

Section II – Items for Executive Action

TO: Chair and Members of the Executive Committee
Meeting #4/18, Friday, June 08, 2018

FROM: Nick Saccone, Senior Director, Restoration and Infrastructure

RE: **MILNE DAM DEFICIENCY STUDY**
Request for Proposal #10006994 – Investigation and Preliminary Design for Deficiencies at Milne Dam

KEY ISSUE

Award of Contract #10006994 for professional engineering consulting services to undertake the Milne Dam Deficiency Study located in the Town of Markham within York Region.

RECOMMENDATION

THAT Contract #10006994 for professional engineering consulting services to undertake the Milne Dam Deficiency Study be awarded to DM Wills Associates Limited at a total cost not to exceed \$84,375, plus 20% contingency, plus HST;

THAT authorized officials be directed to take the necessary action to implement the contract including obtaining the necessary approvals and the signing and execution of documents;

AND FURTHER THAT should Toronto and Region Conservation Authority (TRCA) staff be unable to negotiate a mutually acceptable agreement with the above-mentioned proponent, staff be authorized to enter into contract negotiations with the next highest ranked proponent.

BACKGROUND

Milne Dam is owned and operated by TRCA and is located on the Rouge River at Princess Street and Markham Road in the City of Markham. The dam was constructed in 1969 for flood control, flow augmentation and recreation. It replaced a dam that was destroyed by Hurricane Hazel in 1954.

The dam consists of an earthen embankment with a concrete spillway that directs water over the dam. A small control gate can regulate the reservoir level for maintenance. In 2004, Ministry of Natural Resources (MNRF) constructed a fish ladder into the left spillway wall. The fish ladder is operated and maintained by MNRF.

At Authority Meeting #7/15, held on July 24, 2015, Resolution #A138/15 approved engineering consulting services to conduct a Dam Safety Review (DSR) of Milne Dam in accordance with MNRF Lakes and Rivers Improvement Act (LRIA). The DSR is an engineering review to ensure that the dam meets all current requirements for safety of the structure. Components of a DSR include:

- hydrotechnical analysis;
- geotechnical analysis;
- public safety review;
- structural stability;

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- seismic stability;
- dam break analysis;
- Hazard Potential Classification (HPC).

The HPC is the method for classifying the risk the dam poses should it fail. Milne Dam is classified as a Very High hazard structure which corresponds to a potential loss of life between 11 and 100 persons should the dam fail during a flood. The Very High risk associated with Milne Dam requires the structure to meet the strictest safety requirements as detailed in the LRIA. The DSR was completed using the Very High hazard criteria for determining the safety of the structure. Three major deficiencies were found during the DSR study:

Inadequate Spillway Discharge Capacity

During the hydrotechnical analysis, it was determined that the concrete spillway is too small. Because the dam has an HPC of Very High, it must safely pass the Inflow Design Flood (IDF) that is two-thirds of the way between the 1,000-Year Flood and the Probable Maximum Flood (PMF). This flow is equal to 1167m³/s. The spillway is not large enough to pass this amount of water which causes the earthen embankment to overtop by approximately 0.7m. Overtopping would result in a dam failure.

Inadequate Energy Dissipation

The DSR determined that the stilling basin is too short. During the IDF, the downstream area where the water leaves the dam and enters the river is susceptible to erosion that could lead to dam failure. The stilling basin needs to be lengthened to allow for the water's energy to be reduced to prevent undercutting of the dam's foundation.

Spillway and Stilling Basin Stability

During the structure stability assessment of the DSR it was found that the concrete spillway and stilling basin do not meet stability requirements in the LRIA. Under various loading scenarios prescribed by the LRIA, the concrete spillway is susceptible to sliding. Additionally, the stilling basin downstream of the spillway may have inadequate drainage and could be at risk of uplifting.

RATIONALE

Request for Proposal (RFP)# 10006994 was publicly advertised on electronic procurement website www.biddingo.com on March 16, 2018 and closed on April 27, 2018. Proposals were opened by the Procurement Opening Committee (Lisa Moore, Leena Eappen and Craig Mitchell). The scope of work includes, but is not necessarily limited to investigations into the three major deficiencies found in the 2015 DSR. The tasks include the following:

1. Developing preliminary designs for modifying the dam so that it can pass the IDF safely and providing an opinion of probable cost for implementing the modifications.
2. Confirming the inadequate energy dissipation deficiency and developing preliminary designs for addressing this deficiency with an opinion of probable cost.
3. Confirming subsurface conditions to verify whether the stability deficiencies at the spillway and stilling basin are valid. If they are confirmed then a preliminary design for increasing the stability, with an opinion of probable costs, will be provided by the consultant.

TRCA staff has recommended a 20% contingency in case complications are encountered during the borehole drilling for the geotechnical investigation component of the study. Results of this study will be used by TRCA for development of long term capital projects to upgrade the dam to meet modern dam safety guidelines.

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A total of five companies reviewed the documents and submitted proposals in accordance with the requirements of the RFP.

The Selection Committee of TRCA staff (Leland Wilbur, Matt Derro and Craig Mitchell) reviewed the proposals. The criteria used to evaluate and select the recommended vendor were based on qualifications and experience, understanding of the project, approach/methodology, schedule and reasonableness of cost. A summary of the evaluation results is as follows:

Vendor Name	Technical (70%)	Financial (30%)	Total Cost (plus HST)	Overall Ranking
DM Wills Associates	2	1	\$84,375	1
KGS Group	1	2	\$98,830	2
WPS Canada	5	3	\$112,380	3
Tulloch Engineering	3	4	\$119,470	4
GEI Consultants	4	5	\$139,601	5

Based on the Selection Committee's review of the proposals and upon calling references, DM Wills was ranked the highest based on the evaluation criteria. Therefore, staff is recommending that the contract be awarded to DM Wills at a total upset cost not to exceed \$84,375, plus HST, plus a contingency allowance of 20% if deemed necessary by TRCA staff.

FINANCIAL DETAILS

This project was approved for a funding grant from the Ministry of Natural Resources and Forestry's Water and Erosion Control Infrastructure Program for 50% of the total cost. The remaining funds are available in the Dams and Flood Facilities Capital Account 107-03 funded by York Region.

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