Iona Island Bird Observatory

A Summary Presentation for the Liquid Waste Water Committee Meeting, July 16 2020

Myles Lamont
Director at Large
Iona Island Bird Observatory Committee
Outline

• Who is WildResearch
• What WildResearch does at Iona
• Potential impacts of the waste water treatment upgrade on WildResearch
• Potential collaborative and synergistic opportunities
• Conclusion
Who is WildResearch?

Formed in 2010, WildResearch is a local registered charity and not-for-profit organisation whose mission is to *build, train, and educate* a community that contributes to conservation science.
What does WildResearch do?

What we do:

- Spring/fall migration monitoring programs
- Educational Workshops
- Social nights
- Seminar talk series
- Urban Cooper’s Hawks surveys
- Weekly / biweekly newsletter
- Networking for students and early career
- Community outreach events
- Bird ID Field Trips
- Amphibian surveys
Iona Island Bird Observatory

Operating Since Inception in 2010

- Operating the only bird migration monitoring station in the Fraser Estuary and in the heart of the North American Pacific Flyway
Iona Island Bird Observatory
Iona Island Bird Observatory

Operating Since Inception in 2010

• Capture, band and record data on migratory birds providing critical information on avian trends and abundance.
Iona Island Bird Observatory

Operating Since Inception in 2010

- Operate educational workshops for the general public, elementary, high school students and early career biologists, catering to each demographic.
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Operating Since Inception in 2010

• Offer training opportunities for university and grad students looking to enter the conservation field
Iona Island Bird Observatory

Operating Since Inception in 2010

- We also provide workshops on a variety of topics ranging from understanding bird molts and aging, resume writing, statistics for biology, etc.

Plate 8. Volunteer training on bird extraction through IIBO Citizen Science Program.
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Operating Since Inception in 2010

- IIBO provides critical information on species trends over time from both our spring and fall migration programs.

Liquid Waste Committee
Figure 2. Number of volunteers and the total volunteer hours contributed over the past six years of monitoring.
Iona Island Bird Observatory

Where do we fit in?
Iona Island Bird Observatory

Where do we fit in?

- WildResearch has invested ten years in developing IIBO
- We have invested hundreds-of-thousands of staffing dollars over this time
- In 2018 alone, we had over 80 volunteers contributing nearly 2000 volunteer hours to improving the ecology of IIBO and/or collecting data on the island
- In 2018 alone, we directly engaged with over 500 visitors to the park through our outreach programs
Iona Island Bird Observatory

Where do we fit in?

- Changes to the site will have drastic impacts on our monitoring programs and may completely alter our data and its relevance going forward.
Iona Island Bird Observatory

Where do we fit in?

• We also recognize there is huge opportunities for collaborative work and synergies between IIBO and the Wastewater Treatment Upgrades
Iona Island Bird Observatory

Where do we fit in?

- We see substantial opportunities to continuing with our restoration, education and conservation work on Iona and would like to work more closely with MetroVancouver on these going forward.
Iona Island Bird Observatory

In Summary:

• We appreciate the emphasis provided thus far to catering to wildlife and the proposed ecological improvements and would like to partake in these discussions going forward.

• Given our historic investment in Iona and IIBO, we would like to be viewed as a key stakeholder in further discussions and development plans of the site.
Georgia Strait Alliance

Tessa Danelesko
Biodiversity Program Lead

GeorgiaStrait.org
Our recommendations are grounded in years of experience working to keep the Salish Sea region’s waterways healthy, in support of those who rely on them most.
Georgia Strait Alliance

Since 1990, Georgia Strait Alliance has been an effective voice for communities who care about the Salish Sea and its inhabitants.

Our mission is to protect and restore the marine environment and promote the sustainability of Georgia Strait, its adjoining waters, and communities.
GSA is strongly in favour of national regulations and source control programs to reduce marine contamination in aquatic environments.

This has included our advocacy for region-wide tertiary wastewater treatment.
Pollution in the Salish Sea is putting Pacific salmon at risk and causing immune and endocrine system dysfunction in endangered Southern Resident orcas.

Photo: John Durban/NOAA and others
The Iona Island Project represents one of the single greatest opportunities to considerably quell this known source of pollution to Salish Sea’s waterways.

Photo: Yuri Chufour
The cost of undertreating wastewater includes:

- **The loss of Salish Sea ecosystem function**;
- **The Economic impact on ecotourism and fisheries**;
- **The health impacts on the region’s marine wildlife** and coastal communities; and the
- **Future cost of cleaning up contaminants**.
Treating wastewater to the tertiary level at a minimum, and as soon as possible before the 2030 deadline, will protect the health of the Salish Sea.
The health of these invaluable places relies on decision-makers like you to take action that will offer the protection so desperately needed.

thank you

Georgia Strait.org
Iona Island Wastewater Treatment Plant

PROJECT DEFINITION: RECOMMENDED DESIGN CONCEPT

Peter Navratil
GENERAL MANAGER, LIQUID WASTE SERVICES

Tom Sadleir
PROGRAM MANAGER, COMMUNITY ENGAGEMENT, LWS

Lea Elliot
SENIOR POLICY ANALYSIS, POLICY, PLANNING & ANALYSIS, LWS

Liquid Waste Committee Meeting, July 16, 2020
To obtain Board endorsement of the recommended Design Concept. This will allow the project team to focus on developing:

• Detailed schedule
• Budgets and funding strategy
• Procurement methods

This information will be included in the final Indicative Design and Project Definition Report to be presented to Committee and Board January 2021.
Project Definition Goals

- Wastewater Treatment
- Resource Recovery
- Community and Park Integration

December 31, 2030 – Federal and Provincial Regulatory Deadline
Input to Design Concept (2018-20)

Integrative Design Process workshops (6)
  • Structured decision making

Technical reports from consultants (60)

Steering Committee meetings (monthly)

VSA staff meetings (8)

VSA council updates (7)

Liquid Waste Committee updates (quarterly)
  • February 7, 2020 presentation

Community Engagement
Public Engagement

- 3 meetings with interested groups
- Metro Vancouver participation in three community events
- 2 online public meetings (May 19 and 21 – 140 participants)

First Nations Engagement

- Musqueam participation in 4 project team workshops
- 2 staff-to-staff meetings with Musqueam
- CAO, GM presentation to Musqueam Chief and Council
What we’ve heard

- Raise treatment level to tertiary
- Protect/improve the marine environment
- Protect/enhance fish/fish habitat
- Reduce odour from plant operation
- Maintain Musqueam views to the southwest
- Encourage park use while protecting sensitive habitat
- Reduce operational impacts (air quality, noise, lighting)
- Coordinate lagoon decommissioning with new habitat
- Ensure resiliency to climate change and earthquakes
- Seek provincial and federal funding
WASTEWATER TREATMENT PLANT DESIGN
Evaluation and Comparison of Plant Options

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Concept 1 Base Secondary</th>
<th>Concept 2 Tertiary Filtration</th>
<th>Concept 3 Tertiary MBR</th>
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<tr>
<td>Operational Complexity</td>
<td>Medium</td>
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<td>Maintenance Requirements</td>
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<td>Health and Safety Risks</td>
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<td>Odour Release Risks</td>
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<td>Medium</td>
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<td>Footprint</td>
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<td>Medium</td>
<td>Small</td>
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<td>Ability to Adopt Future Technological Innovations</td>
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<td>Net Energy Use</td>
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<td>High</td>
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<td>Greenhouse Gas Emissions</td>
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<td>Low</td>
<td>High</td>
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<tr>
<td>Capital Cost (2020 Dollars)</td>
<td>Highest</td>
<td>Lowest</td>
<td>Medium</td>
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<tr>
<td>Annual Operating Cost</td>
<td>Medium</td>
<td>Lowest</td>
<td>Highest</td>
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Wastewater Treatment Plant Design Concept

Key Features

- Enhanced primary followed by secondary clarification
- Tertiary effluent
- Effluent reused for heat, reclaimed water and recharge to wetlands
- Biogas upgraded to biomethane
- High energy recovery
- Phased implementation by reuse of existing assets
Existing and New Plant Layouts
Existing and New Plant Layouts

EXISTING PLANT REUSED IN 2030 (YELLOW)

NEW PLANT (GREEN)
Advanced Treatment and Pilot Testing

- Pilot and demonstration scale testing of advanced treatment for micropollutants
  - Ozone, biological activated carbon, granular activated carbon

- Pilot testing of innovative treatment technologies
Odour Control

Key Features

- All new tankage will be covered
- Odours will be collected and treated using biotrickling filters and activated carbon units
- Improvements will be made to odours from existing infrastructure
RESOURCE RECOVERY
Resource Recovery Opportunities

Inputs

- Wastewater
- Trucked Liquid Waste

Potential Products

- Reclaimed Water
- Heat
- Biofuels
- Nutrients

Iona Island Wastewater Treatment Plant
Reclaimed Water

- Potential for 500,000 m$^3$/day of reclaimed water
- Onsite use
  - Tank cleaning and wash down
  - Grey water in O&M building
  - Irrigation
  - Ecological enhancements
- Offsite use
  - Irrigation (e.g. golf courses, parks)
  - Vehicle washing
  - Construction activities
  - Industrial uses
Heat recovery from plant effluent:

- Onsite heating and cooling needs
- Export to district energy system
- Equivalent to heating energy use for 50,000 apartment units
Effluent Heat and Reclaimed Water

Circular Economy in Water & Heat

Iona Island WWTP

Effluent Transmission Pipes

District Energy Plants

Reclaimed Water Users

Sewage — Heating — Non-Potable Water

Cooling

Legend:
- Reclaimed Water & Effluent Node
- Reclaimed Water Node
- District Energy
- Direct Potable Reuse Extensions
- Reclaimed Water Opportunity
- Potential District Energy Zone

Liquid Waste Committee
Renewable Natural Gas

- Biogas upgrade to biomethane with injection to natural gas grid for use as heating or vehicle fuel

- Equivalent to approx.:
  - Natural gas for 2,700 typ. households
  - Vehicle fuel for 3,200 cars

- Could offset approx. 95% of Corporate GHG emissions
Biocrude

- Pilot testing hydrothermal liquefaction (HTL) at Annacis Island WWTP to be completed in 2024
- Lower capital and O&M costs
- Revenue potential
- Displace 1,400 truck loads of biosolids annually
Nutrients

• Biosolids for land application
PARK INTEGRATION AND ECOLOGICAL ENHANCEMENT
Ecological Priorities

- Restore fish habitat
- Improve water quality
- Protect bird habitat
- Enhance terrestrial ecosystems
Improve Aquatic Connectivity
Adapt to Climate Change
Restore and Enhance Ecosystems
Enhanced Park Experience
Progressive Phasing
Resiliency

- Increase flood control elevation to protect against sea level rise
- Salmon-safe to protect ecology and aquatic habitat
- Seismic reinforcement
- Sediment augmentation
- Design to a minimum of LEED and Envision Gold
Community input reflected in Design Concept

- Raise treatment level to tertiary ✓
- Protect/improve the marine environment ✓
- Protect/enhance fish/fish habitat ✓
- Reduce odour from plant operation ✓
- Maintain Musqueam views to the southwest ✓
- Encourage park use while protecting sensitive habitat ✓
- Reduce operational impacts (air quality, noise, lighting) ✓
- Coordinate lagoon decommissioning with new habitat ✓
- Ensure resiliency to climate change and earthquakes ✓
- Provincial and federal funding
<table>
<thead>
<tr>
<th>Timeline</th>
<th>Activity</th>
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<tr>
<td>July 31</td>
<td>GVS&amp;DD Board</td>
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<tr>
<td></td>
<td>• Present recommended Design Concept for endorsement</td>
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<tr>
<td>Aug – Oct</td>
<td>Community Engagement</td>
</tr>
<tr>
<td></td>
<td>• Information out to interested parties and First Nations</td>
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<tr>
<td></td>
<td>• Input received to October 15</td>
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<tr>
<td>Aug – Dec</td>
<td>Complete Indicative Design</td>
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<td></td>
<td>• Habitat enhancement projects</td>
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<tr>
<td></td>
<td>• Resource recovery business cases</td>
</tr>
<tr>
<td></td>
<td>• Schedule, budgets, funding and procurement options</td>
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<tr>
<td>Sept / Oct</td>
<td>Municipal Council presentations (TBD)</td>
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<tr>
<td>Jan 2021</td>
<td>Liquid Waste Committee and GVS&amp;DD Board</td>
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<tr>
<td></td>
<td>• Present Indicative Design and Project Definition Report for endorsement</td>
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View of Freshwater and Tidal Wetlands
View from the Park Entrance
View from the Plant Building
Southwest View from Musqueam Land
VIEWS OF NEW WASTEWATER TREATMENT PLANT
Recommendation

That the GVS&DD Board endorse the Iona Island Wastewater Treatment Plant Project design concept as presented in the report dated June 23, 2020, titled “Iona Island Wastewater Treatment Plant Project Design Concept”.
Questions?
Board Budget Workshop Overview

**Process**

- Board Budget Workshop (Jun 5)
- Committee Update (Jul)
- Budget Committee Reports (Oct)

- Board Budget Workshop (Oct 21)
- Council of Councils (Oct 24)
- Board Meeting (Oct 30)

Liquid Waste Committee
Board Budget Workshop Overview

Approach Going Forward

Short-term Relief for Households
- Leverage supported tools to create a short-term action plan (1-3 years)

Maintain current goals and objectives
- Continue work on strategic and long-range plans

Realize New Opportunities
- Partner on projects to increase affordable housing and reduce GHGs
- Help drive economic recovery
Considerations:

• Actions that can provide immediate relief while maintaining the work on the long-term vision of the Board
• Risk implications for project delays or deferrals
• The impact of changes to debt amortization on future ratepayers
• The ability of the organization to take advantage of potential stimulus funding
• Continuous improvement – review for efficiencies
What this means for Liquid Waste Services

In preparing the 2021 Budget, Liquid Waste Services will carefully consider the following:

• Reviewing the capital program to find opportunities to modify or defer projects, reducing costs in the near term
• Reduce discretionary costs in programs such as travel and training
• Integrating new revenues from realized business cases
• Leverage efficiency savings from continuous improvement work
Thank You
Liquid Waste Services Capital Program Expenditure Update

AS AT APRIL 30, 2020

Colin Meldrum

ACTING DIRECTOR, ENGINEERING, DESIGN & CONSTRUCTION
LIQUID WASTE SERVICES

Liquid Waste Committee – July 16, 2020
Selected Project Updates

• Attachment 3: Project Status Information
  • Annacis Island WWTP Tricking Filters – Delta
  • Annacis Island WWTP Outfall – Delta
  • Sapperton Pump Station – New Westminster
  • Kent St PS Backup Power – Vancouver
  • Golden Ears PS & SSO Tank – Maple Ridge
Annacis Island WWTP Trickling Filters – Delta

Liquid Waste Committee
Sapperton Pump Station – New Westminster

Liquid Waste Committee
Sapperton Pump Station – (cont’d)
Kent St Pump Station Backup Power – Vancouver

Liquid Waste Committee
Golden Ears PS SSO Tank – Maple Ridge

Liquid Waste Committee
Golden Ears PS & SSO Tank – Maple Ridge
First Nations Art on Tank
Trenton Pierre (sɬəməxw)

Liquid Waste Committee
Thank you
Report in brief:

- Wastewater treatment plants (WWTPs) operated in compliance with regulatory requirements
- Applicable water quality objectives and guidelines for the receiving water bodies were mostly met
- Majority of produced biosolids were beneficially used
- Health Authorities posted swimming advisories for a total of 39 days
Metro Vancouver’s WWTPs

3 Secondary - freshwater discharge

2 Primary – marine discharge
Metro Vancouver’s WWTPs

• About 435 billion litres of wastewater treated in 2019
Operational Certificate requirements consistently met

About 66,000 tonnes of suspended solids (TSS) and about 65,000 tonnes of biochemical oxygen demand (BOD) removed

Treatment efficiency met or exceeded expectations

About 205,000 analyses by Metro Vancouver laboratories alone

<table>
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<tr>
<th>WWTP</th>
<th>% BOD Reduction</th>
<th>% TSS Reduction</th>
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<tbody>
<tr>
<td>Iona Island</td>
<td>49</td>
<td>65</td>
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<tr>
<td>Lions Gate</td>
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<td>71</td>
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<tr>
<td>Annacis Island</td>
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<td>94</td>
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<td>Lulu Island</td>
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<tr>
<td>Northwest Langley</td>
<td>95</td>
<td>93</td>
</tr>
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</table>
Biosolids Quality Monitoring

- About 57,000 bulk tonnes of biosolids produced
- Almost 15,000 laboratory analyses performed
- Metal concentrations and fecal coliform counts in biosolids generally well below regulatory limits
- 96% beneficially used
Effluent Toxicity Monitoring

- Effluent from secondary WWTPs passed all acute toxicity tests
- Five samples from Iona Island and one from Lions Gate WWTP required more oxygen than specified by the testing method
- Primary plants upgrades are expected to address the issue
Cardiff monitors WWTP influent and effluent for a number of persistent, toxic and bioaccumulative substances
  • Emerging and legacy contaminants included
• Program is aligned with a Canada-Wide Strategy for the Management of Municipal Wastewater Effluent
• Results are used to inform source control initiatives and treatment options
• Findings are shared with provincial and federal government
Monitoring of Regional Water Bodies

- Strait of Georgia
- Burrard Inlet
- Fraser River
- Boundary Bay
• Bacteriological water quality monitored at 41 beaches
• Most bathing beaches met the primary-contact recreation guideline except at 4 locations
• West and Central False Creek met the secondary-contact recreation guideline throughout the season
• Swimming advisories were posted by the Health Authorities for a total of 39, versus 239 days in 2014
Conclusions

- Metro Vancouver WWTPs operate in compliance with Operational Certificates and other applicable regulatory requirements.
- Treatment plants meet performance expectations and consistently provide an ongoing benefit to the region by reducing contaminant loading to the environment.
- Regional liquid waste discharges are effectively managed in a manner that is protective of human and aquatic life.
Thank You
Metro Vancouver’s Sewer Overflow Map

PHASE 1 PILOT MAP

Tom Sadleir

PROGRAM MANAGER, COMMUNITY ENGAGEMENT, LIQUID WASTE SERVICES

Liquid Waste Committee - July 16, 2020
Direction from Minister of Environment and Climate Change Strategy to “develop a system to notify the public, in real time, of sewer overflows and WWTP treatment interruptions” by October 30, 2020
Notification Phases

Phase 1: Sanitary Sewer Overflows (SSOs) and Wastewater Treatment Plant (WWTP) Process Interruptions

Phase 2: Combined Sewer Overflows (CSOs)
Phase 1: Engagement and Communications

- Member jurisdictions
  - Environmental Monitoring Committee
  - Stormwater Interagency Liaison Group
  - REAC-LW, REAC, RAAC
  - Municipal communications staff
  - Liquid Waste Committee, GVS&DD Board
- Regional Health Authorities
- Ministry of Environment & Climate Change Strategy
- Approximately 200 potentially impacted water users, including First Nations
Email Notifications

• Ability to sign up for automated email notifications
• Emails will provide link to map on Metro Vancouver website
Next Steps

- Met with CSO Elimination Working Group July 15 to develop approach to CSO notification – work ongoing
- Communication with potentially impacted water users to introduce Phase 1 Pilot Map – early August
- Public launch of Phase 1 Map – October
Questions?