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**REPORT TO LYALL HARBOUR / BOOT COVE WATER LOCAL SERVICE COMMITTEE
MEETING OF TUESDAY 19 OCTOBER 2010**

SUBJECT MONEY LAKE DAM STATUS

ISSUE

In the summer of 2010, Capital Regional District (CRD) staff observed changes to the quantity and quality of seepage water exiting a slope northwest of the Money Lake No. 1 Dam. Any change in the condition of a dam, or seepage through or near a dam, represents an increase in the risk of dam failure.

BACKGROUND

An earth fill dam owned by the CRD on Money Lake No. 1 provides water storage for the Lyall Harbour/Boot Cove water service area. The present dam was constructed circa 1979 over an earlier earthen dam. Significant seepage through the dam, or through fractured bedrock beneath and surrounding the dam, has been observed for several years; and efforts have been made to capture and recycle it to the reservoir in order to maintain sufficient storage for summer demands.

In the summer of 2007, having observed greater than normal drawdown of Money Lake, the CRD retained Thurber Engineering Ltd. to investigate the problem of water losses at the Money Lake Dam. At that time, the water loss rate was estimated to be 2.2 litres per second (l/s). Based on a literature review and site inspection, Thurber recommended that a trench be excavated through the dam core to bedrock near the west abutment to examine the dam construction and fill materials. This work was completed in October 2007 under Thurber's supervision, and the trench was backfilled and compacted with locally sourced clay fill. The replacement of original dam core materials with compacted clay did not significantly reduce the water loss rate.

In the fall of 2008, CRD staff reinstated a pumping system to capture and recirculate seepage water into Money Lake, enabling the lake to recharge completely over the subsequent winter. Thurber inspected the dam in September 2008, and again in February 2009 after staff measured historically high seepage flows from the west abutment area with the reservoir near full pool. Thurber made a record of the locations and estimated volumes of seeps along the toe of the west abutment in February 2009.

CRD staff observed changes in the locations and overall volume of seepage along the west abutment in August 2010. These changes coincided with the appearance of reddish-brown algae with a distinct sulfurous odour at some seep locations. Thurber was again retained to attend the site for inspection, and samples of the algae were taken for analysis. Thurber has submitted a preliminary letter report to the CRD including its observations, analysis, conclusions and recommendations for further work. Once the report is finalized, copies will be provided to the Lyall Harbour/Boot Cove Water Local Service Committee. Thurber concludes that a portion of the seepage originates from the reservoir; that the most likely seepage path is through fractured bedrock underlying the west abutment of the dam; and that, "based on the observations made to date, there is no indication that the dam is unsafe to operate." However, a program of further investigation is recommended to better understand seepage pathways and to gain a better understanding of risks of a slope failure in the west abutment due to seepage forces. The recommended work includes drilling, well installations, piezometers (instruments to measure water levels), rock core logging and reporting, at an estimated cost of \$20,000 to \$25,000 for consulting and contractor services.

Staff are preparing a 2011 operating budget and five-year capital plan for the Lyall Harbour/Boot Cove water service. The budget for operation of the system is considered to be sufficient to recover the cost of routine monitoring of the dam and seepage. The capital plan will include a request for funding to implement the Thurber recommendations.

ALTERNATIVES

There are no alternatives.

IMPLICATIONS

Staff will request funding from the operating budget as part of the 2011 Lyall Harbour/Boot Cove Water Service budget recommendation, to complete the program of work proposed by Thurber as a 2011 project in the five-year capital plan. The cost of \$20,000 to \$25,000 estimated by Thurber is less than the estimated 2010 operating budget surplus. Depending on the outcome of this investigation, further improvements or modifications to the dam may be required. Such improvements would require new funding, which would likely impact the cost of water service.

CONCLUSION

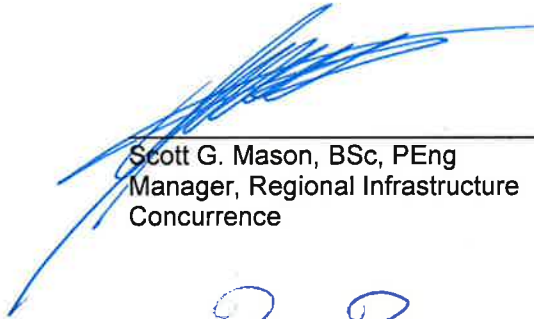
Although the Money Lake Dam is not considered unsafe to operate, there is an uncharacterized risk of seepage induced slope failure in the west abutment of the dam. The recent changes to the seepage pattern at the toe of the abutment require further investigation.

RECOMMENDATION

That the Lyall Harbour/Boot Cove Water Local Service Committee receive this report for information.



Colwyn Sunderland, AScT
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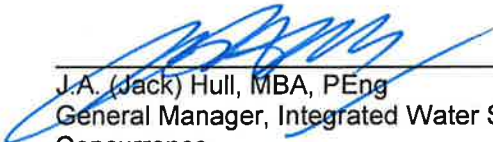
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