



Architectural Rendering of NSWWTP

# North Shore Wastewater Treatment Plant Program

## OVERVIEW FOR NEW WESTMINSTER CITY COUNCIL

Jerry W. Dobrovolny, P.Eng, MBA  
Commissioner/CAO

Cheryl Nelms, P.Eng, PhD  
General Manager, Project Delivery

October 7, 2024  
70984401

**metrovancouver**



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# North Shore Wastewater Treatment Plant Program

MEDIA TECHNICAL BRIEFING, CONTENT PRESENTED MARCH 22, 2024

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**metro**vancouver

# MISSION

A federation that collaboratively plans for and delivers regional-scale services



## Deliver Core Services

Attain the highest possible levels of excellence in meeting our service delivery responsibilities.



## Plan for the Future

Develop and use an integrated system of plans to manage all activities within Metro Vancouver's legislated scope of authority towards the achievement of a sustainable region.



## Act as a Regional Forum

Build and facilitate collaborative processes, including those that engage citizens, to achieve a robust partnership that works together for a sustainable region.

# Metro Vancouver Wastewater Treatment System



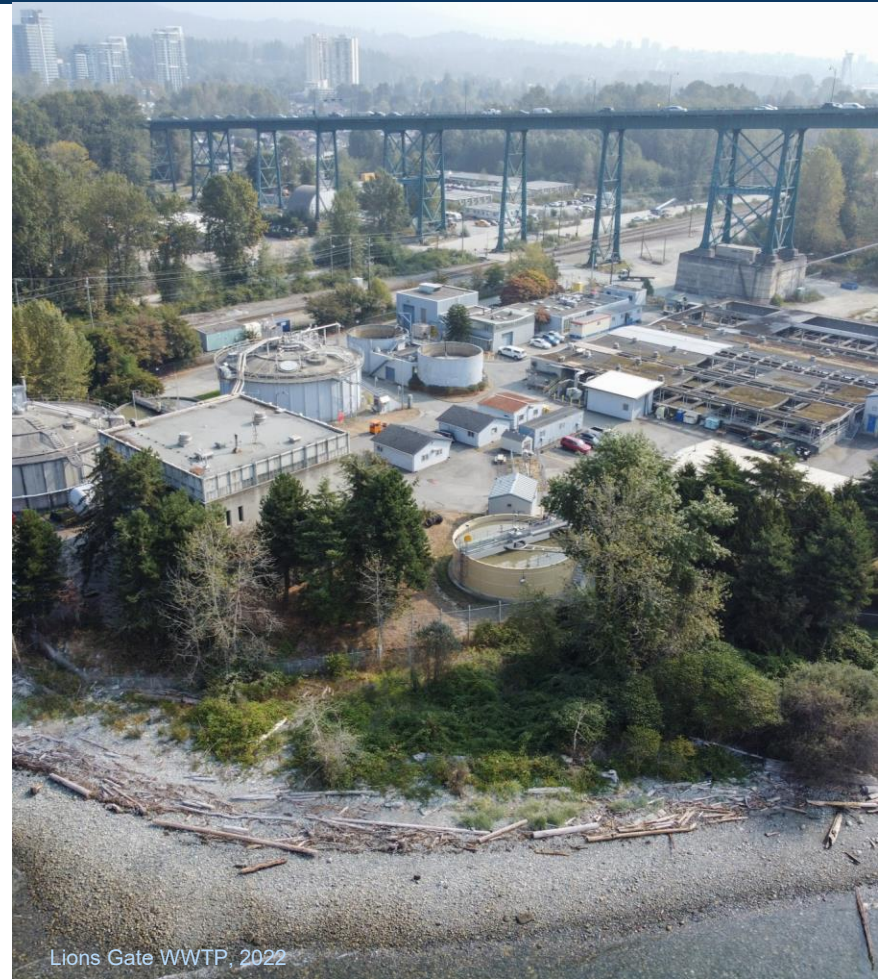
# Program Overview

NSWWTP Site, Apr 2023



# CURRENT PLANT: LIONS GATE

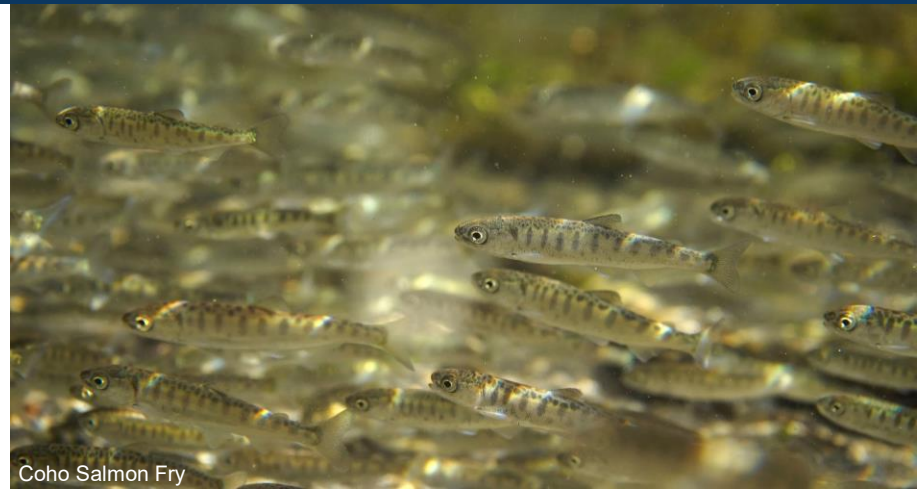
- One of the last plants on the west coast of Canada and the United States to provide only primary level wastewater treatment
- End of its service life
- Does not meet current regulatory requirements
- Metro Vancouver leases the land from the Province



Lions Gate WWTP, 2022

# WHY ARE WE BUILDING A NEW TREATMENT PLANT?

- Protect the sensitive marine habitats of the Burrard Inlet and Salish Sea
- Replace the aging Lions Gate plant
- Meet regulatory compliance for a modern treatment plant



Coho Salmon Fry



Orca

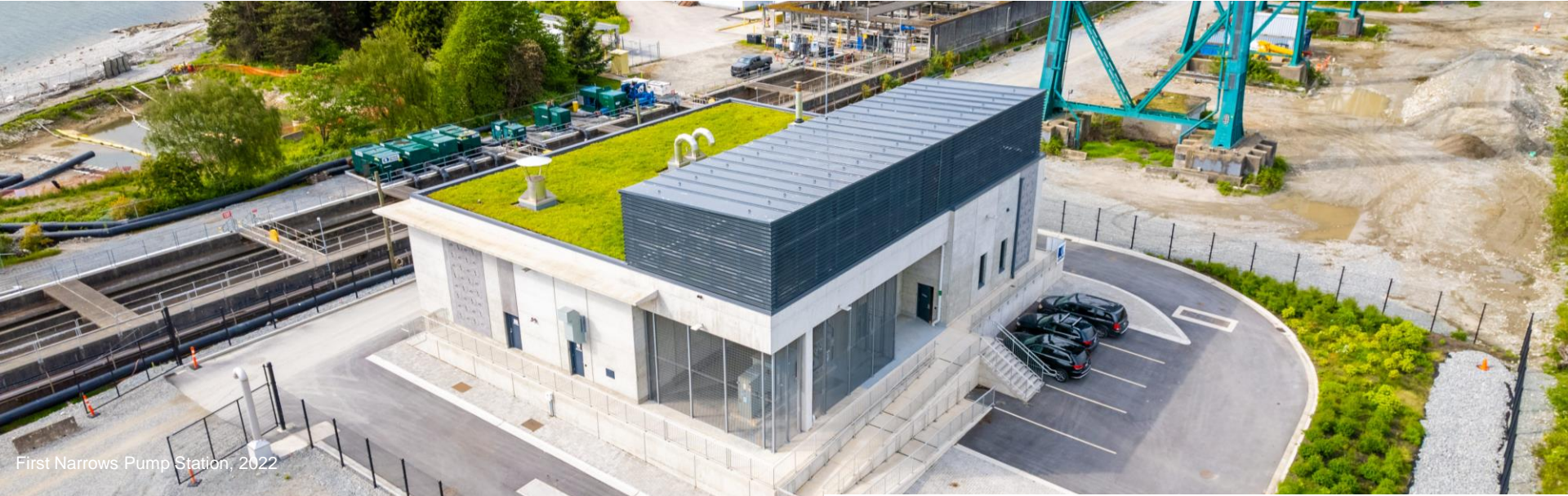
# NORTH SHORE WWTP PROGRAM COMPONENTS





# CONVEYANCE PROJECT

Completed on time, on budget



First Narrows Pump Station, 2022

Project | 2023 Municipal & Civil Infrastructure | 2023 Winner

 2023 Award of Merit

## First Narrows Pump Station Design-Build

WSP Canada

 AWARDS OF  
EXCELLENCE

General Contractors – \$20 Million to \$50 Million

Kenaidan Contracting Ltd.

North Shore Wastewater Treatment Plant Conveyance Project

# BUILDING FOR A GROWING POPULATION

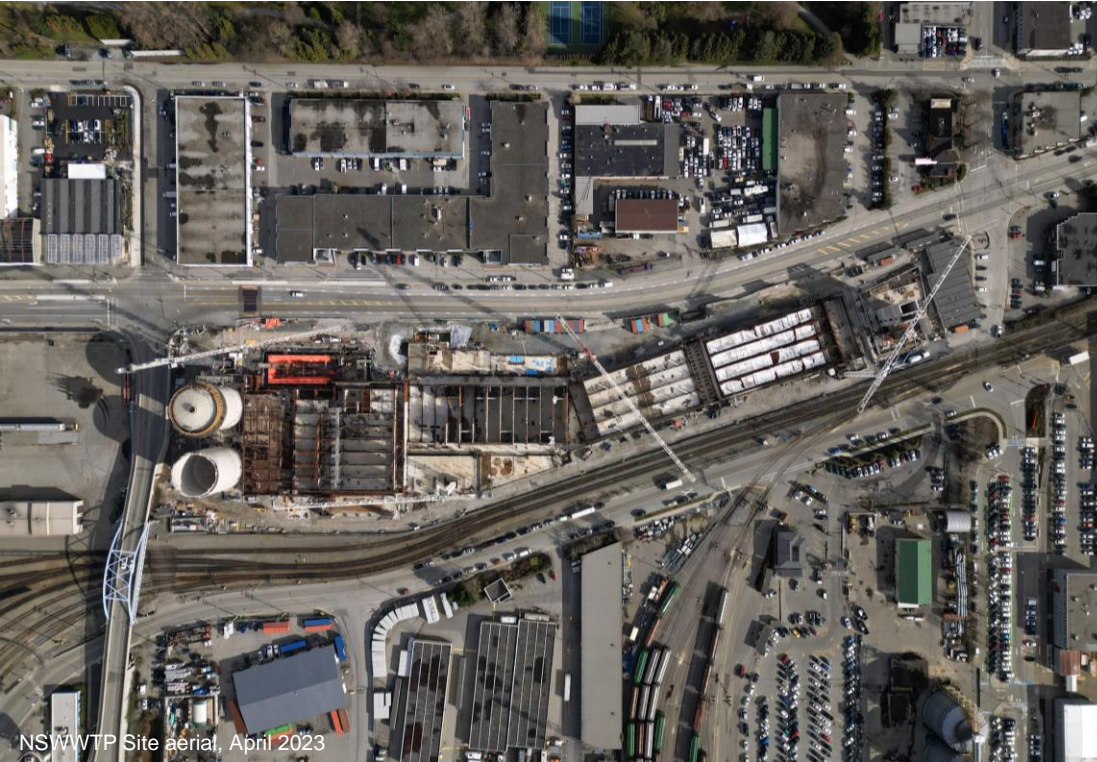
Designed to serve over 300,00 residents

- District of North Vancouver
- District of West Vancouver
- City of North Vancouver
- Sḵw̱x̱wú7mesh Úxwumixw (Squamish Nation)
- səlílwətał (Tsleil-Waututh Nation)



North Shore Sewerage Area

# SITE LOCATION



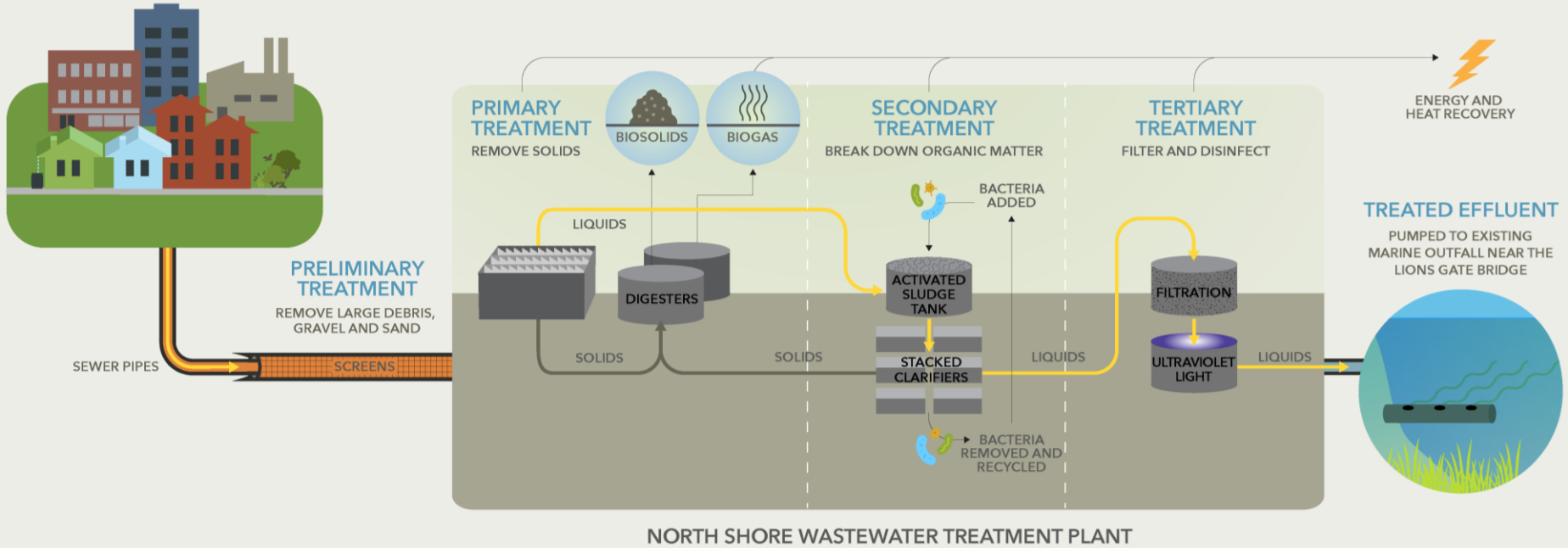
# PROJECT OUTCOMES

- Tertiary filtration
- Accommodating growth
- Resource recovery and sustainability features
- Modern design and odour control
- Community amenities



NSWWTP Architectural Rendering

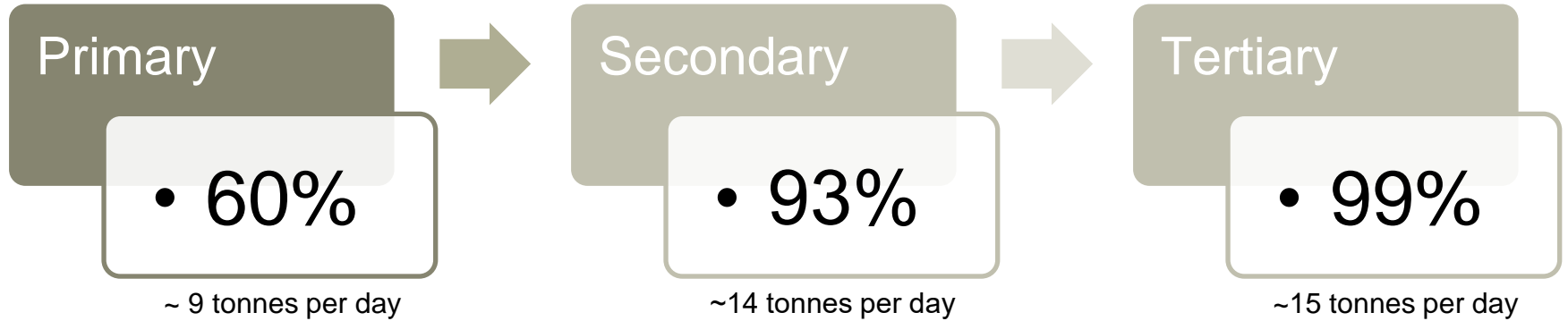
# TREATMENT PROCESSES



Treatment Process Diagram

# TOTAL SUSPENDED SOLIDS (TSS)

How much is removed by treatment?



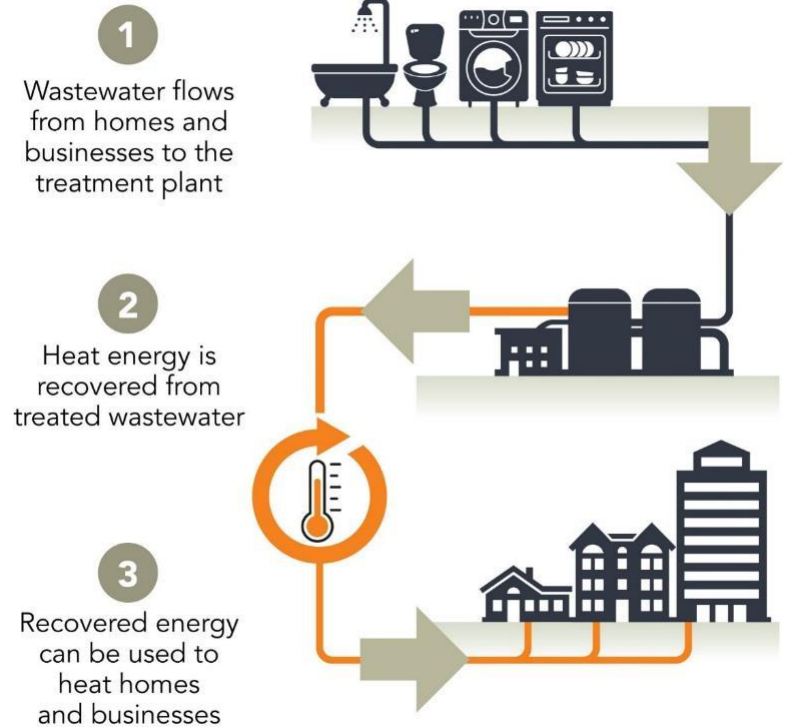
# MICROPLASTICS & CONTAMINANTS OF EMERGING CONCERN (CECS)

- Up to 99% of microplastics removed by secondary and tertiary treatment
- Secondary treatment leads to overall removal of 40-60% of CECs



# RESOURCE RECOVERY & SUSTAINABILITY FEATURES

- District energy system to provide domestic space and hot water heating
- Biogas cogeneration produces heat and power for the plant
- Class A biosolids





# Project History & Background

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# TIMELINE



# PROJECT TIMELINE

**2012 to  
2014**

Indicative  
Design &  
Project  
Definition  
completed



**2017 to  
2018**

\$405 M in  
funding  
received

Award to  
Acciona

WWTP  
construction  
starts

Ground  
improvements

**2019 to  
2020**

Stop work  
order

Acciona  
contractual  
issues

Tertiary  
treatment  
added

COVID-19

**2021**

Updated cost  
\$1.058 B &  
schedule  
(2023)

MV loses  
confidence in  
Acciona

Termination  
notice issued

**2022**

Acciona  
terminated

PCL becomes  
Construction  
Manager

AECOM  
becomes  
Designer

Early works  
begin

**2023 to  
2024**

Updated cost  
estimate and  
schedule

Early works

Addressing  
design &  
construction  
deficiencies

*Community Engagement  
(Planning)*

*Community Engagement / Design & Construction - Ongoing*

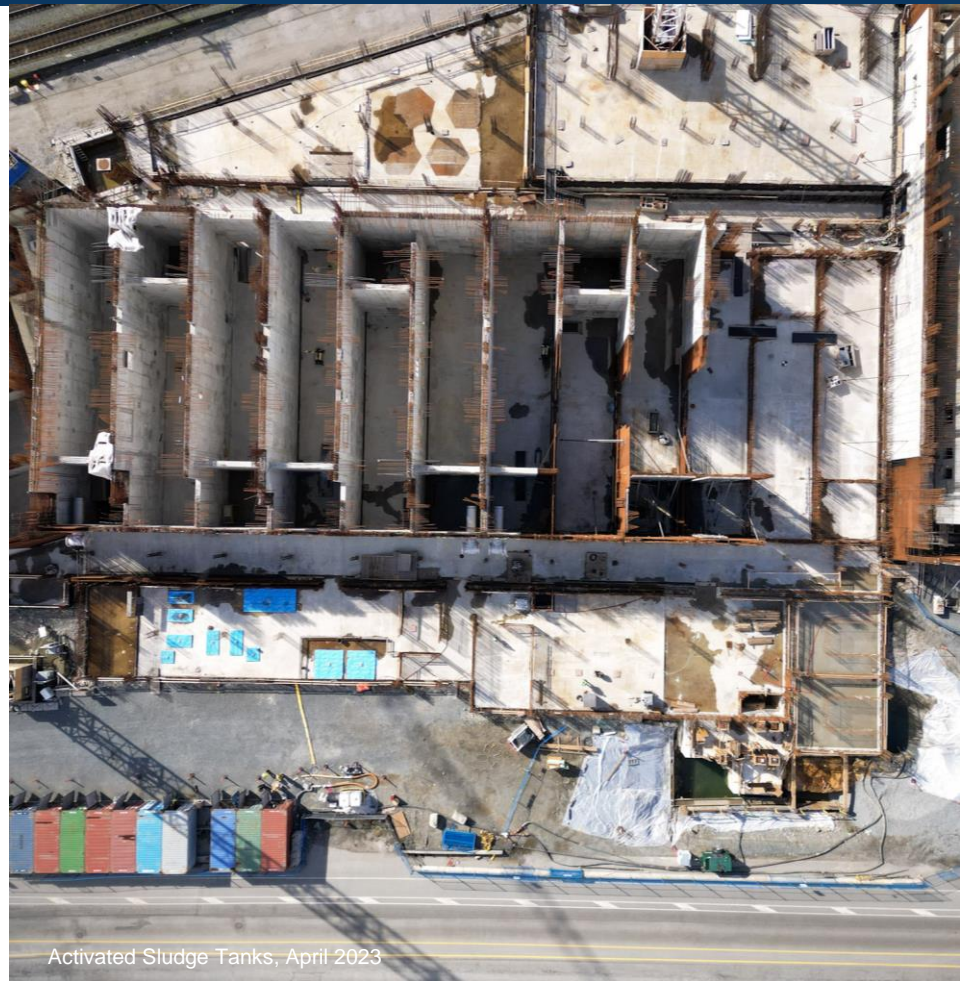
A large-scale construction site for power distribution and disinfection buildings. The foreground shows a concrete foundation with a rebar grid. In the middle ground, several tall, rectangular concrete structures are under construction, with dense rebar frameworks visible. Two large tower cranes are positioned in the background against a blue sky with scattered white clouds. The overall scene is active and industrial.

# Activities Since Transition

Power Distribution & Disinfection Buildings, Apr 2023

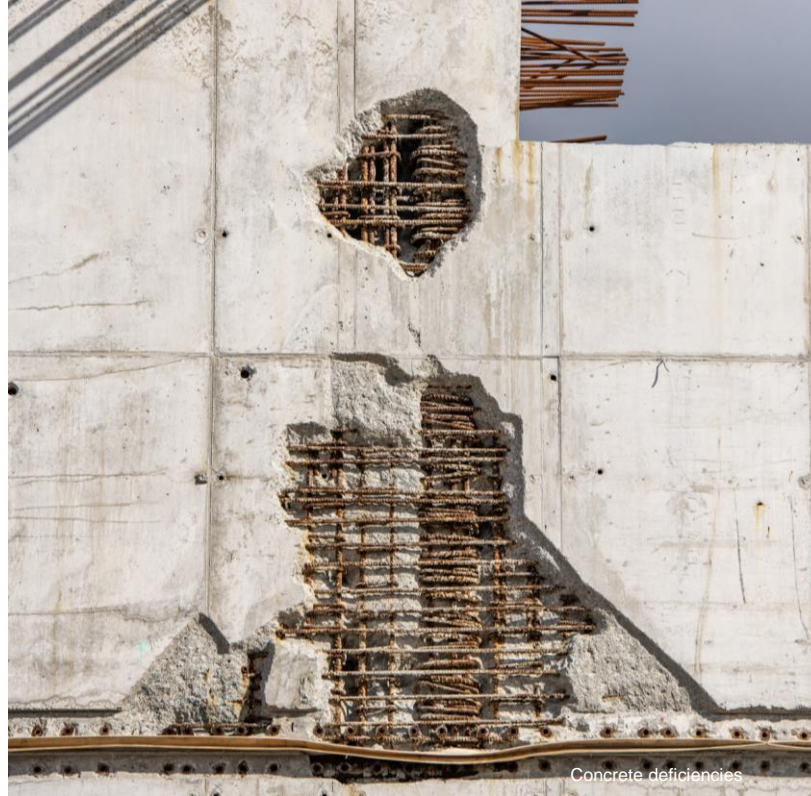
# ACTIVITIES SINCE TRANSITION

- Due diligence review of existing design & construction
- Correction of design deficiencies
- Advancing detailed design
- Early works construction (correcting concrete deficiencies and other concrete work)
- Developing project execution plan, cost estimate, and schedule



Activated Sludge Tanks, April 2023

# DESIGN & CONSTRUCTION DEFICIENCIES



Concrete deficiencies

# APPROACH TO COST AND SCHEDULE ESTIMATES

Oversight and due diligence

- Market sounding
- Three separate cost estimates
- Expert advisory panel
- Value engineering
- Regular Board updates



Architectural Rendering, NSWTP

# TASK FORCE TO REVIEW OPTIONS

- Board task force struck to review options for completing the project, while mitigating cost impacts to region







# Updated Estimate for Cost and Schedule

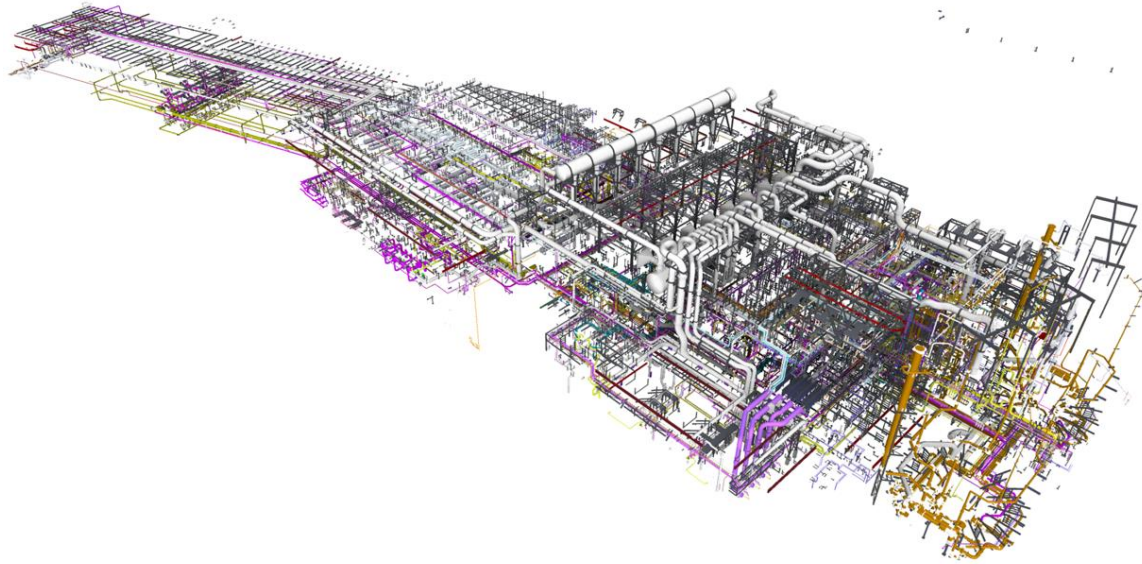
Architectural Rendering, NSWWTP (south side)

# COST ESTIMATE DEVELOPMENT

- Comprehensive cost estimates by three separate organizations
- Value engineering exercise
- Investigation of current market conditions
- Review by expert advisory panel
- Review by a Metro Vancouver Board task force

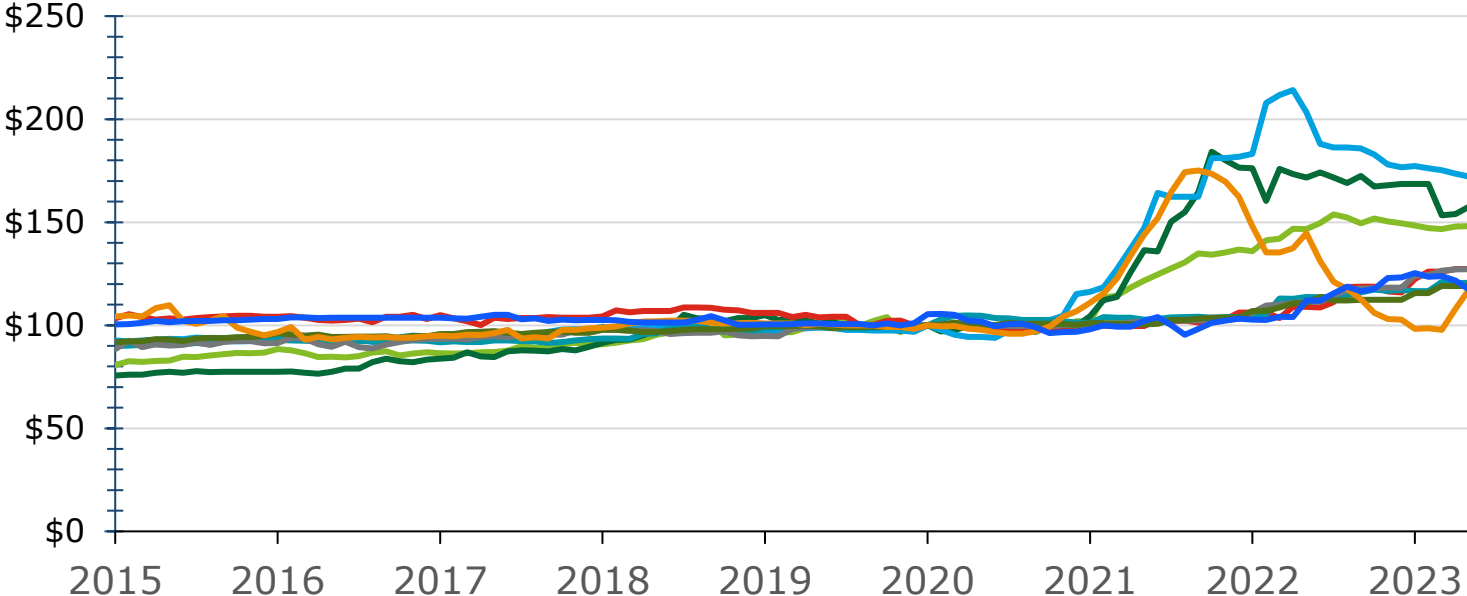
# ESTIMATE DEVELOPMENT

Design and construction complexity and deficiencies



# ESTIMATE PROGRESSION

Impacts of market on current estimate



- Fabricated steel plate/other fabricated structural metal
- Communication and electric wire and cable
- Metal valves and pipe fittings
- Pumps and compressors (except fluid power)
- Other architectural metal products
- Concrete products
- Ready-mixed concrete
- Iron and steel pipes and tubes (except castings)

# THREE SEPARATE COST ESTIMATES

1. Independent - Completed by the Engineer of Record based on previous contractor bid numbers. Quantities were re-verified. Standard engineering-style estimate.
2. Independent – Completed by third-party construction estimators with significant experience working on major projects. This is a contractor-style estimate. The quantities align with current contractor's estimate.
3. Current Contractor - Developed in a similar manner to the second independent estimate produced for Metro Vancouver, based on craft hours, quantities, and other components.

# COST ESTIMATE DRIVERS

- Deficiencies required rework
- Escalation
- Construction cost escalation since COVID-19
- Labour availability, productivity, and capacity
- Market conditions
- Takeover project implications
- Conditions in the construction market
- Location



# UPDATED COST ESTIMATE

Total capital program for North Shore Wastewater Treatment Plant Program estimated at \$3.86 billion

An aerial photograph of an industrial site, likely a water treatment plant, situated along a large body of water. The site features various industrial buildings, parking lots filled with cars, and large cylindrical tanks. In the background, a city skyline is visible across the water under a blue sky with scattered white clouds. A semi-transparent blue vertical bar is overlaid on the left side of the image, containing the text 'Looking Ahead'.

# Looking Ahead

NSWWTP Site Aerial



# LOOKING AHEAD



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*Goal:*

*A high-quality regional asset that runs as intended and will serve North Shore communities for decades to come*

# VIDEO - EXTERIOR FACILITY DESIGN





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# North Shore Wastewater Treatment Plant Program

ADDITIONAL INFORMATION SINCE MARCH 22, 2024 TECHNICAL BRIEFING

Jerry W. Dobrovolny, P.Eng, MBA

Commissioner/CAO

September 14, 2024

70399438

**metrovancouver**

# PROJECT COST INCREASES ACROSS CANADA

- Winnipeg North End Sewage Treatment Plant Upgrade  
*From \$795M to \$3B*
- Surrey Langley SkyTrain  
*From \$3B to \$6B*
- Calgary Green Line LRT  
*From \$4.6B to \$6.2B*
- TransMountain Pipeline  
*From \$5.6B to \$30B*
- Site C  
*From \$8.6B to \$16B*



# NSWWTP EXPERT ADVISORY PANEL

Panel members bring decades of experience with major construction projects

## Purpose

To provide an objective third-party lens on project recommendations

## Members

- **Frank Margitan** – Retired GM, Kiewit
- **John Herbert** – Retired Senior VP, Jacobs
- **Greg Lewis** – Retired Partner, Norton Rose Fulbright LLP
- **Jane Bird** – Director, Canada Infrastructure Bank; Senior Business Advisor, Bennett Jones LLP
- **Don Fairbairn** – President, DCF Consulting
- **Dana Hayden** – Chair, Infrastructure BC

# COST ALLOCATION FOR THE \$2.8B INCREASE

Increase approved March 22, 2024

Board workshops on cost allocation held:

- April 17, 2024
- May 17, 2024
- May 31, 2024



# ESTIMATED HOUSEHOLD IMPACTS

Estimated Incremental Household Impact (HHI)	
North Shore Sewerage Area	+\$590
Vancouver Sewerage Area	+\$150
Fraser Sewerage Area	+\$90
Lulu Island West Sewerage Area	+\$80

- By phasing-in rates for three sewerage areas over one year, the region saves \$60M
- Based on 30-year debt amortization period for North Shore Sewerage Area and 15-year amortization for all other sewerage areas, and average interest rate of 4.5% over borrowing period



# MITIGATION FOR NORTH SHORE ON COST INCREASE

- Just over 70% of the liquid waste levy related to the updated NSWWTP Program is shared across the region
- Allocation adjusted to share more across the region, ~\$10 more per household in other sewerage areas
- This reduced North Shore household impact from \$725 to \$590
- For North Shore, costs will be phased-in over 5 years
- In 2025, North Shore household impact will be \$118

# ACCOUNTABILITY AND ACCIONA TERMINATION

- Metro Vancouver's position is that Acciona underperformed and consistently failed to meet its contractual obligations, which included delivering the project on time and within budget, as required under the initial fixed-cost design-build-finance model.
- Upon Metro Vancouver taking full control of the project, its advisors identified more than 1,500 concrete deficiencies and 400 design conflicts that they recommended for repair.
- Metro Vancouver has a counterclaim against Acciona. At stake is the ability to recover hundreds of millions of public dollars for the region.

# DUE DILIGENCE

## Organization-wide Improvements since 2020

- Completed an assessment to inform improvements to efficiency and capability of project delivery (2020)
- Increased quality management and project controls
- Implemented stage gate framework
- Implemented standard cost estimate framework
- Procurement best-practice updates
- Created regulatory strategy team
- And more

To: Caucus of Committee Chairs

From: Cheryl Nelms, General Manager, Project Delivery  
Nick Kassam, General Manager, Procurement & Real Estate Services

Date: July 10, 2023 Meeting Date: July 25, 2023

Subject: **Due Diligence Improvements for Major Projects**

#### RECOMMENDATION

That the MVRD Board receive for information the report dated July 10, 2023, titled "Due Diligence Improvements for Major Projects."

#### EXECUTIVE SUMMARY

Responding to capacity needs due to population growth and meeting regulatory requirements have led to a dramatic increase in the scope of Metro Vancouver's capital program, and in the scale and complexity of capital projects. In light of these challenges, Metro Vancouver has undertaken extensive continuous improvement measures to enhance the management and delivery of projects, particularly those of the highest value, risk, and consequence. Significant measures taken since 2020 include the establishment of a Project Delivery Department as a centre of project delivery expertise for the organization, and the development of a restructured Procurement and Real Estate Services Department, as well as implementation of enhanced project management and permitting processes.

#### PURPOSE

To provide the Caucus of Committee Chairs and MVRD Board an update on due diligence and continuous improvement measures undertaken since 2020 to strengthen the management of capital project delivery.

#### BACKGROUND

At a number of June Standing Committee meetings, questions were asked by Committee members related to the steps taken to improve Metro Vancouver's management, delivery and control of major capital projects over the past number of years. The Chair of the Caucus of Committee Chairs requested that staff provide an overview and update on this work. This report responds to that request.

#### CONTEXT FOR CONTINUOUS IMPROVEMENT

In the fall of 2019, the Greater Vancouver Sewerage and Drainage District (GVSD&DD) Board expressed interest in undertaking a review of Metro Vancouver's capital project delivery practices to ensure value for residents. Responding to capacity needs due to population growth and meeting regulatory requirements have led to a dramatic increase in the scope of Metro Vancouver's capital program and the scale of projects within this program. The current construction market dynamics coupled with the complex nature of these projects adds additional challenges.

# PUBLIC INFORMATION AND MATERIALS

- Technical briefing video
- FAQs
- Media releases
- Monthly e-newsletters
- Backgrounder materials
- Key events and documents
- Reasons for cost and schedule increase shared publically since March 22, 2024 announcement

The screenshot shows the Metro Vancouver website page for the North Shore Wastewater Treatment Plant Program. The page features a navigation bar with links for Careers, Contact, Live Chat, Select Language, and a search bar. Below the navigation bar, the main heading is "North Shore Wastewater Treatment Plant Program". The page content includes a "Program overview" section with a video player, a "Common questions about the North Shore Wastewater Treatment Plant" section, an "About the treatment plant" section, a "Program benefits" section, and a "Timeline" section. The timeline lists key milestones from 2012 to 2024, including project definition, construction start, contract termination, and the current phase of design and planning.

**metrovancover** Careers Contact Live Chat Select Language Search...

Services Boards Media Room About Us Quick Links Current Conditions

## North Shore Wastewater Treatment Plant Program

Home / Services / Liquid Waste Services / Projects and Initiatives

### Program overview

Metro Vancouver is building the North Shore Wastewater Treatment Plant, a new treatment facility that will provide tertiary filtration to better protect the environment and meet the needs of a growing region.

Also included in the program are:

- The pump station and sewer pipes to serve the new plant (the Conveyance Project)
- The preliminary design for decommissioning the existing Lions Gate Wastewater Treatment Plant

Common questions about the North Shore Wastewater Treatment Plant +

### About the treatment plant

The new North Shore Wastewater Treatment Plant will serve over 300,000 residents and businesses in the Districts of North and West Vancouver, the City of North Vancouver, and Słwgwú7mesh Úxwumíxw (Squamish Nation), and selliwatol (Tsleil-Waututh Nation). It will replace the existing Lions Gate Wastewater Treatment Plant on the North Shore, one of the last plants on the west coast of North America to provide only primary level wastewater treatment. Building a new wastewater treatment plant that provides a higher level of treatment is essential to comply with mandatory federal regulations. It will also ensure the treated wastewater released into the marine environment of the Burrard Inlet is much cleaner.

### Program benefits

The new plant will:

- Provide tertiary filtration to improve the quality of the treated wastewater released into the Burrard Inlet
- Feature a modern, enclosed design and robust odour control system
- Add treatment capacity needed to serve a growing population
- Meet the latest earthquake standards and be resilient to future sea level rise
- Recover heat for use by the Lonsdale Energy Corporation as an alternative energy source
- Be constructed to Leadership in Energy and Environmental Design (LEED) Gold and ENVISION Gold certification standards

### Timeline

- 2012 to 2014**  
Indicative design and project definition
- 2017 to 2021**  
Treatment plant construction started by original contractor  
First Narrows Pump Station and conveyance pipes constructed
- January 2022**  
Original construction contract terminated
- Early 2022 to Mid-2024**  
Develop new cost estimate and plan to complete program  
Address design and

# MATERIALS IN FOLDER

- 1-Page Overview
- Backgrounder
- Claim and Counterclaim
- Due Diligence Report

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GENESIS AND SOLUTIONS FOR A LIVABLE WORLD

2.3

To: Caucus of Committee Chairs

From: Cheryl Nelms, General Manager, Project Delivery  
Nick Kassam, General Manager, Procurement & Real Estate Services

Date: July 30, 2023 Meeting Date: July 25, 2023

Subject: **Due Diligence Improvements for Major Projects**

**RECOMMENDATION**  
That the MVRD Board receive for information the report dated July 30, 2023, titled "Due Diligence Improvements for Major Projects."

**EXECUTIVE SUMMARY**  
Responding to capacity needs due to population growth and meeting regulatory requirements have led to a dramatic increase in the scope of Metro Vancouver's capital program, and in the scale and complexity of capital projects. In light of these challenges, Metro Vancouver has undertaken extensive continuous improvement measures to enhance the management and delivery of projects, particularly those of the highest value, risk, and consequence. Significant measures taken since 2020 include the establishment of a Project Delivery Department, a center of expert delivery expertise for the Estate Services and permitting processes.

due diligence and management of capital

by Committee members delivery and control of Caucus of Committee Chairs sort responds to that

(GV&SDO) Board project delivery practices from growth and meeting Metro Vancouver's capital action market dynamics

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**Project Benefits**

- Improve the quality of the treated wastewater released into the Burrard Inlet
- Provide tertiary filtration to better protect the environment
- Features a modern enclosed

**North Shore Wastewater Treatment Plant Project**  
**Background Paper**  
September 2024

Prepared by: Project Delivery

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**NORTH SHORE WASTEWATER TREATMENT PLANT PROGRAM OVERVIEW**

**About the Program**

The new North Shore Wastewater Treatment Plant will serve over 300,000 residents and businesses in the Districts of North and West Vancouver, the City of North Vancouver, and Sliamwhiish (Squamish Nation), and tsilahlal (Ts'el-wiyath Nation). It will replace the existing Lions Gate Wastewater Treatment Plant, one of the last plants on the west coast of Canada and the United States to provide only primary level wastewater treatment. Building a new wastewater treatment plant that provides a higher level of treatment is essential to comply with mandatory federal regulations. The program also includes construction of a new pump station and sewer pipes to serve the new plant (now complete), and the preliminary design for decommissioning the existing Lions Gate plant.

**Project Transition**

Acciona Wastewater Solutions LP (Acciona) was selected through a competitive process in 2017 to build the future North Shore Wastewater Treatment Plant. The original completion date of the project was end of 2020. In 2019, at the request of the contractor, the contract was revised to provide an additional two-and-a-half years to complete the project (end of 2023), along with an increased budget.

In 2022, Metro Vancouver made the difficult but necessary decision to terminate the contract with Acciona. There were concerns with Acciona's performance under the contract, and the project was not going to be completed on time and within budget. At that time, the project was already two-and-a-half years behind schedule, and Acciona had informed Metro Vancouver that it required an additional two years, along with an increase in budget.

Since termination of Acciona, Metro Vancouver has been working with PCL as the construction manager, and ACCOM as the design consultant, to progress the project. Early works construction has included assessment and repair of more than 1,500 concrete deficiencies identified. Additionally, design reviews identified that the plant design was not as advanced as reported by Acciona at the time of termination.

In the coming months, Metro Vancouver will confirm a contract to complete plant construction, with the treatment plant expected to be complete in 2030. Metro Vancouver is looking forward to delivering a high-quality wastewater treatment plant that will protect the health of residents and the environment for generations to come.



NSWWTP Architectural Rendering

Questions?

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