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Greater Vancouver Regional District • Greater Vancouver Water District • Greater Vancouver Sewerage and Drainage District • Metro Vancouver Housing Corporation

To: GVS&DD Board of Directors

From: Utilities Committee

Date: May 2, 2013 Meeting Date: May 24, 2013

Subject: **Lions Gate Secondary Wastewater Treatment Plant – Proposed Study Tour**

UTILITIES COMMITTEE RECOMMENDATION

That the Board:

a) direct staff to arrange a two day study tour to visit treatment plants in Washington State; and
b) authorize remuneration and expenses for participation of all Utilities Committee members, as well as the Chair and Vice-Chair of the Lions Gate Public Advisory Committee, one staff member from each North Shore municipality representing the Lions Gate Intergovernmental Advisory Committee, four staff members from Metro Vancouver and three members of the technical team, in the two-day study tour of wastewater treatment plants in Washington State, which would be funded from the Board approved budget for the Lions Gate project.

At its May 2, 2013 meeting, the Utilities Committee considered the attached report titled "Lions Gate Secondary Wastewater Treatment Plant – Proposed Study Tour", dated, April 3, 2013. The Committee subsequently amended the recommendation as presented above in underline style.

Attachment:
"Lions Gate Secondary Wastewater Treatment Plant – Proposed Study Tour", dated, April 3, 2013.

7326474

To: Utilities Committee

From: Fred Nenninger, Project Manager, Wastewater Secondary Treatment Upgrades

Date: April 3, 2013 Meeting Date: May 2, 2013

Subject: **Lions Gate Secondary Wastewater Treatment Plant – Proposed Study Tour**

RECOMMENDATION

That the Board:

a) Direct staff to arrange a two day study tour to visit treatment plants in Washington State; and
b) Authorize remuneration and expenses for participation of all Utilities Committee members in the two-day study tour of wastewater treatment plants in Washington State, which would be funded from the Board approved budget for the Lions Gate project.

PURPOSE

To request the Utilities Committee's authorization to arrange a two day study tour in the June to mid-July time period to visit four treatment facilities in Washington State that each have features relevant to the Lions Gate upgrading project.

BACKGROUND

In accordance with the Integrated Liquid Waste and Resource Management Plan, work is underway to complete the Project Definition Phase this year for the upgrading of the Lions Gate Wastewater Treatment Plant. A new plant is being built approximately two kilometres east of the existing plant. The new plant is required to be on-line by December 31, 2020.

DISCUSSION

A study tour is proposed to visit four treatment plants in Washington State to gain a more in-depth understanding of the technologies available and the approaches used to build plants that are well integrated with the community. A case study of each of the plants has been undertaken (Attachment 1) in preparation for proposed site visits to coastal plants in Washington State that have relevance with respect to the Lions Gate Secondary Treatment Plant project for level of treatment, sustainability features, and community integration. The four plants include:

1) The City of Blaine treatment plant which is integrated into a city park and provides advanced treatment that is protective of the local receiving waters.

2) The Seattle Brightwater treatment plant uses a hybrid approach to advanced treatment with comprehensive odour control and is a large facility on a site that has become a community asset.

3) The City of Edmonds treatment plant was built in the 1990s and is located downtown adjacent to residential and commercial development. It is located on a compact site and utilizes a thermal process for solids management.
4) The Olympia LOTT Alliance has built an operational centre adjacent to their treatment plant that utilizes energy and reclaimed water from the plant.

The proposed tour could be undertaken over the course of two days (one overnight) by chartered coach. Individuals would include all available members of the Utilities Committee as well as the chair and vice-chair of the Lions Gate Public Advisory Committee, one staff member from each North Shore municipality representing the Lions Gate Intergovernmental Advisory Committee,four staff members from Metro Vancouver and three members of the technical team. The tour would be arranged in the June to mid-July time frame.

ALTERNATIVES

1. Direct staff to arrange a two day study tour to visit treatment plants in Washington State and authorize remuneration and expenses for participation of all Utilities Committee members in the two-day study tour of wastewater treatment plants in Washington State, which would be funded from the Board approved budget for the Lions Gate project.

2. Direct staff to forego a study tour but arrange a one day workshop and invite staff from each of the four Washington State utilities to travel to Metro Vancouver and participate in the workshop by giving presentations, providing information and interacting in panel discussion.

3. Direct staff to forego a study tour but request staff to prepare a presentation for a future Utilities Committee agenda that summarizes the key features of the Washington State plants.

FINANCIAL IMPLICATIONS

If the Board approves Alternative 1, the expected cost of a two day study tour would be in the order of $25,000 to $30,000 depending on the number of participants and is accounted for in the Lions Gate project budget. Remuneration for Utilities Committee members would be approximately $18,000 if all thirteen members of the Utilities Committee participated in the study tour.

If the Board approves Alternative 2, the expected cost of arranging a one day workshop at Metro Vancouver and inviting each of the four Washington State utilities to participate is approximately $10,000.

SUMMARY / CONCLUSION

The Committee is requested to consider a two day study tour in the June to mid-July time period to visit four treatment facilities in Washington State that each have features relevant to the Lions Gate upgrading project. The study tour falls within the mandate of the Committee and would be funded from the approved budget for the Lions Gate project.

Attachments and References:

1) Case study summary sheets

7228880

Lighthouse Point Water Reclamation Facility
Blaine, WA

Size: 0.4 hectares
Cost: $34 million
Reason for construction: Previous plant at end of service life, First Nation's archaeological concerns forced move to new site
Serves: 5,000 people / day
Commissioned: 2010

Features:

- Integrated into public park
- Covered plant with odour control
- Pedestrian bridge to beach
- Artistic features
- Reclaimed water used to irrigate nearby golf course, street sweeping, and other industrial uses
- Biosolids recycled for use as fertilizer for grass fields

Facilities:

- Advanced treatment plant with high quality effluent
- Laboratory
- Public space

Initial Design

When officials in Blaine, Washington decided to expand their wastewater treatment plant to accommodate their growing population, they ran into problems. Sensitive archaeological remains belonging to the Lummi First Nations were discovered on the site and work had to be stopped.

With the discovery it became clear that the current site must be returned to the Lummi First Nations and a new site for the facility would have to be found. After considering 14 different sites, the selection committee settled on a location in the heart of a city park at the north end of Blaine.

After extensive consultation with the community, and an examination of the environmental impacts, Blaine's Lighthouse Point Water Reclamation Facility was built. Today it serves as the entrance to Blaine's Marine Park a waterfront park that features bird watching, public walking trails, picnic areas, and an amphitheater.

Building in a Prominent Location

Working with only an acre of land in a prominent public location forced plant design to be as compact and unobtrusive as possible. The plant's main above-ground features are two buildings that mimic the style of the surrounding marina and park structures. The above-ground buildings house the process control room, laboratories, and support equipment.

The prominence of the location also forced the design team to focus on odour control. The odour elimination process was carefully attended to with carbon scrubbers installed to remove odours before air is released from the plant.

Attention to Resource Management

As the largest single municipal project in Blaine's history, the Lighthouse Point Water Reclamation Facility was also built with the environment in mind. Water from the facility is reclaimed and delivered to golf course irrigation. The golf course uses an estimated 300 gallons of water per minute on summer days for irrigation, so the repurposed water is expected to create significant resource savings. The water sells at about 80 percent of the cost of fresh water and is expected to bring in additional $45,000 to $60,000 in annual revenue to the City. In addition to selling the water, the City uses reclaimed water for its own street sweeping and industrial uses.

The plant also makes use of the biosolids produced. The facility trucks its biosolids to a processing plant where they are made into fertilizer and used on grass fields in the region.

Serving as the focal point in a public park, the Blaine Lighthouse Point Water Reclamation Facility provides an example of a compact facility that makes innovative use of its resources. Perhaps even more importantly, the facility shows that with careful planning and attention to detail, a wastewater treatment plant can be aesthetically integrated into the local environment.

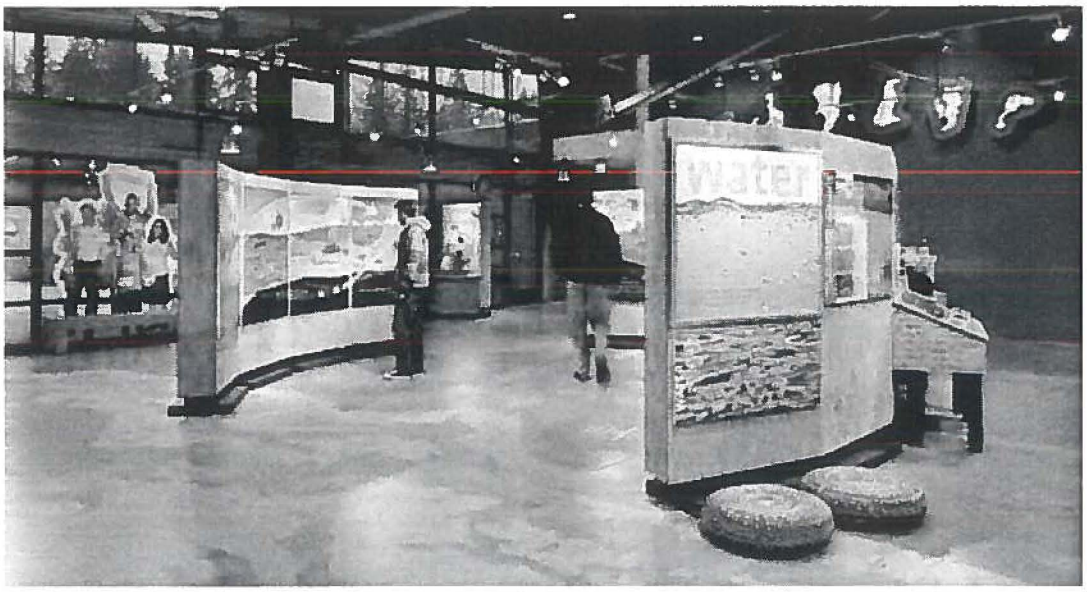
Features applicable to Lions Gate Secondary Wastewater Treatment Plant:

- Compact site and integration of the plant site with the community
- Recovery and use of biosolids and reclaimed water
- Odour mitigation

Brightwater Wastewater Treatment Plant

Snohomish County, WA

Size: 17.4 hectares (treatment and support facilities)
Treatment Plant Cost: $896.3 million
Full Project Cost: $1.86 billion
Reason for construction: Existing system had insufficient capacity for projected population growth
Serves: 189,000 people today, with planned capacity for 435,000 people
Commissioned: 2011



Features:

- LEED-Platinum certified
- Advanced odour control
- Hybrid Advanced Treatment System
- Recovery and recycling of plant resources
- Biosolids recycled as fertilizer and soil conditioner for agriculture and forestry industry
- Biosolids composted by private company and sold for use in landscaping and gardening
- Reclaimed water used for landscaping, street sweeping, heating, cooling, and irrigation of landscaping, sports fields and golf courses
- Reclaimed water used for non-potable water in plant
- Methane gas used to power treatment facility

Facilities:

- Environmental Education and Community Center including exhibit hall and classroom
- 70 acres of natural area including ponds, wetlands, and walking trails
- Multi-purpose meeting facility for conferences, weddings, and special events

Commissioned in 2011, the Brightwater Wastewater Treatment Plant was the largest clean-water capital project in King County in 40 years. Construction of the facility covered 114 acres of land and was a multi-faceted project. In addition to the build of a secondary treatment plant, conveyance pipes, and a marine outfall, the project also included the design of a 15,000 square foot education and community center, the restoration of salmon habitat, and the creation of 70 acres of public-access open space.

Initial Project Considerations

From the beginning environmental sustainability and community integration of the facility were crucial concerns. Residents were naturally skeptical of welcoming a wastewater treatment plant into their neighborhood, so officials were careful to engage in extensive public consultation that enabled citizens to voice their concerns and request features they felt were most important to the community.

Odour control was an obvious citizen concern and the Country addressed this through careful consideration regarding treatment technologies and stringent air collection processes. Employing membrane bioreactor (MBR) technology, odour control processes, and chemical scrubbing, the facility adheres to the goal of no odours detectable beyond site boundaries.

Community-Requested Project Features

In addition to odour control, citizens identified three features they felt would turn the facility from a simple wastewater treatment plant into a welcoming community asset. These features included public space for outdoor activities, a community center with rentable rooms, and a clean water learning space. The Brightwater facility is now home to three miles of walking trails that are frequented by the public, a large event space that hosts weddings and conferences, and a water resource education center that regularly welcomes school programs and public tours.

International Recognition

Certified by the US Green Building Council as LEED Platinum, The Brightwater Center educational facility enjoys international recognition for its high-performance green design.

All aspects of the treatment facility's operations are designed to minimize environmental impact and protect the sensitive marine environment of Puget Sound. Everything from biosolids to the water and methane gas produced by the plant are captured, cleaned, and reused.

The Brightwater Wastewater Treatment Plant is an example of a carefully planned wastewater treatment facility that was designed with and for the community. Today the facility functions as an important educational resource and a host to community recreation and events.

Features applicable to Lions Gate Secondary Wastewater Treatment Plant:

- Hybrid treatment equivalent to secondary treatment discharge standard; also providing reclaimed water volumes to offset drinking water use from potable sources
- Recovery and use of biosolids, methane gas and reclaimed water
- Odour control system
- Integration of the plant site with the community

Edmonds City Wastewater Treatment Plant

Edmonds, WA

Size: 1 hectare (treatment and support facilities)
Cost: $34 million (upgrade to secondary treatment in 1991)
Reason for construction: Upgrades required to meet changing federal regulations and population expansion
Serves: 80,000 people
Commissioned: 1957 with upgrades in 1959, 1967, 1991

Features:

- Public plaza
- Public green space with pagoda, seating, and grassy area
- Artistic water feature
- Located downtown in close proximity to residences

Facilities:

- Secondary treatment plant
- Thermal reduction of solids
- Public space
- Substantially covered plant with odour control

The Growth of a Treatment Plant

The Edmonds City Wastewater Treatment Plant is a facility that's grown with the community. First established in 1957 the plant has gone through a series of upgrades and expansions through the years to keep step with a growing community and changing regulations.

The most recent upgrade was in 1991 with the move to secondary treatment as mandated by federal government regulations. The upgrade represented the largest and most complex public works project in Edmond's history. Due to its scope and potential public impact, the project was undertaken with significant community involvement. A citizen's advisory group was appointed by the Mayor of Edmonds to provide input to the design team regarding community needs and perception. The group's recommendations included direction on the aesthetics of building design and landscaping of the area. The modifications added less than one percent to the overall project cost, but made a significant difference to public perception.

The plant is located in the middle of a residential and commercial area of this tourism-based waterfront city, making perception an important consideration in the design process. Facilities are mostly enclosed and gas by-products are treated to remove odour. The area over a portion of the plant is landscaped with a pagoda and seating area creating a welcoming spot for people to relax. An artistic water feature also adds aesthetic value to the facility.

Environmental Considerations

As with any wastewater treatment plant, environmental impact was also a primary consideration in the design and build of Edmond's secondary treatment expansion. Environmental studies and mitigation measures were taken during the upgrade to ensure that the sensitive marine environment of Puget Sound was not harmed by the effluent discharging through the marine outfall.

In addition to preserving the marine environment steps were taken to protect surrounding marsh land during construction and subsequent operations. Portions of the site were landscaped to create a park-like buffer between the facility and the marsh. Walking paths on surrounding land have also been installed and are frequented by the public.

Resource Reclamation

Edmonds City Wastewater Treatment Plant does not currently engage in resource reclamation. Effluent is released into Puget Sound and biosolids are thermally reduced and the ash disposed of in the local landfill.

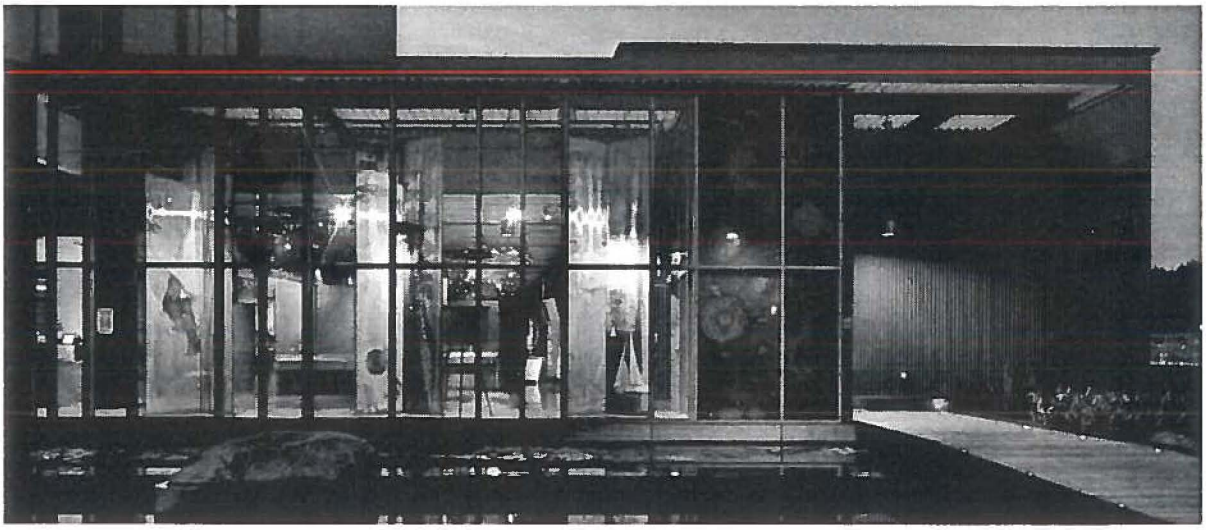
The Edmonds City Wastewater Treatment Plant is an example of a small plant that has successfully integrated with its host community to become an accepted part of the city landscape.

Features applicable to Lions Gate Secondary Wastewater Treatment Plant:

- Compact site and integration of the plant site with the community
- Close proximity to residential neighbourhoods and businesses
- Thermal reduction of solids
- Substantially covered plant with odour control systems installed.

LOTT Regional Services Center & Budd Inlet Treatment Plant
Olympia, WA

Size: 5.7 hectares (treatment and support facilities)
Cost: *LOTT Regional Services Centre* $13.5 million
Treatment Plant $500 million (estimated replacement cost)
Reason for construction: *LOTT Regional Services Centre*: Provide public education on water resources and office space
Treatment Plant: upgrades required to meet changing regulations & accommodate population expansion
Serves: 108,000 people
Commissioned: *LOTT Regional Services Centre*, 2010
Treatment Plant, 1949 with upgrades in 1980, 1994, 2004.



Features:

- LEED-Platinum certification
- Outdoor and indoor ponds and streams supplied by reclaimed water
- Biosolids recycled as fertilizer and soil conditioner for agriculture industry
- Modern architecture featuring reclaimed timber, sculptures, and interpretive displays
- Heat, hot water, and electricity powered by the plant's methane treatment process
- Reclaimed water used for non-potable water in plant and irrigation

Facilities:

- Office tower
- Education Centre
- Interpretive exhibits
- Classroom
- Boardroom
- Laboratory

Budd Inlet Treatment Plant

The Budd Inlet Treatment Plant was first constructed in 1949 to service the Lacey, Olympia, Tumwater, and Thurston County areas of Washington State. Through the years the plant has been expanded and upgraded to meet changing needs such as secondary treatment, nitrogen removal, and UV disinfection of effluent.

Today the plant handles 38-45 million litres of wastewater flow daily. Effluent is treated to secondary treatment standards before being discharged into Budd Inlet via a marine outfall.

Reclaimed water is produced and used in the plant and LOTT Regional Services Centre. The plant reuses methane gas to fuel its operations as well as the operations of the LOTT Regional Services Center. In addition, it captures biosolids and recycles them for use as fertilizer and for soil amendment for surrounding areas.

In 2003, LOTT officials developed a new Master Plan for the Budd Inlet Treatment Plant. The Master Plan outlines the steps the plant must take to remain integrated with its host community, and meet the needs of a growing population. The development of the LOTT Regional Services Center was one of the steps identified in the Master Plan.

LOTT Regional Services Center

Opened to the public in 2010, the LOTT Regional Services Center is a 32,500 square foot building designed to be the public face of the Budd Inlet Treatment Plant. The facility hosts a water quality laboratory, office space, and an education and technology interpretive center.

A LEED Platinum certified building, the Regional Services Center has won multiple awards from the American Institute of Architects and the Sustainable Building Industry Council for its innovative approach to water conservation and education. The Center hosts public interpretive displays housed among ponds and streams that are filled by reclaimed water. The building's non-potable plumbing and irrigation are likewise supplied by reclaimed water. The facility is also able to distribute reclaimed water to local utilities for non-potable water uses, creating a new revenue stream. Electricity and heat generation are drawn from plant byproducts via a cogeneration system. In this way, both the Budd Inlet Treatment Plant and the Regional Services Center function in an environmentally-friendly and cost-effective manner.

Public boardrooms, educational facilities, and 2,600 square feet of interactive and interpretive displays about water resource management ensure the Center is used as a community asset. The facility is designed to become part of a larger community service project that includes the Hands on Children's Museum and a public plaza.

As a wastewater treatment plant that has grown with the region through the years, the Budd Inlet Treatment Plant and LOTT Regional Services Center provide an example of what's possible when wastewater treatment plans focus on a facility's seamless integration with, and service to the community.

Features applicable to Lions Gate Secondary Wastewater Treatment Plant:

- Recovery and use of biosolids, methane gas and reclaimed water
- Education / interpretive facilities for community engagement
- Integration of the plant site with the community