considered arable soils but are well draining (Hoffman et al. 1967). Topographic mapping at 2 m contours shows the area around the subject property consists of a gentle slope down to the water on either shoreline, with elevations ranging between 260 m and 264 m above sea level (masl).

The study area lies within the Mississippi Valley watershed, and more specifically the Crotch Lake-Mississippi River subwatershed. Kashwakamak Lake is a 15 km long, relatively narrow, freshwater lake running in an east-west direction. It is 0.74 km at its widest point with a maximum depth of 22 m. The primary inflow and outflow are both via the Mississippi River; upstream from Marble Lake over the White Fish rapids and downstream, controlled by the Kashwakamak Dam, towards Mud Lake. The damming of this lake raised the water levels up to eight feet (2.44 m; Armstrong 1976:38-39).

The study area is also within the Middle Ottawa sub-region of the Great Lakes-St. Lawrence Forest Region. Tree species within this area include sugar maple, beech, yellow birch, red maple, hemlock, white pine and red pine with lesser numbers of jack pine, white spruce, balsam fir, aspen, white birch, red oak and basswood. Hardwood and mixed wood swamps also can contain easter cedar, tamarack, black spruce, clack ash, red maple and elm. Other occasional species include butternut, bur oak, white ash and black cherry (Rowe 1972:48). The area would have been cleared of its original forest cover with the intensification of Euro-Canadian settlement and extensive logging in the nineteenth century.

## 5.0 STAGE 3 ARCHAEOLOGICAL ASSESSMENT

This section of the report describes the methods used in and the results of the Stage 3 site-specific archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) to be impacted by the proposed improvements of the Kashwakamak Lake dam. The purpose of the Stage 3 assessment was to determine the spatial extent of the site within the impact study area and allow for the collection and analysis of a representative sample of artifacts and a determination of whether or not significant archaeological features were present. The results of this research were compiled to present an evaluation of the cultural heritage value or interest of the site and whether or not recommendations for Stage 4 measures to mitigate development impacts were appropriate.

### 5.1 Detailed Historical Research

Detailed historical research for this project has been presented above in Section 3.6. of this report.

### 5.2 Stage 3 Field Methods

The Stage 3 site-specific archaeological assessment of Kashwakamak Lake Dam site (BfGf-3) was completed over the course of three days – from August 20th, 2024 to August 22nd, 2024. A crew of one field director and three experienced field technicians undertook the assessment (Images 1 and 2). Fieldwork was conducted according to standards outlined in *Standards and Guidelines for Consultant Archaeologists* (MCM 2011). During the Stage 3 fieldwork, weather conditions ranged from sunny to overcast with brief light drizzle of rain and temperatures of 18 to 22 degrees Celsius. Visibility was adequate to excellent, permitting the accurate identification and recording of archaeological resources.

Stage 3 fieldwork began by relocating the test unit dug during the Stage 2 assessment and using that test unit to establish a site grid placing test units at five-meter intervals from the Stage 2 test unit. A tablet running a Geographic Information System (GIS) application was connected to an external GNSS antenna (Trimble DA1) and paired with a high-precision on-demand network real-time kinematic positioning (RTK) subscription (Trimble Catalyst) to record the location of the test units, which gave probable error readings of 1-2 m during use. A presumed site datum was established in the southwest corner of the Stage 2 test unit, given the designation N505E205. One-metre-square test units were laid out at five-meter intervals, with adjustments made when obstructions such as the steeply eroded slope leading to the Mississippi River were encountered. Test unit locations were designated by their southwest corner and their placement on the site grid was verified manually using handheld measuring tapes.

As per the results and recommendations of the Stage 2 archaeological assessment (see Section 4.1.2), the Stage 3 site-specific assessment was undertaken by means of the controlled hand excavation of one-metre-square test units. The test units were excavated using shovel and trowel and soils were screened through 6 mm hardware mesh.

Test unit designations were determined by the location on the five-meter grid from the site datum. A total of eight 'on-grid' test units were excavated during the assessment. An additional three of 'off-grid' test units, equating to 37% of the total number of 'on-grid' test units, were completed in areas of interest. Excavations were conducted carefully and systematically, with stratigraphic layers (lots) identified, recorded and assigned lot numbers in order of their appearance within a given test unit. Upon reaching subsoil, the unit bases were cleaned and examined for features, with excavation then continued five centimetres into sterile subsoil. Artifacts encountered were collected and bagged separately by test unit and lot number. Test units were recorded using fieldnotes, digital photographs, and, where warranted, scaled drawings. All test units were backfilled once completed.

The Stage 3 archaeological assessment was documented through detailed field notes, scaled profile drawings, test unit forms, a site map and digital photographs, as well as GIS mapping generated in the field using the project GPS. A catalogue of the documentary record generated through the Stage 3 fieldwork at the Kashwakamak Lake Dam site (BfGf-3) is included in Table 2. The complete Stage 3 photographic catalogue is included as Appendix 1, and the locations and directions of all photographs used in this report are depicted on Map 4.

### 5.3 Stage 3 Laboratory Methods

Following the completion of the Stage 2 archaeological fieldwork, all artifacts recovered were cleaned, catalogued with their full provenience (surface find and findspot), and inventoried. The inventory used was based on a version of a database designed for post-Contact period sites by staff at Parks Canada. The Parks Canada database and associated

**Table 2. Inventory of the Stage 3 Documentary Record.**

| Type of Document | Description | Number of Records | Location |
|---|---|---|---|
| Field notes | Notes on the Stage 3 fieldwork | 3 pages (1 .pdf) | Past Recovery Server – file PR24-040 |
| Field Drawings | Drawings for the one-metre-square units | 2 pages | Past Recovery Server – file PR24-040 |
| Unit Forms | Notes on the one-metre-square units | 23 pages (1 .pdf) | Past Recovery Server – file PR24-040 |
| Field Maps | Illustrated site plan | 1 page | Past Recovery Server – file PR24-040 |
| Photographs | Digital photographs documenting the Stage 3 fieldwork | 52 photographs | Past Recovery Server – file PR24-040 |

*Artifact Inventory Guide* (Christianson and Plousos n.d.) identifies artifacts according to functional *Classes* intended to allow specific types of activities and behaviors to be separated for analysis. The 'Foodways' class, for example, is used to identify types of artifacts associated with all aspects of food preparation, storage, and consumption. In a similar way, the 'Architectural' class is a catch-all category for structural items such as bricks, nails, window glass, etc. These *Classes* are further subdivided into *Groups*, reflecting more specialized activities/behaviors. Artifacts are further categorized by *Object* and *Datable Attribute*, which are either functionally or temporally diagnostic. This type of artifact inventorying method facilitates the recognition of general trends in the dating and use of a site by allowing the assemblage to be conveniently organized for analysis. The pre-Contact artifact assemblage was catalogued using a modified version of the same Parks Canada database. Changes to the database included alterations to the artifact categories and types to better reflect meaningful categories of analysis for pre-Contact archaeological sites, while following a similar organization structure.

A complete inventory of the artifact assemblage is included as Appendix 2. Sample artifacts were photographed for inclusion in this report. As per the *Terms and Conditions for Archaeological Licences* in Ontario, curation of all artifacts generated during the Stage 2 archaeological assessment is being provided by Past Recovery pending the identification of a suitable repository. The artifact assemblage resulting from this archaeological assessment, consisting of 47 pre-Contact items, is housed in one standard banker's box (measuring 41.4 cm x 32.5 cm x 26.4 cm).

### 5.4 Stage 3 Fieldwork Results

The Stage 3 fieldwork involved the excavation of eleven (11) one-metre-square units over an area measuring roughly 14 meters east-west by 14 metres north-south, or approximately 178.63 square meters (Map 3). Eight (8) test units were excavated on the five metre grid, one (1) of which was adjusted to accommodate for the steep slope of eroded terrain. An additional three (3) infill test units were excavated 'off-grid' in areas of interest. The limits of the excavation were determined based on the site limits established around the positive test pit and test unit dug during the Stage 2 assessment.

The Stage 3 investigation resulted in the recovery of 47 artifacts (Table 3; Map 4). The soil layers in which the artifacts were found were assigned to two (2) contexts related to different events that occurred on the site over time, in order to facilitate the artifact analysis.[43] The contexts are outlined in Table 4.

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[43] Following the completion of the Stage 3 fieldwork, soil layers or lots in individual test units were assigned context numbers representing activities or temporal events that had occurred on the site over time.

**Table 3. Distribution of Artifact Assemblage Material and Group.**

| Material/Group | # | % of Class | % of Total |
|---|---|---|---|
| **Bone** | **3** | | **6.38%** |
| *Bone* | 3 | 100.00% | 6.38% |
| **Chert (Kichessippi)** | **28** | | **59.57%** |
| *Chipped Stone* | 28 | 100.00% | 59.57% |
| **Chert (Onondaga)** | **6** | | **12.77%** |
| *Chipped Stone* | 6 | 100.00% | 12.77% |
| **Quartz** | **10** | | **21.28%** |
| *Chipped Stone* | 10 | 100.00% | 21.28% |
| **Total** | **47** | | **100.00%** |

**Table 4. Stage 3 Artifact Assemblage by Context and Test Unit.**

| Context | Description | Unit and Corresponding Lot | Artifacts |
|---|---|---|---|
| 1 | Modern topsoil | N500E200:1; N500E200:2; N504E208:1; N505E200:1; N505E202:1; N505E204:1; N505E210:1; N506E205:1; N510E200:1; N510E205:1; N510E210:1 | 9 |
| 2 | Subsoil | N500E200:3; N500E205:1a; N500E205:1b; N500E205:1c; N504E208:2a; N504E208:2b; N505E200:2a; N505E200:2b; N505E200:2c; N505E202:2; N505E204:2; N505E204:3; N505E210:2; N506E205:2; N510E200:2a; N510E200:2b; N510E205:2; N510E210:2a; N510E210:2b | 38 |

### 5.4.1 Context 1 – Modern topsoil

Context 1 corresponded to Lot 1, a modern humic topsoil layer, in ten of the eleven test units excavated. It also includes N500E200:2, a modern topsoil without the humic component which was not identified in any of the other test units. It was barely present in Test unit N500E205, appearing only as a thin lens in places, because this test unit fell within the portage trail and the modern humic topsoil had largely been eroded by foot traffic over the trail. This context consists of 1 cm to 29 cm of dark brown humic and decaying wood and or loam silty sand modern topsoil (Images 3 to 7). In some test units the modern humic topsoil came down completely or partially onto bedrock.

A total of 9 artifacts, 2 bone and 7 lithics, were recovered from Context 1. They were recovered from Test units N505 E202, N505 E204, N505 E210, and N506 E205.

### 5.4.2 Context 2 – Subsoil

Context 2 corresponds to the subsoil lots in all eleven test units. It consists of an orange to light yellow silty sand subsoil measuring 10 cm to 28 cm in thickness. In some test units the subsoil partially or completely came down on bedrock (Images 3 to 7).

A total of 38 artifacts, 1 bone and 37 lithics, were recovered from Context 2. They were recovered from Test units N505 E200, N506 E205, and N510 E210. As artifacts were recovered within subsoil without the presence of cultural features, test units were excavated a minimum of 10 cm into subsoil regardless of the presence of artifacts. Test units with artifacts recovered from subsoil were excavated until a minimum of 5 cm of sterile subsoil was established or bedrock was met. No cultural features were present in any of the test units. The sandy nature of the soils and the lack of cultural features suggests that the presence of artifacts in subsoil was likely the result of natural sites formation processes, such as root action or the seasonal freeze-thaw of soils.

## 5.5 Stage 3 Record of Finds

The Stage 3 investigation of the Kashwakamak Lake Dam site (BfGf-3) led to the recovery of 47 artifacts. No cultural features were present in the test units, suggesting the presence of artifacts in subsoil was the result of natural site formation processes acting upon the silty sand soils. As such, the artifacts have been analysed and discussed together.

The Stage 3 investigation at BfGf-3 yielded a total of 44 pieces of lithic material, and 3 fragments of, likely intrusive, small mammal bone. Almost two thirds of the collected lithic material was of local Kichessippi chert, that assemblage comprising late-stage reduction debitage, and one expedient tool. Onondaga chert was also marginally represented, at 13.6% of the total assemblage, again by late-stage reduction debitage. The remainder of the lithic assemblage was quartz (22.7%). The quartz assemblage comprised a wider range of debitage types, including secondary, tertiary, bipolar and broken flakes, and shatter (Table 5). Approximately an eighth of the total lithic assemblage has been subject to thermal alteration; this included three tertiary flakes of Kichessippi chert, and three tertiary flakes of Onondaga chert. No temporally diagnostic artifacts were recovered; it is therefore not possible to assign a date to the site.

**Table 5. Breakdown of the Pre-contact Lithic Artifacts by Material.**

| Material and Utilization | # | % of Total |
|---|---|---|
| **Kichessippi Chert** | **28** | **63.6** |
| *Utilized Flake* | 1 | 2.3 |
| *Tertiary Flake* | 25 | 56.8 |
| *Broken/Partial Flake* | 2 | 4.5 |
| **Quartz** | **10** | **22.7** |
| *Secondary Flake* | 2 | 4.5 |
| *Tertiary Flake* | 1 | 2.3 |
| *Bipolar Flake* | 4 | 9.1 |
| *Shatter* | 2 | 4.5 |
| *Broken/Partial Flake* | 1 | 2.3 |
| **Onondaga Chert** | **6** | **13.6** |
| *Tertiary Flake* | 6 | 13.6 |
| **Total** | **44** | **100%** |

Several sources for the local Kichessippi chert are known in the Ottawa valley, including at Jessup's Rapids on the Bonnechere River, down river from Eganville, and on the Eardley escarpment near Gatineau (Fox 2009:359).

The recovered quartz artifacts predominantly consist of a high quality (fine-grained) colourless to white material. Quartz is a macrocrystalline mineral and does not fracture in the same manner as cryptocrystalline materials such as chert. In general, fine-grained quartz will fracture more predictably than coarse-grained samples or quartz with internal flaws known as planes, which will fracture irregularly. This common attribute can cause difficulties in both the manufacture and the identification of quartz artifacts (Driscoll 2011). There is insufficient information available at present to determine the source of the recovered quartz, though it may be found throughout the region as water-worn cobbles in deposits of glacial till, or in bedrock as vein quartz. This material appears to have been used extensively in the Ottawa Valley prior to Contact, though likely at higher frequencies in proximity to sources and during periods when more easily worked materials, such as chert, were not readily available.

Cherts of the Onondaga formation occur in Southern Ontario at several outcrops and quarries along the north shore of Lake Erie. Other outcrops are found across present-day central New York State to the Hudson Valley. The chert can be found in nodules or in thin beds and is considered a relatively high-quality raw material in the production of stone tools. It was heavily utilised by Pre-contact peoples across the region and is also found on archaeological sites farther afield (Eley & von Bitter 1989: 17, Fox 2010: 361-362).

All but two of the chert debitage are tertiary flakes, with the remainder broken or partial flakes. High frequencies of chert tertiary flakes at BfGf-3 indicate later stage lithic reduction activities, such as preform manufacture from chert blanks prepared elsewhere, and tool maintenance. In contrast, the quartz assemblage contains a wider range of debitage types. The presence of bipolar quartz flakes and shatter indicate that bipolar percussive techniques were being employed, alongside freehand knapping techniques of all stages, likely on quartz raw material collected within the immediate area.

Analysis of the lithic assemblage suggests that the site was the location of a short-term campsite, where the inhabitants undertook a variety of lithic reduction practices specific to the lithic raw material type.

### 5.6 Stage 3 Analysis and Conclusions

The Stage 3 assessment within Kashwakamak Lake Dam site (BfGf-3) corroborated the results of the previous Stage 2 assessment (Past Recovery 2024; PIF: P1074-0089-2023). The nature of the artifacts recovered supports the interpretation that the site was the location of a short-term campsite. The inhabitants of the campsite undertook a variety of lithic reduction practices specific to the lithic raw material type. As the lithic assemblage was comprised of non-diagnostic artifacts, no further inferences may be drawn.

The artifact assemblage, comprised of 44 of lithic and 3 bone artifacts from one or more test units, met the required characteristics of a small or diffuse lithic scatter with cultural heritage value or interest (CHVI) as outlined in Section 3.4.1.1.a of the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011:58). The fulfilment of this requirement indicates that Stage 4 mitigation of development impacts is required for BfGf-3.

### 5.7 Stage 3 Recommendations

On the basis of the results of the Stage 3 site-specific archaeological assessment discussed above, this report concludes with the following recommendations:

2) The Stage 3 archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) has resulted in a determination that the site possesses a high level of cultural heritage value or interest, warranting Stage 4 mitigation of development impacts.

4) The proponent has opted to address the outstanding concerns for the Kashwakamak Lake Dam site (BfGf-3) and a 10-metre protected buffer (hereafter the ‘protected area’) through the implementation of an avoidance and protection strategy that will ensure the protected area remains unaltered in both the short- and long-term:

   *Short-term Measures*

   In the event that grading or other soil disturbing activities will extend to the edge of the protected area, the following steps must be taken:

   f) A temporary barrier (snow fencing) must be erected around the protected area through the completion of development related activities.

g) "No go" instructions must be issued to all on-site construction crews, engineers, architects, or others involved in day-to-day decisions during construction.

h) The location and extent of the protected area must be added to any other contract drawings, when applicable, including explicit instructions or labelling to avoid that area.

i) Any grading or soil disturbing activities immediately adjacent to the protected area must be monitored by a licensed consultant archaeologist to verify the effectiveness of the avoidance strategy. If impacts to the site are observed at any time, MCM is to be notified immediately.

j) A licensed consultant archaeologist must be retained to produce a Stage 4 mitigation avoidance and protection report to verify the effectiveness of the avoidance strategy and document that the site has not been disturbed throughout the development project.

*Long-term Measures*

The following measures have been or will be put in place to ensure the protected area is not impacted by future allowed activities on the property, or would be subject to further archaeological assessment by a licensed archaeologist in advance of a change that might allow for impacts.

c) Draft wording for a Development Agreement for the limits of the Kashwakamak Lake Dam site (BfGf-3) has been devised with the project proponent (a public land-holding body), including provisions for the short- and long-term avoidance and protection measures for the protected area. The draft Development Agreement has been included in the *Project Report Package*.

d) A letter from project proponent (a public land-holding body) confirming their knowledge of outstanding concerns for the protected area and affirming their commitment to ensure the protected area remains unaltered during and following construction-related activities in perpetuity has been included in the *Project Report Package*.

5) Any future archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) should involve continued engagement with interested Indigenous communities/organizations.

The reader is also referred to Section 6.0 below to ensure compliance with relevant provincial legislation and regulations that may relate to this project. In the event that any artifacts of Indigenous interest or human remains are encountered during the development of the subject property, in addition to following the *Advice on Compliance with Legislation* (see Section 6.0), the Indigenous communities listed below should be contacted:

- Alderville First Nation
- Algonquins of Ontario
- Algonquins of Pikwakanagan First Nation
- Chippewas of Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat Nation
- Mississaugas of Scugog Island

Contact information for the above communities can be found in the Supplementary Document entitled "Indigenous Community Contacts."

## 6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

In order to ensure compliance with relevant Provincial legislation as it may relate to this project, the reader is advised of the following:

1) This report is submitted to the Ministry of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2) It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

3) Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

4) The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

5) Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

## 7.0 LIMITATIONS AND CLOSURE

Past Recovery Archaeological Services Inc. has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the archaeological profession currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied, is made.

This report has been prepared for the specific site, design objective, developments and purpose prescribed in the client proposal and subsequent agreed upon changes to the contract. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the client in the design of the specific project.

Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sample and testing program may fail to detect all or certain archaeological resources. The sampling strategies in this study comply with those identified in the Ministry of Citizenship and Multiculturalism's *Standards and Guidelines for Consultant Archaeologists* (2011).

The documentation related to this archaeological assessment will be curated by Past Recovery Archaeological Services Inc. until such a time that arrangements for their ultimate transfer to an approved and suitable repository can be made to the satisfaction of the project owner(s), the Ontario Ministry of Citizenship and Multiculturalism and any other legitimate interest group.

We trust that this report meets your current needs. If you have any questions or if we may be of further assistance, please do not hesitate to contact the undersigned.

Jeff Earl

Jeff Earl, M.Soc.Sc.
Principal
Past Recovery Archaeological Services Inc.

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## PRIMARY DOCUMENTS:

### Library and Archives Canada (LAC):

***Microfilm:*** Reel C-13419

# 9.0 MAPS

Map 1. Location of the study area.

**Map 2. Recent (2020) orthographic imagery showing the study area.**

**Map 3. Recent (2020) orthographic imagery showing Stage 3 site plan.**

**Map 4.** Recent (2020) orthographic imagery showing Stage 3 results as well as field photograph locations, directions, and image numbers.

Base: Frontenac County Orthographic Imagery (2020)
Datum/Grid Zone: NAD83(CSRS)/UTM Zone 18N
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**Map 5.** Recent (2020) orthographic imagery showing Stage 3 protective buffer and monitoring buffer.

# 10.0 IMAGES

**Image 1. View of field crew excavating test unit on 5m grid, facing northwest.** (PR24-040D012)

**Image 2. View of field crew excavating infill test unit, facing south.** (PR24-040D041)

**Image 3. Test unit N500 E205, closing, south profile.** (PR24-040D005)

**Image 4. Test unit N500 E200, closing, west profile.** (PR24-040D028)

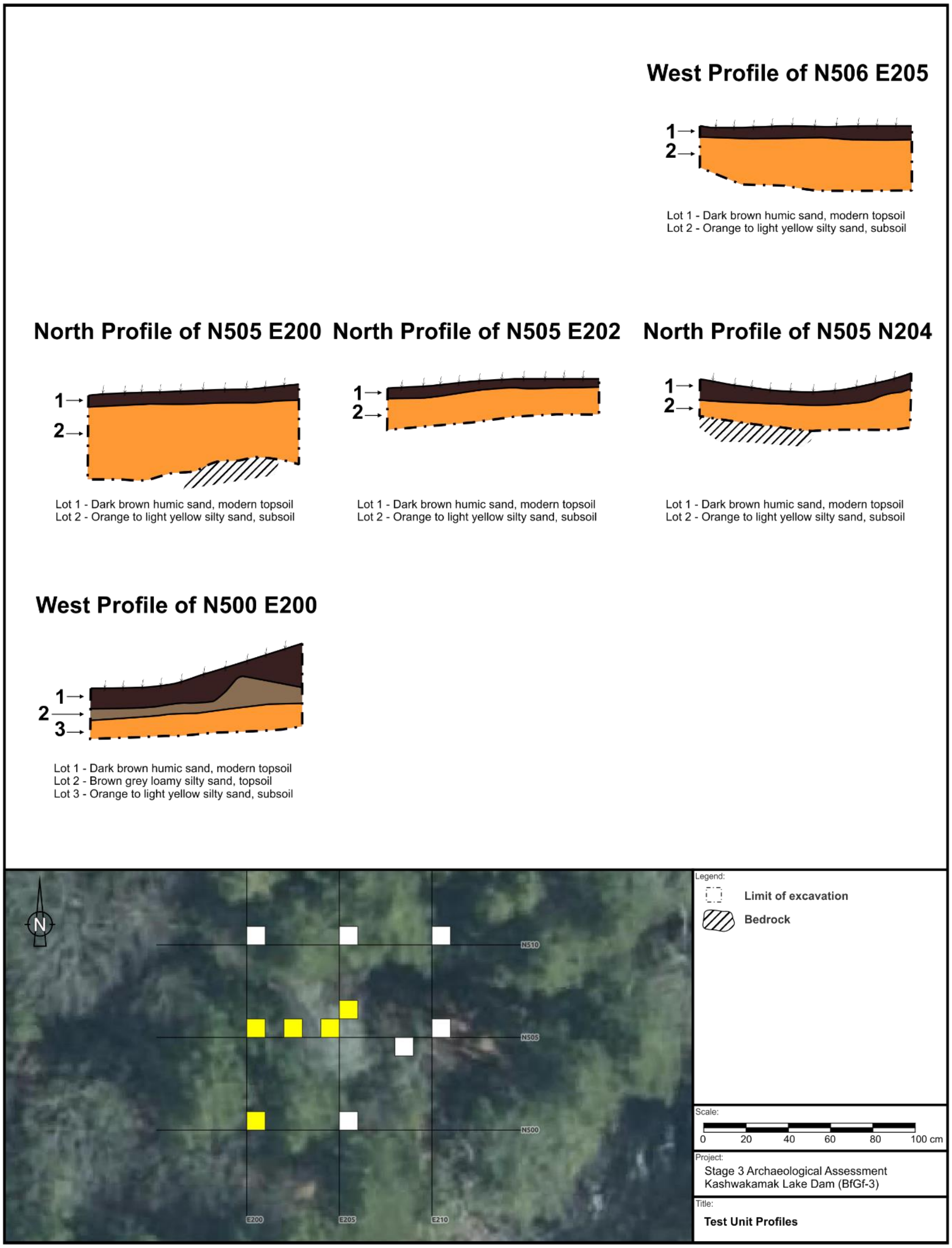

Image 5. Test unit soil profiles.

**Image 6. Test unit N510 E200, closing, south profile.** (PR24-040D020)

**Image 7. Test unit N510 E205, closing, west profile.** (PR24-040D009)

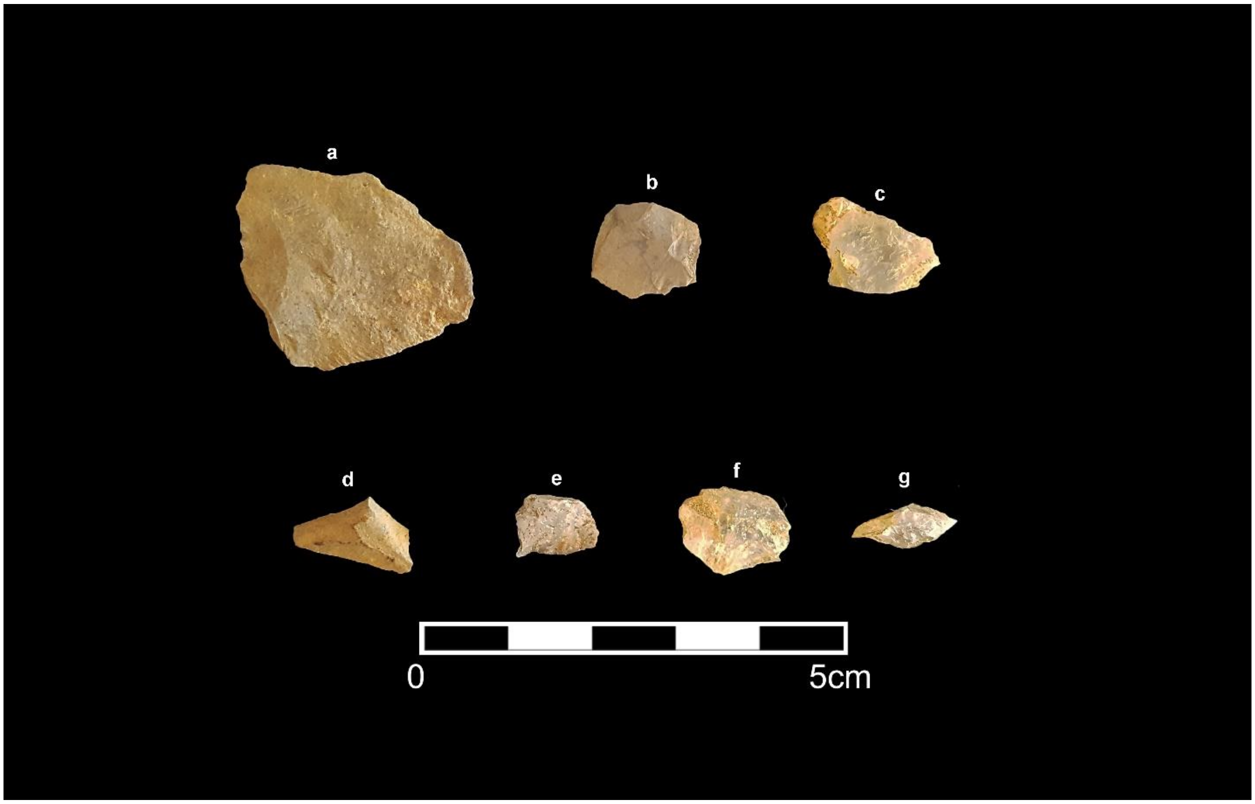

**Image 8. Sample of Lithic Artifacts.**

a: kichessippi chert chipped stone utilized flake, N506E205:2 (#1016); b: Onondaga chert chipped stone tertiary flake, N506E205:1 (#1007); c: quartz chipped stone broken/partial flake, N506E205:2 (#1019); d: kichessippi chert chipped stone broken/partial flake, N506E205:2 (#1018); e: quartz chipped stone secondary flake, N505E202:1 (#1000); f: quartz chipped stone flake, N510E210:2 (#1003); g: quartz chipped stone shatter, N506E205:1 (#1009)

# APPENDIX 1: Photographic Catalogue

Camera: Samsung SM-T547U and SM-X308U

| Catalogue No. | Description | Dir. |
|---|---|---|
| PR24-040D001 | View of field crew excavating test unit on 5m grid | NE |
| PR24-040D002 | View of field crew excavating test unit on 5m grid | S |
| PR24-040D003 | Test unit N500 E205, closing, south profile | S |
| PR24-040D004 | Test unit N500 E205, closing, south profile | S |
| PR24-040D005 | Test unit N500 E205, closing, south profile | S |
| PR24-040D006 | Test unit N510 E205, closing, west profile | W |
| PR24-040D007 | Test unit N510 E205, closing, west profile | W |
| PR24-040D008 | Test unit N510 E205, closing, west profile | W |
| PR24-040D009 | Test unit N510 E205, closing, west profile | W |
| PR24-040D010 | View of field crew excavating test unit on 5m grid | W |
| PR24-040D011 | View of field crew excavating test unit on 5m grid | W |
| PR24-040D012 | View of field crew excavating test unit on 5m grid | NW |
| PR24-040D013 | Test unit N500 E210, closing, north profile | N |
| PR24-040D014 | Test unit N500 E210, closing, north profile | N |
| PR24-040D015 | Test unit N500 E210, closing, north profile | N |
| PR24-040D016 | Test unit N500 E210, closing, north profile | N |
| PR24-040D017 | Test unit N500 E210, closing, north profile | N |
| PR24-040D018 | Test unit N510 E200, closing, south profile | S |
| PR24-040D019 | Test unit N510 E200, closing, south profile | S |
| PR24-040D020 | Test unit N510 E200, closing, south profile | S |
| PR24-040D021 | Test unit N505 E200, closing, north profile | N |
| PR24-040D022 | Test unit N505 E200, closing, north profile | N |
| PR24-040D023 | Test unit N505 E200, closing, north profile | N |
| PR24-040D024 | Test unit N505 E200, closing, north profile | N |
| PR24-040D025 | View of field crew excavating test unit on 5m grid | S |
| PR24-040D026 | View of field crew excavating test unit on 5m grid | S |
| PR24-040D027 | Test unit N500 E200, closing, west profile | W |
| PR24-040D028 | Test unit N500 E200, closing, west profile | W |
| PR24-040D029 | Test unit N500 E200, closing, west profile | W |
| PR24-040D030 | Test unit N500 E200, closing, west profile | W |
| PR24-040D031 | Test unit N510 E210, closing, west profile | W |
| PR24-040D032 | Test unit N510 E210, closing, west profile | W |
| PR24-040D033 | Test unit N510 E210, closing, west profile | W |
| PR24-040D034 | Test unit N504 E208, closing, north profile | N |
| PR24-040D035 | Test unit N504 E208, closing, north profile | N |
| PR24-040D036 | Test unit N504 E208, closing, north profile | N |
| PR24-040D037 | Test unit N506 E205, closing, west profile | W |

| Catalogue No. | Description | Dir. |
|---|---|---|
| PR24-040D038 | Test unit N506 E205, closing, west profile | W |
| PR24-040D039 | Test unit N506 E205, closing, west profile | W |
| PR24-040D040 | Test unit N506 E205, closing, west profile | W |
| PR24-040D041 | View of field crew excavating infill test unit | S |
| PR24-040D042 | Test unit N505 E202, closing, north profile | N |
| PR24-040D043 | Test unit N505 E202, closing, north profile | N |
| PR24-040D044 | Test unit N505 E202, closing, north profile | N |
| PR24-040D045 | Test unit N505 E202, closing, north profile | N |
| PR24-040D046 | Test unit N505 E204, closing, north profile | N |
| PR24-040D047 | Test unit N505 E204, closing, north profile | N |
| PR24-040D048 | Test unit N505 E204, closing, north profile | N |
| PR24-040D049 | Test unit N505 E204, closing, north profile | N |
| PR24-040D050 | Test unit N505 E204, closing, north profile | N |
| PR24-040D051 | Test unit N505 E204, closing, north profile | N |
| PR24-040D052 | View of field crew back filling infill test unit | S |

# APPENDIX 2: Artifact Inventory

| Inv. | Test Unit | Lot | # | Material | Class | Group | Object | Datable Attribute | Ware | Alt | %Complete | Fragment | Mark | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | N505 E202 | 1 | 1 | Quartz | Indigenous | Chipped Stone | Secondary Flake | | | | N/A | | | |
| 1001 | N505 E204 | 1 | 1 | Chert (Kichessippi) | Indigenous | Chipped Stone | Tertiary Flake | | | Burnt | N/A | | | |
| 1002 | N505 E210 | 1 | 1 | Quartz | Indigenous | Chipped Stone | Secondary Flake | | | | N/A | | | |
| 1003 | N510 E210 | 2 | 2 | Quartz | Indigenous | Chipped Stone | Flake | | | | N/A | | | bipolar flakes |
| 1004 | N505 E200 | 2 (0-10cm) | 1 | Quartz | Indigenous | Chipped Stone | Flake | | | | N/A | | | bipolar flake |
| 1005 | N505 E200 | 2 (10-15cm) | 1 | Quartz | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | 'sugary' lustre |
| 1006 | N506 E205 | 1 | 2 | Bone | Faunal/Floral | Bone | Mammal Bone | | | | N/A | | | small mammal fragments |
| 1007 | N506 E205 | 1 | 1 | Chert (Onondaga) | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | |
| 1008 | N506 E205 | 1 | 2 | Chert (Kichessippi) | Indigenous | Chipped Stone | Tertiary Flake | | | Burnt | N/A | | | |
| 1009 | N506 E205 | 1 | 1 | Quartz | Indigenous | Chipped Stone | Shatter | | | | N/A | | | |
| 1010 | N506 E205 | 2 (0-5cm) | 1 | Bone | Faunal/Floral | Bone | Mammal Bone | | | | N/A | | | small mammal, skull fragment |
| 1011 | N506 E205 | 2 (0-5cm) | 1 | Quartz | Indigenous | Chipped Stone | Flake | | | | N/A | | | bipolar flake |
| 1012 | N506 E205 | 2 (0-5cm) | 1 | Chert (Onondaga) | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | |
| 1013 | N506 E205 | 2 (0-5cm) | 7 | Chert (Kichessippi) | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | |
| 1014 | N506 E205 | 2 (5-10cm) | 1 | Quartz | Indigenous | Chipped Stone | Shatter | | | | N/A | | | |
| 1015 | N506 E205 | 2 (5-10cm) | 1 | Chert (Onondaga) | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | |
| 1016 | N506 E205 | 2 (5-10cm) | 1 | Chert (Kichessippi) | Indigenous | Chipped Stone | Utilized Flake | | | | N/A | | | distal use wear, large tertiary flake |
| 1017 | N506 E205 | 2 (5-10cm) | 8 | Chert (Kichessippi) | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | |
| 1018 | N506 E205 | 2 (5-10cm) | 1 | Chert (Kichessippi) | Indigenous | Chipped Stone | Broken/Partial Flake | | | | N/A | | | |
| 1019 | N506 E205 | 2 (10-15cm) | 1 | Quartz | Indigenous | Chipped Stone | Broken/Partial Flake | | | | N/A | | | |
| 1020 | N506 E205 | 2 (10-15cm) | 3 | Chert (Onondaga) | Indigenous | Chipped Stone | Tertiary Flake | | | Burnt | N/A | | | |
| 1021 | N506 E205 | 2 (10-15cm) | 7 | Chert (Kichessippi) | Indigenous | Chipped Stone | Tertiary Flake | | | | N/A | | | |
| 1022 | N506 E205 | 2 (10-15cm) | 1 | Chert (Kichessippi) | Indigenous | Chipped Stone | Broken/Partial Flake | | | | N/A | | | |

**Key:**

| | |
|---|---|
| # | Total |
| Inv. | Inventory No. |

# APPENDIX 3: Glossary of Archaeological Terms

**Archaeology:**
The study of human past, both prehistoric and historic, by excavation of cultural material.

**Archaeological Sites:**
The physical remains of any building, structure, cultural feature, object, human event or activity which, because of the passage of time, are on or below the surface of the land or water.

**Archaic:**
A term used by archaeologists to designate a distinctive cultural period dating between 8000 and 1000 B.C. in eastern North America. The period is divided into Early (8000 to 6000 B.C.), Middle (6000 to 2500 B.C.) and Late (2500 to 1000 B.C.). It is characterized by hunting, gathering and fishing.

**Artifact:**
An object manufactured, modified or used by humans.

**B.P.:**
Before Present. Often used for archaeological dates instead of B.C. or A.D. Present is taken to be 1951, the date from which radiocarbon assays are calculated.

**Backdirt:**
The soil excavated from an archaeological site. It is usually removed by shovel or trowel and then screened to ensure maximum recovery of artifacts.

**Chert:**
A type of silica rich stone often used for making chipped stone tools. A number of chert sources are known from southern Ontario. These sources include outcrops and nodules.

**Contact Period:**
The period of initial contact between Indigenous and European populations. In Ontario, this generally corresponds to the seventeenth and eighteen centuries depending on the specific area.

**Cultural Resource / Heritage Resource:**
Any resource (archaeological, historical, architectural, artifactual, archival) that pertains to the development of our cultural past.

**Cultural Heritage Landscapes:**
Cultural heritage landscapes are groups of features made by people. The arrangement of features illustrate noteworthy relationships between people and their surrounding environment. They can provide information necessary to preserve, interpret or reinforce the understanding of important historical settings and changes to past patterns of land use. Cultural landscapes include neighbourhoods, townscapes and farmscapes.

**Diagnostic:**
An artifact, decorative technique or feature that is distinctive of a particular culture or time period.

**Disturbed:**
In an archaeological context, this term is used when the cultural deposit of a certain time period has been intruded upon by a later occupation.

**Excavation:**
The uncovering or extraction of cultural remains by digging.

**Feature:**
This term is used to designate modifications to the physical environment by human activity. Archaeological features include the remains of buildings or walls, storage pits, hearths, post moulds and artifact concentrations.

**Flake:**
A thin piece of stone (usually chert, chalcedony, etc.) detached during the manufacture of a chipped stone tool. A flake can also be modified into another artifact form such as a scraper.

**Fluted:**
A lanceolate shaped projectile point with a central channel extending from the base approximately one third of the way up the blade. One of the most diagnostic Palaeo-Indigenous artifacts.

**Historic:**
Period of written history. In Ontario, the historic period begins with European settlement.

**Lithic:**
Stone. Lithic artifacts would include projectile points, scrapers, ground stone adzes, gun flints, etc.

**Lot:**
The smallest provenience designation used to locate an artifact or feature.

**Midden:**
An archaeological term for a garbage dump.

**Mitigation:**
To reduce the severity of development impact on an archaeological or other heritage resource through preservation or excavation. The process for minimizing the adverse impacts of an undertaking on identified cultural heritage resources within an affected area of a development project.

**Multicomponent:**
An archaeological site which has seen repeated occupation over a period of time. Ideally, each occupation layer is separated by a sterile soil deposit that accumulated during a period when the site was not occupied. In other cases, later occupations will be directly on top of earlier ones or will even intrude upon them.

**Operation:**
The primary division of an archaeological site serving as part of the provenience system. The operation usually represents a culturally or geographically significant unit within the site area.

**Palaeo-Indigenous:**
The earliest human inhabitation of Ontario designated by archaeologists. The period dates between 9000 and 8000 B.C. and is characterized by small mobile groups of hunter-gatherers.

**Pre-Contact:**
Before written history. In Ontario, this term is used for the period of Indigenous inhabitation up until the first contact with European groups.

**Profile:**
The profile is the soil stratigraphy that shows up in the cross-section of an archaeological excavation. Profiles are important in understanding the relationship between different occupations of a site.

**Projectile Point:**
A point used to tip a projectile such as an arrow, spear or harpoon. Projectile points may be made of stone (either chipped or ground), bone, ivory, antler or metal.

**Provenience:**
Place of origin. In archaeology this refers to the location where an artifact or feature was found. This may be a general location or a very specific horizontal and vertical point.

**Salvage:**
To rescue an archaeological site or heritage resource from development impact through excavation or recording.

**Stratigraphy:**
The sequence of layers in an archaeological site. The stratigraphy usually includes natural soil deposits and cultural deposits.

**Sub-operation:**
A division of an operation unit in the provenience system.

**Survey:**
To examine the extent and nature of a potential site area. Survey may include surface examination of ploughed or eroded areas and sub-surface testing.

**Test Pit:**
A small pit, usually excavated by hand, used to determine the stratigraphy and presence of cultural material. Test pits are often used to survey a property and are usually spaced on a grid system.

**Woodland:**
The most recent major division in the prehistoric sequence of Ontario. The Woodland period dates from 1000 B.C. to A.D. 1550. The period is characterized by the introduction of ceramics and the beginning of agriculture in southern Ontario. The period is further divided into Early (1000 B.C. to A.D. 0), Middle (A.D. 0 to A.D. 900) and Late (A.D. 900 to A.D.1550).

Mississippi Valley
Conservation Authority

November 11, 2024

**Kashwakamak Lake Dam Environmental Assessment**
**Stage 4 Mitigation of Development Impacts – Avoidance and Protection Strategy**

To Whom It May Concern,

The Mississippi Valley Conservation Authority (MVCA) initiated a Conservation Ontario Class Environmental Assessment for the Kashwakamak Lake Dam on the main channel of the Mississippi River. The existing Kashwakamak Lake Dam, constructed over 100 years ago (in 1910), has surpassed its design life.

Through the Class EA process, Stage 1 and 2 Archaeological Assessments (AA) were completed by Past Recovery Archaeological Services Inc. (Past Recovery) in accordance with the *Standards and Guidelines for Consultant Archaeologists (*Ministry of Citizenship and Multiculturalism (MCM), 2011). The Stage 2 property survey identified a small, previously unrecorded potential archaeological site located in the southeast quadrant of the study area. The artifacts recovered suggest that the site was the location of a short-term campsite, where the inhabitants engaged in late-stage lithic reduction practices using both locally available and imported lithic raw materials. A Stage 3 site-specific AA was then undertaken for the small potential archaeological site, and it was determined that the site possesses a high level of cultural heritage value or interest, warranting Stage 4 mitigation of development impacts.

The Stage 4 mitigation of development impacts can be accomplished either through the avoidance and protection of the site or through excavation and recording. In the case of the Kashwakamak Lake Dam site (BfGf-3), it was determined that avoidance and protection would be viable. Therefore, this Memorandum outlines the Protection Mitigation Strategy for the Kashwakamak Lake Dam site (BfGf-3). Please note that this strategy was developed in accordance with the requirements outlined in the *Standards and Guidelines for Consultant Archaeologists* (MCM, 2011), and that MVCA is committed to continuing engagement with participating Indigenous communities to ensure the protection of the archaeological site.

## AVOIDANCE OF ARCHAEOLOGICAL SITE

The AA for the Environmental Assessment of the Kashwakamak Lake Dam covered an area of approximately 1.49 hectares (3.69 acres), as illustrated in the figure appended to this memorandum. This area was delineated to facilitate the evaluation of all proposed alternatives for the Kashwakamak Lake Dam, including the potential construction of a new dam immediately downstream of the existing structure, which would have been in close proximity to the identified archaeological site (BfGf-3).

However, given the location of the archaeological findings and several other factors, it was recommended that the preferred alternative be replace the Kashwakamak Lake Dam at the same location with a similar alignment to that of the existing dam. It is anticipated that the proposed construction area for the Kashwakamak Lake Dam (i.e., dam replacement and staging zones) will be situated a minimum of 50 m from the archaeological site (BfGf-

3). The natural dense vegetation buffer between the construction area and the archaeological site will serve as a protective buffer. Therefore, through careful design of the new dam and strategic placement of staging areas, MVCA is confident that the archaeological site will be fully preserved and will not be impacted by the proposed dam replacement.

MVCA is recommending that 'avoidance and protection of the site' be adopted as the appropriate Stage 4 mitigation strategy. First Nations have been notified and consulted regarding the selection of this preferred approach for mitigating development impacts. At this time, MVCA has received confirmation from the Algonquins of Pikwakanagan First Nation (AOPFN) that they would "adopt the 'avoidance and protection of the site' strategy, as it is the best option in this scenario". Correspondence from AOPFN has been appended to this memorandum.

## PROTECTION OF THE ARCHAEOLOGICAL SITE

The following protection strategy outlines the procedures and precautions necessary to avoid disturbing or damaging an archaeological site during fieldwork, construction, or any other activities. This plan aims to safeguard cultural heritage and ensure compliance with *Standards and Guidelines for Consultant Archaeologists (*MCM, 2011).

### Short-Term Protection:

- A temporary barrier, such as snow fencing, to be erected during construction immediately adjacent to the construction area to delineate the site limits. This will aid in the protection of the archaeological site, as well as maintaining the natural vegetated buffer of approximately 50 m from the site;
- Install clear and visible signs around the site and buffer zone that notify all personnel of the archaeological importance of the area and the prohibition of unauthorized entry;
- Delineate a "No Go Zone" area and issue instructions to all on-site construction personnel to avoid accidental damage to the site:
    - The "No Go Zone" shall not undergo any site alternations, either temporarily or permanently. This includes, but is not limited to, minor forms of soil disturbance such as tree removal, landscaping and regrading.
    - No construction equipment, personnel, or machinery may enter the "No Go Zone".
    - The location of the "No Go Zone" will be clearly identified on the construction drawings, contract documents and reference will be made to avoid this area;
    - Temporary closure or relocation of the portage route on the north shore, and
    - Only trained archaeologists or designated personnel should be allowed access to the archaeological site, and only under appropriate conditions.
- Following construction, retain a licensed consultant archaeologist to complete a Stage 4 avoidance and protection report documenting the success of site avoidance after the completion of the work.

Due to the location of the archaeological site in relation to the proposed construction area, no soil disturbance or construction-related activities will occur within or directly adjacent to the 10 m protective buffer established during the Stage 3 AA. Therefore, the archaeological site will be fully preserved and unaffected during the replacement of the dam.

## Long-Term Protection:

The long-term protection of an archaeological site requires a comprehensive and proactive approach, ensuring that the site is preserved in situ. The objective of this strategy is to avoid disturbance and preserve the integrity of the site with the least amount of impact. This strategy outlines the mandatory steps to secure the ongoing protection of the site, including legal ownership, environmental, and logistical measures.

In 1991, MVCA assumed ownership of the Kashwakamak Lake dam from the Mississippi River Improvement Company. The deed transfer to MVCA includes land within Lots 21 Con. 9, and Lots 20 & 21, Con. 10, Clarendon Ward, Township of North Frontenac. The deed also defines lands specified by a 208-foot setback from the high-water mark, extending parallel to the waterfront along both the north and south banks of the lake and river below the dam. According to Crown land and lot and concession data available through Land Information Ontario, the land surrounding the dam is currently owned by a “public land-holding body”. Based on the delineation of the archaeological site (BfGf-3) through the Stage 3 AA, this entire site is situated within MVCA owned lands. MVCA acknowledges its responsibility to protect the archaeological site and has expressed its commitment to following all recommendations outlined in any related Archaeological Assessments for the subject lands.

To ensure the long-term protection of the archaeological site, MVCA proposes the following mitigation measures:

### 1. Establishment of a Permanent “No Go Zone” for Development

A permanent “No Go Zone” will be established for development of lands through the creation of a natural vegetation buffer, with a minimum offset of 10 meters from the archaeological site. No future development or alteration of natural features (i.e., minor forms of soil disturbance such as tree removal, landscaping, and regrading) will be permitted on MVCA lands, with the exception of the dam replacement. As a result, the existing heavily vegetated buffer around the archaeological site will be preserved to protect the archaeological site. This buffer zone will be clearly delineated on the design plans for the Kashwakamak Lake Dam and will be incorporated into MVCA’s legal documents for the site.

### 2. On-Site Signage

MVCA will install permanent signage at the entrance to the dam site and along the portage route to clearly communicate the following:

- The location of the archaeological site and the prohibition of access beyond this point ("No Go Zone"), except for authorized personnel.

- A warning that any unauthorized alteration within the "No Go Zone" including soil disturbance, vegetation removal, or landscaping, may result in penalties under Section 69 of the Ontario Heritage Act or its associated regulations.

3. Prohibition of Alterations without Authorization

   No alterations to the archaeological site, whether temporary or permanent, including even minor soil disturbances (e.g., tree removal, landscaping, or excavation), will be permitted without prior approval from MVCA to access land and additional archaeological fieldwork by a licensed consultant archaeologist may be required before any such activities can take place. Any future archaeological assessment of the Kashwakamak Lake Dam site (BfGf-3) should involve continued engagement with First Nation communities/ organizations.

4. Record-Keeping and Documentation

   MVCA will maintain comprehensive records of any site assessments, discoveries, or protective measures undertaken to safeguard the archaeological site. These records will be kept up to date and accessible for future reference and compliance purposes.

By implementing this long-term protection strategy, MVCA will ensure the site is preserved in its original state for future generations. MVCA recognizes its responsibility to protect the site and is fully committed to adhering to all recommendations set forth in any related Archaeological Assessments for the subject lands.

Yours truly,

Juraj Cunderlik, PhD., P.Eng., Director, Engineering
Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1
Phone: 613-253-0006 Ext. 233
jcunderlik@mvc.on.ca

# Appendix K – Marine Archaeological Assessment Report

# Marine Archaeological Assessment
# Background Research and In-Water Assessment
# Kashwakamak Lake Dam
# Intersection of Kashwakamak Lake and Main Channel of Mississippi River
# Township of North Frontenac
# County of Frontenac

Prepared for
Lisa Marshall, P. Eng., Project Manager
**Egis Group**
115 Walgreen Road, R.R. 3
Carp, Ontario, K0A 1L0
Tel: (613) 714-0815
Email: Lisa.Marshall@egis-group.com

And
Juraj Cunderlik, PhD., P. Eng, Director, Engineering
**Mississippi Valley Conservation Authority**
10970 Highway 7
Carleton Place, Ontario K7C 3P1
Tel: 613-253-0006, Ext. 233
Email: jcunderlike@mvc.on.ca

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**S. Janusas**
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ARA File #2023-0087
**13/05/2024**

**Original Report**

The following has been adapted from the Assembly of First Nations and demonstrates the importance of water for Indigenous communities (https://www.afn.ca/honoring-water/):

Archaeological Research Associates recognizes the importance of water for Indigenous communities in its many elements including but not limited to the shaping of the land, the rivers, lakes, ice and oceans. We recognize and acknowledge that the Indigenous peoples of North America have a special relationship with water, built on their subsistence ways of life that extends back thousands of years. Traditional activities depend on water for transportation, drinking, cleaning, purification, and provides habitat for the plants and animals gathered as medicines and foods.

# EXECUTIVE SUMMARY

McIntosh Perry Consulting Engineers (McIntosh Perry) and the Mississippi Valley Conservation Authority (MVCA) retained the services of Archaeological Research Associates (ARA) to conduct the marine archaeological background research (equivalent of land-based Stage 1 archaeological assessment) and the in-water marine assessment (equivalent of land-based Stage 2 archaeological assessment) for the Kashwakamak Lake Dam replacement project. The dam is located at the intersection of Kashwakamak Lake and the main channel of the Mississippi River in North Frontenac Township, Frontenac County. The study area extends 20 metres downstream of the dam face and 20 metres upstream of the dam face.

Permission to access the study area and to conduct all activities associated with the background research and a property visit was provided by the proponent. The archaeological assessment was triggered by a Class Environmental Assessment Act.

Background research indicated that there were no registered archaeological sites within one kilometer of the study area. A commemorative plaque located at Ardoch commemorates the struggle back in the early 1980's to preserve manòmin (wild rice) from commercial harvesters (Ardoch First Nation Website, http://www.aafna.ca/). This may relate indirectly to the study area.

The current dam consists of two structures: the main or main control dam, and a secondary saddle dam (overflow dam). The two structures are separated by an earth island. The main dam consists of two bulkhead walls and three concrete piers forming two sluiceways and a broad crested concrete weir. The dam has had major repairs undertaken to address structural and seepage issues and plans are to replace the dam. A scour hole exists downstream at the face of the dam, and reaches a depth of 1.8m maximum.

The immediate reason for the construction of a dam at the exit of the lake into the Mississippi River was to ensure an adequate water supply for downstream mills, particularly for hydro-electric power development. The dam was constructed in 1910.

The proponents have undertaken Indigenous engagement. Indigenous engagement was also conducted on behalf of the client by ARA for this marine archaeological assessment.

The marine archaeological assessment was conducted under license 2023-29 (held by Scarlett Janusas) and took place on September 11th under ideal conditions. Visibility was to the bottom in all areas (upstream and downstream). A snorkel survey was undertaken even with the sluice gates closed, there was deep enough water in the study area to require snorkel survey. The bottom for both upstream and downstream was bedrock with scattering of trees (unmodified) and loose rock. Snorkel survey was conducted in intervals between two and three metres. The extreme shallow areas were assessed by personnel along the shoreline. Wooden notched logs from the previous log boom were located along both edges of the upstream study area. They were located outside the study area proper. They were replaced in 2006 by the current safety boom, and it is generally thought that the logs date from between 20 – 40 years ago and are therefore not considered to have heritage significance or value. No other artifacts, other than modern refuse (broken glass) was located in the study area.

Based upon the background research of past and present conditions, the following is recommended:

1. That the study area be considered free of archaeological concerns;
2. Compliance legislation must be adhered to in the event of discovery of deeply buried cultural material or features; and
3. The Algonquins of Pikwakanagan First Nation (AOPFN) should be contacted if any artifacts of Indigenous interest or human remains are encountered during the development of the subject property. A procedure should be developed between MVCA and AOPFN in the event that there is a disagreement on significance or potential importance of sites.

This archaeological assessment has been conducted under the 2011 *Standards and Guidelines for Consultant Archaeologists* reporting recommendations and using best practices of ARA (MCM 2011).

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# PERSONNEL

*Project Manager:* S. Janusas (#P027)
*Principal Archaeologist:* S. Janusas
*Field Technician:* D. Sweiger, A. Macdonald
*Marine Historian:* P. Folkes
*Report Writer:* S. Janusas
*Report Edit & Review:* Alexis Dunlop (#P1146)

# 1.0 PROJECT CONTEXT

## 1.1 Development Context

The proponent retained the services of Archaeological Services Inc. (ARA) to conduct a marine archaeological assessment - background research and an in-water marine archaeological assessment for the Kashwakamak Lake Dam Class Environmental Assessment (Class EA). For the purposes of this report the property will hereafter be referred to as the "study area".

The study area is located on either side of the existing dam, Kashwakamak Lake to the west and the main channel of the Mississippi River to the east in North Frontenac Township, Frontenac County. Figure 1 provides general location details for the study area, and Table 1 provides the UTM coordinates for the study area. Figure 2 illustrates land and water ownership.

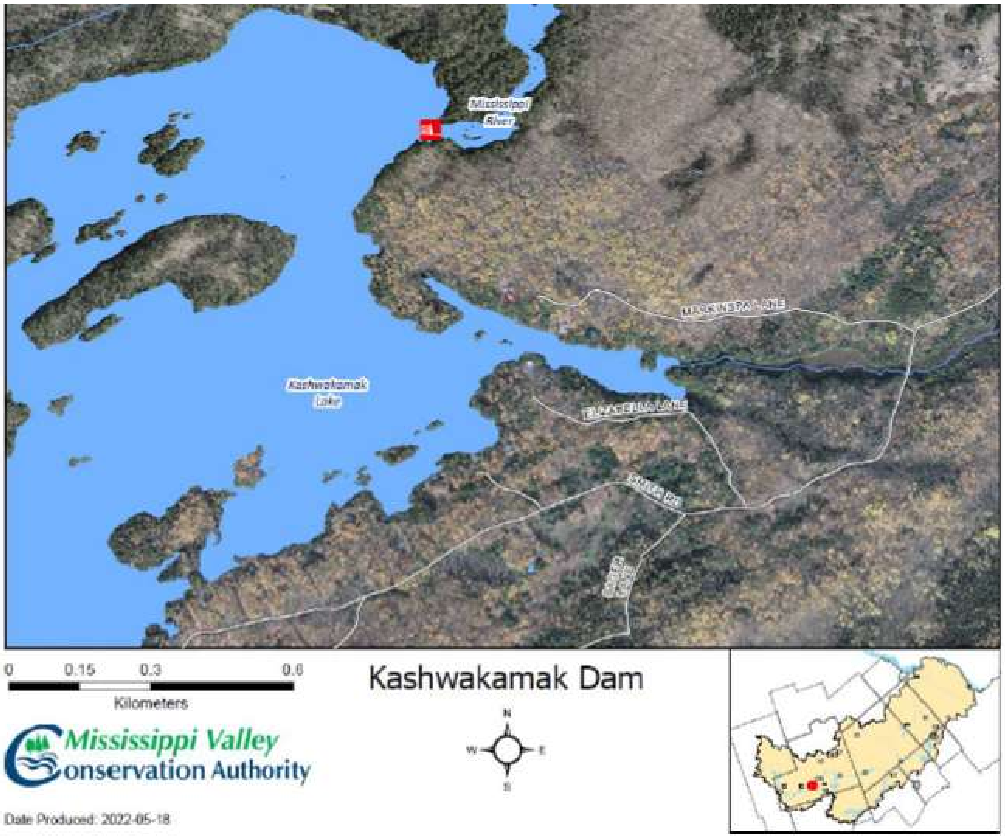

**Figure 1: Regional Location of Study Area**

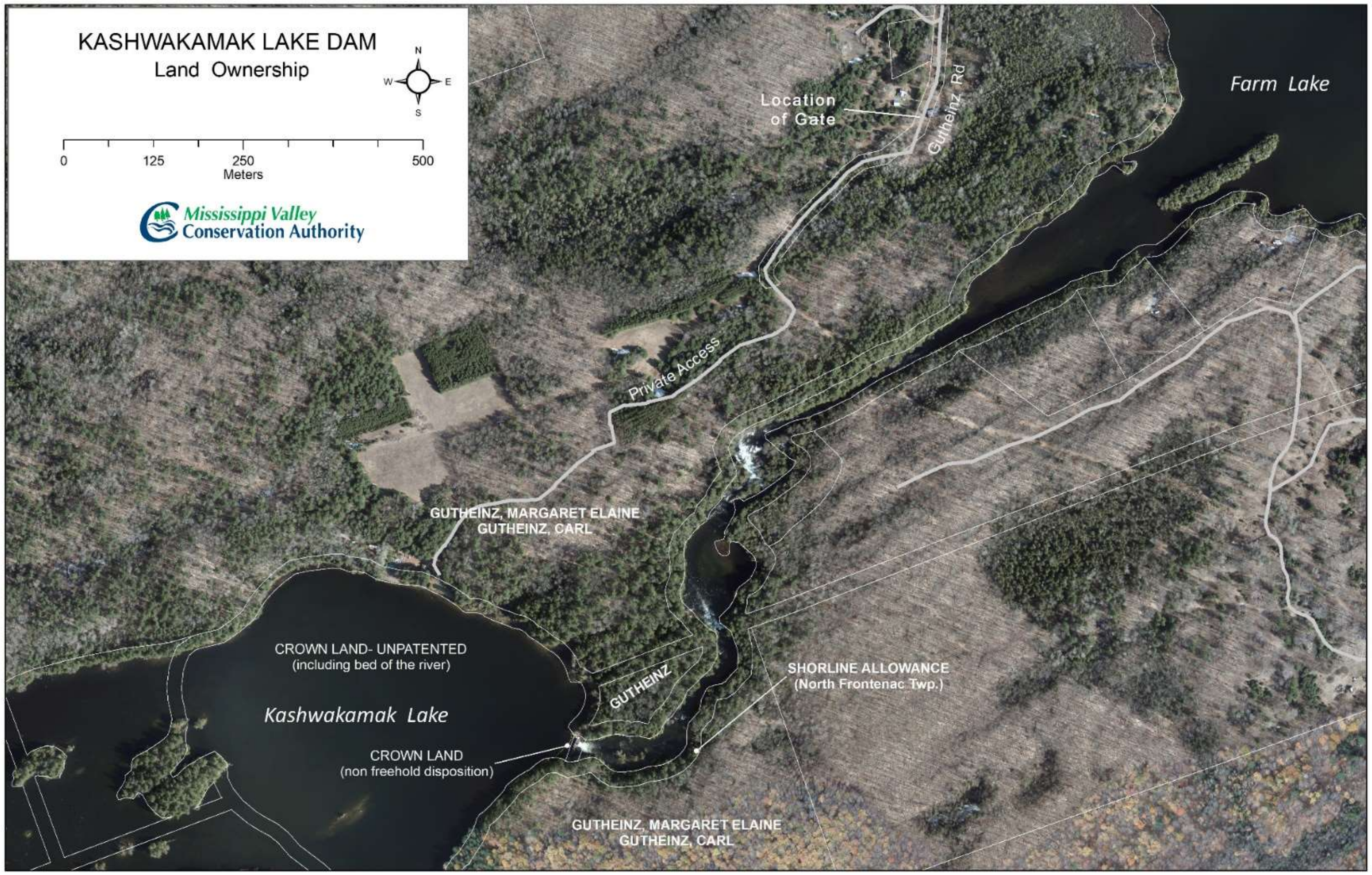

**Figure 2: Land and Water Ownership**

**Table 1: Project UTM Coordinates**

| Point Location | UTM Zone | Easting | Northing |
|---|---|---|---|
| NW corner | 18 | 345327.12 | 4972872.20 |
| NE corner | 18 | 345367.02 | 4972857.98 |
| SE corner | 18 | 345356.90 | 4972840.21 |
| SE corner | 18 | 345316.40 | 4972844.28 |

Figures 3 – 5 illustrate the general arrangement of the dam and the limits of the marine archaeological assessment.

Permission to access the study area and to conduct all activities associated with the marine archaeological assessment was provided by the proponent. The Kashwakamak Lake Dam is owned/managed by the MVCA. The land ownership figure (Figure 2) shows that the lake bottom is owned by the Crown. The study area consists of an area of 20 metres on the upstream and the downstream of the Kashwakamak Lake Dam encompassing approximately .07 hectares.

The archaeological assessment was triggered by the Environmental Assessment Act, 2012, and is being conducted as part of a Class Environmental Assessment, in accordance with Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects. McIntosh Perry is acting on behalf of the MVCA in this regard.

The Ministry of Citizenship and Multiculturalism (MCM) does not have Standards and Guidelines specific to marine archaeology. Therefore, this archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (MCM 2011) and best practices formed by 40 plus years of experience by ARA.

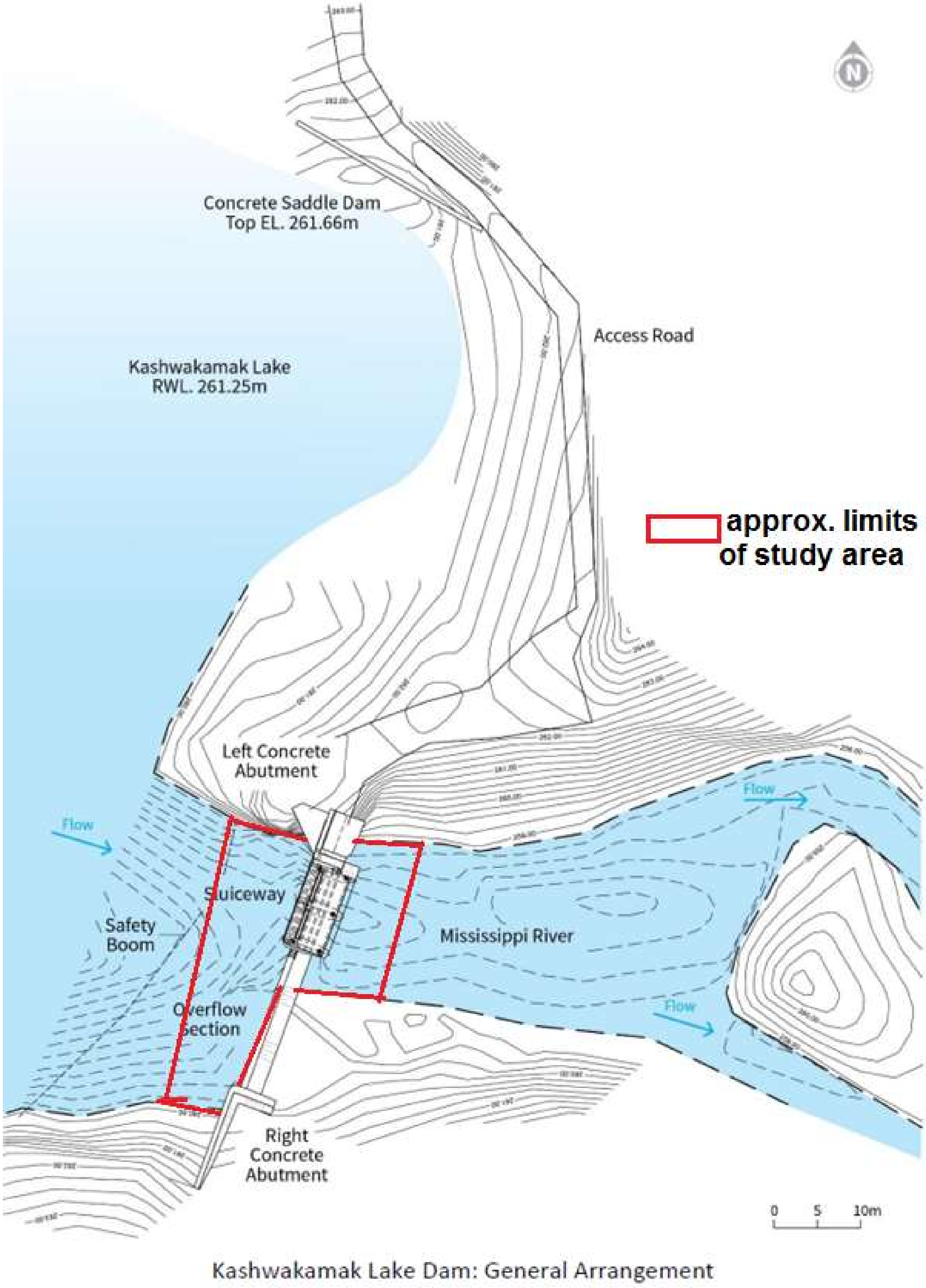

**Figure 3: General Arrangement of the Dam and Study Area**

**Figure 4: MVCA Drone Photo (07/19/2023)**

## 1.2 Description of the Project

The project consists of a Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam located in the Township of North Frontenac on the main channel of the Mississippi River. The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decommission, rehabilitate or replace the existing dam within the next five years.

The current dam consists of two structures: the main or main control dam, and a secondary saddle dam (overflow dam). The two structures are separated by an earth island. The main dam consists of two bulkhead walls and three concrete piers forming two sluiceways and a broad crested concrete weir. The dam has had major repairs undertaken to address structural and seepage issues (MVCA 2023).

**Image 1: Main control dam (MVCA 2023)**

Mississippi Valley Conservation Authority
Kashwakamak Lake Dam Replacement

Request for Proposals
January 2023

View of the overflow weir.

**Image 2: Saddle Dam (MVCA 2023)**

Upstream view of control structure and overflow weir.

**Image 3: Upstream View of Main Dam (MVCA 2023)**

## 1.3 Historical Context

### *1.3.1 Indigenous History*

The following is from MVCA 2019 Background Two Report – People and Property:

"Anishinaabe peoples were the first to inhabit the Mississippi River Watershed and surrounding watersheds. Historical significant places in the watershed continue to hold sacred importance for Indigenous communities. The early Indigenous presence is marked by an extensive collection of pictographs on the face of Mazinaw Rock. It represents the largest visible collection of pictographs in Ontario. The only known concentration of indigenous habitation and camping sites in the watershed is also found at Mazinaw Lake. These, and finds near Crotch Lake, date back to the Middle and late Woodland Periods (ca. 1000 B.C. to the Historic Period). The Mazinaw sites appear to have also been occupied from the Middle Woodland to Historic Fur Trade periods.

Older artifacts (e.g. spear points) dating back to the Laurentian Archaic period (ca. 5000 B.C. to 1000 B.C.) have been found in the Dalhousie Lake area. The Laurentian people represent the first substantial population of hunters and fishermen to live in Southern Ontario and their way of life was to have a vital impact upon subsequent events.

There are other less extensive findings from the Crotch Lake and Dalhousie Lake areas. The scarcity of findings elsewhere suggests that the central and upper watershed was not a major travel route during those times. It is also thought that archaeological features may have been destroyed or covered over with the raising of water levels throughout parts of the river system.

The arrival of Europeans severely disrupted the life of indigenous peoples, as settlers overtook much of the land and resources" (MVCA 2019: 3).

### *1.3.2 European Colonization*

"European settlers generally arrived after the War of 1812 as part of a wartime strategy and government programs aimed at establishing the "Rideau Military Settlements". The first were mostly British soldiers from disbanded regiments who settled around Perth. Two more waves of immigrants came from Scotland in 1820 and from Ireland in 1823. Those settled in and around the Village of Lanark. By 1830 Lanark County had a population of 10,000 largely concentrated in the eastern townships. The population of the western section was considered to have been 'not established' because of the unsuitability of the Canadian Shield to support agriculture.

The continued settlement of the watershed largely centered on the resources provided by the Mississippi River system. From 1820 on the lumber trade opened up large parts of the watershed. Dams were built in the upper (southwest) watershed to raise the water levels enough to float timber downstream. Sawmills, grist mills, flour mills and timber slides were constructed along the waterways, and settlements such as Almonte, Appleton, Carleton Place, Blakeney, Lanark and Pakenham grew around them.

When there was enough soil and water for viable farming, land that had been cleared for lumber was put into agricultural use. Markets for agriculture products grew as towns increased in both number and size. Timber export reached its peak in the 1850's and subsequently declined, with farming then becoming the primary source of livelihood.

In the 1850's and 1860's the introduction of the railway improved accessibility of the area and stimulated some growth, especially in areas like Carleton Place and Almonte. Populations in the watersheds steadily increased until around the turn of the century, at which point it began to decline (MVCA Interim Watershed Plan 1983: 3-4).

The municipal structure of the Mississippi River Watershed dates back to the early 1800's. Parts of Beckwith, Drummond and Tay Valley Townships were among the first townships surveyed and settled between 1816 and 1818. The formation of the municipal wards to the north and west continued through the early 1860's. When the Mississippi Valley Conservation Authority was first formed in 1968, the Mississippi River Watershed included 24 separate municipalities" (MVCA 2019 Background Report Two – People and Property).

The study area and immediate environs was settled quite late according to the above information. Colonization modified the natural landscape, through logging, clearing of land for agriculture (not apparent in the study area), and building of dams, such as the current study dam to manipulate the flow of water for early industries. Potential exists for sites to exist in close proximity to shorelines of both lakes and rivers. The upper parts of the watershed (the study area) was used primarily for transport of logs.

### *1.3.3 Traditional Indigenous Land and Engagement*

Indigenous engagement was undertaken by the proponent. Table 2 presents the list of all First Nations, Indigenous communities/organizations and Métis engaged by the proponent.

### Table 2: List of First Nations, Indigenous Communities/Organizations, and Métis Engaged by Proponent

| In Alphabetical Order |
|---|
| Alderville First Nation |
| Algonquins of Ontario |
| Algonquins of Pikwàkanagàn First Nation |
| Beausoleil First Nation |
| Chippewas of Georgina Island First Nation |
| Chippewas of Rama First Nation |
| Curve Lake First Nation |
| Hiawatha First Nation |
| Huron-Wendat Nation |
| Kawartha Nishnawbe First Nation |
| Métis Nation of Ontario |
| Mississaugas of Scugog Island First Nation |
| Mohawks of the Bay of Quinte |

### Table 3:

### Table 3: List of First Nations, Indigenous Communities/Organizations, and Métis That Participated in Fieldwork

| In Alphabetical Order |
|---|
| Algonquins of Ontario |
| Algonquins of Pikwàkanagàn First Nation |

### *1.3.4 Canadian Heritage River*

The Mississippi River is not a designated Canadian Heritage River (https://chrs.ca/en/rivers).

### *1.3.5 Marine History of the Study Area*

One of the criteria for evaluating potential for possible Indigenous cultural remains in marine archaeology is the presence or nearby presence of rapids. There are two rapids, outside the study area, but potentially close enough to raise interest in the study area's archaeological potential. (Figure 5).

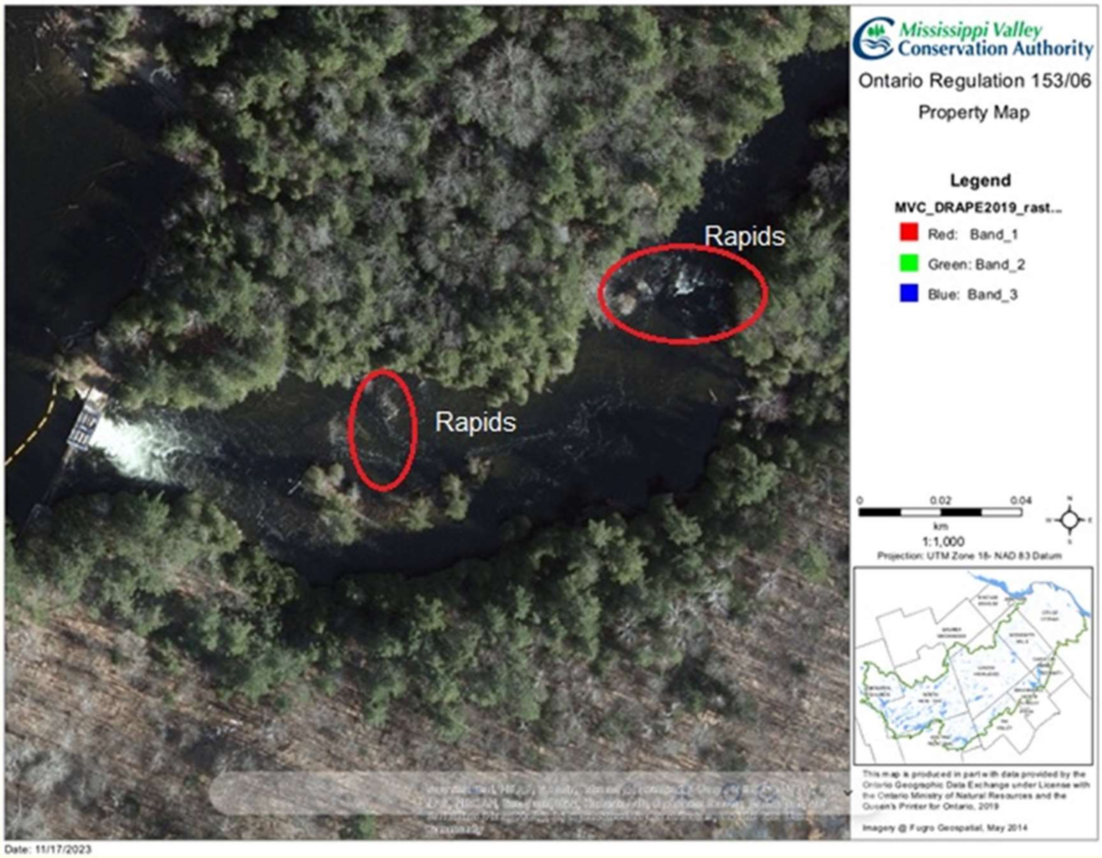

**Figure 5: Location of Two Rapids East of Study Area (2019 DRAPE aerial imagery)**

The dam at the outlet of Kashwakamak Lake (also referred to as Long Lake in historical sources) is situated on Lot 20, Concession X, of former Clarendon Township (now Clarendon Ward of North Frontenac Township). The immediate cause for the construction of a dam at the exit of the lake into the Mississippi River was to ensure an adequate water supply for downstream mills, particularly for hydro-electric power development.

In March of 1910, the existing "power users" on the river secured enabling legislation from the Ontario Legislature for the formation of the Mississippi River Improvement Company Limited of Almonte, for the purpose of regulating waters in the watershed. The legislation stipulated that the locations of proposed dams and their construction be first approved by the Ontario Hydro-Electric Power Commission.

In September, 1910, the Company duly submitted to the Commission the plans and specifications for storage dams and their locations at the outlets of Long and (Big) Gull Lakes, southeast of the hamlet of Fernleigh in Clarendon Township. The Commission approved the proposal and the Company quickly issued tenders. The successful contractors were Allen Gilmour and George Bradford, both of Almonte (The Canadian Engineer 1910: 503). The 1911 Almonte census lists Allen Gilmour, age 49, as a carpenter and George Bradford, 59, as a mason.

Gilmour & Bradford were awarded the contract on October 3 and work was commenced at one. On October 12th and 13th, the Hydro Commission's Hydraulic Engineer visited both the Long and Gull Lake sites. In his report, dated October 20th, he wrote, "the site unwatered and stripped sufficiently to show that there was no cause for anxiety as to the material upon which the dam was to be built, as it was solid rock throughout, with the exception of some weathered portions on each shore, where several fissures and frost-cracks are to be shot out [sic] or pugged with concrete before the actual construction of the dam is commenced" (no author 1912: 154). The name of the engineer was not cited.

The Engineer further stated that cement was then being hauled to the sites of both dams and stored in "well-built waterproof sheds". And that "fairly good sand and gravel are available within easy teaming distances at both sites." Finally, he noted that the contract was not a large one and "only requires reasonable care during construction and adequate measures for protection from frost to make the work safe and permanent" (ibid).

Construction was reported as "progressing rapidly" at the end of the month (Almonte Gazette October 28, 1910). A "coffer dam" (also referred to as a "breakwater" at the Long Lake location was finished in early November and by the 25th, the Almonte Gazette could claim that the dam had been completed, whereas the Gull Lake structure would not be entirely finished until the spring of 1911. Still, as the Gazette anticipated, "Everything will be in readiness for the spring freshets and the gates will be kept closed until the water will be needed in the dry season (Almonte Gazette November 25, 1910).

Details of the construction of the dams are lacking in contemporary sources, although a later (1919) summary has them formed of "rock-filled cribs," (The Canadian Engineer 1919: 452), survey a misinterpretation related to the cofferdams. A three-foot cofferdam is noted at Gull Lake, and at least four large cart loads of cement had been used, probably for both dams (Daily British Whig 1910).

The Long (Kashwakamak) and (Big) Gull Lake dams were the primary dams for ensuring the supply of water for the Mississippi River users. In 1912, the Hydro-Electric Company still owned and operated the 'storage works" that is, the dams, and was responsible for the regulation of the river's flow, as well as for the collection of tolls from the downstream users. The Commission concluded, "Close touch is kept with the Company and with the storage conditions existing from time to time" (Hydro-Electric Power Commission 1923: 102).
Figure 6 illustrates the location of the dam from a 1950 topographic map.

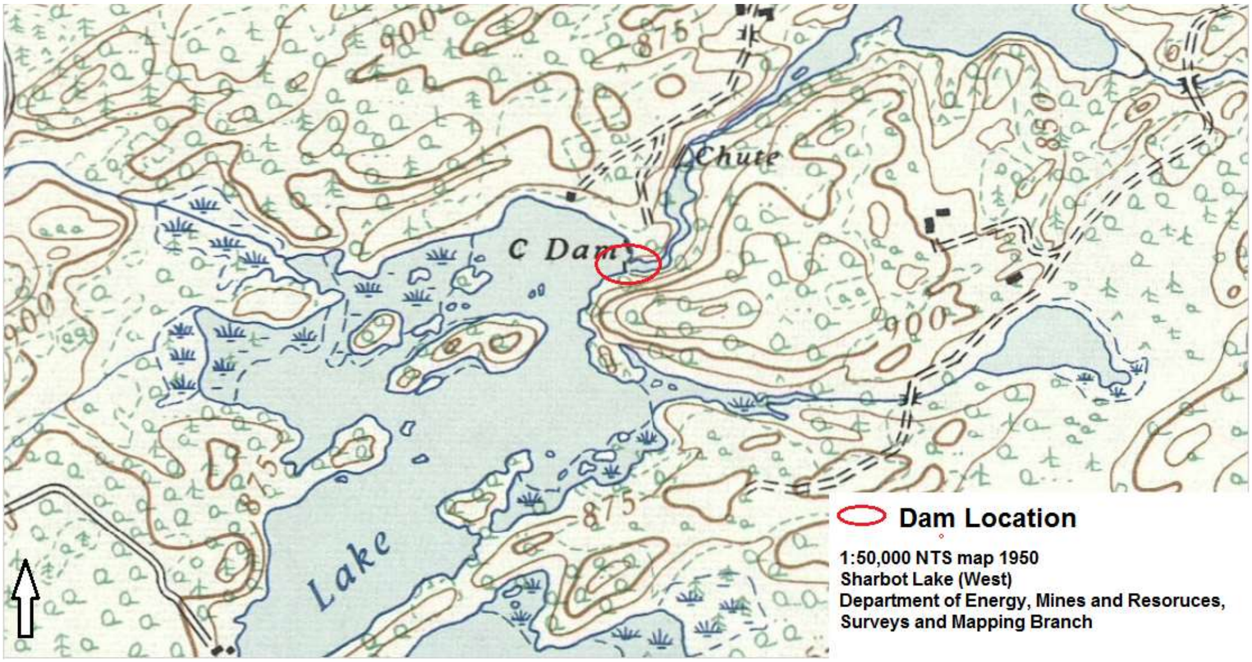

**Figure 6: 1950 Topographic Map**

Figure 7 illustrates the 1986 plan view and elevation; Figure 8 illustrates the 1986 spillway drawing; Figure 9 illustrates the 1998 plan view and elevation; Figure 10 illustrates the 1998 control weir and north bank; Figure 11 illustrates the 1998 control structure and north wingwall; Figure 12 illustrates the 1998 saddle dam; and, Figure 13 illustrates the 1998 south wingwall. Drawings are such that they represent the true configuration of the current dam.

### *1.3.6 Plaques, Monuments or Designated Heritage Properties*

The Ontario Heritage Trust online plaque guide was accessed September 2023 and while there were no plaques specifically for the study area, the following, located in Lanark County, applies to the Rivers and Streams Act of 1884.

“In the 1870s, Boyd Caldwell and Peter McLaren both owned timber rights on the upper Mississippi River. McLaren built a dam and timber slide at High Falls and refused to let Caldwell use the slide. Caldwell appealed to the Liberal provincial government of Oliver Mowat, which passed the Rivers and Streams Act in 1881. This made it legal to use private improvements on a watercourse if compensation was paid to the owner. McLaren appealed to the courts and to the Conservative federal government of John A. Macdonald. Macdonald disallowed the act three times, to protect the rights of property holders. Mowat and Macdonald disagreed over provincial authority to legislate in matters of property rights, as granted at Confederation. The Judicial Committee of the Privy Council ultimately sided with Caldwell, and Mowat's government passed the Rivers and Streams Act again in 1884. This legal decision recognized that use of Canadian waterways could not be blocked by private interests and helped establish a fundamental principle in federal-provincial relations” (https://www.heritagetrust.on.ca/plaques/rivers-and-streams-act-of-1884).

In addition, the plaque at Ardoch commemorates the struggle back in the early 1980's to preserve manòmin (wild rice) from commercial harvesters (Ardoch First Nation Website, http://www.aafna.ca/)" (MVCA 2019 Background Report Two – People and Property: 10).

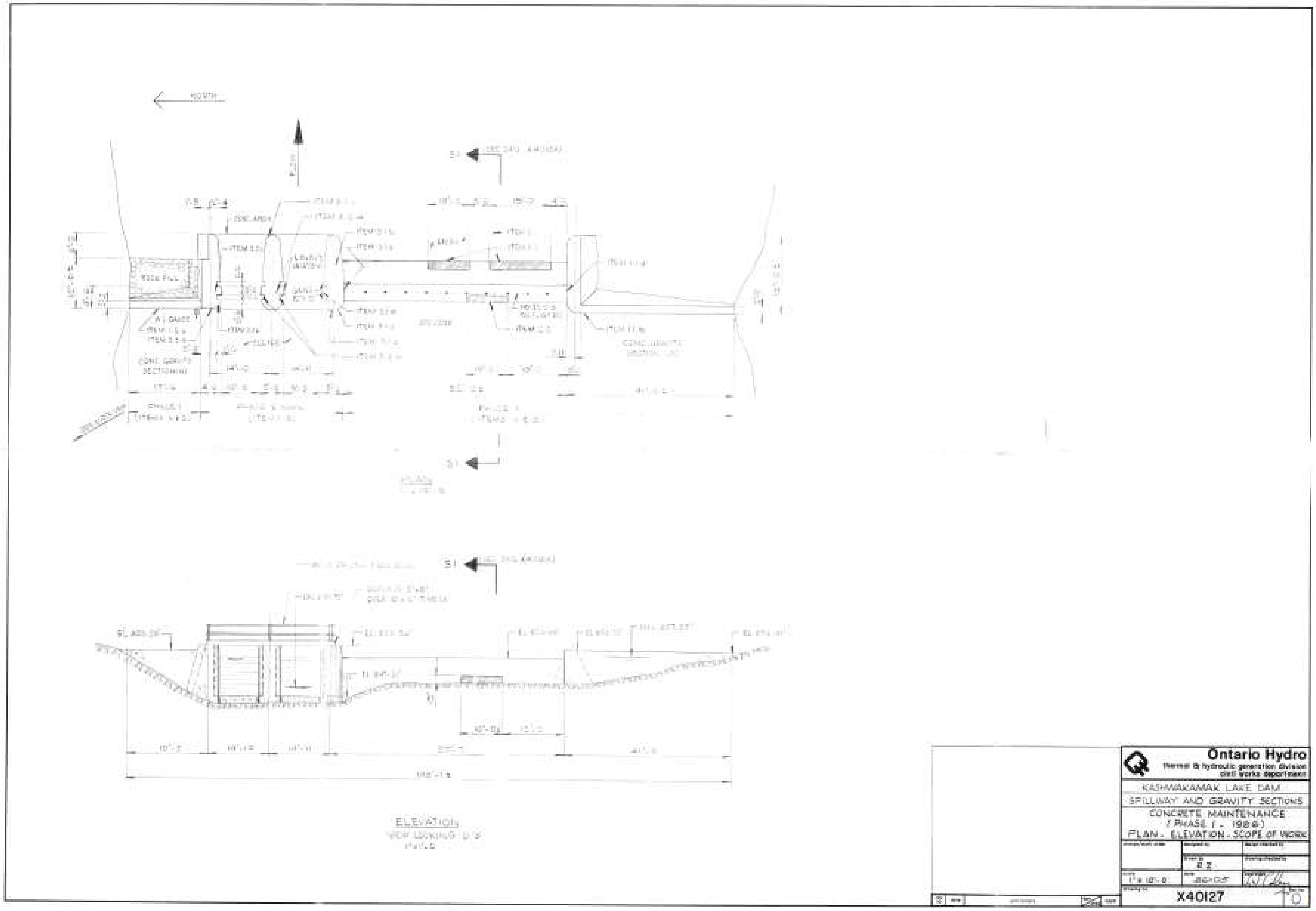

**Figure 7: 1986 Plan View and Elevation**

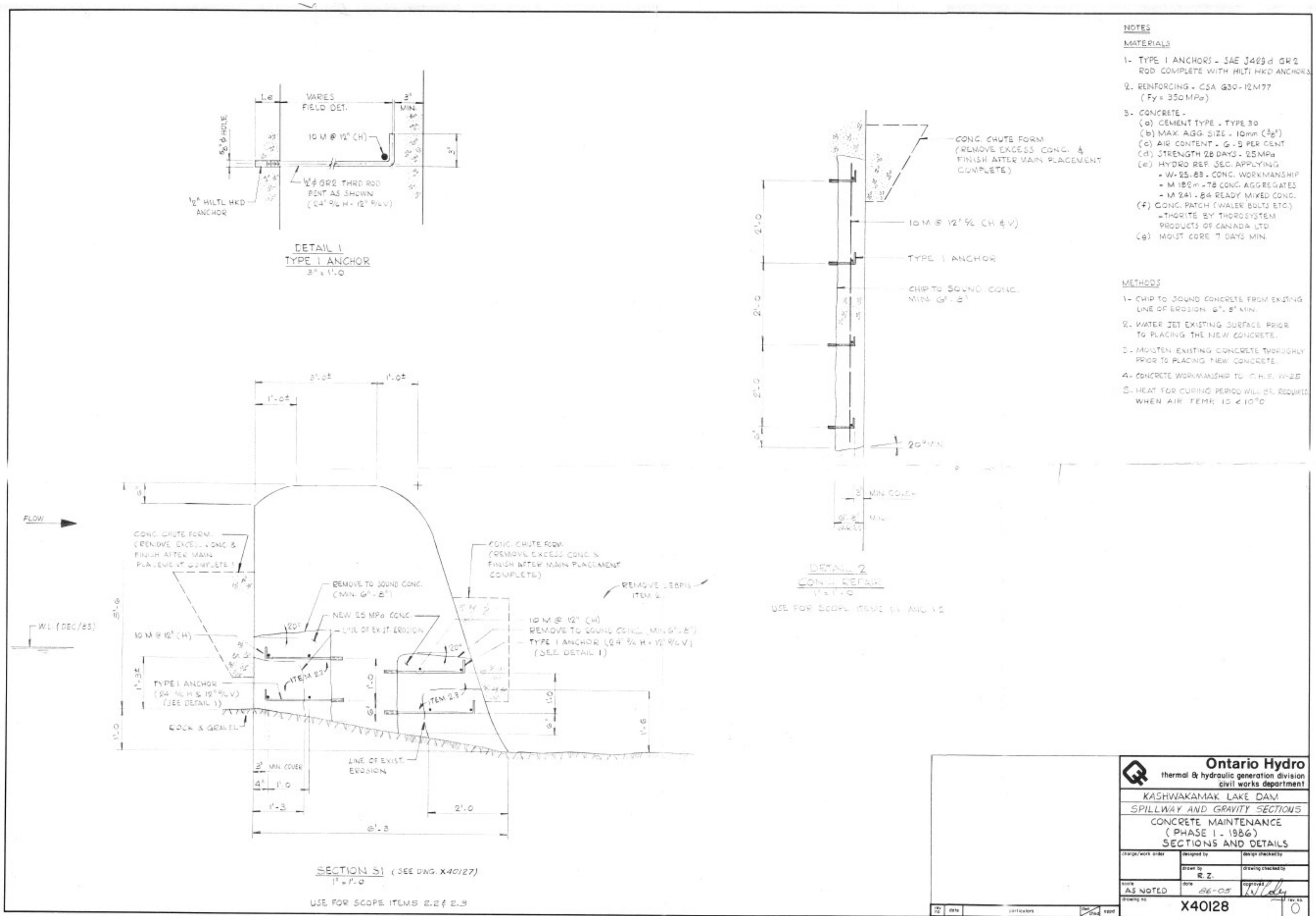

**Figure 8: 1986 Spillway Drawing**

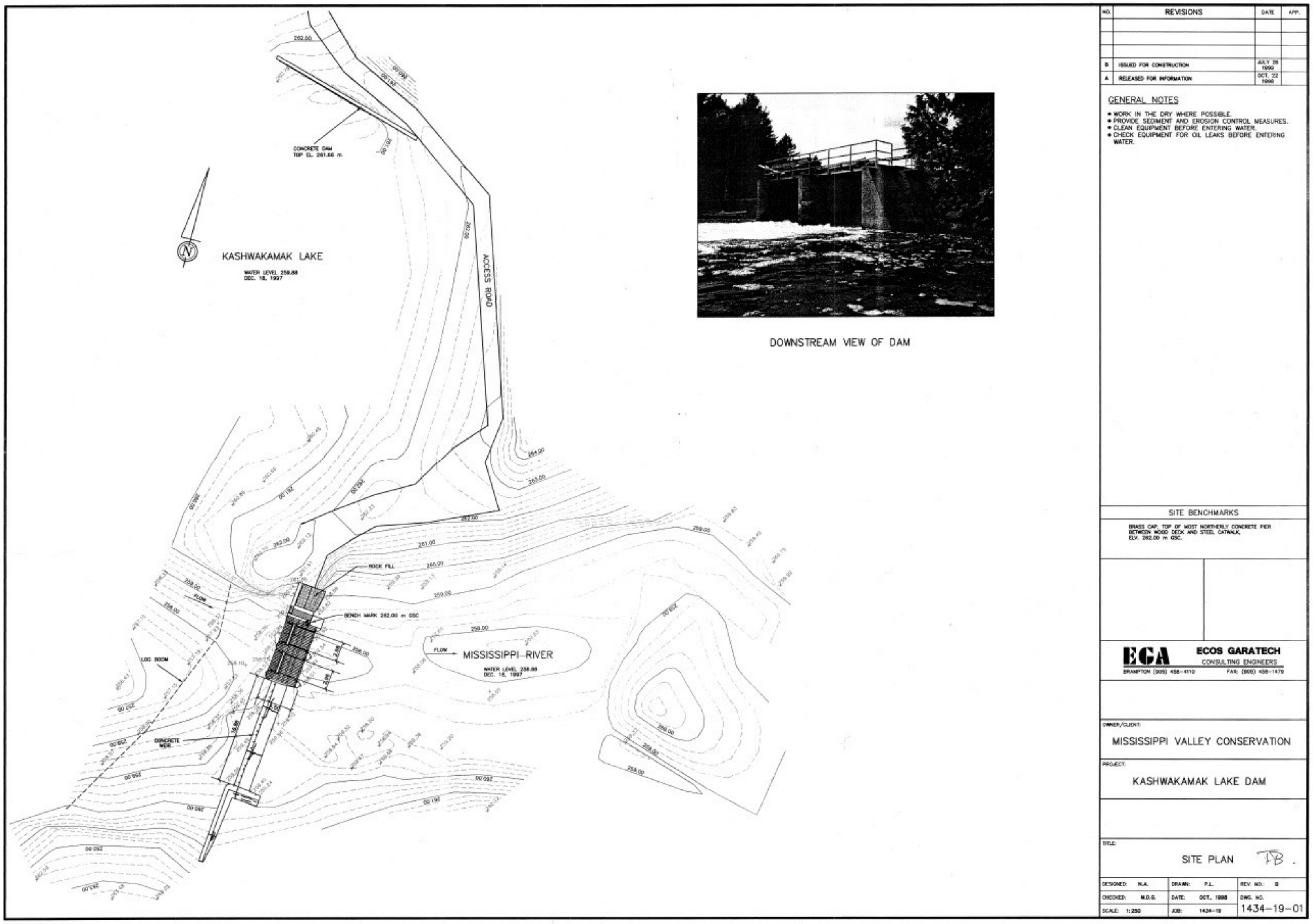

**Figure 9: 1998 Site Plan**

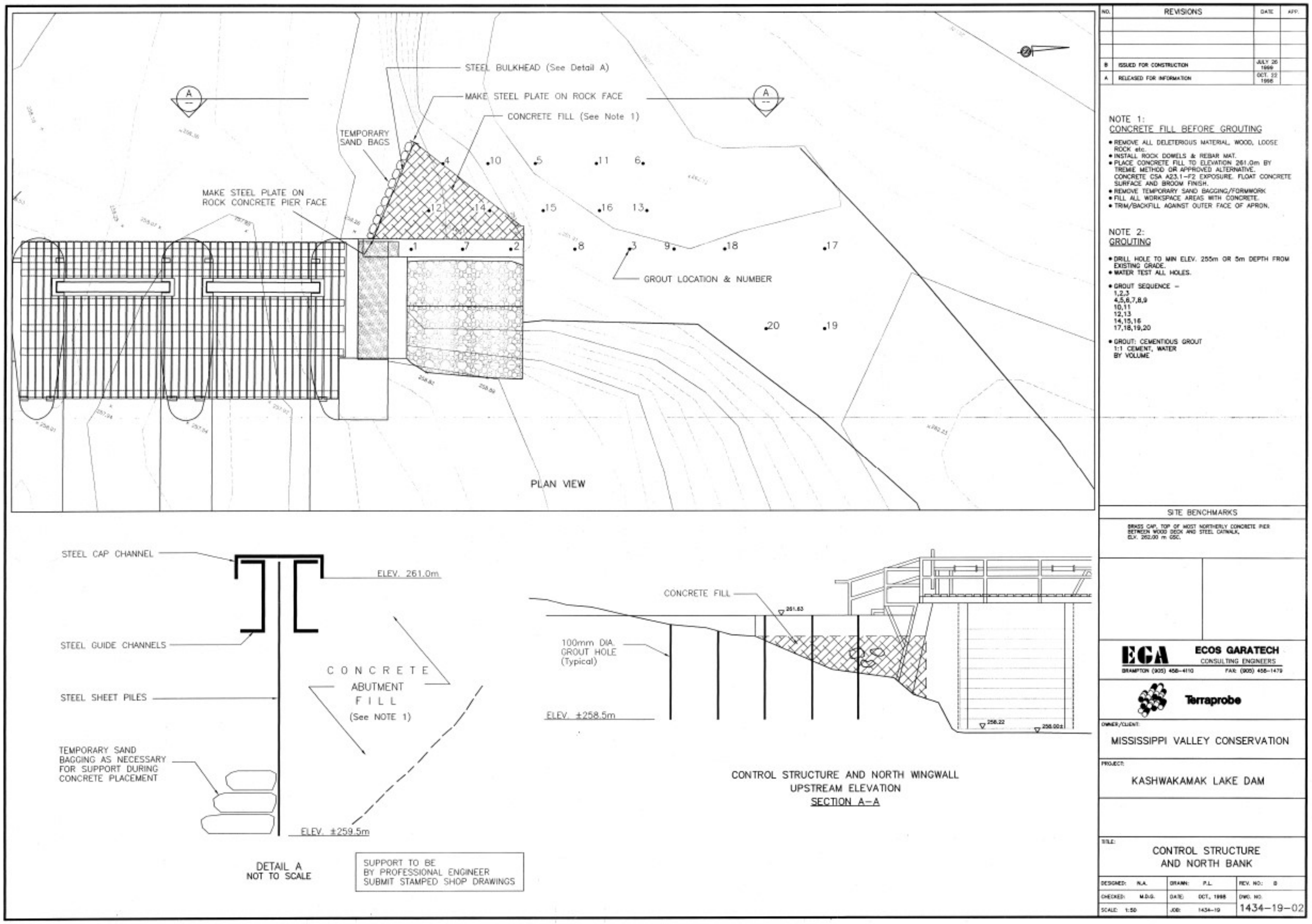

**Figure 10: 1998 Control Weir and North Bank**

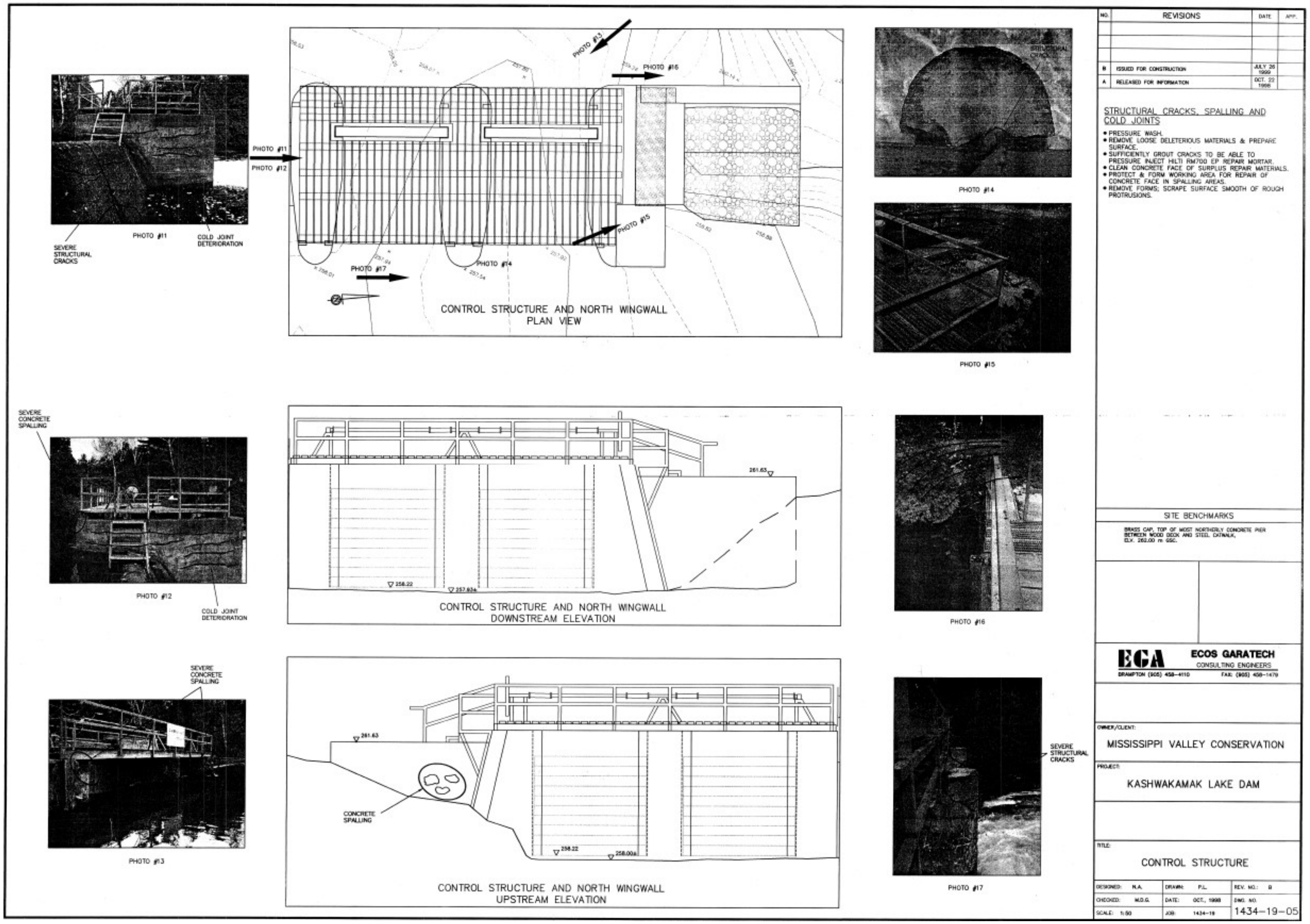

Figure 11: Control Structure and North Wingwall 1998

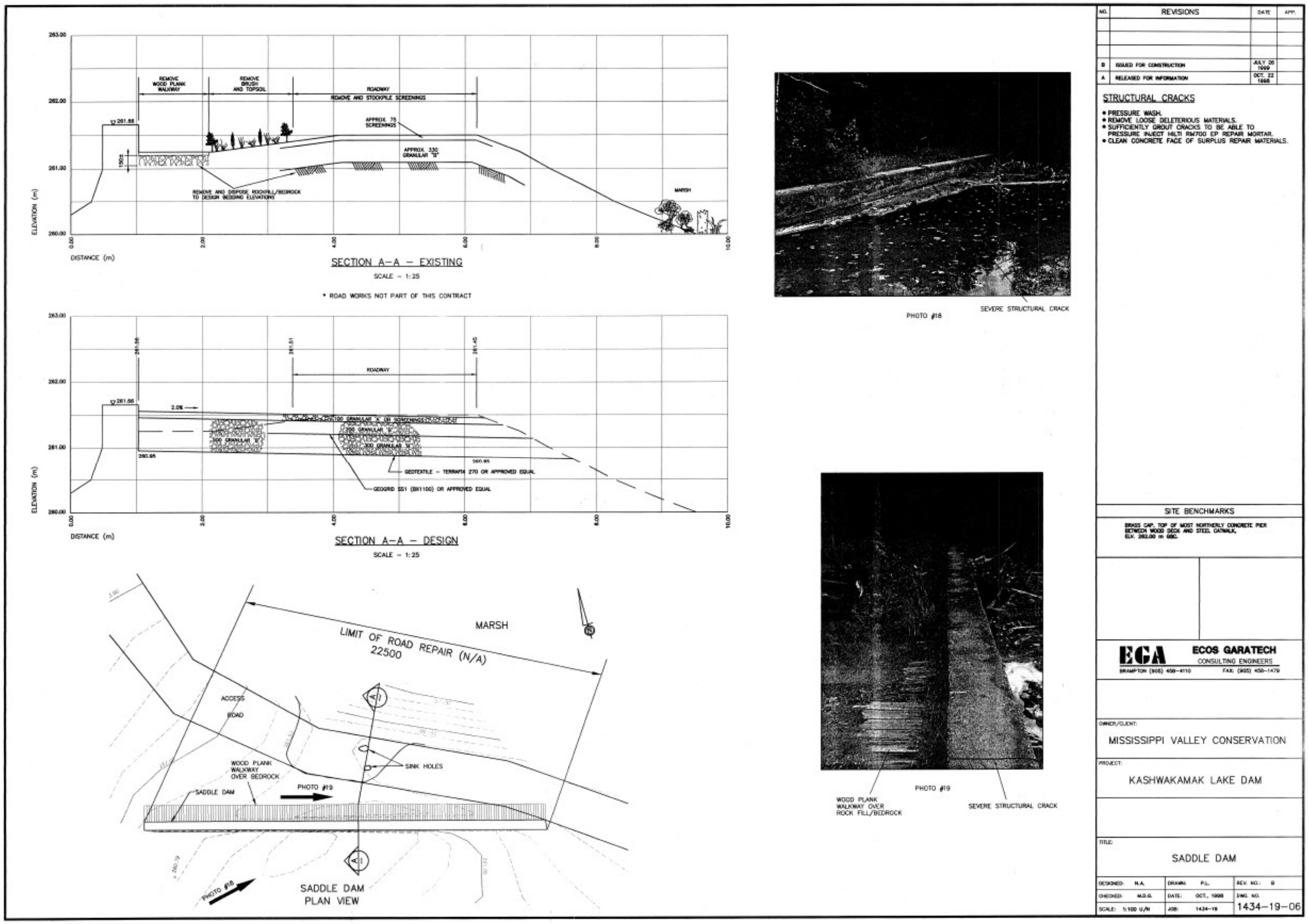

**Figure 12: 1998 Saddle Dam**

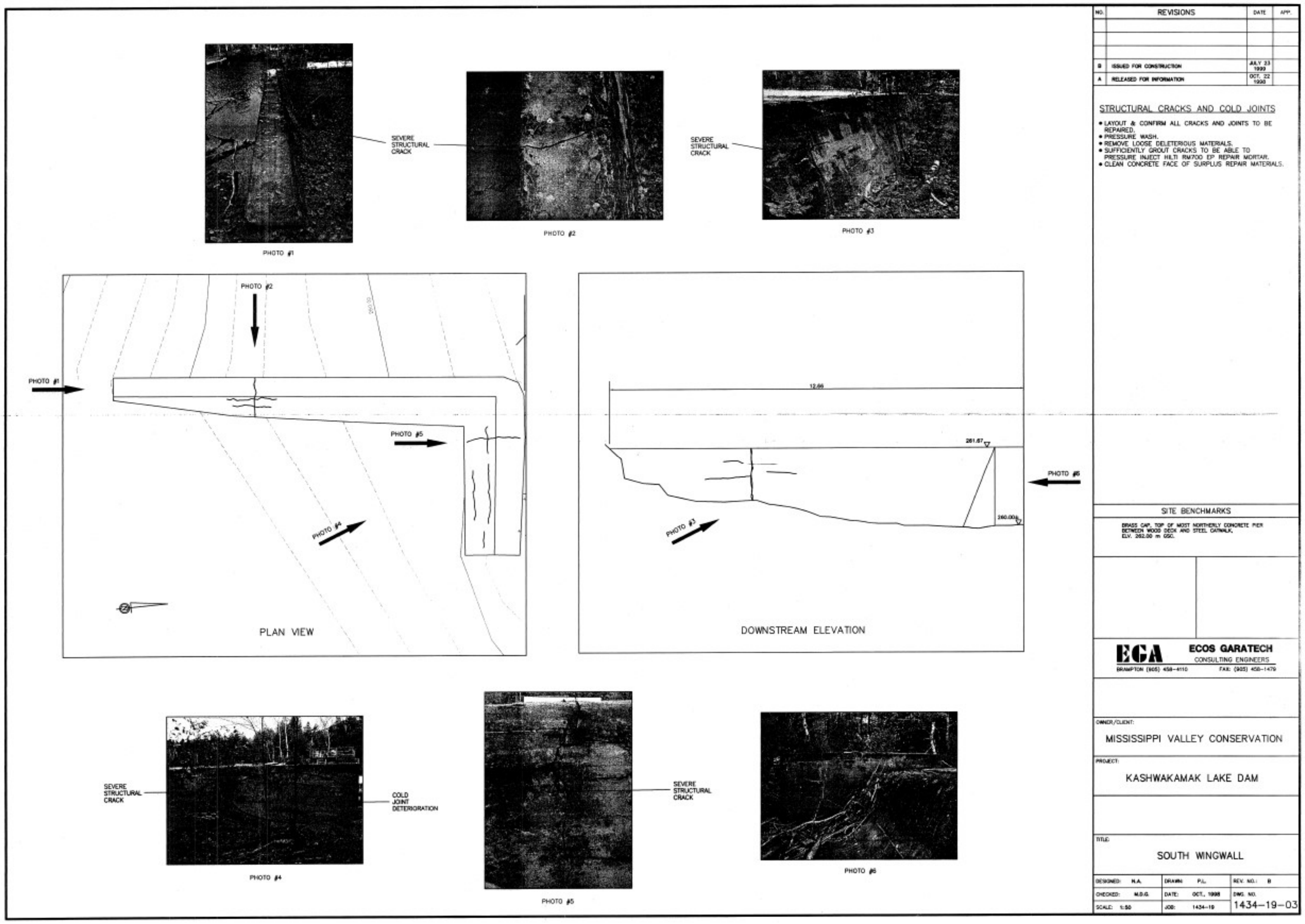

**Figure 13: South Wingwall**

### *1.3.7 Determination of Archaeological Potential*

There are a number of variables that are evaluated when determining marine archaeological potential. These include:

- The presence of previously identified archaeological sites;
- The presence of rapids or nearby rapids;
- Prehistoric lakes and rivers;
- Marine related infrastructure on shore;
- Records of shipbuilding in area;
- Resource areas (food or medicinal plants, scarce raw materials, early Euro-Canadian industry);
- Shipwrecks and/or history of navigation both Indigenous and non-Indigenous;
- Early historic transportation routes;
- Canadian heritage river; and
- Properties with cultural heritage value/interest or archaeological potential as identified by First Nations, Indigenous communities, the Métis, local histories, and/or informants.

Employing these variables, the following are apparent:

1) There are rapids in the area, located east and slightly northeast of the study area;
2) There are no registered archaeological sites or site leads reported by the Ontario government within 1 km of the study area;
3) Natural resources attractive to both Indigenous and Euro-Canadian peoples were present and included fish, herptiles, birds, mammal and vegetation suitable as foodstuffs and for other types of activity (e.g. weaving mats, baskets, clothing, etc.);
4) The original dam, including a cofferdam, was built in 1910, and has undergone numerous maintenance and repairs;
5) The area of the dam was historically reported to be dewatered and stripped for the placement of the dam, suggesting that extreme modification has been made to the river/lake bottom in the area of the dam; and,
6) Only small vessels, such as canoes and kayaks, would have been used in the vicinity of the study area.

The study area is considered to have marine archaeological potential based on the above, with the possibility of materials still being present for both Indigneous and Euro-Canadian periods along the in-water shorelines, and possibly between crevices in the bedrock.

### *1.3.8 Rationale for Fieldwork Strategy*

The study area was accessed when the downstream portion of the river had been partially dewatered, allowing snorkel survey and visual assessment of shallow pools. The upstream part of the dam could not be lowered and had a depth of 3 – 4 metres requiring snorkel survey as well. The shorelines along the upstream portion were examined and the remaining study area snorkeled in 3-4 metre intervals and recording with a video. Visibility of both upstream and downstream section was to the bottom from the surface. Survey was conducted post spawning season removing any concern for disturbance of possible spawning beds.

## 1.4 Archaeological Context

### *1.4.1 Previously Known Archaeological Resources/Assessments*

There are no known land or marine archaeological assessments that have been conducted adjacent or close to the study area.

### *1.4.2 Current Environment – Existing Features*

Kashwakamak Lake is a freshwater lake that is 15 kilometres long, 0.75 kilometres at its widest point, has a surface area of 1,159.8 hectares with a rocky shoreline, and maximum lake depth of 22 metres (72 feet). The lake lies at an election of 260 metres above see level. Its primary inflow and outflow if the main branch of the Mississippi River and the flow is controlled by the Kashwakamak Lake Dam.

The current dam consists of two structures: the main or main control dam, and a secondary saddle dam (overflow dam). The two structures are separated by an earth island. The main dam consists of two bulkhead walls and three concrete piers forming two sluiceways and a broad crested concrete weir. The dam has had major repairs undertaken to address structural and seepage issues (MVCA 2023). Images 1 - 5 illustrate the dam features.

**Image 4: Overflow dam and south wingwall facing southwest.**

**Image 5: Sluiceway from downstream site facing southwest.**

### *1.4.3 Physiography, Bedrock, and Hydrology*

The study area lies within the Precambrian shield consisting mostly of granite gneiss, known for its rugged, hummocky topography. The Shield provides many areas for water storage, including Kashwakamak Lake. The softer bedrock have been eroded by glaciers creating the narrow and long lakes characteristic of the area, following a northeast orientation.

The study area lies within the Upper Mississippi Watershed Area (MVCA 2019: 3) (Figure 14). The watershed is characterized by thin or non-existent overburden. Soils that do occur in the area tend to be acidic, with a coarse texture (MVCA 2019:6).

Stream flow for the Mississippi River, data obtained from 1918 to 2019, indicates an average annual flow of 32.4 m³/sec. Flows tend to be at their peak during the spring freshet, and are often double the annual average flow rate. Low flow rates tend to occur in summer and fall, dropping to between one third and one half of the annual average (ibid: 16).

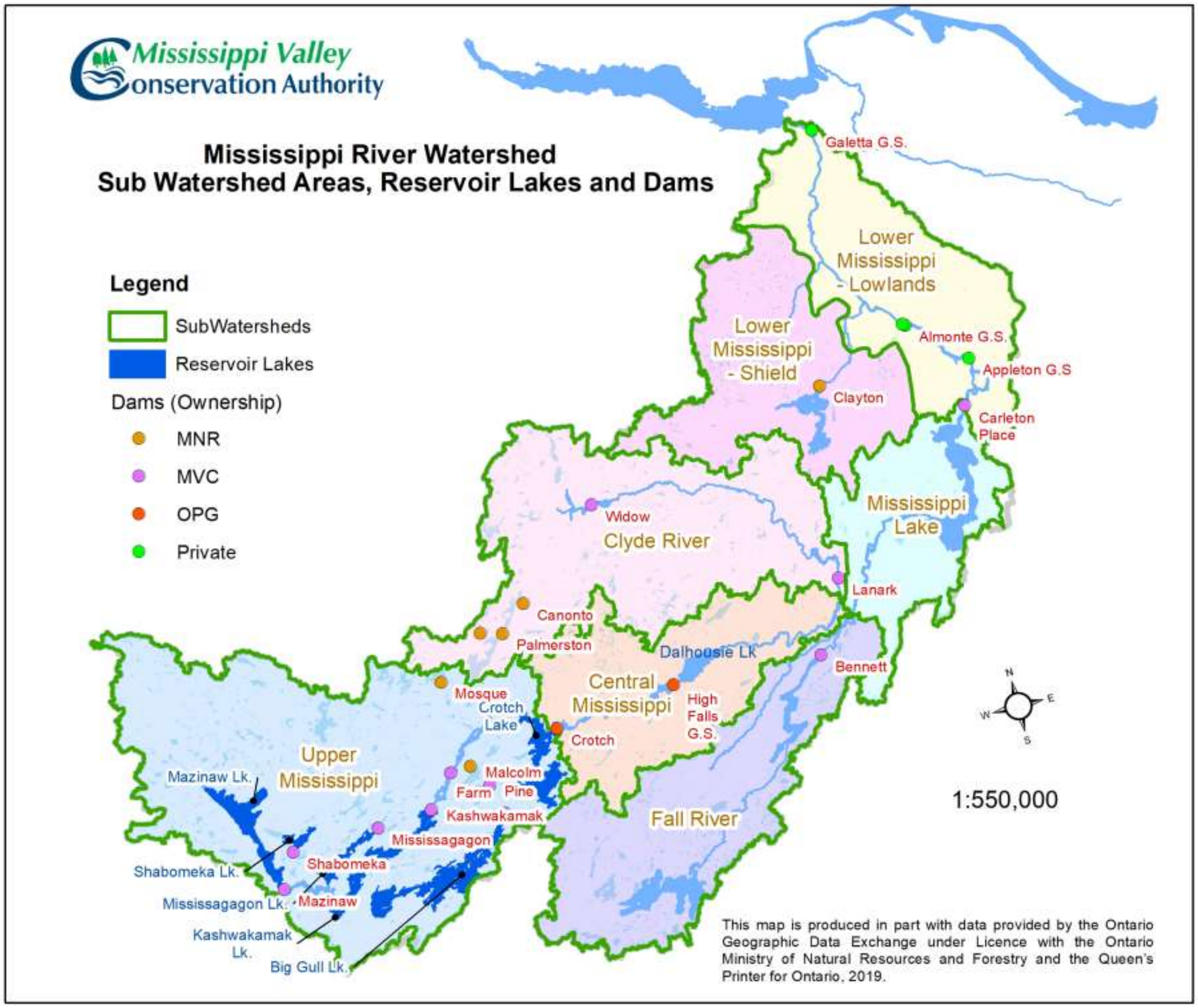

**Figure 14: Mississippi River Watershed, Sub Watershed Areas, Reservoir Lakes and Dams (MVCA 2019: Figure 10)**

### *1.4.4 Vegetation, Fish and Wildlife*

The Mississippi watershed forest is described as largely an immature forest (having been heavily logged historically) with tolerant hardwood, and white pine with scrub areas.

Kashwakamak Lake contains a wide variety of fish species: Largemouth and Smallmouth bass, Northern Pike, Rock bass, Pumpkinseed, Walleye and Yellow Perch (https://www.gpsnauticalcharts.com/main/ca_on_v_103380165-kashwakamak-lake-nautical-chart.html).

### *1.4.5 Dates of Site Visit*

The property visit was conducted on September 11th, 2023 under sunny skies and a high of 24°C. Conditions provided ideal viewing conditions – no waves and good light penetration.

# 2.0 METHODOLOGY

## 2.1 Background Research

As part of the background research, an examination of the following was conducted:

- The Site Registration Database (maintained by the Ontario Ministry of Citizenship and Multiculturalism) was examined for the presence of known archaeological sites in the project area and within a radius of 1 km of the project area by contacting the data coordinator of the Ministry of Citizenship and Multiculturalism;
- Reports of previous archaeological fieldwork within a radius of 50 m around the property were consulted;
- Topographic maps at 1:10 000 (recent and historical) or the most detailed map available were reviewed;
- Historic settlement maps such as the historic atlases were examined;
- Available archaeological management/master plans or archaeological potential mapping were consulted;
- Commemorative plaques or monuments were reviewed; and
- Any other avenues that assist in determining archaeological potential were examined.

## 2.2 Study Area Visit

The property visit was conducted September 11th, 2023 under sunny skies. The upstream and downstream sides of the dam were subject to marine archaeological assessment. The downstream portion of the dam had been partially dewatered allowing for examination of the river bottom using a snorkel survey conducted in two to three metre intervals. Light penetration extended to the bottom in the downstream section of the study area. The upstream portion of the dam was subject to snorkel survey of the sides of the lake up to 20 metres from the dam face, and snorkel survey in intervals of 3 – 4 metres. Video and still photographs were obtained for the marine archaeological assessment.

# 3.0 RESULTS

## 3.1 Background Research

The background research was unable to locate any blueprints or plans of the early 1910 dam, however, the descriptions available indicated that the area had a cofferdam established, and that the bottom was "stripped" to ensure that there were no obstacles that would impede the construction of the dam or flow of water. The same dam exists in situ, however, with many maintenance and repairs having occurred since its initial build. The dam was used to control water for areas downstream of the study area, for early industries such as saw mills, grist and flour mills, logging, etc. There was also a reference in the historic accounts of there being small buildings erected along the shore as storage for materials. The latter is outside the scope of the marine archaeological assessment.

As with most Indigenous prehistory and history, areas located close to rapids were sometimes used to construct fish weirs, and/or to concentrate in fishing and harvesting activities. The area has also been known for pictographs (especially Mazinaw) which suggests a potential for the same, most likely on shore, however, in shallow water periods, this may have occurred in currently inundated places in the study area.

The background research indicated that there is the potential for:

1) Remnants of the 1910 cofferdam;
2) Possible evidence of Indigneous fishing or hunting
3) Possible evidence of pictographs;
4) Possible evidence of Euro-Canadian materials related to the construction period of the dam; and,
5) Use of area by early explorers, missionaries, fur traders and lumbermen;

The above constitutes sufficient evidence for the requirement of an in-field assessment of the study area.

## 3.2 Marine Archaeological Assessment of Downstream Section

Snorkel survey examined the perimeter of the scour hole at the base of the sluice gates, where the area had been eroded to base bedrock. The remainder of the snorkel survey covered off the study area but only found the occasional broken beer bottle glass. There was no evidence of any Indigenous or Euro-Canadian cultural remains in this area. The deepest section of the downstream was the approximately 2m scour hole. The remaining areas ranged in depth from 0 to about .6m in depth.

Image 6 - 12 illustrate the conditions and snorkel survey of the downstream section of the study area.

**Image 6: Downstream from top of dam structure facing east.**

**Image 7: Northeast corner of downstream area – shows water clarity.**

**Image 8: Facing south from north bank – loose branches and sticks, bedrock evident.**

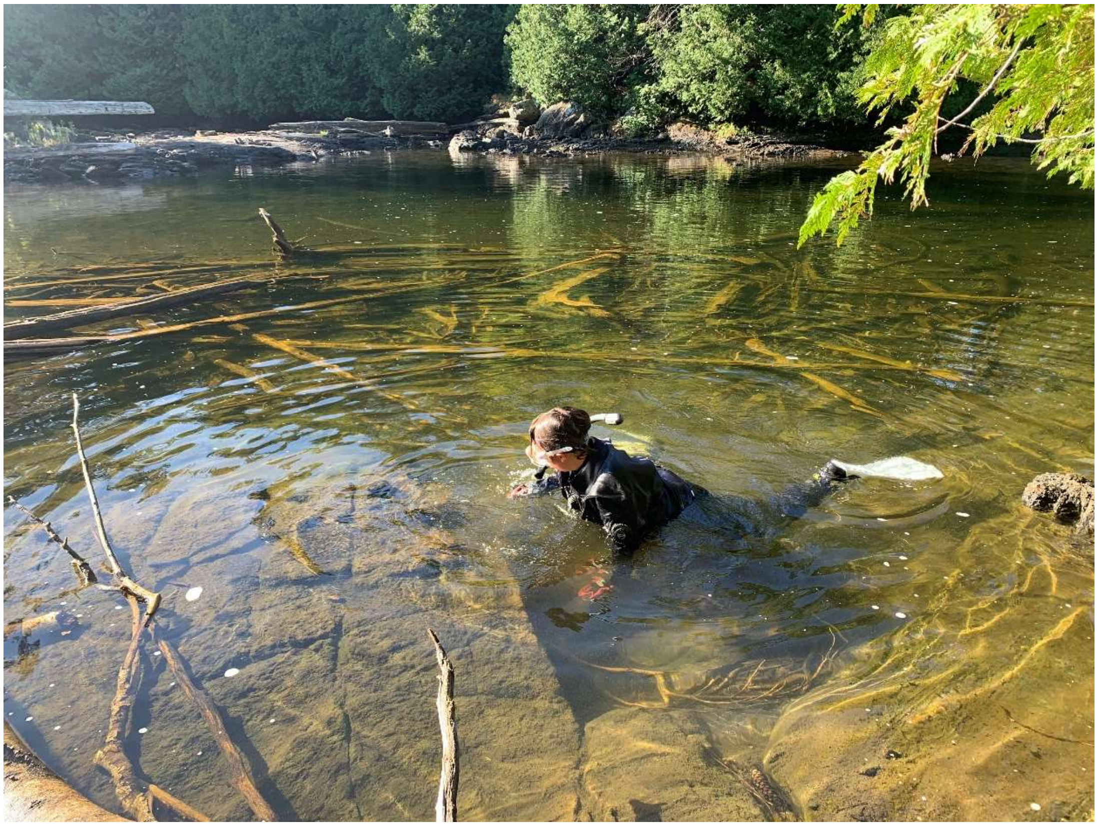

**Image 9: Snorkel Survey of downstream section**

**Image 10: Snorkel Survey about towards southern shore downstream section**

**Image 11: Water Clarity downstream section and appearance of bedrock**

**Image 12: Snorkel Survey near south wingwall and plunge pool**

## 3.3 Marine Archaeological Assessment of Upstream Section

Snorkel survey examined both banks on either side of the dam, along the base of the overflow dam, and the remainder of the survey area was assessed in 3 – 4 metre intervals. The face of the dam was avoided as there was still leakage which posed a potential health and safety risk, and given that it had been subject to extreme disturbance during the construction phase of the dam, had little to no archaeological potential.

On either side of the dam at the edges, there was evidence of the former wooden log boom. On the west side, there were three logs, some with chains intact. On the east side, outside the study area, one log boom rested on the bottom but above water. There were holes where the chains would have been affixed and grooves.

The Mississippi Valley Conservation Authority reported that this wooden log boom had been replaced by the current safety boom in 2006. It is unlikely that the boom is more than 20 – 40 year of age. The former log boom lies outside the study area and based on its age is not considered significant.

Aside from noting floating and sunken unmodified logs, there was no evidence of any material culture.

Images 13 – 15 illustrate the upstream conditions and Images 16 and 17 illustrate an above surface portion of the former log boom. Image 18 illustrates the log boom in 2005 when still actively used.

**Image 13: Snorkel Survey of shoreline – upstream**

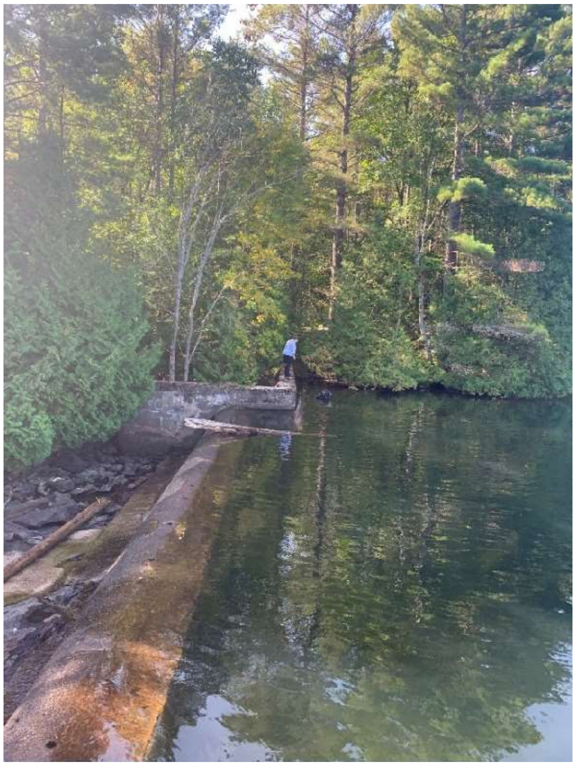

**Image 14: Snorkel Survey along west face of south wingwall and overflow dam**

**Image 15: Snorkel survey of upstream section**

**Image 16: North end of boom log facing south.**

**Image 17: South end of log, notched – former piece of log boom.**

\

**Image 18: 2005 Log Boom (courtesy of Mississippi Valley Conservation Authority)**

### 3.4 Inventory of Documentary Records Made In Field

Documents made in the field include:

- Daily record log and field notes – 5 page;
- Image log – 1 page;
- Digital images – 19 colour images and video

# 4.0 ANALYSIS AND CONCLUSIONS

The original dam was constructed in 1910, and the area “stripped” of any obstacles to assist in the construction of the dam. A cofferdam was built to accommodate the construction, however, there was no evidence of the cofferdam found along the shoreline or in the water as the cofferdam had to be removed. There are no recognizable stone piles that might suggest former cribs, and these might have been destroyed by spring freshets through the area over time. The dam structure itself is well documented with drawings in both 1986 and 1998. There have been numerous patch repairs evident on the structure. The current safety boom on the upstream side was put in place in 2006 replacing the former wooden log boom. The latter probably had a life span of between 20 – 40 years. Evidence of the former log boom were found on both north and south shorelines, on the upstream part of the dam, although just outside the 20 metre study area. It is unlikely they will be disturbed through any dam reconstruction.

Snorkel survey of both the upstream and downstream sections was conducted without observing any cultural remains of significance. There is evidence of use of this area through broken bottle glass on the bottom (downstream side). While there are two rapids located east and northeast of the dam, they are outside the study area. Survey closest to these areas did not locate any cultural material.

Despite excellent survey conditions, including surface to bottom water clarity, there were no cultural remains noted in the survey area.

# 5.0 RECOMMENDATIONS

Based upon the background research of past and present conditions, the following is recommended:

1. That the study area be considered free of archaeological concerns;
2. Compliance legislation must be adhered to in the event of discovery of deeply buried cultural material or features; and
3. The Algonquins of Pikwakanagan First Nation (AOPFN) should be contacted if any artifacts of Indigenous interest or human remains are encountered during the development of the subject property. A procedure should be developed between MVCA and AOPFN in the event that there is a disagreement on significance or potential importance of sites.

# 6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

According to the 2011 *S&Gs* (Section 7.5.9) the following must be stated within this report:

This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the Ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of *the Ontario Heritage Act*.

The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

# 7.0 BIBLIOGRAPHY AND SOURCES

Mississippi Valley Conservation Authority
2023 Kashwakamak Lake Dam, Class Environmental Assessment Notice of Intent. Provided by Mississippi Valley Conservation Authority.

Government of Ontario
1990a *The Ontario Heritage Act R.S.O. 1990.* Ontario Regulation 9/06, made under the Ontario Heritage Act. Criteria for Determining Cultural Heritage Value or Interest. Queen's Printer, Toronto.

1990b *The Environmental Assessment Act. R.S.O. 1990, C. E18***.**

## On-line and Archival Sources

Canadian Heritage Rivers https://chrs.ca/en/rivers).

Mississippi Valley Conservation Authority
2019 DRAFT: Backgrounder One: The Physical Environment, Mississippi River Watershed Plan, Backgrounder Series
https://mvc.on.ca/wp-content/uploads/2023/04/23APR18-Backgrounder-One-Full-Document.pdf

2019 DRAFT: Backgrounder Two: People and Property, Mississippi River Watershed Plan, Backgrounder Series
https://mvc.on.ca/wp-content/uploads/2023/04/23APR18-Backgrounder-One-Full-Document.pdf

2023 Kashwakamak Lake Class EA. Online: https://mvc.on.ca/current-initiatives/kash-class-ea/

Ontario Heritage Trust Plaque Guide https://www.heritagetrust.on.ca/plaques/rivers-and-streams-act-of-1884

# Appendix L – Cultural Heritage Assessment Report

# CULTURAL HERITAGE EVALUATION REPORT

## Kashwakamak Lake Dam, Mississippi River, Township of North Frontenac

MP Project No.: CCO-23-3603

Prepared for:

Mississippi Valley Conservation Authority

Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON, K7C 3P1

Prepared by:

MCINTOSH PERRY

McIntosh Perry Consulting Engineers Ltd.
1-1329 Gardiners Road
Kingston, ON, K7P 0L8

November 16, 2023

# EXECUTIVE SUMMARY

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Cultural Heritage Evaluation Report (CHER) for the property at Kashwakamak Lake Dam on the main channel of the Mississippi River. The CHER has been prepared in support of the Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam Rehabilitation/Replacement Project (the project). The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decommission, rehabilitate or replace the existing dam within the next five years.

This CHER has been carried out in order to determine if it retains cultural heritage value or interest (CHVI) under the *Ontario Heritage Act*. This cultural heritage evaluation was undertaken in accordance with the recommended methodology outlined within the Ontario Heritage Toolkit. This process included background research into the property, a site visit to document current conditions, and evaluation of the cultural heritage value or interest of the property based on the criteria outlined in Ontario Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest under the Ontario Heritage Act (O.Reg.9/06). The property at Kashwakamak Lake Dam consists of a simple concrete sluice dam with two sluiceways with ten stoplogs each, with a total of twenty stoplogs, and an earthen embankment, built in 1910. The main structure consists of two bulkhead walls, three concrete piers forming the two sluiceways, and a broad crested concrete weir. Based on the results of research, site investigation, and application of the criteria in O. Reg. 9/06, it was determined that Kashwakamak Lake Dam does not possess CHVI. Accordingly, no further cultural heritage reporting is required.

The completion of this study has resulted in the following recommendations:

1. The property at Kashwakamak Lake Dam was determined not to possess CHVI. No further cultural heritage reporting is recommended.
2. Once finalized, a copy of this CHER should be distributed to the Ministry of Citizenship and Multiculturalism (MCM) for their records.

## PROJECT PERSONNEL

Prepared By:

Lauren Walker

______________________________
Lauren Walker, HBA, CAHP
Cultural Heritage Lead
McIntosh Perry Consulting Engineers Ltd.

Reviewed By:

L. Marshall

______________________________
Lisa Marshall, P.Eng.
Manager, Environmental Engineering
McIntosh Perry Consulting Engineers Ltd.

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# 1.0 INTRODUCTION

The Mississippi Valley Conservation Authority (MVCA) has retained McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to complete a Cultural Heritage Evaluation Report (CHER) for the property at Kashwakamak Lake Dam on the main channel of the Mississippi River. The CHER has been prepared in support of the Class Environmental Assessment (Class EA) for the Kashwakamak Lake Dam Rehabilitation/Replacement Project (the project). The Kashwakamak Lake Dam was built more than 100 years ago and is reaching the end of its useful lifespan. The deteriorating condition of the dam necessitates that a decision be made on whether to decommission, rehabilitate or replace the existing dam within the next five years.

This CHER has been carried out in order to determine if it retains cultural heritage value or interest (CHVI) under the *Ontario Heritage Act*. The CHER will consist of:

1. A general description of the history of a study area as well as a detailed historical summary of structure construction, ownership and development;
2. A description of the cultural heritage landscape and built heritage resources;
3. Representative photographs of the structure, and character-defining details;
4. A cultural heritage resource evaluation guided by the Ontario Heritage Act criteria;
5. A Statement of Cultural Heritage Value or Interest and a of summary of heritage attributes;
6. Historical mapping and photographs; and
7. A location plan.

This CHER has been carried out in accordance with current best practices and requirements set out in the following legislation and guidelines: the Ontario Heritage Act (R.S.O. 1990); the Provincial Policy Statement (2014); Parks Canada Standards and Guidelines for Conservation of Historic Places in Canada (2010); the Ontario Heritage Toolkit (2006) as well as the Township of North Frontenac Official Plan and other relevant heritage policy. This cultural heritage evaluation was undertaken in accordance with the recommended methodology outlined within the Ontario Heritage Toolkit. This process included background research into the property, a site visit to document current conditions, and evaluation of the cultural heritage value or interest of the property based on the criteria outlined in Ontario Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest under the Ontario Heritage Act (O.Reg.9/06).

# 2.0 DESCRIPTION OF PROPERTY

## 2.1 Description of Existing Conditions

The following descriptions of the subject property are based on a field survey conducted on June 6, 2023, by Lindsay Bennett and Alex Ploughman of McIntosh Perry. The field survey was undertaken to record any features that could enhance the understanding of the setting in the landscape and contribute to the cultural heritage evaluation process. The site visit was conducted on the entire property including landscape features. A key map of the study area is provided in **Figure 1** and a detailed map of the property boundaries and site layout is provided in **Figure 2**.

## 2.2 Description of Surrounding Landscape

Located on the main channel of the Mississippi River in the Township of North Frontenac, Kashwakamak Lake is dominated by numerous inlets and shallow bays (Terraprobe, 1998). The Mississippi River system is composed of a complex network of rivers, streams, rapids and over 250 lakes located in Eastern Ontario. The Mississippi River has a drainage area of 3,740 sq. km from its headwaters in Kilpecker Creek, in the Township of Addington Highlands, to its outlet at the Ottawa River in the City of Ottawa. The Mississippi River enters the west end of the lake from the outlet of Georgia Lake at Whitefish Rapids and exits at the Kashwakamak Lake Dam at the east end of the lake. The river then flows downstream through Farm and Mud Lake to Crotch Lake.

The landscape is predominantly a forested, naturalized landscape (Figures 3, 4 and 6). Recreational development along the shoreline of Kashwakamak Lake includes approximately 577 cottage residences and several marinas and resorts. Other than property on islands, there are no boat-access only dwellings on this lake. Kashwakamak Lake is one of six major lakes in the watershed. These six lakes act as spring storage reservoirs to alleviate flooding. The Kashwakamak Lake Dam is part of a system of dams that work to provide flood control for the lake and downstream areas (MVCA, 2023). The Kashwakamak Lake Dam is necessary for maintaining water levels in the lake for local recreation and tourism, as well as in assisting the spawning of fish species such as walleye and bass (MVCA, 2023).

## 2.3 Description of Property

The Kashwakamak Lake Dam is located at the outlet of Kashwakamak Lake on the Mississippi River. The structure is situated approximately 8 km east of Fernleigh on Lot 21, Concession IX, Clarendon Ward, North Frontenac Township.

Kashwakamak Lake Dam consists of two structures, the main control dam and a secondary side block dam (Figures 6 to 14). These two structures are separated by an earthen island at a distance of about 30 m (Terraprobe, 1998). The main structure consists of two bulkhead walls, three concrete piers forming the two sluiceways, and a broad crested concrete weir. The north bulkhead wall extends 5.5 m from the north bank to the north pier. The crest elevation of this wall is 261.63 m.

The three piers form the two sluiceways and support the wooden deck, metal railing and winch assembly. The elevation of the top of the piers is 262.00 m. The deck is supported by 0.20 m x 0.20 m wooden beams and has a top elevation of 262.26 m (Hatch, 2022). A solid metal railing encloses the deck. The winch assembly consists of a wheel mounted crank and a metal beam extending across the length of the deck.

The north sluiceway has a clear opening width of 2.98 m and contains ten (10) 0.30 m x 0.30 m x 3.43 m stoplogs. The south sluice has a clear opening width of 2.96 m with the same number and size of stoplogs. The sill elevation for both sluiceways is 258.22 m. The broad crested weir extends 16.84 m from the south pier to the south bulkhead wall. The crest elevation is 261.06 m. The south bulkhead wall is 'L' shaped and is 5.5 m x 12.5 m long. The top of the wall is 261.65 m.

The secondary concrete side block dam is located north of the main structure and controls an emergency spillway section. This structure is approximately 25 m long and has a maximum height of 0.80 m. A wooden plank walkway has been installed below the structure. The elevation of the top of this weir is 261.67 m.

# 3.0 RESEARCH

Historical and contextual research has been undertaken to inform the O. Reg 9/06 and O. Reg 10/06 evaluation.

## 3.1 Local Context and Area History

### *3.1.1 Natural Context*

The subject property is located along the Mississippi River in the Township of North Frontenac, within the Georgian Bay Fringe physiographic region, a forested region of stony, sandy, commonly shallow soil over knobs and ridges of Precambrian rock (Chapman and Putnam, 1984). There is a sparse population which is augmented every summer by an influx of cottagers and tourists who take advantage of the area lakes and streams. A few farming settlements occur in areas of deeper soil, the best in pockets of clay land. Although there are several small mines, mining is not a major item in the economy. Lying between Georgian Bay on the west and the Ottawa Valley on the east, it is a broadly dome-shaped region of 17,000 square miles (44,200 sq. km). The landforms of this area commonly consist of bedrock or have cores of bedrock because generally the drift is shallow. However, the emphasis in this report is on the unconsolidated overburden left by glaciers during the Pleistocene Epoch, particularly by the last (Wisconsinan) ice sheet.

The property is also located within the Bancroft Ecodistrict (5E-11) of the Georgian Bay Ecoregion (Wester et al. 2018). The Bancroft Ecodistrict extends from the community of Madoc north to Lake Clear. The eastern boundary is located near Big Rideau Lake, and in the west, the boundary is near the community of Minden. The undulating to rolling topography ranges in elevation from 121 m above sea level east of Big Rideau Lake to 526 m above sea level west of the community of Bancroft. The Bancroft Ecodistrict is characterized by an undulating to rolling landscape covered by a variable layer of acidic, morainal material. It is part of the Eastern Temperate Mixed Forest Vegetation Zone and the Middle Ottawa and Georgian Baysections of the Great Lakes-St. Lawrence Forest Region. Mixed forests cover more than one third of the Ecodistrict and are dominated by sugar maple, yellow birch, red maple, and eastern hemlock. The provision of services for resource-based tourism, timber harvesting, mining, mineral exploration, aggregate extraction, and agriculture are the primary activities in the Bancroft Ecodistrict.

### *3.1.2 Indigenous Context*

The area now known as Township of North Frontenac is within the traditional territory of the Mississauga Nation and Chippewas Nation, part of the Anishinaabe people (Michi Saagiig), as well as the Huron-Wendat and Metis peoples. The Indigenous people of Township of North Frontenac, Ontario have lived in the area for thousands of years before the arrival of European settlers (MVCA, 2004, Terraprobe, 1998). The Anishinaabe people have a rich history, culture and spiritual beliefs that are deeply connected to the land. They are traditionally semi-nomadic, engaged in hunting, fishing, and gathering and a complex system of governance.

During the early 19th century, with the arrival of European settlers in the area, the relationship between the Indigenous communities and the newcomers was complex, with conflicts arising from land disputes, the destruction of natural resources, and the impact of European diseases on the Indigenous population. Many Indigenous people were displaced from their traditional territories and forced to move to reservations or to assimilate into colonial culture. Despite this, the Indigenous people of Township of North Frontenac have continued to maintain their cultural traditions and have been active in working to reclaim their rights and their land.

The Indigenous people of Township of North Frontenac are actively living their culture and preserving their heritage within the landscape. This includes the cultivation of wild rice or manòmin is an integral part of shallow lake and river ecosystems. This tall aquatic grass provides food for waterfowl and habitat for snails and water insects, which are also eaten by waterfowl. Wild rice beds also provide habitat for furbearers and other wildlife. According to the Ardoch Algonquin First Nation, manòmin is a plant with spiritual significance that stretches back to the Creation of Anishinbaabe people and the Great Migration (MVCA, 2004).

Today, the Alderville First Nation, Algonquins of Ontario, Algonquins of Pikwàkanagàn First Nation, Ardoch Algonquin First Nation, Beausoleil First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat Nation, Kawartha Nishnawbe, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation, and Mohawks of the Bay of Quinte all maintain ongoing connections and interest in the area. These Indigenous communities were contacted as a part of the Class EA process. None expressed concerns regarding the built heritage of the site. Hiawatha First Nation expressed an interested in the archaeological investigations underway, and Alderville Fist Nation indicated concern for the potential for remains of their ancestors and archaeological sites within the project area and also expressed interest in participating in the archaeological assessment. Indigenous organizations in the area that work to promote the rights and interests of the Indigenous people, and many Indigenous people are involved in various community initiatives, including the revitalization of traditional languages and customs. It is important to note that the historical account of Indigenous people in Township of North Frontenac is not complete as it is based on limited information, and it is important to consult with Indigenous communities for a more accurate and nuanced understanding of their history and current situation.

### 3.1.3 Settler Context

#### 3.1.3.1 County of Frontenac

In 1846, the County of Frontenac included the Townships of Bedford, Barrie, Clarendon, Hinchinbrooke, Kennebee, Loughborough, Olden, Oso, Portland, and Pittsburgh. Among the largest Townships was Kingston, which served as Canada’s capital from 1841 to 1844 (LHC Inc, 2019). By 1850, farmers had settled in the area and the construction of the Addington Colonization Road further increased access into the interior. By the turn of the century, the lumber industry was in decline and the access to the resources in the interior was no longer needed. The Counties of Frontenac, Lennox and Addington shifted their focus towards tourism and a destination for wealthy nature enthusiasts. In 1899, Weston Price purchased large portions of the area that would become Bon Echo Provincial Park. Price built the Bon Echo Inn, which attracted wealthy tourists who enjoyed the nature and used the area as a getaway from the cities. In 1920 the inn was sold to Flora MacDonald Denison, a Canadian activist, suffragists, and prominent Canadian businesswoman. In 1958, Bon Echo was donated by the Denison family to the Provincial Government to open as a park for everyone to enjoy. In 1982, a portion of Bon Echo Provincial Park was designated as a National Historic Site of Canada.

### 3.1.4 Structural History

The first dam at this location was constructed during the 1860's as part of the logging system of dams along the Mississippi River (Terraprobe, 1998, Hatch 2022). The Mississippi River Improvement Company Limited (MRIC) was formed in 1909. Its purpose was to hold title to the dams at Crotch, Big Gull and Kashwakamak lakes and operate them to maintain storage capacity. The MRIC purchased the rights, title and interest of the dam from James and Alexander Brown in 1909. Within the next ten years, the MRIC had assumed the maintenance and operation of the Mazinaw Lake dam and the abandoned dams at Shabomeka and Mississagagon lakes.

Under an act entitled "An Act respecting the levying and collecting tolls on the Mississippi River" Ontario Hydro became involved in the affairs of MRIC and approved the reconstruction plans of the Kashwakamak Lake Dam in 1910. The dam had undergone only relatively minor repairs to the concrete surfaces since 1910 until 1988, when extensive work was done to the concrete surfaces of the weir (Hatch, 2022). The Mississippi Valley Conservation Authority was formed in 1968 and assumed responsibility for the non-power dams formerly managed by MRIC. The ownership and operation of the structure was transferred by MRIC to the Mississippi Valley Conservation Authority (MVCA) in January 1991.

In 1992, MVCA installed a pressure transducer near the middle of the length of the lake to provide hourly readings of water levels and water temperatures. This system is automated through the telephone lines and powered by a solar panel mounted on the roof of the gauge house. A second staff gauge, located on the upper lake and a manual precipitation gauge were also installed at a private cottage in 1993.

In the fall of 1995, MVCA undertook a repair program to reduce or eliminate the seepage around the earth embankment at the entrance to the dam. Pressure grouting was undertaken to try to plug the fissures in the rock.

In the fall of 2000, MVCA undertook a second grouting program and repairs to cracked and spalled concrete on the weir and the abutments. In 2002, the wooden deck of the dam was replaced and in 2005 an overhead steel gantry system was installed for stop log manipulation. No rehabilitation work has been completed on the dam since this time.

In 2022 a Dam Safety Review concluded that the concrete structures of the Kashwakamak Lake Dam were in a deteriorating condition and that major refurbishment or replacement should be performed within the next 5 years to ensure the continued safe operation of the dam. MVCA initiated planning for this in recognition of the necessary lead-time for design, permitting and funding processes.

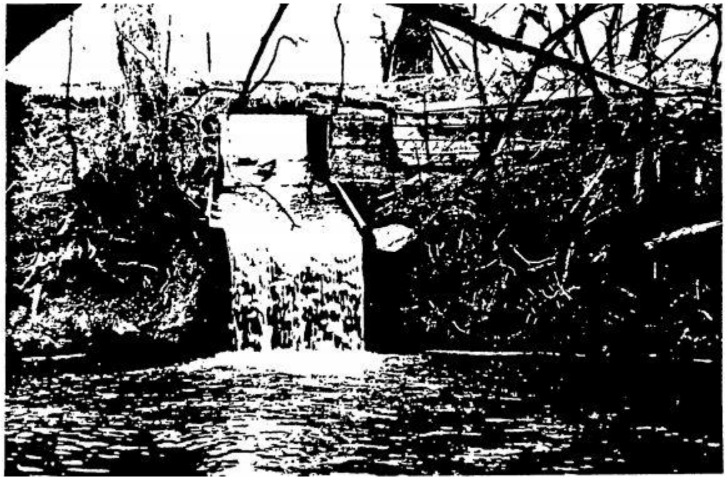
### *3.1.5 Comparative Analysis*

A comparative analysis has been undertaken to inform the O. Reg 9/06 evaluation, specifically, to determine whether the property is a *"rare, unique, representative or an early example of a style and/or type",* and to inform statements about the integrity of the property. This comparative analysis identifies structures of similar style and type.

Canadian waterways have been a source of power for over a century. Communities grew from the construction of mills and dams along the Don River, Rouge River, Ottawa River, and many others. Dams were constructed for controlling waterways, tailings management, irrigation, flood control, and are essential in producing the energy needed to power the 21st century homes (LHC Inc., 2019). Although small dams were used early in the development of Euro-Canadian towns, large dams became a significant part of Canada's modernization. Today, Canada has over 14,000 dams and 1,100 of those are considered large. The following table provides an overview of a number of comparative examples of dams which have been identified as having cultural heritage value or interest from across Ontario and Canada.

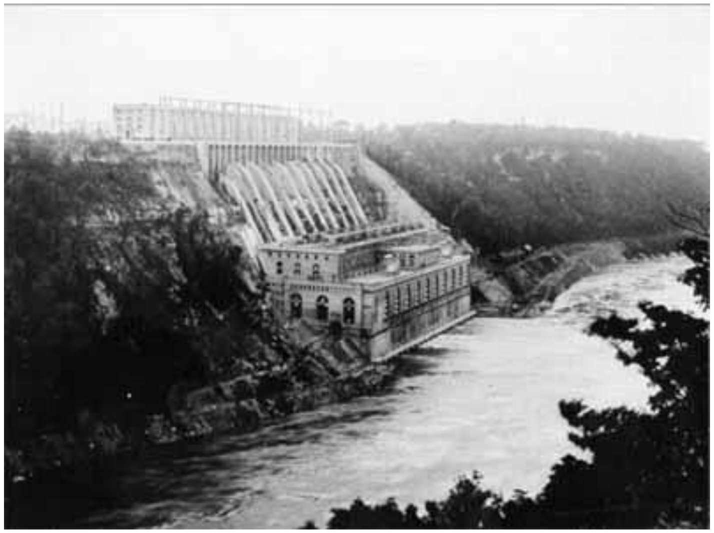
Four representative (4) dams were selected, and are described below in Table 1 below.

**Table 1: Comparative Analysis**

| Name and Location | Heritage Status | Year Built | Description | Picture |
|---|---|---|---|---|
| **Carrville Mill Dam – City of Vaughan**<br>**1040 Rutherford Road, Carrville** | Designated under Part IV, Section 29 of the OHA. By-Law 291-87 | Constructed c.1816<br>Repaired in 1907 and 1916 | The mill complex was designated for its architectural value and historical associations within the community.<br>The community of Carrville began as a mill village and was dependant on the access to water. The mill was operated by Michael Fisher.<br>The dam provided water control and regulation for the economic development of the community.<br>Today the dam is no longer operational but is a reminder of the importance that dams played in the development of Carrville. |  |

| Name and Location | Heritage Status | Year Built | Description | Picture |
|---|---|---|---|---|
| **Alton Mill (Beaver Knitting Mill) – Town of Caledon** | Designated under Part IV Section 29 of the OHA. ByLaw 2004-201 | Constructed in 1881 | The mill complex was designated for its architectural value and historical associations within the community. The plain, but rectangular buildings, the ancillary square stone water tower, brick chimney, mill pond and associated dam. Located in the core of the Alton, acts to form significant vistas from Queen Street and its surrounding residential buildings from the 19th century. The dam historically contributed to the economic development of the town. It is one of two remaining industrial stone complexes in Alton. The mill produced fleece lined long underwear, which was known nation wide. |  |

| Name and Location | Heritage Status | Year Built | Description | Picture |
|---|---|---|---|---|
| **Toronto Power Generating Station – Niagara Falls, Ontario** | Designated a National Historic Site under the Historic Sites and Monuments Act in 1983. | Constructed in 1906<br>Purchased by Ontario Hydro in 1922<br>Operated until 1974 | The building was Canada's first wholly owned hydro-electric dam. An unusual use of Beaux-Arts style for the construction of an industry building. Attributed to architect E.J. Lennox, a prominent Toronto based architect who also designed Old City Hall and Casa Loma. The construction of the hydroelectric plant allowed for Toronto to attract new businesses, industries, and technologies into Ontario. This significantly grew Toronto as a world class city and provided the residents with the electricity to power a growing industrialized urban centre. It ceased operations in 1974. |  |

| Name and Location | Heritage Status | Year Built | Description | Picture |
|---|---|---|---|---|
| **Queenston Chippawa Hydro Electric Development – Queenston, Ontario** | Designated a National Historic Site under the Historic Sites and Monuments Act in 1990 | Began construction in 1917 and finished in 1922 | The construction saw many firsts as the massive project required revolutionary engineering methods and designs not seen in the previous era. The large steel framework, reinforced concrete floors, the interior of the power-station with a fully equipped hospital, kitchen, dining room, and offices. The viewscape provided from across the Niagara River to the east and the Falls at Niagara. The dam located along the Niagara River play a major role in diverting water into the stations to produce 2,080 MW. |  |

# 4.0 MAPS, DRAWINGS, PLANS AND IMAGES

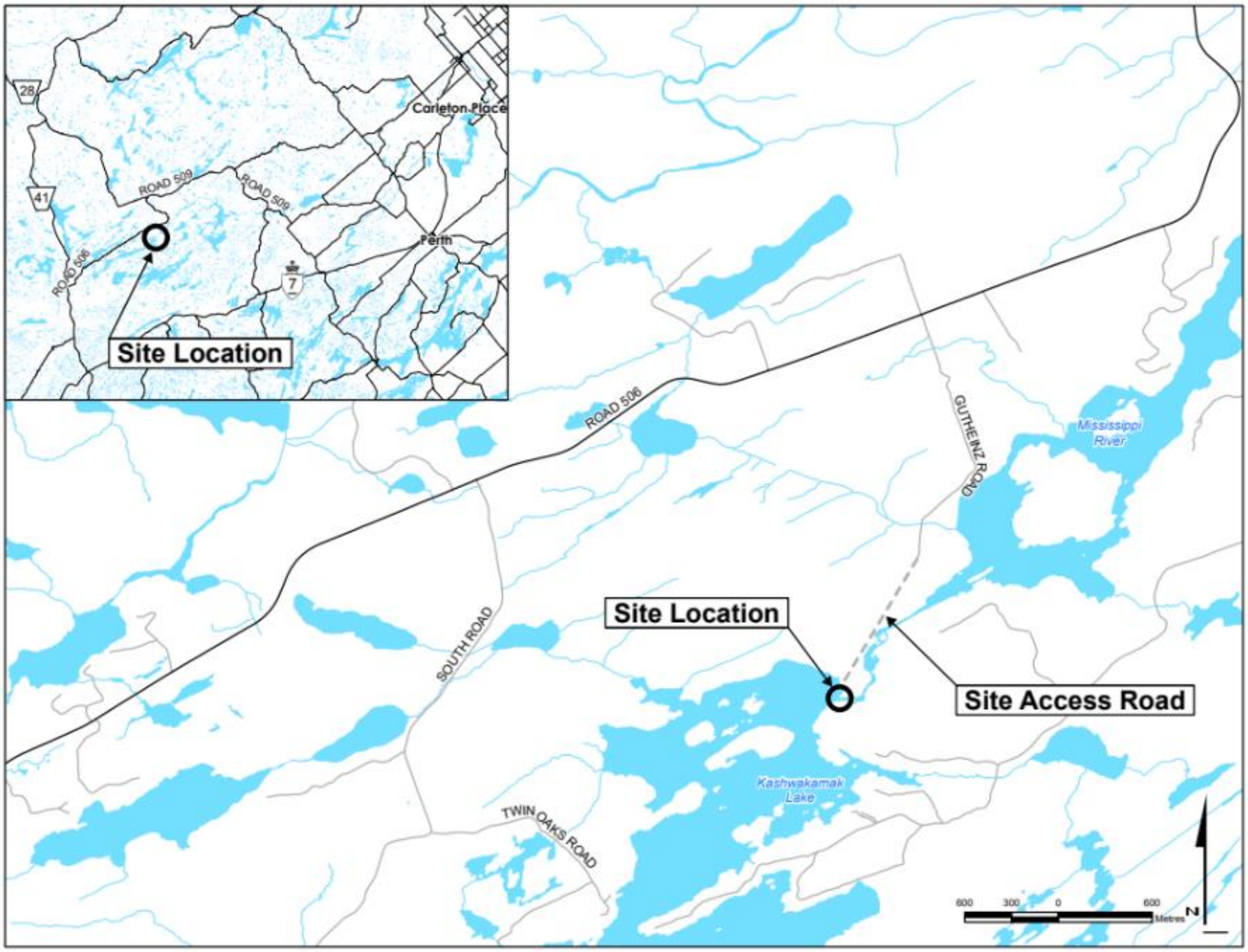


*Figure 1: Study Area Map – Kashwakamak Lake Dam, Township of North Frontenac*

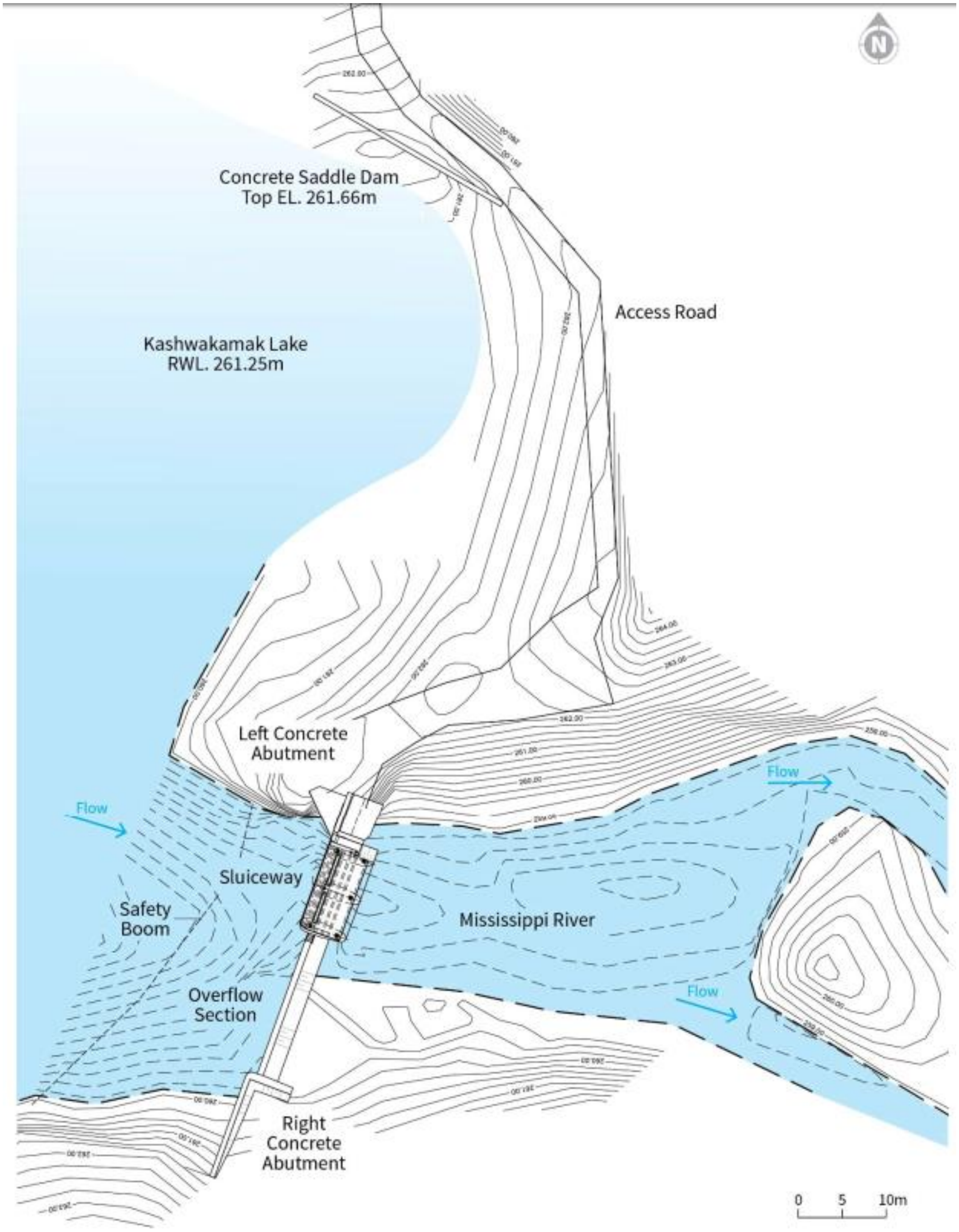


*Figure 2: Detailed Site Layout – Kashwakamak Lake Dam, Township of North Frontenac (Hatch, 2022)*

Figure 3: Study area landscape overview, approach access to dam site.

Figure 4: Study area landscape overview, Mississippi River.

*Figure 5: Kashwakamak Lake Dam, looking northwest.*

*Figure 6: Mississippi River, looking west from Kashwakamak Lake Dam site.*

*Figure 7: Kashwakamak Lake Dam, looking west.*

*Figure 8: Kashwakamak Lake Dam, sluiceway and overflow looking west.*

*Figure 9: Kashwakamak Lake Dam, overflow spillway.*

Figure 10: Kashwakamak Lake Dam, sluiceway and deck, looking north.

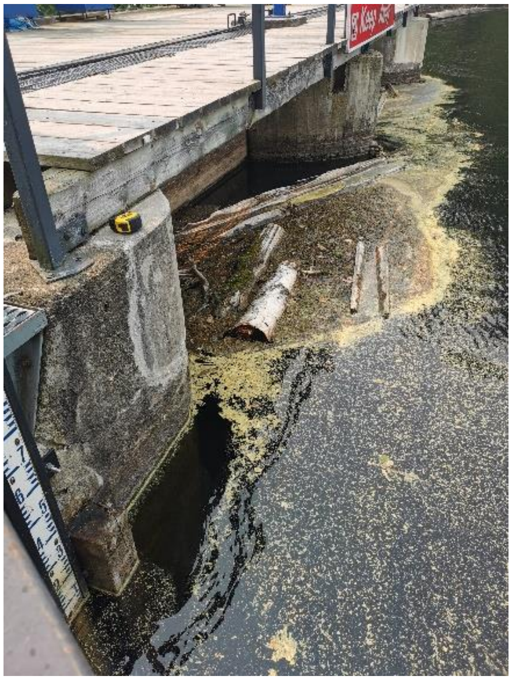
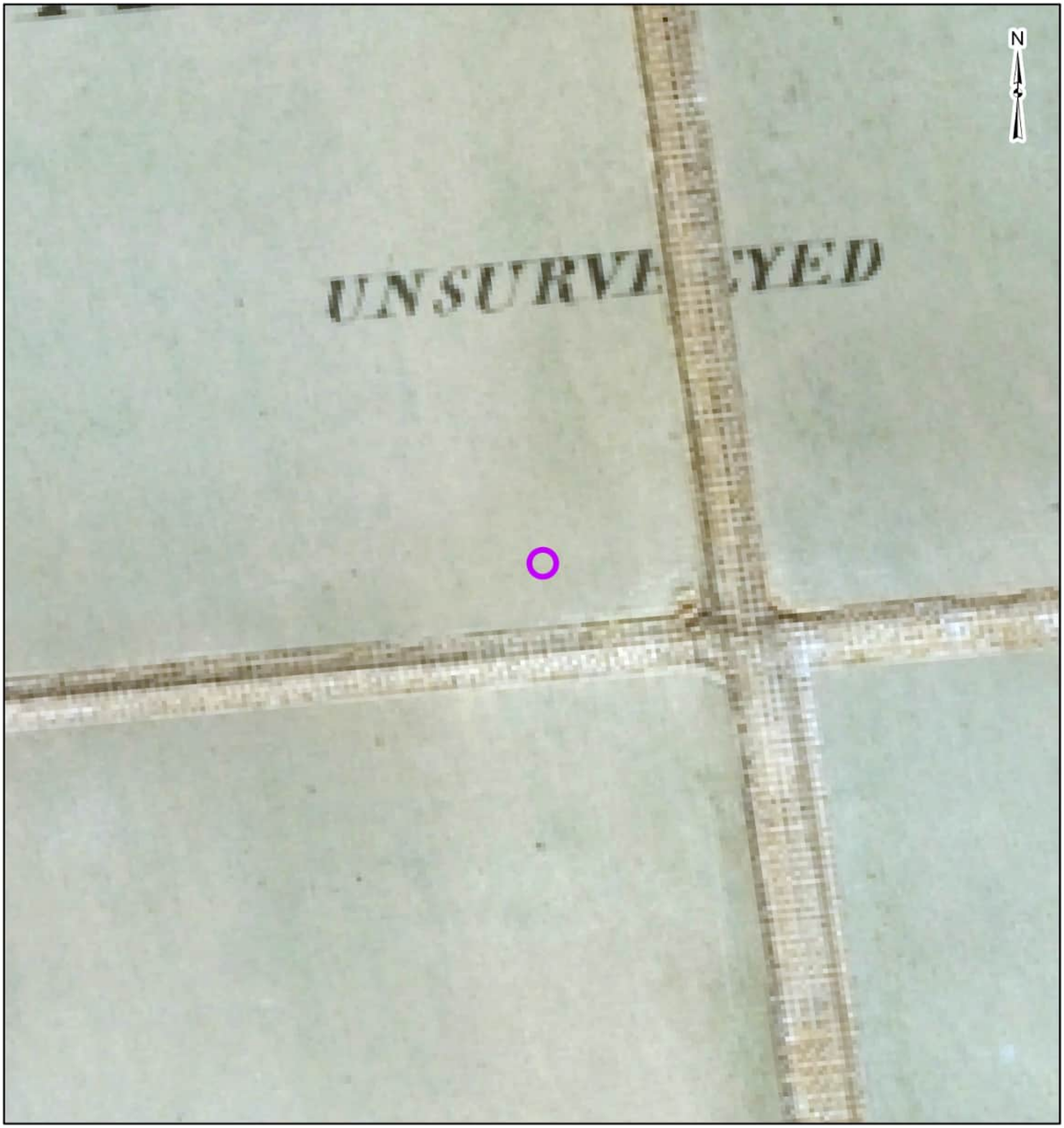


*Figure 11: Kashwakamak Lake Dam, sluiceway and deck, detail.*

Figure 12: Kashwakamak Lake Dam, spillway detail.

*Figure 13: Kashwakamak Lake Dam, left concrete abutment and earthen enbankment.*

*Figure 14: Kashwakamak Lake Dam, concrete detail.*



600 300 0 600

Scale 1:25,000 Metres

LEGEND

○ Kashwakamak Lake Dam

CLIENT: MISSISSIPPI VALLEY CONSERVATION AUTHORITY (MVCA)

PROJECT: CULTURAL HERITAGE EVALUATION REPORT

TITLE: 1860 HISTORICAL ATLAS MAP - KASHWAKAMAK LAKE DAM

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

| | |
|---|---|
| PROJECT NO:CCO-23-3603 | |
| Date | Jul., 21, 2023 |
| GIS | AH |
| Checked By | LW |

FIGURE:

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.

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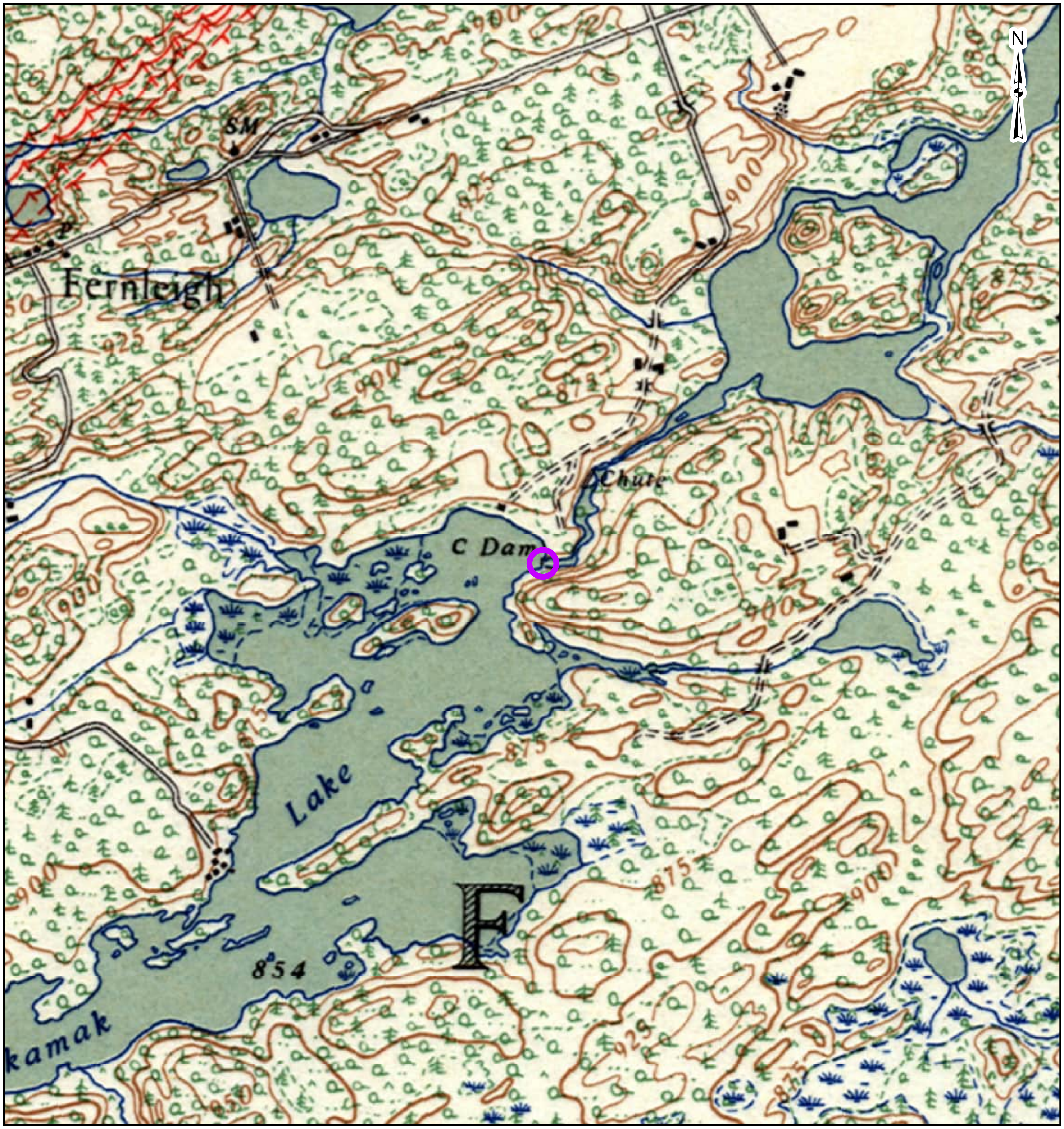

LEGEND

○ Kashwakamak Lake Dam

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.

| | |
|---|---|
| CLIENT: | MISSISSIPPI VALLEY CONSERVATION AUTHORITY (MVCA) |
| PROJECT: | CULTURAL HERITAGE EVALUATION REPORT |
| TITLE: | 1941 TOPOGRAPHIC MAP - KASHWAKAMAK LAKE DAM |

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

| | | |
|---|---|---|
| PROJECT NO:CCO-23-3603 | | FIGURE: |
| Date | Jul., 21, 2023 | 16 |
| GIS | AH | |
| Checked By | LW | |

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# 5.0 COMMUNITY ENGAGEMENT

Local area stakeholders were consulted as a part of this project for information regarding potential cultural heritage resources. Details regarding the scope and timing of this consultation have been provided in **Table 2.**

Table 2: Consultation Record

| Contact | Date sent | Date of response | Response received |
|---|---|---|---|
| **Karla Barboza**<br>Team Lead, Heritage<br>Ministry of Citizenship and Multiculturalism | May 25th, 2023 | June 14th, 2023 | Confirmed the requirement for a CHER. No previous cultural heritage reporting is on file for this structure.<br>MCM requests any technical cultural heritage studies (e.g. Cultural Heritage Assessment Report, Cultural Heritage Evaluation Report, Heritage Impact Assessment) be sent as part of the environmental assessment process. |
| **Sue MacGregor**<br>President<br>Kashwakamak Lake Association<br>president@kashwakamak.ca | May 25th, 2023 | June 23rd, 2023 | Expressed no cultural heritage concerns. |
| **Tara Mieske**<br>Clerk/Planning Manager<br>Township of North Frontenac<br>clerkplanning@northfrontenac.ca | May 25th, 2023 | n/a | No response received to date. |
| **Sonya Bolton**<br>Manager<br>Community Planning, Planning and Economic Development<br>County of Frontenac<br>sbolton@frontenaccounty.ca | May 25th, 2023 | n/a | No response received to date. |

# 6.0 EVALUATION

O. Reg. 9/06 of the OHA provides criteria for determining whether a property has CHVI. If a property meets one or more of the criteria, it is eligible for designation under the OHA. **Table 3** contains the evaluation of the subject structure within the framework set out in O. Reg. 9/06.

**Table 3: O. Reg. 9/06 Evaluation**

| OHA Criteria | Analysis |
|---|---|
| **1. The property has design value or physical value because it:** | |
| i. is a rare, unique, representative or early example of a style, type, expression, material or construction method; | The property at Kashwakamak Lake Dam consists of a simple concrete sluice dam with two sluiceways with ten stoplogs each, with a total of twenty stoplogs, and an earthen embankment, a common design for dams of this type and age. The main structure consists of two bulkhead walls, three concrete piers forming the two sluiceways, and a broad crested concrete weir. Significant concrete repairs, and subsequent rehabilitation and repair work between 1988-2002 has resulted in the removal of much of the original structure. Accordingly, the subject property does not meet this criterion, particularly as compared with other examples of dams which do meet O.Reg.9/06 criteria. |
| ii. displays a high degree of craftsmanship or artistic merit, or; | The Kashmakawak Lake Dam is devoid of artistic elements. Its degree of craftsmanship is consistent with what would be expected of a structure of its stature, location, and age of construction/repairs. Accordingly, the subject property does not meet this criterion. |
| iii. demonstrates a high degree of technical or scientific achievement | The property does not show any distinctive technical or scientific achievement, particularly as compared with other examples of dams which do meet O.Reg.9/06 criteria. Accordingly, the subject property does not meet this criterion. |

| **2. The property has historical value or associative value because it:** | |
|---|---|
| i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community; | The first dam at this location was constructed during the 1860's as part of the logging system of dams along the Mississippi River and it was reconstructed in 1910. In 1988 it was rehabilitated. No notable individuals, associations, institutions or themes are associated with the expression of the buildings or property. Therefore, the property does not meet this criterion. |
| ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or; | The results of research did not indicate that Kashwakamak Lake Dam yields any information that could contribute to the understanding of a community or culture. The extant structure does not have the potential to yield information that would contribute to the understanding of a particular community or culture. Accordingly, the subject property does not meet this criterion. |
| iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community. | The Kashmakawak Lake Dam was constructed by the Regional Office of Ontario Hydro for the Mississippi River Improvement Company. No specific architect, builder, designer, engineer, or theorist significant to the community has been directly attributed to the structure. Accordingly, the subject property does not meet this criterion. |
| **3. The property has contextual value because it:** | |
| i. is important in defining, maintaining or supporting the character of an area; | The dam is not a defining element of the character of the area. As such, the subject property is not considered to define, maintain or support the character of the surrounding area. |
| ii. is physically, functionally, visually or historically linked to its surroundings, or; | The dam is functionally linked to its surrounding by its operation; however, this would be true of any dam structure in this location and is not a function of this specific structure nor is it a reflection of any CHVI. Accordingly, the subject property does not meet this criterion. |

| | |
|---|---|
| iii. is a landmark. | The subject structure has not been identified as a landmark. Therefore, the property does not meet this criterion. |

# 7.0 CONCLUSIONS

Based on the results of research, site investigation, and application of the criteria in O. Reg. 9/06 Kashwakamak Lake Dam **does not** retain cultural heritage value or interest (CHVI) under the Ontario Heritage Act. Accordingly, a Statement of Cultural Heritage Value or Interest and List of Heritage Attributes has not been prepared.

# 8.0 DRAFT STATEMENT OF SIGNIFICANCE

A Statement of Cultural Heritage Value or Interest and List of Heritage Attributes has not been prepared.

# 9.0 RECOMMENDATIONS

The property at Kashwakamak Lake Dam consists of a simple concrete sluice dam with ten stoplogs and an earthen embankment, built in 1910. The main structure consists of two bulkhead walls, three concrete piers forming the two sluiceways, and a broad crested concrete weir. Based on the results of research, site investigation, and application of the criteria in O. Reg. 9/06, it was determined that Kashwakamak Lake Dam does not possess CHVI. Accordingly, no further cultural heritage reporting is required.

The completion of this study has resulted in the following recommendations:

3. The property at Kashwakamak Lake Dam was determined not to possess CHVI. No further cultural heritage reporting is recommended.

4. Once finalized, a copy of this CHER should be distributed to the Ministry of Citizenship and Multiculturalism (MCM) for their records.

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Reference Guide on Physical and Cultural Heritage Resources (1996)

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# Appendix M – Geotechnical Investigation Report

# GEOTECHNICAL INVESTIGATION AND DESIGN REPORT KASHWAKAMAK LAKE DAM REPLACEMENT, TOWNSHIP OF NORTH FRONTENAC, ONTARIO

Project No.: CCO-23-3603

Prepared for:

Mississippi Valley Conservation Authority
10970 Highway 7
Carleton Place, ON K7C 3P1

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
104-215 Menten Place
Ottawa, ON K2H 9C1

Revision 2 – June 2024

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## APPENDICES

# GEOTECHNICAL INVESTIGATION and
# DESIGN RECOMMENDATION REPORT
# Kashwakamak Lake Dam Replacement
# Township of North Frontenac, Ontario.

## 1.0 INTRODUCTION

McIntosh Perry Consulting Engineers (McIntosh Perry) was retained by Mississippi Valley Conservation Authority (Client, MVCA) to complete a geotechnical investigation and design recommendation for the proposed replacement/rehabilitation of Kashwakamak Lake dam (Project) in the Township of North Frontenac. The dam is located on Kashwakamak Lake and forms part of the Mississippi River Watershed.

This geotechnical investigation and design recommendations are provided as part of the Class Environmental Assessment for the Kashwakamak Lake Dam at the request of the MVCA as outlined in the project RFP dated January 18, 2023. A proposal was submitted to the Client on March 03, 2023 and was accepted by the Client by means of signed Agreement dated march 20, 2023. A scope change “Scope Change #1” was requested on July 7, 2023 and was approved by the Client by means of signed back proposal on July 10, 2023.

The fieldwork was carried out between September 18 and 25 and comprised of four (4) boreholes advanced into the bedrock to a maximum depth of 9 meter below existing ground surface (mbgs) (El. 253.1 m) in BH23-4 which was drilled at the north (left) dam abutment. The other three boreholes were drilled downstream to a maximum drilling depth of 6.3 mbgs (El. 252.9 m) in BH23-5.

The purpose of the investigation was to explore the subsurface conditions at this site and to provide borehole location plans, record of borehole logs, and laboratory test results. This report provides anticipated geotechnical conditions influencing the design and construction of the proposed replacement and rehabilitation of the dam structure, as well as recommendations for foundation design.

This report is prepared for the sole use of the Client. The use of this report, or any reliance on it by any third party, is the responsibility of such a third party. This report is subject to the limitations shown in Appendix A. It is understood that the Project will be performed in accordance with all applicable codes and standards present within its jurisdiction.

## 2.0 PROJECT UNDERSTANDING

Kashwakamak Lake Dam is located approximately 8 km east of Femleigh on Lot 21, Concession IX, Clarendon Ward, North Frontenac Township. The dam is one of six major dams that acts as a flood and drought control structures along the Mississippi River, protecting people, property, infrastructure, and natural ecosystems both upstream and downstream of the dam. The dam was built in 1910 by the Mississippi River Improvement Company and its ownership and operation were transferred to MVCA in 1991. The dam also includes a small concrete saddle dam structure that is built to the north of the main dam structure. The saddle dam prevent and control the water from flowing through the natural channel behind the saddle dam into the marsh.

The dam underwent extensive maintenance in 1988 that was completed to the concrete surfaces of the weir. In 1995, MVCA undertook a repair program to reduce or eliminate the seepage around the earth embankment at the entrance to the dam. Terraprobe 1997 performed a limited geotechnical investigation and drilled five boreholes at the north (left) abutment to investigate water seepage through the rock. In 2000, MVCA undertook a grouting program and repairs to cracked and spalled concrete on the weir and the abutments. In 2002, the deck of the dam was replaced. In 2020, a proposed repair option of the Kashwakamak Lake Dam rehabilitation was prepared by Cleland Jardine Engineering Ltd. These repairs were not implemented. In 2020, MVCA conducted a Risk Assessment and in 2022 a Dam Safety Review (DSR) that concluded that structural issues at the dam needed to be addressed within 5 years based on MVCA website. The dam was inspected in 2022 by MVCA and seepage was observed through the embankment and was observed to come from through the rock.

The Dam Safety Review for the main dam and the saddle dam in 2022 completed by Hatch Ltd. included discussion on anticipated dam replacement/rehabilitation options. The report states that the existing dam concrete structures are deteriorating and in poor to fair condition. Major concrete repairs are required, specially at the overflow structure, showing signs of extensive spalled concrete surfaces at the upstream face and a severely deteriorated horizontal joint at the toe. The dam must undergo substantial rehabilitation or replacement within the next five years. The report concluded that both structures are founded on good to excellent quality bedrock foundation with adequate permeability, bearing capacity, strength, and rock quality. The report stated that no rock anchors or dowels are known to have been installed in the dam sections.

Based on the current condition of the Kashwakamak Lake Dam, it is understood to be in poor to fair condition and will require substantial rehabilitation or replacement within the next five years. A decision needs to be made on whether to rehabilitate (Option 1), or to decommission the existing and construct a new dam. It is also understood that replacement options may include replacing the dam with a similar structure at the same location (Option 2) or a new structure to the east of the existing dam (Option 3).

# 3.0 SITE CONDITIONS

## 3.1 Local Geology

Based on the published physiography maps of the area (Ontario Geological Survey), the site is located within the boundary zone of Georgian Bay Fringe from the south and Algonquin Highlands from the north. Surficial geology maps of Southern Ontario indicate that the surficial geology within the site is Precambrian bedrock and bounded by bedrock-drift complex in Precambrian terrain from the south and west. The site is also bounded by geological surficial formation of ice-contact stratified deposits composed of sand and gravel, minor silt, clay and till from the north.

Bedrock geology maps of Southern Ontario indicate the bedrock formation within the site is carbonate metasedimentary bedrock composed of marble, calc-silicate rocks, skarn, tectonic breccias from the Grenville super group and the Finton group.

### 3.2 Site Description

Kashwakamak Lake Dam is located approximately 8 km east of Femleigh on Lot 21, Concession IX, Clarendon Ward, North Frontenac Township. It was built in 1910.

The dam consists of a concrete overflow weir spillway at the south side and a sluiceway containing two stop log bays, each are 10 timber stop logs of 0.30 m high by 0.30 m wide by 3.43 m long, at the north. A small concrete saddle dam structure that is considered as a part of the Kashwakamak Dam built to the north of the main dam structure. The dam is provided with a floating safety/debris broom located upstream and a steel handrail around the control structure. Drawings of the Kashwakamak Lake Dam structures as received from the Client are included in Appendix G.

The surrounding area of the site comprised of a Kashwakamak Lake on the west side of the existing dam, forest area on the south side of the dam, a downstream flow on the east side of the site property and only north side is accessible for the dam site leading to Gutheinz Road. Recreational development along the shoreline of Kashwakamak Lake includes over 500 residences/cottages and at least five marinas/resorts. There are also several wetlands around the perimeter of the lake and manòmin (wild rice) crops downstream of the dam. The dam site location is shown in Figure 1, Appendix B.

## 4.0 FIELD INVESTIGATION

The staff of McIntosh Perry Consulting Engineers (McIntosh Perry) conducted an on-site visit prior to the planned drilling date and marked the proposed borehole locations; additionally, requisitions were submitted to Ontario One Call (ON1Call) to obtain public utility clearance locates, obtained private utility clearance locates and approval permits, and coordinated with the client regarding the intended geotechnical exploration drill-date.

The fieldwork was conducted between September 18 and 25 and comprised of four (4) boreholes advanced into the bedrock. BH23-4 was drilled at the north (left) dam abutment and advanced to a maximum depth of 9 mbgs (El. 253.1 m). The other three boreholes were drilled downstream. BH23-1 was drilled to a maximum depth of 6.5 mbgs (El. 252.8 m), BH23-2 was drilled to a maximum depth of 5.6 mbgs (El. 253.0 m), and BH23-5 was drilled to a maximum depth of 6.3 mbgs (El. 252.9 m). The other three boreholes were drilled downstream to a maximum drilling depth of 6.3 mbgs (El. 252.9 m) in BH23-5.

BH23-4 was drilled using a CME 75 truck-mounted drilling rig, outfitted with casing, while the rest of the boreholes were drilled using portable Hilti Drill. The equipment used for drilling was owned and operated by Ohlmann Geotechncial Services (OGS) of Almonte, Ontario. The bedrock was cored and sampled in all boreholes from the top of the encountered bedrock surface to the bottom of the boreholes. The bedrock was cored and sampled in BH23-1 from the ground surface (El. 259.3 m) to 6.5 mbgs (El. 252.8 m), in BH23-2 from the ground surface (El. 258.6 m) to 5.6 mbgs (El. 253.0 m), in BH23-4 from 0.4 mbgs (El. 261.7 m) to 9.0 mbgs (El. 253.1 m), and in BH23-5 from ground surface (El. 259.2 m) to 6.3 mbgs (El. 252.9 m). NQ size rock cores were obtained using diamond drilling and wireline tooling. Rock cores were retrieved in double-walled NQ coring methods.

Packer testing was performed in all boreholes. The test was performed from the bottom of boreholes towards the top of boreholes. The first test in each borehole was performed within the bottom 1.5 m of the hole. Then the bladder of the Packer test system was pulled up adding another 1.5 m to the tested section, except in BH23-2. In BH23-2, the first tested section was from 1.1 mbgs to the bottom of the borehole, and the second tested section was from 2.6 mbgs to the bottom of the borehole. The procedure was repeated up to the last 1.5 m of the hole near the ground surface. The results of the Packer tests are summarized in Section 6.3 and in Tables D.1 to D.12, in Appendix D.

A 51 mm diameter standpipe monitoring well was installed in BH23-4 with screen installed in the bedrock. The well was protected in flush-mount caps. Details and location information of the well are provided in Section 6.2 and summarized in Tables 6-2.

The bedrock core hole was sealed with bentonite holeplug and the boreholes were backfilled with auger cuttings and holeplug and restored to the original ground surface with cold patch asphalt. The boreholes were surveyed with a GPS unit to record their locations and elevations. Borehole locations are shown in Figure 2, included in Appendix B.

**Table 4-1: Borehole Designations, Locations, and Depth**

| BH No. | Drilling Date | Coordinates (UTM Zone 18T) | | | Borehole Termination | | Remarks |
|---|---|---|---|---|---|---|---|
| | | Northing | Easting | Surface El. (m) | Depth (mbgs) | El. (m) | |
| 23-1 | Sept. 22-25, 2023 | 4972860 | 345362 | 259.3 | 6.5 | 252.8 | - Bedrock was cored from the ground surface.<br>- Rock core ~ 6.5 m |
| 23-2 | Sept. 20, 2023 | 4972859 | 345352 | 258.6 | 5.6 | 253.0 | - Bedrock was cored from the ground surface.<br>- Rock core ~ 5.6 m |
| 23-4 | Sept. 18, 2023 | 4972865 | 345350 | 262.1 | 9.0 | 253.1 | - 0.4 m topsoil<br>- Well installed in bedrock |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | - Rock core ~ 8.6 m |
| 23-5 | Sept. 19, 2023 | 4972839 | 345348 | 259.2 | 6.3 | 252.9 | - Bedrock was cored from the ground surface.<br>- Rock core ~ 6.3 m |

The field investigation, including drilling and sampling, was supervised on a full-time basis by McIntosh Perry. All boreholes were logged during the drilling progress. All samples were labelled by waterproof paper one by one as they retrieved. All soil samples were preserved in double plastic bags to mitigate the risk of moisture loss during transportation to the geotechnical laboratory. Rock cores were laid and labelled in specialty boxes made for rock core transportation. The Rock Quality Designation was measured for the first time in the field immediately after drilling to reduce the measurement errors caused by transportation induced damages to the rock cores.

# 5.0 LABORATORY INVESTIGATIONS

Geotechnical Laboratory testing on representative rock cores was performed at McIntosh Perry Geotechnical Laboratory and included rock compressive strength on 10 rock cores. The laboratory tests were performed in accordance with American Society for Testing Materials (ASTM) test procedures.

Paracel Laboratories Ltd., in Ottawa, Ontario carried out chemical testing on a representative surface water sample to determine the potential susceptibility to corrosion to ductile iron elements and concrete attack parameters. The chemical parameters consisted of pH, chloride, sulphate, and resistivity. Laboratory test results are included in Appendix E.

As per the request of the MVCA, the rest of the soil samples and rock cores will be stored in McIntosh Perry storage facility until McIntosh Perry receives a further notice from MVCA to dispose them.

# 6.0 SUBSURFACE CONDITIONS

## 6.1 Subsoil Conditions

The site stratigraphy at the drilled borehole locations consisted of a thin layer of topsoil encountered in BH23-4 only, underlain by bedrock. In all other boreholes, the bedrock was observed at the ground surface and cored and sampled to the bottom of the boreholes.

The topsoil and bedrock that were encountered during the course of the investigation, together with the field and laboratory test results are shown on the borehole records included in Appendix C. Laboratory test results are included in Appendix E. Description of the strata encountered are given below.

### 6.1.1 Topsoil

A thin topsoil layer of approximately 0.4 m was observed in BH23-4 only on the dam north (left) abutment. No soil testing was performed on the topsoil sample.

### 6.1.2 Bedrock

Bedrock was encountered and cored in all boreholes as described in Table 6-1. The bedrock was observed at the ground surface in BH23-1, 23-2, and 23-5 and was observed below the topsoil in BH23-4 on the north (left) abutment). The bedrock was cored and sampled to the bottom of all boreholes.

During the core drilling, measurements including Total Core Recovery (TCR) and Rock Quality Designation (RQD) were carried out as part of the rock quality classification. TCR is defined as the sum of all recovered rock core pieces from a core run expressed as a percent of the total length of the core run. The RQD is defined as a percentage of the sum of the intact core pieces over 100 mm divided by the total length of core run. The TCR and RQD for the rock cores are presented in the borehole log records in Appendix C.

Based on the retrieved rock cores from borehole, the bedrock was identified as Carbonate Metasedimentary bedrock diagonally parting Marble. It was observed to be slightly weathered and slightly fractured with moderately close, horizontal to diagonal joints. A few vertical cracks were observed in BH23-4 between El. 259.5 and 259.3 m, between El. 256.9 and 256.7 m, and between El. 256.2 and 255.9 m. Also, vertical cracks were observed in BH23-5 between El. 255.6 and 255.4 m, and between El. 253.8 and 253.6 m.

The Carbonate Metasedimentary bedrock was observed to be strong, grey to dark grey with white bands of Marble, medium to thinly bedded. In BH23-1 and 23-2, the bedrock was observed to have good to excellent quality based on RQD value of 75 to 100%. In BH23-4 and 23-5, the bedrock quality was fair to excellent based on RQD value of 56 to 98%. The rock cores are shown in Figures 3, Appendix C.

**Table 6-1: Bedrock Core Summary**

| BH No. | Ground Surface El. (m) | Bedrock Surface El. (m) | Sound Bedrock El. (m) | Rock Core # | El. (m) | Recovery (%) | RQD (%) | UCS (MPa) |
|---|---|---|---|---|---|---|---|---|
| 23-1 | 259.3 | 259.3 | 259.3 – 252.8 | RC-1 | 259.3 – 258.2 | 100 | 93 | |
| | | | | RC-2 | 258.2 – 257.1 | 100 | 89 | 164 |
| | | | | RC-3 | 257.1 – 256.2 | 100 | 94 | |
| | | | | RC-4 | 256.2 – 255.1 | 98 | 84 | 167 |
| | | | | RC-5 | 255.1 – 254.1 | 100 | 100 | |
| | | | | RC-6 | 254.1 – 253.4 | 98 | 83 | 177 |
| | | | | RC-7 | 253.4 – 252.8 | 100 | 92 | |
| 23-2 | 258.6 | 258.6 | 258.6 – 253.1 | RC-1 | 258.6 – 257.4 | 99 | 91 | 201 |

| BH No. | Ground Surface El. (m) | Bedrock Surface El. (m) | Sound Bedrock El. (m) | Rock Core # | El. (m) | Recovery (%) | RQD (%) | UCS (MPa) |
|---|---|---|---|---|---|---|---|---|
| | | | | RC-2 | 257.4 – 256.2 | 92 | 92 | |
| | | | | RC-3 | 256.2 – 255.5 | 100 | 100 | |
| | | | | RC-4 | 255.5 – 254.6 | 97 | 76 | 208 |
| | | | | RC-5 | 254.6 – 253.8 | 100 | 97 | |
| | | | | RC-6 | 253.8 – 253.6 | 94 | 75 | |
| | | | | RC-7 | 253.6 – 253.1 | 100 | 100 | 194.8 |
| 23-4 | 262.1 | 261.8 | 261.8 – 253.1 | RC-2 | 261.8 – 261.5 | 100 | 63 | |
| | | | | RC-3 | 261.5 – 260.9 | 98 | 95 | |
| | | | | RC-4 | 260.9 – 260.6 | 100 | 67 | |
| | | | | RC-5 | 260.6 – 259.2 | 86 | 56 | |
| | | | | RC-6 | 259.2 – 257.6 | 104 | 82 | |
| | | | | RC-7 | 257.6 – 256.1 | 100 | 97 | 211 |
| | | | | RC-8 | 256.1 – 254.6 | 100 | 73 | |
| | | | | RC-9 | 254.6 – 253.1 | 98 | 91 | |
| 23-5 | 259.2 | 259.2 | 259.2 – 252.9 | RC-1 | 259.2 – 258.3 | 100 | 87 | |
| | | | | RC-2 | 258.3 – 257.2 | 100 | 92 | 211 |
| | | | | RC-3 | 257.2 – 256.4 | 95 | 95 | |
| | | | | RC-4 | 256.4 – 255.5 | 102 | 81 | 173 |
| | | | | RC-5 | 255.5 – 254.4 | 100 | 93 | |
| | | | | RC-6 | 254.4 – 253.8 | 96 | 64 | 126 |
| | | | | RC-7 | 253.8 – 252.9 | 103 | 98 | |

## 6.2 Groundwater

Groundwater was not observed during the site of investigation in open BH23-1, 23-4 and 23-5. However, minor artesian pressure observed in BH23-1 which dissipated shortly after completing drilling. One standpipe well was installed in BH23-4. These boreholes were denoted with “MW”. The groundwater was measured in the well on September 26, 2023. The measured groundwater depth in the well with standpipe well information is presented in Table 6-2.

Groundwater levels are expected to fluctuate due to extreme weather events and seasonal changes.

Table 6-2: Monitoring Wells Summary

| BH/MW ID | Screen Interval El. (m) | Groundwater Level Observation | | | | Remarks |
|---|---|---|---|---|---|---|
| | | Installation Date | Measurement Date | Depth (mbgs) | GW Elev. (m) | |
| BH23-4 MW | 258.3 – 253.1 | Sept. 18, 2023 | Sept. 26, 2023 | 1.5 | 260.6 | Screen in the bedrock |

## 6.3 Packer Testing

Twelve (12) Single-Packer tests were performed in total concurrently with the geotechnical drilling program in the drilled boreholes. The tests were performed using a constant head (Lugeon) packer injection test method. The boreholes were first drilled, and the bedrock was cored to the planned depths. Then cumulative single packer tests were performed from the bottom of the boreholes towards the top of boreholes.

The test procedure involved lowering a single packer assembly inside the open boreholes to the top of the test interval. The test section then was isolated by inflating the packer bladder using pressurized water. Once a successful seal was established, water was pumped into the isolated test interval through the injection pipe until a constant differential head and inflow rate were established.

The test was performed by applying a total of three ascending water pressure steps (i.e., 10, 15, and 20 psi) followed by two descending water pressure steps (i.e., 15, and 10 psi) within each test interval. A regulated constant head achieved by controlling the injection flow rate using a bypass valve. For each step, the pressure and injected quantity of water was recorded at one-minute intervals for a total of five (5) minutes until it had stabilized. During the Packer testing, difficulties associated with maintaining a steady pressure were encountered in BH23-4 in the first test, which were fixed, and the test proceeded.

The first test in each borehole was performed within the bottom 1.5 m of the hole. Then the packer bladder was pulled up adding another 1.5 m to the tested section, except in BH23-2. In BH23-2, the first test section was from 1.1 mbgs to the bottom of the borehole, and the second test section was from 2.6 mbgs to the bottom of the borehole. The procedure was repeated up to the last 1.5 m of the hole near the ground surface. The results of the Packer tests are summarized in Tables D.1 to D.12 in Appendix D.

## 6.4 Chemical Analysis

Chemical analyses were conducted by Paracel Laboratories in Ottawa, ON, to determine the resistivity, pH, sulphate and chloride content of a water sample collected from the lake. A summary of chemical analysis results is shown in Table 6-3 and the laboratory results are shown in Appendix E.

Table 6-3: Chemical Analysis Summary

| SAMPLE | DEPTH (m) | Chemical Analysis | | | |
|---|---|---|---|---|---|
| | | pH (pH units) | Resistivity (Ohm.cm) | Chloride (%) | sulphate (%) |
| Surface water | -- | 7.9 | 9170 | 0.0005 | 0.0003 |

## 7.0 DISCUSSIONS AND RECOMMENDATIONS

Based on the results of the geotechnical field and laboratory investigation performed, the following discussion is provided to assist the Client and the Designer with the proposed replacement/rehabilitation of Kashwakamak Lake Dam Project. The recommendations provided within this report are based on our understanding of the proposed Project which is summarized above in “Section 2” and through the interpretation of factual information obtained from the boreholes advanced during this subsurface investigation. If any of these understandings change, McIntosh Perry should be contacted to assess the implications of those changes on the recommendations provided herein.

Based on the subsurface conditions observed in the boreholes, and assuming they are representative of soil and bedrock conditions across the Site, the most important geotechnical considerations for the design and construction of the proposed dam are expected to be the following:

- **Proposed Replacement and Rehabilitation Options:** It is understood that MVCA is considering three replacement and rehabilitation options. The first option is to rehabilitate the existing dam structure which may necessitate executing grouting at the abutment and the dam foundation. The second option involves replacing the existing main structure with a similar one constructed at the same place. The third option is to construct a new dam to the east of the existing at the downstream side while taking advantage of the existing dam to control the surface water during construction.

- **Bedrock Subgrade Preparation:** Information about the foundation level of the existing dam is approximate. It was assumed that the proposed replacement will be also constructed on sound bedrock foundation at elevations varies from approximately El. 257 to 258 m at the Sluiceway to 259 to 260 m at the abutments. The existing saddle dam is assumed to be constructed on sound rock at El. 260 to 261 m. It is also assumed that the proposed saddle dam replacement will be founded on sound bedrock at El. 260 to 261 m. These elevations are estimated based on the provided survey in “Drawing No. 1434-19-01” by Ecos Garatech Consulting Engineers dated Oct. 1998. The bedrock subgrade should be cleaned of any loose or unstable rock pieces from the dam influence zone. Lean mixed concrete should be used for levelling the sound bedrock. The lean mix concrete shall have a minimum compressive strength of 30 MPa. If lean mixed concrete is used below dam at the bedrock surface (i.e., not confined within bedrock), it must extend a minimum of 0.3 m beyond the edge of the dam and then downward at a 1H:1V. The bedrock subgrade has to be approved by the geotechnical engineer.

- **Seismic Site Classification:** The proposed dam will be designed in accordance with Part Four of CSA S6 2020 . Based upon the results of the site investigation, the subject site for the proposed building can be designed to “Site Class C to B” in accordance with Table 4.4.3.2 of the CSA 2020, and subject to the limitations of the code. It should be confirmed by structural engineer based on shear wave velocity.
- **Temporary Construction Dewatering:** Effective water control and management prior to and during construction will be required for the dam replacement options. Water quantities will depend on seasonal conditions, depths of excavations, and the duration that excavations are left open. The water level in the lake may fluctuate in response to extreme weather events and seasonal changes. Temporary water cut-off system such as cofferdams or secant pile wall should be constructed around the excavation and sump pumps may be used to drain the water from the confined zone during the construction. However, it is the Contractors’ responsibility to design the dewatering method based on the expected water levels in the lake and based on the low permeability of bedrock. Recommendations for appropriate dewatering measures to effectively control the water levels shall be provided by a specialized dewatering contractor. It is recommended to plan the excavation during the dry season to reduce the dewatering pumping requirements. The groundwater disposal should be performed in accordance with applicable regulations. Assessment of the dewatering requirements and the need for registration on the Environmental Activity and Sector Registry (EASR) or a Permit to take Water (PTTW) should be carried out by specialists experienced in this field.
- **Rehabilitation of the Existing Dam:** It is understood that rehabilitation of the existing dam structure may be considered for this project. There is limited information available with respect to the existing dam foundation. For both replacement options “Option 2 and Option 3”, bedrock area grouting will be necessary for the foundation bedrock. Grouting is recommended at the upstream face for seepage cut-off through the foundation. Grouting at the north (left) abutment is recommended as water seepage through bedrock was reported within the north (left) abutment and also minor artesian pressure was observed in open BH23-1 which was dissipated shortly after finishing the drilling. It is also recommended to perform grouting at the south (right) abutment of the dam.
- **Existing Dam Removal:** It is understood that the new replacement options include removing the existing dam and either constructing a new dam in place the existing dam or at a new location to the east of the existing. It is understood that rapid drawdown as a result of the dam removal is not allowed or expected. For replacement “Option 2” with a new structure at the same location, a temporary cofferdam or a secant pile wall can be utilized at the upstream to allow for the removal of the old dam and the construction of

the new structure. For replacement “Option 3” with a new structure to the east of the existing dam, the existing dam can act as coffer dam to control the water flowing and allowing for the construction of the new dam. It is also understood that the existing saddle dam and the existing natural channel may be used as a contingency bypass to control the water level in the lake during construction. The flow control during removal of the existing concrete dam shall be outlined by the geomorphologist.

It is understood that Hazard Potential Classification (HPC) and design flood for the replacement and rehabilitation of the dam  according to the CDA and MNRF guidelines have indicated in Hydraulic Analysis Memorandum.

The comments made regarding the construction of the proposed dam replacement/rehabilitation are intended to highlight those aspects which could impact or affect the detail design of the proposed structure, for which special provisions may be required in the Contract Documents. Comments related to construction aspects are not intended to dictate construction equipment or methods. Relevant parties should make their own interpretation of the factual data presented in the report. Interpretation of the data presented may affect equipment selection, proposed construction methods, and scheduling of construction activities.

## 7.1 Site Preparation and Grading

For replacement option “Option 2”, the existing dam shall be demolished to allow for the construction of the new proposed dam. The demolition the existing structure and the construction of the new dam shall be conducted within the confines of a temporary cofferdam, or a secant pile wall designed and installed in accordance with OHSA. The flow control during removal of the existing concrete dam shall be outlined by the geomorphologist.

For replacement option “Option 3”, it is understood that the existing dam is planned to be used to control the water level during the construction phase. Therefore, it will not be demolished until the construction of the new dam to the east of the existing is complete.

The site should be graded in the early stages of construction to provide positive control of surface water and directing it away from excavations and subgrades. The Contractor should take appropriate measurements for collection and disposal of surface and groundwater and runoff including an adequate pumping system.

### *7.1.1 Buried Services*

Public and private utility owners should be notified prior to the commencement of any construction activities. Existing underground utilities in the vicinity of the proposed excavation should be reviewed before commencing any excavation works to identify potential damage hazards due to the proposed excavation. Existing utilities that are excavated or exposed as part of the construction will need to be supported and rerouted during the construction. The contractor shall inform owners of all existing utilities before proceeding with excavation. The utility owners may provide the permissible deformation that a particular utility may tolerate. Shoring shop drawings should be stamped by a professional engineer.

## 7.2 Excavation

### *7.2.1 Existing Topsoil*

Topsoil shall be removed from within the footprint of the proposed structure, to expose the bedrock subgrade. Any over excavation shall be leveled by lean concrete or a concrete mix of the same strength as the foundation system.

The excavated materials and any corresponding excess soils should be disposed of in accordance with all applicable environmental legislation. Excess soils management and evaluation of the environmental quality of subsoils is not within the scope of this geotechnical investigation.

### *7.2.2 Bedrock Excavation*

For excavations into bedrock, the bedrock was observed to be in excellent quality based on RQD values of the retrieved rock cores. In general, sound bedrock was observed in all drilled boreholes at the bedrock surface. The bedrock quality and site-specific requirements need to be assessed during construction by the geotechnical engineer.

The excavations for the proposed dam and abutments will extend to sound bedrock. All excavations must be undertaken in accordance with the requirements of the Occupational Health and Safety Act of Ontario (OHSA), Regulations for Construction O.Reg. 213/91, with specific reference to acceptable size slopes and stabilization requirements. For planning purposes, a weathered bedrock is recommended to be treated as a Type 2 Soil. Sound rock would generally be self-supporting, however, as a precautionary measure, it should be back-sloped at 10V:1H. All rock excavations should be scaled, to remove loose rock fragments to ensure safe working conditions. All rock faces should be reviewed by a geotechnical engineer to look for loose pieces and wedge failures. Rock bolting for worker safety may be necessary depending on the layout and field condition at that time.

The stability of the excavation side slopes is highly dependent on the Contractor’s methodology and layout. Bedrock excavation will require pneumatic or hydraulic breakers such as hoe-rams or heavy rock excavation equipment capable of breaking and ripping sound Carbonate Metasedimentary bedrock. Line drilling for this site can be considered and can be done by drilling 75 to 100 mm holes at 200 to 300 mm spacing but this should be independently assessed by the Contractor. Bedrock excavation should be carried out as per OPSS.MUNI 403.

### *7.2.3 Subgrade Preparation*

The excavations for the proposed dam replacement are generally expected to extend down to sound bedrock. Based on the recent boreholes the sound bedrock is expected to be encountered at shallow depth near the ground surface. The sound bedrock was observed in the cored boreholes at elevations range between which is corresponding to approximate El. 258.6 to 259.3 m in BH23-1, 23-2, and 23-5, while in BH23-4 which was drilled on the north (left) abutment, the sound bedrock was observed at approximately 262.1 m. Moderate bedrock excavation is expected to expose sound bedrock which is expected to generate a manageable amount of excavated rock materials.

Subgrade preparation for footings founded on rock will involve the removal of all soils and weathered bedrock to expose a sound bedrock. Any pieces of rock that can be manipulated by conventional excavation equipment should be removed, and as directed by the geotechnical engineer. Final subgrade surfaces should be brushed and cleaned. The exposed bedrock surface should be examined and approved by the geotechnical engineer to confirm the competency to support the design bearing pressures. Lean mixed concrete should be used for levelling the sound bedrock. The lean mix concrete shall have a minimum compressive strength of 30 MPa. If lean mixed concrete is used below dam at the bedrock surface (i.e., not confined within bedrock), it must extend a minimum of 0.3 m beyond the edge of the dam and then downward at a 1H:1V.

Confirmation of bedrock quality during construction will require the contractor to perform probing of the bedrock using 50 mm diameter drill holes drilled to a depth of 1.5 m within the footprint of the dam. These holes will need to be reviewed by the geotechnical engineer to confirm that no significant mud seams or voids exist at the proposed dam replacement location. If mud seams are found, localized areas may need to be lowered below the mud seam. The locations of these probe holes should be selected under the direction of the geotechnical engineer during construction. Contractors should plan for one probe per pad footing and a minimum or 1 probe every 6 m in strip footings/dam.

### *7.2.4 Temporary Construction Dewatering*

It is understood that the existing saddle dam and the existing natural channel behind it may be used as a contingency bypass to control the water level in the lake during construction.

Groundwater was observed in the monitoring well installed in BH23-4 on the north (left) abutment, and groundwater was at El. 260.6 m which is the approximately same as the water level in the lake upstream. Water quantities will depend on seasonal conditions, depths of excavations, and the duration that excavations are left open. The water level in the lake may fluctuate in response to extreme weather events and seasonal changes. Temporary water cut-off system such as cofferdams or secant pile wall should be constructed around the excavation and sump pumps may be used to drain the water from the confined zone during the construction. However, it is the Contractors’ responsibility to design the dewatering method based on the expected water levels in the lake and based on the low permeability of bedrock. Recommendations for appropriate dewatering measures to effectively control the water levels shall be provided by a specialized dewatering contractor. It is recommended to plan the excavation during the dry season to reduce the dewatering pumping requirements. All construction activities and grouting shall be carried in dry conditions.

The groundwater disposal should be performed in accordance with applicable regulations. A PTTW from the Ontario Ministry of the Environment, Conservation and Parks (MECP) will be required if the quantity of water to be pumped from the Site exceeds 400,000 L/day. For expected groundwater extraction between 50,000 and 400,000 L/day, an EASR permit is adequate. Assessment of the dewatering requirements and the need for registration on the EASR or a PTTW should be carried out by specialists experienced in this field.

### *7.2.5 Temporary Water Cut-off System Installation and Design*

The proposed replacement options of the existing dam and the saddle dam will require dry condition during demolition, excavation and construction. For Option 3, the existing dam can act as a cofferdam during the construction phase. The removal of the existing dam can be done once the new dam is completed with the aid of temporary cofferdam.

For Option 2 and saddle dam, demolition of the existing dam and constructing the new replacement shall be performed within the confines of a temporary cofferdam, or a secant pile wall designed and installed in accordance with OHSA. Based on the encountered bedrock during the site investigation and based on our understanding of the site geology, sheet pile cofferdam is not feasible for this site. Temporary water cut-of alternatives could include portable cofferdam, inflatable bladder, sandbags and plastic sheeting or similar systems. Limitations associated with using such systems are that they can only provide protection up to a limited height. Also, as with other cofferdam methods, dry condition cannot be fully achieved within the work area inside.

A secant pile wall may also be considered. A secant pile wall consists of overlapping (secant) piles to form structural or cut-off walls and achieve the required water tightness. This option involves coring the bedrock and installing reinforced and nonreinforced piles. The secant pile wall is permanent and more expansive but can provide flexibility with respect to the water height behind it.

The contractor should hire an experienced professional geostructural engineer to provide a detailed design for the cut-off system considering the space restrictions, estimated costs, and availability of materials. The designer must take into consideration the loads from water pressure, and seismic loading. Also, it should consider the freeze-thaw action, expansion and contraction of cut-off elements, and construction vibrations.

The General Contractor should count for this in their design and choose suitable system and construction method for this site. The General Contractor shall choose the most suitable option based on their experience, available equipment, and their understanding of the factual information provided in this report. Shop drawings should be submitted to the designers and reviewed by the geotechnical engineer well in advance of mobilization.

### 7.2.6 Permeability of Bedrock and Packer Testing

Hydraulic conductivity of bedrock was calculated from the analysis of Packer testing performed in the cored boreholes. The calculated hydraulic conductivity values of the bedrock spanned over three orders of magnitude from 7.84 x $10^{-6}$ m/sec in BH23-4 to 8.44 x $10^{-9}$ m/sec in BH23-5, with a geometric mean value for all the Packer tests of 3.67 x $10^{-7}$ m/sec.

A summary of the calculated hydraulic conductivity values for the bedrock at Kashwakamak Dam is presented Table 7-1.

**Table 7-1: Summary of Calculated Hydraulic Conductivity for Bedrock**

| BH No. | Test Number | Interval El. (m) | Hydraulic Conductivity (m/sec) | | | Flow Behavior | Representative Lugeon Value (l/min/m) |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Maximum | Average | | |
| 23-1 | Test 1/3 | 254.4 - 252.8 | 1.28 x $10^{-6}$ | 2.49 x $10^{-6}$ | 1.86 x $10^{-6}$ | Void Filling | 12.15 |
| | Test 2/3 | 255.9 - 252.8 | 1.55 x $10^{-6}$ | 4.09 x $10^{-6}$ | 2.35 x $10^{-6}$ | Turbulent | 13.62 |
| | Test 3/3 | 257.5 - 252.8 | 1.29 x $10^{-6}$ | 2.35 x $10^{-6}$ | 1.59 x $10^{-6}$ | Void Filling | 9.73 |
| 23-2 | Test 1/2 | 258.1 - 253.7 | 7.51 x $10^{-8}$ | 4.48 x $10^{-7}$ | 1.92 x $10^{-7}$ | Wash-out | 3.41 |
| | Test 2/2 | 256.6 - 253.7 | 3.75 x $10^{-7}$ | 7.18 x $10^{-7}$ | 5.99 x $10^{-7}$ | | 5.97 |
| 23-4 | Test 1/4 | 254.6 - 253.1 | 1.31 x $10^{-6}$ | 7.84 x $10^{-6}$ | 3.78 x $10^{-6}$ | Void Filling | 14.69 |
| | Test 2/4 | 256.1 - 253.1 | 6.50 x $10^{-7}$ | 1.49 x $10^{-6}$ | 9.95 x $10^{-7}$ | Wash-out | 12.30 |
| | Test 3/4 | 257.7 - 253.1 | 7.21 x $10^{-8}$ | 5.06 x $10^{-8}$ | 6.21 x $10^{-8}$ | Void Filling | 0.38 |
| | Test 4/4 | 259.2 - 253.1 | 2.52 x $10^{-7}$ | 1.45 x $10^{-7}$ | 1.80 x $10^{-7}$ | Void Filling | 1.04 |
| 23-5 | Test 1/3 | 257.3 - 255.8 | 2.65 x $10^{-8}$ | 1.47 x $10^{-7}$ | 7.3 x $10^{-8}$ | Void Filling | 0.70 |
| | Test 2/3 | 258.8 - 255.8 | 2.72 x $10^{-8}$ | 1.01 x $10^{-7}$ | 5.95 x $10^{-8}$ | Dilation | 0.34 |
| | Test 3/3 | 260.4 - 255.8 | 8.44 x $10^{-9}$ | 1.19 x $10^{-7}$ | 7.66 x $10^{-8}$ | Void Filling | 0.06 |

Five flow behaviors through bedrock are typically expected. Darcy's law is predicated on laminar flow (termed Darcian flow) where, for a given geometry (for example a borehole test section), the injection flow rate and the access head pressure have a linearly proportional relationship. It is generally accepted that Packer tests in rock where flow is predominantly via fine fracture networks are dominated by Darcian "Laminar" flow.

However, where more open fractures are present, allowing higher flow rates, non-Darcian (Turbulent) flow will occur, and the flow rate will increase under-proportionally with excess head, as energy is lost to turbulence.

Dilation flow is an indication of maximum pressure that can be applied without risk of dilating or displacing existing fractures/joints (known as hydrojacking) in the rock around or above the test section.

Wash-out flow behavior may be explained as an increase in hydraulic conductivity of the rock caused by the test, due to movement/erosion of infill in fractures in such a way that they do not block flow paths, or permanent rock movements caused by the testing. It could also interpret as leakage past the packers that disturbs or erodes the rock, so that leakage paths do not close with reduced excess head.

Void Filling flow behavior may be explained as a decrease in hydraulic conductivity of the rock caused by the test, with possible mechanisms including:

- Water filling and pressurising of voids or discontinuities not linked to a wider network,
- Movement or swelling of infill in fractures in such a way that they become trapped and block flow paths, and
- Clogging of rock fractures due to use of dirty water for injection.

Based on the Packer testing results, the following is noted:

- The calculated hydraulic permeability in BH23-1, which was drilled downstream on the north channel bank, was relatively high comparing to other boreholes and was generally in the order 1.28 x 10-6 m/sec to 4.09 x 10-6 m/sec with “Void Filling” flow behavior. As noted earlier, minor artesian pressure was observed in open BH23-1 which was dissipated shortly after finishing the drilling.
- The calculated hydraulic permeability in BH23-2, which was drilled downstream behind the north (left) abutment of the dam, was generally in the order 7.51 x 10-8 cm/sec to 3.75 x 10-7 m/sec with “Wash-out” flow behavior.
- The highest calculated hydraulic conductivity value, 7.84 x 10-6 m/sec was in BH23-4, which was drilled the north (left) abutment of the dam, between El. 254.6 - 253.1 m in test “Test 1/4”. The flow behavior was observed to be “Void Filling” behavior which was corresponding to a Lugeon value of 14.69. A “Wash-out” flow behavior observed in the second test “Test 2/4” between El. 256.1 - 253.1 m. In tests “Test 3/4, and Test 4/4”, the hydraulic conductivity observed to become lower with “Void Filling” behavior.
- The calculated hydraulic permeability in BH23-5, which was drilled downstream behind the spillway dam, was generally in the order 8.44 x $10^{-9}$ m/sec to 1.47 x $10^{-7}$ m/sec with “Void Filling” flow behavior for “Test 1/3 and Test 3/3”. A “Dilation” flow was observed during “Test 2/3”.

The Packer testing results summarized in this section are preliminary in nature and shall be referred to for general understanding only.

### *7.2.7 Bedrock Grouting*

As discussed earlier, the rock quality was observed to be generally in fair to excellent condition based on RQD values of the retrieved rock cores. Vertical and diagonal fractures were observed in rock cores retrieved from

BH23-4 which was drilled on the north abutment. Vertical cracks were also observed in rock cores retrieved from BH23-5 which was drilled downstream. Discoloring was observed around the edges of these cracks which may indicate chemical erosion. Discontinuities in the rock mass may be joined to create a continuous seepage path through bedrock. Previous observations of water seepage through the north abutment were reported.

Bedrock grouting is recommended at the upstream face for seepage cut-off through the foundation. Also, grouting at the north (left) abutment is recommended as water seepage through bedrock was reported within the north (left) abutment and also minor artesian pressure was observed in open BH23-1 which was dissipated shortly after finishing the drilling. It is also recommended to perform grouting at the south (right) abutment of the dam.

The design of the grouting program is the responsibility of the General Contractor. It is important to emphasize that the Packer testing results summarized in this report in Section “7.2.6 Permeability of Bedrock and Packer Testing” are preliminary and the Contractor may refer to the Packer testing results for general understanding only. The Contractor shall perform field testing that are suitable for the Contractor’s construction and grouting methods including, but not limited to, performing Packer testing to determine grout pressure, grout holes depths and spacing based on their test results for the design of the grouting program. High mobility grout is recommended to seal these cracks. Grouting pressures shall not exceed the overburden pressure. Grouting shall be carried out in dry conditions.

## 7.3 Foundations

### *7.3.1 Geotechnical Bearing Resistance for the Proposed Building*

Provided there are no continuous soil-filled seams or mud seams present at shallow depth in the sound bedrock below the founding level, conventional pad and strip footings founded on the sound bedrock, a factored bearing resistance of 1,000 kPa under Ultimate Limit States (ULS) conditions is recommended for the proposed dam. This includes for a geotechnical resistance factor of Φ = 0.5. The factored ULS bearing resistance was estimated using the Rock Mass Rating (RMR) method by Bieniawski (1989).

The size of the selected footings shall be determined by the structural engineer. The selected size of the footing shall have adequate compressive strength to provide resistance to the structural loads from the proposed replacement. Designers should keep footing dimensions to a minimum of 1.5 m for pad footings, and 1.0 m for strip footings regardless of the bearing pressure being used.

Provided the bedrock surface is properly cleaned of soil and weathered material at the time of construction, settlement under the ULS condition is expected to be negligible. Therefore, there is no corresponding design bearing pressure recommended under Serviceability Limit State (SLS) conditions for bedrock.

Subgrade preparation shall be in accordance with Section “7.2.3 Subgrade Preparation”.

### *7.3.2 Lateral Resistance of the Proposed Dam*

The factored ultimate resistance of the footings to lateral loading 'shear resistance for sliding' across the interface between the footing, and the bedrock may be calculated using Mohr-Coulomb criterion below with load and resistance factors given in Table 7-2.

$$\tau = f_c c' + (\sigma - f_U U) f_\phi tan\phi'$$

where *c'* is cohesion, $\phi'$ is shearing angle, *U* is water pressure, and $\sigma$ is the normal stress on the sliding surface.

**Table 7-2: Minimum Lateral Load and Resistance Factors after Meyerhof (1984) (Wyllie 2009)**

| Category | Item | Load Factor | Resistance Factor |
|---|---|---|---|
| Loads | Dead Loads, ($f_{DL}$) | 1.25 **(0.8)*** | -- |
| | Live Loads, Wind, earthquake, ($f_{LL}$) | 1.5 | -- |
| | Water Pressure, ($f_U$) | 1.25 **(0.8)*** | -- |
| Shear strength | Cohesion "*c*" - stability, earth pressure, ($f_c$) | -- | 0.65 |
| | Cohesion "*c*" – Foundation, ($f_c$) | -- | 0.5 |
| | Friction angle "$\phi$", ($f_\phi$) | -- | 0.8 |

*** The values given in the parenthesis apply to beneficial loading conditions such as dead loads resist overturning or up lift.**

It is prudent to ignore the cohesion component when estimating the shear resistance against sliding. This is because the cohesive bond may be lost when separation takes place between concrete and rock foundation upon relative movement. The shearing angle $\phi'$ may be taken as 35 deg.

To increase the lateral resistance against sliding, the footings shall be supplied with a shear key and/or anchored to the bedrock by means of rock anchors (i.e., dowels or rebars). The design of both, the shear key (i.e., width and impediment), and the rock anchor system (i.e., the number and interval of the anchors, and the embedment length of anchors in concrete and rock) shall be provided by a structural engineer.

### *7.3.3 Uplift and Overturning Resistance*

Uplift is an active force due to hydrostatic pressure which must be included in the analysis of stability. The uplift pressures act between the dam and its foundation, and within the foundation below the contact plane and it should also be considered within any cracks within the dam.

Uplift at the foundation-concrete interface for structures having no foundation drains or an unverified drainage system should be assumed to vary as a straight line from 100% of the headwater pressure at the upstream face (heel) to 100% of the tailwater pressure at the downstream face (toe) applied over 100% of the base area.

The dead load of the dam can provide resistance to uplift and overturning forces that the proposed dam foundation may experience. Additional resistance can be provided by increasing the dead weight of the structure using additional concrete elements or by using rock anchors.

Grouted rock anchors may be designed based on frictional stress between the grout and intact bedrock. The bond zone must be entirely within sound bedrock. The design of rock anchors can be performed extending the Limit State Design (LSD) method. The Ultimate Limit States (ULS) and Serviceability Limit States (SLS) bond stress values must be based on both performance and structural criteria. However, based upon typical published values, the unfactored ULS bond stress values for limestone bedded with shale may be approximately 800 kPa to more than 1,400 kPa as per Ground Anchors and Anchored System (FHWA-IF-99-015).

CFEM (2006) recommends a geotechnical resistance factor of 0.3 be applied to the empirical unfactored ULS values. Performance testing is recommended to be carried out at the outset of the Project to verify the anchor capacities. Performance tests shall be performed on the first three production anchors installed and thereafter on a minimum of 2% of the remaining production anchors. Designers may take the approach that working stress value is approximately equivalent to the SLS value. We recommend that a conservative allowable working stress value of 240 kPa be used to calculate the length of the required bond zone. The estimated value includes a geotechnical resistance factor of 0.3. The resistance factor can be increased to Φ=0.4 based on the performance testing results and the allowable working stress can be optimized, if required. The bond zone must be entirely within sound bedrock.

In order to mobilize the shear stress in the rock, the load at the top of the anchor must be properly transferred through the upper bedrock to the bond zone to prevent progressive grout fail and ensure proper performance. Therefore, a “free length” is required through the foundation element, and down to the bond zone.

The mass of rock mobilized by a rock anchor may be assumed to be based upon a 60°cone drawn upward from a point located at the lower one-third point of the bond zone and spaced such that the theoretical cones do not overlap. Designers should review the spacing of anchors and take into account of any overlapping cones (i.e., avoid doubling-up on rock mass calculations for overlapping cones). The bulk unit weight of bedrock may be assumed to be approximately 26 kN/m$^3$. The corresponding buoyant unit weight would be approximately 16 kN/m$^3$. It is recommended that the designer uses submerged unit weights for the rock mass calculations since it is below water level.

### 7.3.4 Geotechnical Parameters

The geotechnical parameters used for the slope stability analyses are summarized in Table below.

**Table 7-3: Geotechnical Parameters Used for Dam Design**

| Zones | Material | Parameters | | |
|---|---|---|---|---|
| | | Saturated Unit Weight, $\gamma$ (kN/m$^3$) | Cohesion, c′ (kPa) | Internal Friction Angle, $\phi'$ (degree) |
| Foundation Materials | In-situ Contact Bedrock | Impenetrable | | |
| | In-situ Fractured Bedrock | Impenetrable | | |
| | Concrete | 24 | High Strength | |
| | Riprap | 22 | 0 | 40 |
| | Granular B Type II | 21 | 0 | 32 |
| | Rockfill | 21 | 0 | 35 |
| | Grout | Impenetrable | | |

## 7.4 Frost Protection

Bedrock subgrade is not frost heave susceptible.

Frost penetration depth in overburden is 1.8 m below the surface for the subject site. Frost penetration depth is estimated based on the OPSD 3090.101. For protection against frost effects, earth cover of 1.8 m must be provided for all footings in unheated or isolated structures. In the absence of adequate soil cover, equivalent synthetic insulation material can be used.

Backfill soils should not be placed in a frozen condition or placed on frozen subgrades.

## 7.5 Site Classification for Seismic Site Response

The National Building Code of Canada is not applicable for the design of dams since the seismic zoning maps generated for the National Building Code of Canada are specifically provided for the seismic design of common buildings only. Recommendations for safety analysis of existing dams and design of new dams for seismic loads should be performed in accordance with Canadian Dam Association (CDA) Guidelines.

Dam Class “Very High” in accordance with Table 2-1 of the Canadian Dam Safety Guidelines 2007 (2013 Edition) is recommended. Table 6-1B of the Guidelines should be consulted to estimate the flood and earthquake hazards, traditional Standard-Based Approach. The minimum Annual Exceedance Probability (AEP) for Dam Class “Very High” can be:

- For Floods: two-third between 1/1000 and probable maximum flood (PMF); and
- For Earthquakes: ½ between 1/2475 and 1/10,000 or maximum credible earthquake (MCE).

For earthquakes, the annual exceedance probability (1/2475) was selected for consistency seismic design levels given in the National Building Code of Canada.

Selected spectral responses in the general vicinity of the site for a 2% chance of exceedance in 50 years (2475 years return period) are as indicated in Table 7-3, based on the National Building Code Seismic Hazard published by Natural Resources Canada 2015.

**Table 7-3: Selected Seismic Spectral Responses (2% in 50 Yrs)**

| Sa(0.2) | Sa(0.5) | Sa(1.0) | Sa(2.0) | PGA (g) | PGV (m/s) |
|---|---|---|---|---|---|
| 0.175 | 0.117 | 0.069 | 0.036 | 0.106 | 0.100 |

Given the shallow bedrock across the site and the proposed replacement will be founded on sound bedrock, the site can be classified as Seismic Site Class (C).

## 7.6 Lateral Earth Pressure

Active earth pressure is the minimum value of the lateral earth pressure, which a soil mass can apply against an unrestrained structure. On the other hand, passive earth resistance is the maximum value of lateral pressure, which can be mobilized in the soil by the structure moving toward the soil mass.

This report provides coefficients of lateral earth pressure. Static lateral pressure can be calculated by using the following equation:

$$P_h = K \times (\gamma h + q)$$

In this equation, the provided unit weight of the soil, $\gamma$, is for a moist soil above the groundwater table. Pseudo-dynamic effects of seismic activities are considered based on Mononobe-Okabe method.

The backfill material shall be ‘free draining’ and to follow OPSS.MUNI 1010 recommendation for grain size distribution. However, if there is a chance of hydrostatic pressure build-up behind the wall, the designer shall consider the fluid pressure in the analysis of retaining wall pressure.

Calculation of all live load and dead load surcharges are the responsibility of the designer.

The PGA for this Site is 0.106 based on Site Class C and probability of exceedance per annum of 0.000404.

**Table 7-4: Lateral Earth Pressure Design Parameters for Backfill and Native Soil**

| Design Parameters | Material | | |
|---|---|---|---|
| | Granular A | Granular B | Rock Fill |
| Unit Weight, $\gamma$ (kN/m$^3$) | 21 | 21 | 21 |
| Internal Friction Angle, $\phi$ (°) | 32 | 32 | 35 |
| Static at-rest pressure, $K_o$ | 0.47 | 0.47 | 0.43 |
| Static active pressure, $K_a$ | 0.31 | 0.31 | 0.27 |
| Static passive pressure, $K_p$ | 3.25 | 3.25 | 3.69 |
| Dynamic active pressure, $K_{AE}$ | 0.34 | 0.34 | 0.30 |
| Dynamic passive pressure, $K_{PE}$ | 0.85 | 0.85 | 0.81 |

The above noted lateral pressure coefficients are calculated assuming the wall back angel is vertical and the backslope of the retained soil is horizontal. The wall-soil interaction angle is assumed to equal to 0.5ϕ as per CFEM. If Engineered Shoring is used, then designers should refer to CFEM for design assistance and a geotechnical engineer should be retained to perform the shoring design review.

## 7.7 Backfill

The backfill placed against exterior retaining walls shall be free draining granular material meeting the grading requirements of an OPSS.MUNI 1010 Granular A or Granular B Type II. However, other suitable granular materials may be proposed and considered depending on the site-specific conditions.

The exterior backfill should be placed and compacted as outlined below:

- Backfill should not be placed in frozen condition, or placed on a frozen subgrade;
- Backfill should be placed and compacted in maximum loose lift thickness compatible with the selected construction equipment, but not thicker than 0.3 m. Each lift should be uniformly compacted to achieve 98% of its SPMDD.
- In landscaped areas the upper 0.3 m of backfill below landscape details should be a low permeable soil to reduce surface water infiltration;
- Lateral earth pressure shall be estimated in accordance with Section “7.6 Lateral Earth Pressure”. At rest condition shall be assume for fully restrained retaining wall, and active lateral earth pressure condition should be assumed if relative outward movement is expected;
- For backfill that would underlie paved areas, sidewalks or exterior slabs-on-grade, each lift should be uniformly compacted to achieve 98% of its SPMDD;

- For backfill that would underlie landscaped areas, each lift should be uniformly compacted to at least 95% of its SPMDD;

## 7.8 Underground Utilities

At the subject site, the burial depth of water-bearing utility lines is typically 2.4 m below the ground surface or as dictated by local applicable codes. If this depth is not achievable, equivalent thermal insulation should be provided. The contractor should retain a professional engineer to provide detailed drawings for excavation and temporary support of the excavation walls during construction.

The Occupational Health and Safety Act (OHSA) of Ontario indicated that side slopes in fill above the water could be classified as Type 3 soil and sloped no steeper than 1H:1V or be shored. Below the groundwater level, the fill is considered to be Type 4 Soil and the excavation side slopes must be sloped from their bottom cut back at 3H:1V. Otherwise, lateral support for all excavations such as trench boxes should be used.

For excavation in rock, please refer to Section "7.2.2 Bedrock Excavation".

The engineer designing utilities shall ensure the proposed utility pipes can tolerate compaction loads.

The recommendations within this section are intended to be a supplement to, and not a replacement of the most recent local municipal requirements.

### *7.8.1 Bedding and Cover*

The following are recommendations for service trench bedding and cover materials:

- Bedding for buried utilities should consist of an OPSS.MUNI 1010 "Granular A" material and be placed in accordance with municipal requirements, assuming the subgrade soils are not allowed to become disturbed. All utility pipes and high amps electrical conduits shall receive a minimum of 150 mm bedding.
- The use of clear stone is not recommended for use as pipe bedding.
- The cover material should be a service sand material or an OPSS.MUNI 1010 "Granular A". The dimensions should comply with the pertinent specification section.
- The bedding, spring line, and cover should be compacted to at least 98% of its SPMDD.
- All covers are to be compacted to 100% SPMDD if they are intersecting structural elements.
- Compaction equipment should be used in such a way that the utility pipes are not damaged during construction.

### *7.8.2 Trench Backfill*

Backfill above the cover for buried utilities should be in accordance with the following recommendations:

- For service trenches underlying pavement areas, the backfill should be placed and compacted in uniform lift thickness compatible with the selected compaction equipment and not thicker than 300 mm. Each lift should be compacted to a minimum of 98% of its SPMDD. The upper 0.3 m immediately below the pavement elevation should be compacted to a minimum of 100% of its SPMDD.
- During backfilling, care should be taken to ensure the backfill proceeds in equal stages simultaneously on both sides of the pipe; and
- No frozen material should be used as backfill; neither should the trench base be allowed to freeze.

The quality and workmanship in the construction are as important as the compaction standards themselves. It is imperative that the guidelines for the compaction be followed for the full depth of the trench to achieve satisfactory performance.

# 8.0 CEMENT TYPE AND CORROSION POTENTIAL

A water sample was submitted to Parcel laboratories for testing of chemical properties relevant to exposure of concrete elements to sulphate attacks as well as potential corrosivity effects on buried metallic structural elements. Test results are presented in Table 6-3 and the laboratory results for the chemical analysis are shown in appendix E.

Based on electrical resistivity results and pH-value, the corrosion potential for steel elements in contact to surface water is within the non-aggressive range.

The analytical results of the water sample were compared with applicable Canadian Standards Association (CSA) A23.1-04 and are given in Table 8-1 below.

**Table 8-1: Additional Requirement for Concrete Subjected to Sulphate Attack**

| Class of Exposure | Degree of Exposure | Water Soluble Sulphate in Soil Sample (%) | Cementing Material to be Used |
|---|---|---|---|
| S-1 | Very Severe | > 2.0 | HS or HSb |
| S-2 | Severe | 0.2 – 2.0 | HS or HSb |
| S-3 | Moderate | 0.1 – 0.2 | MS, MSb, LH, HS, or HSb |

The chemical sulphate content analyses for selected soil samples tested indicate a sulphate concentration of maximum of a 0.0003 % in water, as shown in Table 6-3, indicating a “moderate to low” risk for sulphate attack on concrete material.

The potential for sulphate attack on concrete structures is moderate to low. Therefore, Type GU Portland cement may be adequate to protect buried concrete elements in the subsurface conditions encountered.

## 9.0 CONSTRUCTION CONSIDERATIONS

The recommendations presented in this report are based on the assumption that an adequate level of construction monitoring by qualified geotechnical personnel during construction will be provided. The bedrock quality during construction should be confirmed by extending a 1.5 m probe holes into the bedrock within the footing footprints. These holes will need to be reviewed by the geotechnical engineer to confirm that no significant mud seams or voids exist. The holes must be filled with grout after inspection is completed. All bearing surfaces should be inspected and approved by experienced geotechnical personnel prior to placing the footings or lean mix concrete slabs.

In addition, an adequate level of construction monitoring should include laboratory and field test during construction. This includes Full time compaction testing of backfill behind retaining walls and part time compaction testing of general backfill with laboratory testing for the proposed fill soils for this site. Also, periodic testing of concrete is required.

All backfilling shall comply with the OPSS.MUNI 501 for compaction requirements, unless the design recommendations included in this report exceed provisions of OPSS.MUNI 501.

## 10.0 CLOSURE

We trust this geotechnical investigation and design recommendation report meets the requirements of your project. The “Limitations of Report” presented in Appendix A are an integral part of this report. Please contact the undersigned should you have any questions or concerns.

**McIntosh Perry Consulting Engineers Ltd.**

LICENSED PROFESSIONAL ENGINEER
June 26, 2024
P. A. ALMOND
100504002
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M. WANG
100503190
Jun 26, 2024
PROVINCE OF ONTARIO

Michelle Wang, M.Sc. P.Eng.
Geotechnical Engineer

Philip Almond, P.Eng.
Geotechnical Engineer

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# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX A
## LIMITATIONS OF REPORT

MCINTOSH PERRY

# LIMITATIONS OF REPORT

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) carried out the field work and prepared the report. This document is an integral part of the Foundation Investigation and Design report presented.

The conclusions and recommendations provided in this report are based on the information obtained at the borehole locations where the tests were conducted. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the specific locations where tests were conducted and conditions may become apparent during construction, which were not detected and could not be anticipated at the time of the site investigation. The benchmark level used and borehole elevations presented in this report are primarily to establish relative differenced in elevations between the borehole locations and should not be used for other purposes such as to establish elevations for grading, depth of excavations or for planning construction.

The recommendations presented in this report for design are applicable only to the intended structure and the project described in the scope of the work, and if constructed in accordance with the details outlined in the report. Unless otherwise noted, the information contained in this report does not reflect on any environmental aspects of either the site or the subsurface conditions.

The comments or recommendation provided in this report on potential construction problems and possible construction methods are intended only to guide the designer. The number of boreholes advanced at this site may not be sufficient or adequate to reveal all the subsurface information or factors that may affect the method and cost of construction. The contractors who are undertaking the construction shall make their own interpretation of the factual data presented in this report and make their conclusions, as to how the subsurface conditions of the site may affect their construction work.

The boundaries between soil strata presented in the report are based on information obtained at the borehole locations. The boundaries of the soil strata between borehole locations are assumed from geological evidences. If differing site conditions are encountered, or if the Client becomes aware of any additional information that differs from or is relevant to the McIntosh Perry findings, the Client agrees to immediately advise McIntosh Perry so that the conclusions presented in this report may be re-evaluated.

Under no circumstances shall the liability of McIntosh Perry for any claim in contract or in tort, related to the services provided and/or the content and recommendations in this report, exceed the extent that such liability is covered by such professional liability insurance from time to time in effect including the deductible therein, and which is available to indemnify McIntosh Perry. Such errors and omissions policies are available for inspection by the Client at all times upon request, and if the Client desires to obtain further insurance to protect it against any risks beyond the coverage provided by such policies, McIntosh Perry will co-operate with the Client to obtain such insurance.

McIntosh Perry prepared this report for the exclusive use of the Client. Any use which a third party makes of this report, or any reliance on or decision to be made based on it, are the responsibility of such third parties. McIntosh Perry accepts no responsibility and will not be liable for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX B
## SITE AND BOREHOLE LOCATION PLANS

McINTOSH PERRY

LEGEND

○ Site Location

— Local Road

— Major Road

〜 Watercourse

● Waterbody

🟩 Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.

CLIENT:
MISSISSIPPI VALLEY
CONSERVATION AUTHORITY

PROJECT:
GEOTECHNICAL INVESTIGATION AND DESIGN REPORT
KASHWAKAMAK LAKE DAM REPLACEMENT- ONTARIO

TITLE:
SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

| | |
|---|---|
| PROJECT NO:CCO-24-3603 | |
| Date | Nov., 18, 2023 |
| GIS | MG |
| Checked By | JP |

FIGURE:
1

C:\Users\M.Grunstra\McIntosh Perry\GIS - Documents\Projects\2023\CCO\CCO-23-3603_MVCA_Kashwakamak Dam EA\aprx\Geotech\CCO-23-3603 Borehole Locations.aprx

LEGEND

| | |
|---|---|
| ◐ | Borehole Location |
| ⊕ | Basemark Location (B.M. = 262.00 (Abutment planted in 1967)) |

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.

CLIENT: MISSISSIPPI VALLEY CONSERVATION AUTHORITY

PROJECT: GEOTECHNICAL INVESTIGATION AND DESIGN REPORT KASHWAKAMAK LAKE DAM REPLACEMENT- ONTARIO

TITLE: BOREHOLE LOCATIONS

MCINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CCO-24-3603

| | |
|---|---|
| Date | Nov., 25, 2023 |
| GIS | MG |
| Checked By | JP |

FIGURE: 2

C:\Users\M.Grunstra\McIntosh Perry\GIS - Documents\Projects\2023\CCO\CCO-23-3603 MVCA Kashwakamak Dam EA\aprx\Geotech\CCO-23-3603 Borehole Locations.aprx

# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX C
## BOREHOLE LOG RECORDS

McINTOSH PERRY

# EXPLANATION OF TERMS USED IN REPORT

N-VALUE: THE STANDARD PENETRATION TEST (SPT) N-VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5 kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N-VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N-VALUE IS DENOTED THUS $\overline{N}$.

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH ($c_u$) AS FOLLOWS:

| $C_u$ (kPa) | 0 – 12 | 12 – 25 | 25 – 50 | 50 – 100 | 100 – 200 | >200 |
|---|---|---|---|---|---|---|
| | *VERY SOFT* | *SOFT* | *FIRM* | *STIFF* | *VERY STIFF* | *HARD* |

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

| N (BLOWS/0.3m) | 0 – 5 | 5 – 10 | 10 – 30 | 30 – 50 | >50 |
|---|---|---|---|---|---|
| | *VERY LOOSE* | *LOOSE* | *COMPACT* | *DENSE* | *VERY DENSE* |

ROCKS ARE DESCRIBED BY THEIR COMPOSION AND STRUCUTRAL FEATURES AND/OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY IS:

| RQD (%) | 0 – 25 | 25 – 50 | 50 – 75 | 75 – 90 | 90 – 100 |
|---|---|---|---|---|---|
| | *VERY POOR* | *POOR* | *FAIR* | *GOOD* | *EXCELLENT* |

JOINT AND BEDDING:

| SPACING | 50mm | 50 – 300mm | 0.3m – 1m | 1m – 3m | >3m |
|---|---|---|---|---|---|
| JOINTING | *VERY CLOSE* | *CLOSE* | *MOD. CLOSE* | *WIDE* | *VERY WIDE* |
| BEDDING | *VERY THIN* | *THIN* | *MEDIUM* | *THICK* | *VERY THICK* |

## ABBREVIATIONS AND SYMBOLS

### FIELD SAMPLING

| | | | |
|---|---|---|---|
| SS | SPLIT SPOON | TP | THINWALL PISTON |
| WS | WASH SAMPLE | OS | OSTERBERG SAMPLE |
| ST | SLOTTED TUBE SAMPLE | RC | ROCK CORE |
| BS | BLOCK SAMPLE | PH | TW ADVANCED HYDRAULICALLY |
| CS | CHUNK SAMPLE | PM | TW ADVANCED MANUALLY |
| TW | THINWALL OPEN | FS | FOIL SAMPLE |

### STRESS AND STRAIN

| | | |
|---|---|---|
| $u_w$ | kPa | PORE WATER PRESSURE |
| $r_u$ | 1 | PORE PRESSURE RATIO |
| $\sigma$ | kPa | TOTAL NORMAL STRESS |
| $\sigma'$ | kPa | EFFECTIVE NORMAL STRESS |
| $\tau$ | kPa | SHEAR STRESS |
| $\sigma_l, \sigma_2, \sigma_3$ | kPa | PRINCIPAL STRESSES |
| $\varepsilon$ | % | LINEAR STRAIN |
| $\varepsilon_1, \varepsilon_2, \varepsilon_3$ | % | PRINCIPAL STRAINS |
| E | kPa | MODULUS OF LINEAR DEFORMATION |
| G | kPa | MODULUS OF SHEAR DEFORMATION |
| $\mu$ | 1 | COEFFICIENT OF FRICTION |

### MECHANICALL PROPERTIES OF SOIL

| | | |
|---|---|---|
| $m_v$ | $kPa^{-1}$ | COEFFICIENT OF VOLUME CHANGE |
| $c_c$ | 1 | COMPRESSION INDEX |
| $c_s$ | 1 | SWELLING INDEX |
| $c_a$ | 1 | RATE OF SECONDARY CONSOLIDATION |
| $c_v$ | $m^2/s$ | COEFFICIENT OF CONSOLIDATION |
| H | m | DRAINAGE PATH |
| $T_v$ | 1 | TIME FACTOR |
| U | % | DEGREE OF CONSOLIDATION |
| $\sigma'_{vo}$ | kPa | EFFECTIVE OVERBURDEN PRESSURE |
| $\sigma'_p$ | kPa | PRECONSOLIDATION PRESSURE |
| $\tau_f$ | kPa | SHEAR STRENGTH |
| c' | kPa | EFFECTIVE COHESION INTERCEPT |
| $\Phi_{'}$ | $-^o$ | EFFECTIVE ANGLE OF INTERNAL FRICTION |
| $c_u$ | kPa | APPARENT COHESION INTERCEPT |
| $\Phi_u$ | $-^o$ | APPARENT ANGLE OF INTERNAL FRICTION |
| $\tau_R$ | kPa | RESIDUAL SHEAR STRENGTH |
| $\tau_r$ | kPa | REMOULDED SHEAR STRENGTH |
| $S_t$ | 1 | SENSITIVITY = $c_u / \tau_r$ |

### PHYSICAL PROPERTIES OF SOIL

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $P_s$ | $kg/m^3$ | DENSITY OF SOLID PARTICLES | e | 1,% | VOID RATIO | $e_{min}$ | 1,% | VOID RATIO IN DENSEST STATE |
| $\Upsilon_s$ | $kN/m^3$ | UNIT WEIGHT OF SOLID PARTICLES | n | 1,% | POROSITY | $I_D$ | 1 | DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$ |
| $P_w$ | $kg/m^3$ | DENSITY OF WATER | w | 1,% | WATER CONTENT | D | mm | GRAIN DIAMETER |
| $\Upsilon_w$ | $kN/m^3$ | UNIT WEIGHT OF WATER | $s_r$ | % | DEGREE OF SATURATION | $D_n$ | mm | N PERCENT – DIAMETER |
| $P$ | $kg/m^3$ | DENSITY OF SOIL | $w_L$ | % | LIQUID LIMIT | $C_u$ | 1 | UNIFORMITY COEFFICIENT |
| $\Upsilon$ | $kN/m^3$ | UNIT WEIGHT OF SOIL | $w_P$ | % | PLASTIC LIMIT | h | m | HYDRAULIC HEAD OR POTENTIAL |
| $P_d$ | $kg/m^3$ | DENSITY OF DRY SOIL | $w_s$ | % | SHRINKAGE LIMIT | q | $m^3/s$ | RATE OF DISCHARGE |
| $\Upsilon_d$ | $kN/m^3$ | UNIT WEIGHT OF DRY SOIL | $I_P$ | % | PLASTICITY INDEX = $(W_L – W_L)$ | v | m/s | DISCHARGE VELOCITY |
| $P_{sat}$ | $kg/m^3$ | DENSITY OF SATURATED SOIL | $I_L$ | 1 | LIQUIDITY INDEX = $(W – W_P)/ I_P$ | i | 1 | HYDAULIC GRADIENT |
| $\Upsilon_{sat}$ | $kN/m^3$ | UNIT WEIGHT OF SATURATED SOIL | $I_C$ | 1 | CONSISTENCY INDEX = $(W_L – W) / 1_P$ | k | m/s | HYDRAULIC CONDUCTIVITY |
| $P'$ | $kg/m^3$ | DENSITY OF SUBMERED SOIL | $e_{,max}$ | 1,% | VOID RATIO IN LOOSEST STATE | j | $kN/m^3$ | SEEPAGE FORCE |
| $\Upsilon'$ | $kN/m^3$ | UNIT WEIGHT OF SUBMERGED SOIL | | | | | | |

McINTOSH PERRY

PROJECT NO.: **CCO-23-3603**

PROJECT: Geotechnical Investigation - Kashwakamak Lake Dam

CLIENT: Mississippi Valley Conservation Authority

PROJECT LOCATION: Township of North Frontenac, ON

Drilling Date: Sep-22-2023 - Sep-25-2023

BH Location: N 4972860; E 345362

Drilling Equipment: Portable Hilti Drill

Drilling Method: Portable Hilti Drill

Remarks: Coordinate System - UTM Zone 18 T

**BH No: 23-1**

Datum: Geodetic

Elevation: 259.3 m

Compiled by: JF

Checked by: MAK

| SOIL PROFILE | | | SAMPLES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELEV DEPTH | DESCRIPTION | STRATA PLOT | NUMBER | TYPE | "N" BLOWS/0.3 m RQD (%) | RECOVERY (%) | GROUNDWATER CONDITIONS | DEPTH (m) | ELEVATION (m) | DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80<br>SHEAR STRENGTH (kPa) Field. Shear Vane (x) & Sensitivity (s) Pocket Penetrometer ✖ ● Quick Triaxial ○ Unconfined 20 40 60 80 | PLASTIC LIMIT $W_P$ NATURAL MOISTURE CONTENT W LIQUID LIMIT $W_L$<br>WATER CONTENT (%) 10 20 30 40 50 60 70 80 90 | Remarks and Grain Size Distribution (%) Unit Weight (kN/m$^3$) Pocket Penetro. (kPa) GR SA SI CL | |
| 259.3 | Bedrock | | | | | | | | | | | | |
| 0.0 | **Carbonite Metasedimentary Bedrock** marble parting diagonally, strong, grey to darck grey with white bands of marble, fresh to slightly wethered, medium to thinly bedded, good to excellent quality based on RQD. | | 1 | RC | 93 | 100% | | 0.0 | 259 | | | | |
| | | | 2 | RC | 89 | 100% | | 1.0 | 258 | | | UCS = 164 Mpa | |
| | | | 3 | RC | 94 | 100% | | 2.0 | 257 | | | | |
| | | | 4 | RC | 84 | 98% | | 3.0 | 256 | | | UCS = 167 Mpa | |
| | | | 5 | RC | 100 | 100% | | 4.0 | 255 | | | | |
| | | | 6 | RC | 83 | 98% | | 5.0 | 254 | | | UCS = 177 Mpa | |
| 252.8 | | | 7 | RC | 92 | 100% | | 6.0 | 253 | | | | |
| 6.5 | **End of borehole** | | | | | | | | | | | | |

GRAPH NOTES

$\overset{30}{\underset{3}{\times}}$ Upper value = Field Vane Shear Strength
Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

McINTOSH PERRY

PROJECT NO.: **CCO-23-3603**

PROJECT: Geotechnical Investigation - Kashwakamak Lake Dam

CLIENT: Mississippi Valley Conservation Authority

PROJECT LOCATION: Township of North Frontenac, ON

Drilling Date: Sep-20-2023 - Sep-20-2023

BH Location: N 4972859; E 345352

Drilling Equipment: Portable Hilti Drill

Drilling Method: Portable Hilti Drill

Remarks: Coordinate System - UTM Zone 18 T

## BH No: 23-2

Datum: Geodetic

Elevation: 258.6 m

Compiled by: JF

Checked by: MAK

| SOIL PROFILE | | | SAMPLES | | | | GROUNDWATER CONDITIONS | DEPTH (m) | ELEVATION (m) | DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80<br>SHEAR STRENGTH (kPa) Field. Shear Vane (x) & Sensitivity (s) Pocket Penetrometer ✖ ● Quick Triaxial ○ Unconfined 20 40 60 80 | PLASTIC LIMIT $W_P$ NATURAL MOISTURE CONTENT W LIQUID LIMIT $W_L$<br>WATER CONTENT (%) 10 20 30 40 50 60 70 80 90 | Remarks and Grain Size Distribution (%) Unit Weight (kN/m$^3$) Pocket Penetro. (kPa) GR SA SI CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELEV DEPTH | DESCRIPTION | STRATA PLOT | NUMBER | TYPE | "N" BLOWS/0.3 m RQD (%) | RECOVERY (%) | | | | | | |
| 258.6 | Bedrock | | | | | | | | | | | |
| 0.0 | **Carbonite Metasedimentary Bedrock** marble parting diagonally, strong, grey to darck grey with white bands of marble, fresh to slightly wethered, medium to thinly bedded, excellent quality based on RQD. | ▨ | 1 | RC | 91 | 99% | | 0.0<br>1.0 | 258 | | | UCS = 201 Mpa |
| | | ▨ | 2 | RC | 92 | 92% | | 2.0 | 257 | | | |
| | | ▨ | 3 | RC | 100 | 100% | | 3.0 | 256 | | | |
| | | ▨ | 4 | RC | 76 | 97% | | | 255 | | | UCS = 208 Mpa |
| | | ▨ | 5 | RC | 97 | 100% | | 4.0 | 254 | | | |
| | | ▨ | 6 | RC | 75 | 94% | | 5.0 | | | | |
| | | ▨ | 7 | RC | 100 | 100% | | | | | | UCS = 195 Mpa |
| 253.0<br>5.6 | **End of borehole** | | | | | | | | | | | |

GRAPH NOTES

$\overset{30}{\underset{3}{\times}}$ Upper value = Field Vane Shear Strength
Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

McINTOSH PERRY

PROJECT NO.: **CCO-23-3603**

PROJECT: Geotechnical Investigation - Kashwakamak Lake Dam

CLIENT: Mississippi Valley Conservation Authority

PROJECT LOCATION: Township of North Frontenac, ON

Drilling Date: Sep-18-2023 - Sep-18-2023

BH Location: N 4972865; E 345350

Drilling Equipment: CME 75 Trackmount

Drilling Method: CME 75 Trackmount

Remarks: Coordinate System - UTM Zone 18 T

# BH No: 23-4 MW

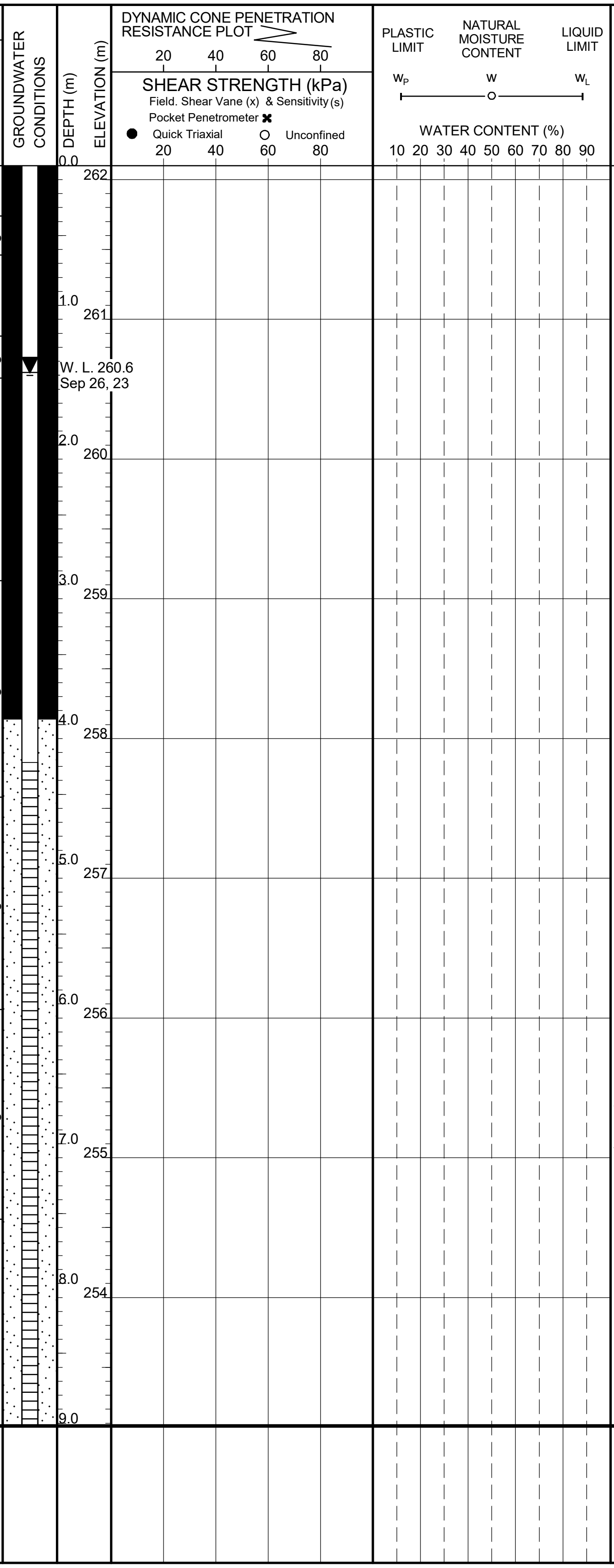
Datum: Geodetic

Elevation: 262.1 m

Compiled by: JF

Checked by: MAK

| SOIL PROFILE |  | SAMPLES |  |  |  | Remarks and Grain Size Distribution (%) |
|---|---|---|---|---|---|---|
| ELEV DEPTH | DESCRIPTION | NUMBER | TYPE | "N" BLOWS/0.3 m RQD (%) | RECOVERY (%) | Unit Weight (kN/m³) Pocket Penetro. (kPa) GR SA SI CL |
| 262.1 | Access Road |  |  |  |  |  |
| 0.0 | **Topsoil** | 1 | SS | 50/ 50mm | 86% |  |
| 261.7<br>0.4 | **Carbonite Metasedimentary Bedrock** marble parting diagonally, strong, grey to darck grey with white bands of marble, fresh to slightly wethered, medium to thinly bedded, good to excellent quality based on RQD. | 2 | RC | 63 | 100% |  |
|  |  | 3 | RC | 95 | 98% |  |
|  |  | 4 | RC | 67 | 100% |  |
|  |  | 5 | RC | 56 | 86% |  |
|  |  | 6 | RC | 82 | 104% |  |
|  |  | 7 | RC | 97 | 100% | UCS = 158 Mpa |
|  |  | 8 | RC | 73 | 100% | Verical crack encountered from 6.7 to 6.9 m. |
|  |  | 9 | RC | 91 | 98% |  |
| 253.1<br>9.0 | **End of borehole**<br>Monitoring Well Installed |  |  |  |  |  |



GRAPH NOTES

30/3 Upper value = Field Vane Shear Strength
Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

McINTOSH PERRY

PROJECT NO.: **CCO-23-3603**

PROJECT: Geotechnical Investigation - Kashwakamak Lake Dam

CLIENT: Mississippi Valley Conservation Authority

PROJECT LOCATION: Township of North Frontenac, ON

Drilling Date: Sep-19-2023 - Sep-19-2023

BH Location: N 4972839; E 345348

Drilling Equipment: Portable Hilti Drill

Drilling Method: Portable Hilti Drill

Remarks: Coordinate System - UTM Zone 18 T

# BH No: 23-5

Datum: Geodetic

Elevation: 259.2 m

Compiled by: JF

Checked by: MAK

| SOIL PROFILE | | SAMPLES | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ELEV<br>DEPTH | DESCRIPTION | NUMBER | TYPE | "N" BLOWS/0.3 m<br>RQD (%) | RECOVERY (%) | GROUNDWATER CONDITIONS | DEPTH (m) | ELEVATION (m) | Remarks and Grain Size Distribution (%)<br>Unit Weight (kN/m³)<br>Pocket Penetro. (kPa)<br>GR SA SI CL |
| 259.2 | Bedrock | | | | | | | | |
| 0.0 | **Carbonite Metasedimentary Bedrock** marble parting diagonally, strong, grey to darck grey with white bands of marble, fresh to slightly wethered, medium to thinly bedded, good to excellent quality based on RQD. | 1 | RC | 87 | 100% | | 0.0 | 259 | |
| | | 2 | RC | 92 | 100% | | 1.0 | 258 | UCS = 211 Mpa |
| | | 3 | RC | 95 | 95% | | 2.0 | 257 | |
| | | 4 | RC | 81 | 102% | | 3.0 | 256 | UCS = 174 Mpa |
| | | 5 | RC | 93 | 100% | | 4.0 | 255 | |
| | | 6 | RC | 64 | 96% | | 5.0 | 254 | UCS = 126 Mpa |
| 252.9 | | 7 | RC | 98 | 103% | | 6.0 | 253 | |
| 6.3 | **End of borehole** | | | | | | | | |

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80

SHEAR STRENGTH (kPa)
Field. Shear Vane (x) & Sensitivity (s)
Pocket Penetrometer ✖
● Quick Triaxial ○ Unconfined
20 40 60 80

PLASTIC LIMIT $W_P$ — NATURAL MOISTURE CONTENT $W$ — LIQUID LIMIT $W_L$

WATER CONTENT (%)
10 20 30 40 50 60 70 80 90

GRAPH NOTES

$\overset{30}{\underset{3}{\times}}$ Upper value = Field Vane Shear Strength
Lower value = Vane Sensitivity

○ ε=3%
Strain at Failure

# Retrieved Rock Cores

## (BH23-1)

RC 1 – 259.3 to 258.18 m
(RQD = 93%)

RC 2 – 258.18 to 257.04 m
(RQD = 89%)

## (BH23-1)

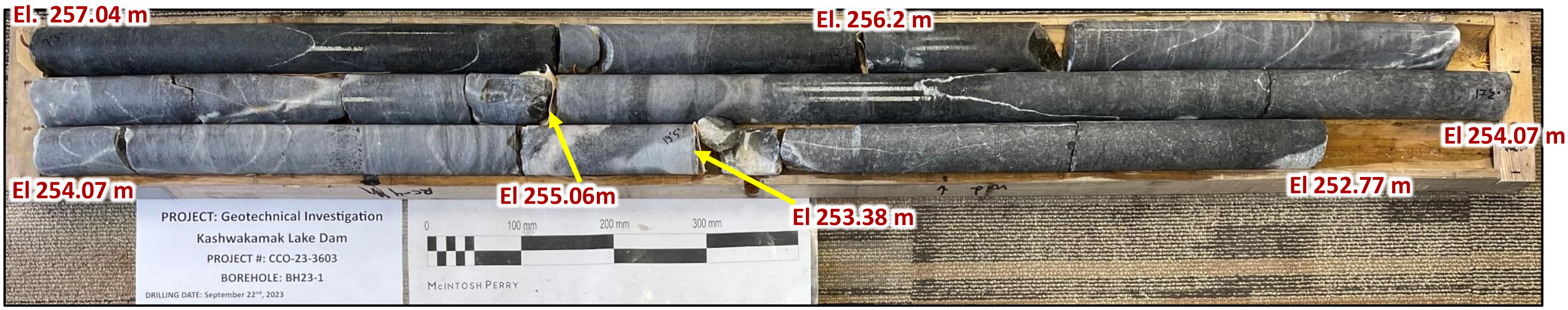
RC3 – 257.04 to 256.2m
(RQD = 94%)

RC4 – 256.2 to 255.06 m
(RQD = 84%)

RC5 – 255.06 to 254.07 m
(RQD = 100%)

RC6 – 254.07 to 253.38
(RQD = 83%)

RC7 – 253.38 to 252.77
(RQD =92%)



McINTOSH PERRY

**Kashwakamak Lake Dam**

Township of North Frontenac, ON

**Project No: CCO-23-3603**
**Client: MVCA**

# Retrieved Rock Cores (BH23–2)

**RC1 – 258.6 to 257.38 m**
**(RQD=91%)**

**RC2 – 257.38 to 256.11 m**
**(RQD=92%)**

**RC3 – 256.11 to 255.45 m**
**(RQD=100%)**

**RC4 – 255.45 to 254.59 m**
**(RQD=76%)**

**RC5 – 254.59 to 253.72m**
**(RQD = 97%)**

**RC6 – 253.72 to 253.52 m**
**(RQD = 75%)**

**RC7 – 253.52 to 253.01**
**(RQD = 100%)**

McINTOSH PERRY

**Kashwakamak Lake Dam**

Township of **North Frontenac, ON**

**Project No: CCO-23-3603**
**Client: MVCA**

# Retrieved Rock Cores

## (BH23-4)

**RC2 – 262.1 to 261.82 m**
**(RQD = 63%)**

**RC3 – 261.82 to 261.24 m**
**(RQD = 95%)**

**RC4 – 261.24 to 260.94 m**
**(RQD = 67%)**

**RC5 – 260.94 to 259.49 m**
**(RQD = 56%)**

**RC6 – 259.49 to 257.94 m**
**(RQD = 82%)**

## (BH23-4)

**RC7 – 257.94 to 256.42m**
**(RQD = 97%)**

**RC8 – 256.42 to 254.92 m**
**(RQD = 73%)**

**RC9 – 254.92 to 253.44 m**
**(RQD=91%)**

McINTOSH PERRY

**Kashwakamak Lake Dam**

**Township of North Frontenac, ON**

**Project No: CCO-23-3603**
**Client: MVCA**

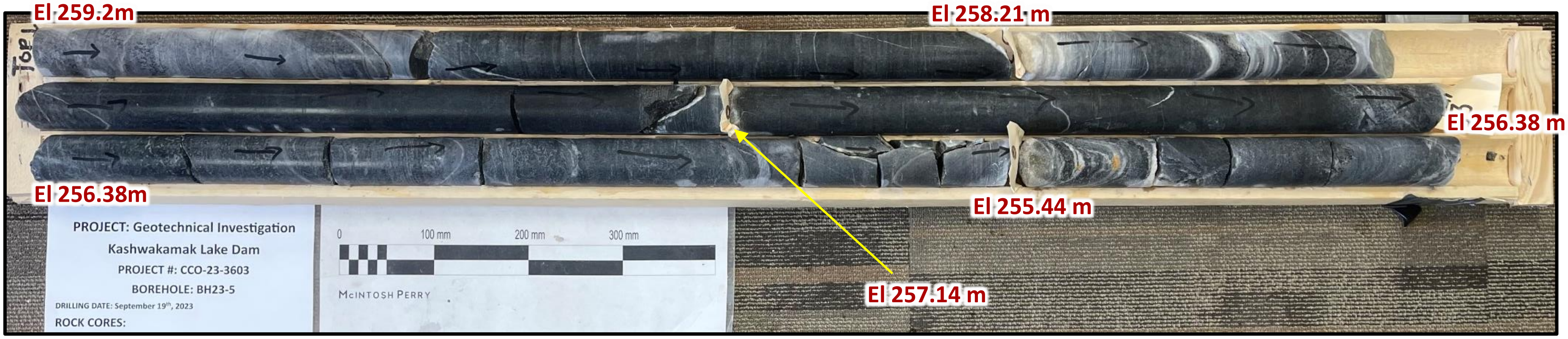
# Retrieved Rock Cores (BH23-5)

**RC1 – 259.2 to 258.21 m**
**(RQD=87%)**

**RC2 – 258.21 to 257.14 m**
**(RQD=92%)**

**RC3 – 257.14 to 256.38 m**
**(RQD=95%)**

**RC4 – 256.38 to 255.44 m**
**(RQD=81%)**



PROJECT: Geotechnical Investigation
Kashwakamak Lake Dam
PROJECT #: CCO-23-3603
BOREHOLE: BH23-5
DRILLING DATE: September 19th, 2023
ROCK CORES:

**RC5 – 255.44 to 254.32m**
**(RQD = 93%)**

**RC6 – 254.32 to 253.71 m**
**(RQD = 64%)**

**RC7 – 253.71 to 252.9**
**(RQD = 98%)**

PROJECT: Geotechnical Investigation
Kashwakamak Lake Dam
PROJECT #: CCO-23-3603
BOREHOLE: BH23-5
DRILLING DATE: September 19th, 2023

McINTOSH PERRY

**Kashwakamak Lake Dam**

**Township of North Frontenac, ON**

**Project No: CCO-23-3603**
**Client: MVCA**

# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX D
## PACKER TESTING RESULTS

McINTOSH PERRY

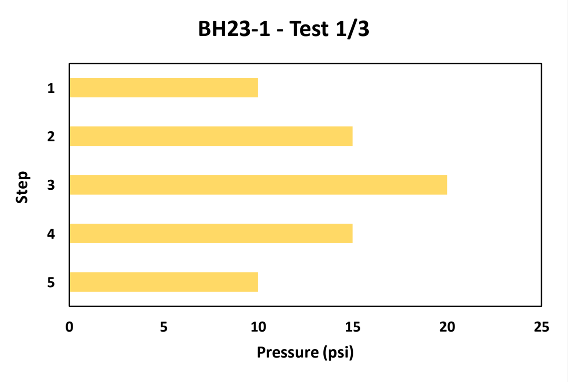
## Packer Testing Analysis
## Kashwakamak Lake Dam Replacement– Ontario

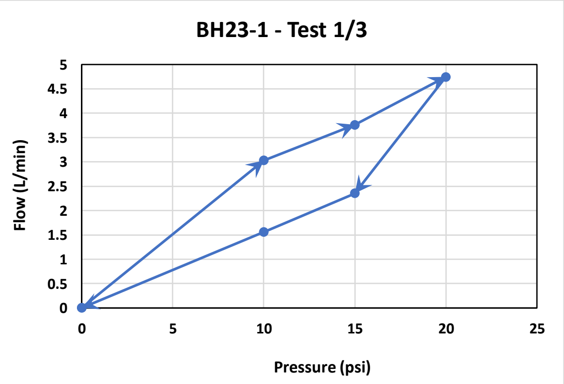
# Table D.1

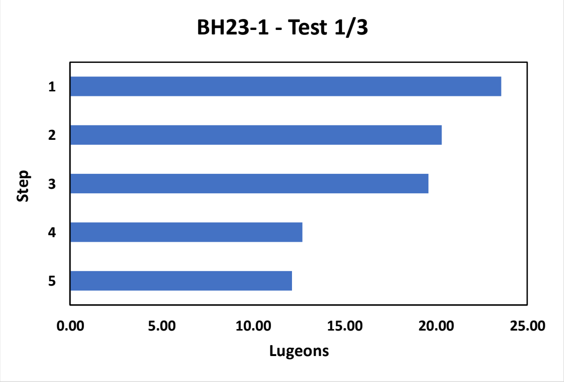
## BH23-1 - Test 1/3

Top of section(ft) = 16
Bottom of Section (ft) = 21.42
Total length (ft)= 5.42
Total length (m)= 1.65
Surface Elevation (m) = 259.3
Section Int. El. (m) 254.4 252.8
Depth to center of tested section (m) = 5.7
Depth to Groundwater (m) = 0
$H_{gauge}$ above ground (m) = 0.9

| | Flow (Gallon) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure *p* (bar) | **K (m/s)** | **Lugeons, V** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 3737.15 | 3737.98 | 3738.81 | 3739.55 | 3740.38 | 3741.15 | 0.8 | 3.028328 | 0.003028328 | 5.04721E-05 | 7.03 | 7.93 | 0.778 | **2.49E-06** | **23.59** |
| 15 | 3742.1 | 3742.22 | 3744.2 | 3745.43 | 3746.09 | 3747.07 | 0.994 | 3.76269754 | 0.003762698 | 6.27116E-05 | 10.54 | 11.44 | 1.122 | **2.145E-06** | **20.32** |
| 20 | 3747.98 | 3749.33 | 3750.61 | 3751.88 | 3753.13 | 3754.25 | 1.254 | 4.74690414 | 0.004746904 | 7.91151E-05 | 14.06 | 14.96 | 1.468 | **2.069E-06** | **19.60** |
| 15 | 3755.26 | 3755.93 | 3756.64 | 3757.35 | 3758.04 | 3758.37 | 0.622 | 2.35452502 | 0.002354525 | 3.92421E-05 | 10.54 | 11.44 | 1.122 | **1.342E-06** | **12.72** |
| 10 | 3759.33 | 3759.79 | 3760.23 | 3760.64 | 3760.99 | 3761.39 | 0.412 | 1.55958892 | 0.001559589 | 2.59931E-05 | 7.03 | 7.93 | 0.778 | **1.282E-06** | **12.15** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | **Average Values =** | **1.866E-06** | **17.1** |







**Flow Behavior:** **Void Filling**
**Lugeon:** **12.15**
**Hydraulic Conductivity:** **1.28239E-06**

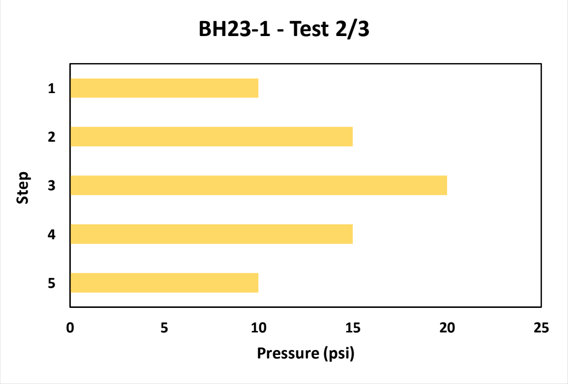
**Packer Testing Analysis**
**Kashwakamak Lake Dam Replacement– Ontario**

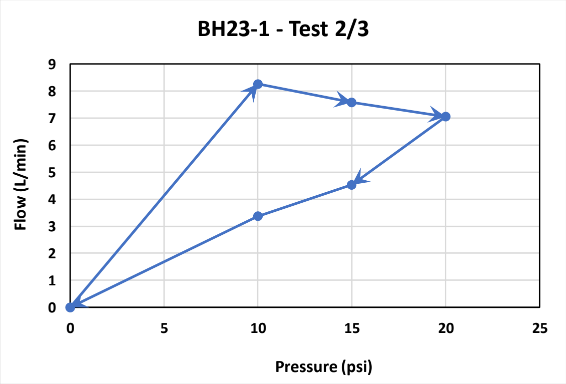
*CCO-23-3603*

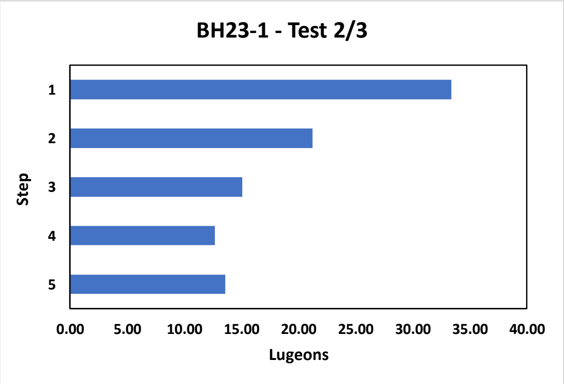
## Table D.2

### BH23-1 - Test 2/3

| Top of section(ft) = | | 11 | Bottom of Section (ft) = | | | 21.42 | Total length (ft)= | | | 10.42 | Total length (m)= | | | 3.18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Elevation (m) = | | 259.3 | Section Int. El. (m) | | 255.9 | 252.8 | Depth to center of tested section (m) = | | | | | 4.94 | | |
| Depth to Groundwater (m) = | | 0 | $H_{gauge}$ above ground (m) = | | | 0.9 | | | | | | | | |
| | Flow (Gallon) | | | | | | | | | | | | | |
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure *p* (bar) | **K (m/s)** | **Lugeons, V** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 3761.35 | 3763.92 | 3766.44 | 3768.41 | 3770.37 | 3772.26 | 2.182 | 8.25976462 | 0.008259765 | 0.000137663 | 7.03 | 7.93 | 0.778 | **4.094E-06** | **33.39** |
| 15 | 3773.98 | 3776.18 | 3778.26 | 3780.29 | 3782.17 | 3783.99 | 2.002 | 7.57839082 | 0.007578391 | 0.000126307 | 10.54 | 11.44 | 1.122 | **2.604E-06** | **21.24** |
| 20 | 3786.7 | 3789 | 3791.1 | 3793.22 | 3795.29 | 3796.01 | 1.862 | 7.04843342 | 0.007048433 | 0.000117474 | 14.06 | 14.96 | 1.468 | **1.852E-06** | **15.10** |
| 15 | 3799.2 | 3801.8 | 3802.27 | 3803.72 | 3803.72 | 3805.18 | 1.196 | 4.52735036 | 0.00452735 | 7.54558E-05 | 10.54 | 11.44 | 1.122 | **1.556E-06** | **12.69** |
| 10 | 3807.95 | 3808.82 | 3809.76 | 3810.67 | 3811.55 | 3812.4 | 0.89 | 3.3690149 | 0.003369015 | 5.61502E-05 | 7.03 | 7.93 | 0.778 | **1.67E-06** | **13.62** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | 0 | | | | |
| | | | | | | | | | | | | | **Average Values =** | **2.355E-06** | **19.2** |







**Flow Behavior:** Turbulent
**Lugeon:** 15.10
**Hydraulic Conductivity:** 1.8519E-06

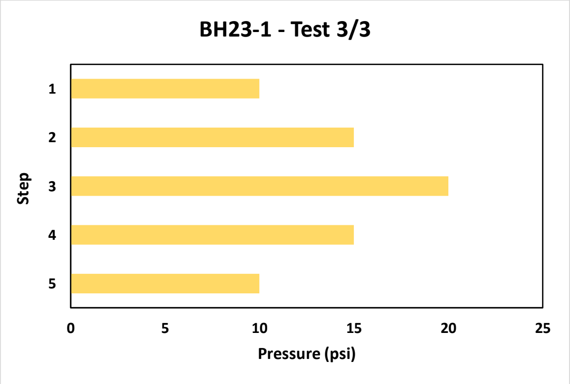
**Packer Testing Analysis**
**Kashwakamak Lake Dam Replacement– Ontario**

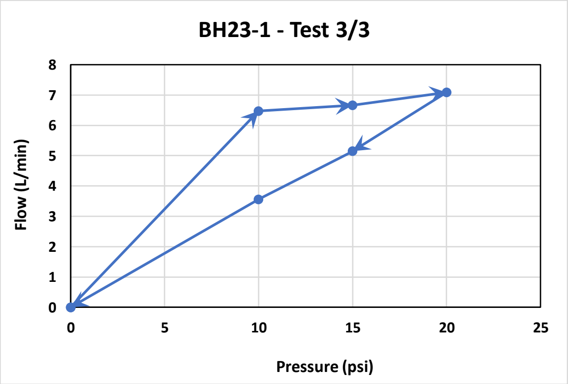
*CCO-23-3603*

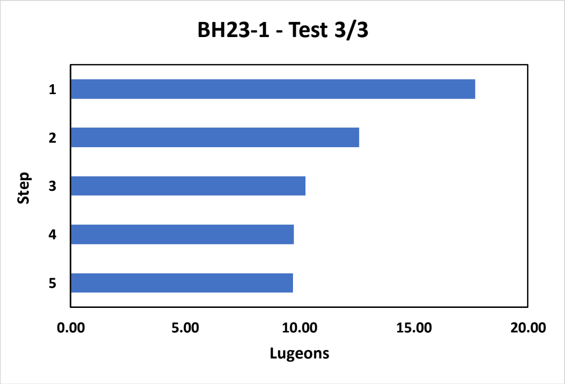
# Table D.3

## BH23-1 - Test 3/3

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top of section(ft) = | | 6 | Bottom of Section (ft) = | | | 21.42 | | | Total length (ft)= | 15.42 | | | | Total length (m)= | 4.7 |
| Surface Elevation (m) = | | 259.3 | Section Int. El. (m) | | 257.5 | 252.8 | | | | | Depth to center of tested section (m) = | 4.18 | | | |
| Depth to Groundwater (m) = | | 0 | $H_{gauge}$ above ground (m) = | | | 0.9 | | | | | | | | | |
| | Flow (Gallon) | | | | | | | | | | | | | | |
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure *p* (bar) | K (m/s) | Lugeons, V |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 3812.4 | 3814.36 | 3816.27 | 3817.85 | 3819.45 | 3820.95 | 1.71 | 6.4730511 | 0.006473051 | 0.000107884 | 7.03 | 7.93 | 0.778 | **2.351E-06** | **17.70** |
| 15 | 3822.2 | 3823.1 | 3825.87 | 3827.6 | 3829.31 | 3831 | 1.76 | 6.6623216 | 0.006662322 | 0.000111039 | 10.54 | 11.44 | 1.122 | **1.677E-06** | **12.63** |
| 20 | 3832.94 | 3835 | 3836.86 | 3838.7 | 3840.56 | 3842.3 | 1.872 | 7.08628752 | 0.007086288 | 0.000118105 | 14.06 | 14.96 | 1.468 | **1.364E-06** | **10.27** |
| 15 | 3843.6 | 3845.06 | 3846.42 | 3847.78 | 3849.19 | 3850.4 | 1.36 | 5.1481576 | 0.005148158 | 8.58026E-05 | 10.54 | 11.44 | 1.122 | **1.296E-06** | **9.76** |
| 10 | 3851.4 | 3852.4 | 3853.34 | 3854.29 | 3855.25 | 3856.1 | 0.94 | 3.5582854 | 0.003558285 | 5.93048E-05 | 7.03 | 7.93 | 0.778 | **1.292E-06** | **9.73** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | **Average Values =** | **1.596E-06** | **12.0** |


**BH23-1 - Test 3/3**


**BH23-1 - Test 3/3**


**BH23-1 - Test 3/3**

**Flow Behavior:** **Void Filling**
**Lugeon:** **9.73**
**Hydraulic Conductivity:** **1.29225E-06**

## Packer Testing Analysis
## Kashwakamak Lake Dam Replacement– Ontario

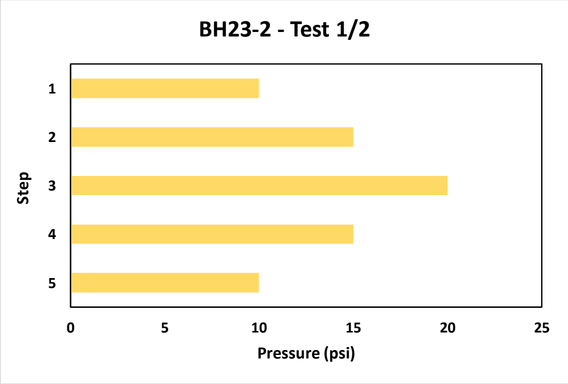
*CCO-23-3603*

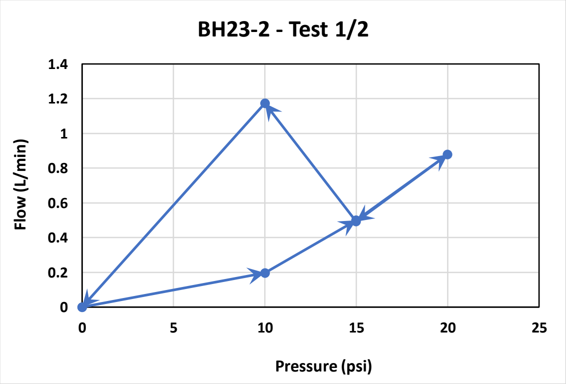
### Table D.4

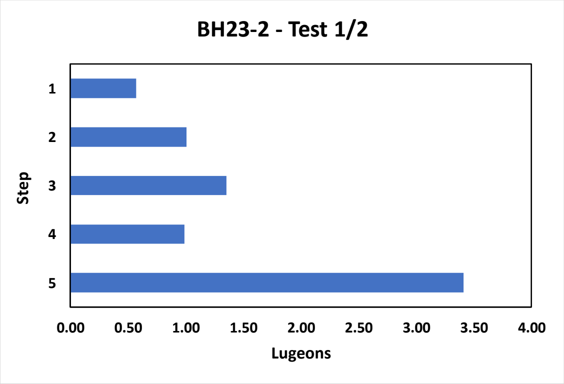
### BH23-2 - Test 1/2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Top of section(ft) = | 3.83 | Bottom of Section (ft) = | 18.33 | Total length (ft)= | 14.5 | Total length (m)= | 4.42 |
| Surface Elevation (m) = | 259.3 | Section Int. El. (m) | 258.1 | 253.7 | Depth to center of tested section (m) = | 3.38 | |
| Depth to Groundwater (m) = | 0 | $H_{gauge}$ above ground (m) = | 0.9 | | | | |

| | Flow (Gallon) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure *p* (bar) | K (m/s) | Lugeons, V |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 3717.56 | 3717.65 | 3717.7 | 3717.73 | 3717.77 | 3717.82 | 0.052 | 0.19684132 | 0.000196841 | 3.28069E-06 | 7.03 | 7.93 | 0.778 | 7.51E-08 | 0.57 |
| 15 | 3718 | 3718.16 | 3718.2 | 3718.42 | 3718.54 | 3718.66 | 0.132 | 0.49967412 | 0.000499674 | 8.3279E-06 | 10.54 | 11.44 | 1.122 | 1.321E-07 | 1.01 |
| 20 | 3718.83 | 3719.08 | 3719.35 | 3719.53 | 3719.76 | 3719.99 | 0.232 | 0.87821512 | 0.000878215 | 1.46369E-05 | 14.06 | 14.96 | 1.468 | 1.776E-07 | 1.35 |
| 15 | 3720.13 | 3720.27 | 3720.4 | 3720.53 | 3720.66 | 3720.78 | 0.13 | 0.4921033 | 0.000492103 | 8.20172E-06 | 10.54 | 11.44 | 1.122 | 1.301E-07 | 0.99 |
| 10 | 3721.17 | 3721.55 | 3721.86 | 3722.18 | 3722.44 | 3722.72 | 0.31 | 1.1734771 | 0.001173477 | 1.9558E-05 | 7.03 | 7.93 | 0.778 | 4.477E-07 | 3.41 |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | Average Values = | 1.925E-07 | 1.5 |







**Flow Behavior:** Wash-out
**Lugeon:** 3.41
**Hydraulic Conductivity:** 4.47709E-07

## Packer Testing Analysis
## Kashwakamak Lake Dam Replacement– Ontario

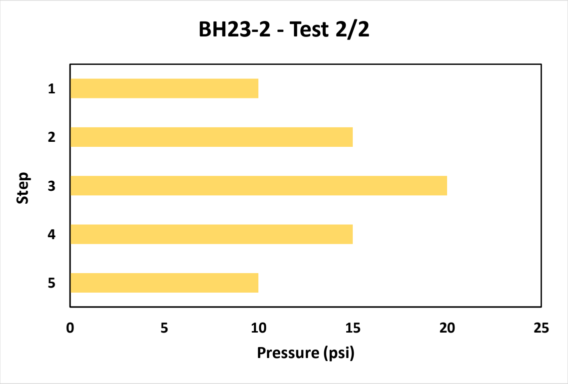
*CCO-23-3603*

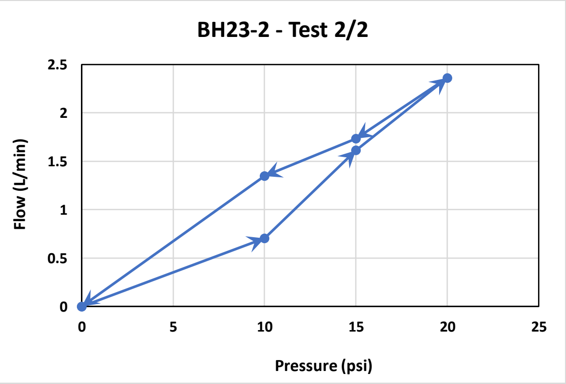
# Table D.5

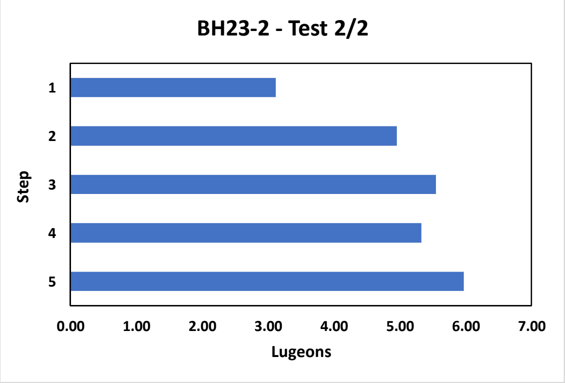
## BH23-2 - Test 2/2

Top of section(ft) = 8.83
Bottom of Section (ft) = 18.33
Total length (ft)= 9.5
Total length (m)= 2.9
Surface Elevation (m) = 259.3
Section Int. El. (m) 256.6 253.7
Depth to center of tested section (m) = 4.14
Depth to Groundwater (m) = 0
$H_{gauge}$ above ground (m) = 0.9

| | Flow (Gallon) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}$/p.g | ΔH (m) | Net Inj Pressure *p* (bar) | K (m/s) | Lugeons, V |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 3723.13 | 3723.38 | 3723.54 | 3723.72 | 3723.89 | 3724.06 | 0.186 | 0.70408626 | 0.000704086 | 1.17348E-05 | 7.03 | 7.93 | 0.778 | 3.752E-07 | 3.12 |
| 15 | 3724.49 | 3724.93 | 3725.34 | 3725.73 | 3726.1 | 3726.62 | 0.426 | 1.61258466 | 0.001612585 | 2.68764E-05 | 10.54 | 11.44 | 1.122 | 5.957E-07 | 4.95 |
| 20 | 3728.22 | 3728.95 | 3729.44 | 3730.15 | 3730.74 | 3731.34 | 0.624 | 2.36209584 | 0.002362096 | 3.93683E-05 | 14.06 | 14.96 | 1.468 | 6.672E-07 | 5.55 |
| 15 | 3731.82 | 3732.33 | 3732.75 | 3733.29 | 3733.65 | 3734.11 | 0.458 | 1.73371778 | 0.001733718 | 2.88953E-05 | 10.54 | 11.44 | 1.122 | 6.404E-07 | 5.33 |
| 10 | 3734.46 | 3734.82 | 3735.21 | 3735.54 | 3735.9 | 3736.24 | 0.356 | 1.34760596 | 0.001347606 | 2.24601E-05 | 7.03 | 7.93 | 0.778 | 7.181E-07 | 5.97 |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | Average Values = | 5.993E-07 | 5.0 |







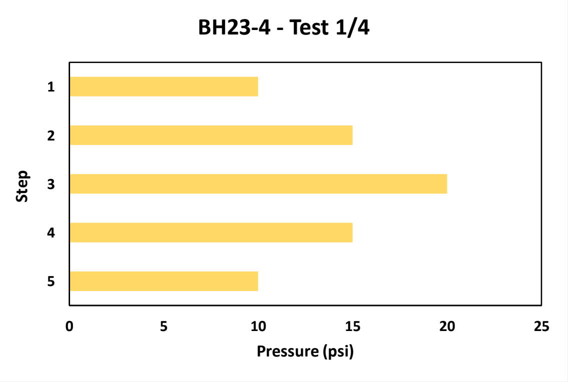
**Flow Behavior:** Wash-out
**Lugeon:** 5.97
**Hydraulic Conductivity:** 7.18119E-07

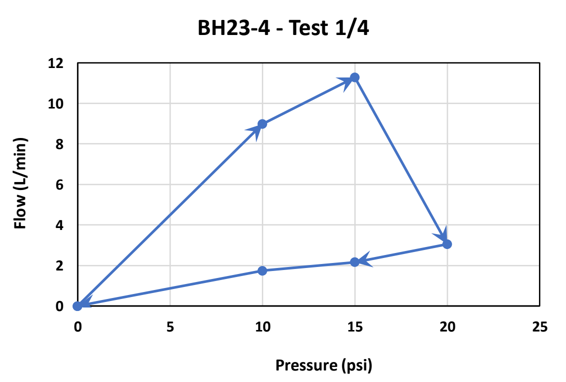
## Table D.6

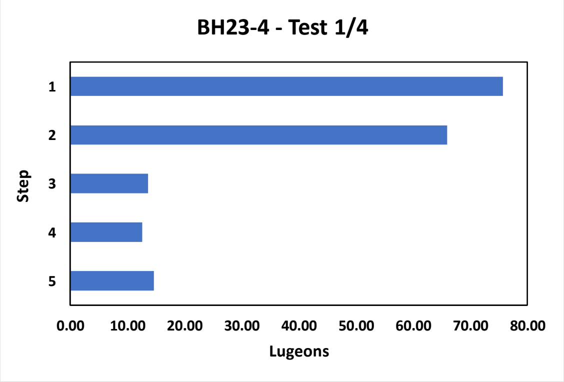
### BH23-4 - Test 1/4

Top of section(ft) = 24.58
Bottom of Section (ft) = 29.58
Total length (ft)= 5
Total length (m)= 1.524
Surface Elevation (m) = 262.1
Section Int. El. (m) 254.6 253.1
Depth to center of tested section (m) = 8.253984
Depth to Groundwater (m) = 0
$H_{gauge}$ above ground (m) = 0.9

| | Flow (Gallon) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}$/ρ.g | Net Inj Head ΔH | Net Inj Pressure *p* (bar) | K (m/s) | Lugeons, V |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 75.3 | 78.23 | 78.78 | 81.93 | 84.05 | 87.16 | 2.372 | 8.97899252 | 0.008978993 | 0.00014965 | 7.03 | 7.93 | 0.778 | 7.837E-06 | 75.74 |
| 15 | 88.7 | 92.55 | 95.32 | 99.62 | 102.77 | 103.6 | 2.98 | 11.2805218 | 0.011280522 | 0.000188009 | 10.54 | 11.44 | 1.122 | 6.825E-06 | 65.96 |
| 20 | 108.06 | 108.97 | 109.66 | 110.47 | 111.29 | 112.09 | 0.806 | 3.05104046 | 0.00305104 | 5.08507E-05 | 14.06 | 14.96 | 1.468 | 1.412E-06 | 13.64 |
| 15 | 113.73 | 114.4 | 115.13 | 115.7 | 116.34 | 116.58 | 0.57 | 2.1576837 | 0.002157684 | 3.59614E-05 | 10.54 | 11.44 | 1.122 | 1.305E-06 | 12.62 |
| 10 | 118.3 | 119.05 | 119.41 | 120.95 | 120.26 | 120.6 | 0.46 | 1.7412886 | 0.001741289 | 2.90215E-05 | 7.03 | 7.93 | 0.778 | 1.52E-06 | 14.69 |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | Average Values = | 3.78E-06 | 36.5 |







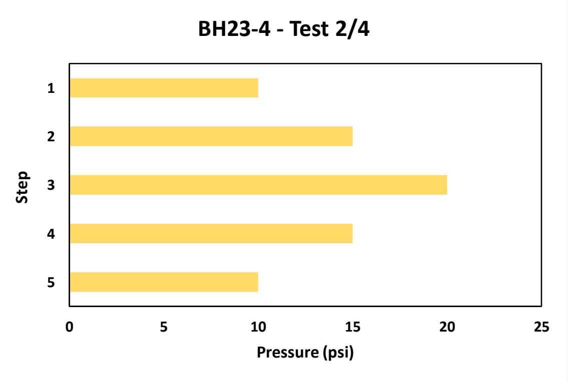
**Flow Behavior:** Void Filling
**Lugeon:** 14.69
**Hydraulic Conductivity:** 1.51981E-06

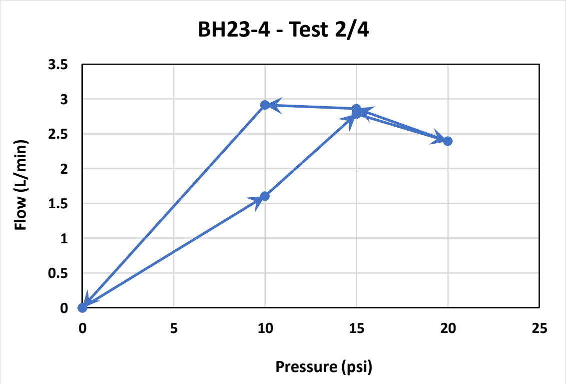
## Table D.7

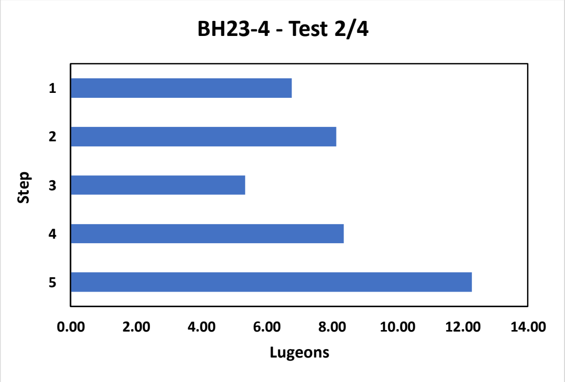
### BH23-4 - Test 2/4

Top of section(ft) = 19.58
Bottom of Section (ft) = 29.58
Total length (ft)= 10
Total length (m)= 3.048
Surface Elevation (m) = 262.1
Section Int. El. (m) 256.1 253.1
Depth to center of tested section (m) = 7.491984
Depth to Groundwater (m) = 0
$H_{gauge}$ above ground (m) = 0.9

| | Flow (Gallon) | | | | | | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure $p$ (bar) | **K (m/s)** | **Lugeons, V** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | | | | | | | | | |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 21.2 | 21.66 | 22.1 | 22.51 | 22.9 | 23.32 | 0.424 | 1.60501384 | 0.001605014 | 2.67502E-05 | 7.02829766 | 7.92829766 | 0.778 | **8.227E-07** | **6.77** |
| 15 | 24.11 | 25.77 | 25.25 | 26.75 | 26.22 | 27.79 | 0.736 | 2.78606176 | 0.002786062 | 4.64344E-05 | 10.5424465 | 11.4424465 | 1.123 | **9.895E-07** | **8.14** |
| 20 | 27.27 | 27.91 | 28.44 | 29.18 | 29.86 | 30.43 | 0.632 | 2.39237912 | 0.002392379 | 3.9873E-05 | 14.0565953 | 14.9565953 | 1.467 | **6.5E-07** | **5.35** |
| 15 | 31 | 31.76 | 32.59 | 33.23 | 33.95 | 34.78 | 0.756 | 2.86176996 | 0.00286177 | 4.76962E-05 | 10.5424465 | 11.4424465 | 1.123 | **1.016E-06** | **8.36** |
| 10 | 35.55 | 36.12 | 36.7 | 37.27 | 38.83 | 39.4 | 0.77 | 2.9147657 | 0.002914766 | 4.85794E-05 | 7.02829766 | 7.92829766 | 0.778 | **1.494E-06** | **12.30** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | **Average Values =** | **9.945E-07** | **8.2** |







**Flow Behavior:** **Wash-out**
**Lugeon:** **12.30**
**Hydraulic Conductivity:** **1.49406E-06**

MCINTOSH PERRY

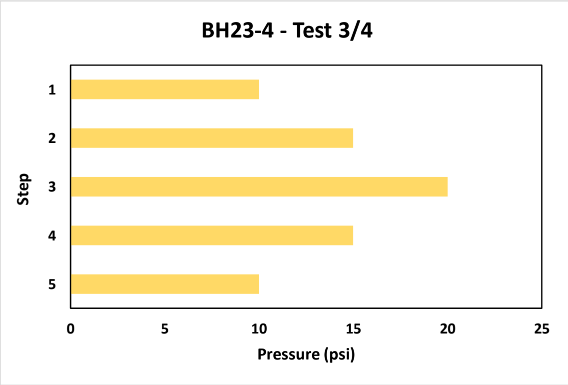
**Packer Testing Analysis**
**Kashwakamak Lake Dam Replacement– Ontario**

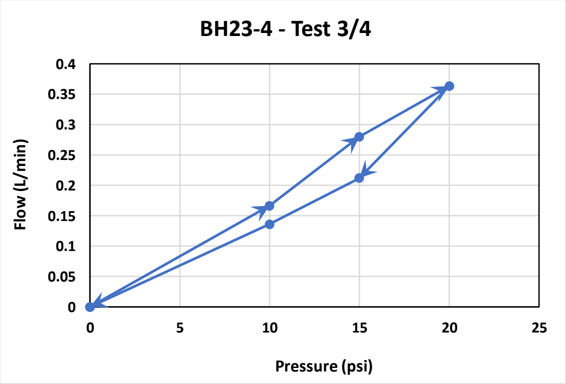
*CCO-23-3603*

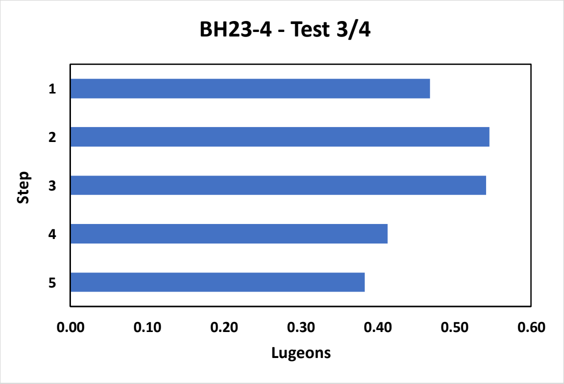
# Table D.8

## BH23-4 - Test 3/4

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top of section(ft) = | | 14.58 | Bottom of Section (ft) = | | | 29.58 | Total length (ft)= | | | 15 | Total length (m)= | | | 4.572 |
| Surface Elevation (m) = | | 262.1 | Section Int. El. (m) | | 257.7 | 253.1 | Depth to center of tested section (m) = | | | | | 6.729984 | | |
| Depth to Groundwater (m) = | | 0 | $H_{gauge}$ above ground (m) = | | | 0.9 | | | | | | | | |
| | Flow (Gallon) | | | | | | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}$/ρ.g | ΔH (m) | Net Inj Pressure *p* (bar) | **K (m/s)** | **Lugeons, V** |
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | | | | | | | | |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 39.89 | 39.96 | 39.93 | 40.09 | 40.05 | 40.11 | 0.044 | 0.16655804 | 0.000166558 | 2.77597E-06 | 7.02829766 | 7.92829766 | 0.778 | **6.186E-08** | **0.47** |
| 15 | 40.21 | 40.37 | 40.31 | 40.47 | 40.42 | 40.58 | 0.074 | 0.28012034 | 0.00028012 | 4.66867E-06 | 10.5424465 | 11.4424465 | 1.123 | **7.208E-08** | **0.55** |
| 20 | 40.52 | 40.62 | 40.72 | 40.81 | 40.91 | 41 | 0.096 | 0.36339936 | 0.000363399 | 6.05666E-06 | 14.0565953 | 14.9565953 | 1.467 | **7.154E-08** | **0.54** |
| 15 | 41.06 | 41.11 | 41.17 | 41.22 | 4138 | 41.34 | 0.056 | 0.21198296 | 0.000211983 | 3.53305E-06 | 10.5424465 | 11.4424465 | 1.123 | **5.455E-08** | **0.41** |
| 10 | 41.59 | 41.53 | 41.67 | 41.6 | 41.64 | 41.77 | 0.036 | 0.13627476 | 0.000136275 | 2.27125E-06 | 7.02829766 | 7.92829766 | 0.778 | **5.061E-08** | **0.38** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | **Average Values =** | **6.213E-08** | **0.5** |







**Flow Behavior:** Void Filling
**Lugeon:** 0.38
**Hydraulic Conductivity:** 5.06115E-08

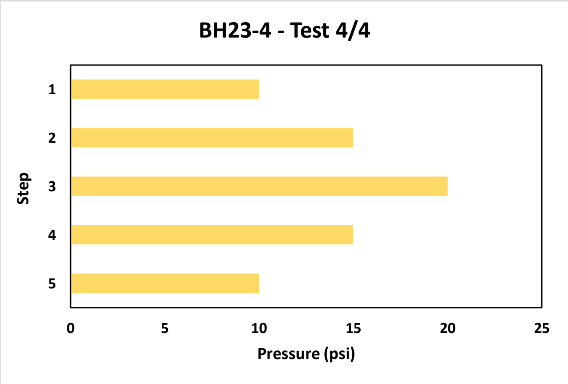
**Packer Testing Analysis**
**Kashwakamak Lake Dam Replacement– Ontario**

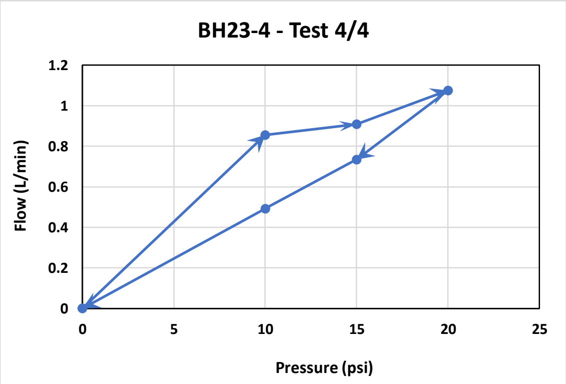
*CCO-23-3603*

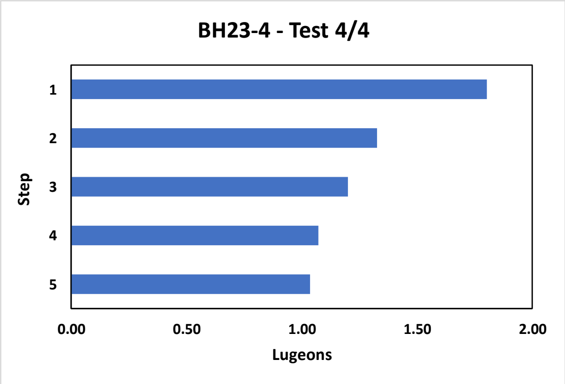
## Table D.9

### BH23-4 - Test 4/4

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top of section(ft) = | | 9.58 | Bottom of Section (ft) = | | | 29.58 | | | | Total length (ft)= | 20 | | | Total length (m)= | 6.1 |
| Surface Elevation (m) = | | 262.1 | Section Int. El. (m) | | 259.2 | 253.1 | | | | Depth to center of tested section (m) = | | | 5.97 | | |
| Depth to Groundwater (m) = | | 0 | $H_{gauge}$ above ground (m) = | | | 0.9 | | | | | | | | | |
| | Flow (Gallon) | | | | | | | | | | | | | | |
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure $p$ (bar) | K (m/s) | Lugeons, V |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 41.06 | 41.29 | 41.43 | 41.76 | 41.98 | 42.19 | 0.226 | 0.85550266 | 0.000855503 | 1.42584E-05 | 7.02829766 | 7.92829766 | 0.778 | 2.517E-07 | 1.80 |
| 15 | 42.33 | 42.67 | 42.82 | 43.05 | 43.39 | 43.53 | 0.24 | 0.9084984 | 0.000908498 | 1.51416E-05 | 10.5424465 | 11.4424465 | 1.123 | 1.852E-07 | 1.33 |
| 20 | 43.74 | 44.04 | 44.3 | 44.69 | 44.98 | 45.16 | 0.284 | 1.07505644 | 0.001075056 | 1.79176E-05 | 14.0565953 | 14.9565953 | 1.467 | 1.676E-07 | 1.20 |
| 15 | 45.36 | 45.58 | 45.79 | 45.91 | 46.12 | 46.33 | 0.194 | 0.73436954 | 0.00073437 | 1.22395E-05 | 10.5424465 | 11.4424465 | 1.123 | 1.497E-07 | 1.07 |
| 10 | 46.49 | 46.64 | 64.79 | 46.84 | 47.09 | 47.14 | 0.13 | 0.4921033 | 0.000492103 | 8.20172E-06 | 7.02829766 | 7.92829766 | 0.778 | 1.448E-07 | 1.04 |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | Average Values = | 1.798E-07 | 1.3 |







**Flow Behavior:** Void Filling
**Lugeon:** 1.04
**Hydraulic Conductivity:** 1.44765E-07

## Table D.10

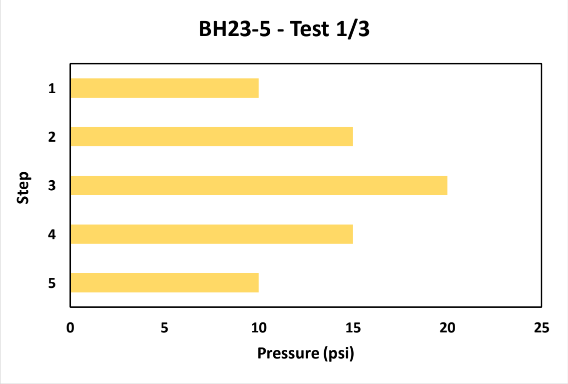
### BH23-5 - Test 1/3

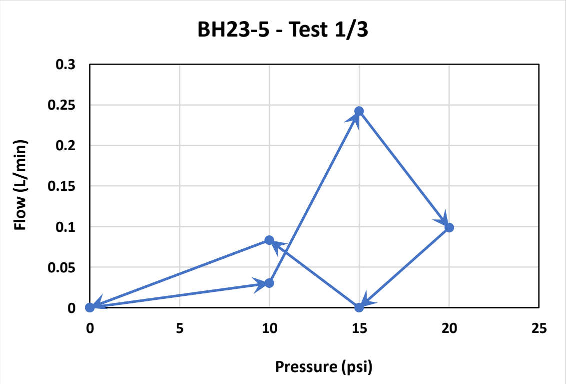
Top of section(ft) = 15.67 | Bottom of Section (ft) = 20.67 | Total length (ft)= 5 | Total length (m)= 1.52

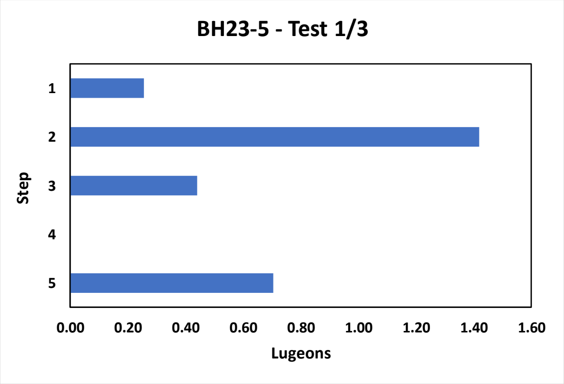
Surface Elevation (m) = 262.1 | Section Int. El. (m) 257.3 255.8 | Depth to center of tested section (m) = 5.54

Depth to Groundwater (m) = 0 | $H_{gauge}$ above ground (m) = 0.9

| | Flow (Gallon) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}=P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure *p* (bar) | **K (m/s)** | **Lugeons, V** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 58.46 | 58.58 | 58.59 | 58.5 | 58.5 | 58.5 | 0.008 | 0.03028328 | 3.02833E-05 | 5.04721E-07 | 7.02829766 | 7.92829766 | 0.778 | **2.649E-08** | **0.26** |
| 15 | 58.63 | 58.71 | 58.88 | 58.82 | 58.96 | 58.95 | 0.064 | 0.24226624 | 0.000242266 | 4.03777E-06 | 10.5424465 | 11.4424465 | 1.123 | **1.468E-07** | **1.42** |
| 20 | 58.46 | 58.48 | 58.58 | 58.59 | 58.59 | 58.59 | 0.026 | 0.09842066 | 9.84207E-05 | 1.64034E-06 | 14.0565953 | 14.9565953 | 1.467 | **4.564E-08** | **0.44** |
| 15 | 58.5 | 58.5 | 58.5 | 58.5 | 58.5 | 58.5 | 0 | 0 | 0 | 0 | 10.5424465 | 11.4424465 | 1.123 | **0** | **0.00** |
| 10 | 58.55 | 58.55 | 58.55 | 58.66 | 58.66 | 58.66 | 0.022 | 0.08327902 | 8.3279E-05 | 1.38798E-06 | 7.02829766 | 7.92829766 | 0.778 | **7.285E-08** | **0.70** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | **Average Values =** | **7.295E-08** | **0.6** |







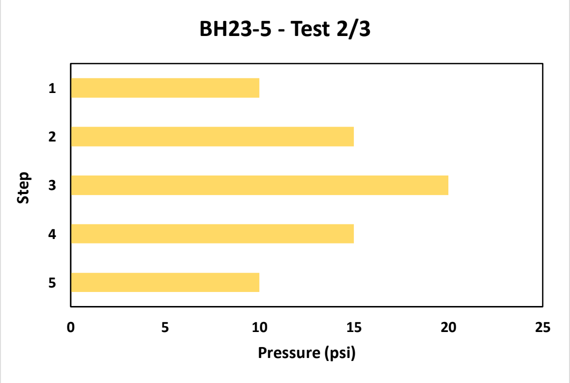
**Flow Behavior:** **Void Filling**
**Lugeon:** **0.70**
**Hydraulic Conductivity:** **7.28453E-08**

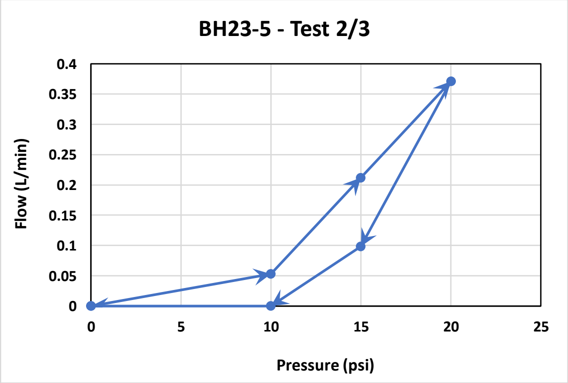
# Table D.11

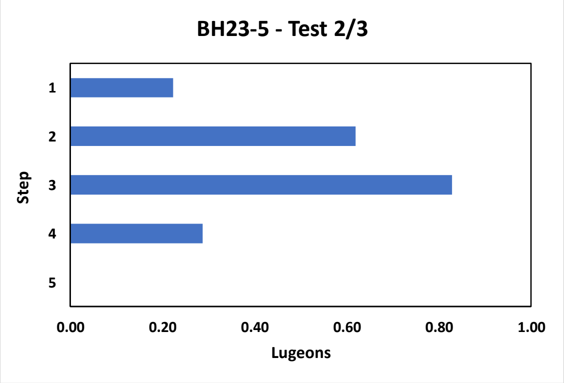
## BH23-5 - Test 2/3

Top of section(ft) = 10.67
Bottom of Section (ft) = 20.67
Total length (ft)= 10
Total length (m)= 3.05
Surface Elevation (m) = 262.1
Section Int. El. (m) 258.8 255.8
Depth to center of tested section (m) = 4.78
Depth to Groundwater (m) = 0
$H_{gauge}$ above ground (m) = 0.9

| | Flow (Gallon) | | | | | | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure *p* (bar) | **K (m/s)** | **Lugeons, V** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | | | | | | | | | |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 59.63 | 59.78 | 59.79 | 59.79 | 59.7 | 59.7 | 0.014 | 0.05299574 | 5.29957E-05 | 8.83262E-07 | 7.02829766 | 7.92829766 | 0.778 | **2.715E-08** | **0.22** |
| 15 | 59.71 | 59.75 | 59.89 | 59.82 | 59.86 | 59.99 | 0.056 | 0.21198296 | 0.000211983 | 3.53305E-06 | 10.5424465 | 11.4424465 | 1.123 | **7.525E-08** | **0.62** |
| 20 | 60.09 | 60.12 | 60.21 | 60.31 | 60.49 | 60.58 | 0.098 | 0.37097018 | 0.00037097 | 6.18284E-06 | 14.0565953 | 14.9565953 | 1.467 | **1.007E-07** | **0.83** |
| 15 | 60.52 | 60.55 | 60.67 | 60.69 | 60.62 | 60.65 | 0.026 | 0.09842066 | 9.84207E-05 | 1.64034E-06 | 10.5424465 | 11.4424465 | 1.123 | **3.494E-08** | **0.29** |
| 10 | 60.65 | 60.65 | 60.65 | 60.65 | 60.65 | 60.65 | 0 | 0 | 0 | 0 | 7.02829766 | 7.92829766 | 0.778 | **0** | **0.00** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | **Average Values =** | **5.952E-08** | **0.4** |





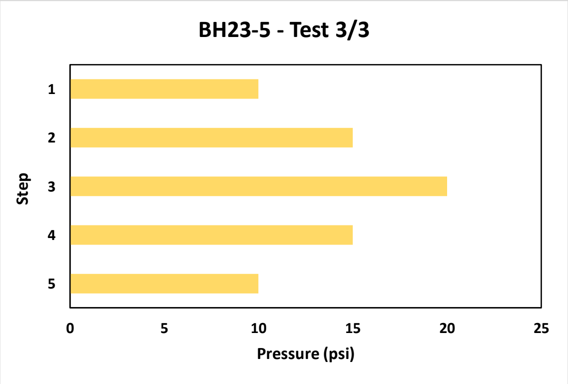


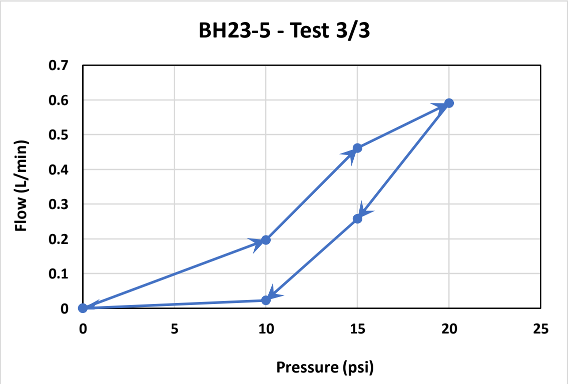
**Flow Behavior:** **Dilation**
**Lugeon:** **0.22**
**Hydraulic Conductivity:** **4.14817E-08**

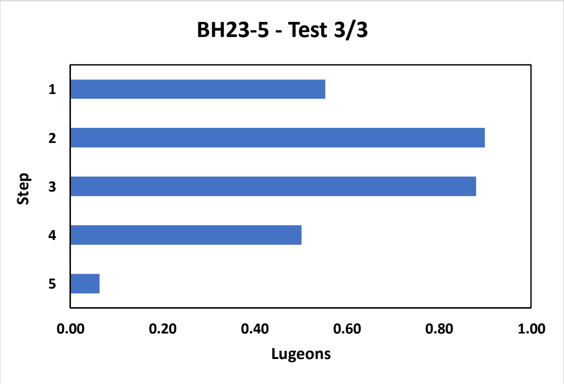
## Table D.12

### BH23-5 - Test 3/3

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top of section(ft) = | | 5.67 | Bottom of Section (ft) = | | | 20.67 | Total length (ft)= | | | 15 | Total length (m)= | | | | 4.57 |
| Surface Elevation (m) = | | 262.1 | Section Int. El. (m) | | 260.4 | 255.8 | Depth to center of tested section (m) = | | | | | 4.01 | | | |
| Depth to Groundwater (m) = | | 0 | $H_{gauge}$ above ground (m) = | | | 0.9 | | | | | | | | | |
| | Flow (Gallon) | | | | | | | | | | | | | | |
| Presure (Psi) | 0 min | 1 min | 2 min | 3 min | 4 min | 5 min | Average Flow Rate (Gallon/min) | Average Flow Rate (L/min) | Average Flow Rate (m3/min) | Average Flow Rate (m3/Sec) | $H_{gauge}$= $P_{gauge}/\rho.g$ | ΔH (m) | Net Inj Pressure $p$ (bar) | K (m/s) | Lugeons, V |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| 10 | 50.98 | 50.96 | 51.04 | 51.11 | 51.27 | 51.24 | 0.052 | 0.19684132 | 0.000196841 | 3.28069E-06 | 7.02829766 | 7.92829766 | 0.778 | **7.313E-08** | **0.55** |
| 15 | 51.33 | 51.57 | 51.69 | 51.71 | 51.83 | 51.94 | 0.122 | 0.46182002 | 0.00046182 | 7.697E-06 | 10.5424465 | 11.4424465 | 1.123 | **1.189E-07** | **0.90** |
| 20 | 52.01 | 52.15 | 55.39 | 52.42 | 52.66 | 52.79 | 0.156 | 0.59052396 | 0.000590524 | 9.84207E-06 | 14.0565953 | 14.9565953 | 1.467 | **1.163E-07** | **0.88** |
| 15 | 52.75 | 52.89 | 52.84 | 53 | 52.95 | 53.09 | 0.068 | 0.25740788 | 0.000257408 | 4.29013E-06 | 10.5424465 | 11.4424465 | 1.123 | **6.626E-08** | **0.50** |
| 10 | 53.17 | 53.19 | 53.12 | 53.16 | 53.27 | 53.2 | 0.006 | 0.02271246 | 2.27125E-05 | 3.78541E-07 | 7.02829766 | 7.92829766 | 0.778 | **8.438E-09** | **0.06** |
| 0 | | | | | | | 0 | 0 | 0 | 0 | | | | | |
| | | | | | | | | | | | | | **Average Values =** | **7.66E-08** | **0.6** |







**Flow Behavior:** Void Filling
**Lugeon:** 0.06
**Hydraulic Conductivity:** 8.43821E-09

# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX E
## LAB RESULTS

McINTOSH PERRY

# Unconfined Compressive Strength of Intact Rock Cores
# ASTM D7012 Method C

| | | | |
|---|---|---|---|
| **Project No.:** | CCO-23-3603-03 | **Date Issued:** | Nov 14,2023 |
| **Lab No.:** | OL-23063 | **Report No.:** | 1 of 4 |
| **Project Name:** | Kashwakamak Dam | | |

| | | | | | |
|---|---|---|---|---|---|
| **Core No.:** | 1 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-1 | **RC:** | 2 | **Depth (ft):** | 5'3.5"-5'8.5" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | 2 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-1 | **RC:** | 4 | **Depth (ft):** | 11'2"-11'6" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | 3 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-1 | **RC:** | 6 | **Depth (ft):** | 18'2"-18'7" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |

| **Core No. :** | 1 | 2 | 3 |
|---|---|---|---|
| **Diameter (mm)** | 49.1 | 49.1 | 49.1 |
| **Thickness/Height (mm)** | 117.2 | 97.6 | 118.8 |
| **Density (Kg/m$^3$)** | 2747 | 2718 | 2732 |
| **Compressive Strength (Mpa)** | 164 | 167.2 | 177.3 |
| **Mass of Core (kg)** | 0.6084 | 0.4991 | 0.6157 |
| **Description of Failure** | 3 | 3 | 1 |

**Remarks:** Core# 1&2 Columnar vertical cracking through both ends. No well formed Cones on ether end.

Core # 3 Reasonably well formed cones on both ends.

**Reviewed By:** **Date:** Nov 14,2023

Jason Hopwood-Jones
Laboratory Manager

McINTOSH PERRY

# Unconfined Compressive Strength of Intact Rock Cores
## ASTM D7012 Method C

| | | | |
|---|---|---|---|
| **Project No.:** | CCO-23-3603-03 | **Date Issued:** | Nov 14,2023 |
| **Lab No.:** | OL-23063 | **Report No.:** | 2 of 4 |
| **Project Name:** | Kashwakamak Dam | | |

| | | | | | |
|---|---|---|---|---|---|
| **Core No.:** | 4 | **Moisture Condition:** | | Dry as received | |
| **Borehole Location:** | BH23-2 | **RC:** | 1 | **Depth (ft):** | 2'2"-2'7" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | 5 | **Moisture Condition:** | | Dry as received | |
| **Borehole Location:** | BH23-2 | **RC:** | 4 | **Depth (ft):** | 11'8"-12'1" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | 6 | **Moisture Condition:** | | Dry as received | |
| **Borehole Location:** | BH23-2 | **RC:** | 7 | **Depth (ft):** | 17'5"-17'10" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |

| **Core No. :** | 4 | 5 | 6 |
|---|---|---|---|
| **Diameter (mm)** | 49.1 | 49.1 | 49.1 |
| **Thickness/Height (mm)** | 120.1 | 114.8 | 118 |
| **Density (Kg/m$^3$)** | 2785 | 2793 | 2762 |
| **Compressive Strength (Mpa)** | 201.1 | 208.2 | 194.8 |
| **Mass of Core (kg)** | 0.6332 | 0.6070 | 0.6171 |
| **Description of Failure** | 1 | 2 | 2 |

**Remarks:** Core # 4 Reasonably well formed cones on both ends.

Core # 5 & 6 Well formed cone on one end and vertical cracking through bottom.

**Reviewed By:** **Date:** Nov 14,2023

Jason Hopwood-Jones
Laboratory Manager

# Unconfined Compressive Strength of Intact Rock Cores

# ASTM D7012 Method C

| | | | |
|---|---|---|---|
| **Project No.:** | CCO-23-3603-03 | **Date Issued:** | Nov 14,2023 |
| **Lab No.:** | OL-23063 | **Report No.:** | 3 of 4 |
| **Project Name:** | Kashwakamak Dam | | |

| | | | | | |
|---|---|---|---|---|---|
| **Core No.:** | 7 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-4 | **RC:** | 7 | **Depth (ft):** | 15'1"-15'6" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | 8 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-5 | **RC:** | 2 | **Depth (ft):** | 4'11"-5'4" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | 9 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-5 | **RC:** | 4 | **Depth (ft):** | 10'10"-11'3" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |

| **Core No. :** | 7 | 8 | 9 |
|---|---|---|---|
| **Diameter (mm)** | 47.4 | 49.4 | 49.4 |
| **Thickness/Height (mm)** | 116.2 | 118.8 | 117.1 |
| **Density (Kg/m$^3$)** | 2736 | 2793 | 2844 |
| **Compressive Strength (Mpa)** | 157.8 | 211.3 | 173.9 |
| **Mass of Core (kg)** | 0.5610 | 0.6359 | 0.6383 |
| **Description of Failure** | 4 | 4 | 1 |

**Remarks:** Core # 7 & 8 Diagonal fracture with some cracking through ends.

Core # 9 Reasonably well formed cones on both ends.

**Reviewed By:**

**Date:** Nov 14,2023

Jason Hopwood-Jones
Laboratory Manager

# Unconfined Compressive Strength of Intact Rock Cores

# ASTM D7012 Method C

| | | | |
|---|---|---|---|
| **Project No.:** | CCO-23-3603-03 | **Date Issued:** | Nov 14,2023 |
| **Lab No.:** | OL-23063 | **Report No.:** | 4 of 4 |
| **Project Name:** | Kashwakamak Dam | | |

| | | | | | |
|---|---|---|---|---|---|
| **Core No.:** | 10 | **Moisture Condition:** | Dry as received | | |
| **Borehole Location:** | BH23-5 | **RC:** | 6 | **Depth (ft):** | 16'9"-17'2" |
| **Date Sampled:** | Sept 25,2023 | **Received:** | Nov 2,2023 | **Tested:** | Nov 7,2023 |
| **Core No.:** | | **Moisture Condition:** | | | |
| **Borehole Location:** | | **RC:** | | **Depth (ft):** | |
| **Date Sampled:** | | **Received:** | | **Tested:** | |
| **Core No.:** | | **Moisture Condition:** | | | |
| **Borehole Location:** | | **RC:** | | **Depth (ft):** | |
| **Date Sampled:** | | **Received:** | | **Tested:** | |

| | | | |
|---|---|---|---|
| **Core No. :** | 10 | | |
| **Diameter (mm)** | 50.7 | | |
| **Thickness/Height (mm)** | 116.9 | | |
| **Density (Kg/m$^3$)** | 2757 | | |
| **Compressive Strength (Mpa)** | 126.2 | | |
| **Mass of Core (kg)** | 0.6506 | | |
| **Description of Failure** | 1 | | |

**Remarks:** Core # 10 Reasonably well formed cones on both ends.

**Reviewed By:** **Date:** Nov 14,2023

Jason Hopwood-Jones
Laboratory Manager

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# Certificate of Analysis

**McIntosh Perry Consulting Eng. (Nepean)**
215 Menten Place, Unit 104
Nepean, ON K2H 9C1
Attn: Jeff Forrester

Report Date: 3-Nov-2023
Order Date: 31-Oct-2023

Client PO: CCO-23-3603
Project: CCO-23-3603 (Kashwakamak Dam)
Custody: 66483

**Order #: 2344177**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 2344177-01 | CCO-23-3603 |

Approved By:

Dale Robertson, BSc
Laboratory Director

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Anions | EPA 300.1 - IC | 1-Nov-23 | 1-Nov-23 |
| pH | EPA 150.1 - pH probe @25 °C | 1-Nov-23 | 1-Nov-23 |
| Resistivity | EPA 120.1 - probe | 1-Nov-23 | 1-Nov-23 |

Certificate of Analysis

Report Date: 03-Nov-2023

**Client:** **McIntosh Perry Consulting Eng. (Nepean)**

Order Date: 31-Oct-2023

**Client PO: CCO-23-3603**

**Project Description: CCO-23-3603 (Kashwakamak Dam)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client ID:** | | CCO-23-3603 | - | - | - | | |
| **Sample Date:** | | 31-Oct-23 09:00 | - | - | - | - | - |
| **Sample ID:** | | 2344177-01 | - | - | - | | |
| **Matrix:** | | Surface Water | - | - | - | | |
| | **MDL/Units** | | | | | | |
| **General Inorganics** | | | | | | | |
| pH | 0.1 pH Units | 7.9 | - | - | - | - | - |
| Resistivity | 0.01 Ohm.m | 91.7 | - | - | - | - | - |
| **Anions** | | | | | | | |
| Chloride | 1 mg/L | 5 | - | - | - | - | - |
| Sulphate | 1 mg/L | 3 | - | - | - | - | - |

## Method Quality Control: Blank

| Analyte | Result | Reporting Limit | Units | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|
| **Anions** | | | | | | | | |
| Chloride | ND | 1 | mg/L | | | | | |
| Sulphate | ND | 1 | mg/L | | | | | |
| **General Inorganics** | | | | | | | | |
| Resistivity | ND | 0.01 | Ohm.m | | | | | |

## Method Quality Control: Duplicate

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Anions** | | | | | | | | | |
| Chloride | 490 | 5 | mg/L | 498 | | | 1.6 | 20 | |
| Sulphate | 213 | 1 | mg/L | 210 | | | 1.3 | 10 | |
| **General Inorganics** | | | | | | | | | |
| pH | 7.9 | 0.1 | pH Units | 8.0 | | | 0.4 | 3.3 | |
| Resistivity | 12.9 | 0.01 | Ohm.m | 12.8 | | | 1.3 | 20 | |

## Method Quality Control: Spike

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Anions** | | | | | | | | | |
| Chloride | 9.78 | 1 | mg/L | ND | 97.8 | 78-114 | | | |
| Sulphate | 220 | 1 | mg/L | 210 | 100 | 74-126 | | | |

## Qualifier Notes:

## Sample Data Revisions:

None

## Work Order Revisions / Comments:

None

## Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

PARACEL
LABORATORIES LTD.

**Paracel ID: 2344177**

Paracel Order Number
(Lab Use Only)
2344177

## Chain Of Custody
(Lab Use Only)
Nº 66483

Client Name: McIntosh Perry
Contact Name: Jeff Forrester
Address: 215, Menten Place, Unit 104,
Ottawa, ON, K2H-9C1.
Telephone:

Project Ref: CCO-23-3603 (Kashwakamak Dam)
Quote #:
PO #: CCO-23-3603
E-mail: j.forrester@mcintoshperry.com

Page 1 of 1

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required:

☐ REG 153/04 ☐ REG 406/19
☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water)
SW (Surface Water) SS (Storm/Sanitary Sewer)
P (Paint) A (Air) O (Other)

Required Analysis

| | Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken Date | Sample Taken Time | Corrosivity Package (Sulphate, pH, Chloride, Resistivity) |
|---|---|---|---|---|---|---|---|
| 1 | CCO-23-3603 | SW | 0 | 1 | Oct, 31, 2023 | 09:00 AM | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |

Comments:
Test for corrosivity Package (Sulphate, PH, chloride, Resistivity).

Method of Delivery: Walk-in

Relinquished By (Sign): JE
Relinquished By (Print): Jay Patel
Date/Time: October 31, 2023

Received By Driver/Depot: T. Scouse
Date/Time: 31/10/23 1232
Temperature: 19.7 °C

Received at Lab:
Date/Time: Oct.31 2023 1327
Temperature: 11.1 °C

Verified By: Hiral
Date/Time: Oct 31, 23 | 15:19
pH Verified: ☐ By:

Chain of Custody (Blank).xlsx

Revision 4.0

# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX F
## SEISMIC HAZARD CALCULATIONS

McINTOSH PERRY

# 2015 National Building Code Seismic Hazard Calculation

**INFORMATION:** **Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836**
**Western Canada English (250) 363-6500 Facsimile (250) 363-6565**

**Site:** 44.892N 76.959W **User File Reference:** Kashwakamak Lake Dam 2023-11-16 19:28 UT

**Requested by:** McIntosh Perry

| Probability of exceedance per annum | 0.000404 | 0.001 | 0.0021 | 0.01 |
|---|---|---|---|---|
| Probability of exceedance in 50 years | 2 % | 5 % | 10 % | 40 % |
| Sa (0.05) | 0.139 | 0.087 | 0.058 | 0.021 |
| Sa (0.1) | 0.184 | 0.120 | 0.082 | 0.032 |
| Sa (0.2) | 0.175 | 0.116 | 0.080 | 0.033 |
| Sa (0.3) | 0.146 | 0.098 | 0.069 | 0.028 |
| Sa (0.5) | 0.117 | 0.079 | 0.054 | 0.022 |
| Sa (1.0) | 0.069 | 0.046 | 0.031 | 0.011 |
| Sa (2.0) | 0.036 | 0.023 | 0.015 | 0.005 |
| Sa (5.0) | 0.010 | 0.006 | 0.004 | 0.001 |
| Sa (10.0) | 0.004 | 0.002 | 0.002 | 0.001 |
| PGA (g) | 0.106 | 0.069 | 0.046 | 0.018 |
| PGV (m/s) | 0.100 | 0.063 | 0.041 | 0.014 |

**Notes:** Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s$^2$). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are highlighted in yellow. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. **These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.**

---

## References

**National Building Code of Canada 2015 NRCC no. 56190;** Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

**Structural Commentaries (User's Guide - NBC 2015: Part 4 of Division B)**
**Commentary J**: Design for Seismic Effects

**Geological Survey of Canada Open File 7893** Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites www.EarthquakesCanada.ca and www.nationalcodes.ca for more information

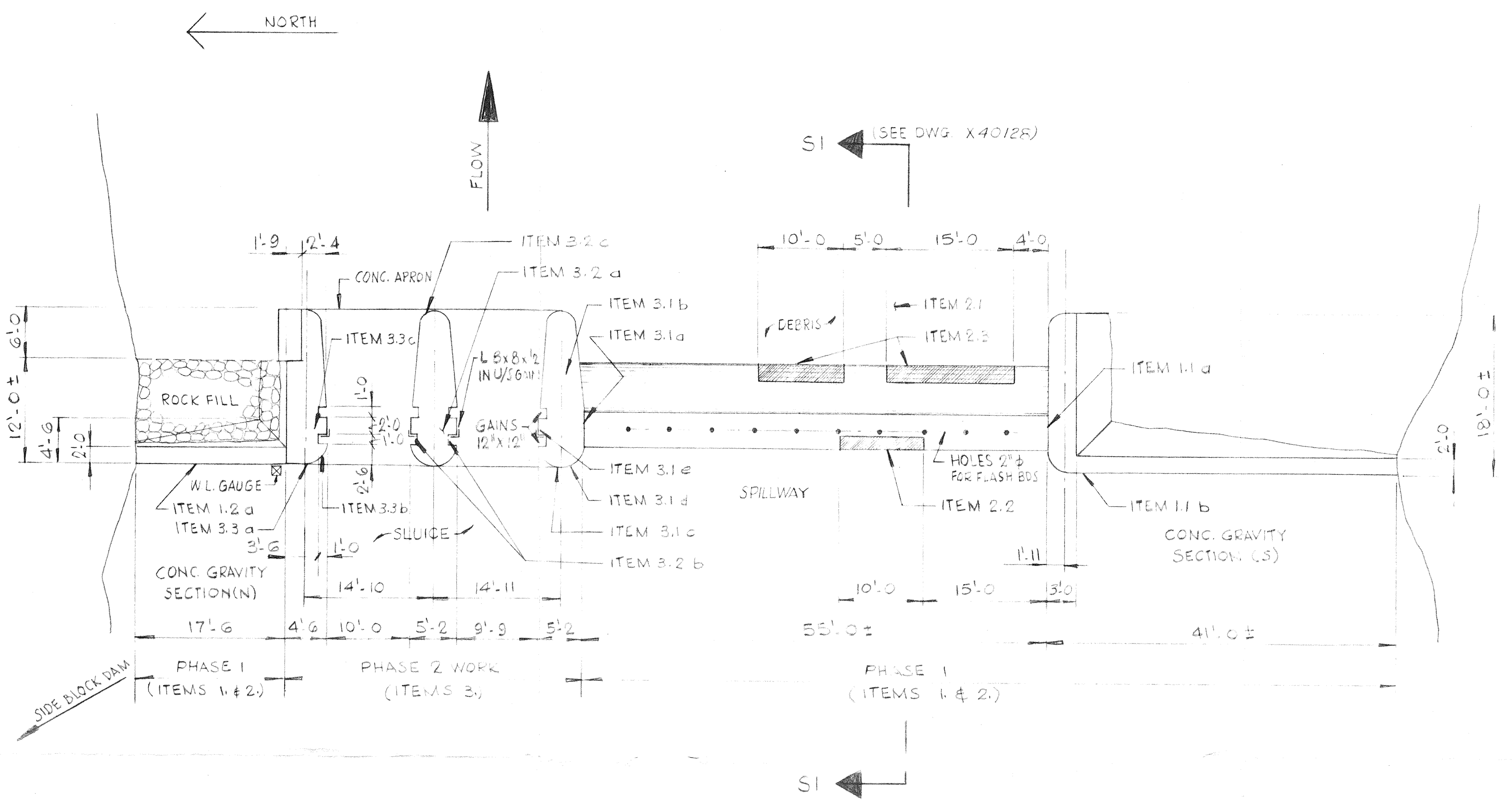
Natural Resources Canada Ressources naturelles Canada

Canada

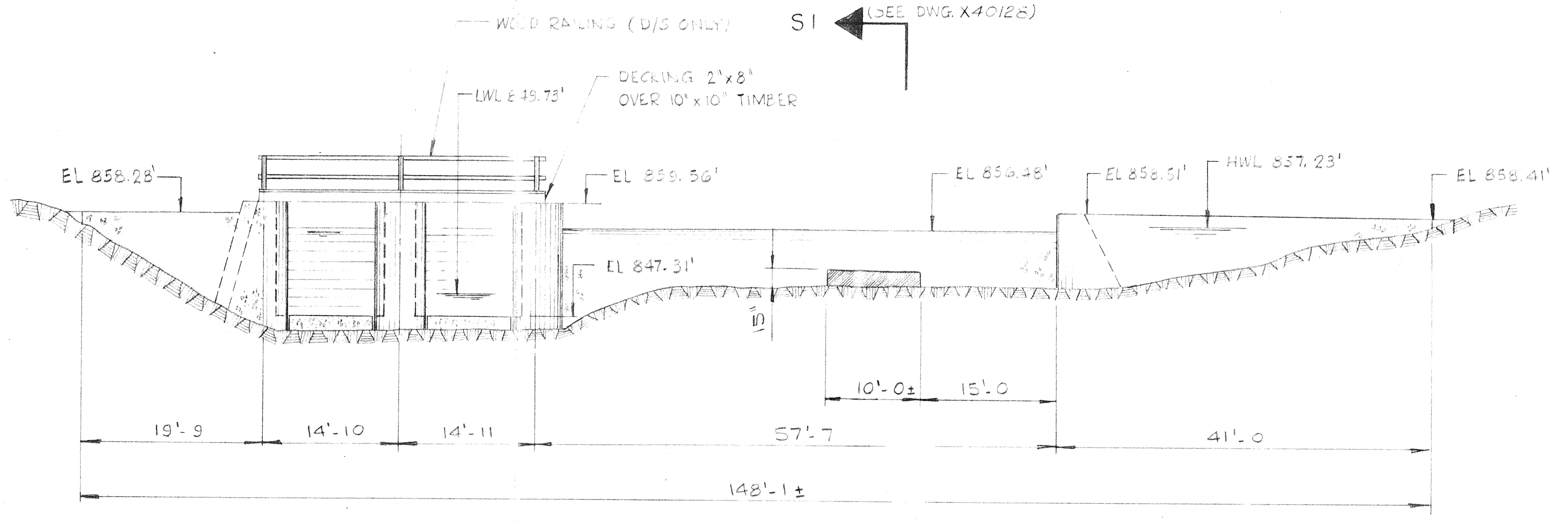
# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX G
## AVAILABEL DRAWINGS AND DOCUMENTS

McINTOSH PERRY



PLAN
1" = 10'-0



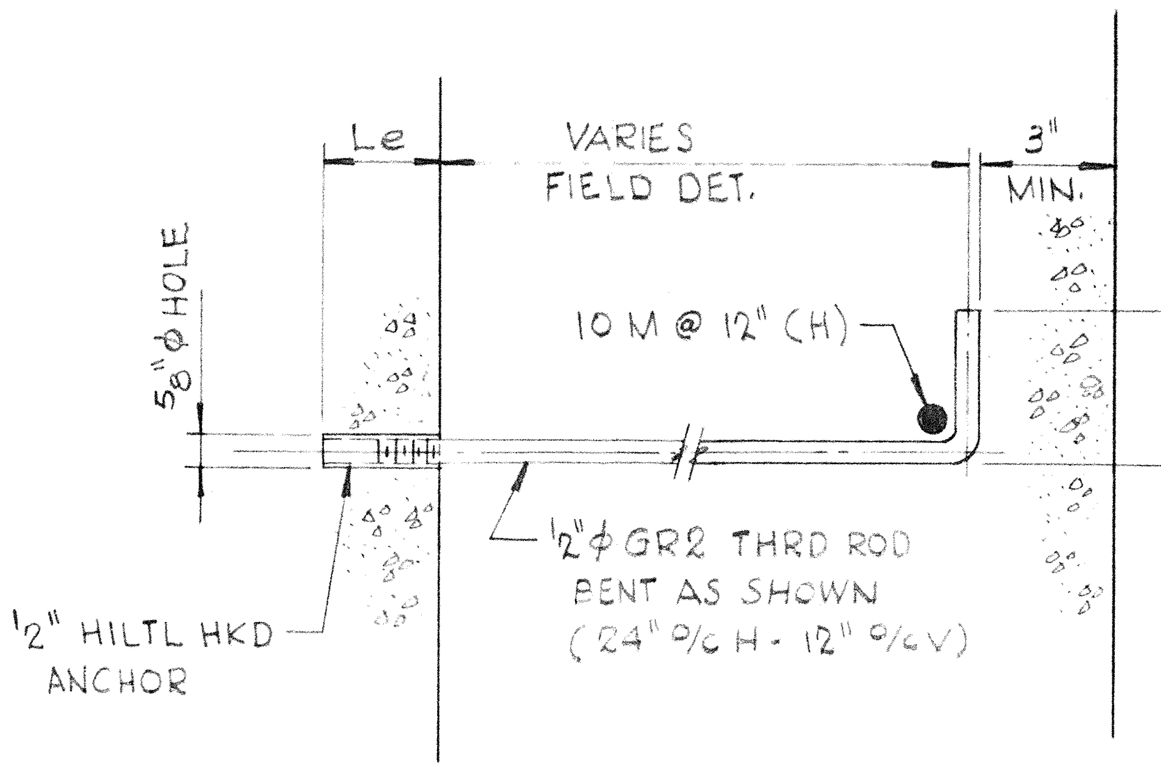
ELEVATION
VIEW LOOKING D/S
1"=1'-0

| rev no | date | particulars | dwn / chkd | appd |
|---|---|---|---|---|

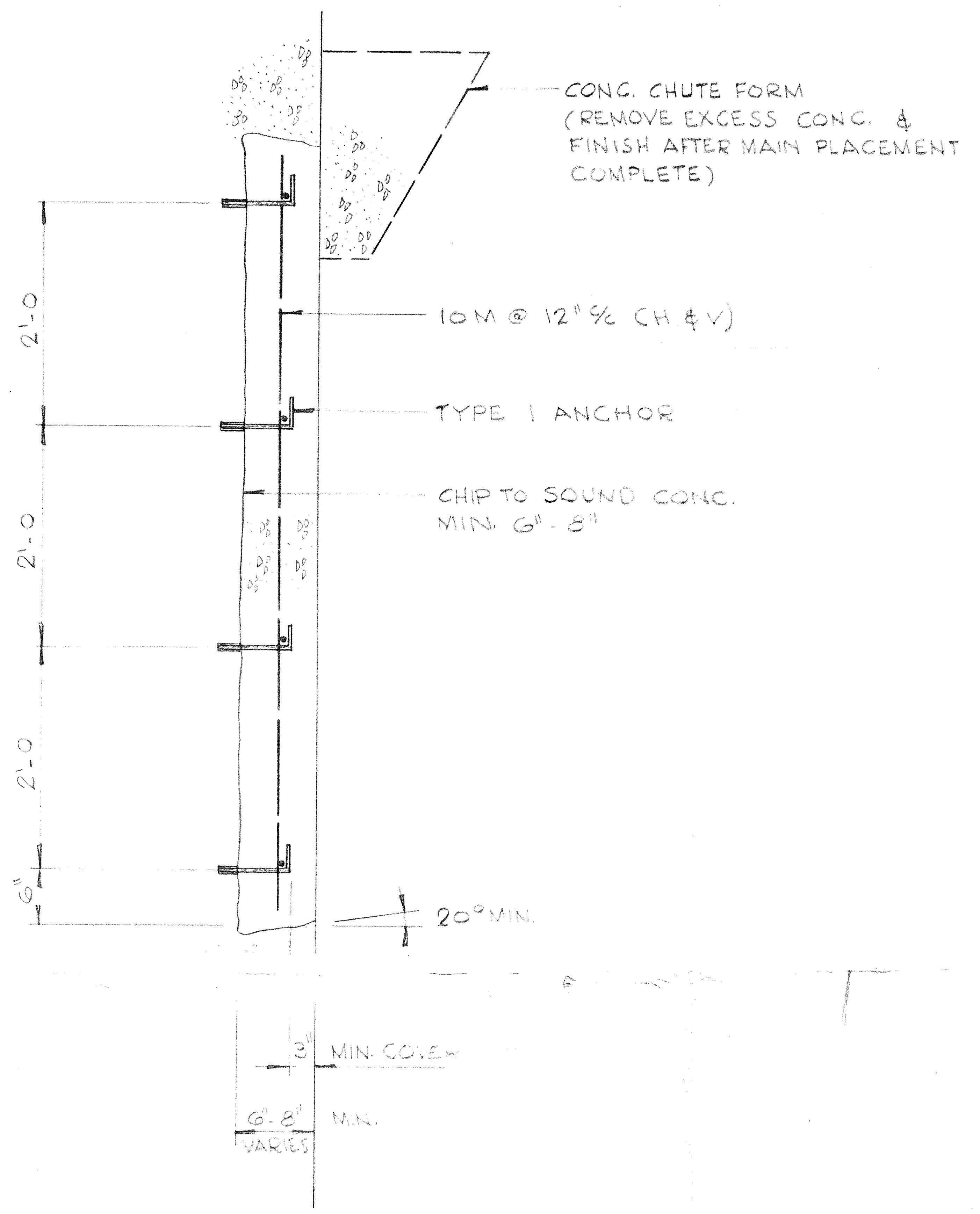
**Ontario Hydro**
thermal & hydraulic generation division
civil works department

KASHWAKAMAK LAKE DAM
SPILLWAY AND GRAVITY SECTIONS
CONCRETE MAINTENANCE
( PHASE 1 - 1986)
PLAN - ELEVATION - SCOPE OF WORK

|  |  |  |
|---|---|---|
| charge/work order | designed by | design checked by |
|  | drawn by<br>R Z | drawing checked by |
| scale<br>1" = 10'-0 | date<br>86-05 | approved<br>L.W. Coley |
| drawing no.<br>X40127 |  | rev. no.<br>0 |



DETAIL 1
TYPE 1 ANCHOR
3" = 1'-0



DETAIL 2
CONC. REPAIR
1" = 1'-0

USE FOR SCOPE ITEMS 1.1 AND 1.2

## NOTES

### MATERIALS

1- TYPE 1 ANCHORS - SAE J429 d GR 2 ROD COMPLETE WITH HILTI HKD ANCHORS.

2. REINFORCING - CSA G30-12M77 (Fy = 350 MPa)

3- CONCRETE -
   - (a) CEMENT TYPE - TYPE 30
   - (b) MAX. AGG. SIZE - 10mm (3/8")
   - (c) AIR CONTENT - 6 - 9 PER CENT
   - (d) STRENGTH 28 DAYS - 25 MPa
   - (e) HYDRO REF. SEC. APPLYING
     - W-25.83 - CONC. WORKMANSHIP
     - M 182m - 78 CONC. AGGREGATES
     - M 241 - 84 READY MIXED CONC.
   - (f) CONC. PATCH (WALER BOLTS ETC.) - THORITE BY THOROSYSTEM PRODUCTS OF CANADA LTD.
   - (g) MOIST CORE 7 DAYS MIN.

### METHODS

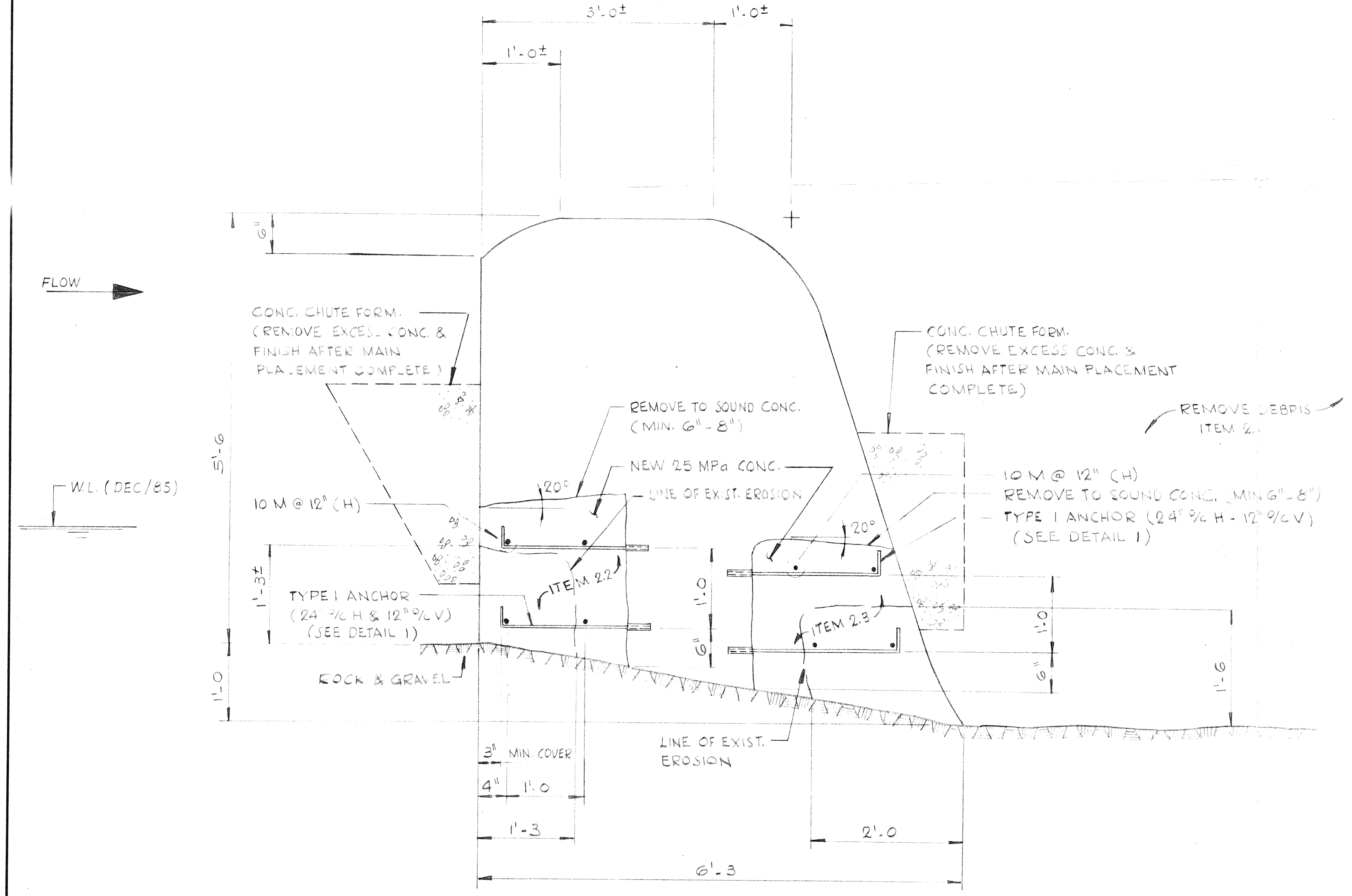
1- CHIP TO SOUND CONCRETE FROM EXISTING LINE OF EROSION 6" - 8" MIN.

2. WATER JET EXISTING SURFACE PRIOR TO PLACING THE NEW CONCRETE.

3 - MOISTEN EXISTING CONCRETE THOROGHLY PRIOR TO PLACING NEW CONCRETE.

4- CONCRETE WORKMANSHIP TO O.H.S. W-25

5. HEAT FOR CURING PERIOD WILL BE REQUIRED WHEN AIR TEMP. IS < 10°C



SECTION S1 (SEE DWG. X40127)
1" = 1'-0

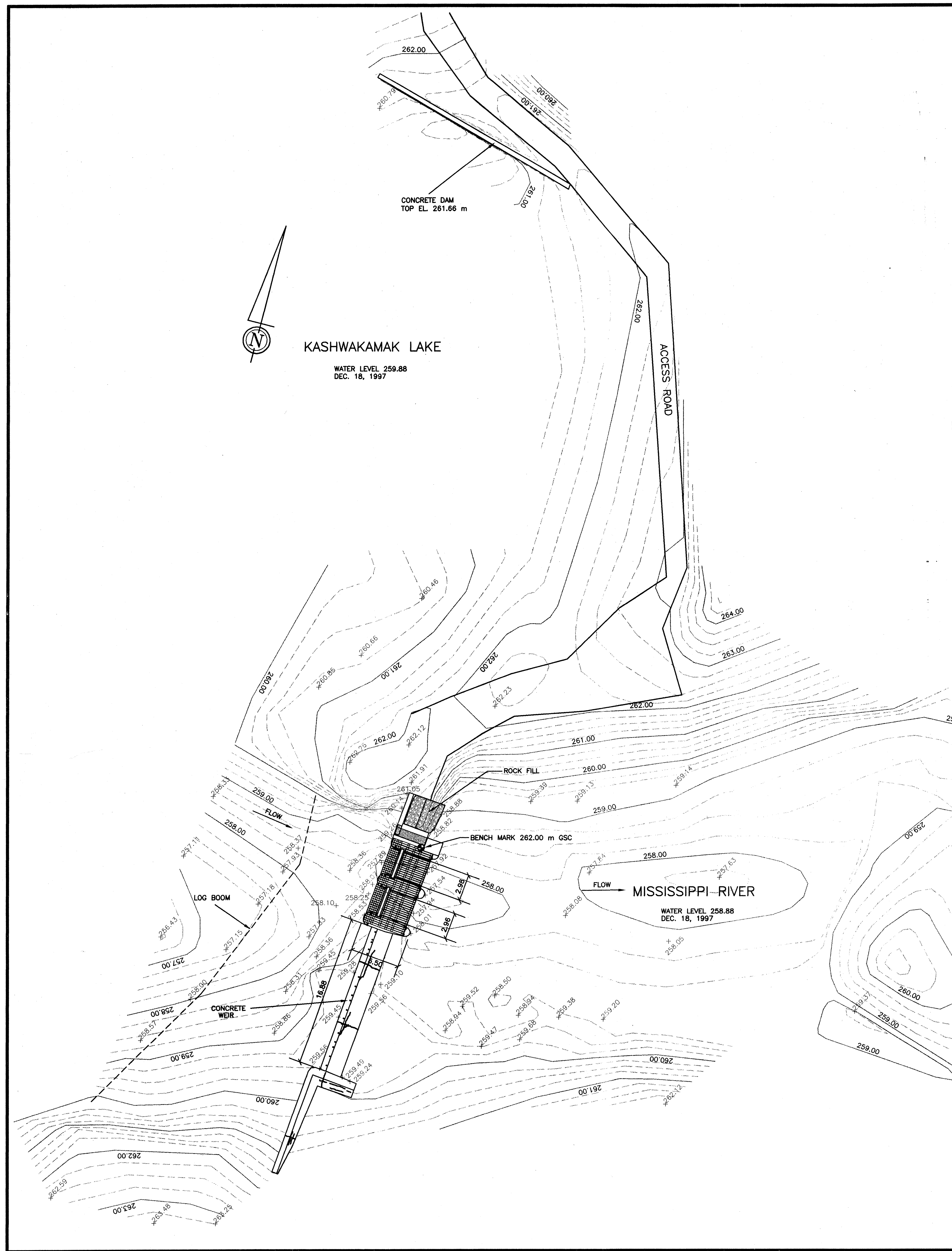
USE FOR SCOPE ITEMS 2.2 & 2.3

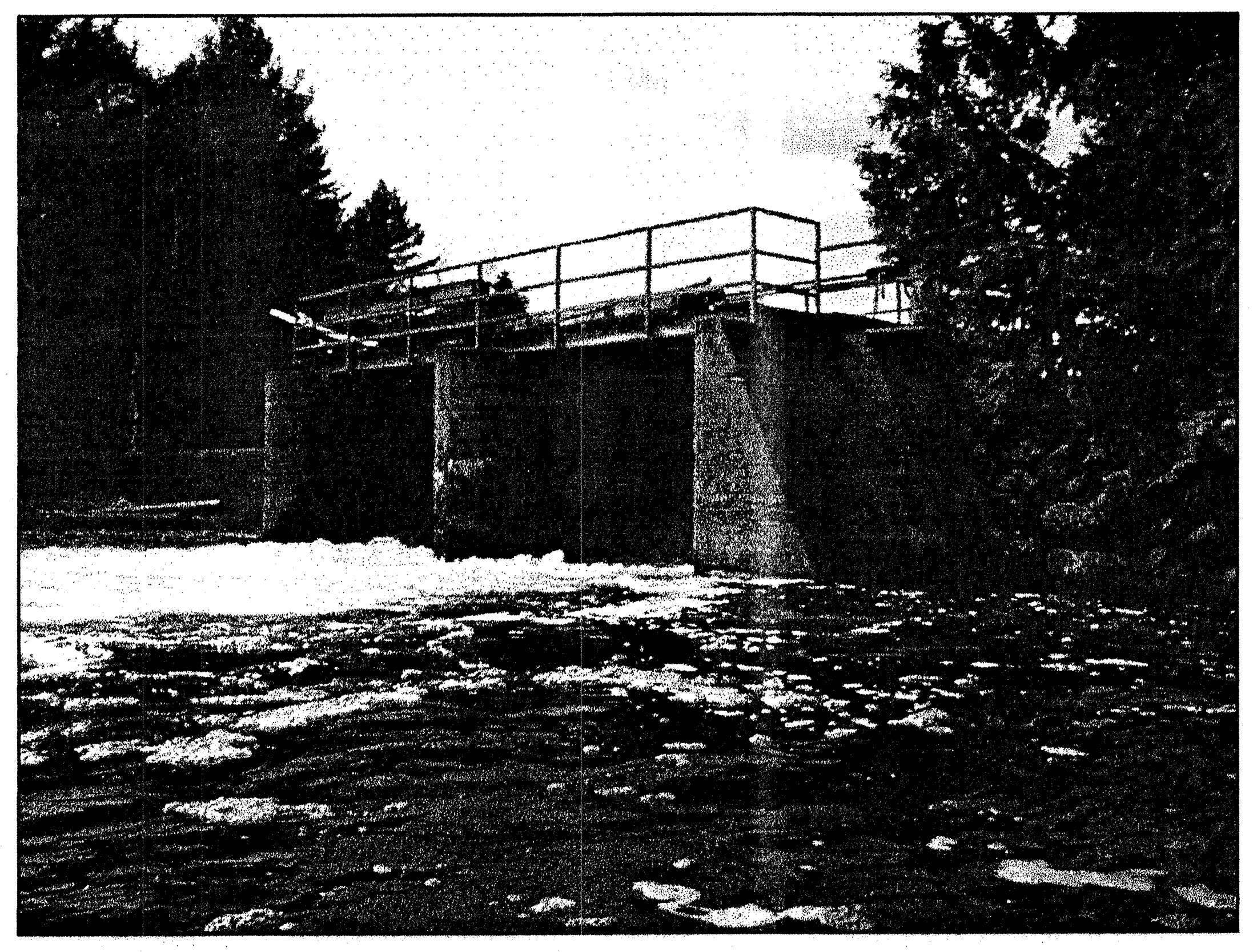
| rev no | date | particulars | dwn chkd | appd |
|---|---|---|---|---|

**Ontario Hydro**
thermal & hydraulic generation division
civil works department

KASHWAKAMAK LAKE DAM
SPILLWAY AND GRAVITY SECTIONS
CONCRETE MAINTENANCE
(PHASE 1 - 1986)
SECTIONS AND DETAILS

| | | |
|---|---|---|
| charge/work order | designed by | design checked by |
| | drawn by<br>R.Z. | drawing checked by |
| scale<br>AS NOTED | date<br>86-05 | approved<br>R.N. Coley |
| drawing no.<br>X40128 | | rev. no.<br>0 |





DOWNSTREAM VIEW OF DAM

| NO. | REVISIONS | DATE | APP. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| B | ISSUED FOR CONSTRUCTION | JULY 26 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

## GENERAL NOTES

- WORK IN THE DRY WHERE POSSIBLE.
- PROVIDE SEDIMENT AND EROSION CONTROL MEASURES.
- CLEAN EQUIPMENT BEFORE ENTERING WATER.
- CHECK EQUIPMENT FOR OIL LEAKS BEFORE ENTERING WATER.

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER BETWEEN WOOD DECK AND STEEL CATWALK, ELV. 262.00 m GSC.

**EGA** **ECOS GARATECH**
CONSULTING ENGINEERS
BRAMPTON (905) 458-4110 FAX: (905) 458-1479

OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
SITE PLAN TB

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. |
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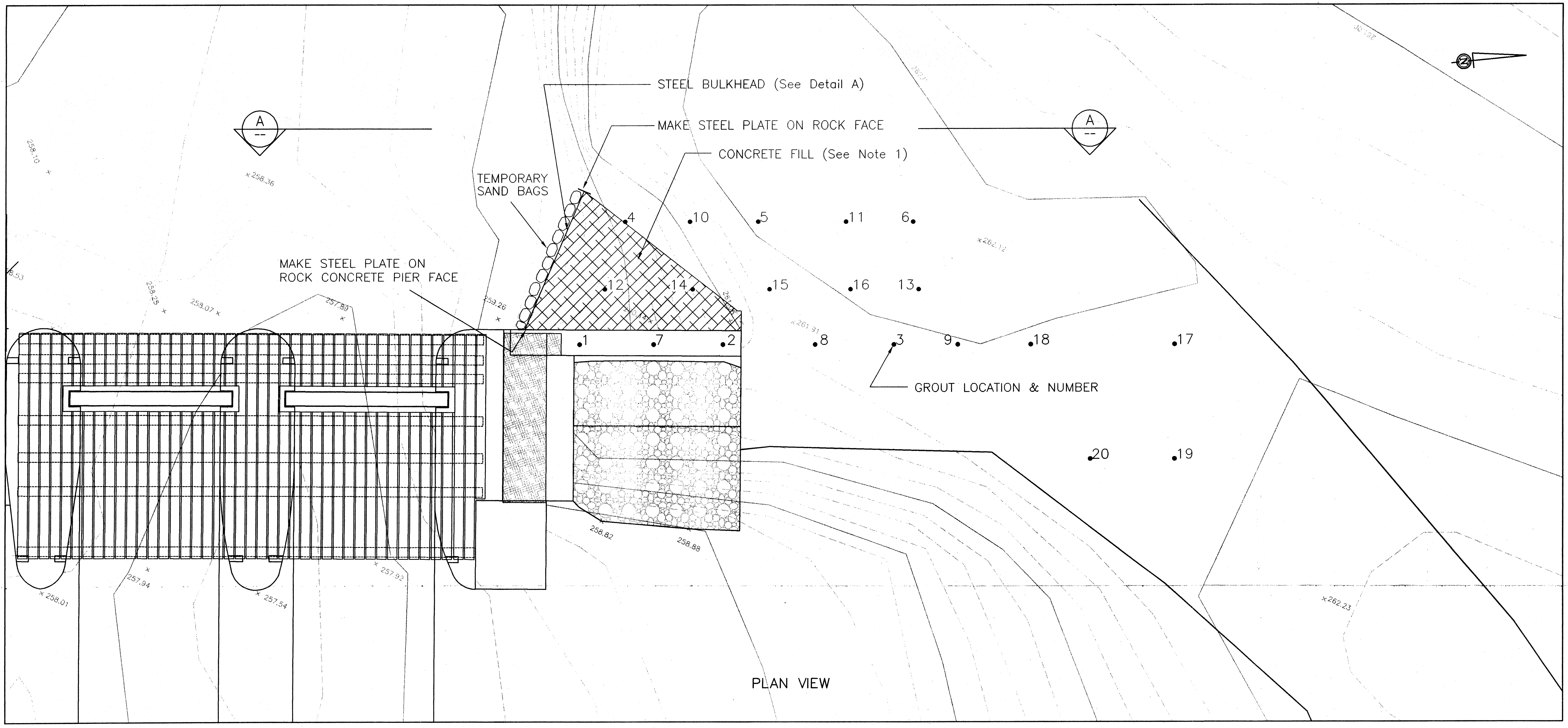
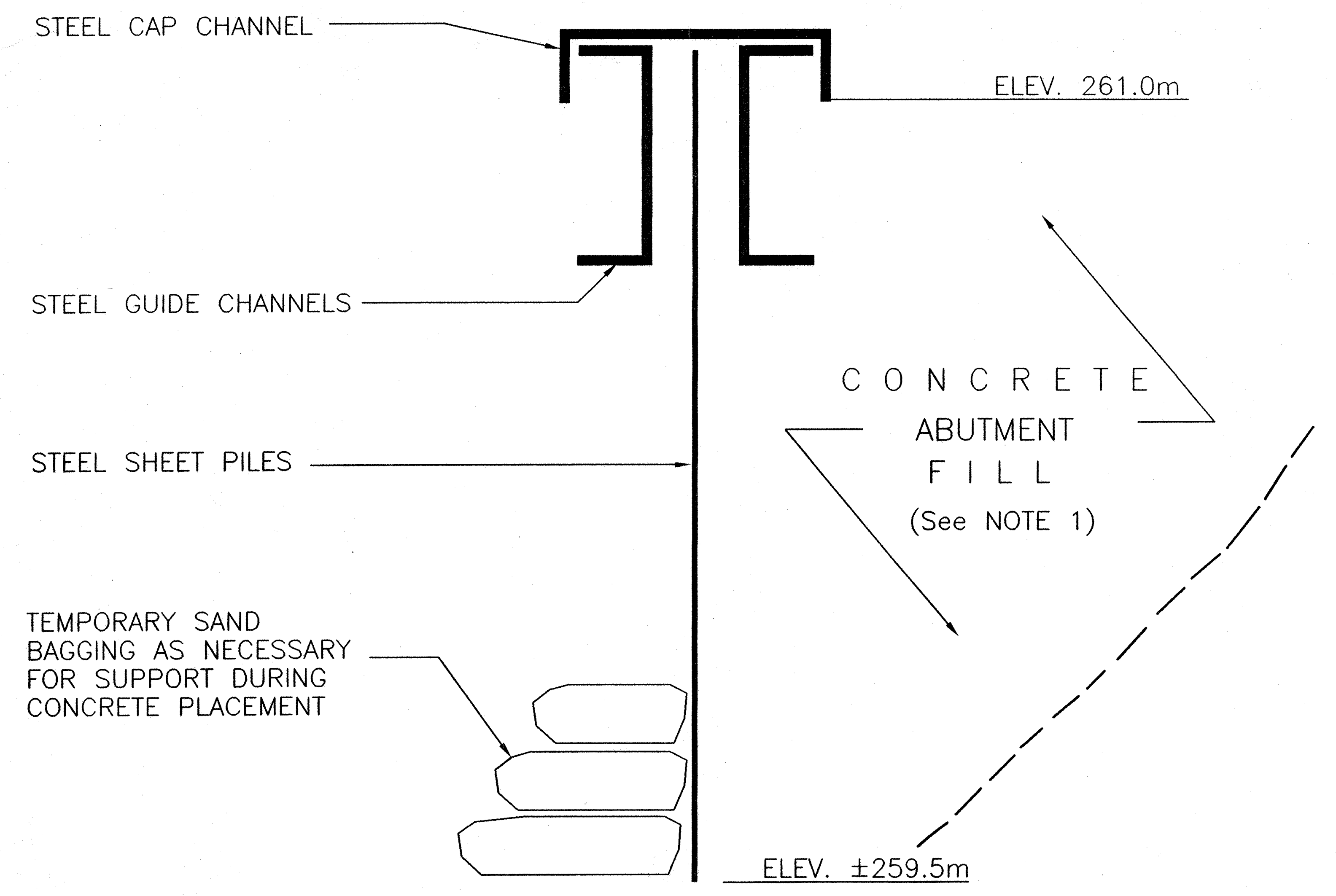
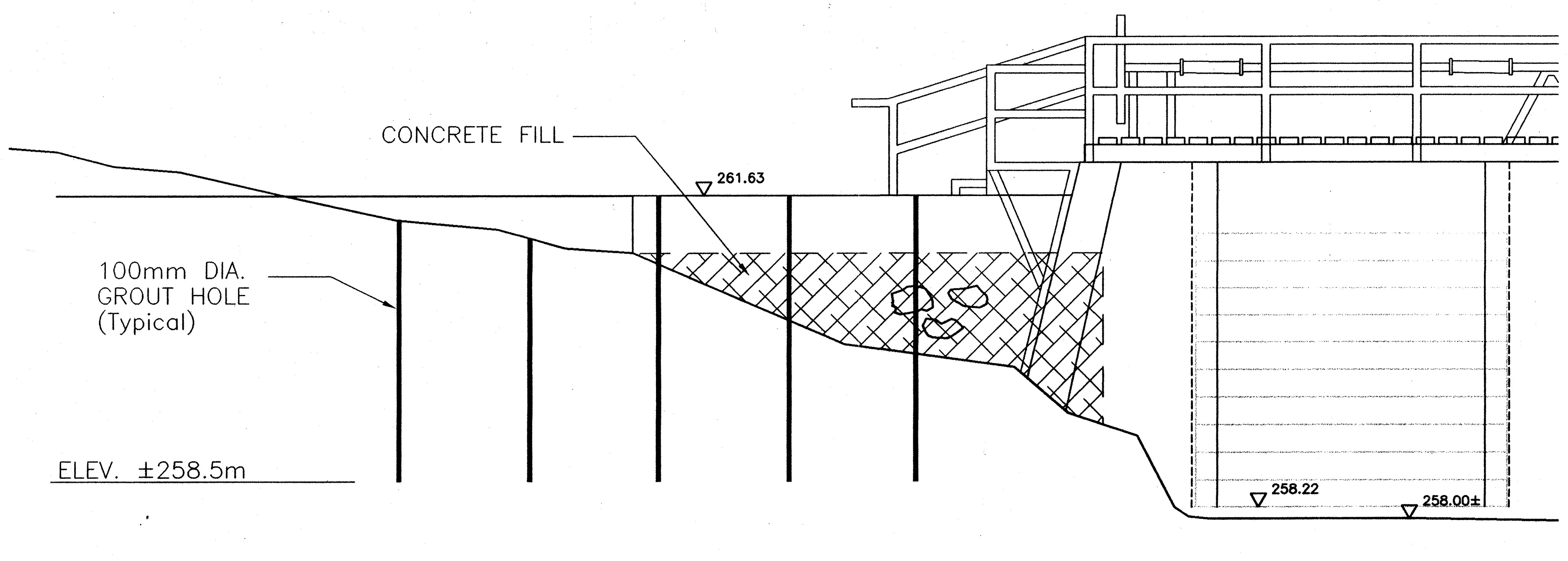


PLAN VIEW



DETAIL A
NOT TO SCALE

SUPPORT TO BE
BY PROFESSIONAL ENGINEER
SUBMIT STAMPED SHOP DRAWINGS



CONTROL STRUCTURE AND NORTH WINGWALL
UPSTREAM ELEVATION
SECTION A–A

| NO. | REVISIONS | DATE | APP. |
|---|---|---|---|
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| | | | |
| | | | |
| B | ISSUED FOR CONSTRUCTION | JULY 26 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

NOTE 1:
CONCRETE FILL BEFORE GROUTING

- REMOVE ALL DELETERIOUS MATERIAL, WOOD, LOOSE ROCK etc.
- INSTALL ROCK DOWELS & REBAR MAT.
- PLACE CONCRETE FILL TO ELEVATION 261.0m BY TREMIE METHOD OR APPROVED ALTERNATIVE. CONCRETE CSA A23.1–F2 EXPOSURE. FLOAT CONCRETE SURFACE AND BROOM FINISH.
- REMOVE TEMPORARY SAND BAGGING/FORMWORK
- FILL ALL WORKSPACE AREAS WITH CONCRETE.
- TRIM/BACKFILL AGAINST OUTER FACE OF APRON.

NOTE 2:
GROUTING

- DRILL HOLE TO MIN ELEV. 255m OR 5m DEPTH FROM EXISTING GRADE.
- WATER TEST ALL HOLES.

- GROUT SEQUENCE –
  1,2,3
  4,5,6,7,8,9
  10,11
  12,13
  14,15,16
  17,18,19,20

- GROUT: CEMENTIOUS GROUT
  1:1 CEMENT, WATER
  BY VOLUME

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER BETWEEN WOOD DECK AND STEEL CATWALK, ELV. 262.00 m GSC.

**EGA** **ECOS GARATECH**
CONSULTING ENGINEERS
BRAMPTON (905) 458–4110 FAX: (905) 458–1479

**Terraprobe**

OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
CONTROL STRUCTURE
AND NORTH BANK

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. |
| SCALE: 1:50 | JOB: 1434–19 | 1434–19–02 |

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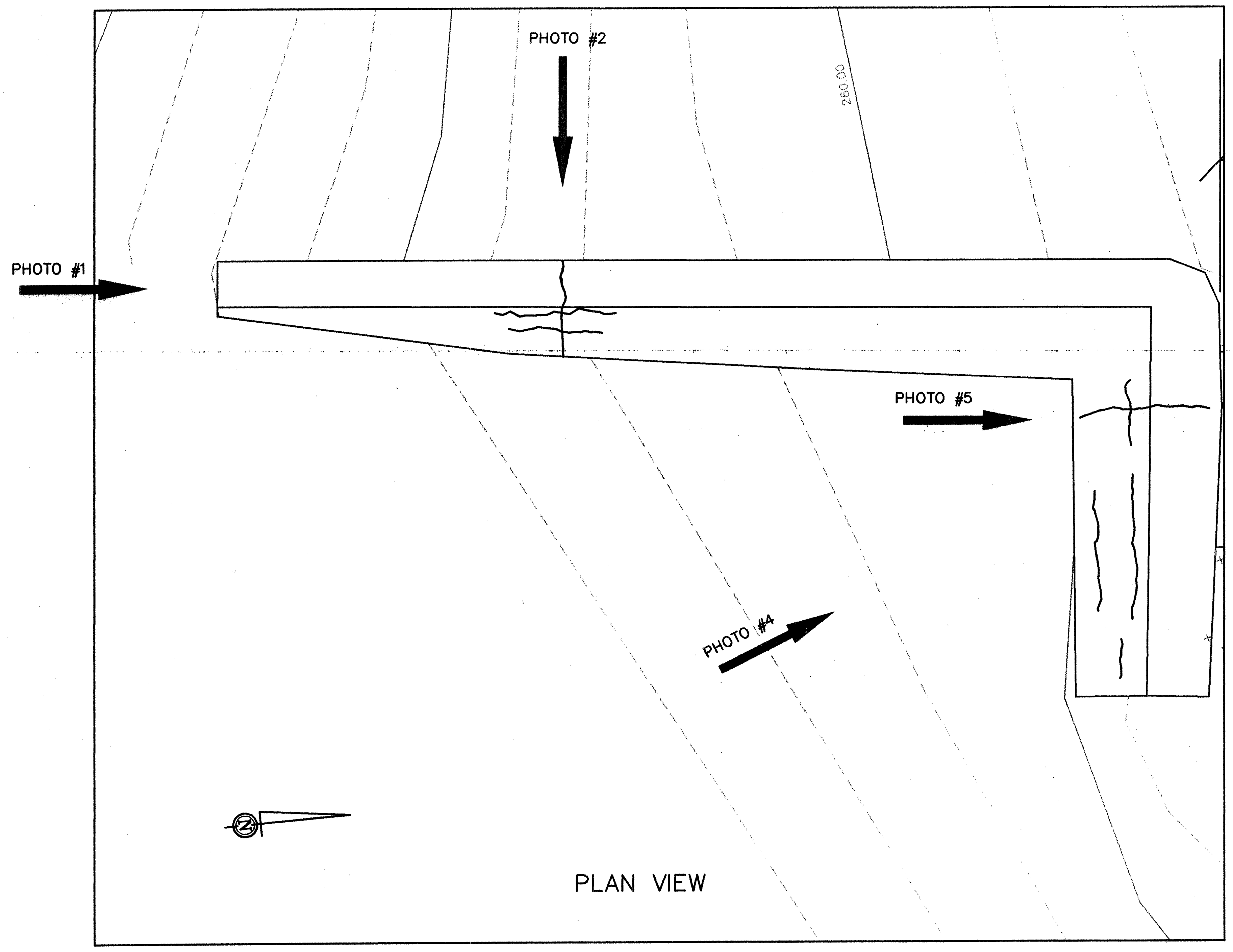
PHOTO #1

SEVERE STRUCTURAL CRACK

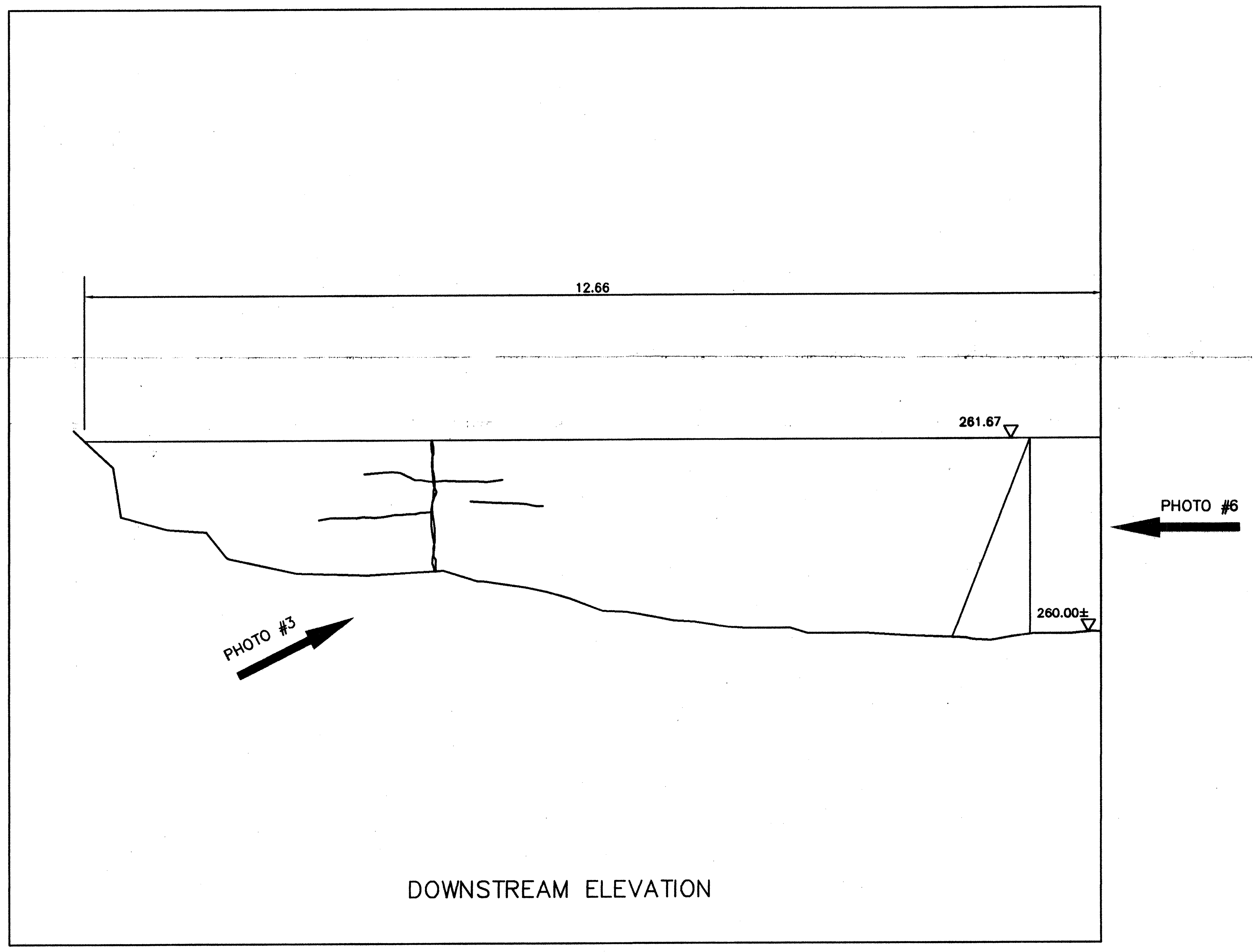

PHOTO #2

SEVERE STRUCTURAL CRACK


PHOTO #3

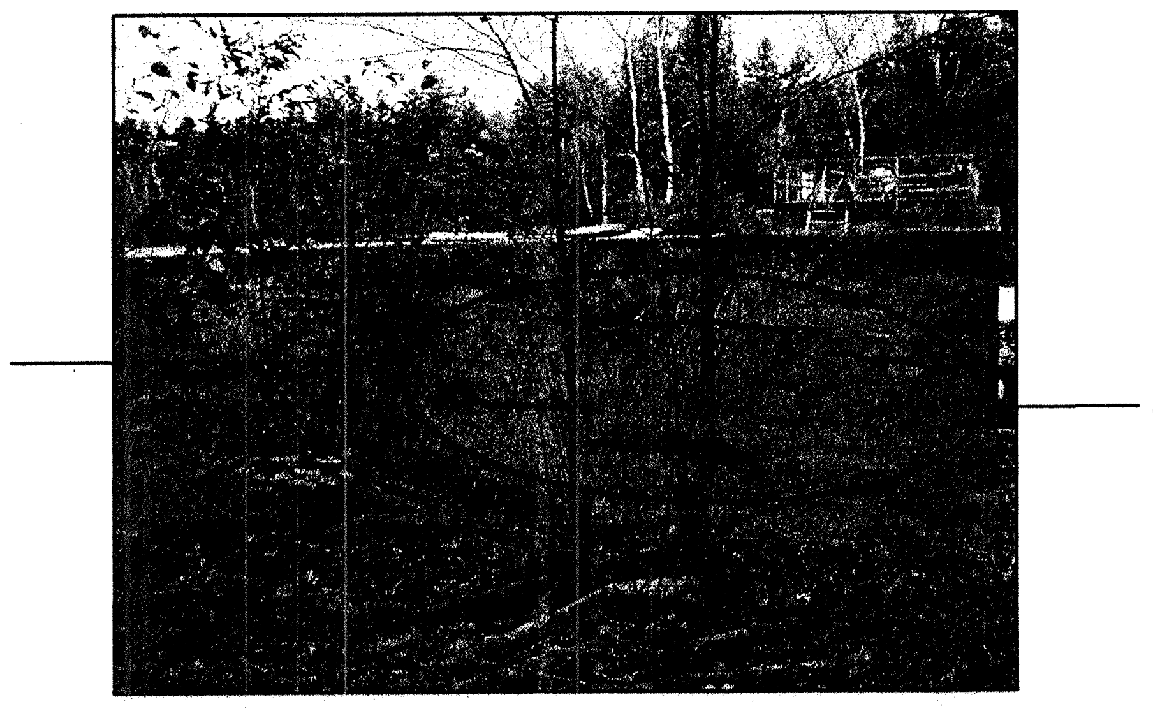


PLAN VIEW



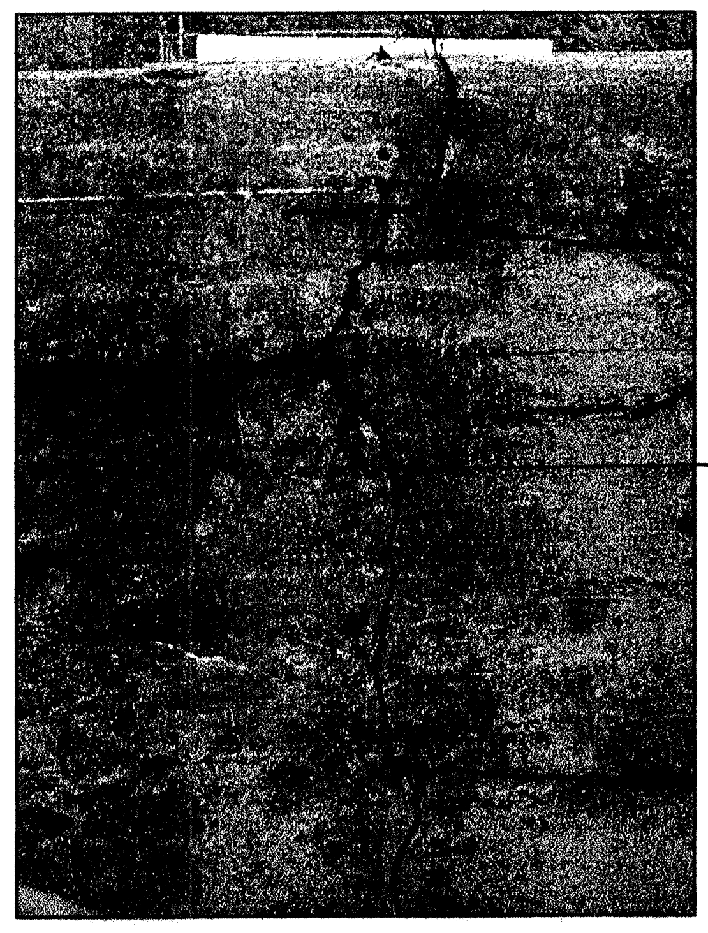
DOWNSTREAM ELEVATION

SEVERE STRUCTURAL CRACK



COLD JOINT DETERIORATION

PHOTO #4



SEVERE STRUCTURAL CRACK

PHOTO #5


PHOTO #6

| NO. | REVISIONS | DATE | APP. |
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| B | ISSUED FOR CONSTRUCTION | JULY 23 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

## STRUCTURAL CRACKS AND COLD JOINTS

- LAYOUT & CONFIRM ALL CRACKS AND JOINTS TO BE REPAIRED.
- PRESSURE WASH.
- REMOVE LOOSE DELETERIOUS MATERIALS.
- SUFFICIENTLY GROUT CRACKS TO BE ABLE TO PRESSURE INJECT HILTI RM700 EP REPAIR MORTAR.
- CLEAN CONCRETE FACE OF SURPLUS REPAIR MATERIALS.

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER
BETWEEN WOOD DECK AND STEEL CATWALK,
ELV. 262.00 m GSC.

**EGA** **ECOS GARATECH**
CONSULTING ENGINEERS
BRAMPTON (905) 458-4110 FAX: (905) 458-1479

OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
SOUTH WINGWALL

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. 1434-19-03 |
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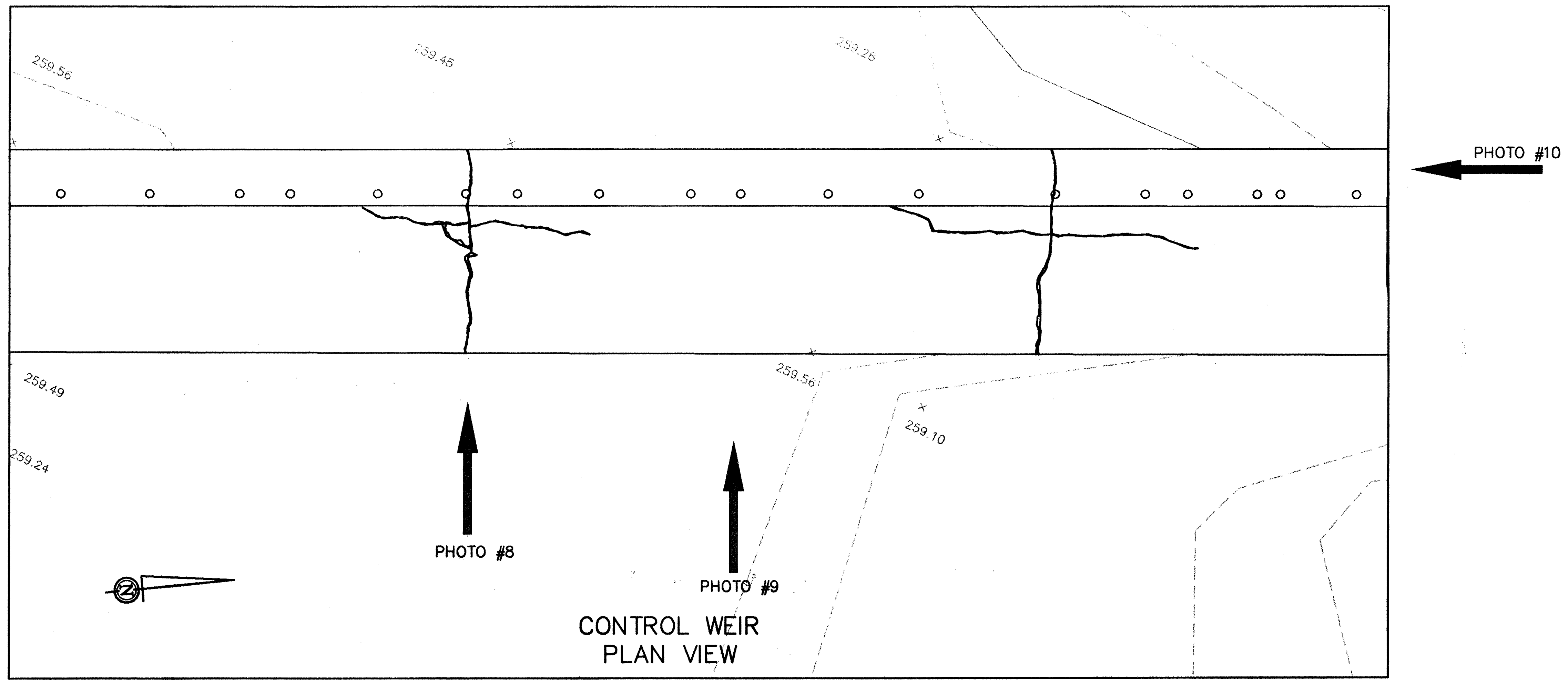
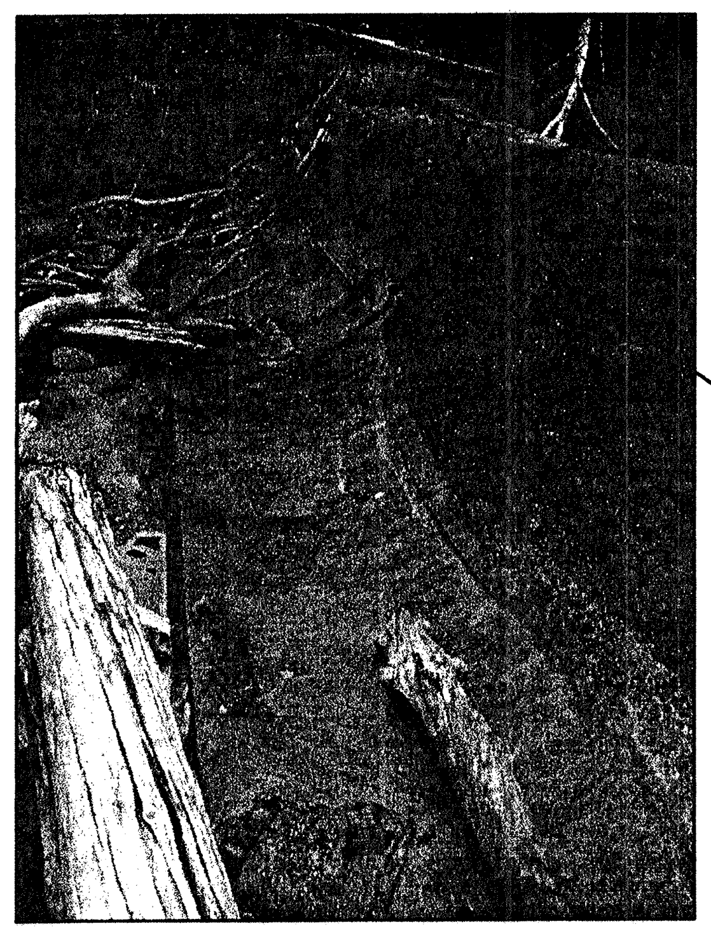
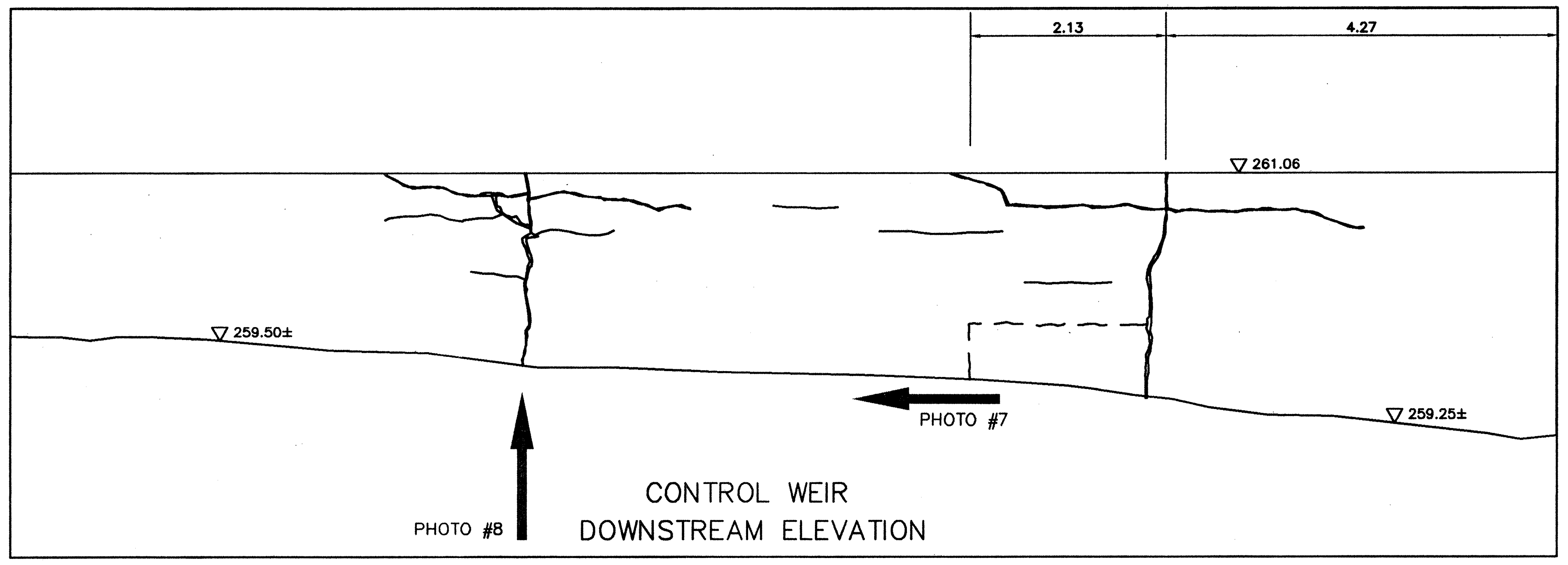


CONTROL WEIR
PLAN VIEW

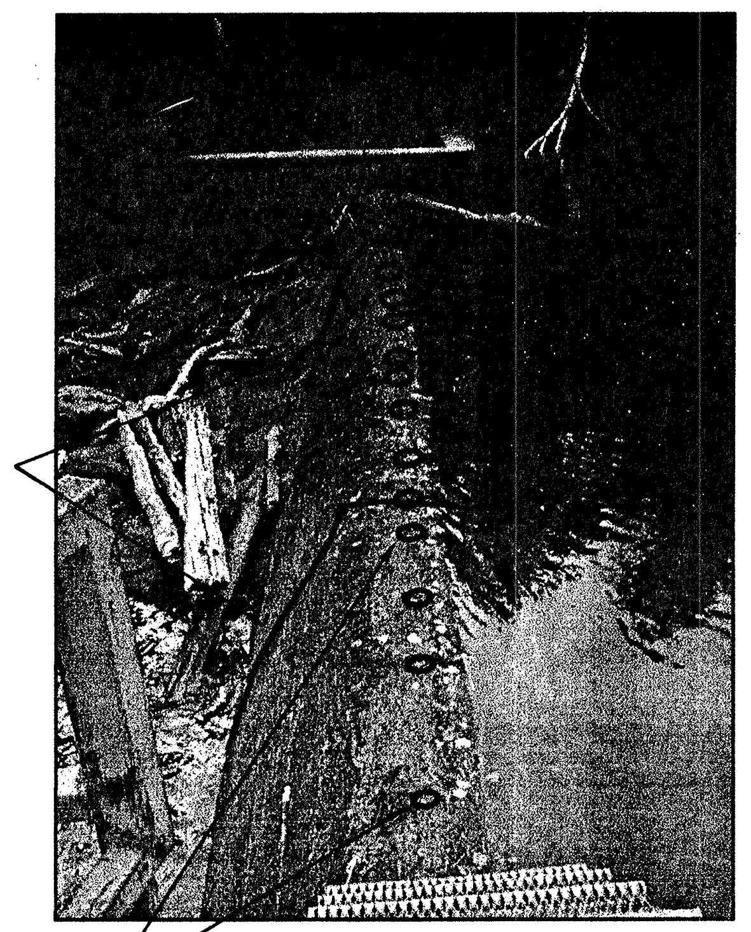


SEVERE STRUCTURAL CRACK

PHOTO #7



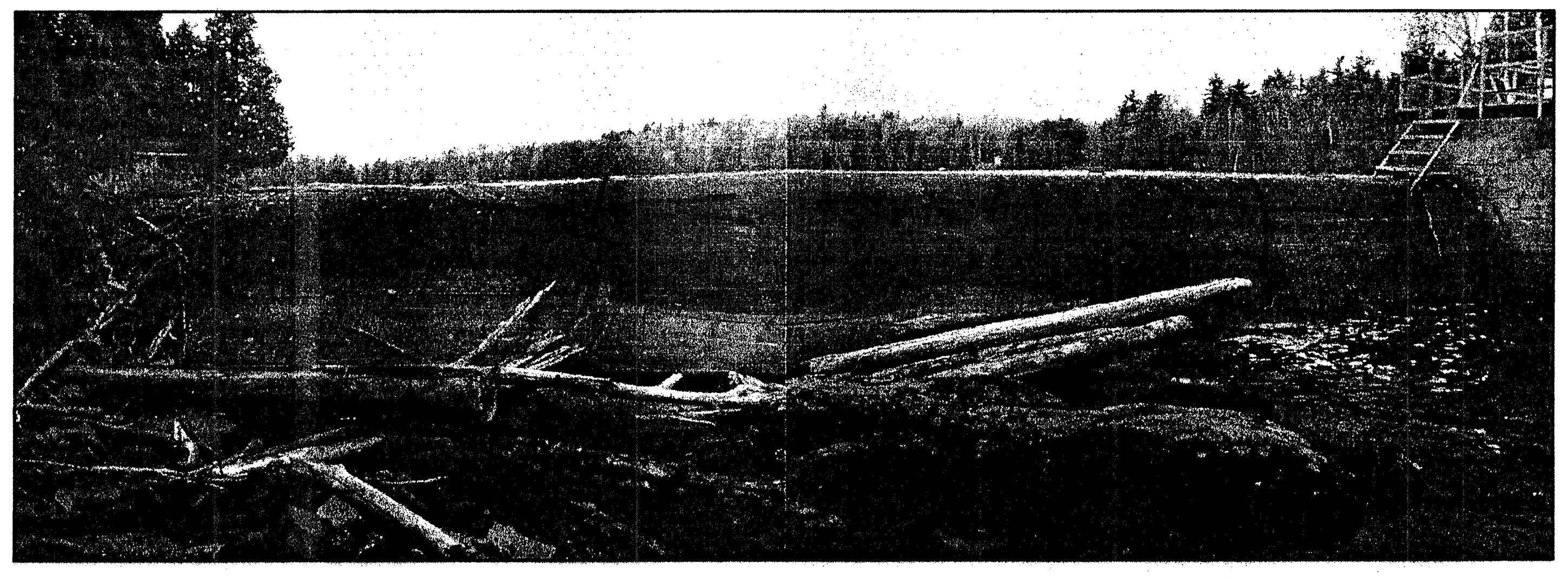
CONTROL WEIR
DOWNSTREAM ELEVATION



SEVERE STRUCTURAL CRACK

ABANDONED POST HOLES FOR FLASHBOARDS

PHOTO #10



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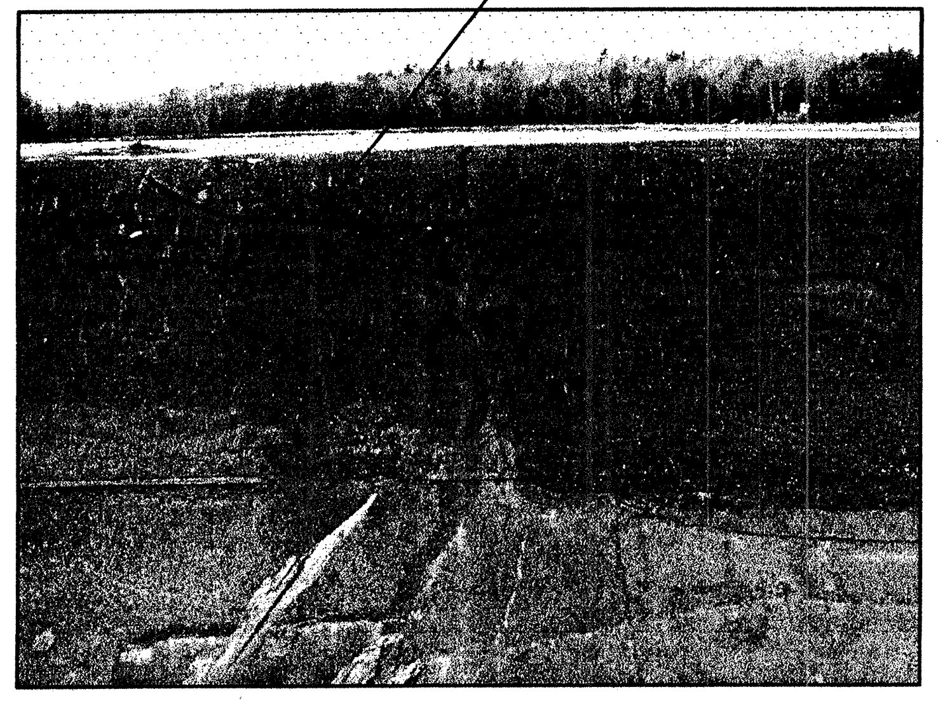
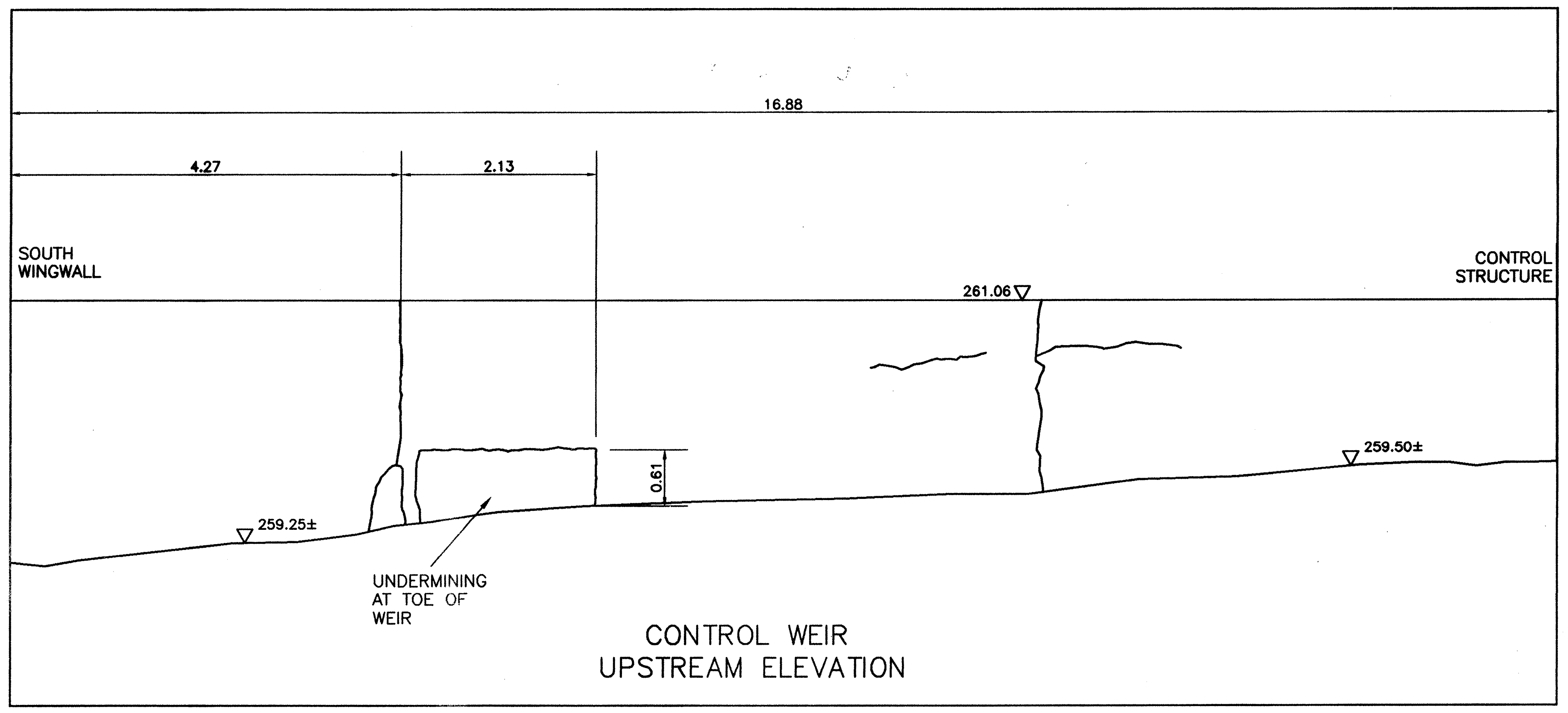


SEVERE STRUCTURAL CRACK

PHOTO #8



CONTROL WEIR
UPSTREAM ELEVATION

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| B | ISSUED FOR CONSTRUCTION | JULY 26 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

## STRUCTURAL CRACKS AND POST HOLES

- PRESSURE WASH.
- REMOVE LOOSE DELETERIOUS MATERIALS.
- SUFFICIENTLY GROUT CRACKS TO BE ABLE TO PRESSURE INJECT HILTI RM700 EP REPAIR MORTAR.
- CLEAN CONCRETE FACE OF SURPLUS REPAIR MATERIALS.

## TOE OF WEIR & CONCRETE SPALLING

- REMOVE LOOSE DELETERIOUS MATERIALS & PREPARE SURFACE.
- PROTECT & FORM WORKING AREA.
- PLACE TREMIE CONCRETE (30 mPa) TO SUFFICIENTLY TREAT UNDERMINING UPSTREAM TOE OF WEIR & AREAS OF SPALLING OF THE CONCRETE FACE.
- REMOVE FORMS & SCRAPE SURFACE SMOOTH OF ROUGH PROTRUSIONS.

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER
BETWEEN WOOD DECK AND STEEL CATWALK,
ELV. 262.00 m GSC.

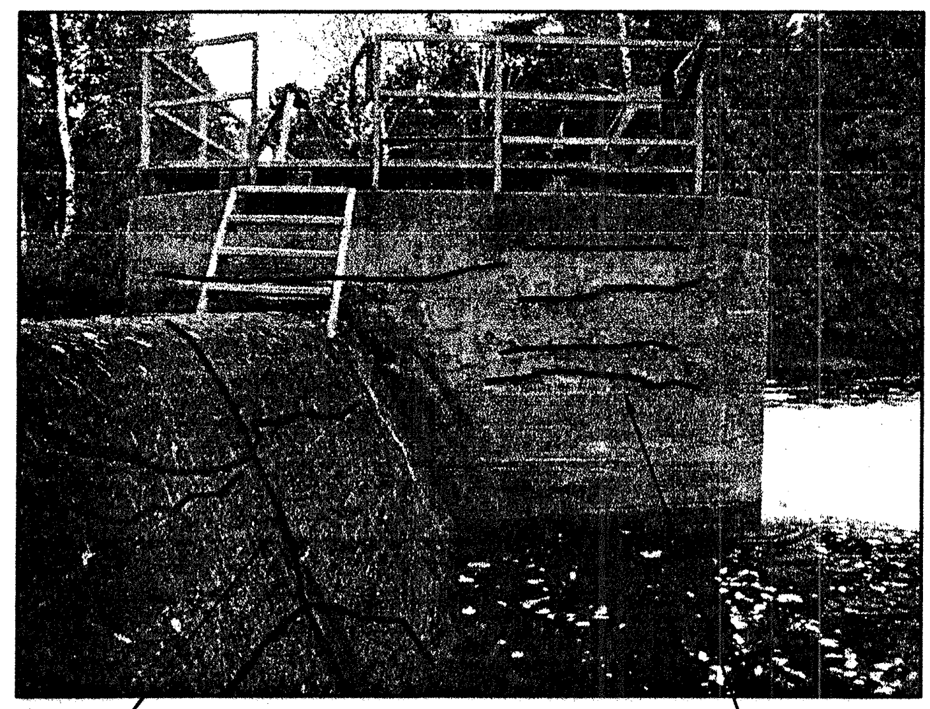
EGA
**ECOS GARATECH**
CONSULTING ENGINEERS
BRAMPTON (905) 458-4110 FAX: (905) 458-1479

OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
CONTROL WEIR

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. |
| SCALE: 1:50 | JOB: 1434-19 | 1434-19-04 |



SEVERE STRUCTURAL CRACKS

PHOTO #11

COLD JOINT DETERIORATION

SEVERE CONCRETE SPALLING

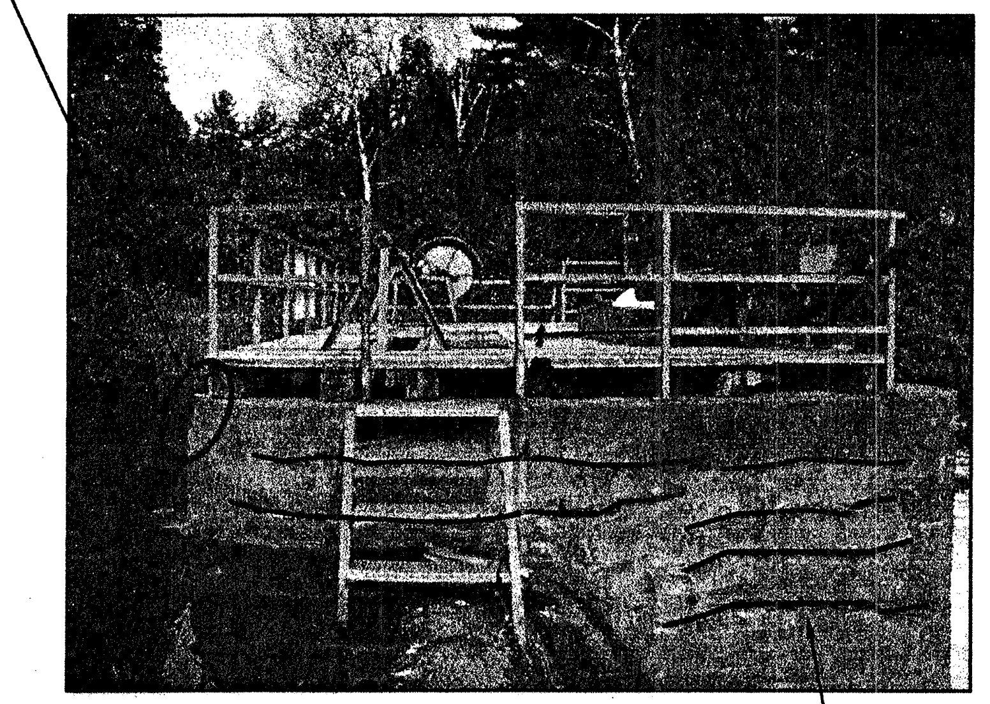
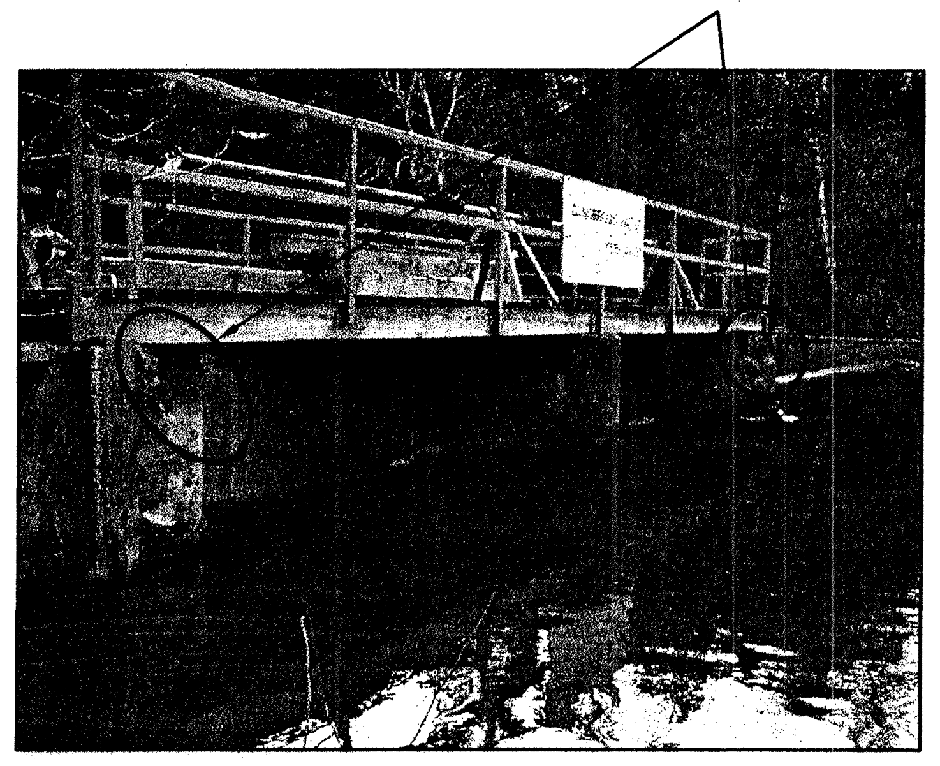


PHOTO #12

COLD JOINT DETERIORATION

SEVERE CONCRETE SPALLING



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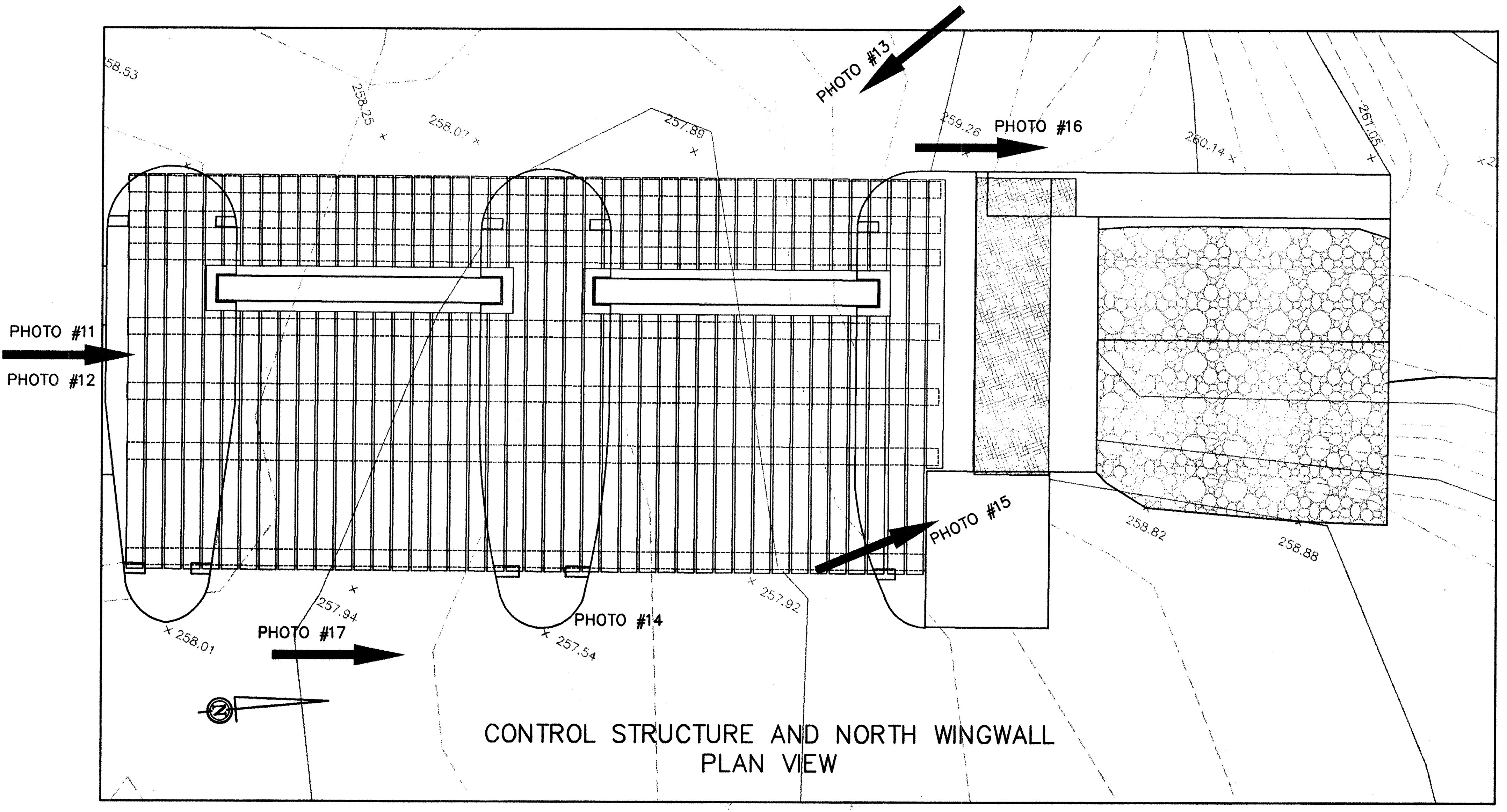
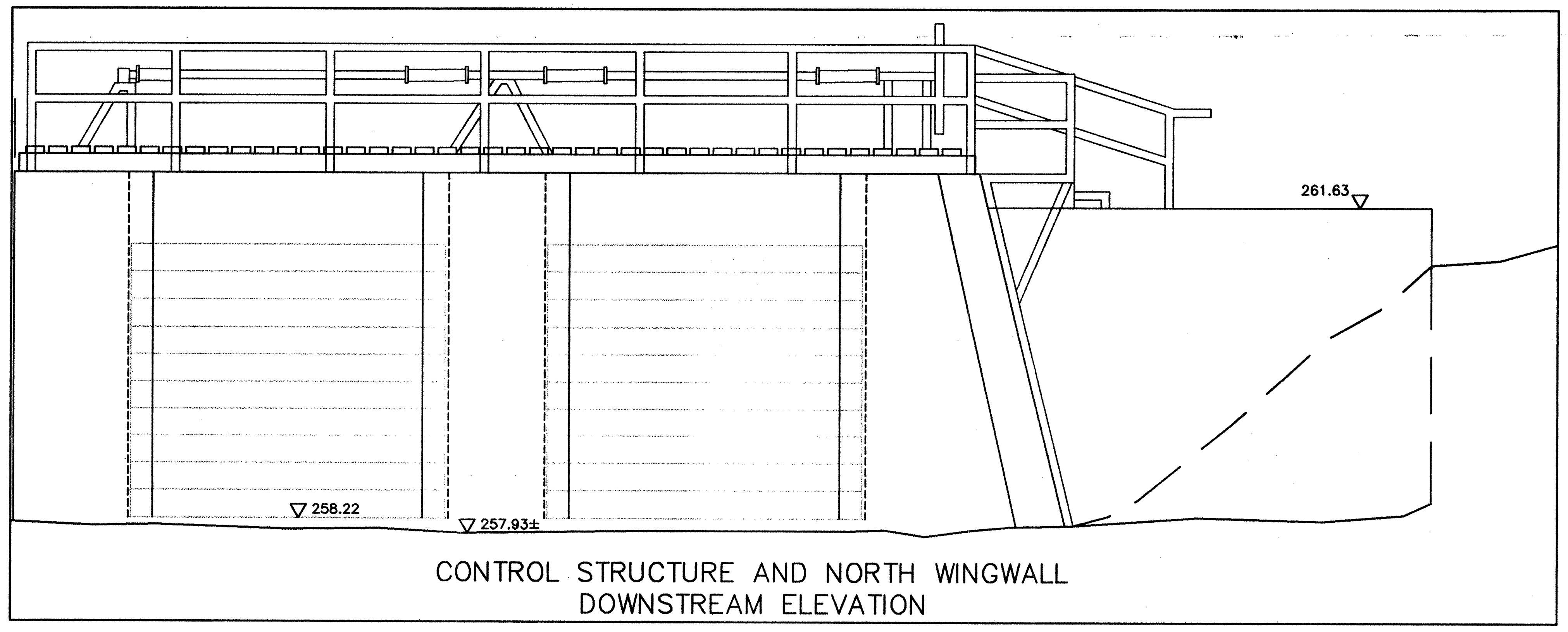
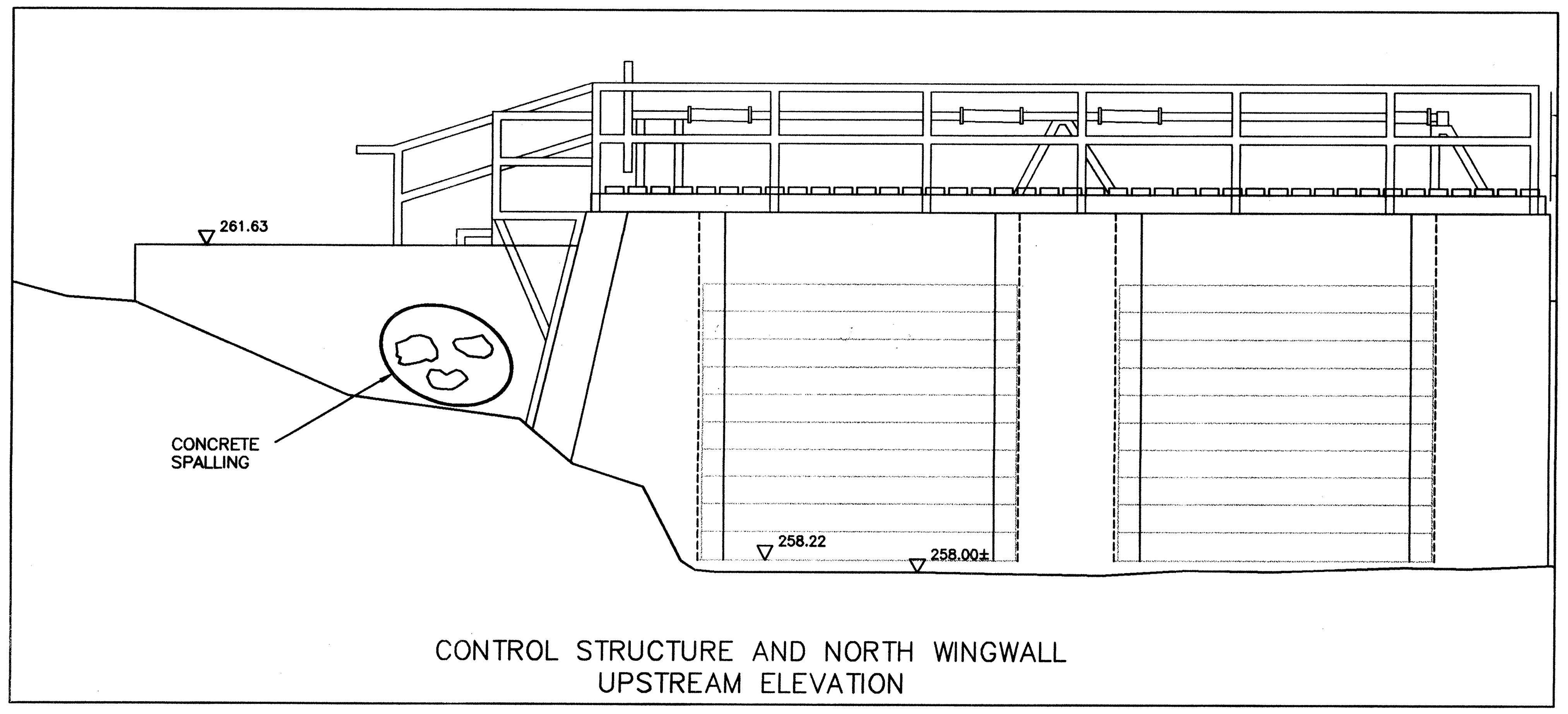


CONTROL STRUCTURE AND NORTH WINGWALL
PLAN VIEW



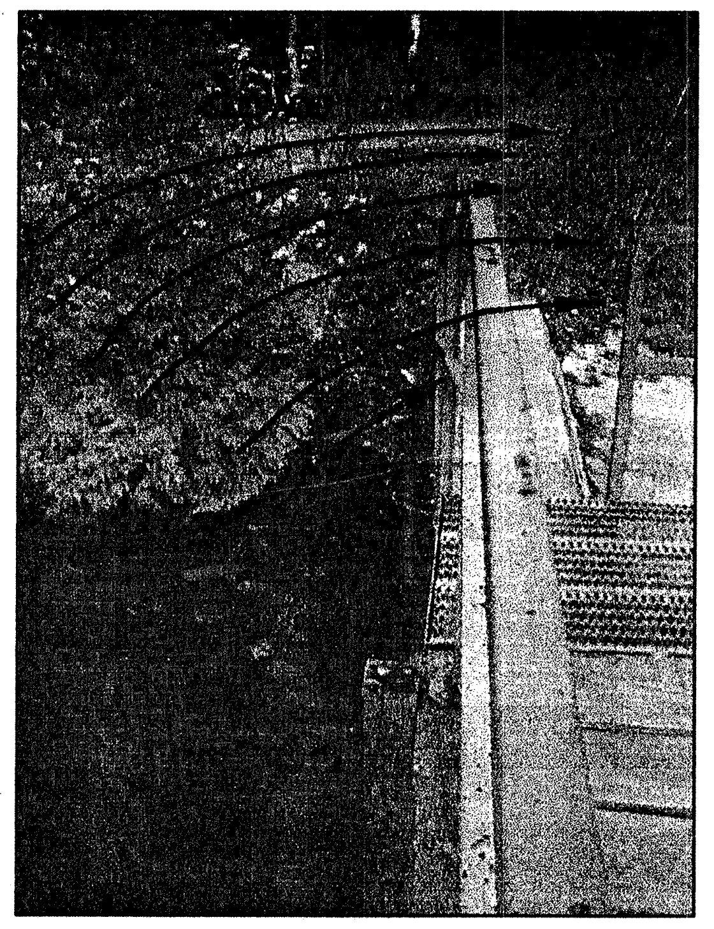
CONTROL STRUCTURE AND NORTH WINGWALL
DOWNSTREAM ELEVATION



CONTROL STRUCTURE AND NORTH WINGWALL
UPSTREAM ELEVATION

PHOTO #14

PHOTO #15



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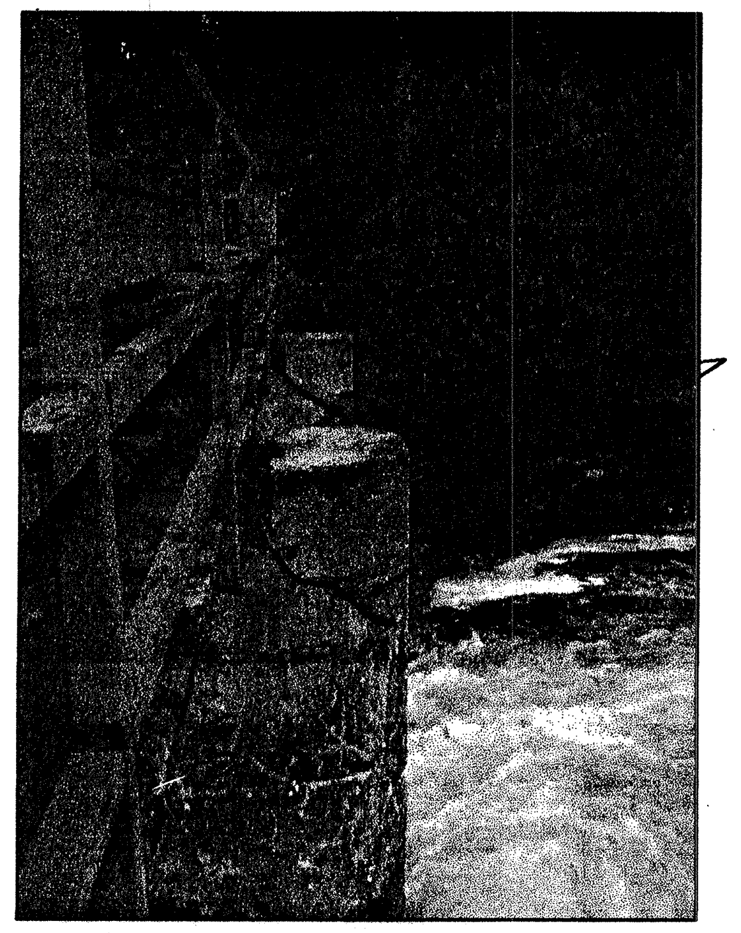

SEVERE STRUCTURAL CRACKS

PHOTO #17

| NO. | REVISIONS | DATE | APP. |
|---|---|---|---|
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| | | | |
| | | | |
| B | ISSUED FOR CONSTRUCTION | JULY 26 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

## STRUCTURAL CRACKS, SPALLING AND COLD JOINTS

- PRESSURE WASH.
- REMOVE LOOSE DELETERIOUS MATERIALS & PREPARE SURFACE.
- SUFFICIENTLY GROUT CRACKS TO BE ABLE TO PRESSURE INJECT HILTI RM700 EP REPAIR MORTAR.
- CLEAN CONCRETE FACE OF SURPLUS REPAIR MATERIALS.
- PROTECT & FORM WORKING AREA FOR REPAIR OF CONCRETE FACE IN SPALLING AREAS.
- REMOVE FORMS; SCRAPE SURFACE SMOOTH OF ROUGH PROTRUSIONS.

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER
BETWEEN WOOD DECK AND STEEL CATWALK,
ELV. 262.00 m GSC.

**EGA** **ECOS GARATECH**
CONSULTING ENGINEERS
BRAMPTON (905) 458-4110 FAX: (905) 458-1479

OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
CONTROL STRUCTURE

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. 1434-19-05 |
| SCALE: 1:50 | JOB: 1434-19 | |

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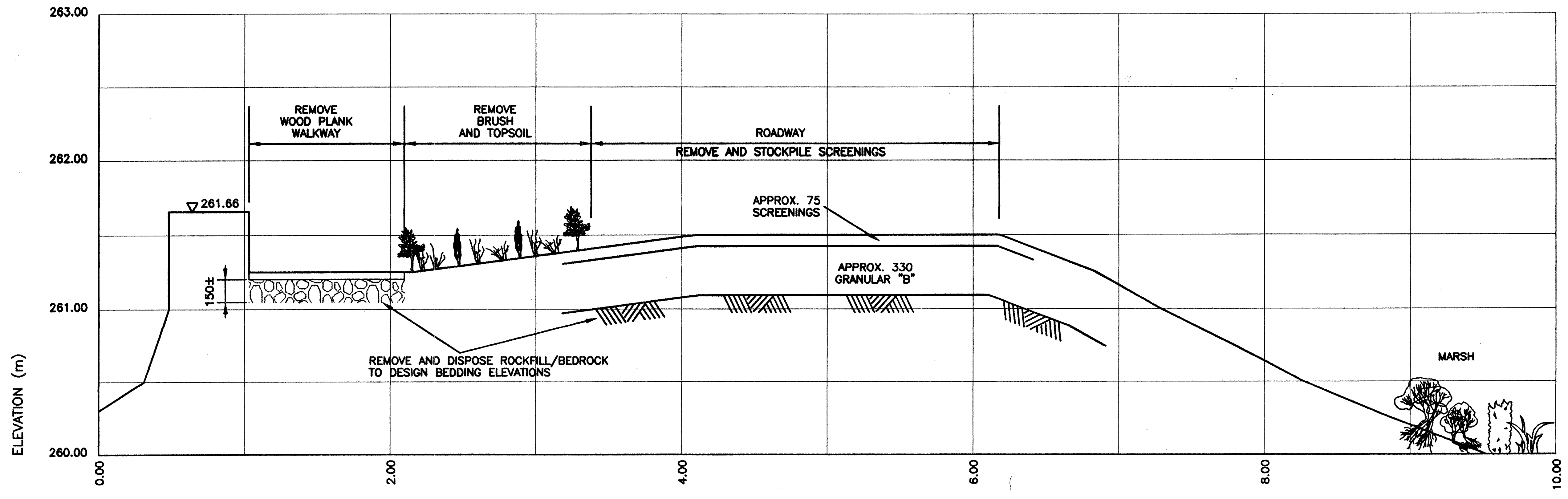
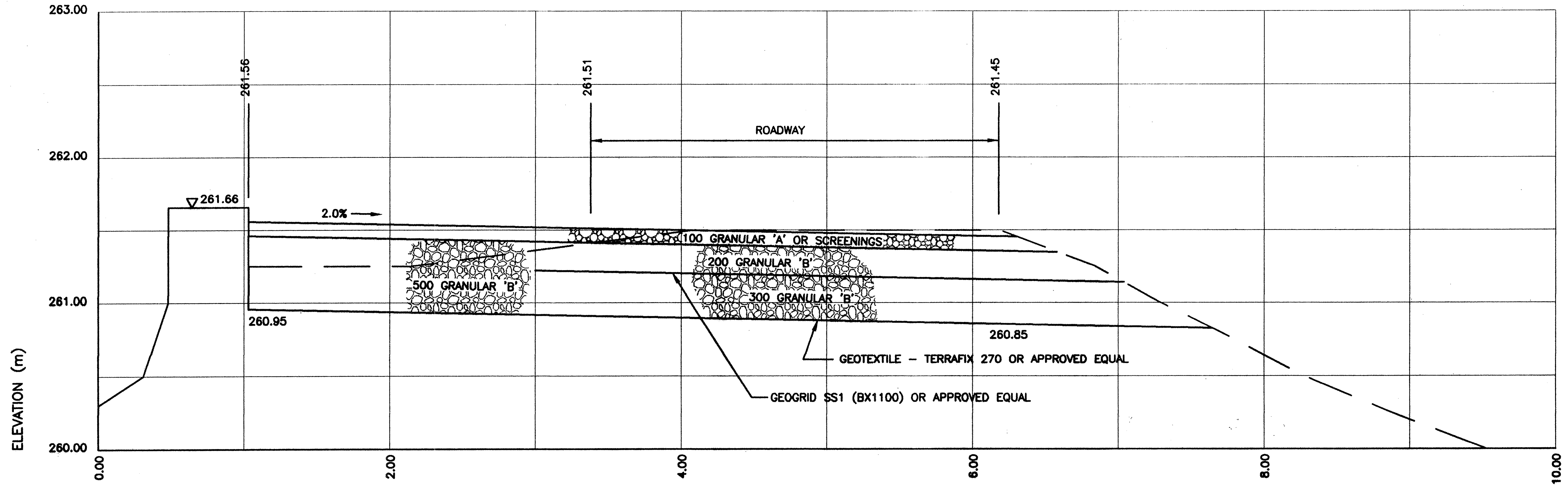


## SECTION A–A – EXISTING

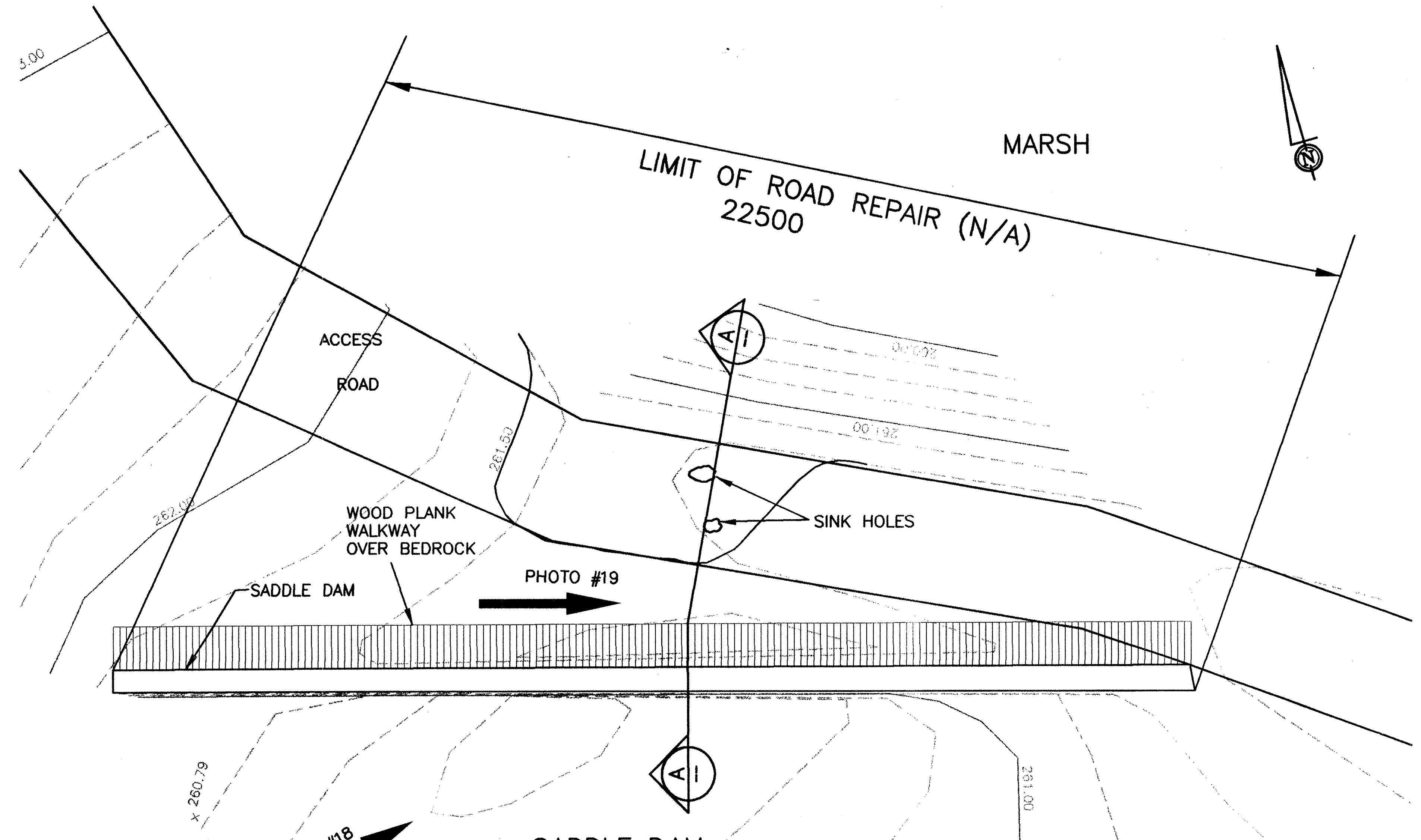
SCALE – 1:25

* ROAD WORKS NOT PART OF THIS CONTRACT



## SECTION A–A – DESIGN

SCALE – 1:25



## SADDLE DAM
## PLAN VIEW


SEVERE STRUCTURAL CRACK

PHOTO #18

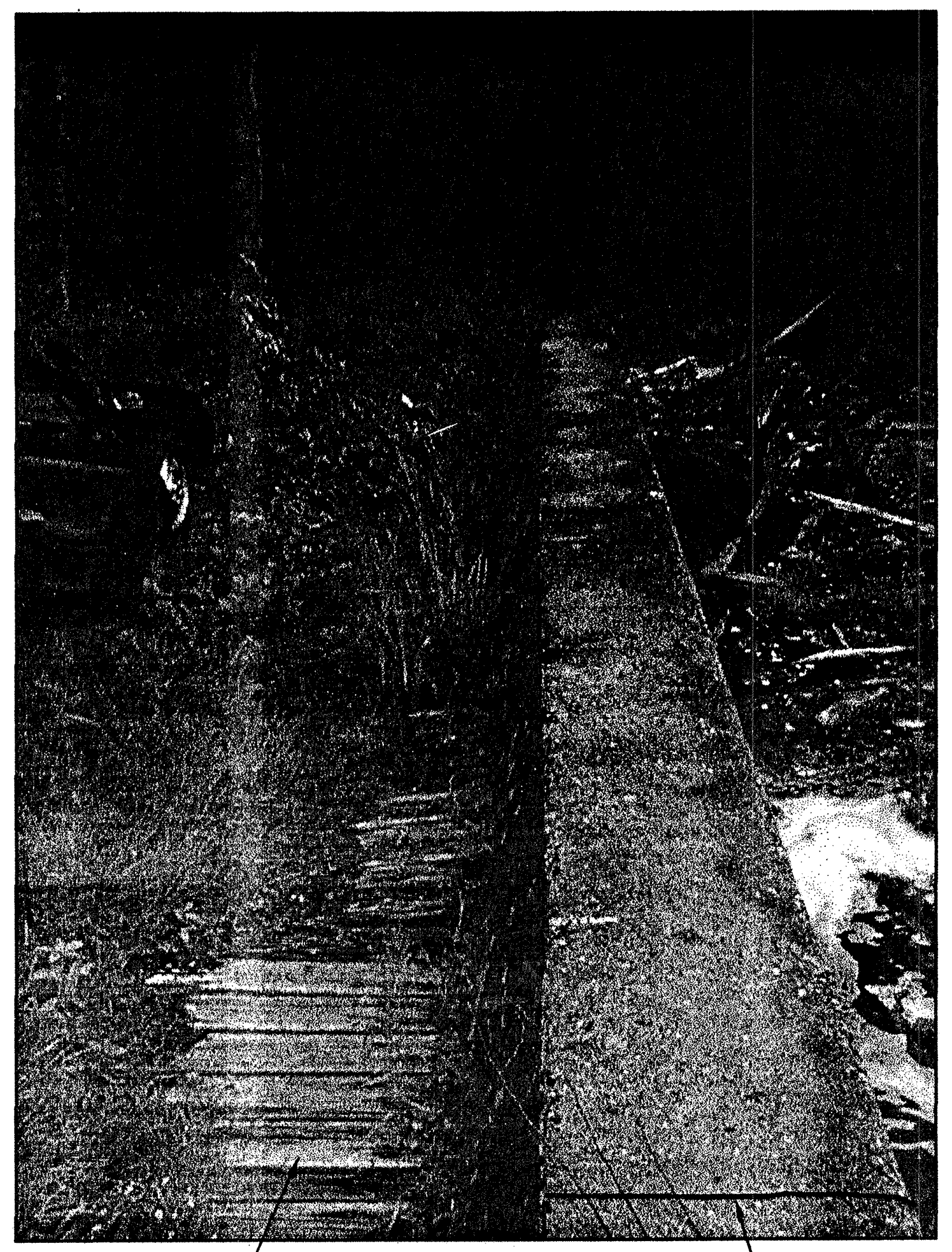

WOOD PLANK WALKWAY OVER ROCK FILL/BEDROCK

PHOTO #19

SEVERE STRUCTURAL CRACK

| NO. | REVISIONS | DATE | APP. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| B | ISSUED FOR CONSTRUCTION | JULY 26 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

## STRUCTURAL CRACKS

- PRESSURE WASH.
- REMOVE LOOSE DELETERIOUS MATERIALS.
- SUFFICIENTLY GROUT CRACKS TO BE ABLE TO PRESSURE INJECT HILTI RM700 EP REPAIR MORTAR.
- CLEAN CONCRETE FACE OF SURPLUS REPAIR MATERIALS.

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER
BETWEEN WOOD DECK AND STEEL CATWALK,
ELV. 262.00 m GSC.

**EGA** **ECOS GARATECH**
CONSULTING ENGINEERS
BRAMPTON (905) 458–4110 FAX: (905) 458–1479

OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
SADDLE DAM

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. |
| SCALE: 1:100 U/N | JOB: 1434–19 | 1434–19–06 |

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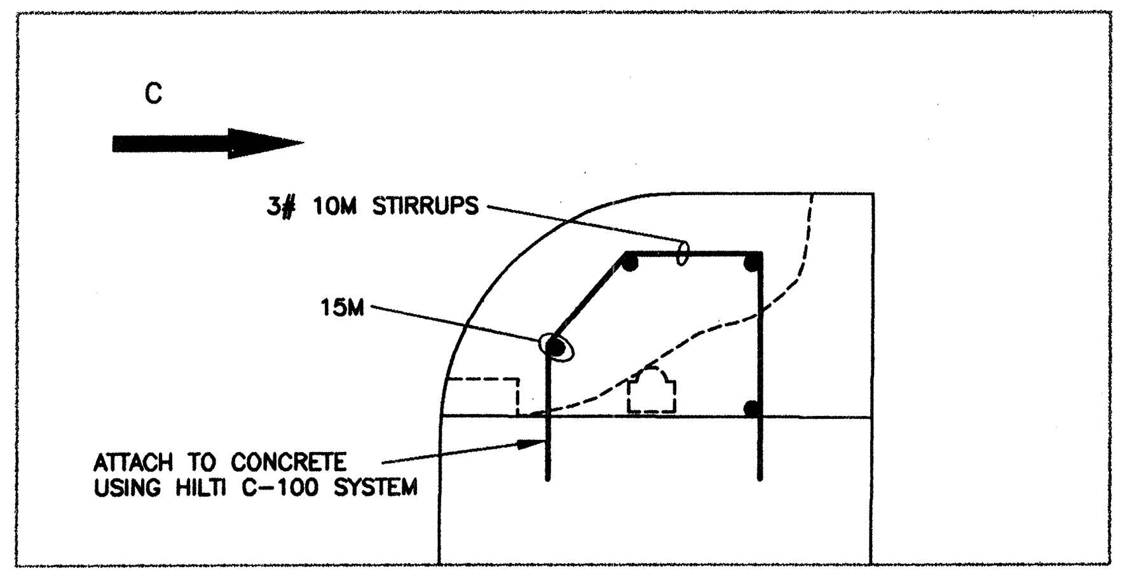
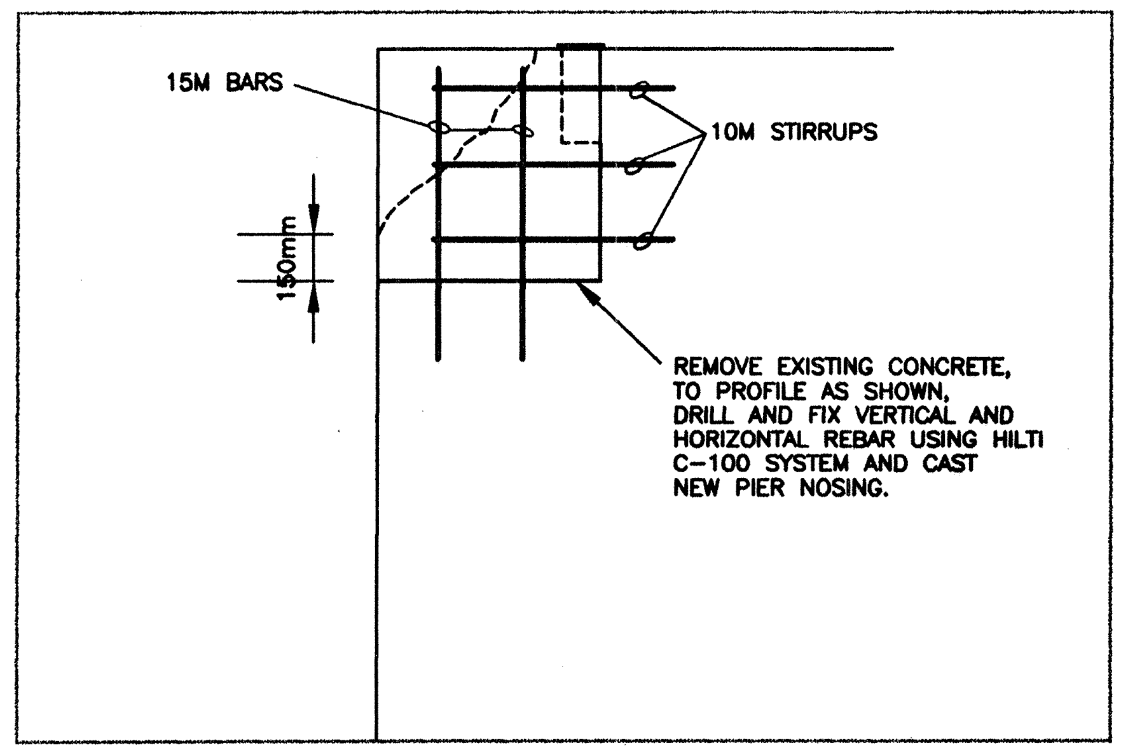
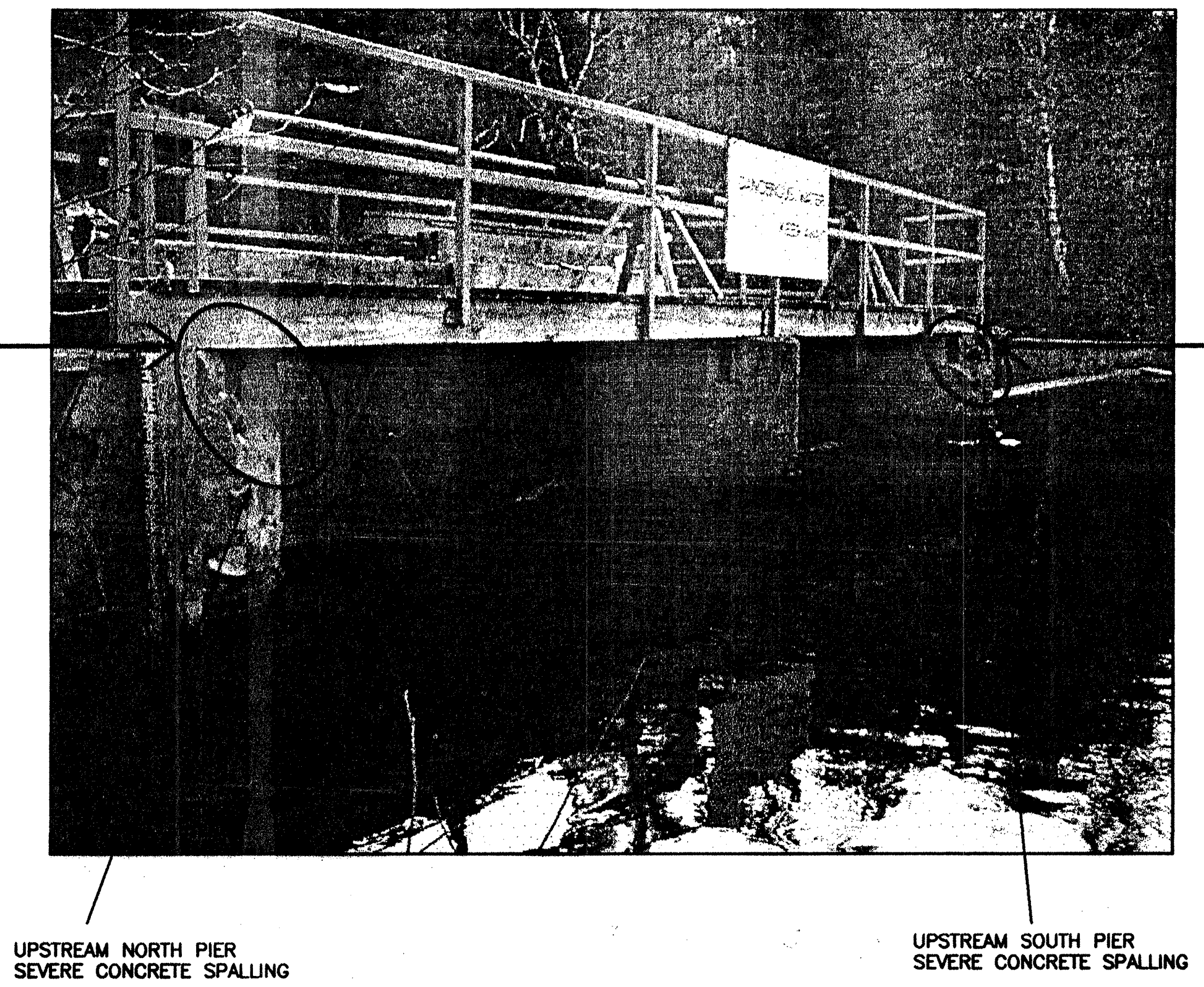


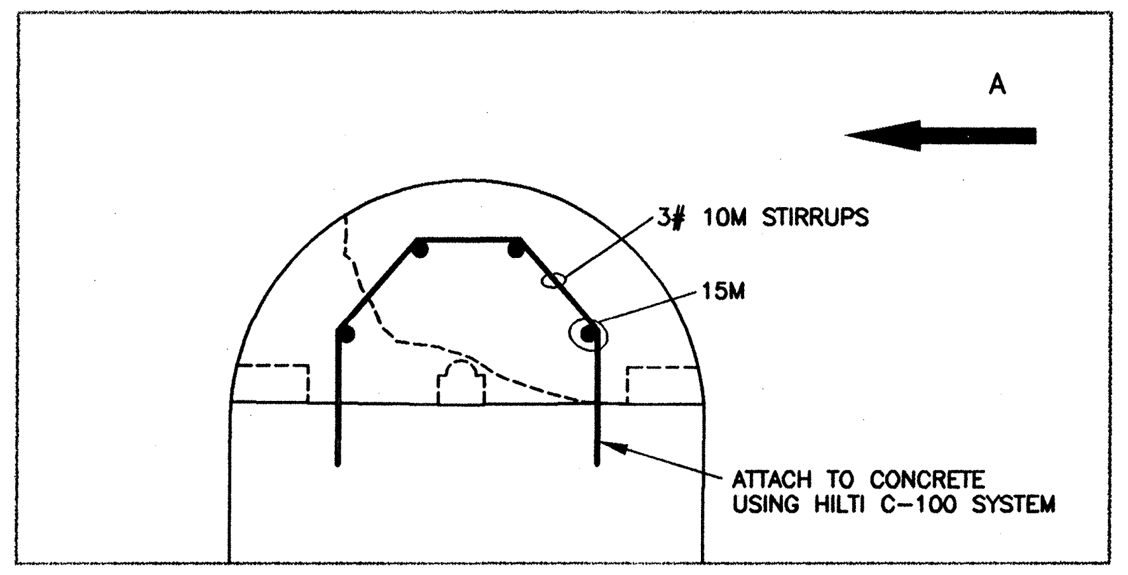
PLAN VIEW



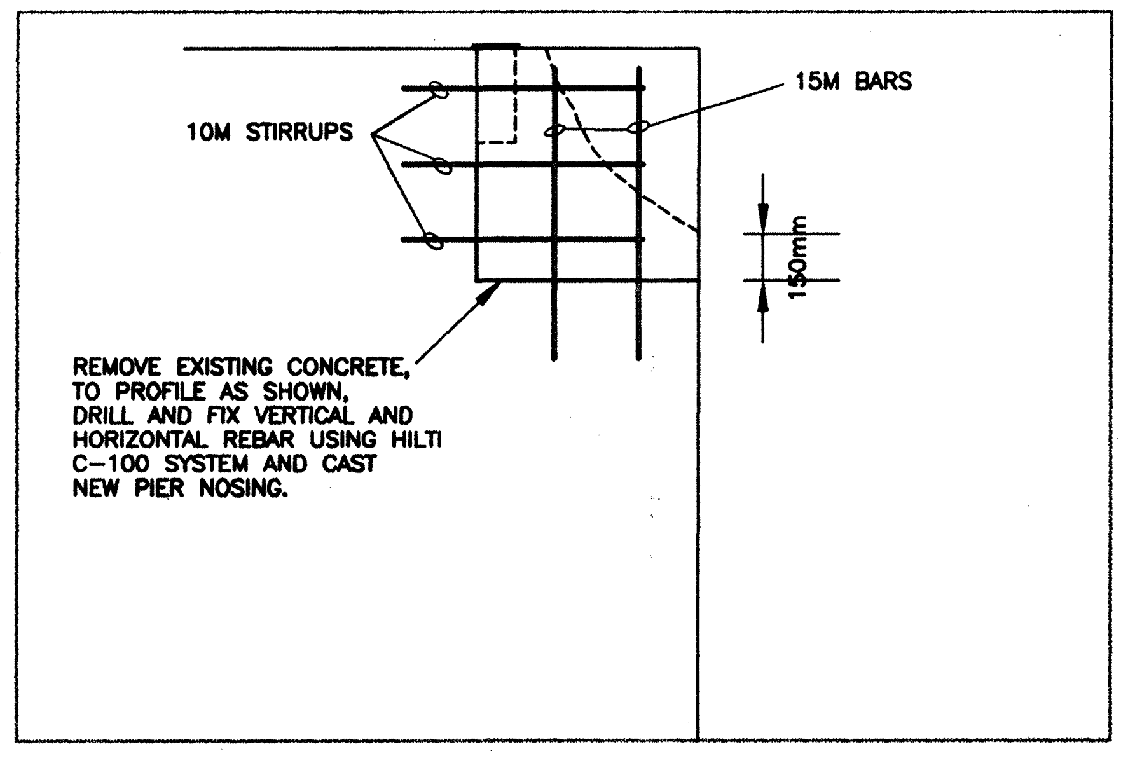
ELEVATION C

## NORTH PIER – UPSTREAM SIDE



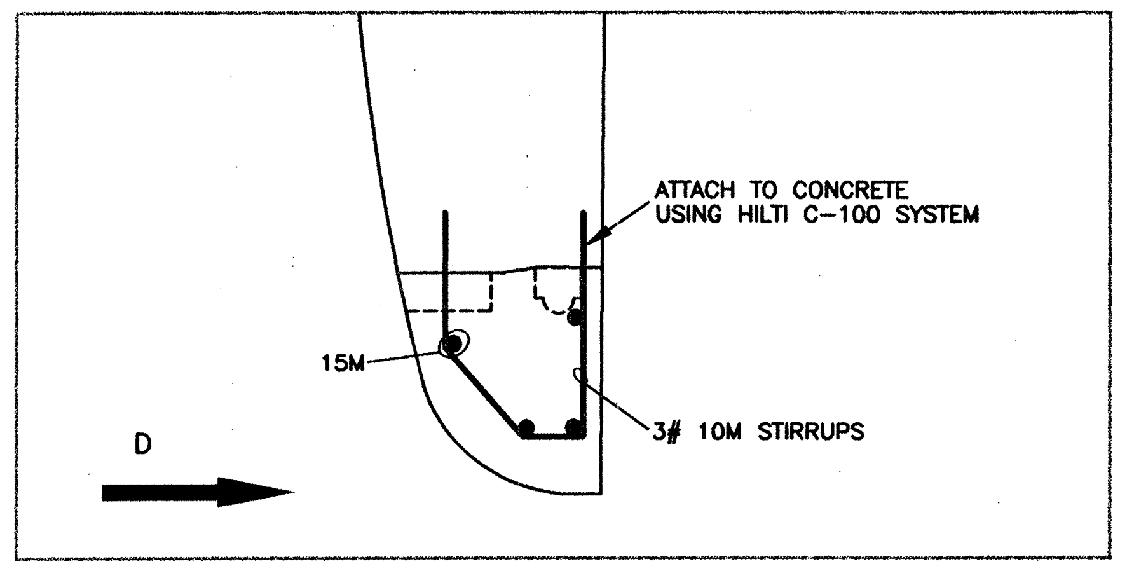


PLAN VIEW

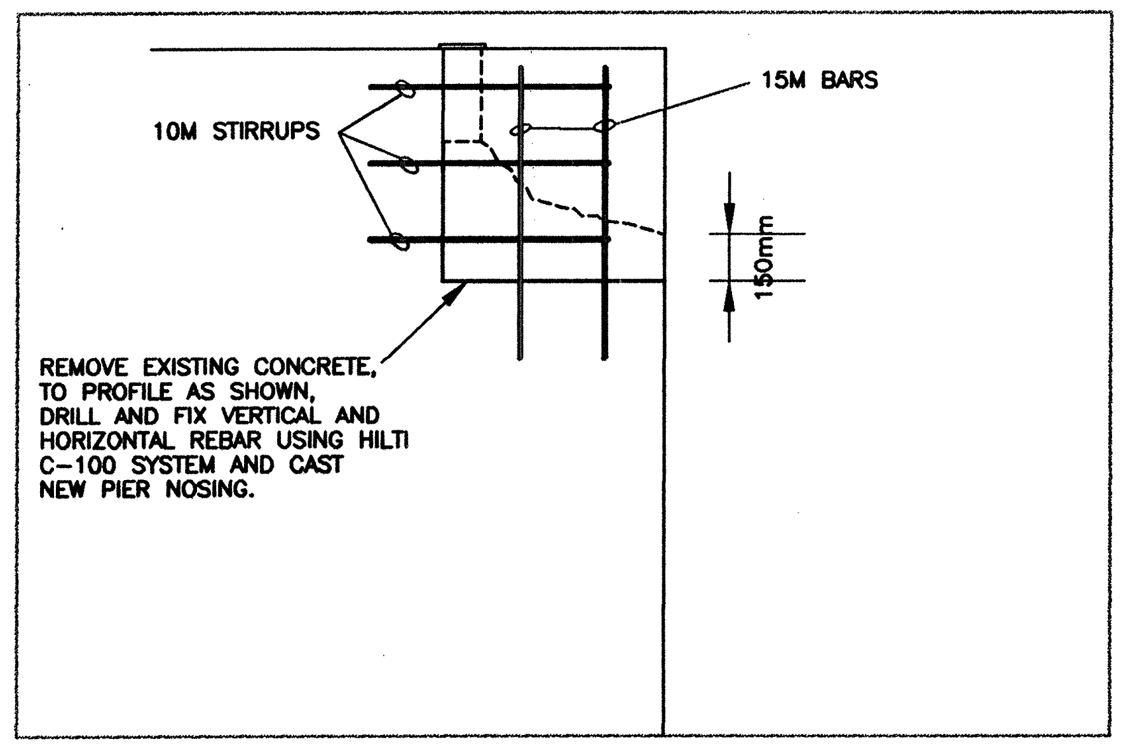


ELEVATION A

## SOUTH PIER – UPSTREAM SIDE

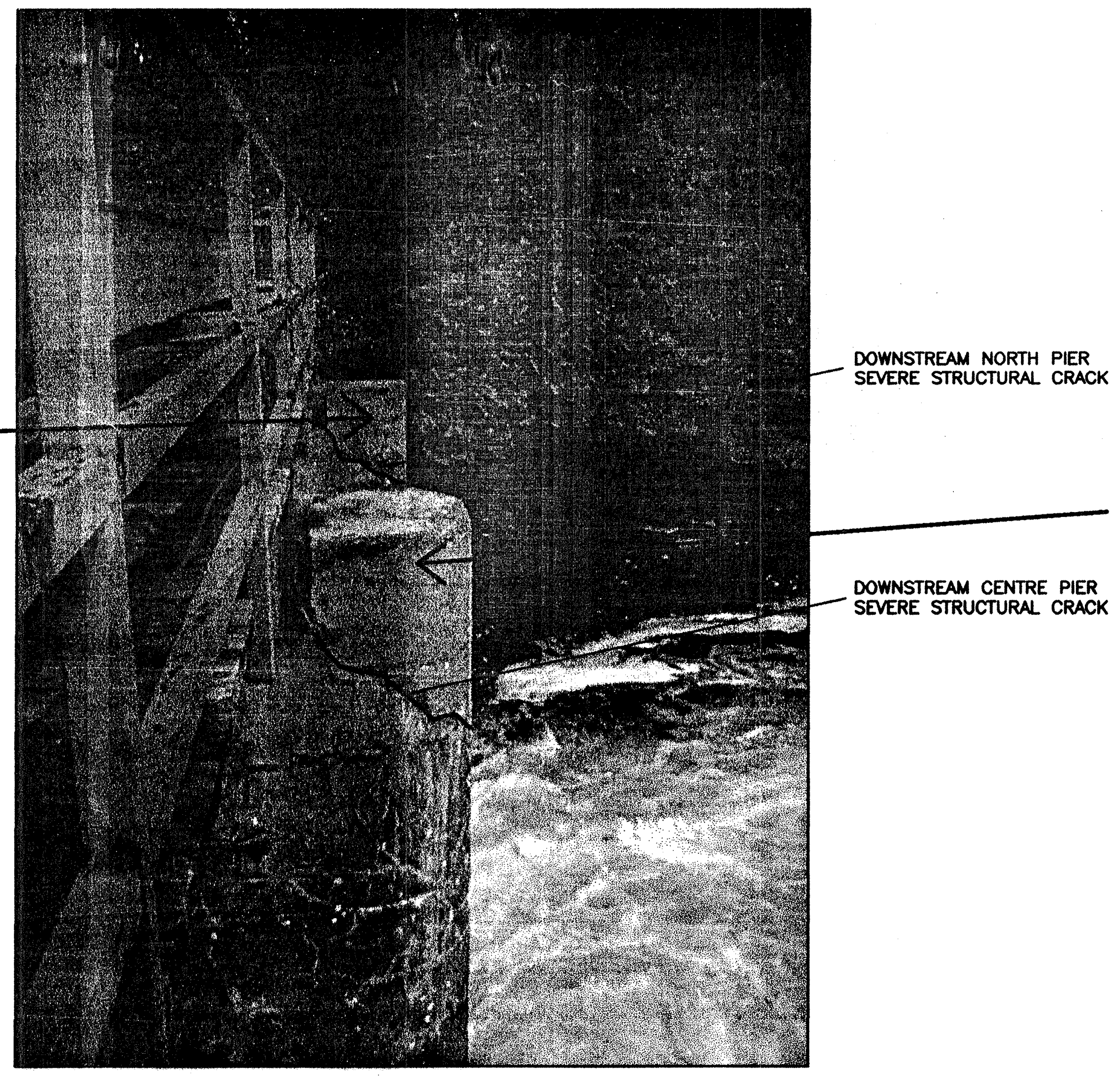


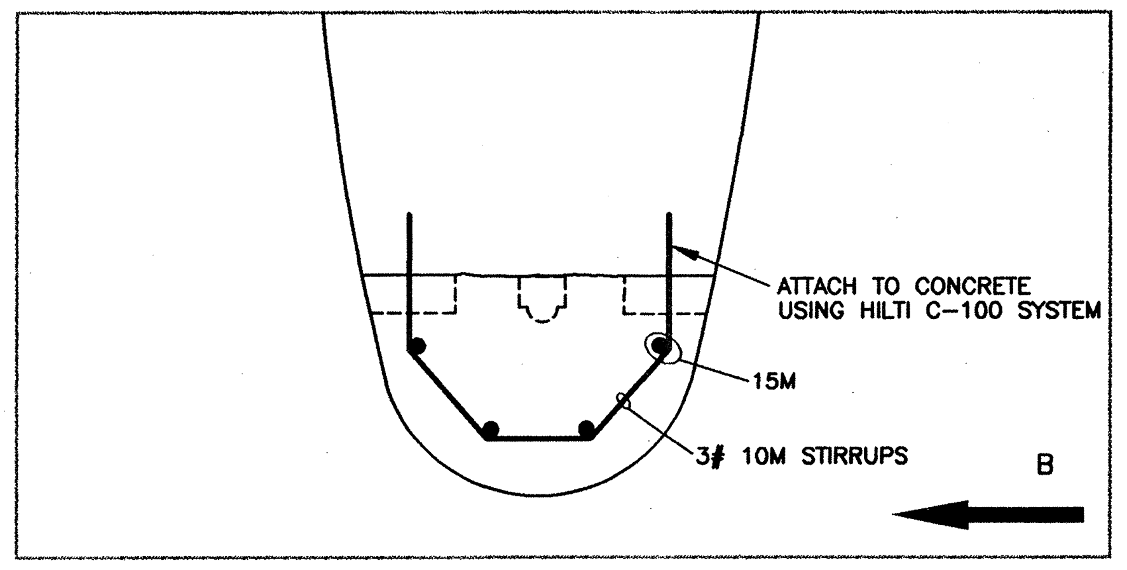
PLAN VIEW



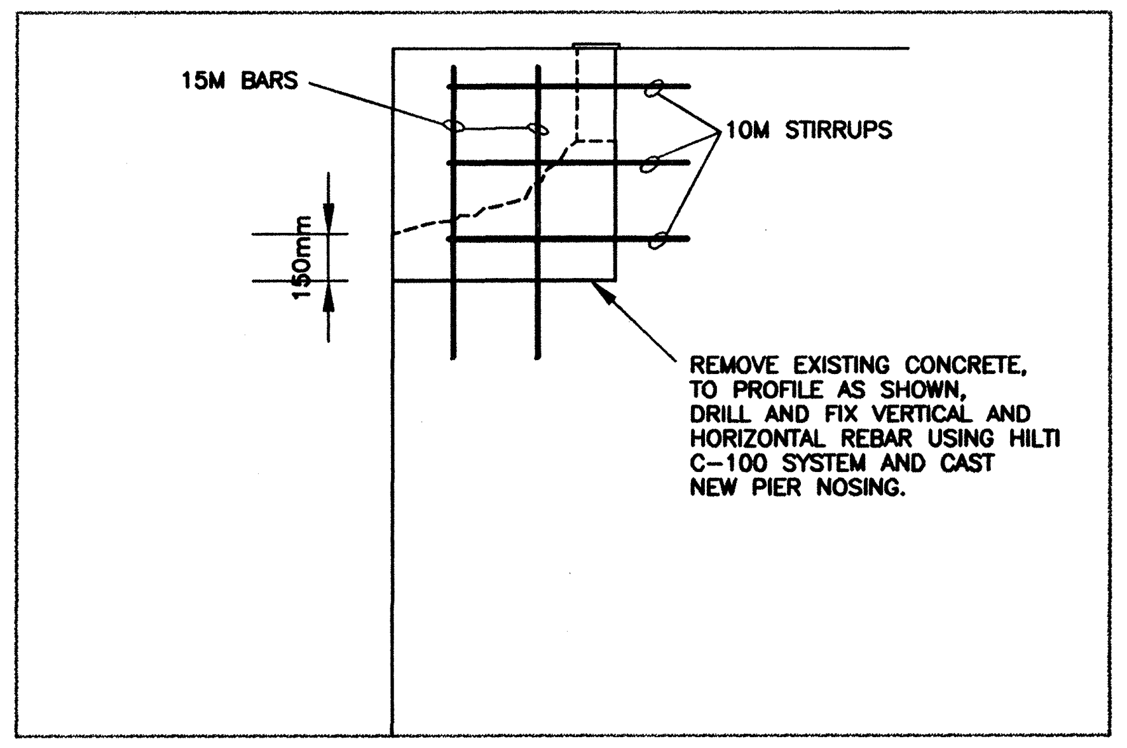
ELEVATION D

## NORTH PIER – DOWNSTREAM SIDE





PLAN VIEW



ELEVATION B

## CENTRE PIER – DOWNSTREAM SIDE

| NO. | REVISIONS | DATE | APP. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| B | ISSUED FOR CONSTRUCTION | JULY 26 1999 | |
| A | RELEASED FOR INFORMATION | OCT. 22 1998 | |

## GENERAL STRUCTURAL NOTES:

- CONCRETE TO BE CSA STANDARD CAN3-A23.1 WITH MIN. STRENGTH OF 30 MPa IN 28 DAYS. EXPOSURE CLASS B.
- ALL PIER REINFORCING TO BE VERIFIED BY DESIGN ENGINEER OR HIS REPRESENTATIVE PRIOR TO POURING CONCRETE.
- ALL FASTENERS TO BE CADMIUM-PLATED CARBON STEEL.
- CONCRETE COVER TO REINFORCING STEEL:
  - 75 mm UNLESS NOTED
- MAINTAIN/PROVIDE MISCELLANEOUS METAL FOR DECK ANCHOR/ SUPPORT AT COLUMNS AS NECESSARY.

SITE BENCHMARKS

BRASS CAP, TOP OF MOST NORTHERLY CONCRETE PIER
BETWEEN WOOD DECK AND STEEL CATWALK,
ELV. 262.00 m GSC.

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OWNER/CLIENT:
MISSISSIPPI VALLEY CONSERVATION

PROJECT:
KASHWAKAMAK LAKE DAM

TITLE:
CONTROL STRUCTURE

| | | |
|---|---|---|
| DESIGNED: N.A. | DRAWN: P.L. | REV. NO.: B |
| CHECKED: M.D.G. | DATE: OCT., 1998 | DWG. NO. 1434-19-07 |
| SCALE: 1:25 | JOB: 1434-19 | |

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# PROPOSED KASHWAKAMAK LAKE DAM REPLACEMENT – NORTH FRONTENAC TWN. ON

## APPENDIX H
## SITE PHOTOS

McINTOSH PERRY

Figure 3: Study area landscape overview, approach access to dam site.

Figure 4: Study area landscape overview, Mississippi River.

*Figure 5: Kashwakamak Lake Dam, looking northwest.*

*Figure 6: Mississippi River, looking west from Kashwakamak Lake Dam site.*

*Figure 7: Kashwakamak Lake Dam, looking west.*

*Figure 8: Kashwakamak Lake Dam, sluiceway and overflow looking west.*

*Figure 9: Kashwakamak Lake Dam, overflow spillway.*

Figure 10: Kashwakamak Lake Dam, sluiceway and deck, looking north.

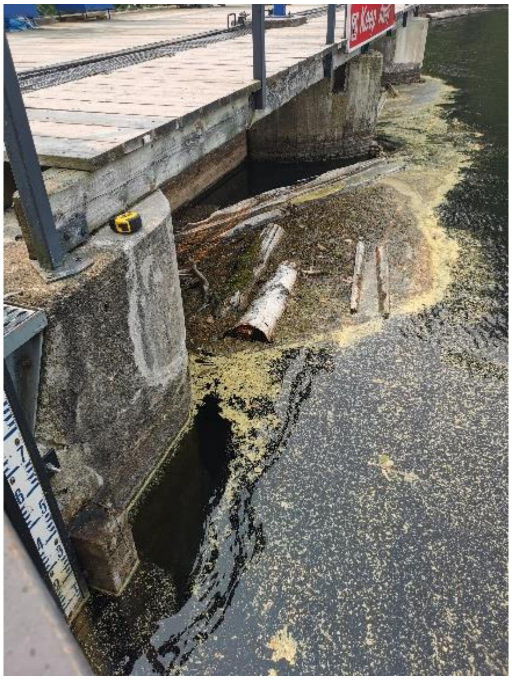

*Figure 11: Kashwakamak Lake Dam, sluiceway and deck, detail.*

Figure 12: Kashwakamak Lake Dam, spillway detail.

*Figure 13: Kashwakamak Lake Dam, left concrete abutment and earthen enbankment.*

*Figure 14: Kashwakamak Lake Dam, concrete detail.*

# Appendix N – Environmental Impact Assessment

**Table: Detailed Environmental Impact Analysis**

| Screening Criteria | Rating of Potential Effect | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | -H | -M | -L | NIL | +L | +M | +H | NA | |
| **Physical** | | | | | | | | | |
| Unique Landforms | | | | | | | | • | No unique landforms were identified within the study area. |
| Existing Mineral/Aggregate Resources Extraction Industries | | | | | | | | • | No extraction industry operations have been identified in the study area. |
| Earth Science - Areas of Natural and Scientific Interest (ANSI) | | | | | | | | • | There are no Earth Science ANSIs in the local study area. |
| Specialty Crop Areas | | | | | | | | • | No specialty crop areas were identified in the study area. |
| Agricultural Lands or Production | | | | | | | | • | No agricultural lands or production were identified in the study area. |
| Niagara Escarpment | | | | | | | | • | The study area is outside of the Niagara Escarpment. |
| Oak Ridges Moraine | | | | | | | | • | The study area is outside of the Oak Ridges Moraine. |
| Environmentally Sensitive/Significant Areas (physical) | | | | • | | | | | The physical function and form of environmentally sensitive/significant areas are not anticipated to be impacted. |
| Air Quality | | | • | | | | | | Temporary negative effects associated with construction activities are possible within the study area, and the lands immediately surrounding it. Mitigation measures will be in place to minimize the impact. See Section 6.1.1 for more information. |
| Agricultural Tile or Surface Drains | | | | | | | | • | No agricultural drains were found within the study area. Any drains in the surrounding area are not expected to be impacted. |
| Noise Levels and Vibration | | | • | | | | | | Noise and vibration levels in the study area and lands immediately surrounding it may be affected during the proposed construction. Mitigation measures will be in place to minimize the impact. See Section 6.12 for more information. |
| High/Storm Water Flow Regime | | | • | | | | | | The project activities are not anticipated to have long-term effects on the flow regime of Kashwakamak Lake. The proposed dam replacement will be designed to current standards and will incorporate considerations for climate change. During construction, there may be temporary impacts on water levels, including potential early drawdown of the lake. Mitigation measures will be implemented to minimize these impacts. See Section 6.1.3 for more information. |
| Low/Base Water Flow Regime | | | | • | | | | | The project activities are not anticipated to have long-term effects on the water level regime of Kashwakamak Lake. The proposed dam replacement will be designed to current standards and will incorporate considerations for climate change. During construction, there may be temporary impacts on water levels, including potential early drawdown of the lake. Mitigation measures will be implemented to minimize these impacts. See Section 6.1.3 for more information. |

| Screening Criteria | Rating of Potential Effect | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | -H | -M | -L | NIL | +L | +M | +H | NA | |
| Existing Surface Drainage and Groundwater Seepage | | | • | | | | | | Minor disruptions to existing surface drainage paths within the study area may occur due to construction activities. Several mitigation measures will be implemented to minimize disturbances to these drainage paths during construction. Additionally, post-construction site restoration is expected to further reduce impacts and ensure that there are no long-term adverse effects on surface drainage and groundwater seepage. See Section 6.1.4 for more information. |
| Groundwater Recharge/Discharge Zones | | | | | | | | • | The project activities are not anticipated to negatively affect groundwater recharge/discharge zones within the study area. |
| Falls within a vulnerable area as defined by the Clean Water Act | | | | | | | | • | The study area does not fall within a vulnerable area as defined by the Clean Water Act. The study area is not within Mississippi-Rideau's source water protection areas. |
| Littoral Drift | | | | | | | | • | N/A |
| Other Coastal Processes | | | | | | | | • | N/A |
| Water Quality | | | • | | | | | | Potential negative impacts on water quality may include increased turbidity during construction. However, it is expected that any adverse effects on water quality from construction activities can be mitigated to minimize impacts. See Section 6.1.5 for more information. |
| Soil/Fill Quality | | | | • | | | | | Shore infilling may be necessary on the embankment during the installation of the new dam. To prevent negative impacts, the project will adhere to relevant guidelines, including the MECP Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario. |
| Contaminated Soils/Sediments/Seeps | | | | • | | | | | It is not anticipated that contaminated soils, sediments or seeps occur within the study area. Excess soils generated during construction should be handled in accordance with requirements of Ontario Regulation (O.Reg.) 406/19 (as amended). See Section 6.1.6 for more information. |
| Existing Transportation Routes | | | • | | | | | | Site is accessed by a private road off of Gutheinz Road. In the lands surrounding the study area, there is a potential for increase in truck traffic during construction. In the long term, the preferred alternative is not expected to have any effects on the study area. Mitigation measures will be put in place to minimize these effects. See Section 6.5.2 for more information. |
| Constructed Crossings (e.g. bridges, culverts) | | | | | | | | • | No existing watercourse crossing are within close proximity to the study area. |
| Geomorphology | | | | | | | • | | The construction of the new dam will enhance the geomorphology of the dam and surrounding channel, while maintaining the integrity of the Mississippi Watershed Management Plan. This improvement will optimize the channel's natural processes and stability, aligning with sustainable watershed management practices. |
| Other | | | | | | | | • | N/A |
| **Biological** | | | | | | | | | |
| Wildlife Habitat | | | • | | | | | | During the proposed construction activities, minor impacts are anticipated to occur to wildlife habitat within the study area. Disturbances such as vegetation removal and increased noise from construction are anticipated. However, these impacts are expected to be minimized through careful |

| Screening Criteria | Rating of Potential Effect | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | -H | -M | -L | NIL | +L | +M | +H | NA | |
| | | | | | | | | | site design, adherence to breeding and migratory bird timing restrictions, and compliance with post-construction site restoration regulations. See Section 6.2.1 for more information. |
| Habitat Linkages or Corridors | | | | • | | | | | The proposed works are not anticipated to have any impacts on the existing habitat linkages or corridors in the study area. |
| Significant Vegetation Communities | | • | | | | | | | Potential negative impacts from construction activities within the study area may include vegetation removal for dam access and the establishment of construction laydown and staging areas. These impacts are expected to be mitigated by minimizing vegetation loss and implementing post-construction site restoration to facilitate vegetation reestablishment. See Section 6.2.2 for more information. |
| Environmentally Sensitive/Significant Areas (biological) | | | • | | | | | | Significant fish habitat in the form of sport fish and baitfish spawning is located immediately downstream of Kashwakamak Lake Dam. Mitigation measures will be in place to minimize the impact. See Section 6.2.3 for more information. |
| Fish Habitat | | | • | | | | | | Fish are anticipated to be displaced as a result of increases in noise and vibration, the construction of cofferdams, and localized turbidity increases resulting from construction activities within the study area. Best environmental management practices will be implemented to minimize impacts on fish habitat. In the long term, the preferred alternative is anticipated to offer opportunities for enhancing fish and aquatic habitats within the study area. See Section 6.2.3 for more information. |
| Species of Concern (e.g. species at risk, Vulnerable/ threatened/endangered species, conservation priorities - either flora or fauna) | | | • | | | | | | There is a potential for habitat of species at risk to be present within the study area. During construction, mitigation measures will be implemented to avoid impacts on these species and their habitats. Post-construction site restoration will be carried out to prevent long-term adverse effects. The preferred alternative is not anticipated to have any lasting impact on species of concern. See Section 6.2.4 for more information. |
| Exotic/Alien and Invasive Species | | | | | | | | • | There were no plant species listed as Restricted under the Invasive Species Act (2015) observed to be present within the study area. |
| Wildlife/Bird Migration Patterns | | | | • | | | | | As the project activities are confined to the study area, which does not significantly influence wildlife movement or bird migration patterns, it is unlikely that these patterns will be affected. |
| Wildlife Population | | | • | | | | | | The replacement of the dam has the potential to impact wildlife populations, however, with careful planning, mitigation measures (i.e., stagging, protecting vegetation, etc.), and modern design practices can help minimize negative effects and enhance ecological benefits. See Section 6.2.1 for more information. |
| Wetlands | | | | • | | | | | There are no significant wetlands present within the study area. Manòmin, although not present in Kashwakamak Lake, is found growing downstream in Mud Lake. Mitigation measures will be in place to minimize the impact to Manòmin. See Section 6.2.2 for more information. |
| Microclimate | | | | • | | | | | While highly localized changes in the study area water temperature may occur during construction, the overall impacts on the study area microclimate are expected to be neutral. |
| Life Science ANSIs | | | | | | | | • | No life science ANSIs have been identified in the study area, or in the immediate surrounding area. |
| Unique Habitats | | | | | | | | • | No unique habitats were identified within the study area. |

| Screening Criteria | Rating of Potential Effect | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | -H | -M | -L | NIL | +L | +M | +H | NA | |
| Other | | | | | | | | • | N/A |
| **Cultural** | | | | | | | | | |
| Traditional Land Uses | | | | • | | | | | Impacts on Traditional Land Uses are not anticipated from the dam replacement. During consultations, no concerns were raised by the Aboriginal Communities during consultation. |
| Aboriginal Community or Reserve | | | | • | | | | | Impacts on Aboriginal Community or Reserve are not anticipated to occur with the dam replacement. During consultations, no concerns were raised by the Aboriginal Communities during consultation. |
| Outstanding Native Land Claim as identified by the Aboriginal Community | | | | | | | | • | No Outstanding Native Land Claim. No concerns have been raised by the Aboriginal Communities during consultation. |
| Transboundary Water Management Issues | | | | | | | | • | No Transboundary Water Management issues concerning the study area have been identified. |
| Riparian Uses | | • | | | | | | | Kashwakamak Lake is utilized by riparian users for activities such as boating, swimming, fishing, camping, and cottaging. The construction is expected to have short-term impacts on these riparian uses. Mitigation measures will be implemented to minimize these effects. See Section 6.3.1 for more information. |
| Recreational or Tourist Uses of a Water Body and/or Adjacent Lands | | | • | | | | | | The Kashwakamak Lake Dam obstructs the navigability of the waterway, requiring boaters to portage. However, construction will have short-term impacts on portage routes and access to shoreline trails. Mitigation measures will be put in place to minimize these effects. See Section 6.3.1 for more information. |
| Recreational or Tourist Uses of Existing Shoreline Access | | | • | | | | | | Shoreline access will be temporarily impacted during construction. See Section 6.3.1 for more information. |
| Aesthetic or Scenic Landscapes or Views | | | | • | | | | | In the study area, construction activities may temporarily result in aesthetic impacts. However, in the long term, the preferred alternative is expected to have an aesthetic similar to that of the existing dam. |
| Archaeological Resources | | | • | | | | | | Stages 1, 2, and 3 of the AA were carried out for the study area. The Stage 2 AA identified a small Indigenous site along the water's edge, necessitating a Stage 3 AA. The Stage 3 AA was completed to determine the appropriate setback from the archaeological resources within the study area. As a result, no impacts on archaeological resources are expected from the proposed construction activities. For additional details, please refer to Section 6.3.2. |
| Built Heritage Resources | | | | • | | | | | The dam was found to have no cultural heritage value or interest (CHVI) under the Ontario Heritage Act. There are no significant heritage features within the study area. For additional details, please refer to Section 6.3.3. |
| Cultural Heritage Landscapes | | | | • | | | | | No impacts on cultural heritage landscapes are anticipated from the proposed work. |
| Historic Canals | | | | | | | | • | There are no historic canals within or immediately surrounding the study area. |
| Federal Property | | | | | | | | • | There is no federal property within or immediately surrounding the study area. |

| Screening Criteria | Rating of Potential Effect | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | -H | -M | -L | NIL | +L | +M | +H | NA | |
| Heritage River System | | | | | | | | • | The Mississippi River flows directly into the Ottawa River, a designated Heritage River System. Mitigation measures will be implemented during construction to limit disturbances in Kashwakamak Lake and the Mississippi River. |
| Other | | | | | | | | • | N/A |
| **Socioeconomic** | | | | | | | | | |
| Surrounding Neighbourhood or Community | | | • | | | | | | The proposed construction works may affect adjacent property owners, residents, seasonal cottagers, and nearby resorts due to increased noise levels and potential truck traffic. These temporary impacts are expected to be mitigated through measures such as enforcing noise bylaws and implementing traffic management plans. In the long term, the new dam will adhere to safety guidelines and support the ongoing recreational and tourism use of the lake. Mitigation measures will be put in place to minimize these effects. See Section 6.4.1 for more information. |
| Surrounding Land Uses or Growth Pressure | | | | | | | | • | The surrounding land use consists of residents/seasonal cottagers and resorts. The proposed replacement of the dam is not anticipated to impact surrounding land uses or growth pressures. |
| Existing Infrastructure, Support Services, Facilities | | | | | | | | • | N/A |
| Pedestrian Traffic Routes | | | • | | | | | | Access to the dam is restricted; however, there are existing shoreline trails that could be temporarily impacted during the construction phase. Mitigation measures will be put in place to minimize these effects. See Section 6.4.1 for more information. |
| Property Values or Ownership | | | | • | | | | | No effects on property values or ownership are expected in the area surrounding the study area. |
| Existing Tourism Operations | | | • | | | | | | Kashwakamak Lake is renowned for its picturesque beauty and offers a range of tourist attractions, including boating, fishing, and swimming opportunities. Construction activities could temporarily affect tourism operations due to increased noise levels, early drawdown of the lake, and truck traffic. However, these short-term impacts are expected to be mitigated through appropriate measures. In the long run, the new dam will adhere to safety guidelines and ensure the continued enjoyment of the lake for recreational and tourism purposes. |
| Property /Farm Accessibility | | | • | | | | | | The proposed construction works may affect adjacent property owners' accessibility during construction. Mitigation measures will be put in place to minimize these effects. See Section 6.4.2 for more information. |
| Other | | | | | | | | • | N/A |
| **Engineering/Technical** | | | | | | | | | |
| Rate of Erosion in Ecosystem | | | | | • | | | | The proposed works will reduce the rate of erosion within the study area's ecosystem. By stabilizing the embankment and rectifying seepage issues, erosion on the embankment will be reduced, which will help prevent sediment deposition downstream. |

| Screening Criteria | Rating of Potential Effect | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | -H | -M | -L | NIL | +L | +M | +H | NA | |
| Sediment Deposition Zones in Ecosystem | | | | | | • | | | By stabilizing the embankment and improving the dam's design, the rate of erosion on the dam and surrounding areas can be reduced. This helps minimize the amount of sediment entering the river system and accumulating in deposition zones downstream. |
| Flood Risk in Ecosystem | | | | | | | • | | The new dam will be designed to improve flood risk management by incorporating advanced engineering features, enhancing storage capacity, supporting effective sediment and water flow management, and maintaining the integrity of the Mississippi Watershed Management Plan. |
| Slope Stability | | | | | • | | | | Dam designs typically include enhanced embankment stabilization techniques. This can involve using more robust materials, incorporating proper drainage patterns, and employing geotechnical measures to prevent erosion and slope failure. By addressing these factors, the replacement of a dam can significantly enhance slope stability, reduce the risk of erosion, and contribute to the overall safety and durability of the dam and its surrounding environment. |
| Existing Structures | | | | • | | | | | No impacts anticipated to existing structures within or adjacent to the study area. |
| Hazardous Lands | | | | | | | | • | No hazardous lands were identified within or adjacent to study area. |
| Hazardous Sites | | | | | | | | • | No hazardous sites were identified within or adjacent to study area. |
| Other | | | | | | | | • | N/A |

(-H) = highly negative; (-M) = moderately negative; (-L) = minor negative; (NIL) = neutral or none; (+L) = minor positive; (+M) = moderately positive; (+H) = highly positive; (NA) = not applicable.