



Iona Island Wastewater Treatment Plant Projects

CONTRACT AWARD - RFP NO. 23-041: CONSULTING ENGINEERING SERVICES FOR THE IONA ISLAND WWTP UPGRADE

Cheryl Nelms, P.Eng., Ph.D.
GENERAL MANAGER, PROJECT DELIVERY

Liquid Waste Committee – July 10, 2024

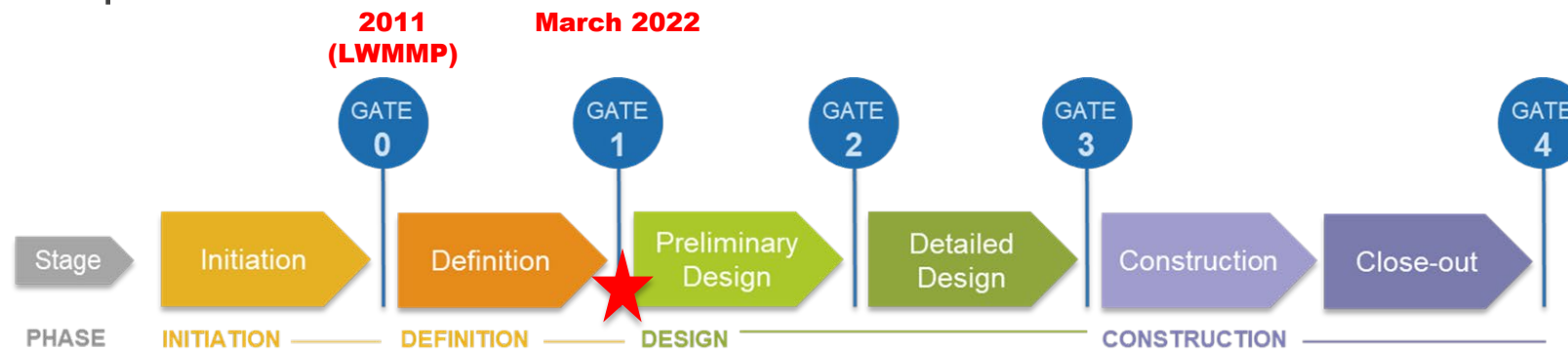
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RECOMMENDATION

That the GVS&DD Board:

- Approve award of Phase 1 – Preliminary Design of RFP No. 23-041 - Consulting Engineering Services for the Iona Island Wastewater Treatment Plant Upgrade in the amount of up to \$60,574,702 (exclusive of taxes) to Fraser Delta Group, subject to final review by the Commissioner; and
- Authorize the General Manager, Procurement and Real Estate to execute the required documentation once the General Manager, Procurement and Real Estate is satisfied that the award should proceed.



ADDRESSING BOARD COMMENTS

What We've Heard

- Ensure cost sustainability
- Optimize project delivery strategies

SEWER SERVICING HISTORY

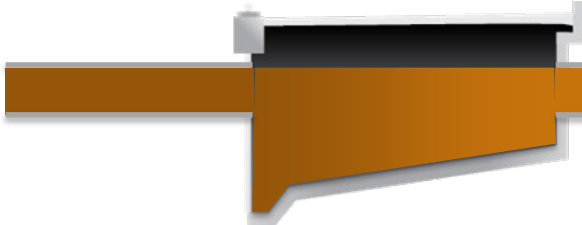
How We Got Here

<p>Pre-1911</p> <p>Cholera outbreaks</p> <p>Four municipalities worked together to build common sewers</p>	<p>1913 R.S. Lea Report</p> <p>First “Master Plan” – separated sewers recommended, but combined sewers built</p>	<p>1953 A.M. Rawn Report</p> <p>New “Master Plan”.</p> <p>City of Richmond advocated for Secondary Treatment at Iona</p>	<p>1989 Stage 1/ 1999 Stage 2 LWMP</p> <p>More quality/ quantity issues, branching out to CSOs & sewer separation impacts</p>	<p>2001 LWMP</p> <p>Basic service concept introduced</p>	<p>2011 LWMP</p> <p>Directly incorporated growth planning at both regional and local level</p>
<p>Burrard Peninsula Joint Sewerage Commission forms</p>	<p>1914 – formation of Vancouver & Districts Joint Sewerage & Drainage Board</p>	<p>1956 – GVS&DD Act; established 4 sewerage areas</p> <p>Interceptors and Primary Treatment at all WWTP</p>	<p>Secondary treatment at Annacis and Lulu</p> <p>- Under Prov order</p>	<p>LWMP approved by MOE</p> <p>- Secondary at Iona by 2020 and at Lions Gate by 2030</p>	<p>Updated LWMP approved by MOE</p> <p>- Secondary at Iona by 2030 and at Lions Gate 2020</p>

PURPOSE OF IONA ISLAND WWTP PROJECTS

Upgrade of Existing WWTP to Meet Regulatory Requirements of Secondary Treatment

Existing Primary Treatment

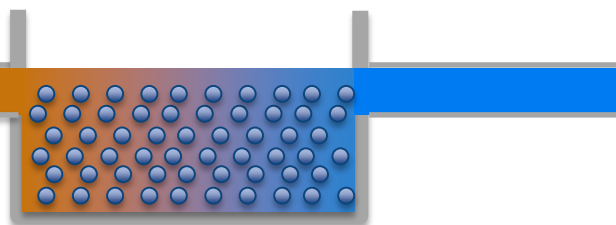


Physical separation and removal of large floating and settleable solids

~50% reduction in suspended solids

~30% reduction in biodegradable organic matter

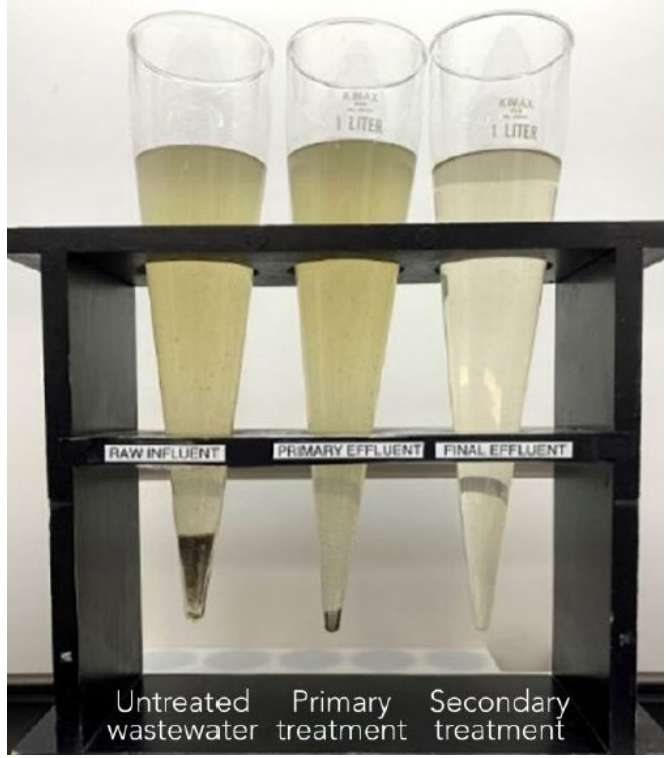
Proposed Secondary Treatment



Biological removal of organic matter

~90% reduction in suspended solids

~90% reduction in biodegradable organic matter



Federal 2012 Wastewater Systems Effluent Regulations require IWWTP to be upgraded to secondary treatment by 2030

PURPOSE OF IONA ISLAND WWTP PROJECTS

Consequences of Not Undertaking Upgrade

- Non-compliance with regulatory requirements result in significant penalties
- Human health impacts
- Ecological impacts
- Inability to support population and housing growth
- Inflationary impacts over time
- Increased rehabilitation costs to existing primary plant
- Last plant on west coast with primary treatment



Movement in Primaries conc. wall



Spalled concrete adjacent to bar screen



Exposed concrete aggregate



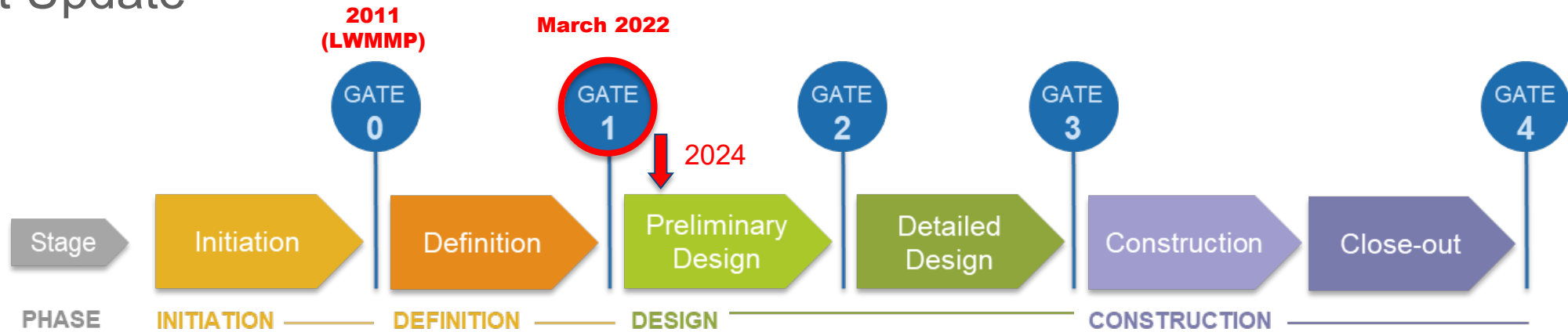
Siphon chamber rusted pipework



Rusted exposed rebar in pipe gallery

PROJECT DEFINITION STAGE GATE 1 (APPROVED 2022)

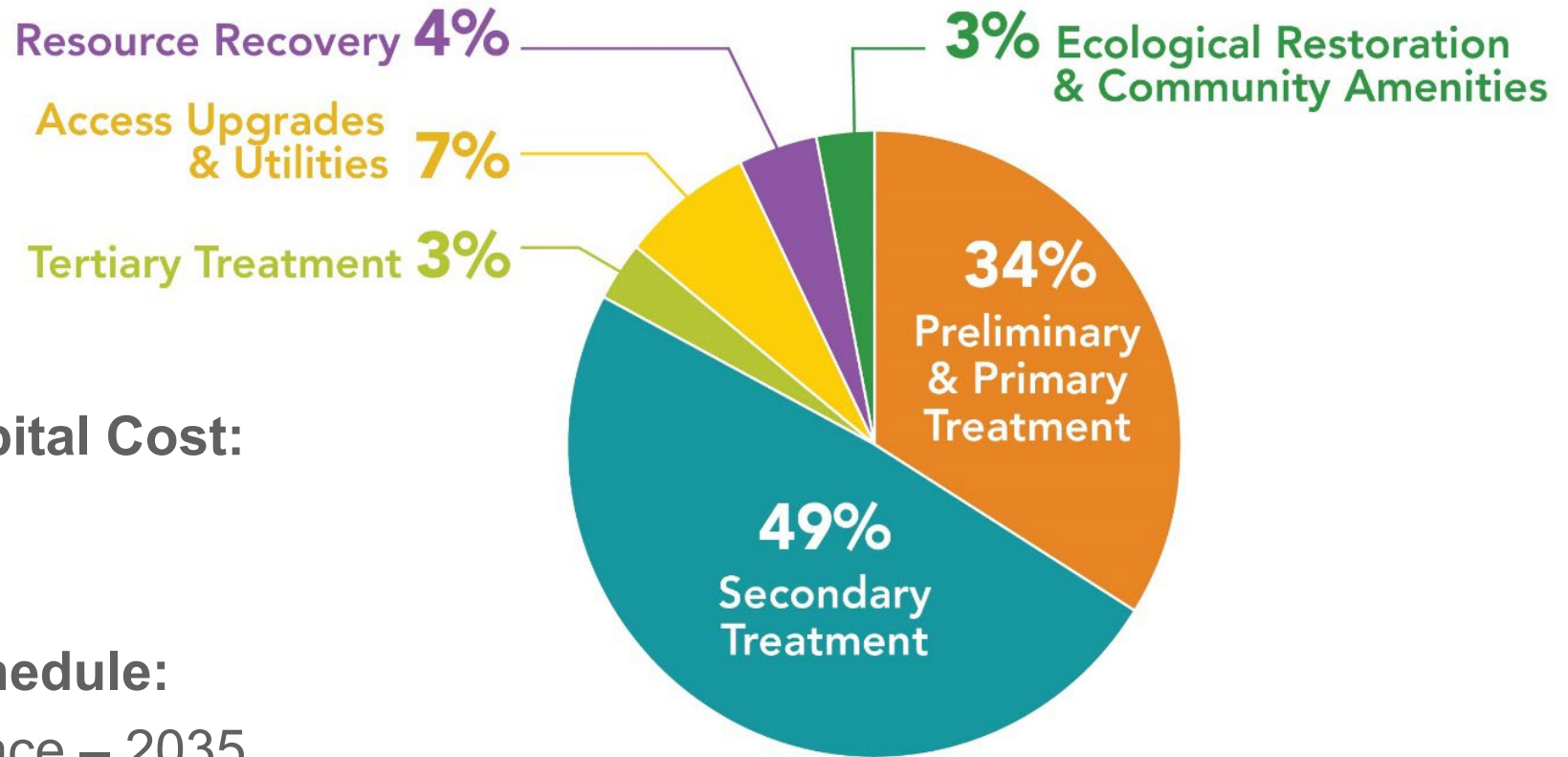
Project Update



- Upgrade to secondary level treatment with tertiary filtration
- Replace existing primary plant
- Re-use solids treatment influent effluent pumping and outfall
- Resource recovery opportunities (RNG, biosolids, heat, reclaimed water)
- Ecological restoration projects



PROJECT DEFINITION REVIEW: COST AND SCHEDULE



Project Definition Review Capital Cost:
\$9.9B (\$6.7B in 2021 Value)

Project Definition Review Schedule:
Secondary Treatment Compliance – 2035

Capital Cost includes contingency, escalation, and risk reserve

An aerial photograph of the Iona Island Wastewater Treatment Plant. The plant features several large circular tanks, a large rectangular aeration basin with a grid of pipes, and various industrial buildings. The facility is situated on a narrow strip of land between a large body of water and a residential area. In the background, there are mountains and a forested area. A blue semi-transparent overlay covers the left portion of the image, containing the text 'Work to Date'.

Work to Date

Iona Island Wastewater Treatment Plant

KEY ACTIVITIES SINCE STAGE GATE 1

Biophysical Studies for Ecological Restoration Projects



- Terrestrial biophysical surveys of x^wəyeyət / Iona Island are underway and will continue through 2025.
- **Key activities to date:**
 - Late 2023 - Water quality monitoring and freshwater fish sampling,
 - Early 2024 - terrestrial ecosystem mapping, rare plant surveys, and wetland classification.
- **Objective:** understanding of x^wəyeyət / Iona Island's rich biological and physical conditions to guide Ecological Restoration and long-term monitoring program

KEY ACTIVITIES SINCE STAGE GATE 1

Supporting breaches with Raincoast Conservation Foundation

North Arm Jetty breaches:
restoring aquatic connectivity for
juvenile salmon and ecosystem
health in the Fraser River estuary

Timeline:

- **February 2022:** first breach completed
- **December 2023:** second breach completed
- **Results** will inform park and ecological restoration projects



KEY ACTIVITIES SINCE STAGE GATE 1

Ferguson Road Upgrade

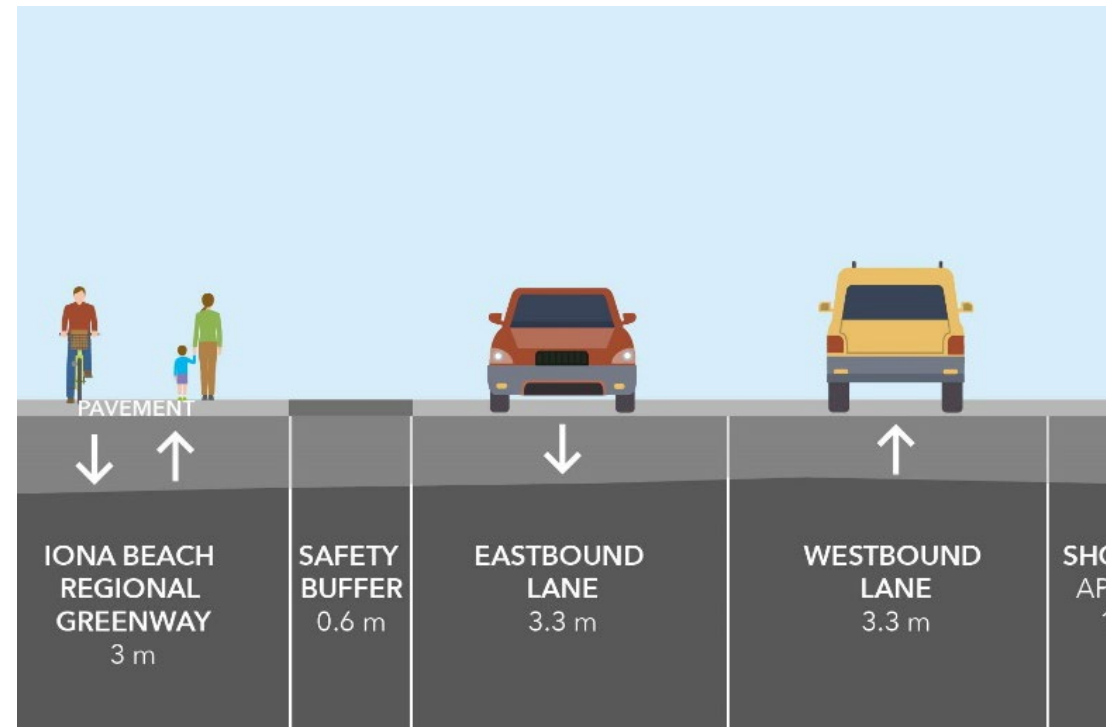


- **Scope:** Project includes new re-aligned Ferguson Road, cycling infrastructure, multi-use path and a new water supply to the IWWTP
- **Partnership:** Work is being completed in partnership with the Vancouver Airport Authority, where Metro Vancouver is supplying 50% of funding
- **Benefits:** Project improves access for construction traffic needed for the IWWTP upgrade and improves safety for cyclists and visitors to Iona Beach Regional Park
- **Timeline:** Construction complete September 2024

KEY ACTIVITIES SINCE STAGE GATE 1

Causeway Road Improvements

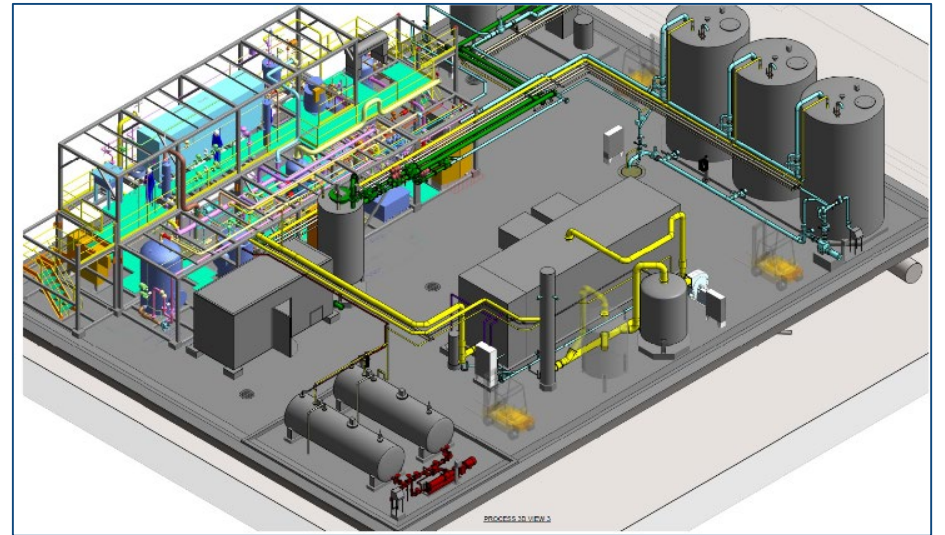
- **Improve safety** for all road users during construction
- **Maintain access** to Iona Island during construction
- **Ensure efficient delivery of construction materials**
- **Connect Iona Beach Regional Greenway** to new multi-use path led by Vancouver Airport Authority
- **June 2024:** In-person and virtual engagement opportunities



KEY ACTIVITIES SINCE STAGE GATE 1

Pilot Plant

- **Purpose:** pilot test shortlisted treatment technologies at Iona to inform full-scale process design
- **Scope:** designing, installing, and commissioning pilot plants with a 2-year operational period
- **Pilot tender issued in Q1 2024** and preparing award of tender
- **University of British Columbia:** academic involvement and planning underway
- **Timeline**
 - August 2024 – mobilization
 - April 2025 – construction completion
 - June 2025 – commissioning complete



Pilot Plant: Rendering of typical facility

KEY ACTIVITIES SINCE STAGE GATE 1

Biosolids Removal

- **Over 500,000 tonnes of land-dried biosolids removed from x^wəyeyət / Iona Island** to make way for construction of new Iona treatment plant
- Effort to remove the biosolids spanned over a decade and **fully completed in June 2024**





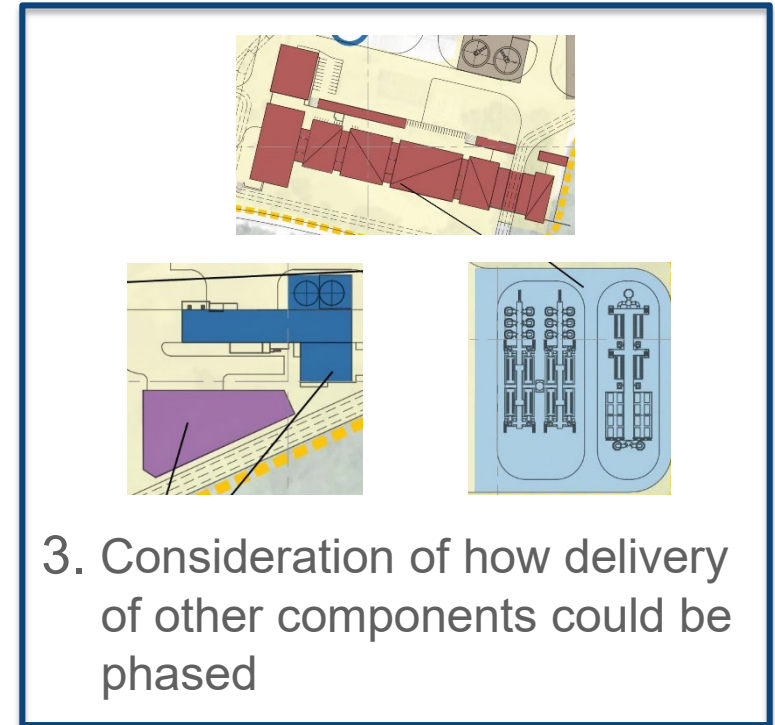
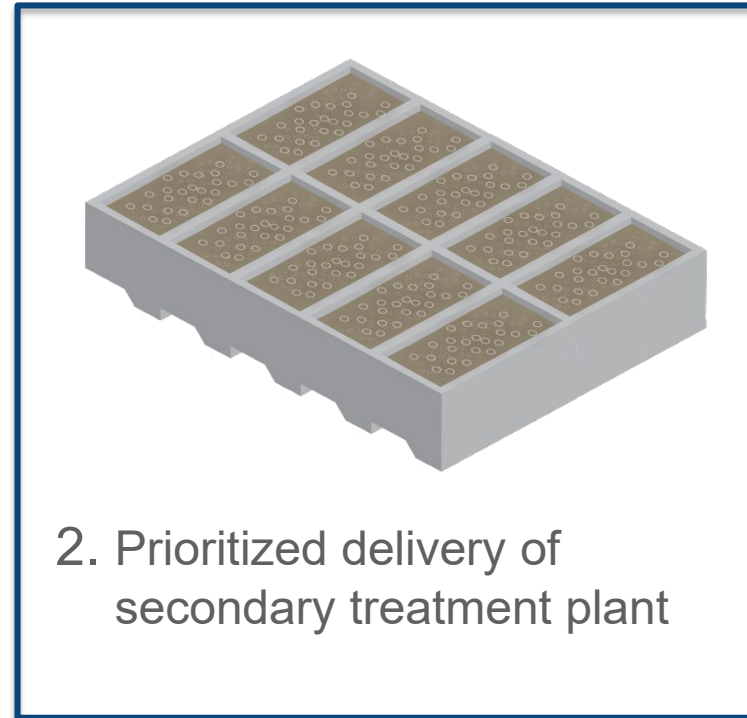
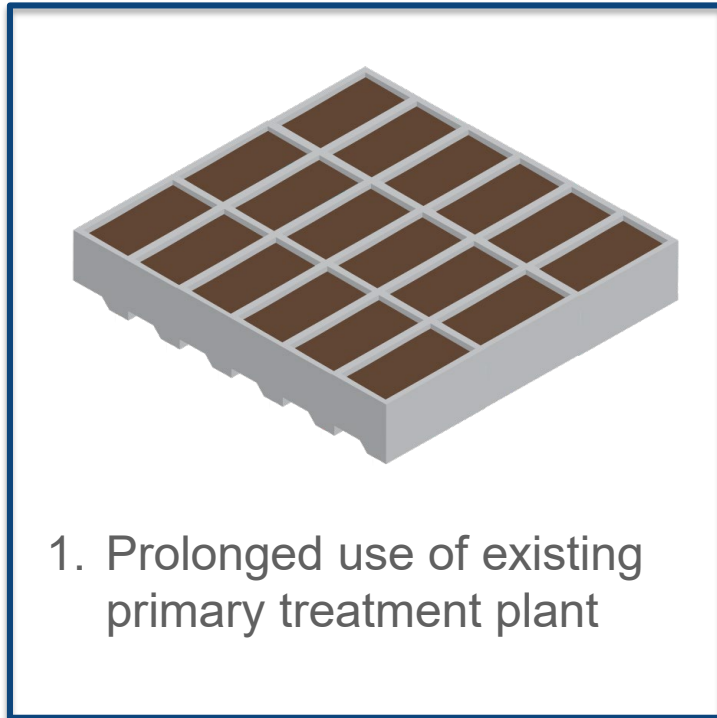
Designer Scope of Work

Iona Island Wastewater Treatment Plant

TO EXPLORE: PHASING STRATEGY

Investigate Phasing of Project Components

Key scope of designer is to assess phasing options that include:

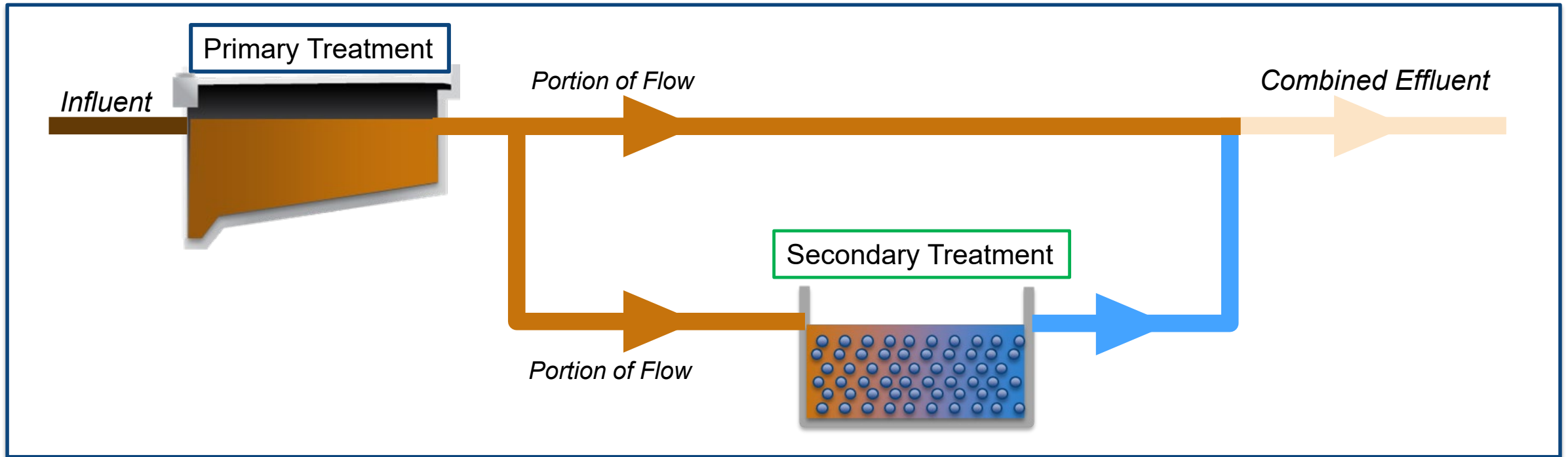


- Regulators need to be engaged in this process

TO EXPLORE: SECONDARY TREATMENT

Options to Phase in Secondary Treatment

In prioritizing secondary treatment, further explore options to phase in secondary treatment:

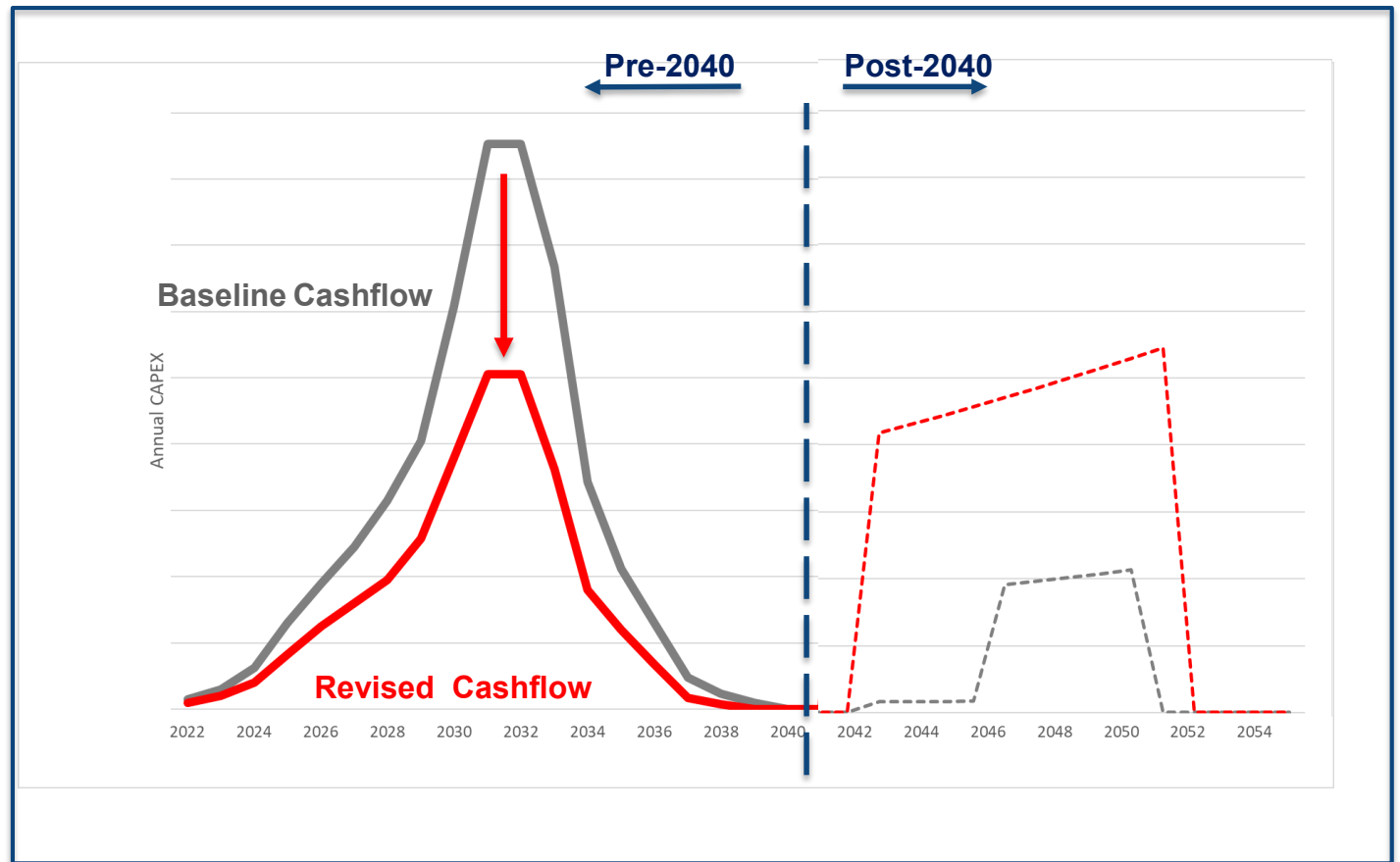


Metro Vancouver will continue to have regulatory engagement of this and other options to meet regulatory requirements

OUTCOME: ADDRESSING COST SUSTAINABILITY

The combined strategies will result in options that allow delivery of Iona in a more cost sustainable manner

The designer's scope of work will allow us to assess and recommend phasing options



WWTP DESIGN CONSULTANT SCOPE OF SERVICES

- Preliminary design of 5 packages:
 1. Preliminary and primary treatment
 2. Secondary and tertiary treatment
 2. Solids management
 3. O&M Building
 4. Odour control
- Cost and schedule update
- **Identify delivery strategies and assess medium and long-term costs and risks**



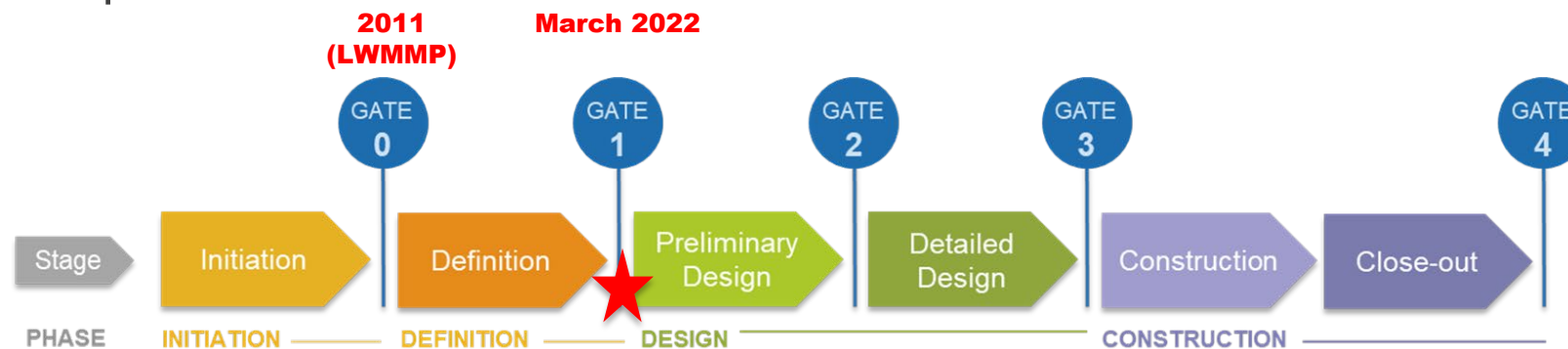
NEXT STEPS

- 1) Award designer contract to advise on design and assess phasing strategies
- 2) Accelerate IGR strategy to pursue senior government funding
- 3) Continued engagement with regulators

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Iona Island Wastewater Treatment Plant

Thank You

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Pacific Spirit Regional Park

Preview of the Updated Liquid Waste Management Plan

Paul Kadota, MAsc, MPA, PEng.

Director, Policy Planning & Analysis, Liquid Waste Services

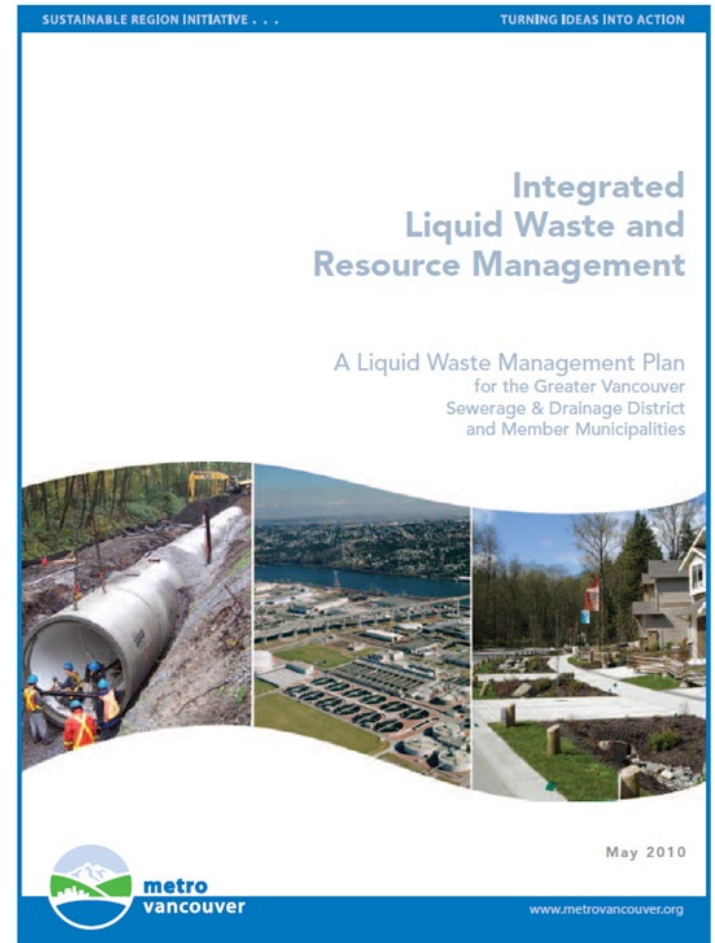
Liquid Waste Committee - July 10, 2024

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LIQUID WASTE MANAGEMENT PLANS

- Covers wastewater and stormwater systems
- Regulatory instrument to bring regional and municipal systems into full compliance
- Actions for Metro Vancouver and its members
- Past approvals: 2002, 2011.



DEVELOPING THE NEXT PLAN



Phase 1 – 2021
Vision and
Guiding Principles



Phase 2 – 2022 - 2024
Goals, Strategies, Actions,
and Draft Plan



Phase 3 – 2025
Plan Approvals

TO BE ADDRESSED

- Achieving compliance with Provincial regulations
- Affordability
- Ecological health
- Greater First Nations influence



Prevent



Reduce

WHERE ARE WE HEADED?



Recover



Restore

PREVENT POLLUTION

Entering and discharging from wastewater and rainwater systems

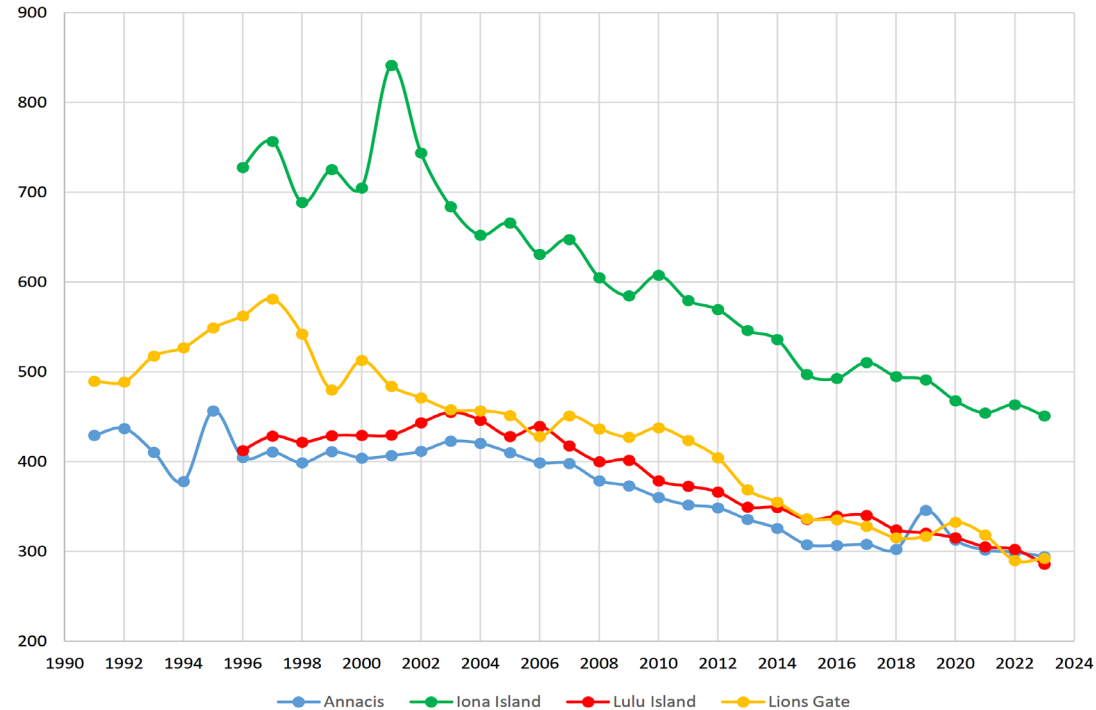


CONSERVATION

Reducing per capita demands can defer expansions

Demand-side Management (DSM)

- Lower flows
- Lower organics



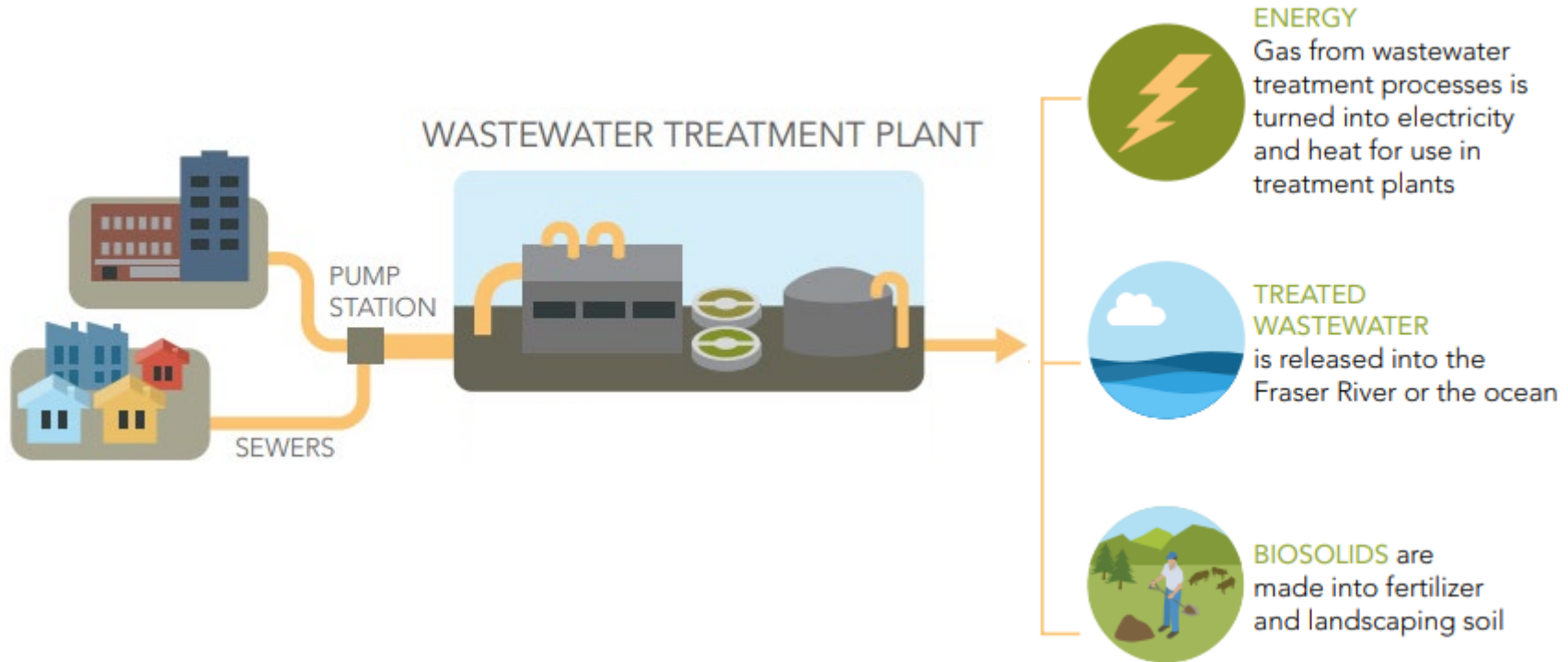
Flooding in District of West Vancouver

MANAGING RAINWATER

Restoring streams and trees



RECOVER RESOURCES



FURTHER CONSIDERATIONS

- Growth
- Improved collaboration with First Nations
- Conservation driven and affordability focused



Centennial Beach

ENGAGEMENT AND REPORTING

Phase 2 Schedule

Activity	Timeline
First Nations and public engagement	June – October
LWC / Board workshop with delegations	October 30
LWC receives draft LWMP and engagement report	November 13
Board receives draft LWMP and engagement report; provides direction	November 29
Draft LWMP and engagement reports submitted to the Province. Phase 3 engagement proceeds, pending Board authorization	December



TOGETHER
WE MAKE OUR REGION
STRONG

Annacis Island Wastewater Treatment Plant

Thank you

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Annacis Island Wastewater Treatment Plant

Liquid Waste Services

2025 – 2029 DRAFT CAPITAL PLAN

Peter Navratil, P.Eng, MPA

General Manager, Liquid Waste Services

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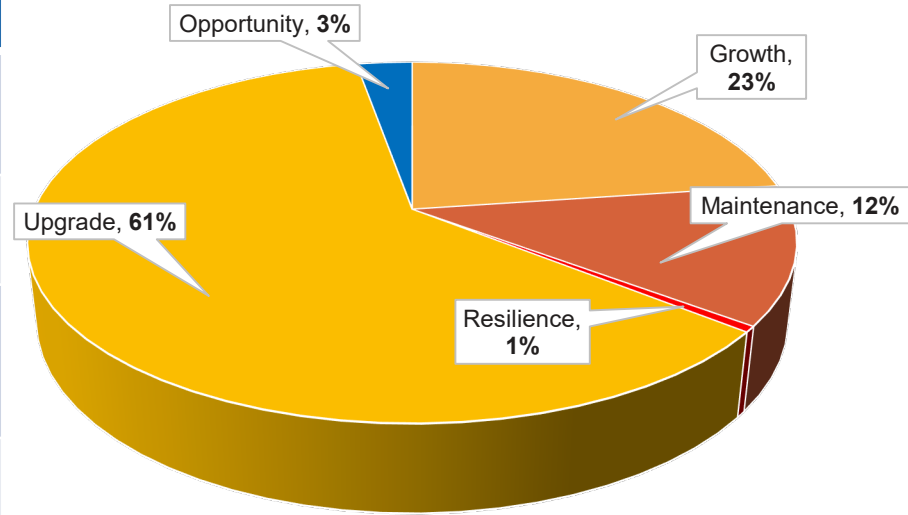
SERVICE OBJECTIVES

Liquid Waste

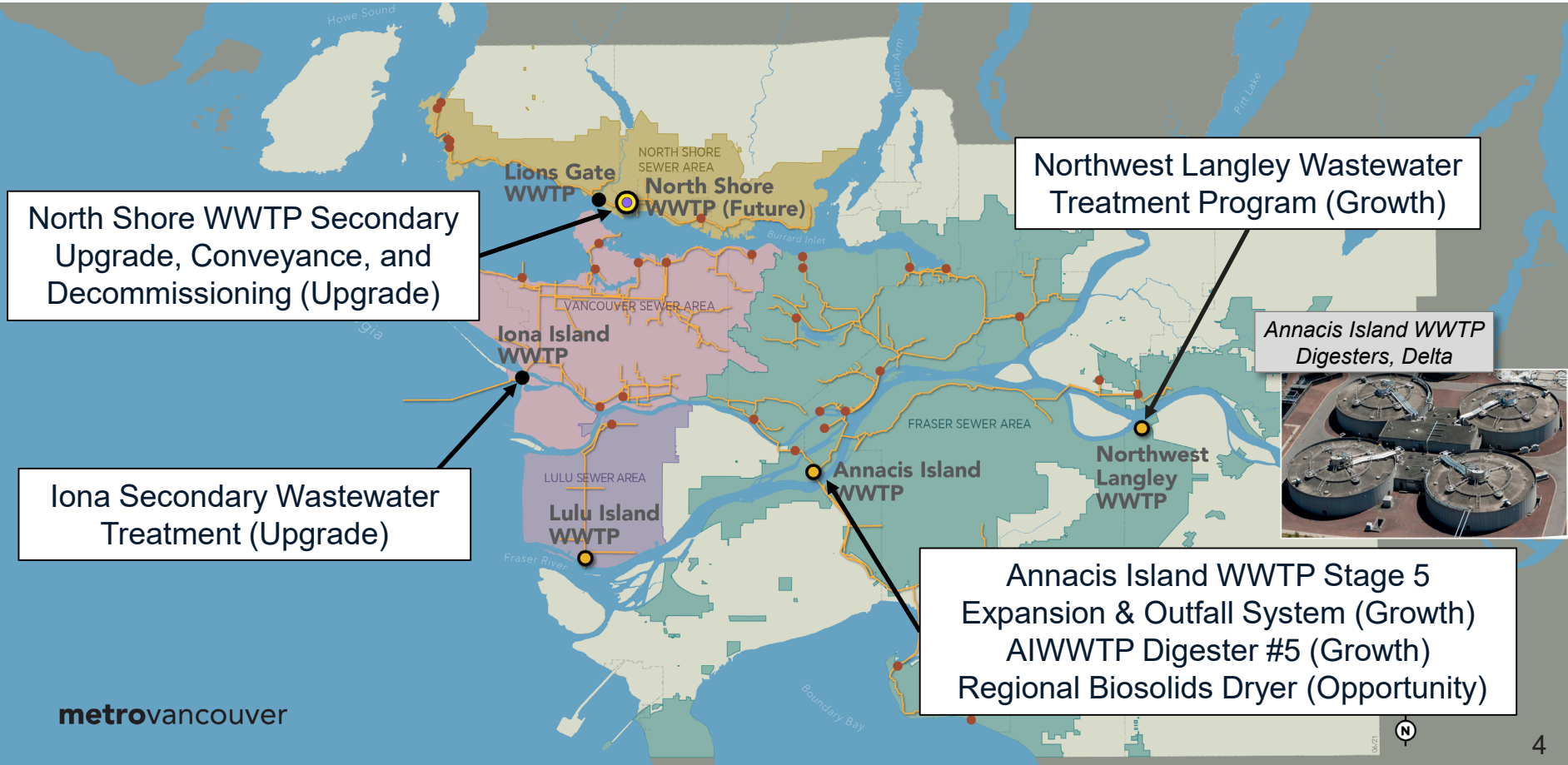
1. Eliminate discharges from the sewer system
2. Ensure that authorized wastewater treatment plant discharges meet regulatory requirements
3. Improve environmental stewardship
(nutrient recovery, energy use, greenhouse gas and odour emissions)
4. Minimize timeline to recover from a major event
(seismic, power interruption, and climate change)

CAPITAL PLAN DRIVERS

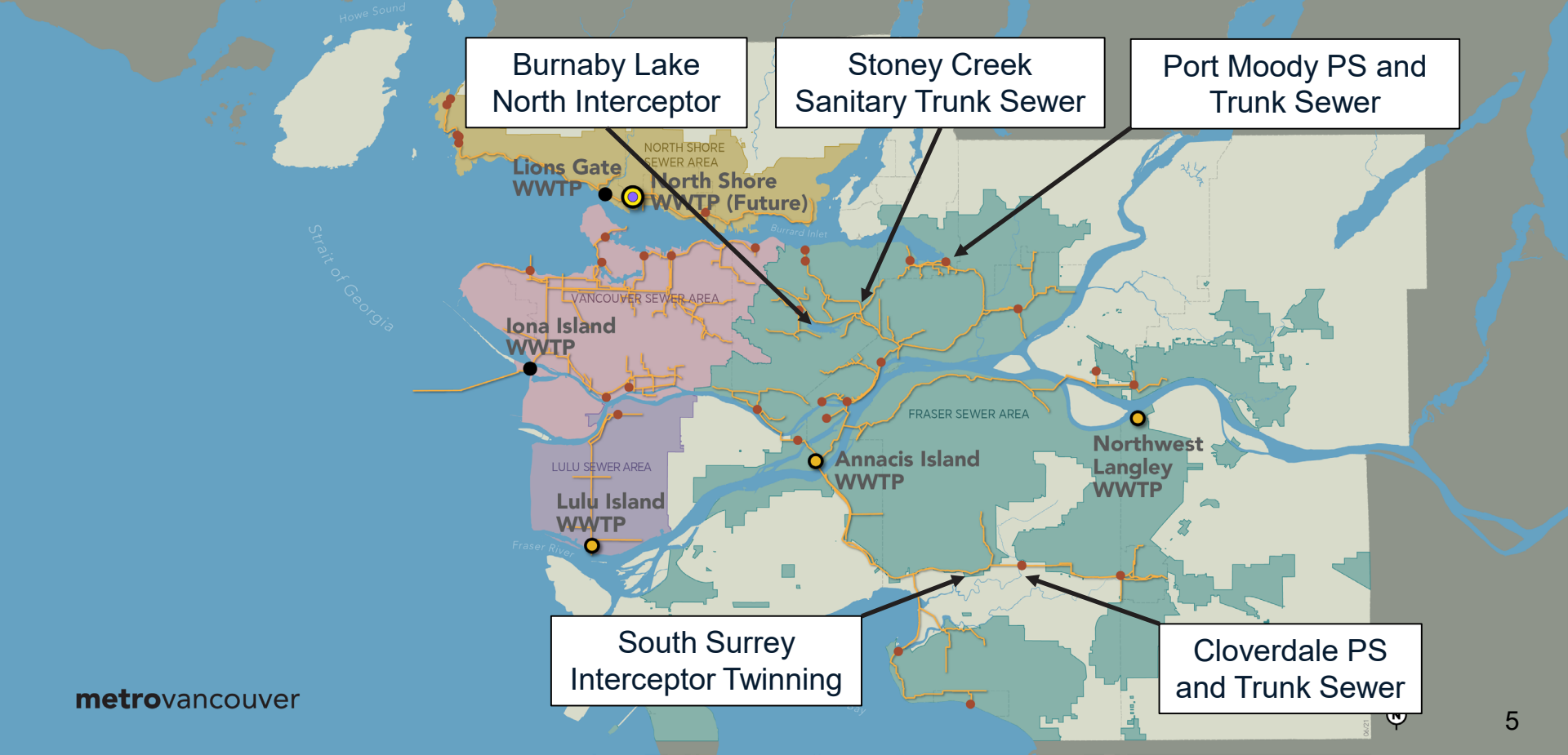
Driver	Outcome	% 2025 - 2029 Capital Plan
Growth	Accommodate population and economic growth	22%
Maintenance	Maintain assets in a state of good repair	12%
Resilience	Minimize impacts resulting from seismic events and climate change	1%
Upgrade	Enhance levels of service	61%
Opportunity	Reduce life-cycle costs and/or achieve Board goals	3%



HIGHEST VALUE, RISK, AND CONSEQUENCE PROJECTS

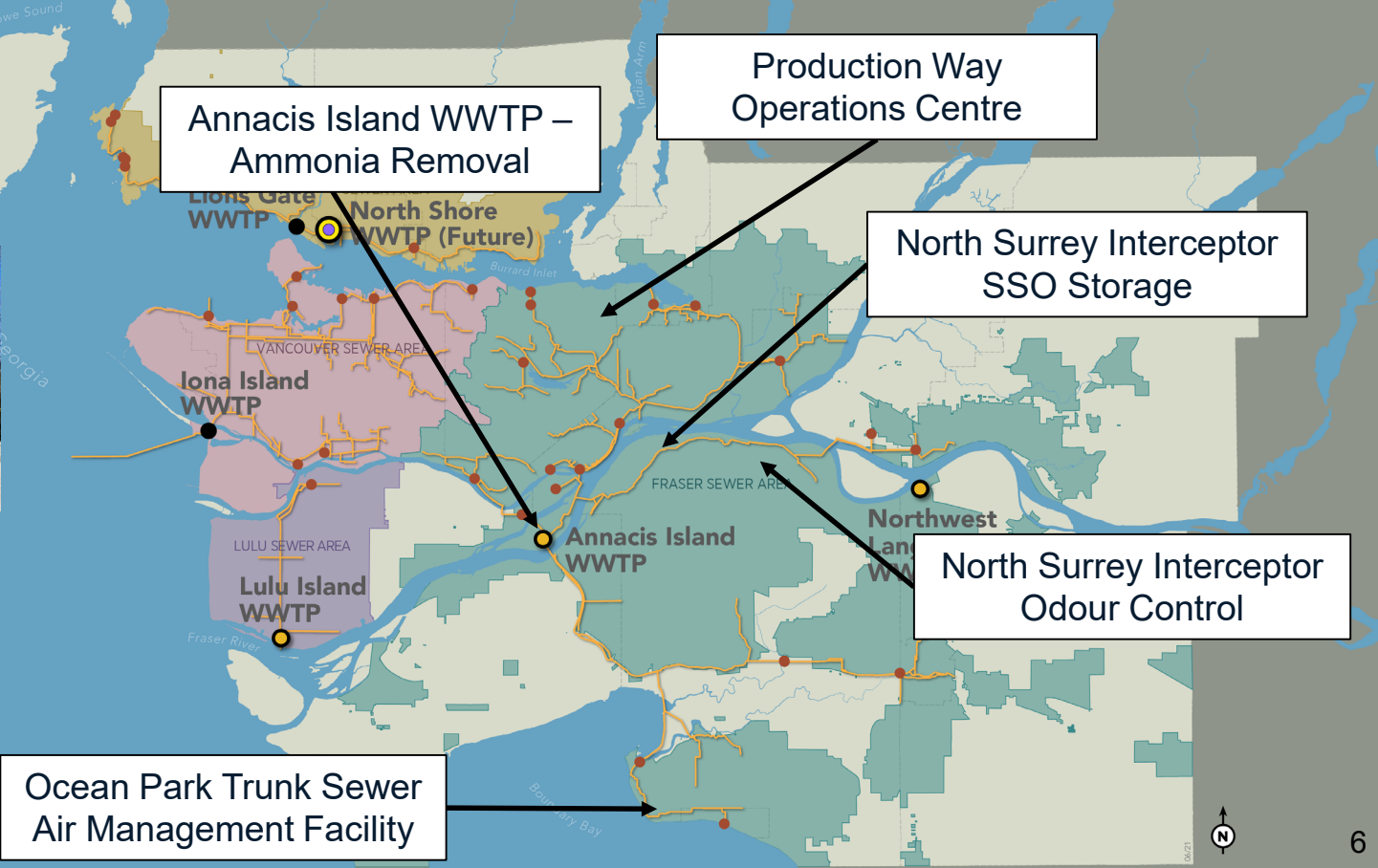


KEY PROJECTS – GROWTH

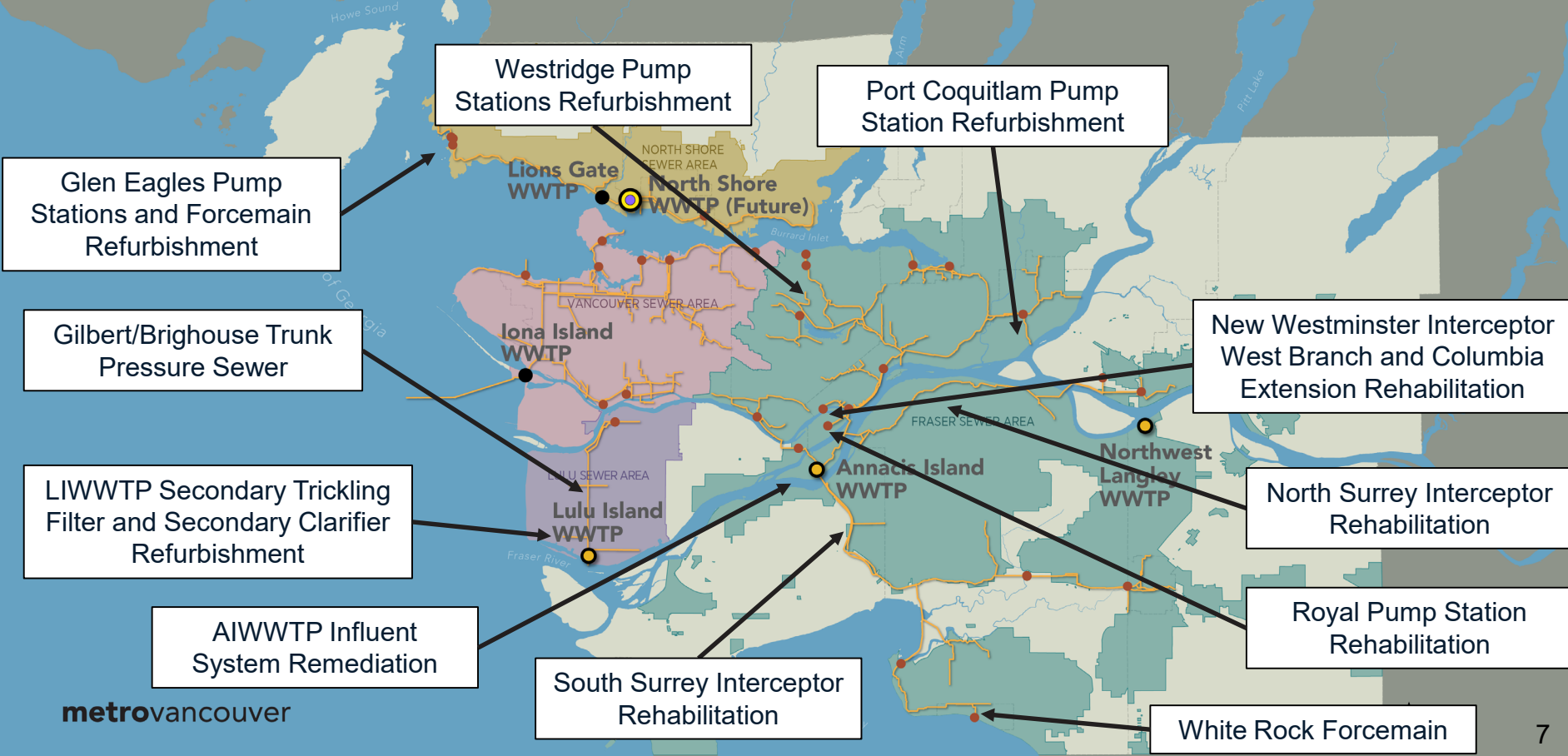


KEY PROJECTS – UPGRADES

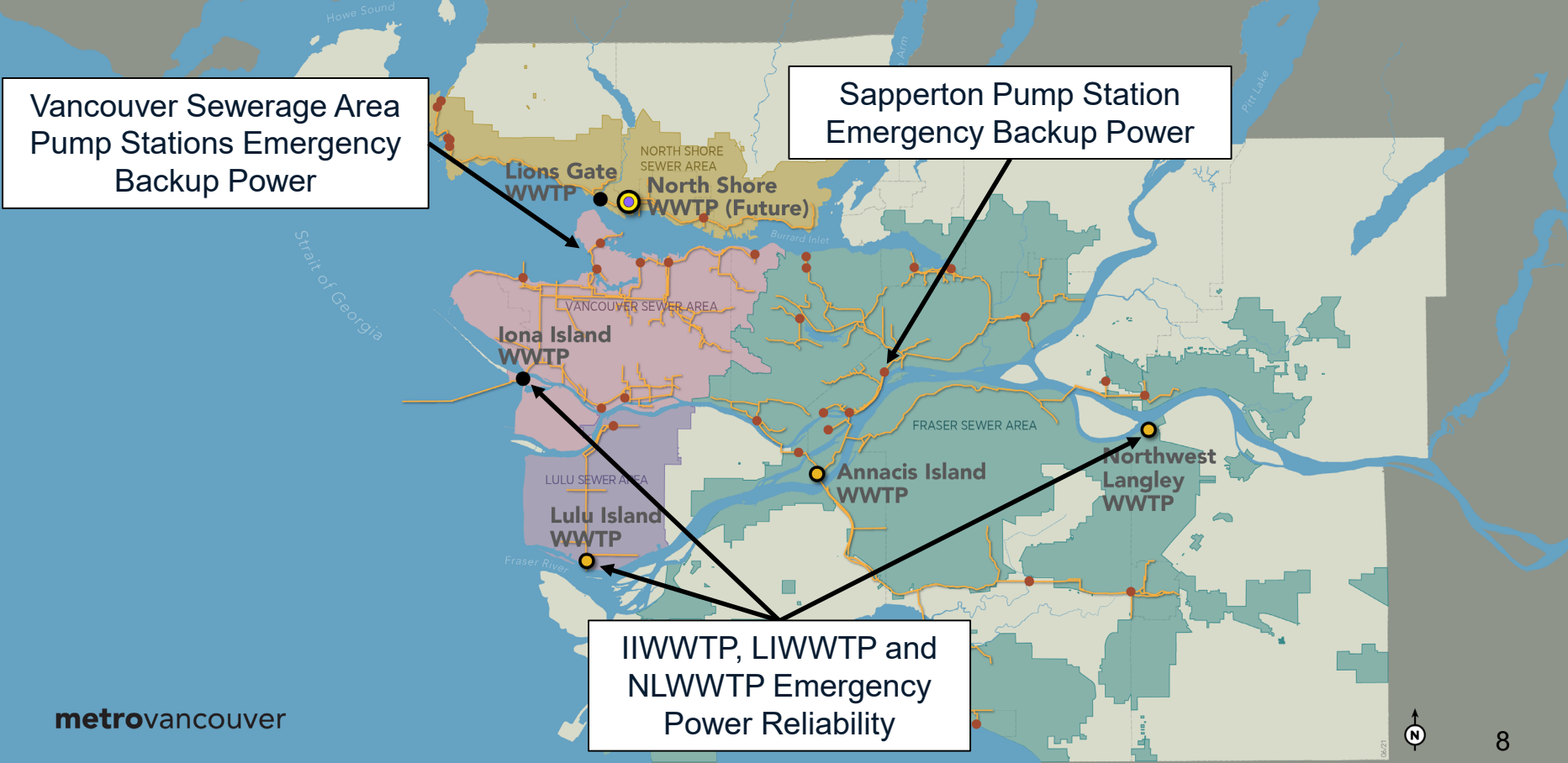
Highbury Air Management Facility, Vancouver



KEY PROJECTS – MAINTENANCE



KEY PROJECTS – RESILIENCE



KEY PROJECTS – OPPORTUNITY

Lulu Island WWTP RNG Facility, Richmond



Lulu Island WWTP Pilot Digestion Optimization Facility, Richmond



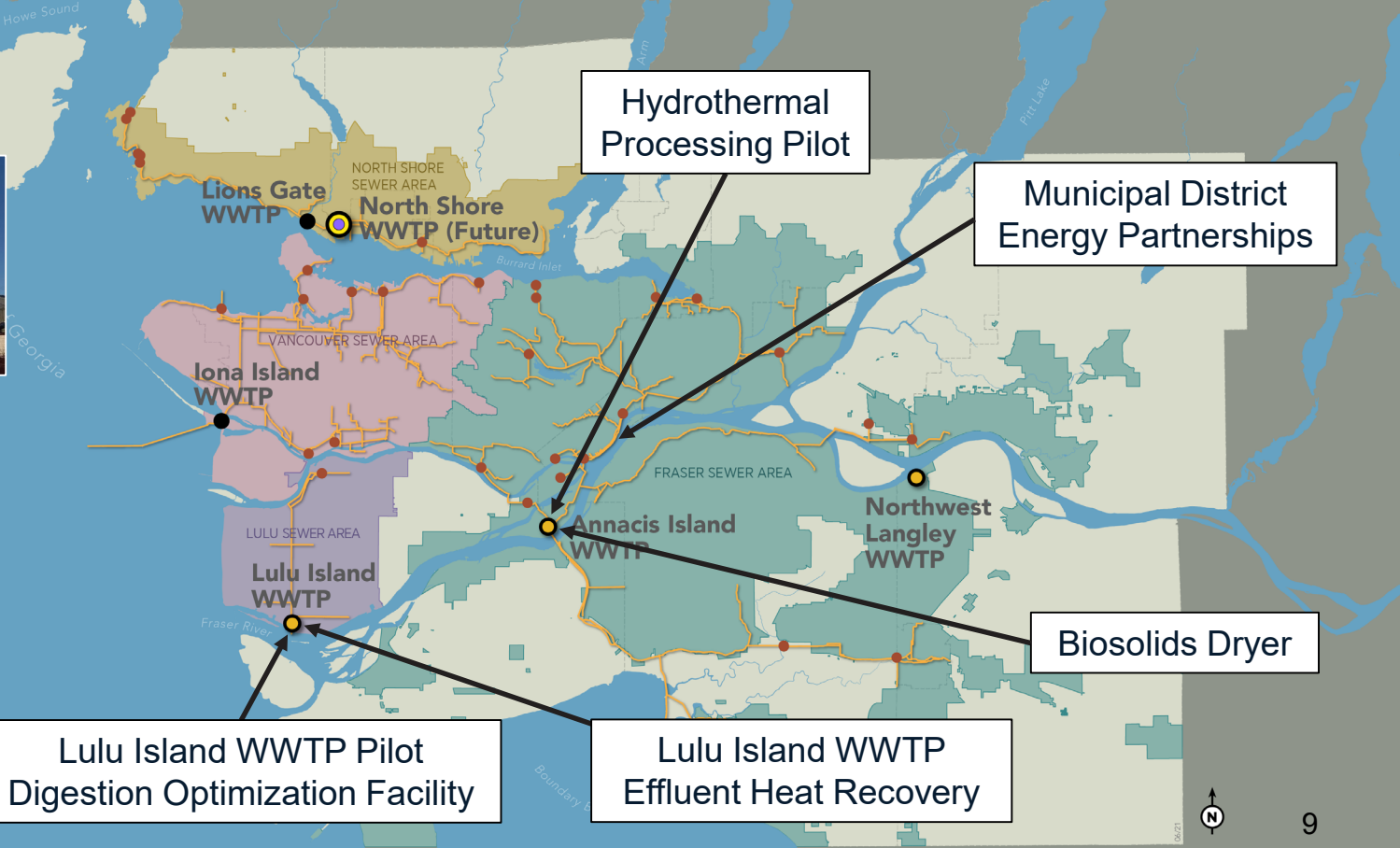
Lulu Island WWTP Pilot Digestion Optimization Facility

Hydrothermal Processing Pilot

Municipal District Energy Partnerships

Biosolids Dryer

Lulu Island WWTP Effluent Heat Recovery



LIQUID WASTE

2025 - 2029 CAPITAL PLAN EXPENDITURES

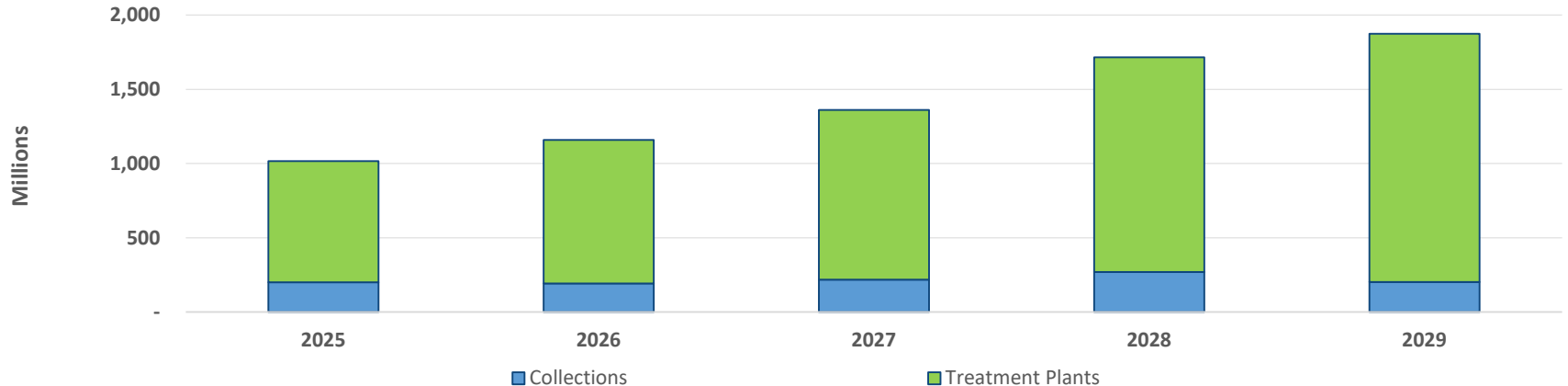
Overview:

- 2025 - 2029 Capital Plan: \$7.1B
- 2025 cash flow: \$1,017.4M
- 150 projects

Drivers:

- Tertiary Treatment Upgrade (NSWWTP / IIWWTP)
- FSA Treatment Expansions (AIWWTP / NLWWTP)
- Maintenance

2025 - 2029 Water Services Capital Plan



2025 CAPITAL EXPENDITURES

- The following 8 projects make up 80% of the proposed 2025 capital expenditures for all 150 projects
 - North Shore WWTP Secondary Upgrade
 - Iona Island WWTP Secondary Upgrade
 - Annacis Island Stage 5 Expansion
 - Northwest Langley WWTP Expansion
 - Gilbert / Brighthouse Trunk Sewer
 - Annacis Outfall System
 - Burnaby Lake North Interceptor - Winston Section
 - South Surrey Interceptor - Johnston Section

PROPOSED CAPITAL PLAN CHANGES

(\$ Millions)

Prior Cycle Cash flow 2024 - 2028	Cash flow 2024	Adjustments to 2025 - 2028 Capital Plan			Cash flow 2029	Draft Capital Plan 2025 - 2029
		Carry- Forward	Cost Adjustments	Total		
\$5,407.7	(781.2)	146.6	479.6	626.2	1,873.9	\$7,126.6

NEXT STEPS

- Consider Committee comments on the 2025-2029 Capital Plan
- Present revised 2025-2029 Capital Plan and 2025 Operating and Capital Budgets for Committee and Board consideration in October



Burrard Inlet - Burnaby



Fraser River – Northwest Langley Wastewater Treatment Plant, Barnston Island and Surrey Bend Regional Park

Thank you

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