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.

Liquid Waste Committee

What does WildResearch do?

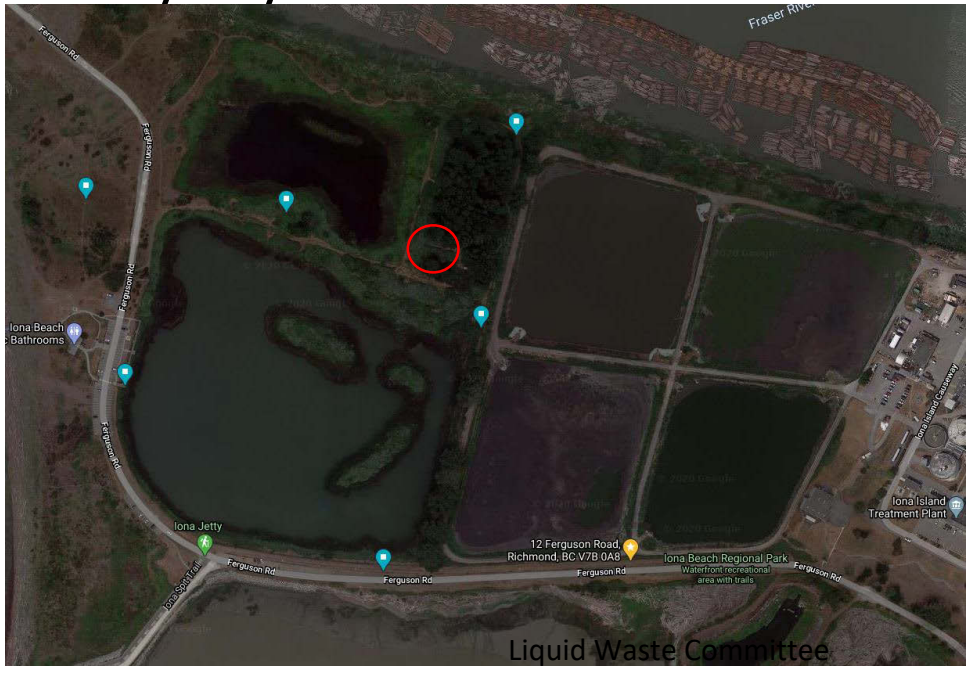
What we do:

- 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.

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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.

Iona Island Bird Observatory

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

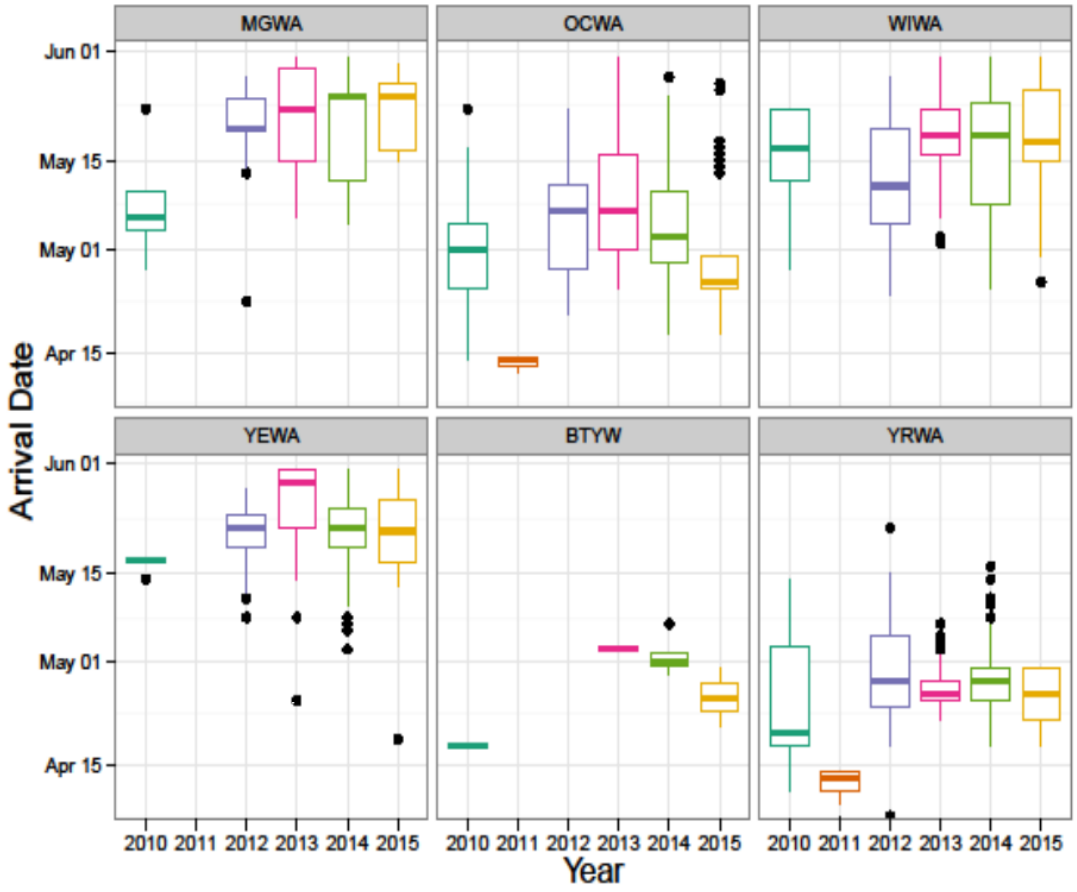
- We also provide workshops on a variety of topics ranging from understanding bird molts and aging, resume writing, statistics for biology, etc

Plate 8. Volunteer training on bird extraction through IIBO Citizen Science Program.

Iona Island Bird Observatory

Operating Since Inception in 2010

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



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Operating Since Inception in 2010

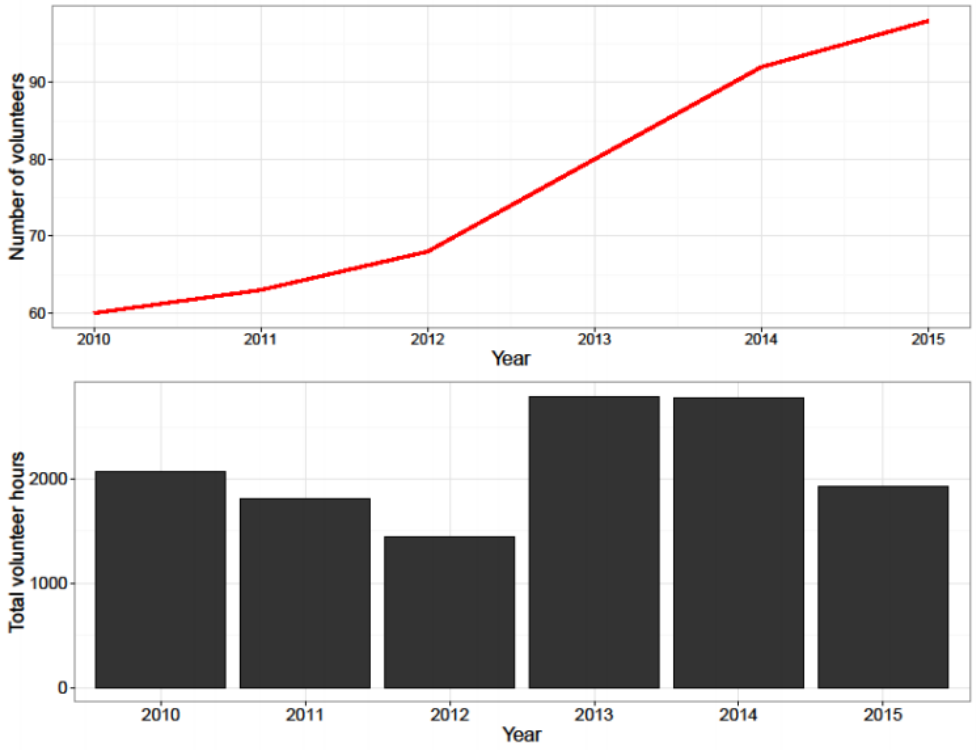
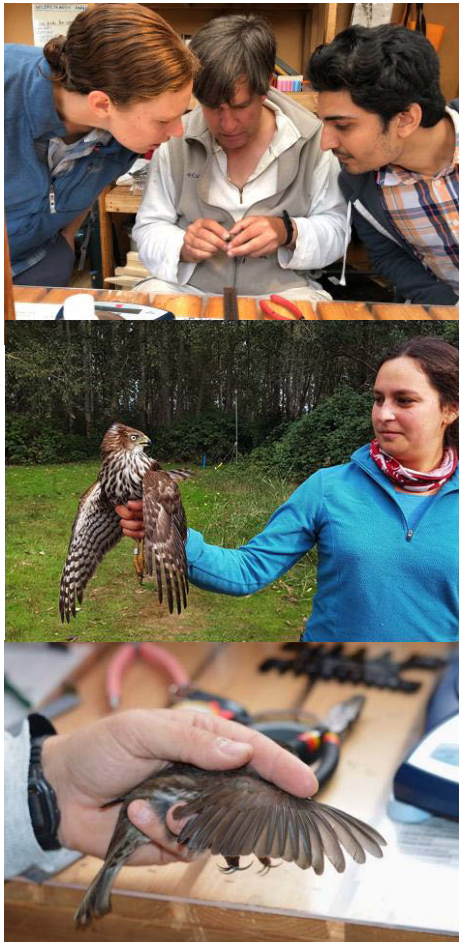


Figure 2. Number of volunteers and the total volunteer hours contributed over the past six years of monitoring.



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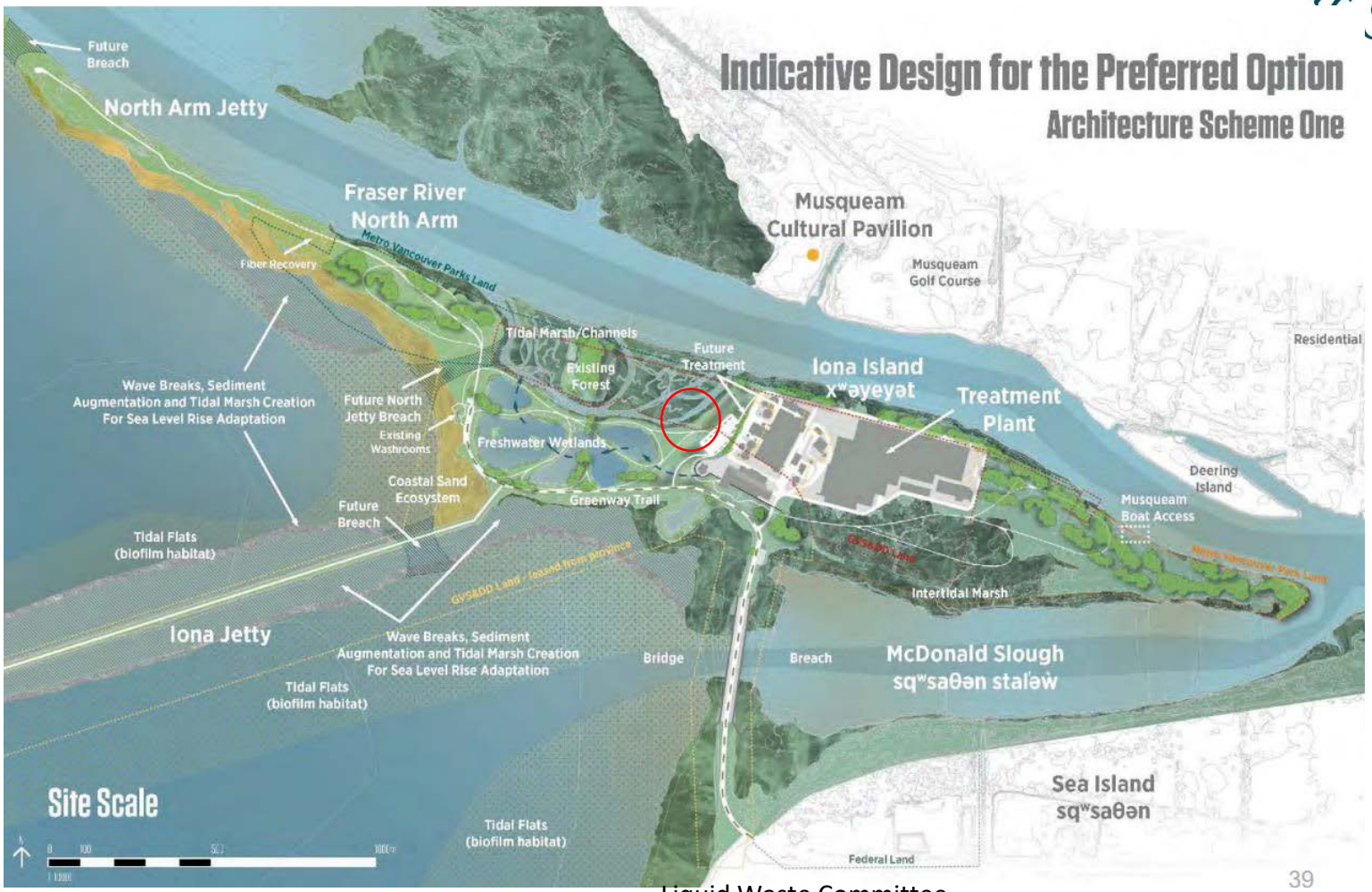
Iona Island Bird Observatory

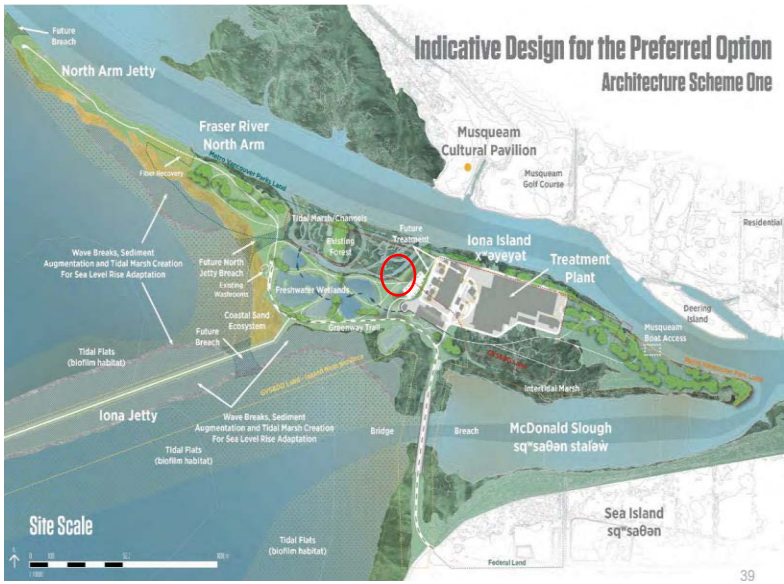
Where do we fit in?



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.

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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.

Photo: Alex Harris

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.

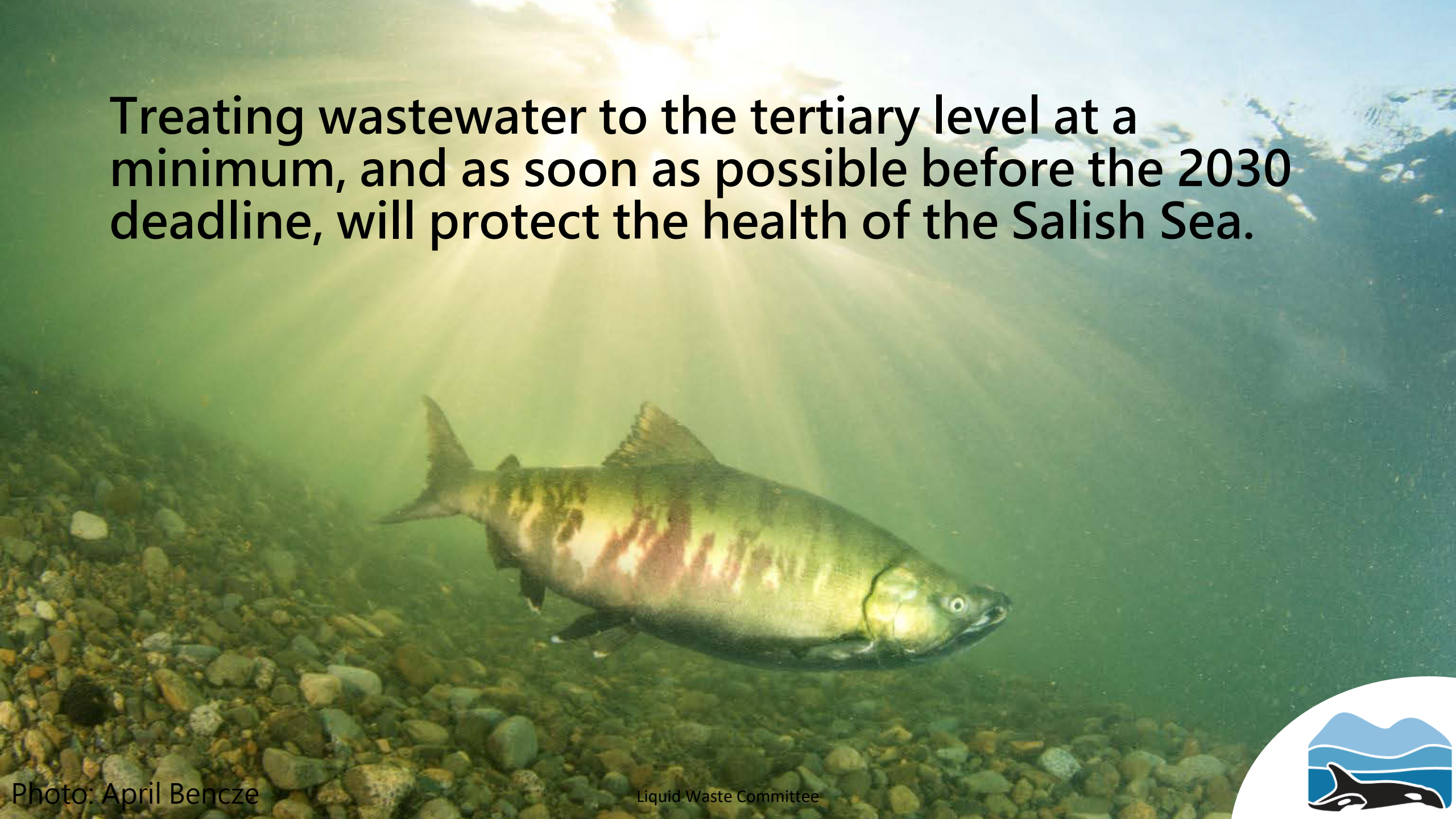
Photo: John Durban/NOAA and others

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.

Photo: April Bencze

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

GeorgiaStrait.org

Photo: Michael Snyder

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

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Report Objective

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

Community Engagement (Design Concepts)

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

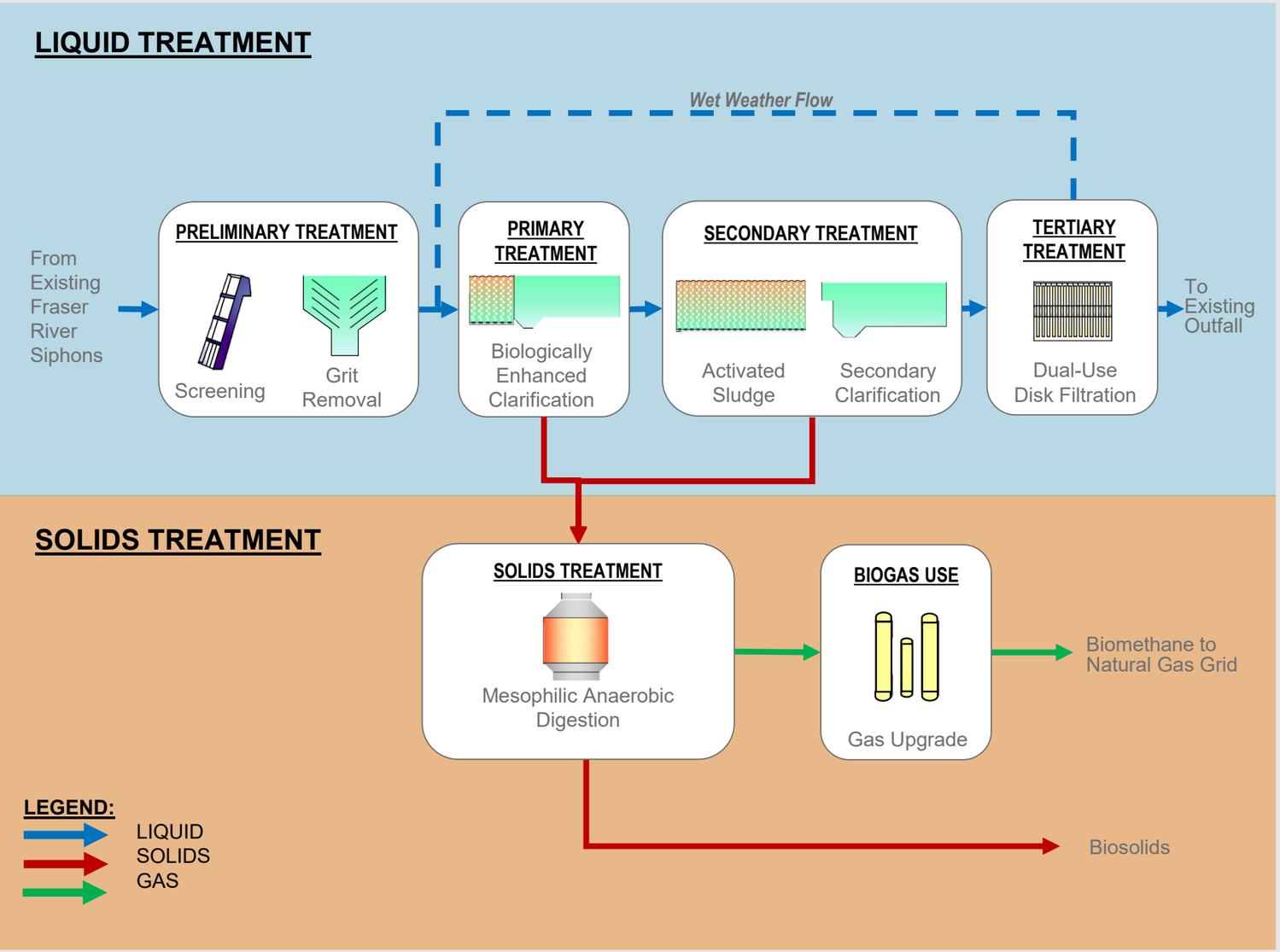
WASTEWATER TREATMENT PLANT DESIGN

Liquid Waste Committee

Evaluation and Comparison of Plant Options

Criteria	Concept 1 Base Secondary	Concept 2 Tertiary Filtration	Concept 3 Tertiary MBR
Operational Complexity	Medium	Low	High
Maintenance Requirements	High	Low	High
Health and Safety Risks	High	Low	High
Odour Release Risks	High	Medium	Low
Footprint	Large	Medium	Small
Ability to Adopt Future Technological Innovations	Medium	High	Low
Net Energy Use	Medium	Low	High
Greenhouse Gas Emissions	Medium	Low	High
Capital Cost (2020 Dollars)	Highest	Lowest	Medium
Annual Operating Cost	Medium	Lowest	Highest

Wastewater Treatment Plant Design Concept



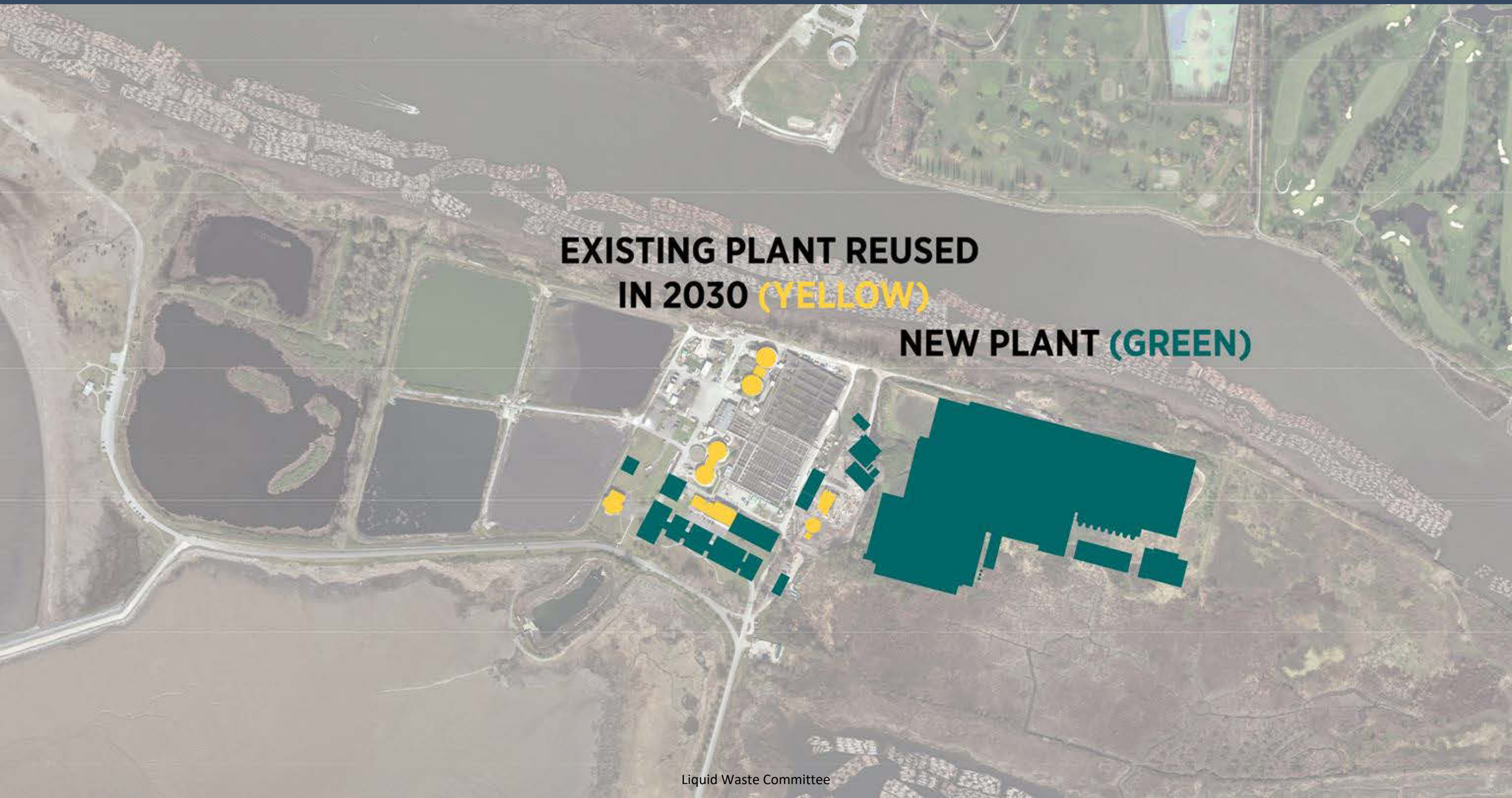
Key Features

- 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

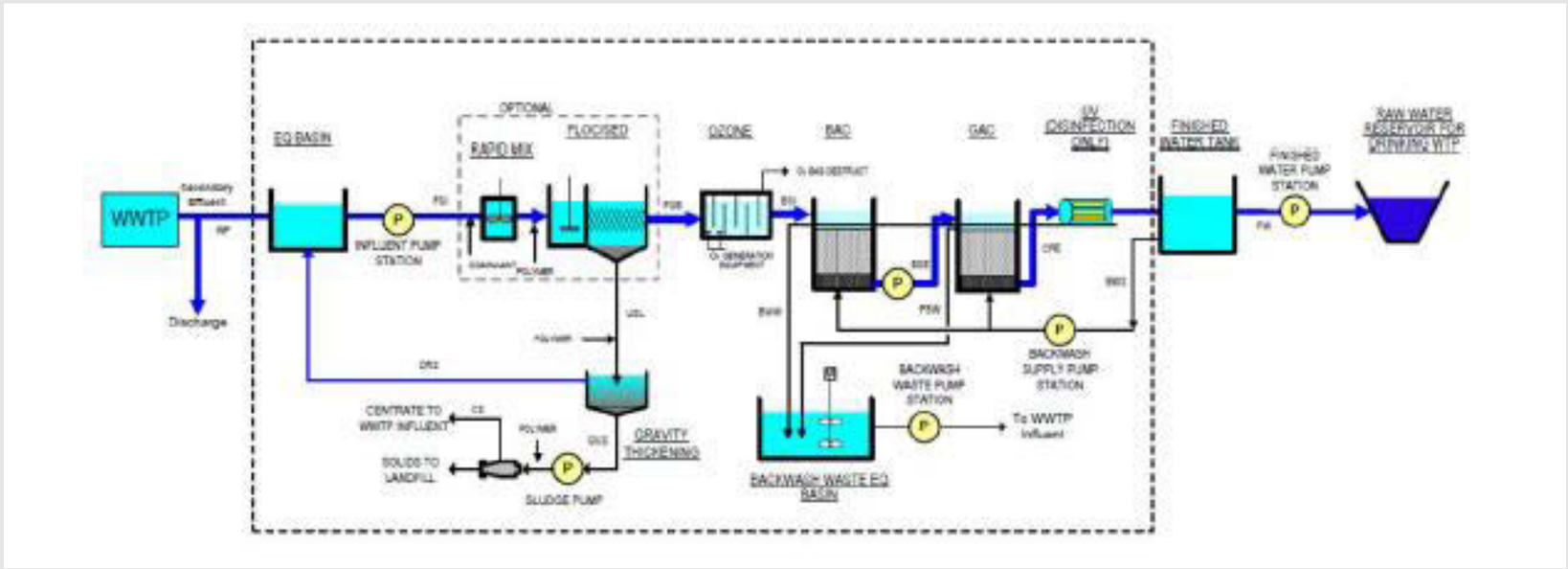
Existing and New Plant Layouts

Existing and New Plant Layouts

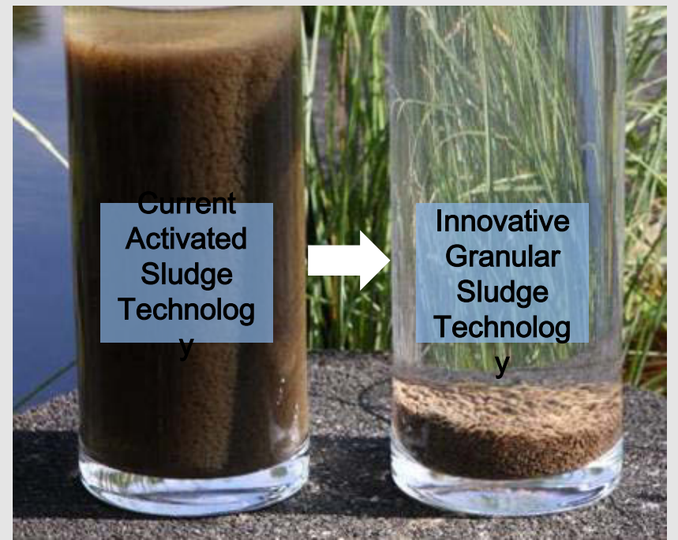


Advanced Treatment and Pilot Testing

- 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

Iona Island Wastewater Treatment Plant

Potential Products

Reclaimed Water

Heat

Biofuels

Nutrients

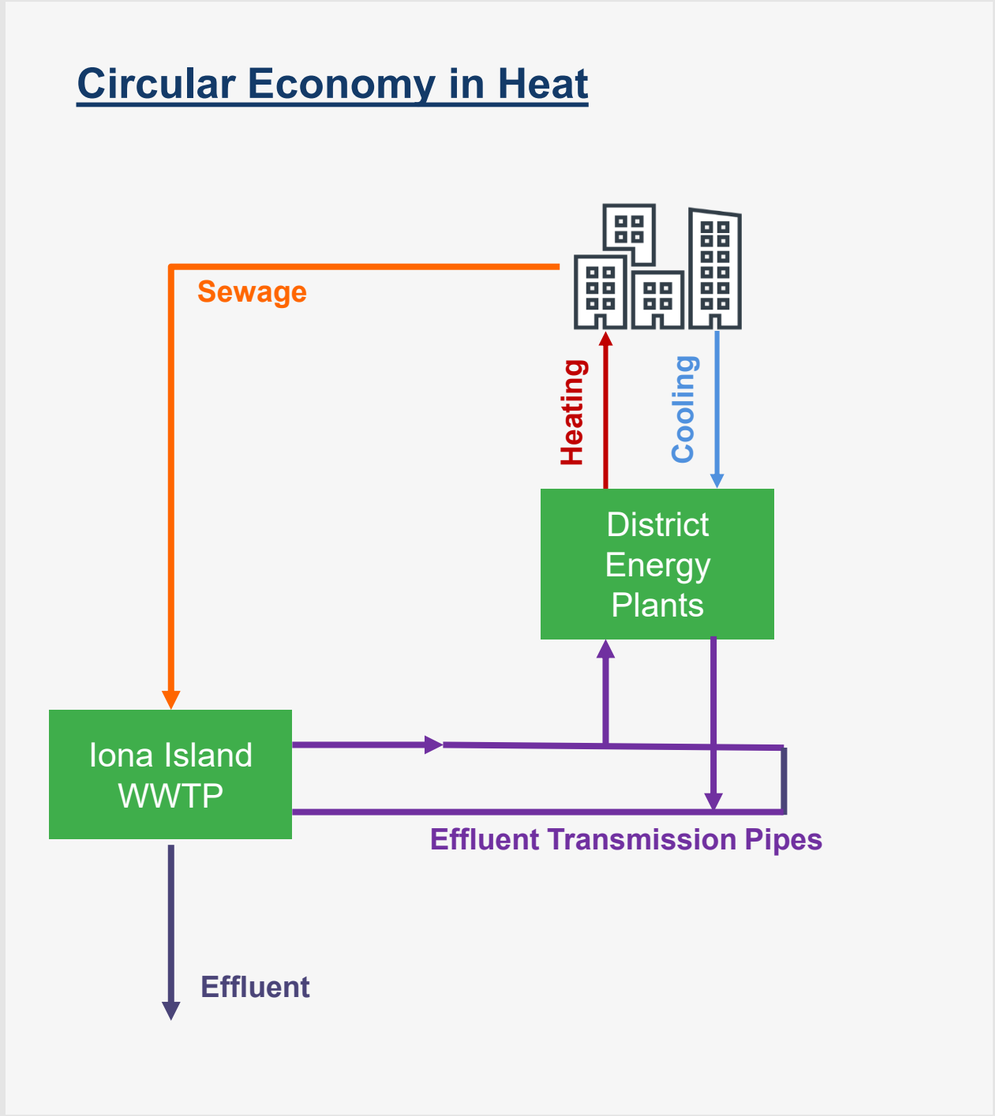
Reclaimed Water

- 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

Effluent Heat Recovery

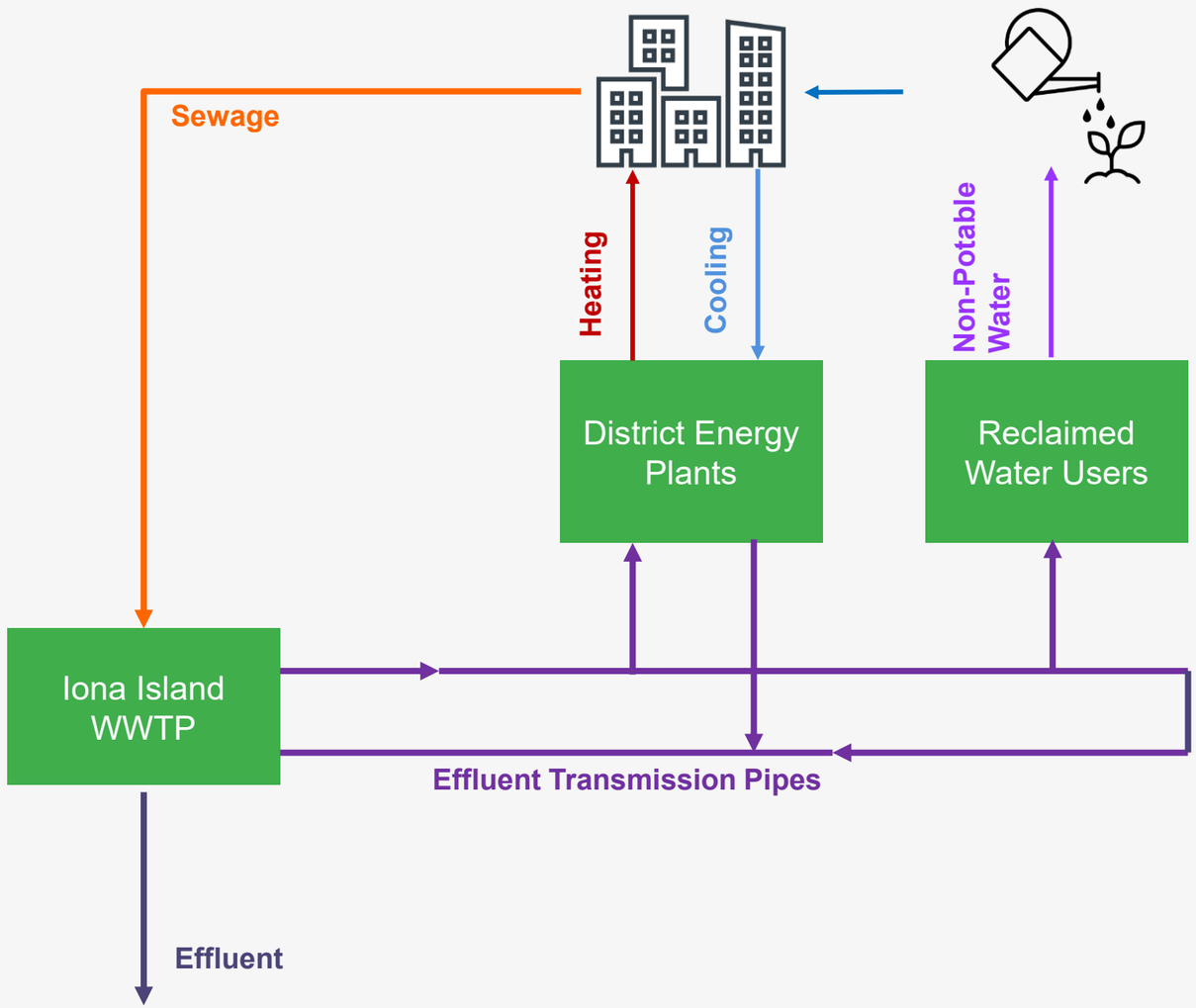
Heat recovery from plant effluent:

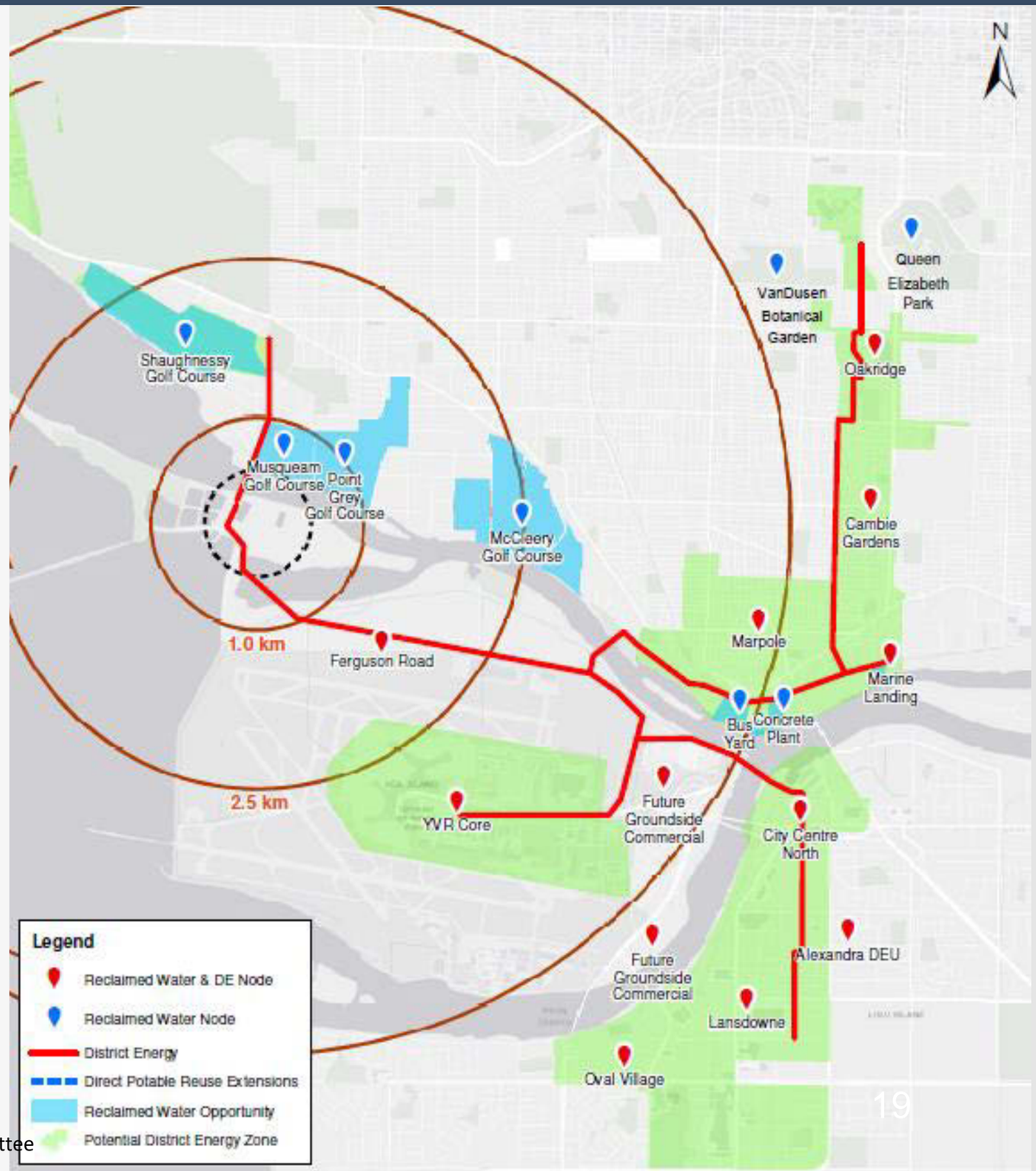
- Onsite heating and cooling needs
- Export to district energy system
- Equivalent to heating energy use for 50,000 apartment units



Effluent Heat and Reclaimed Water

Circular Economy in Water & Heat





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

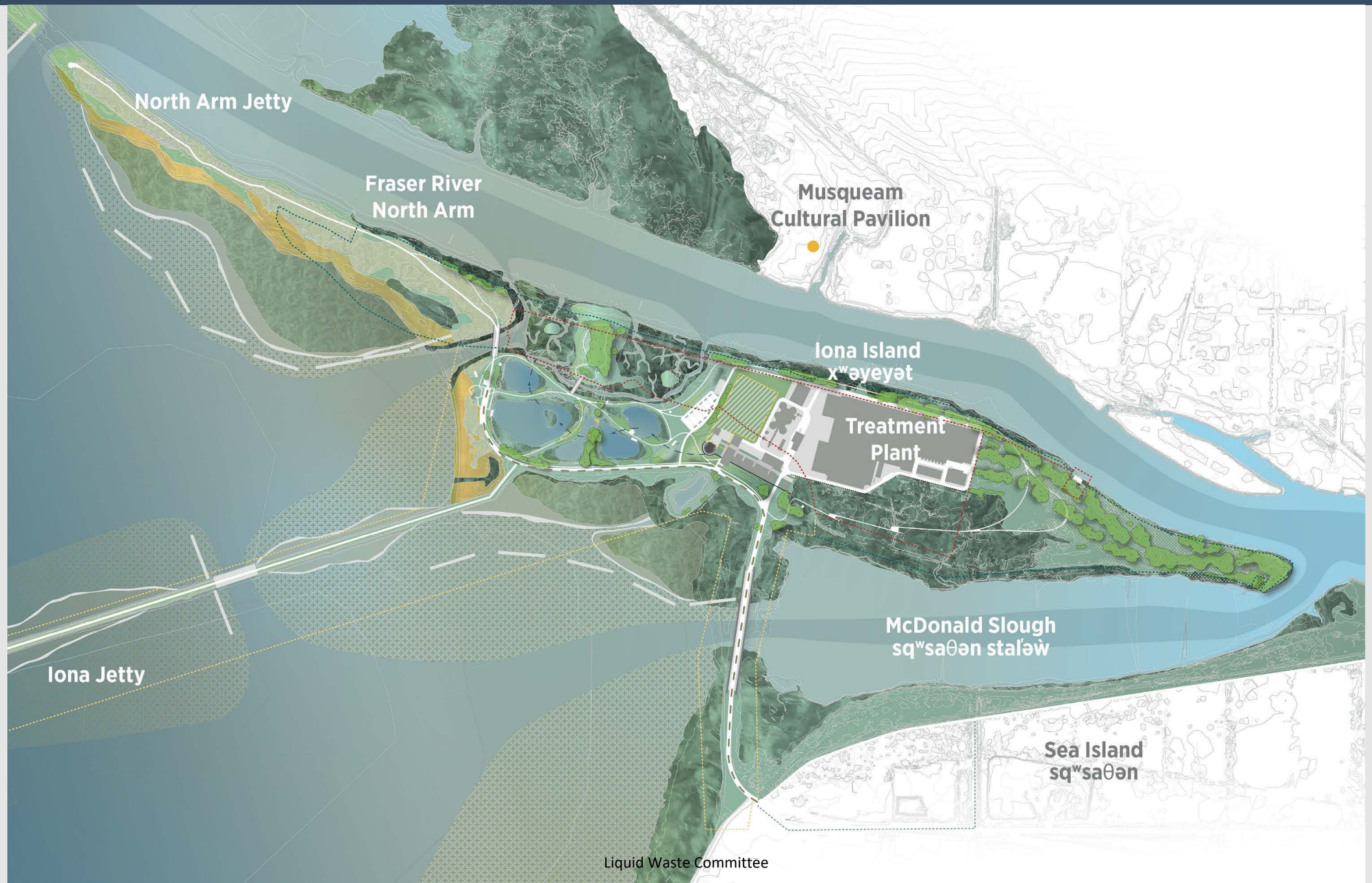
Nutrients

- Biosolids for land application

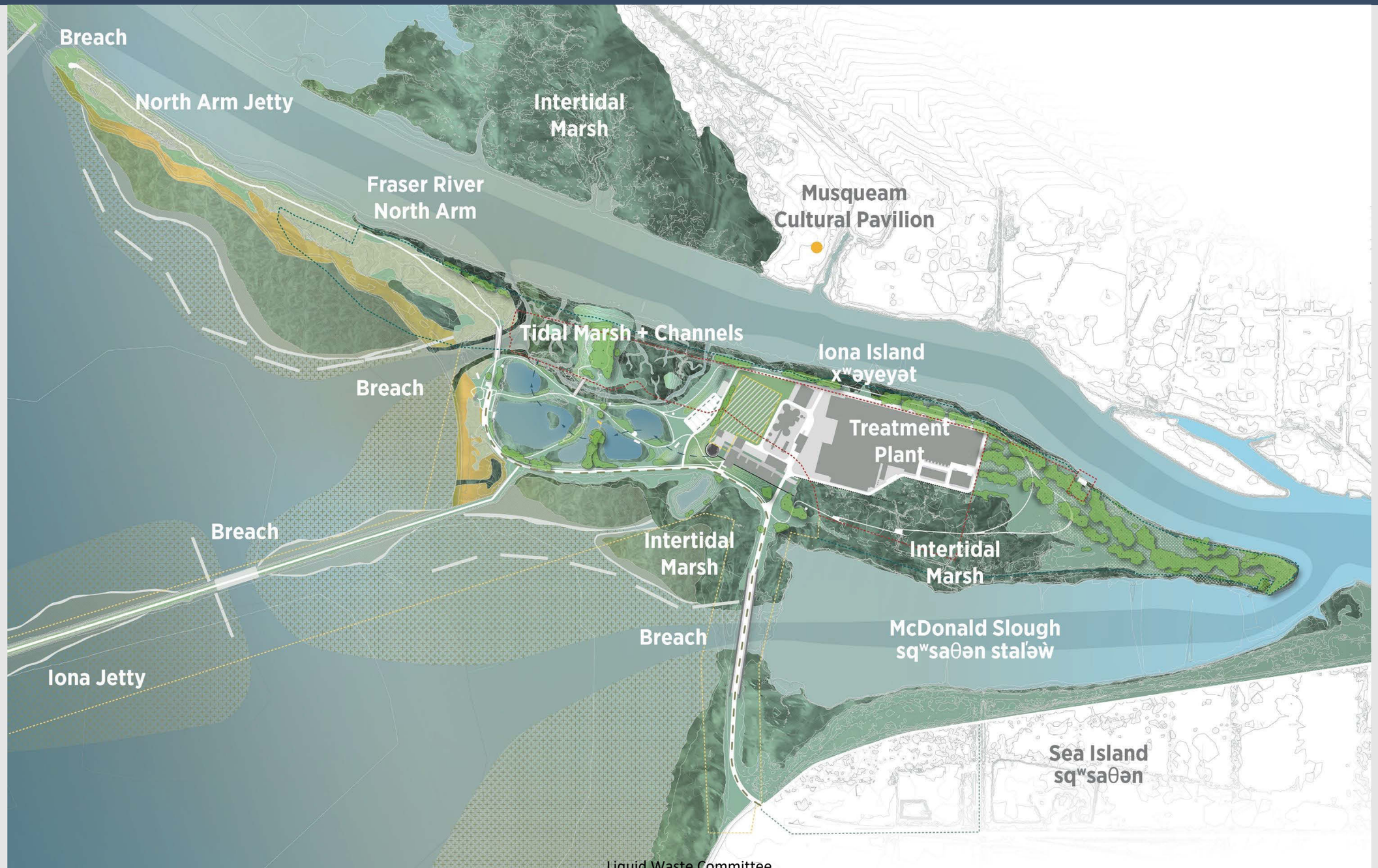
PARK INTEGRATION AND ECOLOGICAL ENHANCEMENT

Ecological Priorities

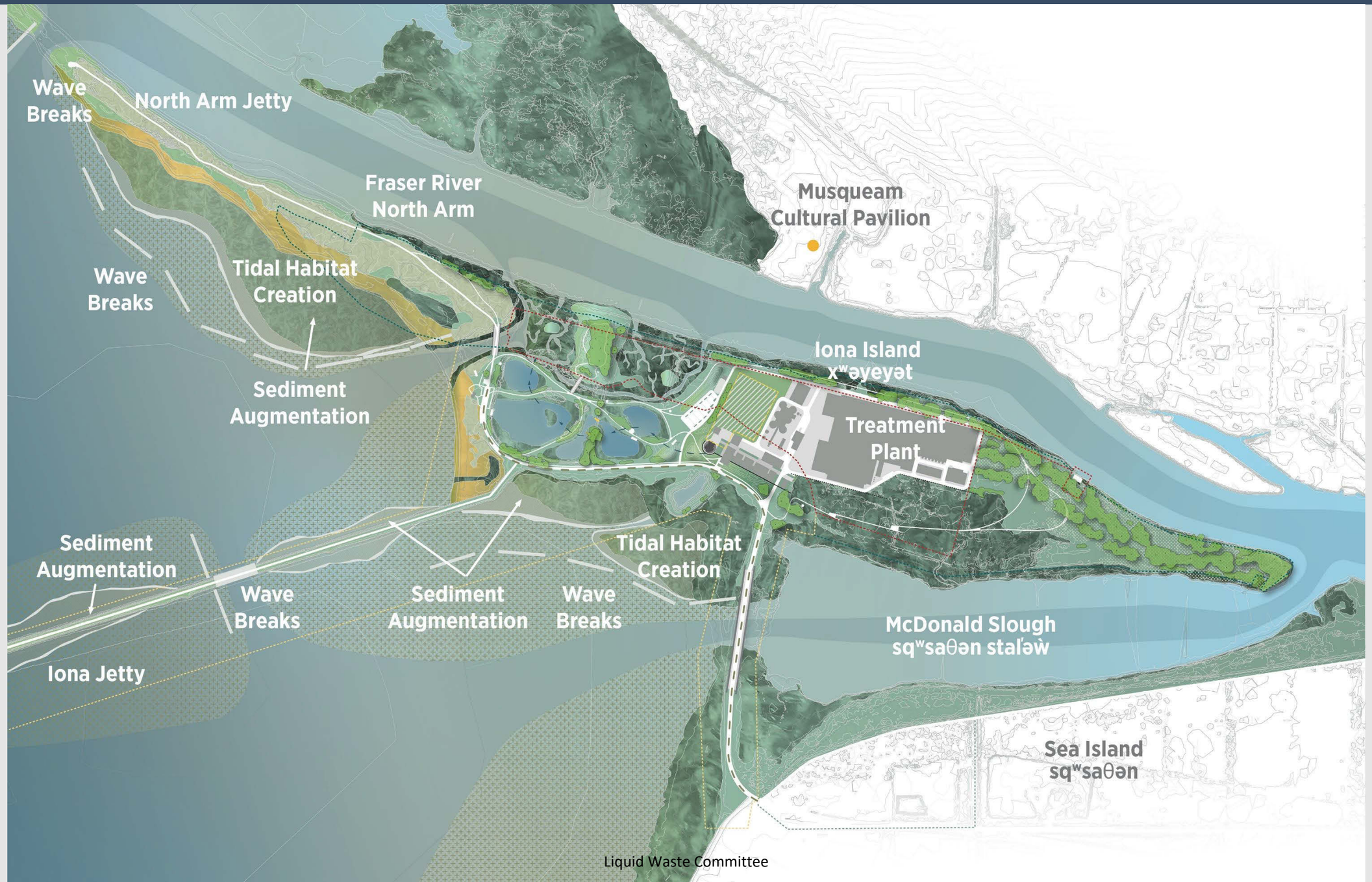
Integrative Design



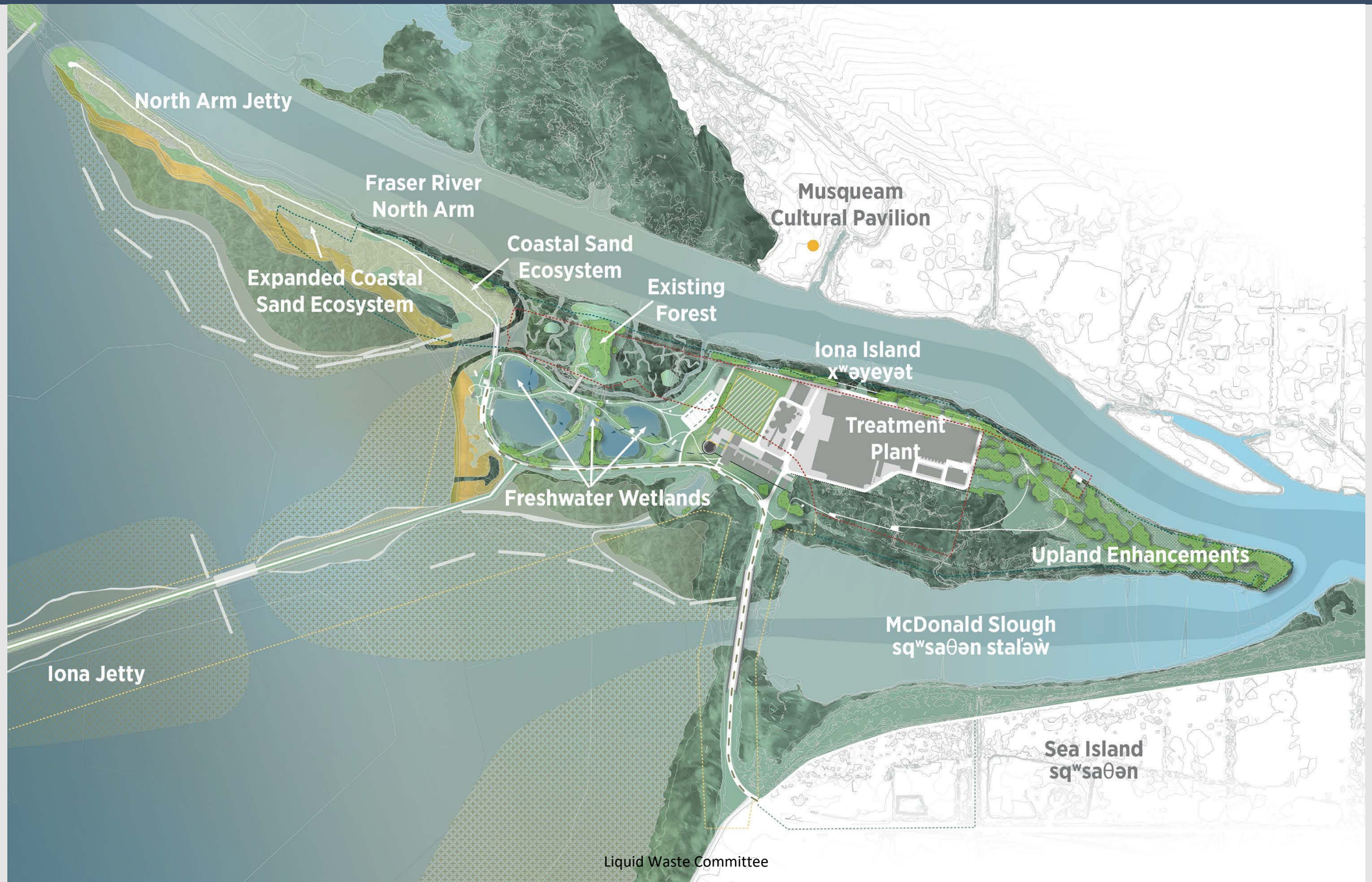
Improve Aquatic Connectivity



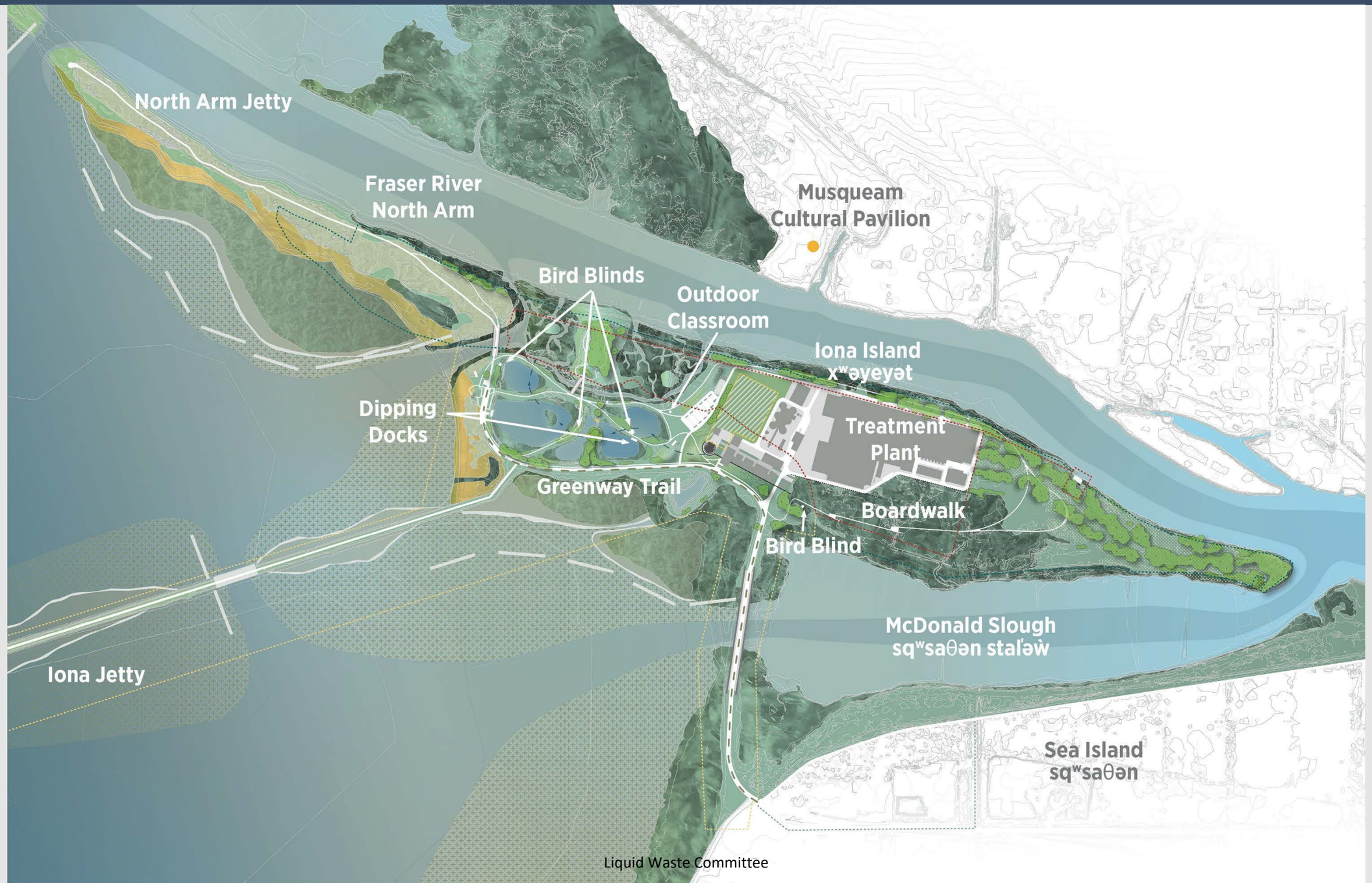
Adapt to Climate Change



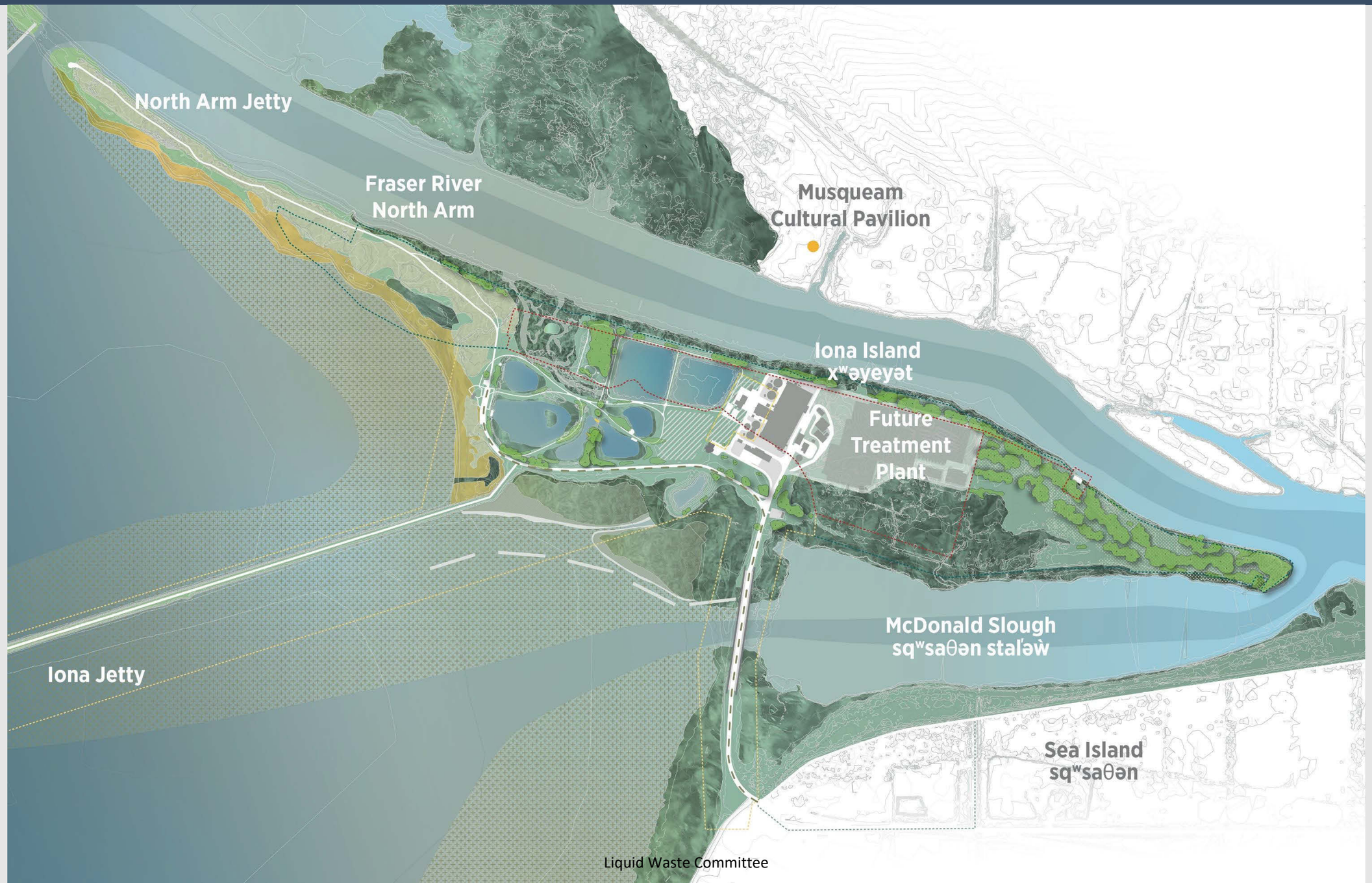
Restore and Enhance Ecosystems



Enhanced Park Experience

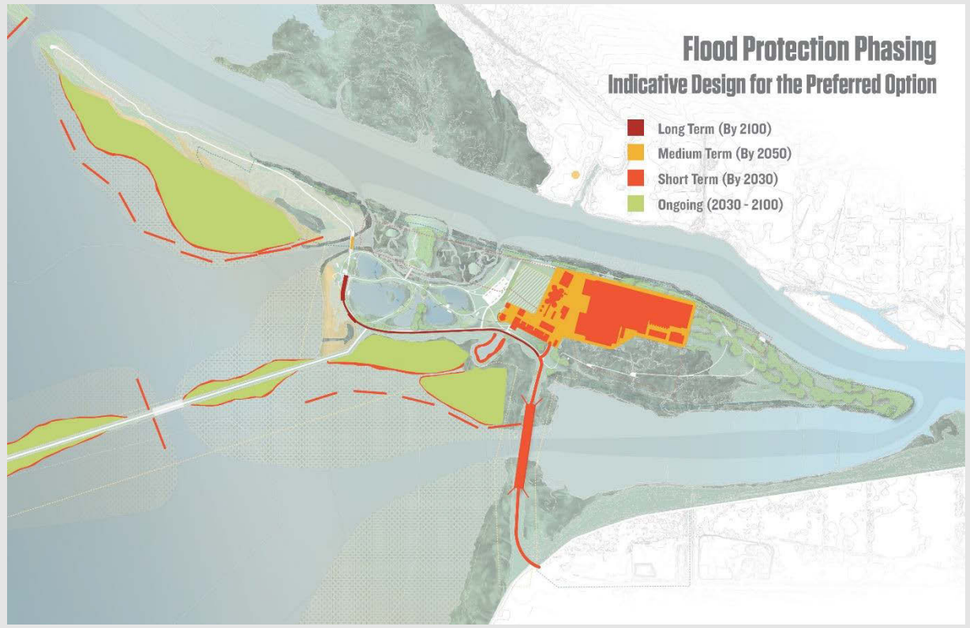


Progressive Phasing



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

Next Steps

Timeline	Activity
July 31	GVS&DD Board • Present recommended Design Concept for endorsement
Aug – Oct	Community Engagement • Information out to interested parties and First Nations • Input received to October 15
Aug – Dec	Complete Indicative Design • Habitat enhancement projects • Resource recovery business cases • Schedule, budgets, funding and procurement options
Sept / Oct	Municipal Council presentations (TBD)
Jan 2021	Liquid Waste Committee and GVS&DD Board • Present Indicative Design and Project Definition Report for endorsement

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 AND NEXT STEPS

Peter Navratil

GENERAL MANAGER, LIQUID WASTE SERVICES

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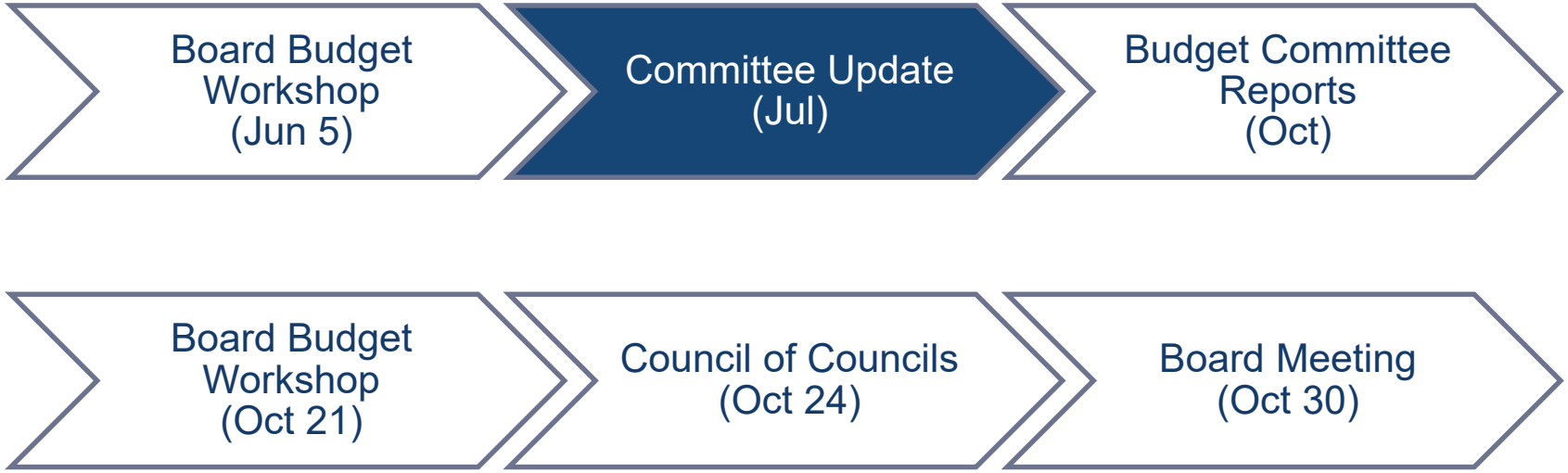
Board Budget Workshop Overview
Process



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

Board Budget Workshop Overview

Next Steps

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

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Liquid Waste Services Capital Program Expenditure Update

AS AT APRIL 30, 2020

Colin Meldrum

ACTING DIRECTOR, ENGINEERING, DESIGN & CONSTRUCTION
LIQUID WASTE SERVICES

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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

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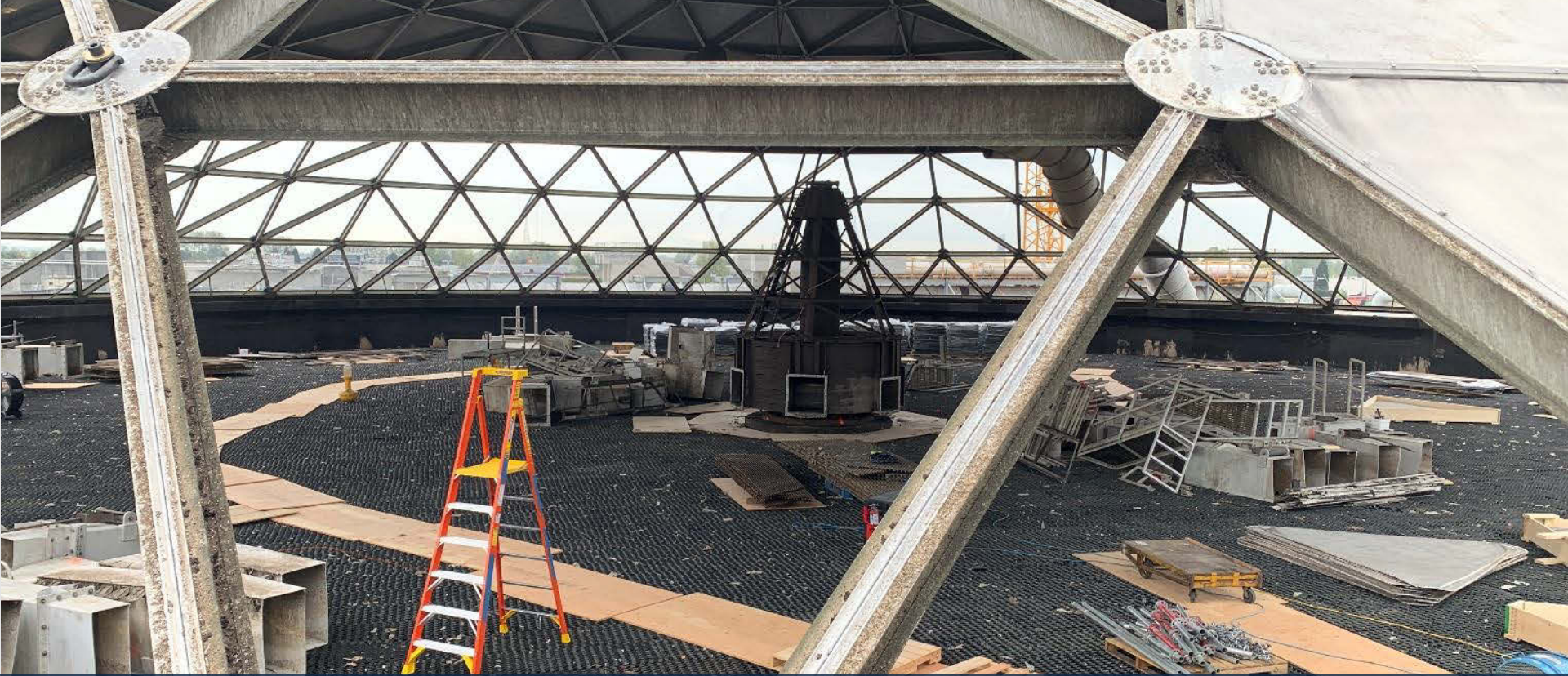

Annacis Island WWTP Trickling Filters – (cont'd)

Annacis Island WWTP Outfall – Delta

Annacis Island WWTP Outfall – cont'd

Annacis Island WWTP Outfall – cont’d

Sapperton Pump Station – New Westminster

Sapperton Pump Station – (cont’d)

Kent St Pump Station Backup Power – Vancouver

Golden Ears PS SSO Tank – Maple Ridge

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Golden Ears PS & SSO Tank – Maple Ridge

First Nations Art on Tank

Trenton Pierre (sɬə́məxw)

Thank you

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5.5

2019 GVS&DD Environmental Management & Quality Control

ANNUAL REPORT

Andjela Knezevic-Stevanovic

DIRECTOR, ENVIRONMENTAL MANAGEMENT & QUALITY CONTROL
LIQUID WASTE SERVICES

Liquid Waste Committee – July 16, 2020

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Environmental Management & Quality Control Annual Report

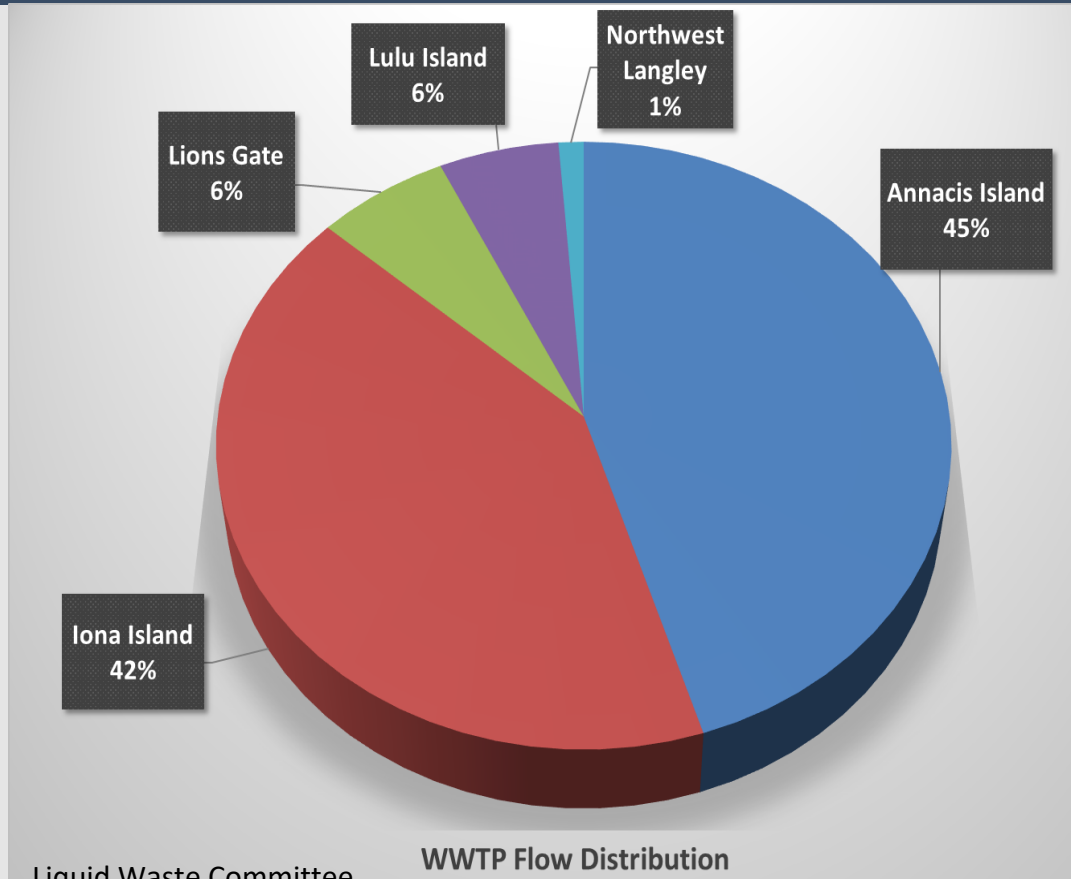
- Report in brief:
  - Wastewater treatment plants (WWTPs) operated in compliance with regulatory requirements
  - Applicable water quality objectives and guidelines for the receiving water bodies were mostly met
  - Majority of produced biosolids were beneficially used
  - Health Authorities posted 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



WWTP Regulatory and Technical Performance

- 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

WWTP	% BOD Reduction	% TSS Reduction
Iona Island	49	65
Lions Gate	48	71
Annacis Island	93	94
Lulu Island	98	98
Northwest Langley	95	93

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

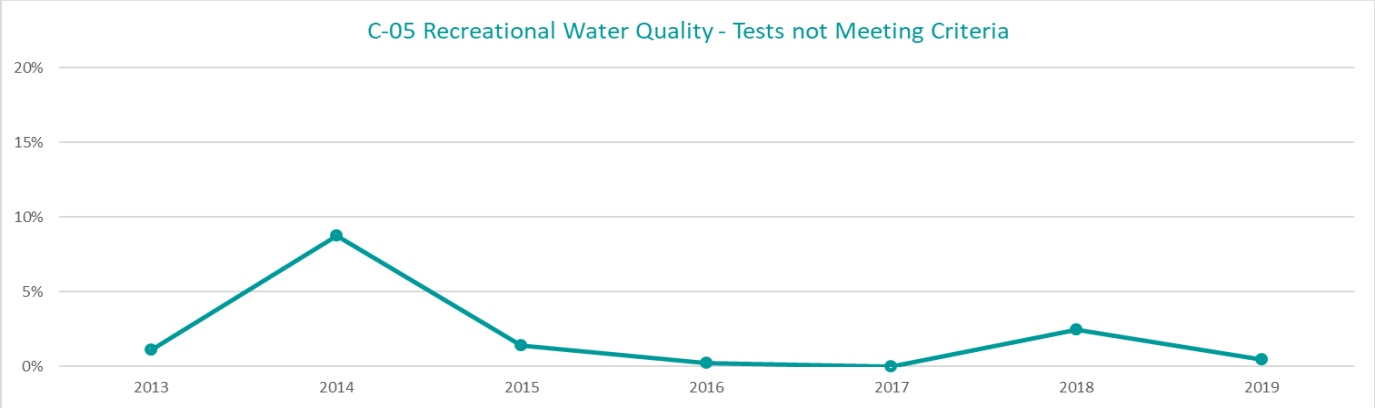
Endocrine Disrupting Substances and Trace Organics Monitoring

- Metro Vancouver 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

Beach Monitoring



- 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

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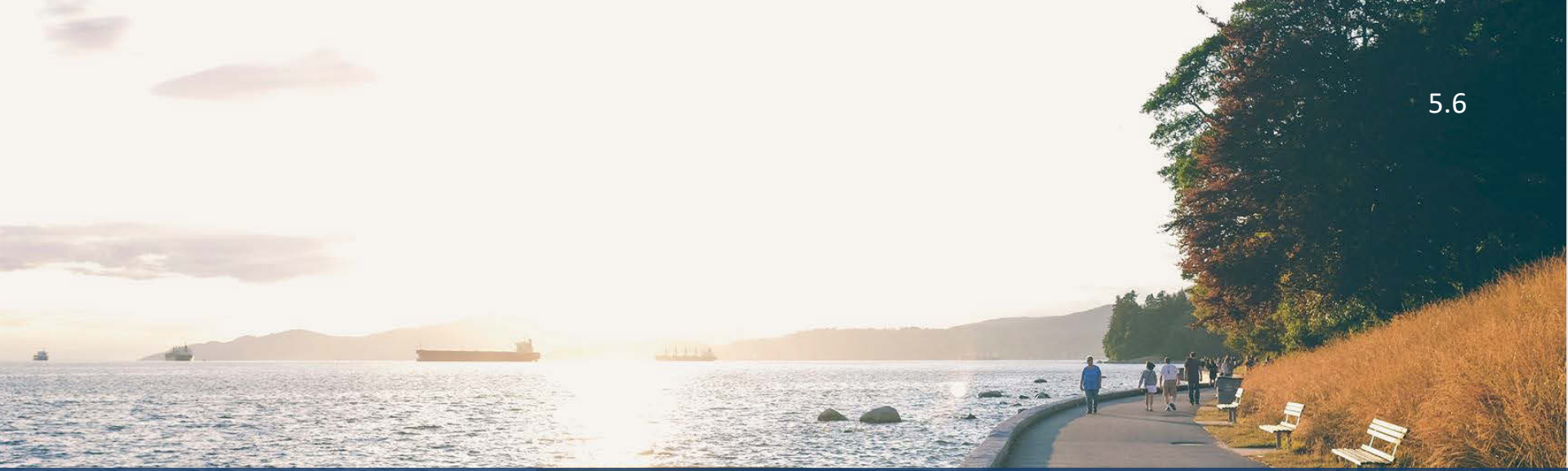

Metro Vancouver's Sewer Overflow Map

PHASE 1 PILOT MAP

Tom Sadleir

PROGRAM MANAGER, COMMUNITY ENGAGEMENT, LIQUID WASTE SERVICES

Liquid Waste Committee - July 16, 2020

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Background

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

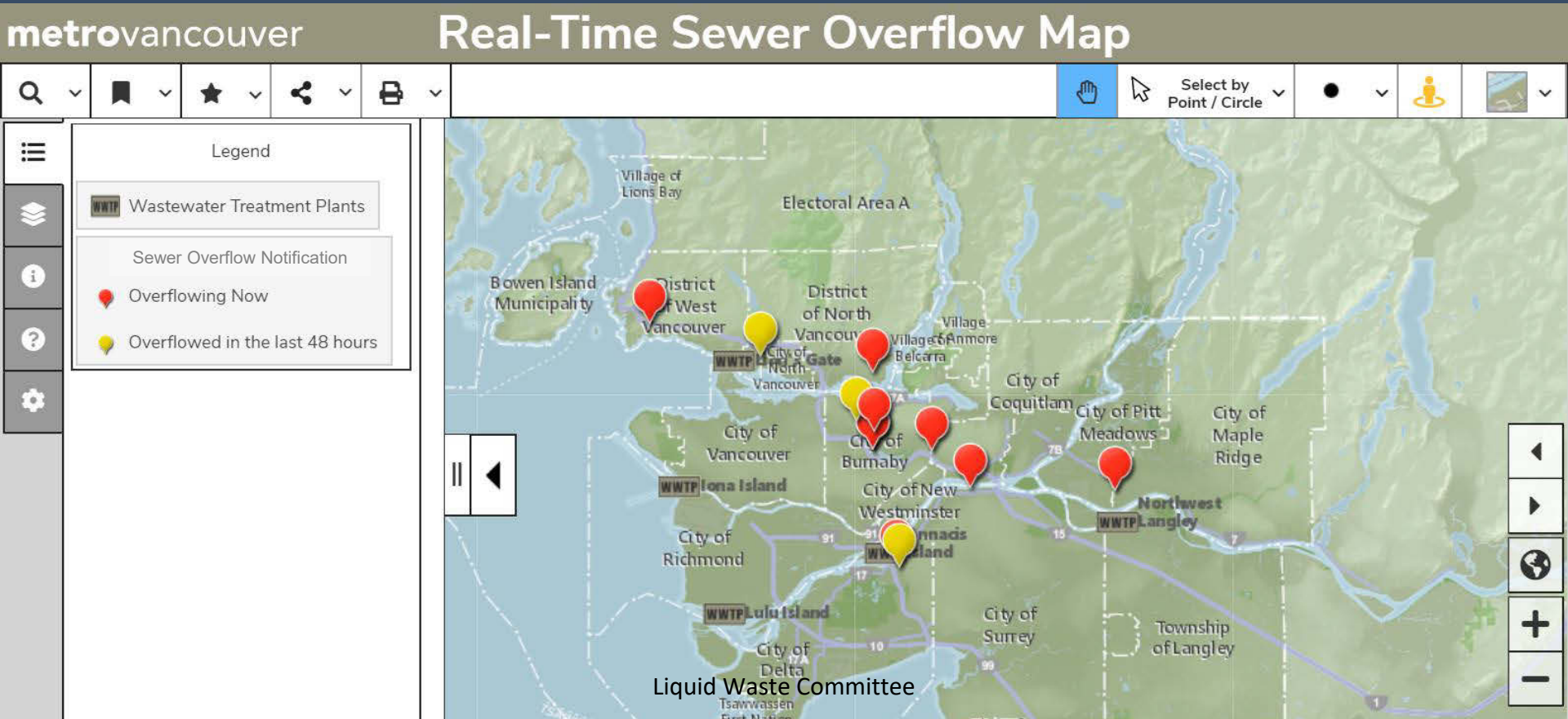
Phase 1: Sanitary Sewer Overflows (SSOs) and Wastewater Treatment Plant (WWTP) Process Interruptions

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

Phase 1 Map



Liquid Waste Committee

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?

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