**Iona Island Wastewater Treatment Plant**

**Stakeholder Meeting (Birds, Lagoons & Community Integration)**

**Wednesday, May 13, 2020**

metrovancouver

SERVICES AND SOLUTIONS FOR A LIVABLE REGION

47260070

# Iona Island Wastewater Treatment Plant
## Project Definition Update

MV Project Team

May 13, 2020

Stakeholder meeting (Birders and Naturalists)

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

# Welcome

Thank you for joining us for an online meeting about the Iona Island Wastewater Treatment Plant Project.

To help things go more smoothly:

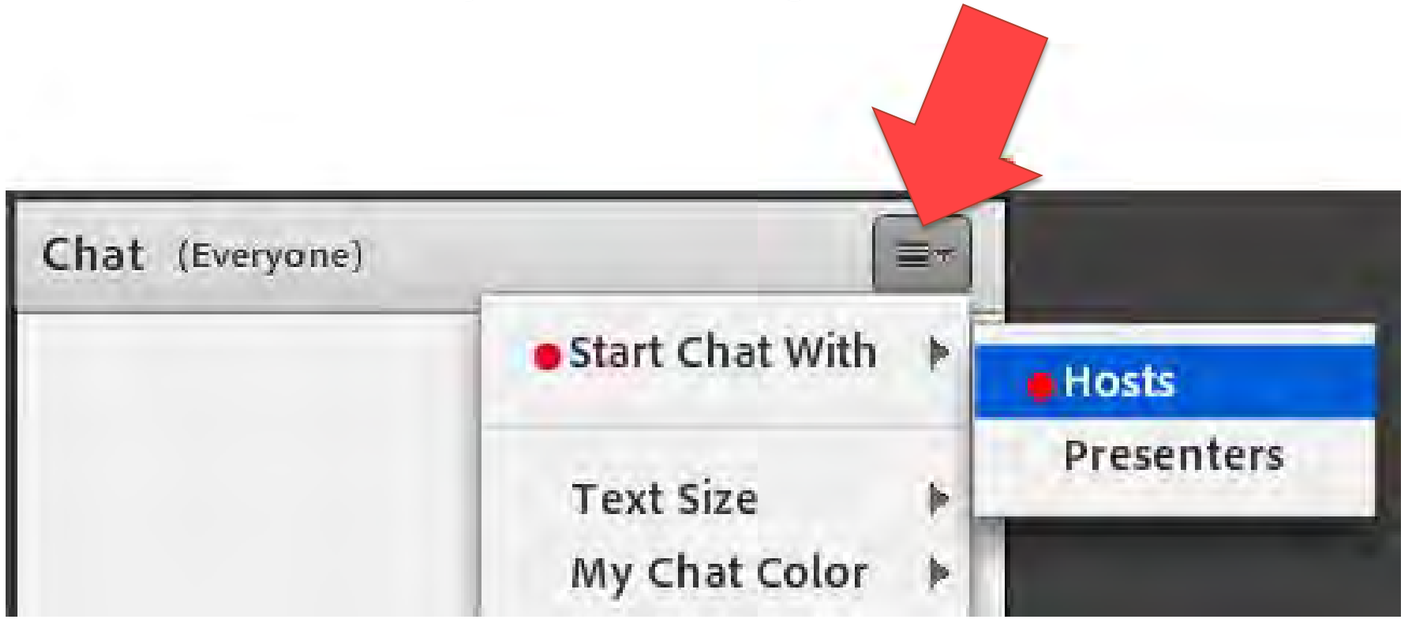
**When you are not speaking:**
Please press the green microphone or telephone button at the top of your screen to mute your microphone

**To ask a question or provide a comment:**
Please press the raise hand button and the moderator will address you at the appropriate time

# Welcome

**To ask a technical question:**

- Click drop down arrow at the top corner of the chat window to “Start Chat With → Hosts”
- A separate tab will open in the chat window where you can type in your question
- When finished, select the “Everyone” tab to go back to the main chat



# Presentations (discussion throughout)

1. Project definition overview & update
   Martin Clarke, Senior Engineer & Project Manager, MV
2. Community engagement
   Lena Zordan, Policy Coordinator, MV
3. Resource recovery and wastewater treatment options
   Rick Bitcon, Senior Engineer, AECOM
4. Lagoons & decommissioning schedule
   Dave Keeney, Project Engineer, MV
5. Iona Island ecological priorities
   Robyn Worcester, Natural Resource Management Specialist, MV
6. Preliminary design concepts for the Plant and island including habitat enhancement opportunities
   Jeff Cutler, Landscape Architect, Space2Place

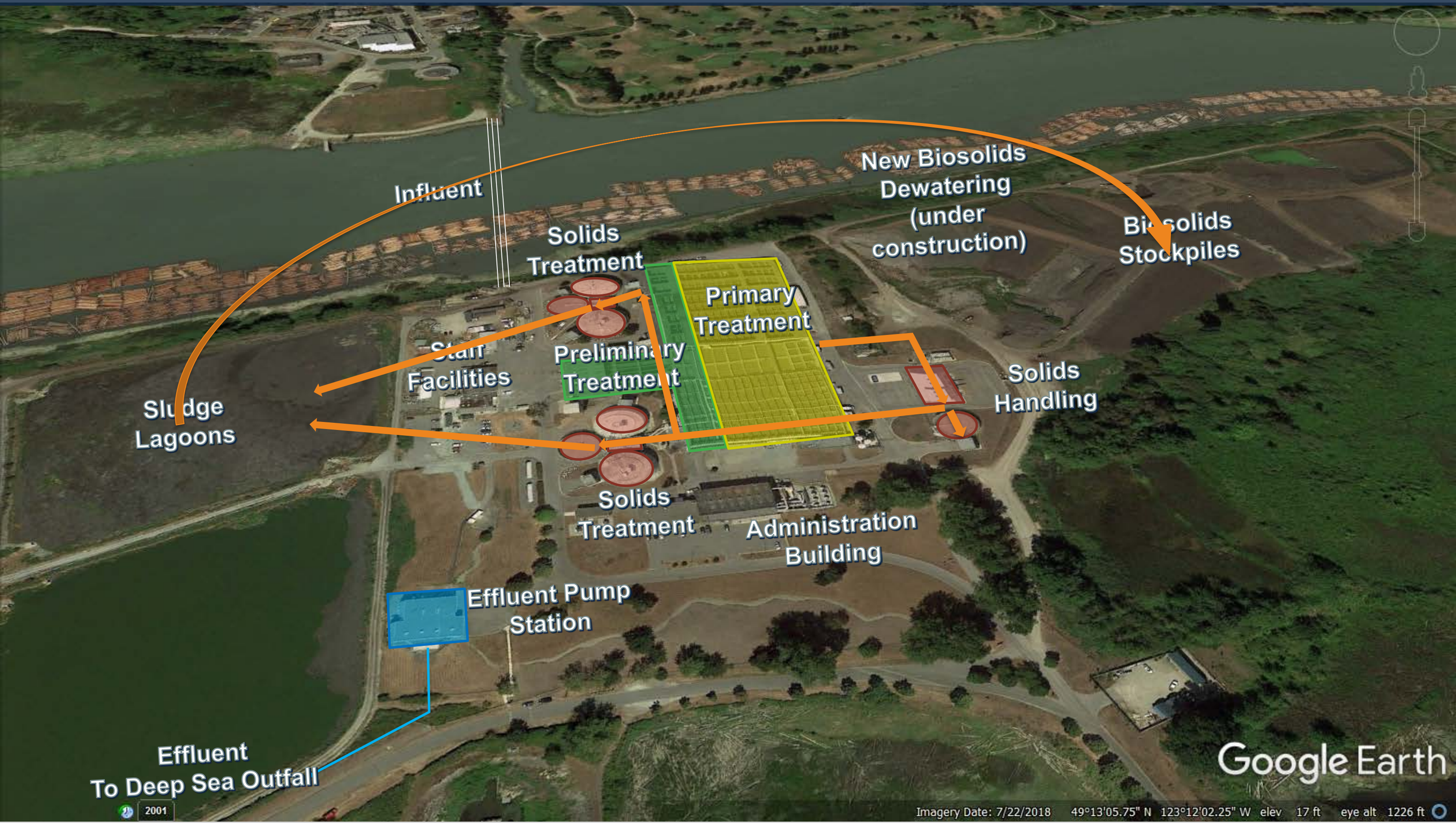
# 1. PROJECT DEFINITION OVERVIEW

## Overall project timeline

# Existing Plant Layout

# Existing Plant Layout

# Existing Plant Layout



# Existing Plant Layout

# Project Definition Goals

- Wastewater Treatment
- Community and Park Integration
- Resource Recovery

# Project Definition Design Considerations

CLIMATE CHANGE RESPONSE

EDUCATION

BIRDING

ADAPTABILITY + RESILIENCE

LEADERSHIP

COMMUNITY HEALTH

ARCHITECTURE

FACILITY INTEGRATION

STEWARDSHIP

DELIGHT

HISTORY + CULTURE

LIFE IN WATER

LIFE ON LAND

RECREATION

# Questions?

# 2. COMMUNITY ENGAGEMENT

- GVS&DD Board (LWC, Regional Parks)
- VSA members
- Residents and businesses
- Special interests
- Musqueam Indian Band

*Technical Workshop 4, Musqueam Indian Band, July 24, 2019*

# What We've Heard

*Community Workshop 1, January 9, 2019, Richmond*

- Increase treatment level
- Reduce odour
- Reduce plant lighting
- Maintain access to park
- Replace and create new habitat
- Coordinate removal of existing lagoons with new habitat
- Maintain Musqueam views

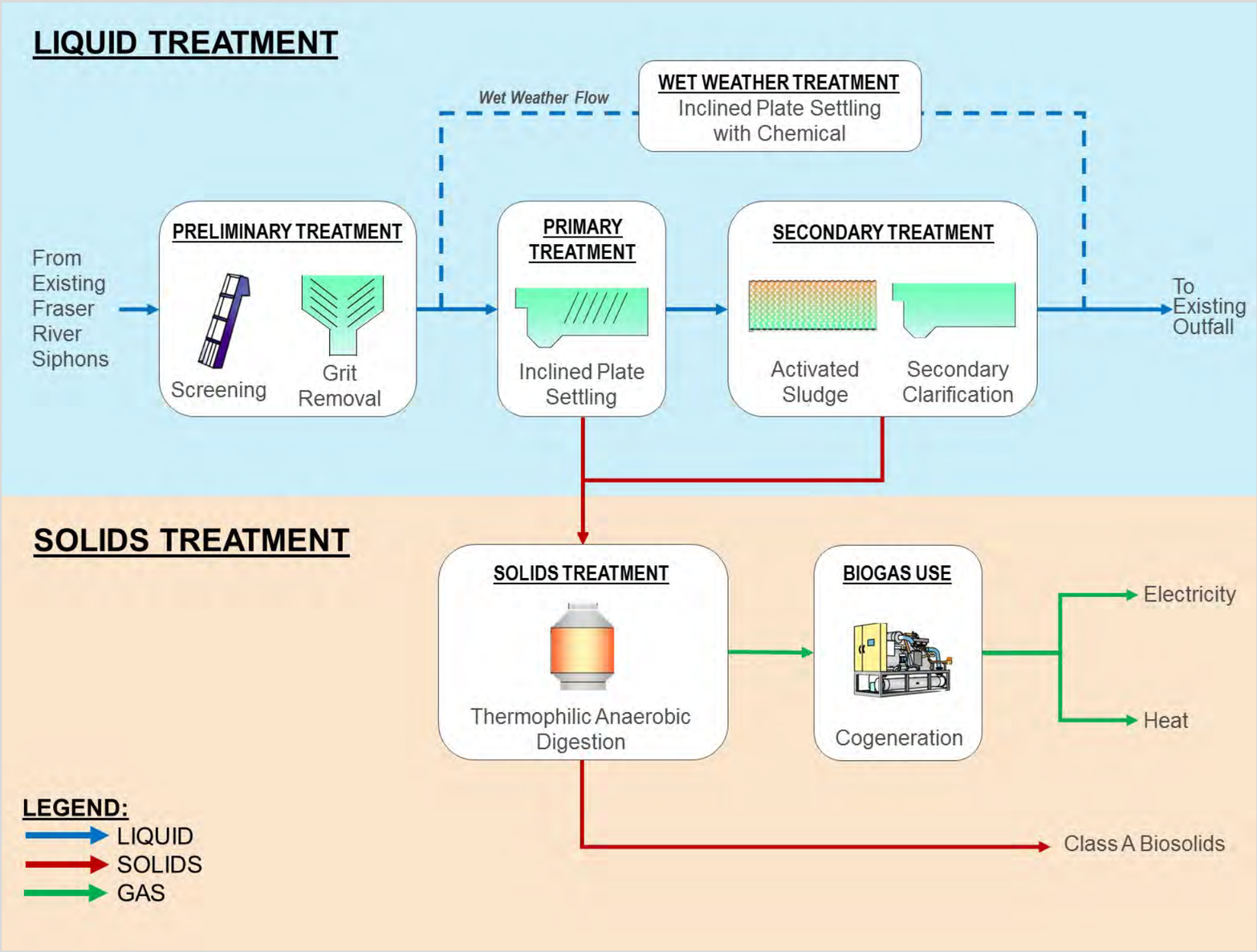
# Committee & Engagement Overview (2020)

| Timeline | Activity |
|---|---|
| February 7 | Liquid Waste Committee<br>Present design concepts. No decision sought. |
| February 22 | Council of Councils<br>Design concepts |
| March 11 | Regional Parks Committee<br>Park integration and habitat enhancement |
| May – June | Community Engagement<br>Design concepts |
| July | Liquid Waste Committee and GVS&DD Board<br>Recommend preferred concept, review input received.<br>Seek approval. |
| January 2021 | Liquid Waste Committee and GVS&DD Board<br>Present Indicative Design and Project Definition Report.<br>Seek approval. |

# Questions?

# 2. RESOURCE RECOVERY & WASTEWATER TREATMENT OPTIONS

# Treatment Concept 1- Base Secondary



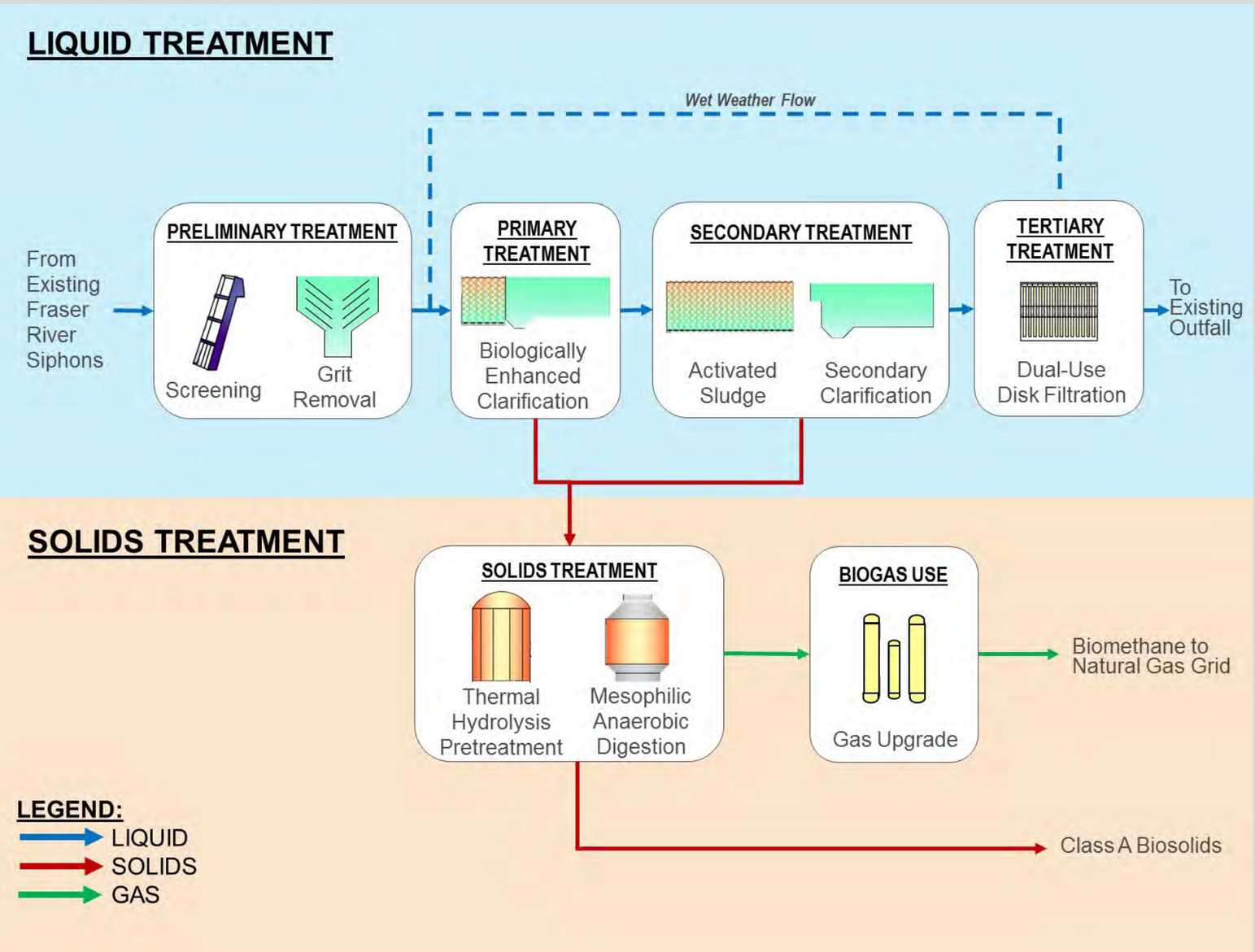

## Key Features

- Secondary clarification and thermophilic digestion
- Secondary effluent that meets regulatory requirements
- Flexibility to adopt future technologies
- Low operational complexity

## Resource Recovery Opportunities

- Reclaimed water
- Effluent heat recovery
- Biogas → Electricity and heat
- Class A biosolids

# Treatment Concept 2 – Tertiary Disk Filtration



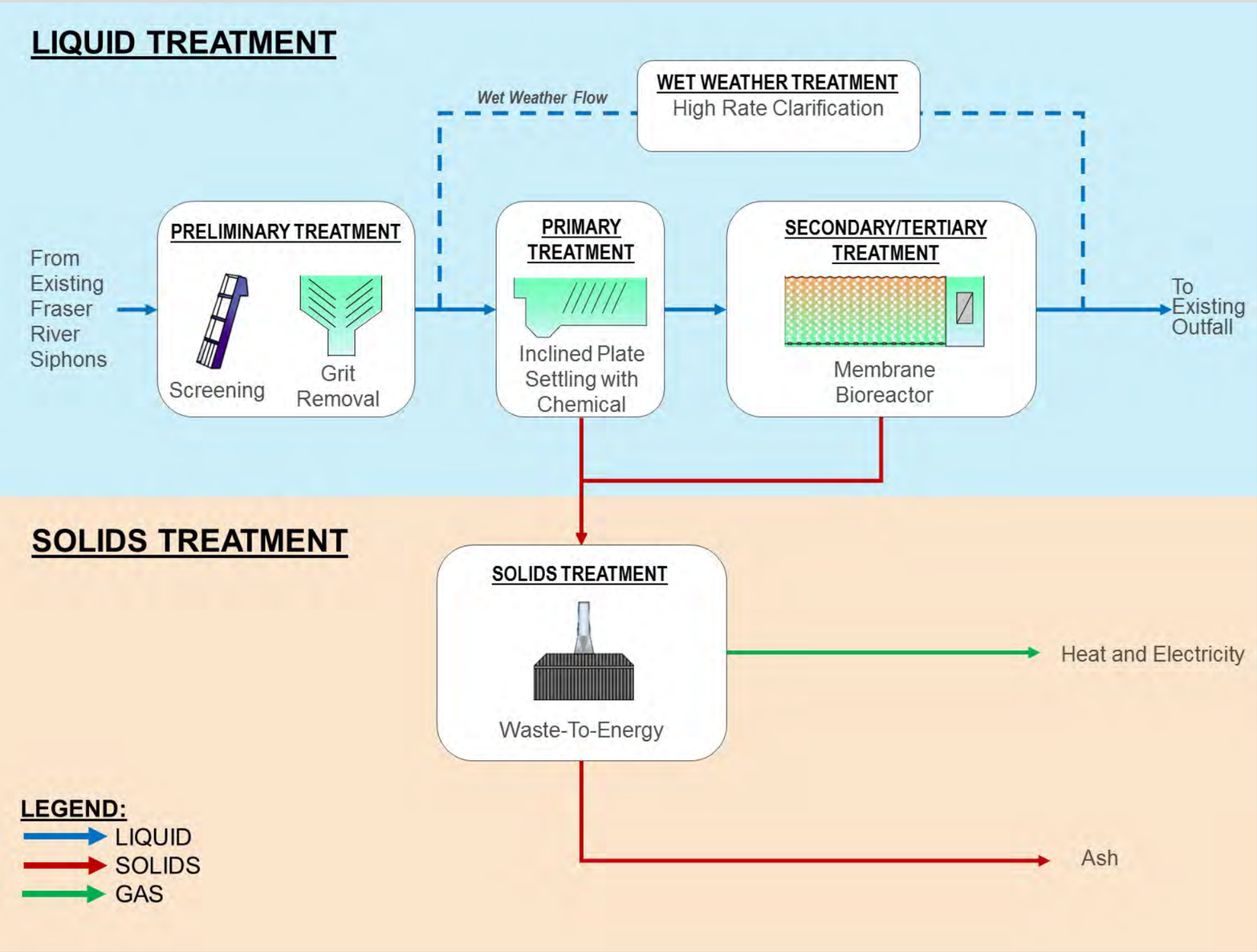

## Key Features

- Enhanced primary followed by secondary clarification
- Tertiary effluent
- Opportunities for effluent reuse
- Biogas upgraded to biomethane
- Higher energy recovery
- Smaller activated sludge tanks
- Smaller digesters with THP
- More biogas

## Resource Recovery Opportunities

- Reclaimed water
- Effluent heat recovery
- Biogas → biomethane
- Class A biosolids

# Treatment Concept 3 – Tertiary Membrane Bioreactor (MBR)



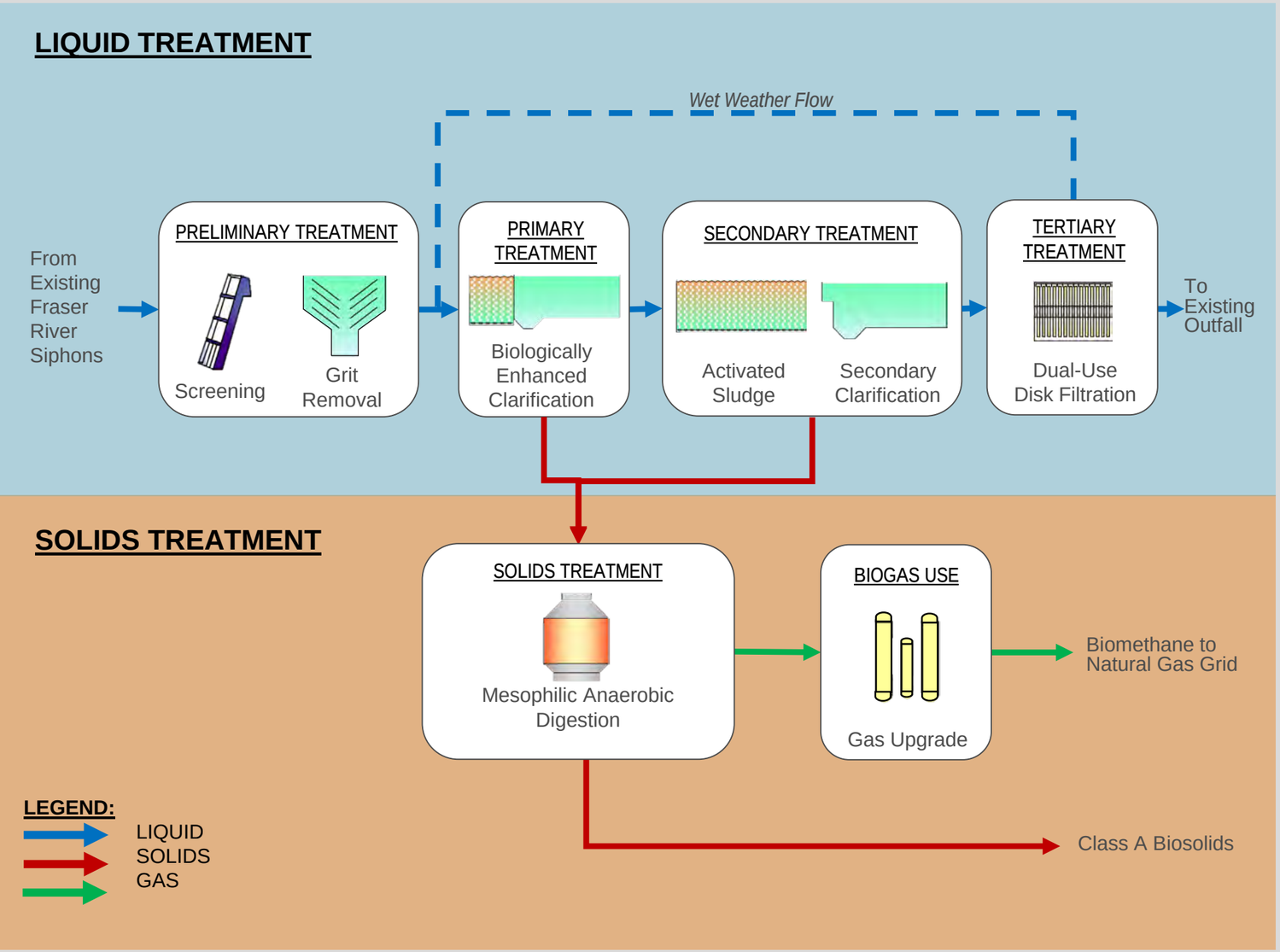

## Key Features

- Tertiary level treatment achieved in one step
- Opportunities for effluent reuse
- Small footprint (MBR)
- Ash management in lieu of biosolids

## Resource Recovery Opportunities

- Reclaimed water
- Effluent heat recovery
- Heat and electricity recovery
- Beneficial use of ash

# Preferred Wastewater Treatment Plant Concept (#2)




## Key Features

- Enhanced primary followed by secondary clarification
- Tertiary effluent
- Opportunities for effluent reuse
- Biogas upgraded to biomethane
- Higher energy recovery
- Smaller secondary tanks

# Resource Recovery Opportunities

## Inputs

**Wastewater**

**Trucked Liquid Waste**

**Iona Island Wastewater Treatment Plant**

## Potential Products

- **Reclaimed Water**
- **Electricity**
- **Heat**
- **Biofuel**
- **Nutrients / Biosolids**

# Reclaimed Water

- Potential for 500 ML/day of reclaimed water
- Equivalent to 40% of Metro Vancouver drinking water supply

- Onsite use
  - Tank cleaning and wash down
  - Grey water in O&M building

- Offsite use
  - Irrigation (e.g. golf courses, parks)
  - Toilet flushing
  - Vehicle washing
  - Construction activities
  - Industrial uses

# Reclaimed Water – Potential Demand


UBC

Musqueam Indian Band

Canada Post

UPS

YVR

Golf Courses

City of Vancouver

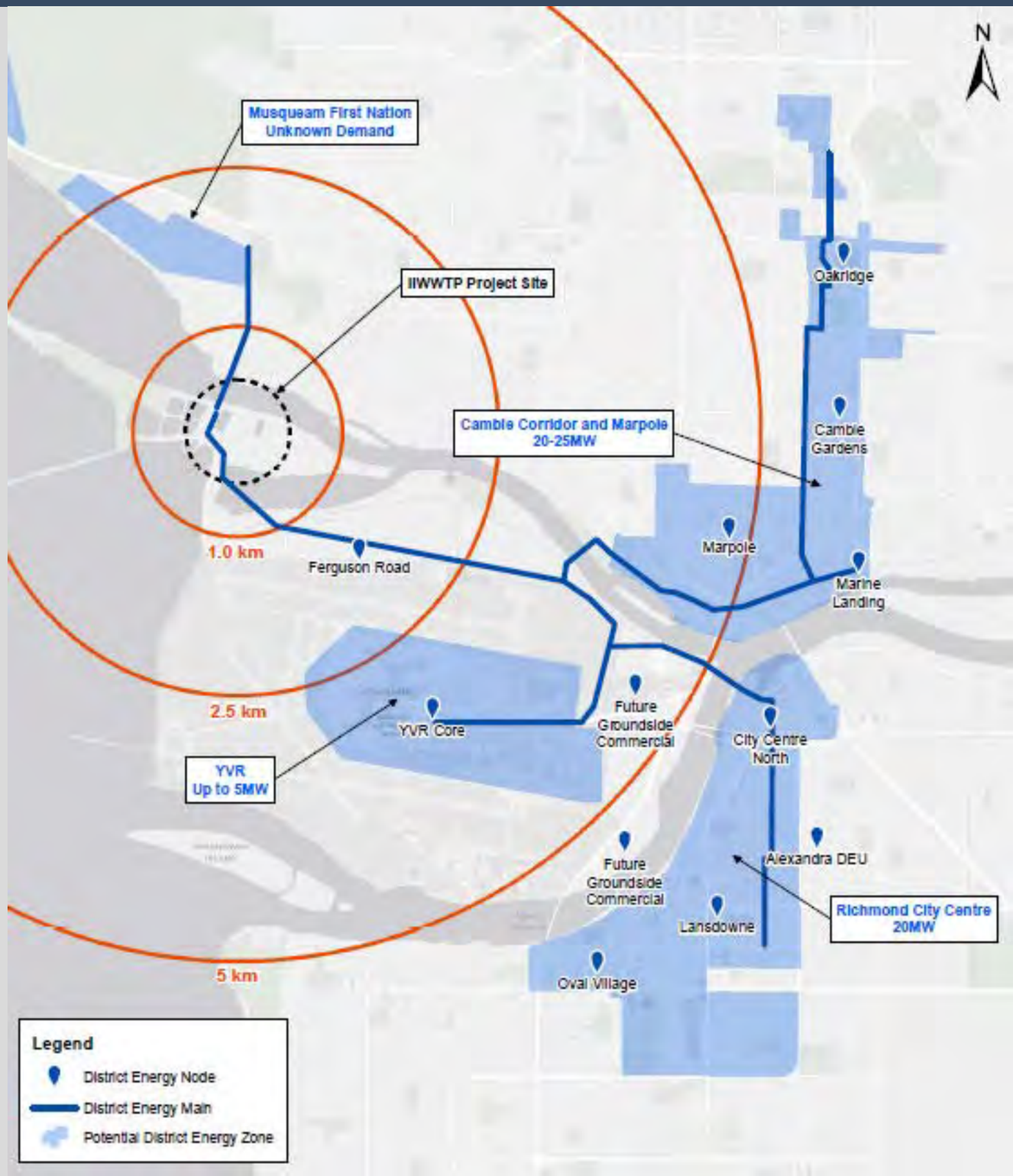
TransLink

City of Richmond

# Effluent Heat Recovery

Heat recovery from plant effluent

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



# Renewable Natural Gas

## Biofuels

- Biogas upgrade to biomethane/renewable natural gas (RNG) with injection to natural gas grid
- Equivalent to 3,500 household served
- 2,800 cars taken off the road
- Offset 85% of Corporate GHG emissions

*Biogas upgrade system at Surrey Biofuel Facility*

# Biocrude

- Pilot testing hydrothermal liquefaction (HTL) technology at Annacis Island WWTP
- Lower capital and O&M costs
- Revenue potential
- Equivalent of taking 3,500 cars off the road annually
- Displace 1,400 truck loads of biosolids annually

Wastewater Biomass

Biocrude

Low Carbon Fuel

# Nutrients

- Biosolids for land application
- Nutrient recovery opportunities through struvite crystallization

# Questions?

# 4. LAGOONS & DECOMMISSIONING SCHEDULE

# Lagoon Cleaning

# Excavate biosolids from lagoon

# Timeline - Lagoon cleaning

# Timeline - Lagoon cleaning

# Timeline - Lagoon cleaning

# Lagoon Dredging/Dewatering

# Lagoon Dredging

# Overall Timeline

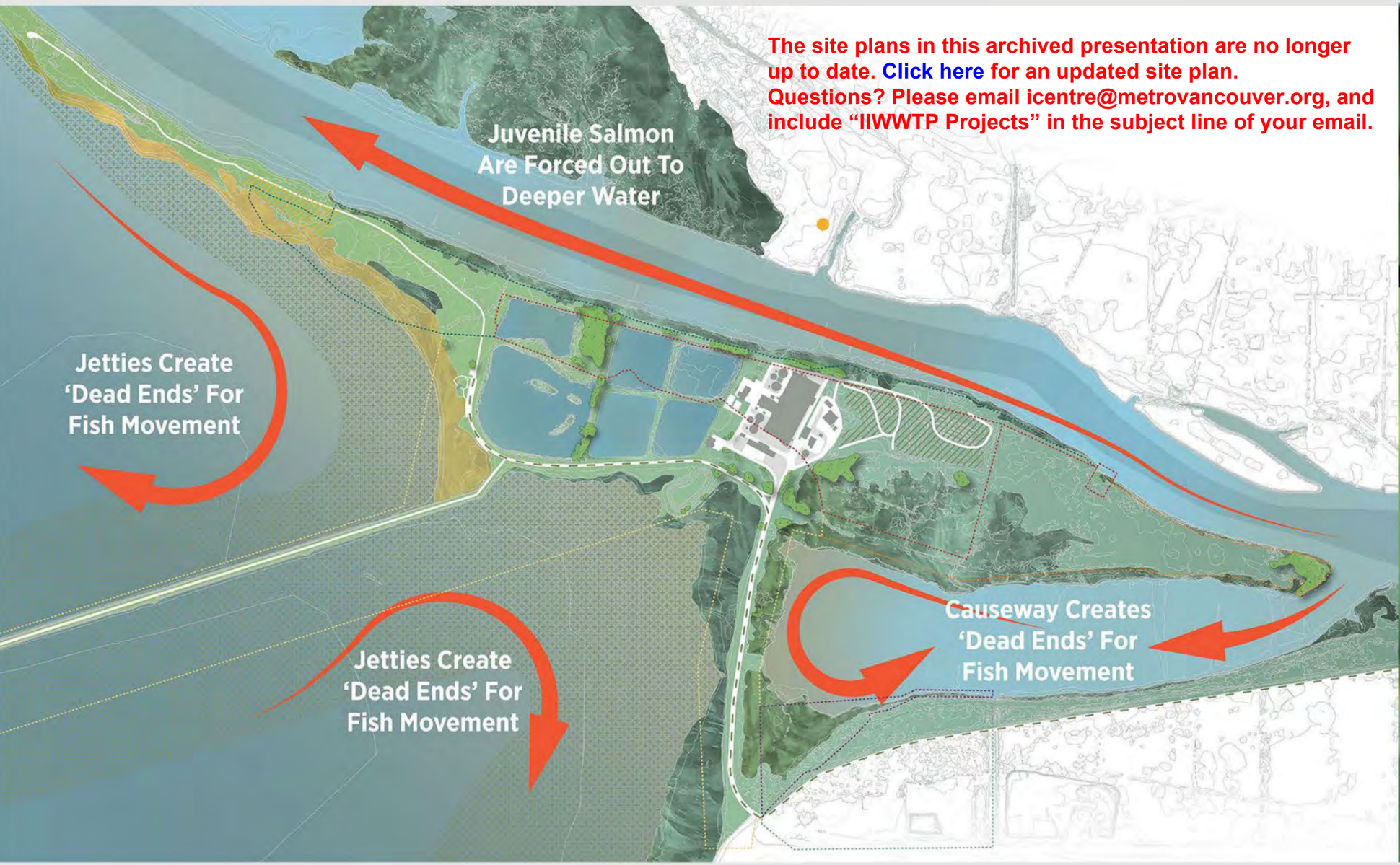
| Period | Activity | Access Restrictions | Lagoon Status | |
|---|---|---|---|---|
| | | | Full | Empty |
| Summer 2020 | SW Lagoon Cleaning | Intermittent closure of lagoon area | NE, NW, SE | SW |
| Winter 2020-2021 | NE Lagoon Dredging | None | NE, NW, SE, SW? | SW? |
| Summer 2021 | SE Lagoon Cleaning<br>NE Lagoon Dredging | Partial closure of lagoon area | NE, NW, SW | SE |
| Summer 2022 | SE Lagoon Cleaning<br>NW Lagoon Dredging | Partial closure of lagoon area | NW, SW | SE, NE |
| Winter 2022-2023 | NW Lagoon Dredging | None | NW, SW | SE, NE |
| Summer 2023 | SW Lagoon Dredging | None | SW | SE, NE, NW |

# Questions?

# 5. IONA ISLAND AND ECOLOGICAL PRIORITIES

# Iona Beach Regional Park

# Disconnected Salmon Migration

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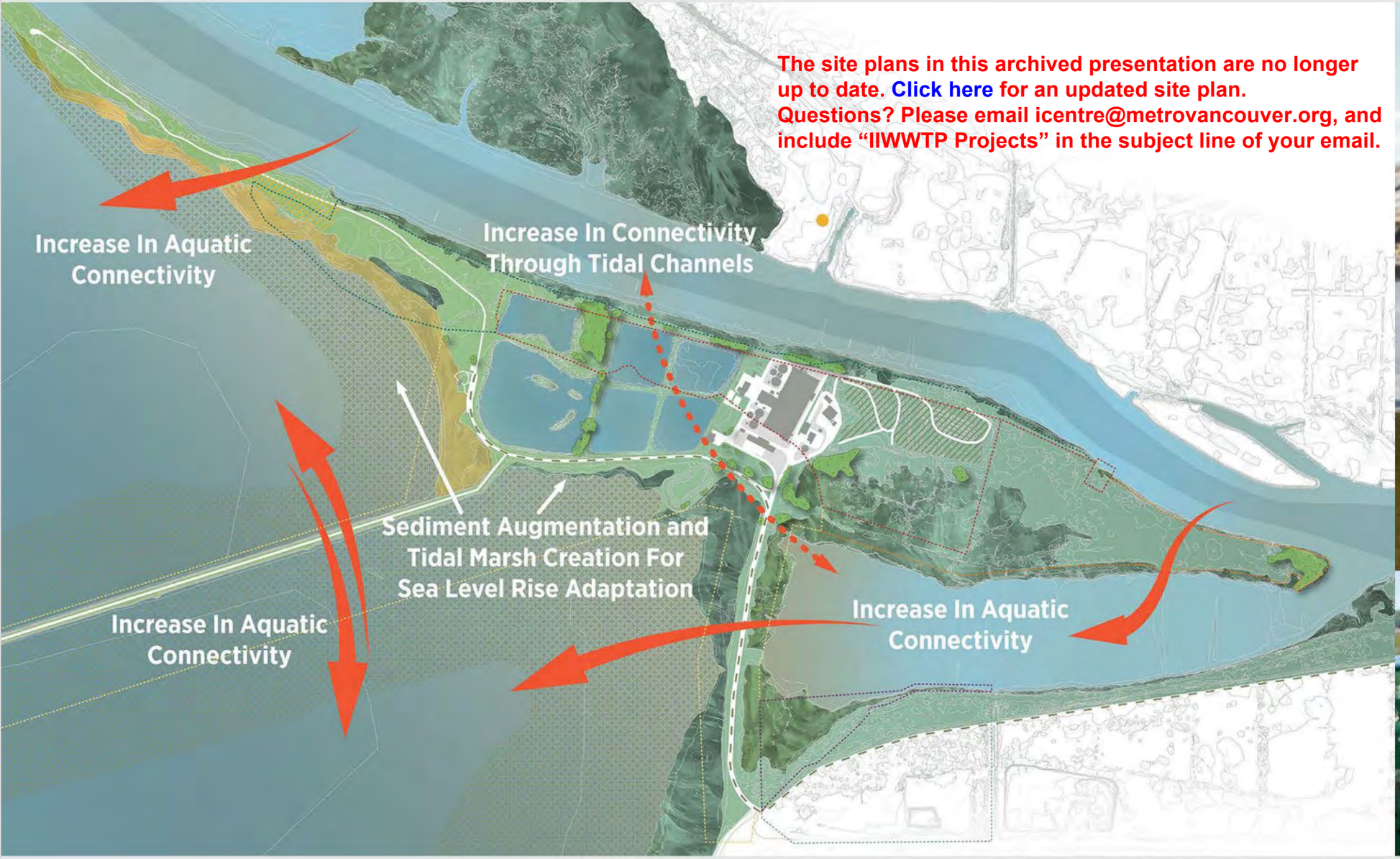
# Connected Salmon Migration

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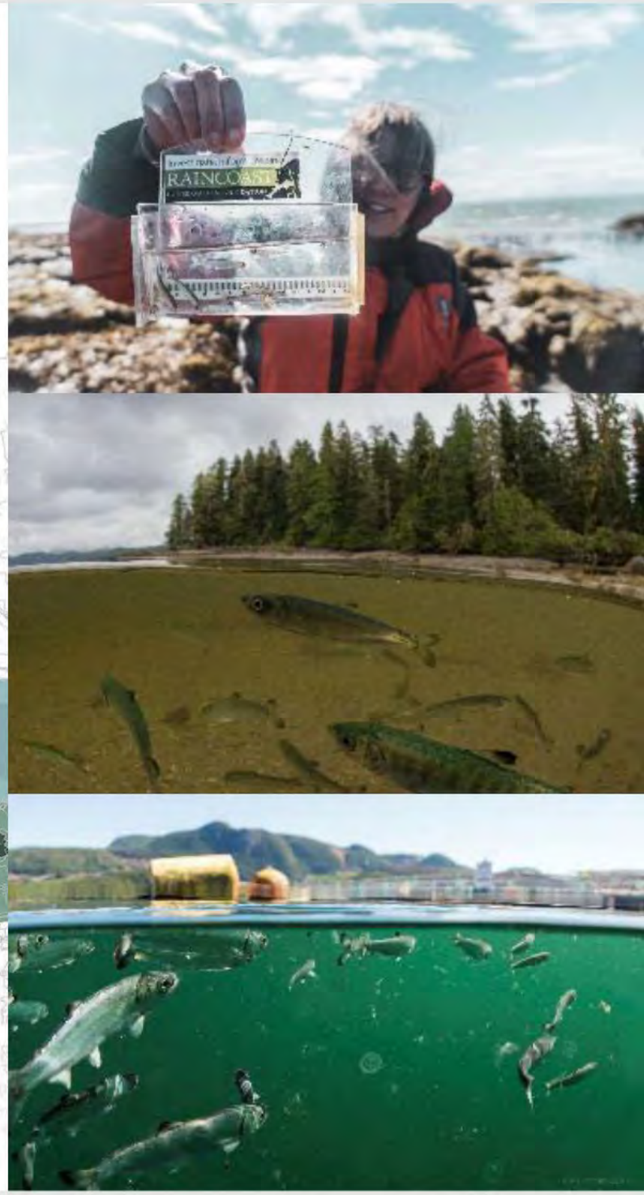

# Ecological Priorities

# Park Connection Opportunities

1. Enhance park ecology
2. Improve circulation, connections and visitor experience
3. Opportunities for education, recreation programming
4. Park expansion (access to more area)
5. Sea level rise and climate change mitigation
6. New partnerships and community connections

# Questions?

# 6. PRELIMINARY DESIGN CONCEPTS FOR PLANT AND ISLAND INCLUDING HABITAT ENHANCEMENT OPPORTUNITIES

# Indicative Design for the Preferred Option

## Architecture Scheme One

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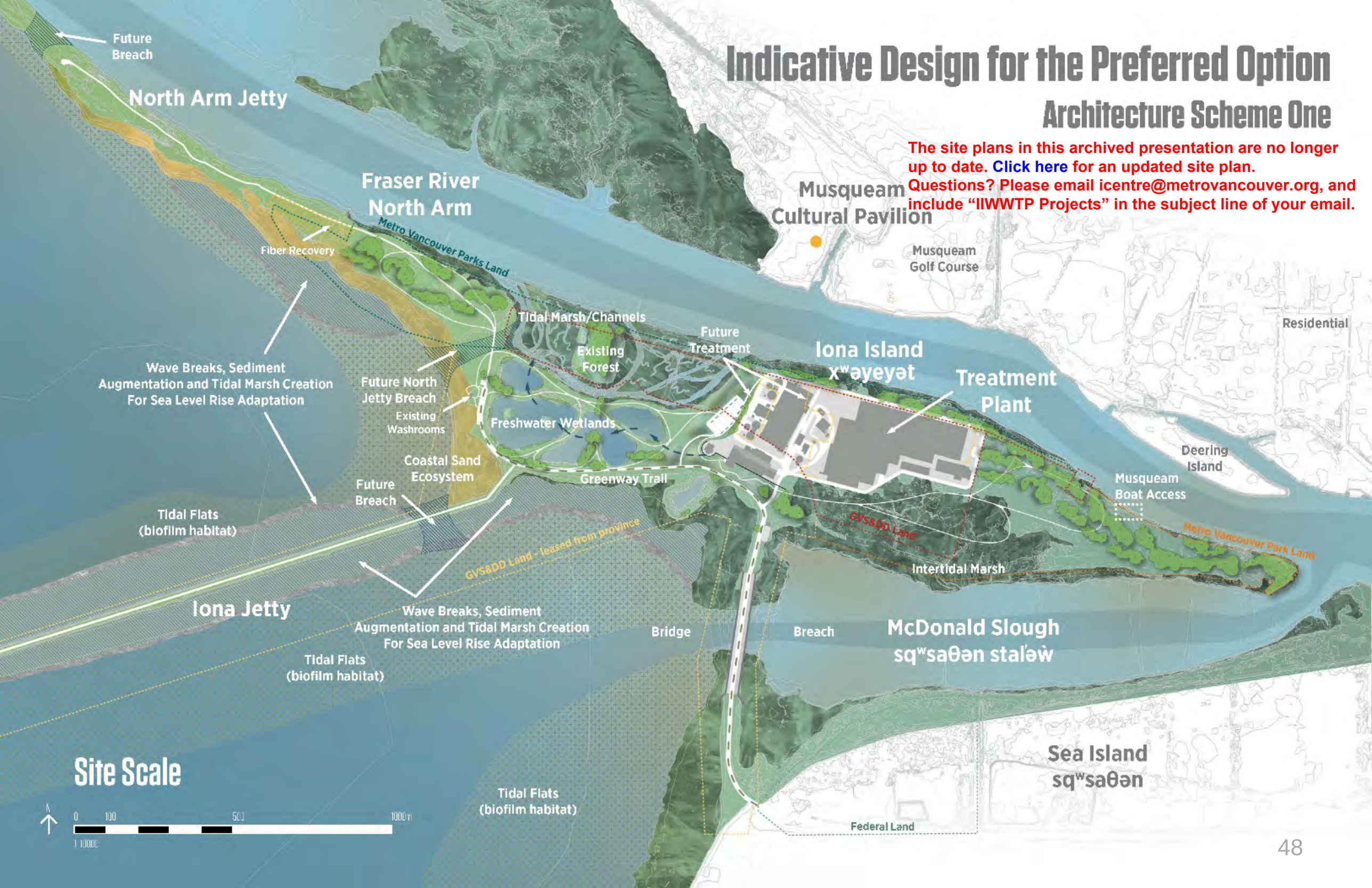

# Indicative Design for the Preferred Option
## Architecture Scheme One

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Fraser River
North Arm

Musqueam
Cultural Pavilion

Musqueam
Golf Course

Residential

Metro Vancouver Park Land

Tidal Marsh/Channels

Future North
Jetty Breach

Existing
Forest

Tidal Marsh/Channels

Future
Treatment

Iona Island
xʷəyeyət

Existing
Washrooms

Existing
Solids
Treatment

Biosolids
Dewatering

Existing
Primary
Treatment

B Stage Activated
Sludge Tanks

Primary
Clarifiers

Secondary
Clarifiers

A Stage Activated
Sludge Tanks

Blower Building

Secondary
Clarifiers

New Siphon South Shaft

Existing Effluent
Pump Station

Freshwater Wetlands

Existing
Parking

Greenway Trail

Operations and
Maintenance
Building

Eagle Nest

Odour Control

Preliminary Treatment and IPS
Electrical/Mechanical Room

Wave Breaks, Sediment
Augmentation and Tidal Marsh Creation
For Sea Level Rise Adaptation

Existing Gravity
Thickener

Existing Sludge
Screening

Electrical and Mechanical
Room with Substation

Dual Use Disk Filters
(Tertiary Treatment)

Future Breach

Tidal Flats
(biofilm habitat)

GVS&DD Land - leased from province

GVS&DD Land

Intertidal Marsh

Parks Works Yard
and Maintenance
Building

Metro Vancouver Park Land

## Plant Scale

N

0 250m

1:5000

Bridge

Breach

McDonald Slough
sqʷsaθən staɬəw̓

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# ECOLOGICAL OPPORTUNITIES

- Plant Effluent Discharge
- Tidal Wetlands Habitat
- Wave Breaks
- Mudflat Habitat
- Riparian Habitat
- Freshwater Habitat
- Breaches

19. Offshore Wave Breaks

10. Foreshore Restoration

14. Outfall Jetty Breach

7. North Lagoons

16. Riparian Forest Restoration

2. North Jetty East Breach

5. South Pond

6. South Lagoons

18. Tidal Marsh Creation

9. Foreshore Restoration

15. North Channel Tie-In

4. North Pond

8. Foreshore Restoration

1. Causeway Breach

12. Upland Restoration

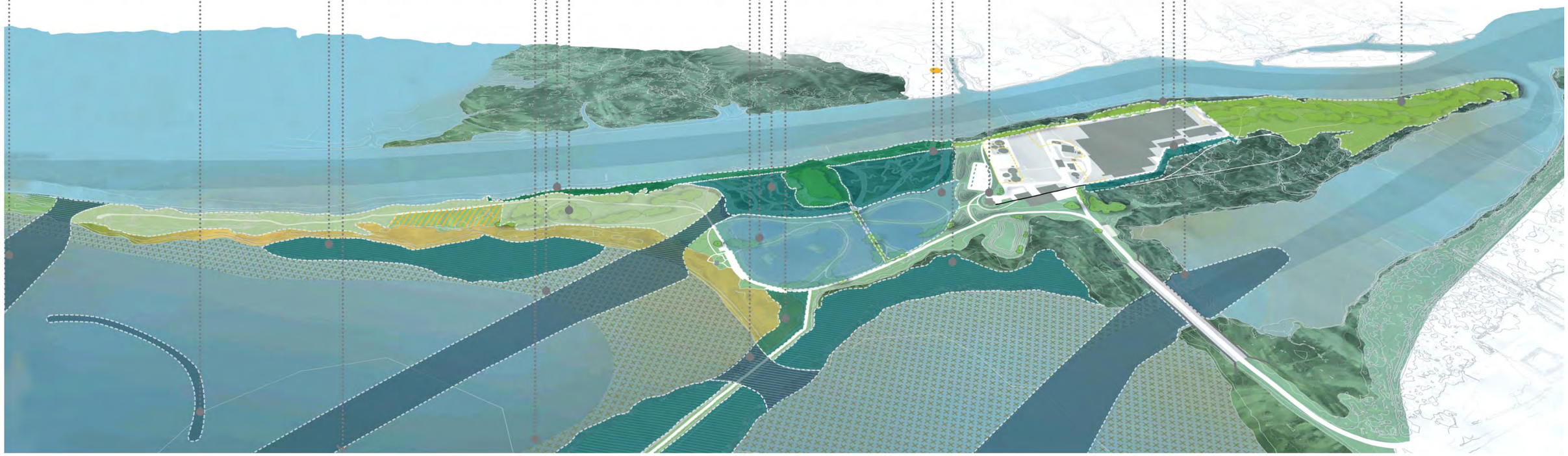
3. North Jetty West Breach

11. Foreshore Restoration

20. Coastal Sand Habitat

17. Tidal Marsh

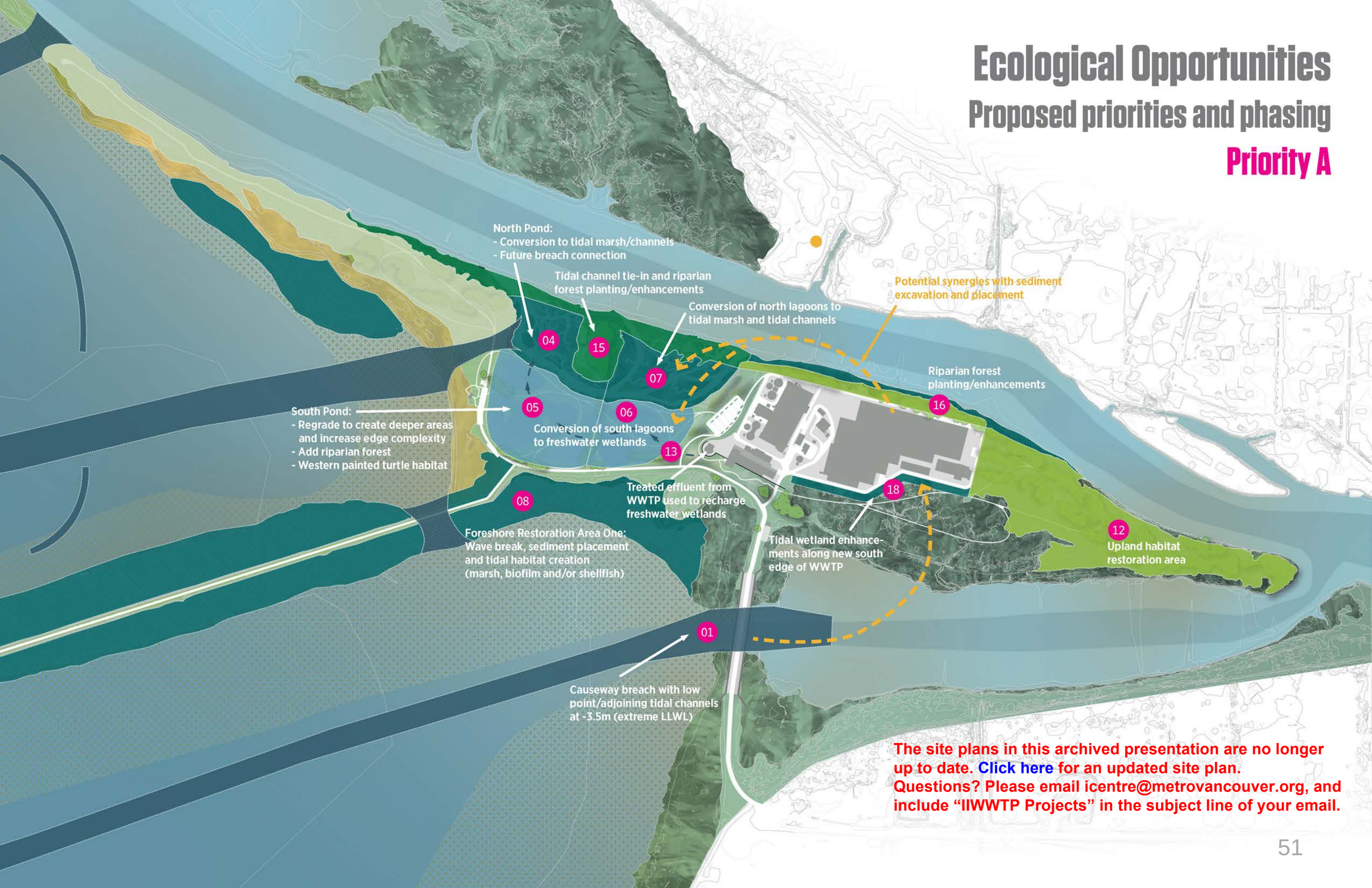
13. Discharged Effluent



# Ecological Opportunities

## Proposed priorities and phasing

## Priority A

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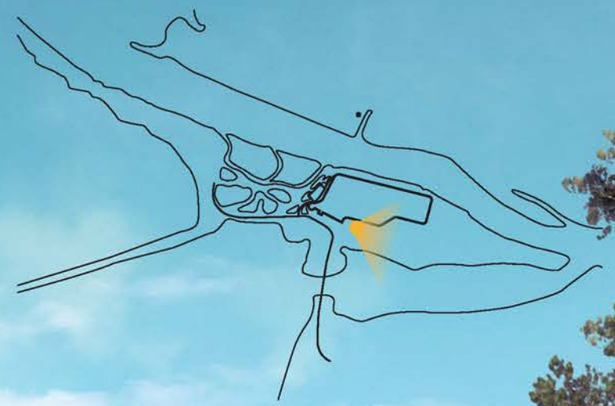
# SOUTHERN INTERTIDAL WETLANDS



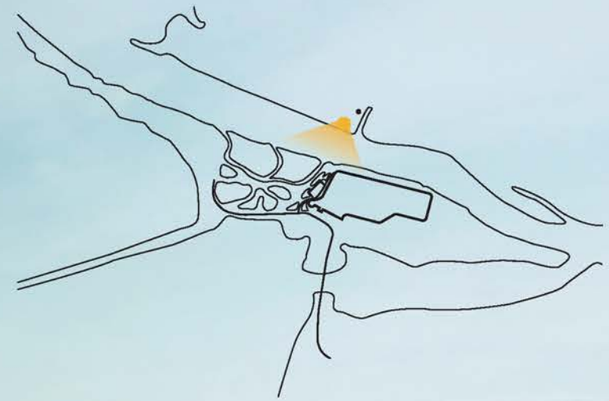
# KNOLLS AND FRESHWATER WETLANDS

# TIDAL CHANNELS, FRESHWATER WETLANDS AND THE PLANT

## ARCHITECTURE SCHEME ONE

# SOUTHERN VIEW FROM MUSQUEAM

## ILLUSTRATION SHOWING PROPOSED VIEW WITH TREES REMOVED



# Questions?

# 7. NEXT STEPS

2020

- Two public meetings (May 19 & 21)
- Musqueam Chief and Council (May 19)
- Consider and incorporate additional input, where possible
- Recommend preferred concept to LWC and GVS&DD Board (July)
- Present Indicative Design and Project Definition Report to LWC & Board (January)

# Final thoughts?