TOWNSHIP OF NORTH HURON REPORT

Item No.

REPORT TO: **Reeve Vincent and Members of Council**
PREPARED BY: **Sean McGhee**
DATE: **22/05/2018**
SUBJECT: **Howson Dam Report**
ATTACHMENTS: **KGS Stability Assessment 2018, Structure Assessments 1983 – 1984 BM Ross / Atkinson Davies, Various BM Ross Documents – 2014 – 2016, MNRF LRIA Requirements - MNRF**

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22, 2018 regarding the Howson Dam for information purposes;

AND FURTHER THAT staff be directed to forward a copy of this report and the corresponding attachments to the Maitland Valley Conservation Authority, the Howson Dam Committee, the Ontario Rivers Alliance, and other stakeholders upon request.

AND FURTHER THAT a report be presented to Council summarizing the comments of any delegations received and providing further details on financing and amortization details associated with the options presented in this report.

EXECUTIVE SUMMARY

There has been a great deal of engineering work associated with the Howson Dam which has spanned a number of decades. The information found within this report has been compiled from available historic files and has been presented in conjunction with the KGS report.

KGS Group was commissioned by Council in 2017 to complete a Safety Assessment of the Howson Dam. The intent of the study was to determine the following:

- Establish the Hazard Potential Classification (HPC) of the Dam;
- Determine the Inflow Design Flood (IDF);
- Complete a Breach Analysis;
- Perform a Slope Stability and Concrete Condition Assessment, and;
- Determine options with associated costs for the consideration of Council.

The recommendations found in the Executive Summary presented by KGS Group were developed through analysis of the data generated through a number of site visits. The findings of this evaluation were determined to be consistent with the structural evaluations performed by Atkinson Davis Inc. and BM Ross between 1983 and 1984.

Decisions surrounding the future of the Howson Dam potentially impact the environment, safety, and quality of life within our community. There are various stakeholders interested in the future of the Howson Dam, many of which may wish to address Council to present their concerns and perspectives.

The findings of the KGS and past reports, options available to Council, and associated costs are outlined in the Discussion below. The merits of each option should be weighed and considered against Councils own Strategic Plan.

DISCUSSION

Engineering History and Background:

In 1983, the services of Atkinson Davis Inc. were retained at the request of the Ministry of Natural Resources to visually examine the Howson Dam concrete and make recommendations for further investigation should they be warranted. As a result of their examination, a number of approaches, including core sampling and ultrasonic testing, were recommended in the brief report from P.H Davies, B SC. P.Eng dated September 30th, 1983.

Subsequently, the firm was commissioned to acquire and analyze a number of core samples and collect ultrasonic data to determine the strength and integrity of the concrete. Following this analysis, in a document dated May 10th, 1984, Mr. Davis concluded, "*In view of the condition of the concrete, we are of the opinion that it will not act as a base for repair work and that the only course open is to remove and replace the dam and bridge structure.*"

This prompted a structural review at the request of the Municipality, at which time the allowable load on the bridge structure was reduced to a 3 tonne live load.

As a follow-up to the Atkinson Davis reports, the municipality contracted the services of BM Ross to complete an evaluation of the Bridge and Dam structure as well as its load carrying capacity. The report concurred with the 1984 report of Atkinson Davis Inc. and went on to recommend that aside from the reduction in allowable loading, the structure should be inspected yearly to detect further deterioration until appropriate measures could be taken.

Load capacity reviews were carried out until approximately 1999 when it was determined that the bridge was no longer appropriate for vehicular traffic. No notable planning or design work was done until 2015 at which time BM Ross was instructed through a group comprised of municipal staff in consultation with members of the public to develop plans and a costing for concrete repair work on the Dam. Preliminary drawings were completed and submitted to the Township for review in March 2015. As a follow-up to the submission of draft drawings, a letter from BM Ross to the Director of Public Works of the day identified the requirement for the completion of a stability analysis, IDF report, and HPC classification prior to any work permit being issued by MNRF.

The mandate given to KGS Group through RFP 2017-004 went beyond the structural and material assessments that were completed in the eighties insofar as they establish the rating of the Howson Dam, consider downstream risk, suggest the options available to the municipality, and look at high level costing for various options. All assessments completed by KGS Group were conducted in accordance with legislative requirements associated with the Lakes and Rivers Improvement Act (LRIA) and its associated Administrative Guide.

Outcome of the KGS Group Assessment:

The consequences of a dam breach in terms of Incremental Loss of Life (ILOL) were reviewed by KGS utilizing hydraulic modeling and resulted in a Hazard Potential Classification of HIGH. It was determined that the design of the Howson Dam corresponds with an Inflow Design Flood (IDF) which was equivalent to a 100-year storm providing that all bays are opened and the boards were removed from the sluiceway on the North Structure.

During the course of the evaluation, which included site work and analysis of core samples, it was determined that there was sufficient evidence that the deterioration of the structure could pose a risk to the public that the bridge was closed to pedestrian traffic.

Four options were considered by KGS Group following the assessment. The options are:

Option 1 – Do Nothing and Maintain Status Quo.

This option, although included for the purpose of discussion, is not viable. The existing structure has deteriorated to the point that it does not meet the dam safety requirements under LRIA and is a risk to the community. No costing was associated with this option.

Option 2 – Decommission the Dam.

The decommissioning of the Howson Dam is a viable option although there is a great deal of work associated with the rehabilitation of the area. If pursued, there will be extensive stakeholder consultation at many levels. It is expected that there will be public opposition to this route by some groups. An estimated cost of $436,000 for the removal of the dam was suggested with additional funds necessary for the rehabilitation of the area and the establishment of an aesthetically acceptable public use area.

Option 3 – Dam Rehabilitation.

There are two courses of action available with regard to this option. They include the installation of tension anchors to stabilize the structure as well as the addition of concrete mass. The rehabilitation option is ONLY viable if the concrete in the weirs and foundation were found to possess sufficient compressive strength. If the concrete in the spillways is found to be consistent with the concrete tested previously, the rehabilitation option cannot be considered as an option. Cost for LRIA compliant rehabilitation is estimated to be between $2,869,000 and $4,581,000.

Option 4 – Replacement of the Howson Dam

For the purpose of this study, two options were considered for reconstruction. The construction of a new concrete overflow weir was estimated at $6,209,000. The second option was an earth embankment and new sluiceway structure which had an approximate cost of $3,960,000.

The final report developed by KGS Group provides all of the technical information necessary to fully understand the condition of the Howson Dam. This information is vital in assisting with the determination of next steps and ultimately in determining the future of the Howson Dam.

In the interim, the Howson Dam has been closed to all public use based on an opinion provided in light of the data available by KGS Group that identifies concern over the use of the current structure. In response to this document, the Public Works department has closed the structure to all pedestrian and vehicle traffic.

Considerations and Implications

Equipped with the Safety and Stability reports, there are varying perspectives to consider while assessing the merits and detriments associated with the various options available to Council. Discussion leading up to the decision on the disposition of the Howson Dam should at the very least consider the following:

Environmental Impacts:

There is a great deal of information surrounding the changes to a natural watercourse that are introduced through the operation of a Dam. This includes changes in water temperature, habitat, flow patterns, and fish population. The Ontario Rivers Alliance distributed a letter to a number of municipalities which is included in the May 22nd Council agenda package maintaining that returning any watercourse to its natural state has distinct benefits.

Social Considerations:

The Howson Dam has been a landmark within the community since its initial construction prior to 1862. The existing Dam, which was constructed in approximately 1921 is seen by many as part of the community. There is a group of local residents who are actively working to save the Howson Dam and desire to see the headwaters returned to previous historic levels.

Financial Implications:

Each viable option presented carries with it a varying degree of significant financial pressure for the municipality. Both replacement and rehabilitation options have very high price tags and carry with them the cost associated with ongoing maintenance, regulatory inspection, repair, and replacement of the asset in the future.

The information found in this report, as supported by the KGS Group Reports as well as the BM Ross and Atkinson Davis studies, should provide Council with sufficient background information to identify a preferred course of action. Staff is prepared to take direction from Council to either arrange for further information to be presented either in the form of invited delegations or staff reports for information.

FINANCIAL IMPACT

As noted, the cost to address the Howson Dam will range between an estimated $436,000, and $6,209,000 depending upon the direction taken.

It is important to note that AACE Class 4 estimate methods were used to develop all of the estimates provided. This method provides a very high-level estimate with an accuracy of plus or minus 40% to 50% and are not for budget purposes, rather to establish comparative pricing for discussion purposes.

A detailed cost analysis will be performed on the options preferred by Council. Costs associated with the investigation of these options and next steps will be brought forward in a manner consistent with the Municipal Procurement Policy.

FUTURE CONSIDERATIONS

In light of the current condition of the Howson Dam and the risk factors associated with it in its current state, the determination of next steps should be seen as a matter of highest priority. The closing of the structure should be seen as a short-term measure.

RELATIONSHIP TO STRATEGIC PLAN

This project relates to **Goal No. 2** of the Strategic Plan in that our residents are engaged and well informed, **Goal No.3**, the Township is healthy and safe. **Goal No. 4**, the administration is fiscally responsible and strives for operational excellence, and **Goal No. 5** in that our natural environment is valued and protected.

Sean McGhee, Director of Public Works

Dwayne Evans, CAO