



**REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, SEPTEMBER 4, 2013**

SUBJECT LUBBE DAM #4 UPGRADE

ISSUE

Lubbe Dam #4 is showing signs of internal erosion which could lead to failure of the dam.

BACKGROUND

Lubbe Lake Reservoir (See Location Map) is one of four water supply reservoirs constructed in the 1890's within the Goldstream River watershed by the Esquimalt Water Works Company. Water in Lubbe Lake Reservoir is contained by four dams. Lubbe Dam #4 has a crest length of about 34 metres, is about 6 metres high and is rated as a High Consequence dam that, in the event of failure, would send water toward Shawnigan Lake along Shawnigan Creek. Due to the age of the dam, design and construction records are not clear and important information including dam internal composition and depth to the bedrock foundation is missing. In addition, how the dam would perform under earthquake loading is unknown.

In 2011, a significant amount of sediment was observed by Integrated Water Services (IWS) staff between the toe of the dam and the downstream weir. Since the sediment might indicate that the internal core of the dam was being eroded, a geotechnical consultant, Thurber Engineering Ltd., was hired to review the existing data and monitor sediment and leakage during 2012 and 2013.

Thurber concluded that Lubbe Dam #4 is experiencing internal erosion. This could eventually result in failure of this dam. Thurber recommended that the maximum reservoir operating level temporarily be maintained at 1.85 metres below the spillway elevation until a remediation plan can be implemented and, to date, this practice has been followed by IWS staff. In a preliminary report, Thurber identified the following remediation options for the dam, with order of magnitude costs in the range of \$1 million:

1. Construction of a concrete pile wall through the dam and along the entire length.
2. Construction of a new dam downstream of the existing dam.
3. Construction of a new dam in place of the existing dam at the current location.

A site investigation and preliminary design is required to more accurately estimate costs and determine the best remediation option. A \$200,000 budget has been established for this work.

ALTERNATIVES

1. That the Regional Water Supply Commission approve that further investigation, design and eventual remediation of Lubbe Dam #4 be undertaken, with funding included in the 2014-2015 Capital Budget, for consideration by the budget subcommittee.
2. That the Regional Water Supply Commission not approve further investigation, design and eventual remediation of Lubbe Dam #4.

IMPLICATIONS

Alternative 1 - Further investigation and preliminary design is estimated to cost \$200,000. Remediation of the dam is difficult to estimate at the current time, but is believed to be in the order of \$1 million.

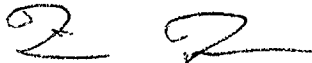
Alternative 2 - Although this alternative would not have an immediate budget impact, the dam condition would continue to deteriorate, increasing the risk of dam failure.

CONCLUSION

To address increasing concerns about internal erosion of Lubbe #4 dam, further investigation and preliminary design is prudent. Failure of the dam could result in significant property damage downstream and would have serious legal and cost consequences, as well as reducing the storage in the Goldstream system.

RECOMMENDATION

That the Regional Water Supply Commission approve that further investigation, design and eventual remediation of Lubbe Dam #4 be undertaken, with funding included in the 2014-2015 Capital Budget, for consideration by the budget subcommittee.

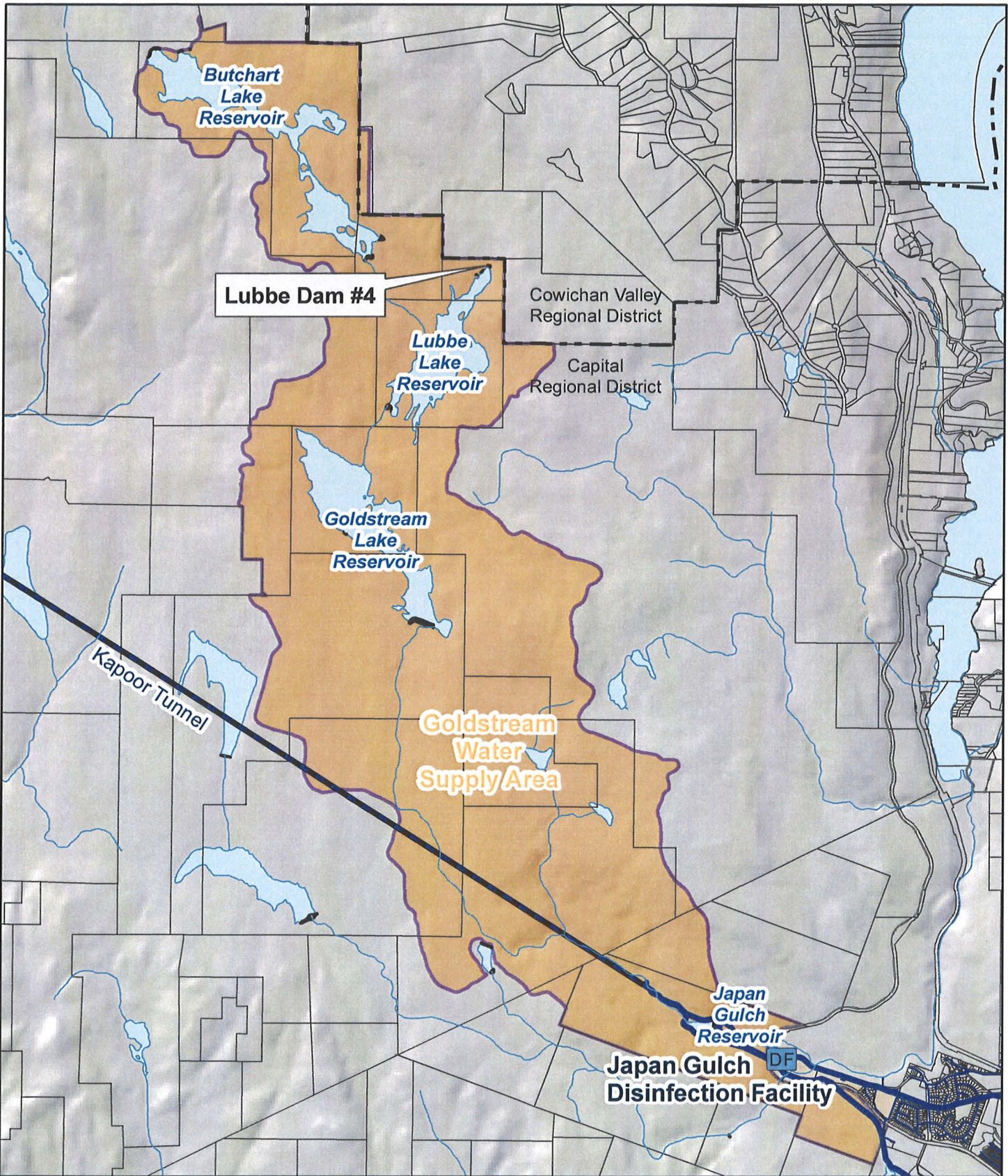


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Concurrence

TT:ls:mm
Attachment: 1



0 250 500 1,000 1,500 Metres

UTM Zone 10N NAD 1983



Lubbe Dam #4 Location Map

DISCLAIMER

This map is for general information only and may contain inaccuracies.

August 2013 | LubbeDam4.mxd | gis@crd.bc.ca



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