To: Liquid Waste Committee

From: Fred Nenninger, Director, Policy Planning and Analysis, Liquid Waste Services

Date: March 7, 2019 Meeting Date: March 14, 2019

Subject: **North Shore Wastewater Treatment Plant Indicative Design**

RECOMMENDATION

That the GVS&DD Board receive for information the report dated March 7, 2019, titled "North Shore Wastewater Treatment Plant Indicative Design".

PURPOSE

To update the Board on the background and the decisions made during the selection of the Indicative Design for the new North Shore Wastewater Treatment Plant – specifically the selection of the level of treatment and the preferred treatment technology.

BACKGROUND

This report is being brought forward at this time to address inquiries specific to the level of treatment and the technology selected for the new North Shore Wastewater Treatment Plant. At their meeting on November 7, 2013, the Board considered a report related to the new plant to serve the North Shore (Attachment 1) and endorsed the Indicative Design for the new plant by adopting the following resolution:

"That the GVS&DD Board:

a) Endorse the Indicative Design for the new Lions Gate Secondary Wastewater Treatment Plant as developed through the Project Definition Phase and as summarized in the report titled "Lions Gate Secondary Wastewater Treatment Plant Indicative Design Summary Report" (Attachment 2); and

b) Direct staff to utilize the Indicative Design as the basis for senior government funding applications and for the procurement work for design and construction of the new plant."

The Indicative Design was used to secure senior government cost sharing for the project and to procure the design and construction phase of the project utilizing a Design-Build-Finance contract.

LEVEL OF TREATMENT

To establish the level of treatment needed to ensure protection of the receiving waterways, Metro Vancouver and all Canadian municipalities now follow the approach developed and adopted by the Canadian Council of Ministers of Environment (CCME) in 2009 and documented in the *Canadian Strategy for the Management of Municipal Wastewater Effluent*. This strategy is based on a standard of secondary treatment for Canada to be implemented based on a priority assessment – in the Metro Vancouver region the North Shore plant is being upgraded by 2020 and the Iona Island plant by 2030. The need for treatment beyond the secondary level is determined based on a receiving environment

assessment approach as specified in the *Canadian Strategy for the Management of Municipal Wastewater Effluent*. Metro Vancouver has a comprehensive receiving environment monitoring program that has been in place for several decades, which confirms that our wastewater discharges are protective of the receiving waterways.

Tertiary Treatment

Tertiary treatment is any additional treatment train that provides a level of treatment beyond the secondary treatment base standard needed to ensure protection of the receiving environment. It is often associated with the removal of nitrogen and phosphorus nutrients to protect sensitive receiving waters from algae blooms (eutrophication). This is not currently a requirement in Metro Vancouver given the large receiving waterways and the discharge to the marine environment.

Two tertiary treatment trains have been incorporated into the approved North Shore plant design. High levels of ammonia will be removed from the solids train de-watering side stream to ensure that the effluent ammonia levels remain low and non-toxic to fish. The use of tertiary filtration using disk filter technology will provide a quantity of reclaimed non-potable water to be made available for use within the plant and for external users from a standpipe for tanker truck connection. The initial disk filter installation will produce reclaimed water up to 25 percent of the average daily flow.

TREATMENT TECHNOLOGY SELECTION

During the Project Definition Phase, technical assessment from a list of modern treatment technologies resulted in the development of three distinct Build Scenarios that were business-cased using a triple bottom line assessment to establish the preferred treatment technology for the new North Shore Wastewater Treatment Plant. These scenarios were reviewed with the Utilities Committee at the time in a series of three workshops - April 10, 2013; June 25, 2013; and September 24, 2013. The recommended technology and Indicative Design for the new plant was presented at the September 24th workshop. The treatment technology related to the three Build Scenarios were:

Build Scenario A: based on Biologically Aerated Filtration (BAF) having the advantage of the smallest footprint.

Build Scenario B: based on Deep Tank Activated Sludge having the advantage of a robust, reliable technology that can be migrated to higher intensity technologies in the future.

Build Scenario C: based on a Membrane Bioreactor having the advantage of a more polished effluent.

Attachment 2 is an excerpt from the June 25, 2013 Utilities Committee workshop which summarized the business case analysis relative to the six key objectives.

The Indicative Design presented at the September 24, 2013 workshop and endorsed by the Board at their November 7, 2013 meeting was based on the selection of Scenario B, which meets the secondary treatment objective, has the lowest electrical consumption, has the lowest greenhouse gas emissions, requires no chemicals, has the lowest capital and operating cost and provides flexibility

for future adaption. The recommendation ensured that the receiving waters are protected and that the plant is optimized relative to costs, chemical use, energy use and greenhouse gas emissions.

Metro Vancouver received input during the development of the Indicative Design through an extensive community engagement program. The program included a Public Advisory Committee, a Community Resource Forum, Norgate residents, local businesses, the broader public, the North Shore Councils and First Nations.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The North Shore Wastewater Treatment Plant project is currently in the Design and Construction phase. Funding for the project is included in the Board's current year budget and the 5-year budget outlook. The current approved budget for the project is $778 million which includes the treatment plant construction, the conveyance works and decommissioning of the existing Lions Gate plant. The project received $212.3 million in grant funding from the federal government and $193 million in grant funding from the provincial government.

SUMMARY / CONCLUSION
This report addresses recent inquiries specific to the level of treatment and technology selection for the new North Shore Wastewater Treatment Plant. At their meeting on November 7, 2013 the Board considered a report related to the new plant to serve the North Shore and endorsed the Indicative Design for the new plant.

To establish the needed level of treatment all Canadian municipalities now follow the approach developed and adopted by the Canadian Council of Ministers of Environment (CCME) in 2009 and documented in the *Canadian Strategy for the Management of Municipal Wastewater Effluent*. The need for treatment beyond the secondary level is determined based on a receiving environment assessment approach. Metro Vancouver has a comprehensive receiving environment monitoring program that has been in place for several decades, which confirms that our wastewater discharges are protective of the receiving waterways.

Three distinct Build Scenarios were developed and business-cased using a triple bottom line assessment to establish the preferred treatment technology for the new North Shore Wastewater Treatment Plant. The Indicative Design endorsed by the Board at their November 7, 2013 meeting was based on the selection of Scenario B, which meets the secondary treatment objective, has the lowest electrical consumption, has the lowest greenhouse gas emissions, requires no chemicals, has the lowest capital and operating cost and provides flexibility for future adaption. The recommendation ensured that the receiving waters are protected and that the plant is optimized relative to costs, chemical use, energy use and greenhouse gas emissions.

Attachments

1. *Lions Gate Secondary Wastewater Treatment Plant Indicative Design* report dated October 22, 2013
2. Excerpt from Utilities Committee Special Meeting on June 25, 2013

References

1. Meeting details page for Special Utilities Committee Meeting on April 10, 2013
2. Meeting details page for Special Utilities Committee Meeting on June 25, 2013
3. Meeting details page for Special Utilities Committee Meeting on September 24, 2013

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