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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

METRO VANCOUVER REGIONAL DISTRICT
LIQUID WASTE COMMITTEE

REGULAR MEETING

February 7, 2019
1:00 p.m.
28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia

A G E N D A[1]

1. ADOPTION OF THE AGENDA

1.1 February 7, 2019 Regular Meeting Agenda
That the Liquid Waste Committee adopt the agenda for its regular meeting scheduled for February 7, 2019 as circulated.

2. ADOPTION OF THE MINUTES

2.1 January 17, 2019 Regular Meeting Minutes
That the Liquid Waste Committee adopt the minutes of its regular meeting held January 17, 2019 as circulated.

3. DELEGATIONS

3.1 Rick and Makai Genovese
Subject: Sewer Main Connection Renewal – 2100 Block, 2179 124 Street, Surrey

4. INVITED PRESENTATIONS

5. REPORTS FROM COMMITTEE OR STAFF

5.1 Northwest Langley Wastewater Treatment Projects – Project Status Update
Designated Speaker: Paul Wilting, Program Manager, Northwest Langley Treatment Projects, Liquid Waste Services
That the GVS&DD Board receive for information the report dated January 28, 2019, titled "Northwest Langley Wastewater Treatment Projects – Project Status Update".

5.2 Climate Change Impacts on Precipitation and Stormwater Management
Designated Speaker: Lillian Zaremba, Senior Project Engineer, Liquid Waste Services

[1] *Note: Recommendation is shown under each item, where applicable.*

That the GVS&DD Board receive for information the report dated January 28, 2019, titled "Climate Change Impacts on Precipitation and Stormwater Management".

5.3 Overview of Metro Vancouver's Methods in Projecting Regional Growth
Verbal Report
Designated Speaker: Terry Hoff, Senior Planner, Regional Planning, Planning and Environment

5.4 Metro Vancouver's Procurement Process for Vendor Selection
Designated Speaker: Roy Moulder, Director, Purchasing and Risk Management, Financial Services
That the GVS&DD Board receive for information the report dated January 29, 2019, titled "Metro Vancouver's Procurement Process for Vendor Selection".

5.5 Award of a Contract Resulting from Request for Proposal (RFP) No. 18-129: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility Project
Designated Speakers: Roy Moulder, Director, Purchasing and Risk Management, Financial Services; Fred Nenninger, Director, Policy, Planning and Analysis, and Jeff Chan, Division Manager, Project Delivery, Liquid Waste Services
That the GVS&DD Board:

a) approve the award of a contract in an amount of up to $50,679,095 (exclusive of taxes) to NAC Constructors Ltd. resulting from RFP No. 18-129: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility; and
b) authorize the Commissioner and the Corporate Officer to execute the contract.

5.6 Manager's Report
Designated Speaker: Peter Navratil, General Manager, Liquid Waste Services
That the Liquid Waste Committee receive for information the "Manager's Report", dated January 29, 2019.

6. INFORMATION ITEMS

6.1 Overview of Metro Vancouver's Methods in Projecting Regional Growth

7. OTHER BUSINESS

8. BUSINESS ARISING FROM DELEGATIONS

9. RESOLUTION TO CLOSE MEETING

10. ADJOURNMENT/CONCLUSION

That the Liquid Waste Committee adjourn/conclude its regular meeting of February 7, 2019.

Membership:

Stewart, Richard (C) - Coquitlam
Little, Mike (VC) - North Vancouver District
Calendino, Pietro - Burnaby
Dominato, Lisa - Vancouver
Ferguson, Steve - Langley Township
LeBlanc, Justin - Electoral Area A
Loo, Alexa - Richmond
Svendsen, Ryan - Maple Ridge
Trentadue, Mary - New Westminster
Vagramov, Rob - Port Moody
van den Broek, Val - Langley City
Walker, Darryl - White Rock

METRO VANCOUVER REGIONAL DISTRICT
LIQUID WASTE COMMITTEE

Minutes of the Regular Meeting of the Metro Vancouver Regional District (MVRD) Liquid Waste Committee held at 1:03 p.m. on Thursday, January 17, 2019 in the 28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia.

MEMBERS PRESENT:
Chair, Mayor Richard Stewart, Coquitlam
Vice Chair, Mayor Mike Little, North Vancouver District
Councillor Pietro Calendino, Burnaby
Councillor Lisa Dominato, Vancouver
Councillor Steve Ferguson, Langley Township
Director Justin LeBlanc, Electoral Area A
Councillor Alexa Loo, Richmond
Councillor Ryan Svendsen, Maple Ridge (arrived at 1:14 p.m.)
Councillor Mary Trentadue, New Westminster
Mayor Rob Vagramov, Port Moody
Mayor Val van den Broek, Langley City

MEMBERS ABSENT:
Mayor Darryl Walker, White Rock

STAFF PRESENT:
Peter Navratil, General Manager, Liquid Waste Services
Carol Mason, Chief Administrative Officer
Genevieve Lanz, Legislative Services Coordinator, Board and Information Services

1. ADOPTION OF THE AGENDA

1.1 January 17, 2019 Regular Meeting Agenda

It was MOVED and SECONDED
That the Liquid Waste Committee adopt the agenda for its regular meeting scheduled for January 17, 2019 as circulated.

CARRIED

2. ADOPTION OF THE MINUTES

No items presented.

3. DELEGATIONS

No items presented.

4. INVITED PRESENTATIONS

No items presented.

5. REPORTS FROM COMMITTEE OR STAFF

5.1 2019 Liquid Waste Committee Priorities and Work Plan

Report dated January 3, 2019 from Peter Navratil, General Manager, Liquid Waste Services, providing the Liquid Waste Committee with the priorities and Work Plan for the year 2019.

1:14 p.m. Councillor Svendsen arrived at the meeting.

Members were provided a presentation on the 2019 Work Plan and priorities highlighting the *Integrated Liquid Waste and Resource Management Plan*, the four sewerage areas and regional drainage system, the five Metro Vancouver wastewater treatment plants, and the Liquid Waste Services divisions.

Presentation material titled "2019 Work Plan Priorities and Committee Orientation – Liquid Waste Committee" is retained with the January 17, 2019 Liquid Waste Committee agenda.

It was MOVED and SECONDED

That the Liquid Waste Committee endorse the work plan as presented in the report dated January 3, 2019, titled "2019 Liquid Waste Committee Priorities and Work Plan".

CARRIED

Councillors Dominato and Trentadue absent at the vote.

5.2 North Shore Wastewater Treatment Plant Project

Report dated January 14, 2019 from Paul Dufault, Project Manager, North Shore Wastewater Treatment Plant Project, Liquid Waste Services, updating the GVS&DD Board on the current status of the North Shore Wastewater Treatment Plant project.

Members were provided a presentation on the North Shore Wastewater Treatment Plant, highlighting federally mandated upgrades, decommissioning components, project objectives and project timelines.

Presentation material titled "North Shore Wastewater Treatment Plant – Project Status Update" is retained with the January 17, 2019 Liquid Waste Committee agenda.

It was MOVED and SECONDED
That the GVS&DD Board receive for information the report dated January 14, 2019 titled "North Shore Wastewater Treatment Plant Project Status Update".

CARRIED

5.3 Iona Island Wastewater Treatment Plant – Project Definition Update

Report dated January 10, 2019 from Fred Nenninger, Director, Policy Planning and Analysis, Liquid Waste Services, updating the GVS&DD Board on the status of the Iona Island Wastewater Treatment Plant Project Definition Phase.

Members were provided a presentation on the Iona Island Wastewater Treatment Plant secondary regulatory drivers, project goals, integrative design process, and next steps.

Presentation material titled "Iona Island Wastewater Treatment Plant Project Definition Phase" is retained with the January 17, 2019 Liquid Waste Committee agenda.

It was MOVED and SECONDED
That the GVS&DD Board receive for information the report dated January 10, 2019 titled "Iona Island Wastewater Treatment Plant – Project Definition Update".

CARRIED

5.4 2019 Liquid Waste Capital Projects

Report dated January 7, 2019 from Paul Dufault, Acting Director, Project Delivery, Liquid Waste Services, informing the GVS&DD Board of the liquid waste capital projects under its purview for 2019.

Members were provided a presentation on the 2019 Liquid Waste capital projects, highlighting size, scope, and technical specifications.

Presentation material titled "2019 Liquid Waste Capital Projects" is retained with the January 17, 2019 Liquid Waste Committee agenda.

It was MOVED and SECONDED
That the GVS&DD Board receive for information the report dated January 7, 2019, titled "2019 Liquid Waste Capital Projects".

CARRIED

6. INFORMATION ITEMS

It was MOVED and SECONDED
That the Liquid Waste Committee receive for information the following Information Items:

6.1 Map of Metro Vancouver Liquid Waste Infrastructure
6.2 Extension of Comprehensive Review Cycle – GVS&DD Integrated Liquid Waste and Resource Management Plan

CARRIED

7. OTHER BUSINESS

No items presented.

8. BUSINESS ARISING FROM DELEGATIONS

No items presented.

9. RESOLUTION TO CLOSE MEETING

No items presented.

10. ADJOURNMENT/CONCLUSION

It was MOVED and SECONDED
That the Liquid Waste Committee conclude its regular meeting of January 17, 2019.

CARRIED
(Time: 3:07 p.m.)

_____ _____

Genevieve Lanz,
Legislative Services Coordinator

Richard Stewart, Chair

28228260 FINAL

SUMMARY of PRESENTATION by; (Revision 2)
Rick and Makai Genovese.
Resident Homeowners of; 2179, 124 Street Surrey, since 2006.

Regarding;

1. Appeal of the egregiously biased decision to deny our home's sewer main connection renewal to Metro Vancouver GVS&DD (Metro Van) 750 diameter sewer main fronting our property along 124 St. Surrey, and to present our revised case for connection renewal given that we in good faith but mistakenly presented on 18 04 12 alternatives for connection to the City of Surrey mains that the GVS&DD deferred to the City of Surrey rendering our presentation ineffective.
   Attached for reference are;
   a) Utilities Committee meeting follow up letter; "18 04 24 Metro Van Committee Presentation Follow up"
   b) Metro Van and COS letter for File: SE-02-02-OPC dated March 01, 2018.

Content to be Presented;
We will present Power Point and PDF documents as follows;

1. Marked up snapshot of Cosmos Geomap showing Utilities connections along 124 St. Surrey between 21A Ave. and 24 Ave. emphasizing precedence of sewer connection renewals to same Metro Van sewer main for 4 recent new builds within the past 5 years, within "reasonable" proximity to a City of Surrey arterial sewer main and or similar extension distance as our home;

2. Our presentation will show why the denial of our renewal to the Metro Van main is egregiously biased based on the facts as follows;

NOTE; These 4 Metro Van sewer connections where renewed regardless of them being within a similar, "Reasonable" proximity to a City of Surrey arterial sewer main and unlike the demand imposed on us these new builds where not denied renewal and issued a demanded to extend the City of Surrey arterial main across their entire frontage?

	Address		Building Permit		Occupancy Permit		Connected to sanitary sewer owned by…		
			#	Issue Date	#	Issue Date	Metro Vancouver	City	Asbuilt Date
a.	2260	124 St	15-037618	Jan 22/16	15-037618	Jun 16/17	X		June 2016
b.	2285	124 St	14-048425	Jan 30/15	14-048425	Feb 05/16		X	October 2015
c.	2324	124 St	15-015134	May 14/15	15-015134	Mar 30/17	X		April 2015
d.	2345	124 St	15-038831	Feb 19/16	15-038831	Feb 16/17	X		March 2016
e.	12390	24 Ave	12-029461	May 3/13	12-029461	Aug 22/14	X		March 2013

a. 2260, 124 St.
   This new build received occupancy June 16, 2017.
   Connection to Metro Van main was renewed regardless of the COS arterial main manhole "extending onto it's frontage" on 124 St.
   Contrary to our case, there was no requirement to extend the COS Main to the North Property Line of 2260 as is being demanded of us, or even to connect to the COS catch basin as was the case with 2285?

b. 2285, 124 St.
   Directly across the street from 2260, 2285 was denied renewal to the Metro Van main, but not required to extend the COS Main to their North property line to accommodate the "Future" extension that would have removed 2260 from the Metro Van main, and now when 2295, 2301 and 2280 build the extension that 2285 could have started would have captured all of those and removed them from the Metro Van main.

   The rationale presented for our denial and extension demand is exactly the same as this scenario.
   A COS sewer main and or inspection manhole resides at or in close proximity to the property line.

Based on the fact that 2285 did not have to extend, nor should we have to extend and be burdened with an additional $40 to $60 Thousand in costs to construct a COS main as these examples reflect that the removal of domestic lines from the Metro Van main is not actually an urgent requirement or these other properties would have been denied renewal, required to extend the COS arterial main and be removed from the Metro Van main systematically, which has not been the precedence.

c. 2345, 124 St.
This new build received occupancy February 16, 2017.
Connection to Metro Van main was renewed regardless of the COS arterial main being just one lot North of it's North property line, same distance as we're being asked to extend the COS main along our lot frontage. As noted, extending from the existing COS main to the North property line **is just one lot length** and the connection could have been the same as 2285, just over the lot line rendering the extension distance "reasonable", as "up to 2 lot lengths" was explained to me as being reasonable by COS engineering.

Again, this extension not being demanded removes the opportunity for 2332, 2314, 2335 and 2325 to disconnect from the Metro Van main and connect to a COS arterial main.
As was also explained to us these demands to extend COS mains are imposed on ALL NEW BUILDS in reasonable proximity to a COS Main, which these preceding examples show has NOT been the case?
It was also stated to us that we Must Extend and that we would have to pay the Latecomer Fee and Bond for adjacent properties if they did not extend before us. The extension and Latecomer demand was not imposed here or on any other builds along 124 St.

d. 2324, 124 St.
This new build received occupancy March 30, 2017.
Connection to Metro Van main was renewed with no demand to construct a COS arterial extension at their sole cost to connect to the COS main 2 lots north as we where told we would have been required to do. And as noted above a Demand to Extend and pay the Latecomer Fee and Bond for adjacent properties was not imposed here as it was on us.

COS Engineering stated by email that if the main fronting 2169 was not constructed before our sewer connection application that we would have been required to post 2 bonds and construct the COS Main at our soles cost for 2 lot lengths and wait for a late comer's fee refund after 2169 posted bond to construct. Based on precedence, this was an unfair and unreasonable demand.

e. 12390, 24 Ave.
This new build received occupancy August 22, 2014.
Connection to Metro Van main was renewed regardless of close proximity for extension of the COS main. There was also an opportunity to connect to the existing COS main diagonally located NE across 124 St.

Again, no requirement to extend the COS main which could have begun the process of removing residential lines form the Metro Van main progressively west along 124 St. which is the rationale proposed to us for denying our renewal to the Metro Van Main and demanding we construct a COS Main extension at a cost of $40,000 to $60,000 that was not imposed on any of these recent, similar proximity builds.

Based on the 4 cases above it's clear that the stated "requirement and or mandate to remove residential lines from Metro Van mains" is neither urgent or a requirement along 124 St. and that it's denial and COS main extension is not being deployed systematically or fairly and that we have been unfairly singled out.

In Closing ask that we be offered the same opportunity to connect to the existing Metro Van main as the rest of the recent new builds along 124 St. and to not be unfairly financially burdened by denial of the renewal of our connection.

We look forward to presenting our case and the committee meeting and if you have any questions prior to the meeting feel free to contact us on 604-603-0929 or by email at rickgvcv@gmail.com.

Sincerely, Rick and Makai Genovese.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Paul Wilting, Program Manager, Northwest Langley Treatment Projects, Liquid Waste Services

Date: January 28, 2019 Meeting Date: February 7, 2019

Subject: **Northwest Langley Wastewater Treatment Projects – Project Status Update**

RECOMMENDATION

That the GVS&DD Board receive for information the report dated January 28, 2019, titled "Northwest Langley Wastewater Treatment Projects – Project Status Update".

PURPOSE

To update the GVS&DD Board on the work completed to date for the Northwest Langley Wastewater Treatment Projects.

BACKGROUND

On September 23, 2016, the GVS&DD Board endorsed the implementation of the East Fraser Sewerage Area Servicing Plan. The plan recommended conveying all the sewage generated in Pitt Meadows and Maple Ridge across the Fraser River to an upgraded Northwest Langley Wastewater Treatment Plant (NLWWTP). Currently these areas are pumped, via Katzie Pump Station, almost 25 km to Annacis Island Wastewater Treatment Plant.

The Northwest Langley Wastewater Treatment Projects includes an upgraded treatment plant, a new pump station, a new forcemain and river crossing, and a new outfall into the Fraser River. In addition, a storage tank will be constructed adjacent to the pump station aimed at eliminating overflows in the Pitt Meadows/Maple Ridge area (Attachment 1). The projects are being completed to address regional growth and protect human health and the environment. At its meeting on May 25, 2018, the GVS&DD Board adopted the following resolution:

> *That the GVS&DD Board endorse Tertiary (Advanced Secondary plus Disk Filters) as the level of treatment carried forward into the Project Definition Report, as presented in the report dated April 25, 2018, titled 'Northwest Langley Wastewater Treatment Plant – Treatment Technology'.*

The current plant in Northwest Langley, which services roughly 30,000 people, will be upgraded to service 230,000 people and be operational in 2026. The ultimate capacity of the plant will be 700,000 people, including the Township of Langley, City of Langley, Pitt Meadows, Maple Ridge and a portion of North Surrey.

Public and First Nations Engagement

Staff worked with impacted and interested groups, individuals, municipalities and First Nations to ensure concerns were identified and addressed through the project definition phase (Attachment 2). The following key themes emerged during the engagement:

- Protect or improve the water quality in the Fraser River
- Minimize the impact of the project on fish, fish habitat and fishing activities
- Eliminate or reduce long standing odour issues
- Provide a seismically resistant pipe under the Fraser River.

2018 Accomplishments

A significant amount of work was conducted in 2018 resulting from the following GVS&DD Board endorsements and approvals:

- April – Award of the design services for the new pump station and sanitary sewer overflow storage tank
- May – Award of the Phase 1 ground improvements for the new treatment plant
- May – Endorsement of tertiary treatment as the level of treatment for the new plant
- June – Award of the design services for the new river crossing
- September – Receipt of the project definition engagement results for information
- September – Award of the project management and technical services contract for supervision of the treatment plant design
- October – Committee endorsement and Board approval of the Indicative Design (project definition report)

Treatment Plant

The Indicative Design is at 30% design which includes sizing for all tanks and vessels, selection and sizing of key equipment and a detailed list of user requirements. From this information a cost estimate was generated. This report documents the scope of the project, which will form the basis for the design consultant to accurately bid on the detailed design work.

A Request for Qualifications (RFQ) was issued in October 2018 for the detailed design services for the new treatment plant and three design consultants have been shortlisted. The RFP will be released shortly with the consultant selected by July 2019.

Ground Improvements

The treatment plant site has sandy soils that could liquefy during an earthquake. Therefore, ground improvements are required to ensure the new treatment plant will survive an earthquake. These include installation of stone columns and preload which densify the ground and prevent liquefaction. The $24M, Phase 1 Ground Improvements are currently underway and are 20% complete. The Phase 2 Ground Improvements, estimated at $35M, will be tendered early this summer. The third and final phase of ground improvements will be completed in 2022.

Forcemain and Fraser River Crossing

Preliminary work indicated that a drilled, deep river crossing will avoid environmental impacts in the river and foreshore area, and provide a seismically resistant crossing. The new 1.5 km crossing will

consist of two steel pipes to increase operational flexibility and reduce maintenance costs. Detailed design is approximately 40% complete and will be ready for tender by the end of the year.

Pump Station and Storage Tank

Metro Vancouver has a significant sanitary sewer overflow (SSO) issue at three locations in Maple Ridge and North Surrey. In 2017 there were 22 SSO's and in 2018 there were 16 SSO's at these locations. In order to reduce sanitary sewer overflows in this area, a 22,000 m^3 sanitary sewer overflow storage tank will be constructed to store the wastewater during heavy rainfall events to accommodate peaks and fluctuations in flow within the conveyance system. The wastewater would be pumped back into the system as conveyance and treatment capacity becomes available.

The storage tank will be constructed adjacent to the new pump station. The existing Katzie Pump station must be replaced due to seismic and flood level requirements, and because the new pumping requirements to cross the river are very different than those for pumping to Annacis Island. The new pump station and storage tank will be incorporated into one structure on GVS&DD-owned property next to the existing Katzie Pump Station. Detailed design is 75% complete and staff are targeting the issuing of tenders later this year.

Outfall Pipe

A new outfall pipe has been proposed for Parsons Channel adjacent to the treatment plant site. Outfall placement is governed by regulations that ensure proper dilution and mixing. Tenders for preliminary and detailed design are expected to be issued this summer.

Project Timeline

The project team is working to a 2026 completion for all components of the treatment system.

The storage tank would have been able to mitigate the SSO events that occurred in 2017 and 2018 by reducing the volume of the SSO or by completely eliminating the occurrence. In particular, 21 out of 22 of the 2017 SSO events, and 16 out of the 17 of the 2018 events could have been prevented.

To reduce the risk of sanitary sewer overflows in the area, the storage tank is being accelerated, with a completion date of 2021.

Project Budget

The Northwest Langley Wastewater Treatment Projects are proceeding according to budget and schedule. The estimated construction costs for the new treatment plant and related facilities are as follows:

Project Components	**Budget** based on 5 Year Plan
Pump Station & SSO Storage Tank	$100M
Fraser River Crossing	$86M
NLWWTP Expansion	$984M
NLWWTP Outfall	$159M
Total Cost	**$1,329M**

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The Servicing and Facility Plan for Northwest Langley and Annacis Island Wastewater Treatment Plant established the business case supporting the Northwest Langley Wastewater Treatment Projects. The study identified a cost savings of approximately $300M (in 2015 dollars) over the course of the project life, by conveying sewage from Maple Ridge and Pitt Meadows across the Fraser River to an expanded Northwest Langley Wastewater Treatment Plant.

The Northwest Langley Wastewater Treatment Projects are growth driven and the capital costs are funded by Tier II growth projects. Like the existing treatment plant, operating costs will be funded by the Fraser Sewerage Area (FSA) levy. The Northwest Langley Wastewater Treatment Projects are included in the 5-year plan.

The following work has been completed to date:
- The indicative design of the plant is complete and represents a 30% design
- Construction of phase 1 ground improvement is 20% complete
- Detailed design of the forcemain and river crossing are 40% complete
- Detailed design of the pump station and SSO tank are 75% complete

SUMMARY / CONCLUSION
Northwest Langley Wastewater Treatment Projects include an upgraded treatment plant, a new pump station, a new forcemain and river crossing, and a new outfall into the Fraser River. In addition, a storage tank will be constructed adjacent to the pump station, aimed at eliminating overflows in the Pitt Meadows/Maple Ridge area. Staff worked with impacted and interested groups, individuals, municipalities and First Nations to ensure concerns were identified and addressed through the project definition phase. Currently the first phase of ground improvements is being constructed on the treatment plant site with tenders for the detailed design services for the new plant anticipated to close in March. The new pump station/storage tank and river crossing are currently in detailed design and expected to be tendered for construction later this year. The new outfall, in Parsons Channel, will be tendered later this year for the preliminary and detailed design. Treatment plant construction is expected to start in 2022 and commissioning of the new plant in late 2026. The project components are expected to cost $1.329B. The project team is working to a 2026 completion for all components of the treatment system.

Attachments
1. Overview of the Northwest Langley Wastewater Treatment Projects
2. Northwest Langley Wastewater Treatment Projects, Engagement June 2016 to July 2018

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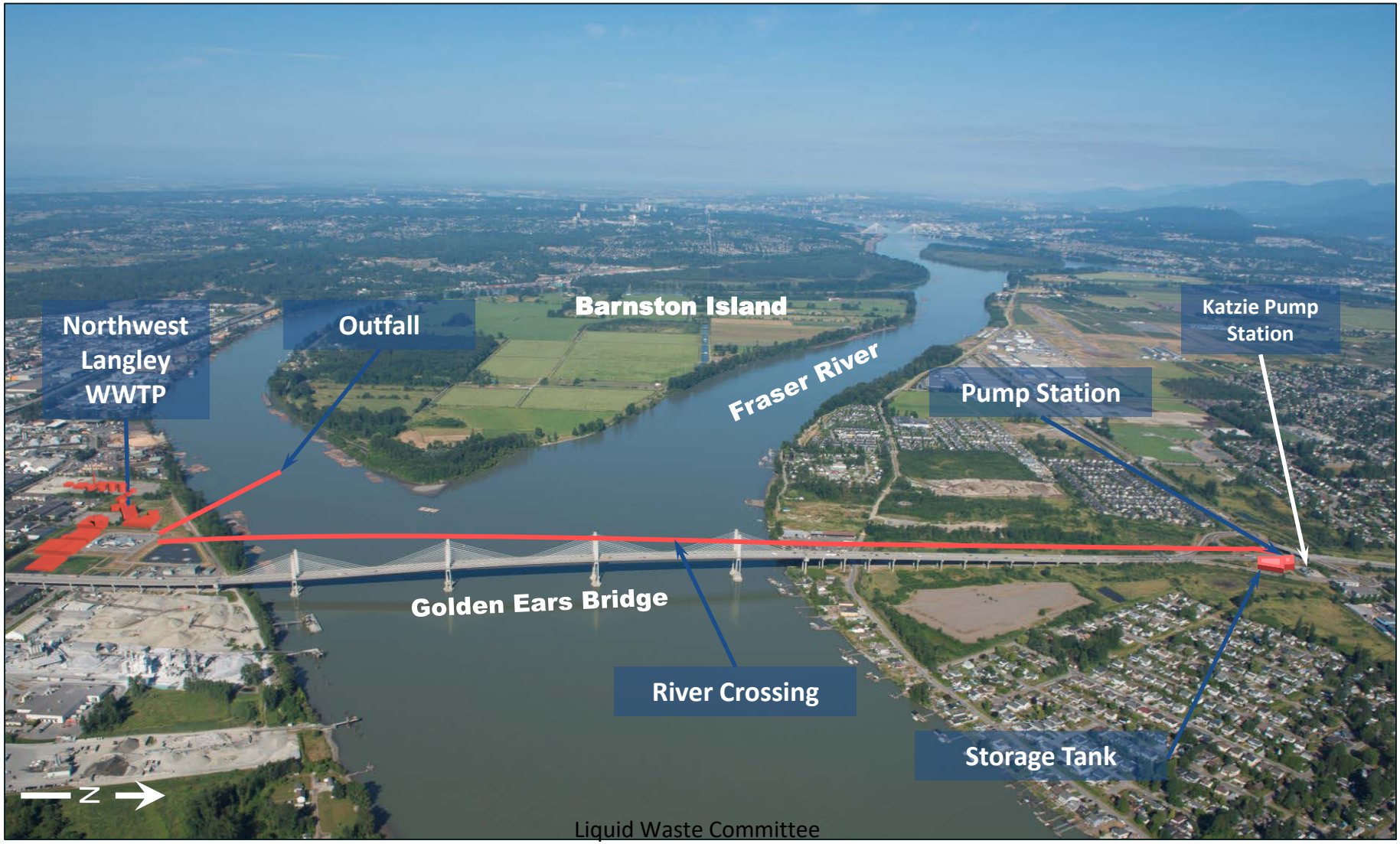
Overview of Northwest Langley Wastewater Treatment Projects



NORTHWEST LANGLEY WASTEWATER TREATMENT PROJECTS

September 2018

Engagement June 2016 to July 2018 – What we did & what we heard

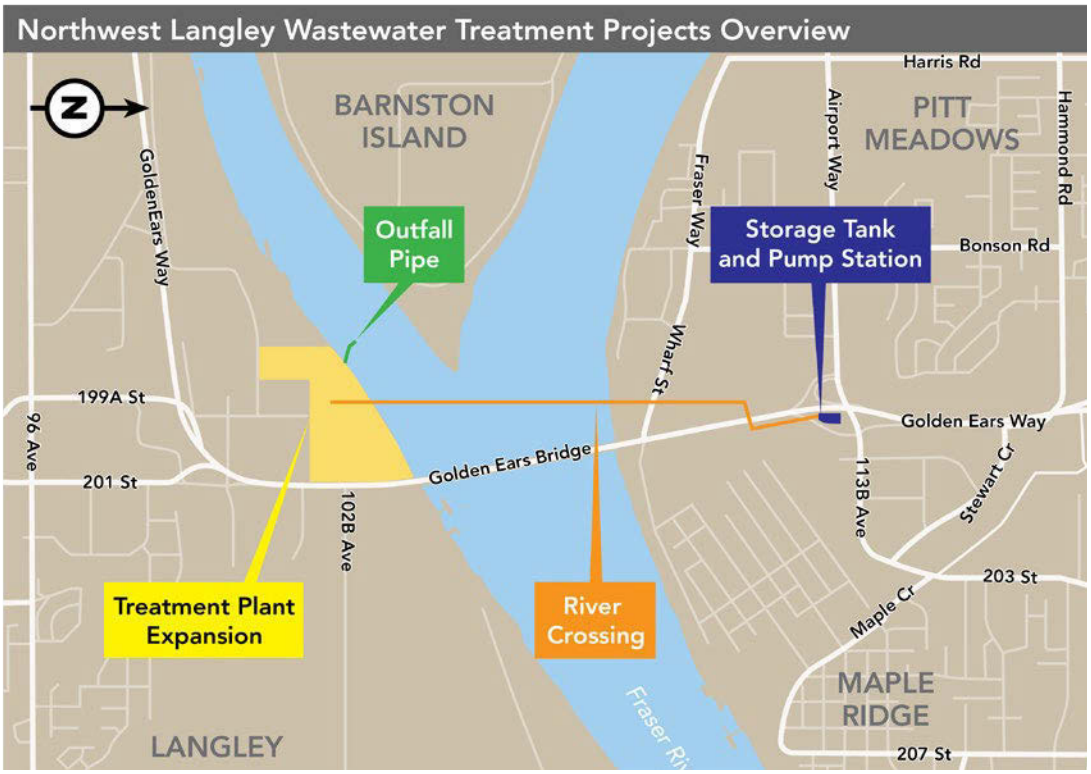
Engagement is a key component in planning for the Northwest Langley Wastewater Treatment Projects. It is an opportunity to connect with First Nations, residents, businesses, community groups and others who may be interested in or impacted by the projects.

What we did

What we heard

- Protect or improve water quality in the Fraser River
- Minimize impact on fish, habitat and fishing activities
- Eliminate or reduce odour
- Minimize outfall location impacts
- Provide a pipe crossing that is resistant to earthquakes
- Minimize construction impacts on traffic

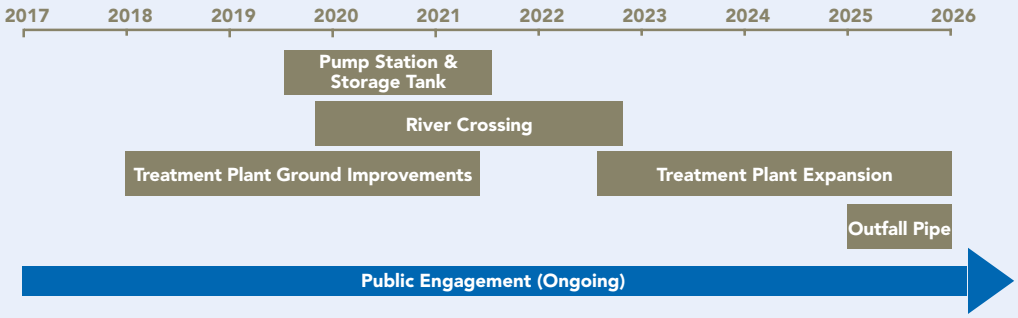
Metro Vancouver is undertaking the Northwest Langley Wastewater Treatment Projects to continue to protect public health and the environment in a growing region. The map below shows the four projects and their respective locations.



DID YOU KNOW

The Northwest Langley plant currently serves 30,000 people. In 2026, the plant will be able to serve 230,000 people.

Construction Schedule



Engagement principles

- Build and maintain trust and positive working relationships
- Recognize community input is integral for project development
- Provide meaningful opportunities for participation
- Report back to stakeholders and demonstrate how their input has been considered

Contact Us

Metro Vancouver Information Centre:
604-432-6200

Email: icentre@metrovancouver.org

Website: www.metrovancouver.org
and search "Northwest Langley WWTP"

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Lillian Zaremba, Senior Project Engineer, Liquid Waste Services

Date: January 28, 2019 Meeting Date: February 7, 2019

Subject: **Climate Change Impacts on Precipitation and Stormwater Management**

RECOMMENDATION

That the GVS&DD Board receive for information the report dated January 28, 2019, titled "Climate Change Impacts on Precipitation and Stormwater Management".

PURPOSE

The purpose of this report is to share the results of a recent study that is useful to member jurisdictions for climate adaptation planning in the area of stormwater management.

BACKGROUND

Metro Vancouver provides drainage facilities for stormwater conveyance in Still Creek, Brunette River, the Chines area of Port Moody and Coquitlam, and some combined sewer areas. The majority of stormwater management in the region is the responsibility of member jurisdictions.

The *Integrated Liquid Waste and Resource Management Plan* (ILWRMP) commits Metro Vancouver to design and adapt infrastructure to address risks associated with climate change. Through the ILWRMP, member jurisdictions have committed to undertake and implement integrated stormwater management plans that include managing rainwater on-site to minimize runoff.

Metro Vancouver recently undertook a study of the impacts of climate change on precipitation and stormwater. The study was scoped so that the results would be useful to its members.

STUDY FINDINGS

The study developed a methodology to create future projections of local rainfall using information from global climate models. The methodology considered various sources of uncertainty in future climate projections to develop moderate and high scenarios of future rainfall intensity-duration-frequency (IDF) curves to the end of this century. The moderate and high scenarios can be considered likely and worst-case, respectively. Key findings are summarized in this section.

Future rainfall intensity

Significant increases in rainfall intensity due to climate change are expected under all scenarios, as shown in Table 1. Rainfall will be 20 to 45% more intense by 2050, and 40 to 75% more intense by 2100. These increases are averaged over the entire region and averaged over different types of storm events with durations ranging from 5 minutes to 24 hours.

Table 1. Future increases in rainfall intensity

Future climate scenario	2050 time horizon	2100 time horizon
Moderate	20%	40%
High	45%	75%

Changes in frequency of extreme events

The study also suggests that intense rainfall events will occur more frequently. For example, the current 1-in-100-year event is a large rainstorm that currently has a 1% probability of occurring in any year, also known as annual exceedance probability (1% AEP). An event of the same size may become the 1-in-12-year (8% AEP) event or the 1-in-6-year (18% AEP) event by end of century, under the moderate and high scenario, respectively.

Case studies of impacts on sewerage and drainage infrastructure and services

Three case studies were analyzed to determine the potential effects of the projected future rainfall increases on these sewerage and drainage functions: combined sewers, drainage areas, and inflow and infiltration in sanitary sewers. Key takeaways from the case studies include:

- Flows in sewers will increase due to a combination of population growth and increased rainfall due to climate change.
- Pipe upsizing will be required to prevent sewer overflows and flooding.
- Source controls (also known as green infrastructure) help reduce peak flows. However, relying solely on source controls or green infrastructure will not maintain current levels of service in the face of climate change.
- Results were similar for the 2050 high future scenario and the 2100 moderate future scenario. Both are within the lifetime of infrastructure that is designed to last many decades.
- The incremental cost of preparing for the more conservative high future climate scenario is 10 to 15% compared to the moderate scenario.

Good practice recommendations for climate adaptation planning

Current levels of service for sewerage and drainage systems cannot be maintained by current infrastructure in the future climate. Decisions are needed whether increased localized flooding will be acceptable, compared to the costs of adaptation to protect infrastructure and buildings against increasing flood risks. Adaptation responses include hardening and protecting, gradually upgrading, or accepting lower levels of service. These involve tradeoffs between cost, flexibility, and risk.

The information provided by this rainfall study provides key information to enable members to assess the resilience of their infrastructure. Vulnerability and risk assessments of existing infrastructure are recommended to reflect risk thresholds and prioritize climate change adaptation measures to be incorporated into long-range capital plans.

REGIONAL COORDINATION

Due to the integrated nature of the region's sewerage and drainage services, adaptation planning needs to be coordinated between Metro Vancouver and member jurisdictions. Managing upstream inputs is crucial to ensure that adequate levels of service are maintained. Through the ILWRMP, Metro Vancouver has committed to adapt its infrastructure for climate change and members have committed to implement integrated stormwater management plans that apply on-site stormwater

management. The new future IDF curves from the recent study provide information that feeds into planning for these commitments.

The new future IDF curves have been adopted by Metro Vancouver for planning and design. Member jurisdictions can use the future IDF curves in their own stormwater planning and design. The study results have been shared with the Regional Engineers Advisory Committee (REAC), the REAC Liquid Waste and Climate Protection Subcommittees, and the Stormwater Inter-Agency Liaison Group.

The *Climate 2050* strategy currently in development by Metro Vancouver will further guide regional policies and collective action towards infrastructure resilience.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The $189,000 cost to complete the study was part of the 2017-2018 work plan.

SUMMARY / CONCLUSION
A recent study generated future rainfall projections for moderate and high future climate scenarios. Significant increases in rainfall intensity due to climate change are expected: a 20 to 45% increase by 2050, and a 40 to 75% increase by 2100. Intense rainfall events will occur more frequently. Infrastructure upgrades are required to maintain current levels of service for stormwater management and local flood protection in the future climate. Vulnerability and risk assessments of existing infrastructure are recommended to reflect risk thresholds and prioritize climate change adaptation measures to be incorporated into long-range capital plans. Climate change adaptation planning is coordinated between Metro Vancouver and member jurisdictions for areas where Metro Vancouver provides major drainage services. In addition, forums such as the Regional Engineers Advisory Committee and the Stormwater Inter-Agency Liaison Group facilitate the sharing of best practice, research and policies among members.

28097447

To: Liquid Waste Committee

From: Roy Moulder, Director, Purchasing and Risk Management, Financial Services

Date: January 29, 2019 Meeting Date: February 7, 2019

Subject: **Metro Vancouver's Procurement Process for Vendor Selection**

RECOMMENDATION

That the GVS&DD Board receive for information the report dated January 29, 2019, titled "Metro Vancouver's Procurement Process for Vendor Selection".

PURPOSE

To provide the GVS&DD Board with information regarding the process undertaken by Metro Vancouver staff for procurement competitions from determining the procurement method through to vendor selection.

BACKGROUND

At the January 17, 2019 meeting of the Water Committee, a discussion ensued regarding the process by which vendors are prequalified to submit proposals/bids on Metro Vancouver work. It was evident that any subsequent report would also prove beneficial to the Liquid Waste Committee. As such, this report has been prepared for the purpose of providing context to future contracting awards that may come before the Committee and GVS&DD Board.

This report summarizes the methodology used by staff in a typical procurement process, including the standard criteria at staff's disposal for vendor pre-qualification.

PROCUREMENT PROCESS

Policy

Procurement activities at Metro Vancouver are conducted in accordance with the Board's *Procurement and Real Property Contracting Authority Policy* ("Policy") and are consistent with the requirements outlined in the Laws of Competitive Bidding and the various legislated trade agreements. Metro Vancouver's primary goal in the procurement process is to attain best value, using processes that are competitive, open and transparent, non-discriminatory and support Metro Vancouver's commitment to sustainability. The type of competition required for Metro Vancouver procurement is based on the dollar value and the nature of the specific procurement transaction.

Competition Process

Procurement activities valued at less than $5,000 can be direct awarded without competition. All procurement activities in excess of $5,000 undergo some variation of competition for the selection of a vendor. Awards valued between $5,000 and $75,000 for Goods and Services and between $5,000 and $200,000 for Construction can be awarded through an invitational competition. As per the above mentioned Policy, a minimum of three vendors will be invited to provide quotes/proposals. Awards valued above these invitational thresholds undergo a public competition. Staff will determine, based on the complexity of the procurement transaction, whether to conduct a one or two-stage selection process.

The initiating department, in consultation with Purchasing staff will determine which procurement method best suits the required good or service. Staff may consider utilizing one or combination of these processes to achieve their procurement needs:

ITT:	Invitation to Tender	(Price is the determining factor)
RFP:	Request for Proposal	(Team experience, methodology and price)
RFQ:	Request for Qualifications	(Team and corporate experience determining factor)
RFEOI:	Request for Expression of interest	(Market sounding only)
RFI:	Request for Information	(Market sounding only)
NOIC:	Notice of Intent to Contract	(Advising marketplace of pending Sole Source award)

The majority of competitions are conducted as either an Invitation to Tender (ITT) or a Request for Proposal (RFP). In 2018, Purchasing staff ran approximately 440 competitions, with 250 of those competitions conducted as either an ITT or an RFP. In addition, 50 Request for Qualifications (RFQ) were conducted as the first stage in a two-stage process in 20% of the ITT's and RFP's noted above.

Evaluation Process

An RFP, by nature, provides Metro Vancouver with the flexibility to evaluate a Proposal on criteria over and above pricing. An ITT, however, is awarded solely on price and compliance with contract specifications. There are no other considerations under evaluation. Staff utilize RFQ's to prequalify vendors as a mechanism to both streamline the competition process and safeguard against aggressive pricing to win a competition by vendors that may lack the experience needed to successfully complete the work.

Where RFP's have been commonplace for selection of consultants, Metro Vancouver has, in recent years, increased their usage on construction project competitions. Whether a competition be awarded resulting from a two-stage process or direct from an RFP, staff are able to take into consideration additional factors over and above pricing. These criteria can include:

- Evidence of Bonding Capacity
- Corporate Qualifications and Experience
- Project Team and Experience
- Key Personnel Qualifications and Experience
- Project Methodology, Work Plan, Tasks and Schedule
- References.

All competitions, where other factors are taken into consideration when selecting a vendor or prequalifying a shortlisted group of vendors for further stages, include the following language regarding references:

> *Whereas previous experience with the Corporation is not required and does not in any way confer an advantage, the Corporation's previous experience with the Proponent may also be taken into consideration in its evaluation of Proposals. The Corporation reserves the right to rely upon its records, references and recollection in this regard. The Corporation may also obtain references other than those provided by the Proponent and may use these references in determining greatest value.*

Reference checking is conducted by members of the evaluation team and may consist of the following types of questions:

1. Please describe the size/scope, nature, timeline and complexity of the project.
2. What types of services did the contractor/consultant provide?
3. Did the contractor provide all disciplines/trades with their in-house resources, or did they sub-contract with others? Please specify.
4. How was the quality of the contractor/consultant's work? Was it well done? If not, why?
5. Did design drawings and specifications meet your quality standards?
6. Did the consultant accomplish all of the project objectives?
7. Was the contractor/consultant cooperative?
8. Was there willingness to negotiate change orders?
9. Was the contractor/consultant able to complete the project on time and within budget?
10. Was the contractor/consultant able to respond to questions or requests in a timely manner?
11. What if anything, could the contractor/consultant have done better?
12. Will you work with the contractor/consultant again?

Reference checks are a critical component of the overall evaluation. Also, the questions listed above are designed to elicit responses with sufficient detail to ensure that contractors/consultants are capable of undertaking the projected work in an efficient and collaborative manner.

Where competitions allow for evaluation factors other than merely price, the evaluation team score each of the criteria independently. The assigned buyer to the competition will coordinate a consensus meeting whereby the evaluation team will review their independent scores and come to consensus for each individual criterion. The resulting overall score is tabulated and highest ranked is selected for award. In some cases, highest ranked is not the lowest price/fee and justification is provided as to why one submission is superior to another. It is through this rigorous evaluation process that Metro Vancouver strives to achieve best value in its procurement decisions.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

As this report is for information purposes only, there are no financial implications.

SUMMARY / CONCLUSION

Procurement activities at Metro Vancouver are conducted in accordance with the Board's *Procurement and Real Property Contracting Authority Policy ("Policy")* and are consistent with the requirements outlined in the Laws of Competitive Bidding and the various legislated trade agreements. Metro Vancouver maintains a procurement process with various points of oversight throughout to ensure each award has been conducted with the intent of achieving best value for the organization. While achieving best value, the process also ensures that the competition meets the organization's other procurement principles to seek competition in the marketplace and remain open, transparent, and non-discriminatory with those that compete for Metro Vancouver opportunities.

Competitions are conducted using various procurement processes, with the majority being either an Invitation to Tender or a Request for Proposal. Project complexity will dictate whether a two-stage process is required to solicit interest from the marketplace. Where evaluation considerations extend beyond low bid, staff utilize an extensive list of criteria to ensure that an award is made to a vendor with a proven track record of completing projects on time, on budget and as designed. The procurement processes utilized by Metro Vancouver are designed to achieve best value as required in the *Procurement and Real Property Contracting Authority Policy.*

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Roy Moulder, Director, Purchasing and Risk Management, Financial Services
Jeff Chan, Division Manager, Project Delivery, Liquid Waste Services

Date: January 31, 2019 Meeting Date: February 7, 2019

Subject: **Award of a Contract Resulting from Request for Proposal (RFP) No. 18-129: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility Project**

RECOMMENDATION

That the GVS&DD Board:

a) approve the award of a contract in an amount of up to $50,679,095 (exclusive of taxes) to NAC Constructors Ltd. resulting from RFP No. 18-129: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility; and
b) authorize the Commissioner and the Corporate Officer to execute the contract.

PURPOSE

This report is to advise the GVS&DD Board of the results of Request for Proposal (RFP) No. 18-129: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility Project, and to recommend award of a contract in an amount of up to $50,679,095 (exclusive of taxes) to NAC Constructors Ltd (NAC).

BACKGROUND

Pursuant to the *GVS&DD Officers and Delegation Bylaw No. 284, 2014* (Bylaw) and the *Procurement and Real Property Contracting Authority Policy* (Policy), procurement contracts which exceed a value of $5 million require the approval of the Board of Directors.

This report is being brought forward to the Liquid Waste Committee to consider a recommendation to the GVS&DD Board to authorize the award of a contract to design and build a Biosolids Dewatering Facility at the Iona Island Wastewater Treatment Plant.

PROJECT DESCRIPTION

A new Iona Island Wastewater Treatment Plant will be built to at least secondary treatment levels by 2030, as required by federal regulations and Metro Vancouver's *Integrated Liquid Waste and Resource Management Plan*. In preparation for construction of the new wastewater treatment plant, four existing digested sludge lagoons and a sludge drying area must be decommissioned to free up space for staging and construction.

A study in 2015 evaluated five different dewatering technologies and analyzed two project delivery alternatives for dewatering the biosolids. The resulting business casing of the alternatives concluded that a Design-Build option for a purpose-built mechanical dewatering facility owned and operated by Metro Vancouver is most advantageous to the Corporation and is expected to cost approximately

10% less than a third party Design-Build-Operate option. The Design-Build approach is selected to expedite the project schedule in order to meet the 2030 secondary treatment plant deadline.

The dewatering facility has to be fully operational by 2020 in order to dewater on-going plant production of biosolids so that they can be hauled away for disposal. The dewatering facility will be located on a site that does not constrain the construction of the secondary treatment plant, while taking into account the potential integration and re-use of assets from the dewatering facility. Treatment processes will be housed in a building enclosure equipped with engineered odour control measures to ensure that there is no new net odour generation on the site.

As a result of Request for Qualifications (RFQ) No. 18-011 that was publicly advertised on Metro Vancouver's and BC Bid websites, three (3) experienced firms were shortlisted and invited to respond to RFP No. 18-129, for design-build services. The RFP closed on September 12, 2018, and all three (3) firms submitted proposals as follows:

Proponent	**Design-Build Price** (exclusive of taxes)	**Overall Ranking**
NAC Constructors Ltd.	$50,679,095	1
Maple Reinders Constructors Ltd.	$47,097,000	2
Graham Infrastructure LP	$54,745,000	3

The technical component of the proposals was evaluated by staff from Liquid Waste Services as well as AECOM (owner's engineer). The financial component was evaluated by staff from the Purchasing and Risk Management Division. The proposal submitted by NAC Constructors Ltd. is the highest ranked proposal. NAC's proposal demonstrated a good understanding of the project scope and key issues. Their facility configuration is technically superior, simpler to operate and maintain, and poses a lower level of occupational health and safety risks than the other two proposals. As well, with the required seismic ground improvements included in the scope, the facility will be able to be operational post disaster. These features/requirements were preferred by the Evaluation Committee and the Advisors, including the end users.

Throughout the procurement process, a Fairness Monitor was retained to ensure that implementation of the entire process is unbiased and objective. See Attachment 1.

ALTERNATIVES

1. That the GVS&DD Board:
   a) approve the award of a contract in an amount of up to $50,679,095 (exclusive of taxes) to NAC Constructors Ltd. resulting from RFP No. 18-129: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility; and
   b) authorize the Commissioner and the Corporate Officer to execute the contract.

2. That the GVS&DD Board terminate RFP No. 18-029: Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility Project and direct staff to report back to the GVS&DD Board with options for an alternate course of action.

FINANCIAL IMPLICATIONS

If the GVS&DD Board approves Alternative 1, the Design-Build Agreement will be awarded to NAC Constructors Ltd. in the amount of up to $50,679,095 (exclusive of taxes). The proposal submitted by NAC is the highest ranked proposal. The project budget, as per the GVS&DD Board endorsed financial plan, is $61.3M and there is sufficient budget to award and complete this project. This project is a multi-year project, and as such, some of the expenditures will occur in future years.

The GVS&DD Board has the choice not to proceed with Alternative 1, and in this case, staff will need further direction in relation to the project. Alternative 2 will result in a delay in completing construction of the dewatering facility and will adversely affect the 2030 completion of the new Iona Island Secondary Wastewater Treatment Plant. The areas currently occupied by the sludge lagoons and drying bed would then have to remain in service and would not be available for construction and site preparation activities.

SUMMARY / CONCLUSION

Request for Proposal (RFP) No. 18-129 was issued for the Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility Project, and NAC Constructors Ltd. was identified as the highest ranked compliant proposal. It is recommended that the GVS&DD Board authorize the Commissioner and the Corporate Officer to award and execute the Design-Build Agreement with NAC Constructors Ltd. in the amount of up to $50,679,095 (exclusive of taxes).

Attachment:

1. Final Report of the Fairness Monitor, Iona Island Wastewater Treatment Plant, Biosolids Dewatering Facility Project RFP Process, October 4, 2018.

28377703

IONA ISLAND WASTEWATER TREATMENT PLANT
Biosolids Dewatering Facility Project

RFP Process

Final Report of the Fairness Monitor

INTRODUCTION

I was retained as Fairness Monitor for the Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility Project (the "Project"). My mandate is to act as an independent observer of the procurement and report to the Division Manager, Purchasing and Risk Management, regarding whether the Project team has fairly implemented the procurement process in accordance with the Project procurement documents.

I reported previously on the Request For Qualifications phase of procurement. This is my final report as of October 4, 2018, when the Project team has completed evaluation of Proposals filed in response to the Project's Request For Proposals ("RFP").

RFP / COLLABORATIVE PROCESS

The RFP was issued in April, 2018 to the three Proponents selected through the RFQ process. The RFP included detailed technical requirements, the form of the project agreement to be signed by the successful Proponent, the required format and content of Proposals, a summary of the process and criteria for evaluation of Proposals, and other terms of the competition.

Data Room / RFI Process: The Project team operated an electronic data room with various documents relevant to the Project, and answered written requests for information ("RFIs") from Proponents. I monitored the data room periodically, and reviewed all communications between the Project team and Proponents.

Meetings: After release of the RFP, Project staff held several rounds of meetings with Proponents for discussion and consultation about requirements of the RFP and the project agreement, the expectations of the parties, and specific topics of concern. The Project team also managed various site tours and investigations, meetings for Proponents with relevant utilities and municipal officials, and similar activities.

I was invited to all meetings between the Project team and Proponents, and I attended or monitored most of the meetings. I was satisfied that:

- meetings were attended by Project staff with appropriate expertise and authority to address Proponents' questions;
- all Proponents were provided with the same information about the Project;
- meetings were conducted in consistent fashion for all three Proponents; and
- meetings were conducted in accordance with the RFP, including requirements as to confidentiality, restrictions on communications with Proponents, and other matters.

EVALUATION

All three Proponents filed Proposals including both Technical and Financial Components prior to the deadline specified in the RFP. Proposals were evaluated by an Evaluation Committee of persons with expertise in the subject matter of the Proposals, and also by Advisors engaged to provide the Evaluation Committee with advice and observations in specific technical disciplines.

Evaluation Manual: Before the Proposals were received, the Project team produced a detailed Proposals Evaluation Manual setting out:

- procedures for receipt of Proposals, initial completeness review, protocols for access to Proposals and maintaining confidentiality;
- procedures for review of evaluators' relationships to eliminate potential conflicts;
- details of the responsibilities of all participants in the evaluation;
- the method and procedures for evaluating Proposals;

and other matters. I was satisfied that the Evaluation Manual set out a reasonable basis for evaluation of the Proposals, consistent with the RFP.

Orientation: Before commencing work, all evaluation participants received an orientation in which the Project Team highlighted aspects of the Evaluation Manual, including methods for evaluation, standards related to confidentiality, consistency, the role of the Fairness Monitor, and other matters.

Closing and Completeness Review: I monitored the closing time for submissions, and confirmed that the Project team followed the processes set out in the Evaluation Manual for receipt and initial completeness review of Proposals.

Relationship Review: Before evaluators were permitted access to Proposals, a Relationship Review Committee conducted a process consistent with the Evaluation Manual to elicit and consider details of relationships among members of Proponent teams and the evaluation team, to ensure that all evaluators were free of bias.

Evaluation Process: During the evaluation, I had access to the Proposals. I was informed of all meetings, and reviewed any correspondence between the Project team and Proponents. I talked with the evaluators, and attended the meetings where evaluation conclusions were discussed. I observed that all participants followed the processes outlined in the RFP and Evaluation Manual.

When all members of the Evaluation Committee had reviewed all of the Proposals, the Committee met together to consider the details of the Proposals, the advice received from the appointed Advisors, and discuss their observations and conclusions, following the ranking process set out in the RFP.

I observed that all members of the Evaluation Committee were familiar with the details of each Proposal, and participated fully in discussion of the evaluation criteria. During its work, the Evaluation Committee periodically discussed and instructed itself appropriately on

issues of fairness, objectivity, and consistent application of the evaluation criteria to the Proposals. I observed that the conclusions reached by the Evaluation Committee were unanimous and were based on thorough consideration of the Proposals.

CONCLUSIONS

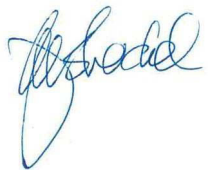
Throughout the RFP process, the Project team ensured that:

- I received copies of all correspondence between the Project team and Proponents;
- I had full access to all Proposals and evaluators, and the opportunity at any time to speak with Project staff including managers, evaluators and advisors;
- I was invited to attend all meetings held by the Project team with Proponents, and all meetings of the evaluators (including those at which proposals were discussed and evaluated). I attended such meetings as I considered necessary to carry out my role.

During the RFP process, I observed that the Project team discussed as necessary and instructed itself appropriately on matters related to fairness. Periodically, I was asked for, or offered, advice and comments on fairness issues. In each such case, the Project team considered my advice and I was satisfied with the resolution of the matter.

Based on my observations above, I am satisfied that the procurement process as described in the RFP was fair and reasonable, and that the Project team fairly and reasonably implemented and complied with that process.

Signed at Vancouver, October 4, 2018.



Jane Shackell, QC

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Peter Navratil, General Manager, Liquid Waste Services

Date: January 29, 2019 Meeting Date: February 7, 2019

Subject: **Manager's Report**

RECOMMENDATION
That the Liquid Waste Committee receive for information the "Manager's Report", dated January 29, 2019.

1. Attendance at 2019 Standing Committee Events

Participation by Liquid Waste Committee members at external events provides important learning and networking opportunities. The following events that fall under the purview of the Liquid Waste Committee are included in the 2019 Leadership and Engagement budget. For the following event, up to two spots are available for Committee members:

- **Water Environment Federation Technical Exhibition and Conference 2019**
  Date and Place: September 21-25, 2019; Chicago, IL
  Number of attendees: 2

  The Water Environment Federation Technical Exhibition and Conference (WEFTEC) is the largest conference of its kind in North America and offers water and wastewater professionals and public officials from around the world with excellent water quality education and training. In addition to offering access to the most cutting-edge technologies in the field, the conference also serves as a forum for peer-to-peer networking among professionals and public officials on water and wastewater issues and solutions.

Please notify the Committee Chair as soon as possible, but no later than February 28, 2019, if you are interested in attending the above-noted event. As the funds for this event is budgeted in general government, the Finance and Intergovernment Committee will consider approval of the event, but final approval on attendance rests with the Board Chair.

2. Liquid Waste Committee Tour of Annacis Research Centre and Annacis Wastewater Treatment Plant

In the past, the Liquid Waste Department has offered facility tours for Committee members. We would like to invite the Committee for a tour of the Annacis Research Center and the Annacis Wastewater Treatment Plant.

Potential Dates:	Wednesday April 17, 2019 - 9:00am to noon Wednesday, May 8, 2019 – 9:00am to noon Wednesday, May 22, 2019 – 9:00am to noon
Travel Options:	Details will be provided once tour date is confirmed.

Attachment:
Liquid Waste Committee 2019 Work Plan

27829148

ATTACHMENT

Liquid Waste Committee 2019 Work Plan
Report Date: January 29, 2019

Priorities	
1st Quarter	**Status**
2019 Liquid Waste Capital Projects	Complete
Iona Island Secondary WWTP Project Definition Quarterly Update	Complete
North Shore Wastewater Treatment Plant Construction Update	Complete
Climate Change Impacts on Precipitation and Stormwater Management	In Progress
Sewer Overflow and WWTP Process Interruption Public Notification Process	In Progress
Integrated Liquid Waste and Resource Management Plan Overview	In Progress
Unflushables Campaign Update	In Progress
GVS&DD DCC Bylaw Revisions	In Progress
Municipal Requests for Sewerage Area Boundary Amendments (as applicable)	In Progress
Utility Policies (as applicable)	In Progress
Contract Approvals – Contracts > $5M (as applicable)	In Progress
2nd Quarter	
Recreational Water Quality Monitoring	In Progress
Biosolids Management Strategy	In Progress
Integrated Liquid Waste and Resource Management Plan Biennial Report 2017-2018	In Progress
GVS&DD Membership Requests	In Progress
30 Year Financial Plan – Liquid Waste Scenarios	In Progress
Iona Island Secondary Wastewater Treatment Plant Project Definition Quarterly Update	Pending
Status of Liquid Waste Capital Expenditures	Pending
GVS&DD DCC Bylaw Revisions	Pending
Municipal Requests for Sewerage Area Boundary Amendments (as applicable)	Pending
Contract Approvals – Contracts > $5M (as applicable)	Pending
Utility Policies (as applicable)	Pending
3rd Quarter	**Status**
2018 GVS&DD Environmental Management & Quality Control Annual Report	Pending
Iona Island Secondary Wastewater Treatment Plant Project Definition Quarterly Update	Pending
Status of Liquid Waste Capital Expenditures	Pending
Poplar Landing	Pending
Annual Energy Management Progress Update	Pending
Capital Projects Policy Update	Pending
Environmental Management Systems Update	Pending
Unflushables Campaign Results	Pending
Grease Campaign Update	Pending
Municipal Requests for Sewerage Area Boundary Amendments (as applicable)	Pending
Contract Approvals – Contracts > $5M (as applicable)	Pending
Utility Policies (as applicable)	Pending

4th Quarter	Status
Annual Budget & 5 Year Financial Plan - Liquid Waste	Pending
Iona Island Secondary Wastewater Treatment Plant Project Definition Quarterly Update	Pending
Status of Liquid Waste Capital Expenditures	Pending
Municipal Requests for Sewerage Area Boundary Amendments (as applicable)	Pending
Contract Approvals – Contracts > $5M (as applicable)	Pending
Utility Policies (as applicable)	Pending

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Peter Navratil, General Manager of Liquid Waste Services

Date: January 21, 2019 Meeting Date: February 7, 2019

Subject: **Overview of Metro Vancouver's Methods in Projecting Regional Growth**

The attached report titled "Overview of Metro Vancouver's Methods in Projecting Regional Growth" was considered by the Regional Planning Committee at its meeting of January 11, 2019, and by the MVRD Board at its meeting of January 25, 2019, and is presented here to the Liquid Waste Committee for its information.

Population projections provide critical information for the development of long range capital plans. A key objective of the Integrated Liquid Waste and Resource Management Plan is to ensure the construction of the regional sanitary system at a similar pace with development. Population growth, and its location, along with a host of technical factors such as, per capita water consumption and local inflow and infiltration rates are used to identify future needs.

Attachment

1. "Overview of Metro Vancouver's Methods in Projecting Regional Growth", dated December 18, 2018

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ATTACHMENT

To: Regional Planning Committee

From: Terry Hoff, Senior Planner, Regional Planning

Date: December 28, 2018 Meeting Date: January 11, 2019

Subject: Overview of Metro Vancouver's Methods in Projecting Regional Growth

RECOMMENDATION

That the MVRD Board receive for information the report dated December 28, 2018, titled *Overview of Metro Vancouver's Methods in Projecting Regional Growth*.

PURPOSE

To provide an overview of Metro Vancouver's role and methods in monitoring and projecting regional growth, primarily for population, housing, employment and land use activity.

BACKGROUND

With the formation of a new Metro Vancouver Board and Regional Planning Committee, it is an opportune time to provide an overview of Metro Vancouver's regional planning methods in preparing regional growth analytics and projections.

OVERVIEW OF METRO VANCOUVER'S GROWTH ANALYTICS AND PROJECTIONS

Metro Vancouver's mandate in preparing, implementing and monitoring *Metro Vancouver 2040: Shaping our Future (Metro 2040),* the regional growth strategy, requires population, housing, employment growth and land use projections for a variety of regional and local planning applications.

The analytics involved in preparing this information can range from relatively simple to extremely complex methods and corresponding resource commitments. To advise and assist Regional Planning Committee members in interpreting Metro Vancouver's Regional Planning work, staff have prepared a descriptive document titled *Metro Vancouver Growth Projections – A Backgrounder* (Attachment) as well as a corresponding presentation.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

There are no financial implications.

SUMMARY / CONCLUSION

Metro Vancouver's Regional Planning function involves a variety of demographic, development and land use and analytics, that are prepared and applied in collaboration with member jurisdictions, other Metro Vancouver departments and associated regional agencies. As the methods involved in preparing this information can be complex and technical, staff have prepared a descriptive document

titled *Metro Vancouver Growth Projections – A Backgrounder* as well as a corresponding presentation to assist Regional Planning Committee members.

Attachment: Metro Vancouver Growth Projections – A Backgrounder

27960941

Metro Vancouver Growth Projections – A Backgrounder

Metro Vancouver's mandate in preparing, implementing and monitoring *Metro Vancouver 2040: Shaping our Future (Metro 2040),* the regional growth strategy, requires a variety of land use and development analytics. The most fundamental analytical tasks in this role are to coordinate, establish and monitor projections for population, housing, employment and land use.

As a part of a collaborative regional agency, Metro Vancouver's Regional Planning Division works closely with other Metro Vancouver departments, member jurisdictions and other regional agencies. The Regional Planning Division works especially closely with Metro's member jurisdictions in coordinating the implementation of *Metro 2040*'s policies with local Official Community Plans (OCPs) through the preparation and updates of Regional Context Statements. This work establishes a shared regional / local perspective on growth that is applicable to Metro Vancouver's regional water and liquid waste utilities demand planning and to TransLink's transportation demand modelling to ensure that an appropriate integration among critical regional infrastructure planning and implementation is achieved.

Metro Vancouver's process in preparing regional growth projections includes establishing a Baseline Scenario, i.e. monitoring current activity and projecting future activity based on the current policy framework and trends. Statistics Canada, through the Census, provides the most reliable comprehensive source of baseline and trend data for population, housing and employment. A variety of other data sources are used to monitor current population, housing, employment and land use activity, which is appended to the baseline data to prepare current estimates and to assess variations in these growth trends. Projections then extend the current estimates out to a desired time horizon based on the indicators, trend analysis and scenario assumptions regarding the many factors influencing regional growth.

A primary methodological tool in Metro Vancouver's population / demographic projections is the Cohort Projection Model. This well-established modelling tool utilizes a base year population by gender and single year of age for defined geographies, and projects the change in the next year population due to natural increase and migration trends and assumptions on drivers affecting those trends. This demographic model provides the foundation for estimating household formation within the population and associated housing demand. Census trend data on household maintainer rates (i.e. the person identified on Census forms as the primary person in the household) and average household size (i.e. the number of persons per household / dwelling unit) are applied to the population projections to estimate overall regional housing demand and likely choices in structural types of dwelling.

Regional employment projections are derived through comparative projections of the labour force and regional economic sector / employment trends. The allocation of regional employment to each municipality is estimated by the regional share of established economic sector employment within

each, and by relating the regional share of population serving sector employment growth to the regional share of population growth within each respective area.

From a 2016 Census baseline, the Baseline Scenario includes annual growth projections to the year 2050, and more generally extended to the year 2121. Base year (2016), current annual estimates and short term projections (under 10 years) are necessary for numerous program monitoring applications. Longer term projections are more speculative, but necessary in anticipating and assessing potential future land use and infrastructure planning, policies, investment impacts and outcomes.

All projections are, explicitly or implicitly, scenario based. Metro Vancouver's Baseline Scenario generally assumes that the existing regional growth policy framework remains in place, and that a variety of external factors potentially affecting the region (i.e. migration, the global and national economies, climate impacts, and politics) will remain consistent and stable using 2016 as the benchmark.

Finally, for each of the projections there can be various depths of research, analytics and resources involved in exploring the historic trends and patterns of association among all contributing factors that can influence future events. This can involve very intensive modelling and data acquisition programs, but the intensity and complexity of analytics must be balanced with practical application, resources and time considerations. Given the potential resource demand, Metro Vancouver attempts to combine available staff knowledge and resources from the regional and municipal agencies with commissioned studies to provide reasonable assumptions and estimates of future growth.

Overview of Methods and Assumptions

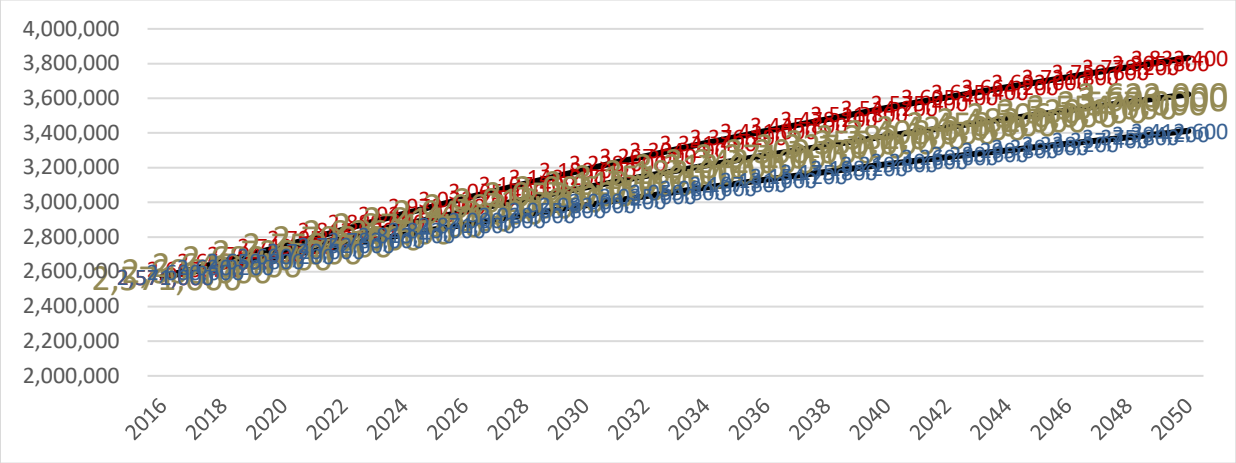
1.1 Population

Population is the most commonly applied element in regional growth projections and provides a basis for projecting housing, employment and related land use. Metro Vancouver's population projections are based largely on Census data base counts and trend demographic indicators, and how those trend indicators may evolve in the future. A cohort survival model is used to coordinate the relationships among the component demographic indicators and dynamics: natural increase – births minus deaths; international immigration and emigration flows; domestic migration flows to and from other areas of British Columbia (intra-provincial migration) and Canada (inter-provincial migration); and inter-municipal migration as residents move among municipalities within Metro Vancouver.

The Cohort Model establishes population by gender and single year of age for a given base year. Then for every subsequent year, the population for that single year of age is predicted by estimating the additions and subtractions due to births, deaths or net migration for that single year of age. Metro Vancouver's Cohort Model is built for projecting both at the regional level and for each municipality.

Figure 1 shows the projected components of Metro Vancouver's population growth to the year 2050. From a 2016 base population of 2,570,000, it is anticipated that the population will increase by about 1 million to 3,600,000 by the year 2050.

Figure 1. Metro Vancouver Baseline Scenario - Projected Population 2016 - 2050



Natural Increase

Natural increase is the capacity of a population within a given jurisdiction to regenerate or degenerate only through births and deaths within the current population. The projected population includes the cumulative projected immigration or migration in estimating births and deaths of the future population.

Projecting natural increase involves methods for projecting the future number births and number of deaths by age within the population.

Births

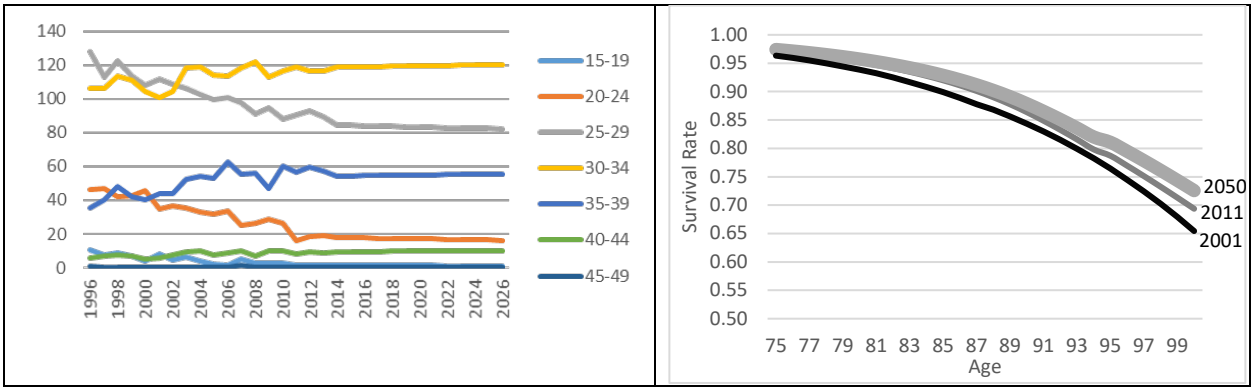
Projecting births begins with historic trends in fertility rates (i.e. births) for women of child bearing age. Vital statistics data is provided annually by each of the BC Health Authority jurisdictions showing current and historic births per 1,000 women aged 15-44 (by component age cohorts).

- Births = Total number of women by age cohort within in the current population * fertility rate for women by age cohort

Fertility rates have shifted by large margins over the past 20 years. Overall, rates have been decreasing, with rates for younger women (i.e. 15-30) decreasing while rates for older women (i.e. 30-45) have been increasing. Projecting future patterns in these trend rates must moderate the rates of change in these trends to avoid reaching extreme / unrealistic levels. For example, pure extrapolation of rapidly decreasing rates for women under 25 would result in negative rates in the later 2020s. Therefore, for each cohort, the change in past trend rates are assumed to continue at a

decreasing annual rate over the next 10 years, and to stabilize thereafter throughout the projection period.

Figure 2. Example of Projected Fertility and Survival Rates by Age



Fertility – Birth rates per 1000 women by age cohort

Survival rates by age

Deaths

Projecting future deaths in the Metro Vancouver population is based on historic trends in death/survival rates by age, and assumptions how those rates may change in the future. Statistics Canada assembles vital statistics data on deaths by age and publishes the data annually as Life Tables.

From historic data in the Life Tables, Metro Vancouver's death projections utilize a survival rate – which is the probability that males and females of a specific age will survive another year.

- Deaths = total persons by single year of age * survival rate for that single year of age

For example, current infant mortality rates indicate that there is a survival rate of 0.996 for males under 1 year of age, or a 99.6% chance that male child will survive past his 1st birthday. Similarly, the survival rate for a female aged 91 is 0.88, or an 88% chance of surviving one more year.

Survival trend rates will continue to increase, especially for older cohorts. However, because rates cannot exceed 1 (i.e. living forever), the rate increases are modified such that rate increases will decrease as the rate approaches 1.0, and cannot reach or surpass 0.999.

The Metro Vancouver projections assume that fertility trends will continue but stabilize within a 10-year time frame, and continue at a constant rate for the remainder of the projection period. With increases in health technology, survival trend rates will continue to increase, especially for older cohorts. However, with the overall aging of the population and a growing share of the population in the older age cohorts, the number of deaths will increase more rapidly than the number of births. Based on these assumptions, population growth by natural increase will decrease from to zero by the early 2030s, and become natural decrease thereafter as deaths will continue to exceed births.

Immigration

Future immigration will be the primary variable affecting future population growth and related, housing, employment and land use considerations in Metro Vancouver. Assumptions for the future number of immigrants to Canada choosing to settle in the region are based on the following:

- Federal immigration policy and annual admission quotas; historic regional trends in the annual share of Canada immigration settling in BC and Metro Vancouver. Immigrants are categorized primarily by age, gender, country of origin, but also with regard to admission type classification (i.e. permanent, non-permanent, economic, family, refugee, etc.). Immigrant settlement patterns are based on 2 sources: Census data on place of residence and mobility, and the periodic data published by Canada's Ministry of Immigration, Refugees and Citizenship.
- Emigration of persons leaving Metro Vancouver to live in other countries. The emigrant estimates are based on periodic data published by Canada's Ministry of Immigration, Refugees and Citizenship.
- Historic trends in the municipal share of Metro Vancouver settlement destinations for immigrants by age and sex, as indicated by Census mobility data.

Within Metro Vancouver's Growth Model, the net annual number of immigrants projected for Metro Vancouver is estimated for each projection year, and allocated by gender, single year of age and trend distribution share to each member jurisdiction. It is assumed that the gender and age structure of immigrants and emigrants will remain relatively constant over time, i.e. that Federal immigration policies will maintain approximately 300,000 persons per year for Canada over the short term, with gradual increases based on the aging profile of the national population, economic sector change and labour force demand. The Metro Vancouver share of Canada's immigration (currently about 11%) is assumed to marginally decrease as larger shares of immigrants settle in other areas of Canada and elsewhere within BC. Therefore, net immigration settling in Metro Vancouver is assumed to be in the 30,000 to 40,000 per year range through the projection period.

Within Metro Vancouver, municipal allocation trends are assumed to continue within the 5 to 10-year term, with a gradual shift toward a more balanced share / distribution of immigrant settlement in relation to overall population growth capacity in each member jurisdiction. The data trends show that the City of Vancouver has accommodated the region's largest share of recent immigrants over the past 20 years, but has declined substantially from 36% to 30% over that period. Much of this reallocation has been to the City of Surrey which has increased from 13% to 22% over that period, as well as toward a broader distribution among other municipalities.

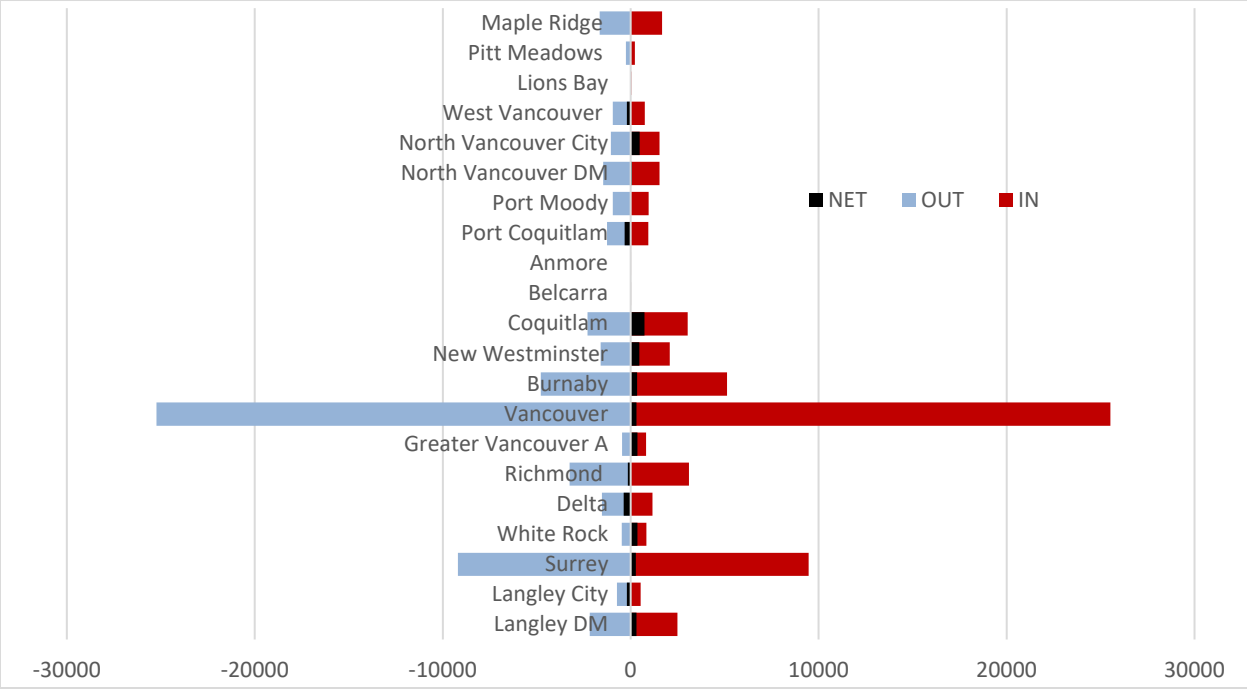
Alternative scenarios, prepared using a number of identified drivers and disruptors, will consider the potential implications of factors such as climate change on population migration in the world and potential implications for Metro Vancouver's population growth.

Inter-Provincial Migration

Inter-provincial migration includes the annual number of persons moving to or from Metro Vancouver / each municipality and other provinces in Canada. Trends in the rates of inter-provincial migration primarily relate to the comparative strength of the regional economy, employment opportunities and lifestyle choices in Metro Vancouver versus other regions in Canada.

Net inter-provincial migration in the Metro Vancouver region generally ranges between -5,000 and +5,000 residents per year. However, while the overall regional net flow is relatively minor in overall regional growth projections, there has been an average regional in-migration of 12,000 per year and out-migration 11,000 per year over the past 15 years with varying impacts for each municipality.

Figure 3. Inter-Provincial Migration Patterns Among Metro Municipalities – 5 Year Totals 2011-2016



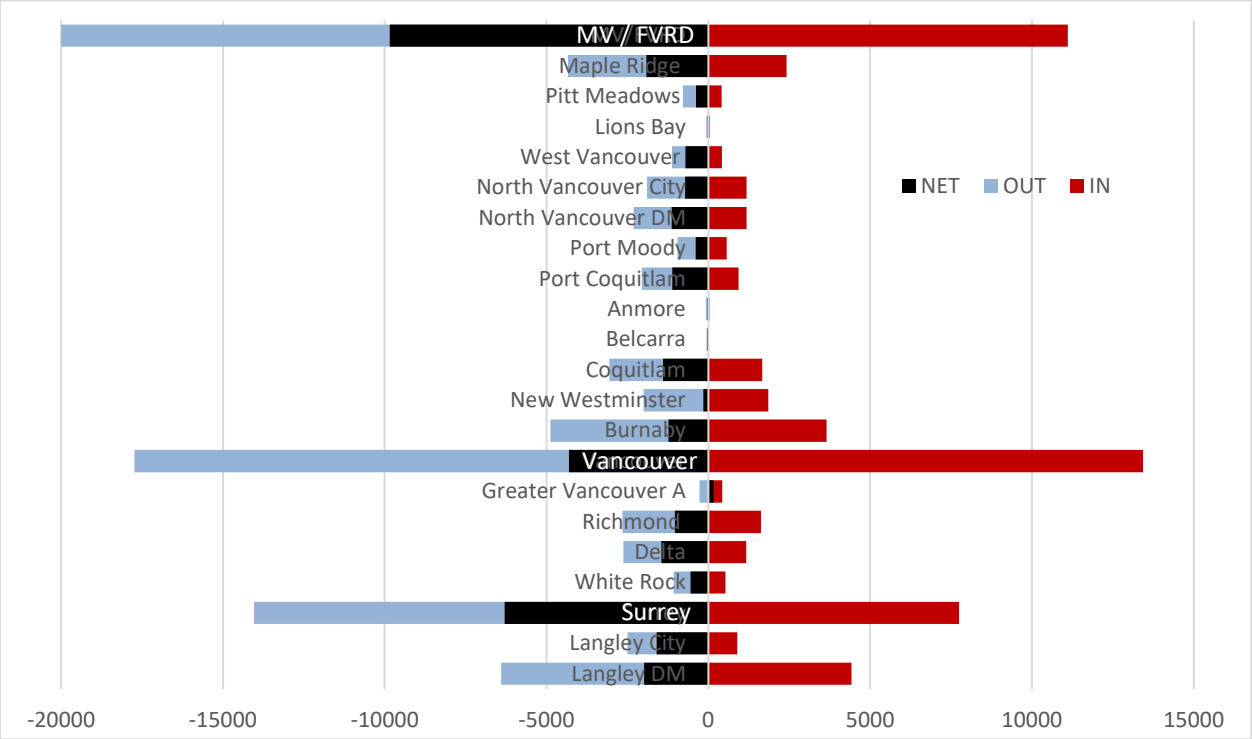
Within Metro Vancouver's Growth Model, it is assumed that there will be a modest net inflow of +/- 2,000-4,000 persons per year to Metro Vancouver, and that the historic inter-provincial flow distributions among municipalities will remain relatively consistent. Regional in and out flows are allocated by age and respective jurisdiction. For example, a projected inflow of 12,000 is allocated into historically profiled age and gender cohorts, then allocated to each municipality based on the historical inflow share of those cohorts to each municipality.

Trend data on inter-provincial migration flows for Metro Vancouver and its member jurisdictions is derived from a custom acquisition of Census mobility data – current Census residence and place of residence 5 years ago. This data is cross-referenced by gender, age and municipality to produce a trend profile of migrants and municipal distribution patterns.

Intra-Provincial Migration

Intra-provincial migration includes the number of persons moving to or from Metro Vancouver / each municipality and other regions of British Columbia. Trends in the rates of intra-provincial migration typically primarily relate to the comparative strength of the regional economy and opportunities in Metro Vancouver verses other regions in BC. However, Metro Vancouver's climate, geography, lifestyle (e.g. cost of living) are also factors that can encourage or discourage this type of migration.

Figure 4. Intra-Provincial Migration Patterns Among Metro Municipalities – 5 Year Totals 2011-2016



Net intra-provincial migration is a more significant factor in overall regional growth projections in the Metro Vancouver region, generally averaging a net loss ranging between 0 and -10,000 residents per year. Through 2011 to 2016, there was a net out-flow of about 5,300 persons per year from Metro Vancouver to other areas of BC. The intra-provincial flow dynamics vary among municipalities and have a significant impact on growth for particular municipalities. Eastern municipalities of Surrey, Langley Township and Maple Ridge, as well as the City of Vancouver, have the highest net out-flow to other areas of B.C.

This migration dynamic is especially relevant to the inter-relationship between Metro Vancouver and the Fraser Valley Regional District (FVRD) (particularly Abbotsford, Mission and Chilliwack). Net population migration flow from Metro Vancouver accounted for about 40% of the population growth in the FVRD between 2011 and 2016. It is expected that this general pattern will continue and potentially increase in future years.

Net outflow can likely be attributed to the increasing cost of living within the region and the increasing aging population utilizing housing equity in retirement years. Considering these factors, the Baseline Scenario projections assume there will be an average net out-flow in intra-provincial migration ranging to 10,000 persons per year by 2050.

Trend data on intra-provincial migration flows for Metro Vancouver and its member jurisdictions is derived from custom acquisitions of Census mobility data – current Census residence and place of residence 5 years ago. This data is cross-referenced by gender, age and municipality.

Inter-Municipal Migration

Inter-municipal migration includes the number of persons moving from one Metro Vancouver municipality to another. Trends in the rates of inter-municipal migration typically relate to the particular lifestyle preference and choices for residents and the relative housing, employment and amenity options and opportunities in each municipality.

The effect of inter-municipal migration is quite significant within the region. Between 2011 and 2016 about 40,000 residents changed municipalities. While there is no net change for the region, Figure 5 shows there is a high net out-flow in particular municipalities (e.g. City of Vancouver -3,400/year, Burnaby -1,600/year), and high in-flow in other municipalities (e.g. Surrey, Langley, Maple Ridge). It is assumed that the trend flow patterns will generally continue, at a modifying rate, through the projection periods.

Projections for inter-municipal migration is based on the assumption that, on the average, a relative consistent share of Metro Vancouver residents will be moving among Metro municipalities in any given year - about 1.6% per year. Projections also assume some variance in inter municipal migration anticipating Tsawwassen First Nation urban development from 2016 to 2050 will largely come from from inter-municipal migration.

Trend data on inter-municipal migration flows among the municipalities is derived from custom acquisition of Census mobility data – current Census residence and place of residence 5 years ago - cross-referenced by gender, age and municipality.

Figure 5. Inter-Municipal Migration Patterns Among Metro Municipalities – 5 Year Totals 2011-2016

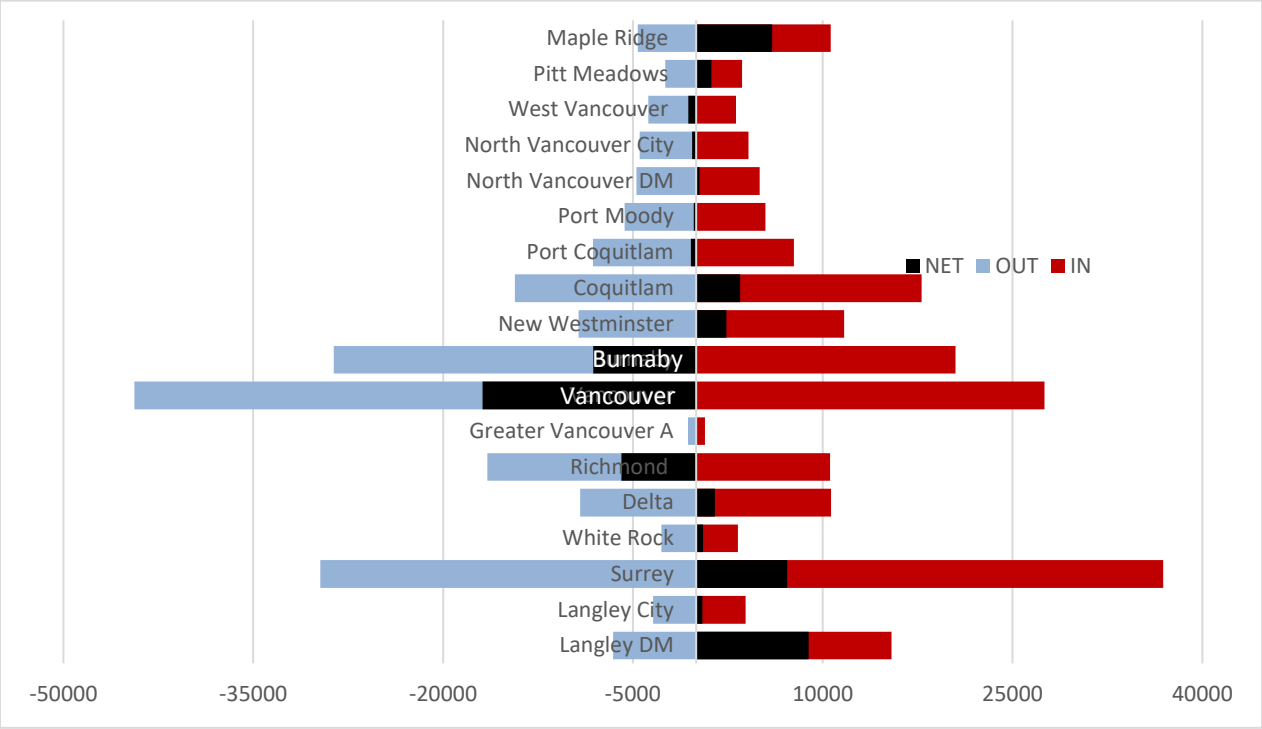
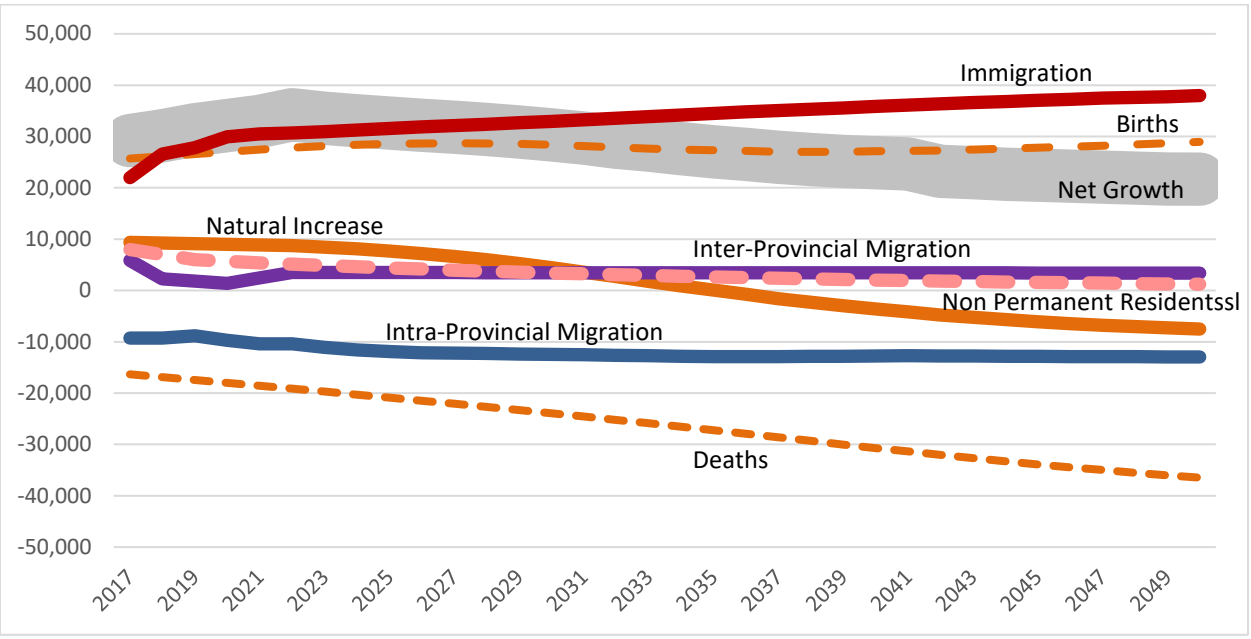


Figure 6. Metro Vancouver Baseline Scenario - Projected Population Growth Components 2016 - 2050



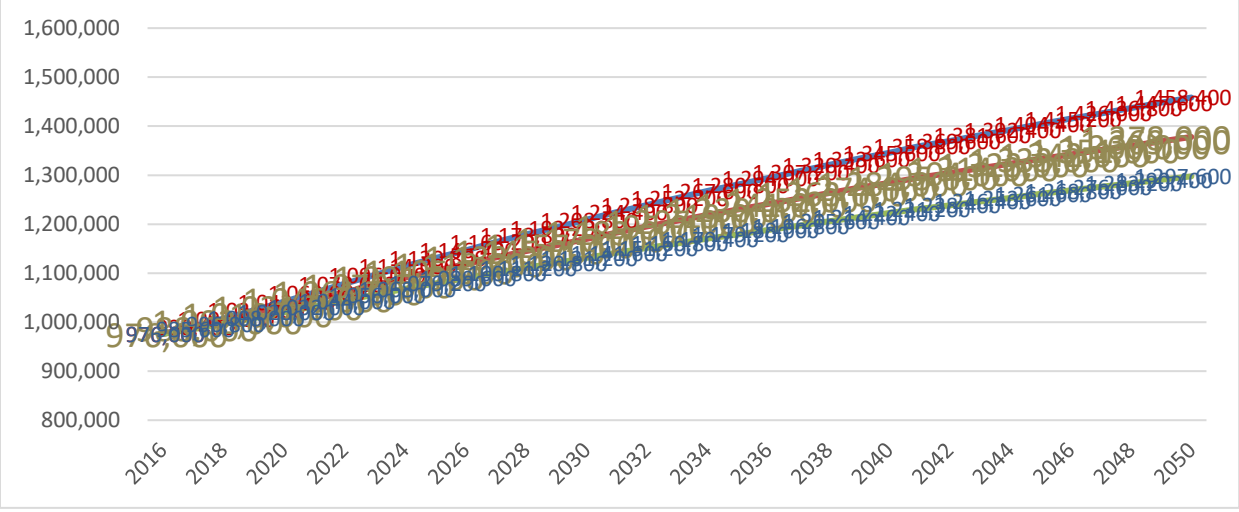
1.2 Occupied Dwelling Unit Demand for the Projected Population

Projecting future housing demand is directly related to the trends and projections in household formation characteristics of the projected population and dwelling choices of those households. Two basic indicators for household formation are the household maintainer rates with the population and average household size.

Household maintainers are the individuals identified in the Census as the primary person in a household. In 2016, 39% of (non-institutional) persons in the Metro Vancouver population were identified as household maintainers. Each household maintainer equals one household, and one dwelling unit. The demographic characteristics of the maintainer (i.e. age, gender) are then associated with the structure type and other household type and tenure characteristics (i.e. single person, couple, multi-person non-family etc.). This rate can be further specified by age cohort and gender to account for shifting demographics, and by municipality to account for locational differences and preferences.

Average household size is the typical number of persons occupying a dwelling unit, and can be further specified to the location, structure type and other characteristics of dwellings or households. In 2016, the overall average household size for Metro Vancouver was 2.60 persons per private occupied unit (including Census undercount estimates) – ranging from 3.2 for a single detached dwelling to 1.93 for an apartment. For example, a population aged 15+ (non-institutional) of 2.17 million would be multiplied by a household maintainer rate of 0.45 (45%), or an average household size of 2.6, to estimate about 975,000 projected dwelling units.

Figure 7. Metro Vancouver Baseline Scenario – Projected Dwelling Units 2016 - 2050



Patterns in household maintainer rates and household size vary over time, affected by changing demographics (e.g. baby boomers' life cycle, changes to immigration), as well as changing external factors affecting housing choice (e.g. household incomes, housing costs and availability). Maintainer

and household size rates and trends also vary by municipality, age cohort, household type and dwelling structure type.

Based on population projections by age cohort, and trends in household formation rates, total housing demand and dwelling structure type are projected for Metro Vancouver and for each municipality, with consideration for the land use and development / density plans prepared by each municipality, knowledge and advice from municipal planners, and overall land base and development potential within the municipalities.

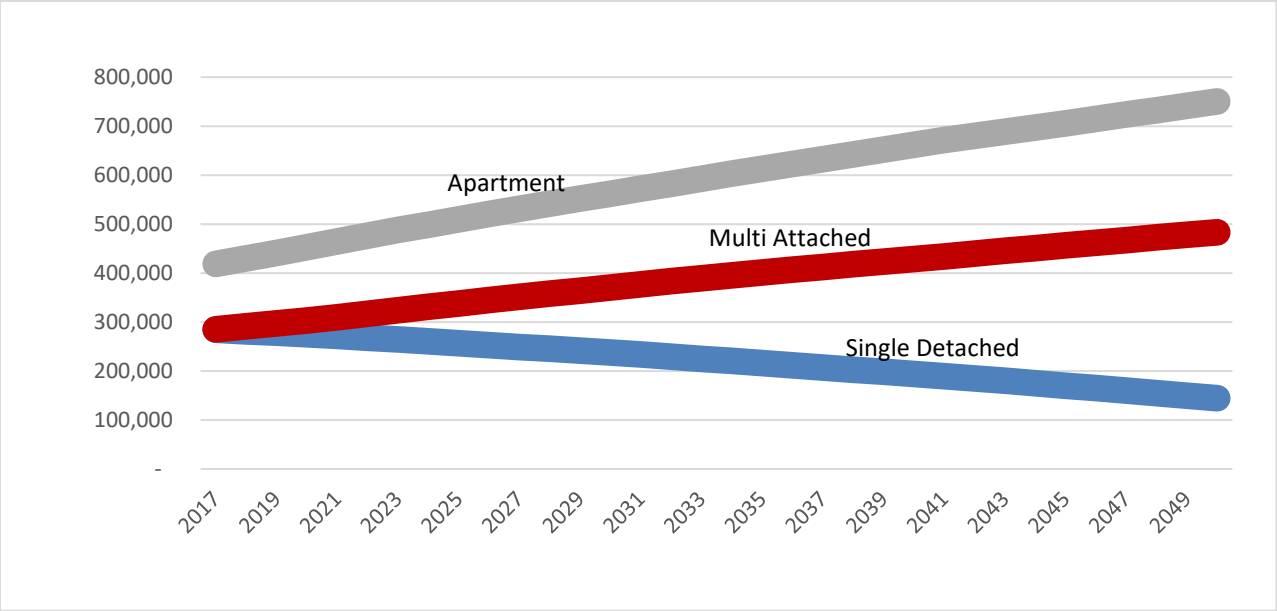
Housing development throughout the region is distinctly trending toward increasingly dense multi-unit forms, with apartments comprising about 60% of new housing growth. Many municipalities have revised development plans and allowable densities for various types of more intense housing development in urban centre areas, major transit locations, as well as redevelopment / intensification of existing and new urban neighbourhoods.

By about 2030-2035 all new housing development will be through redevelopment and intensification of the existing urban land base. This likely will take the form of apartments in and around the core areas (i.e. urban centres and transit station / corridors) and various forms of housing intensification replacing aging single detached dwellings within many existing urban neighbourhoods and throughout the region.

By 2050 the region's projected population of 3.6 million is expected to require about 1.4 million dwelling units. It is anticipated that apartments will continue to take about 62% of new unit growth, increasing the share of the housing stock from 42% to 57%. The other primary source of housing growth, i.e. the redevelopment of the existing single detached dwellings into hybrid forms (e.g. accessory units, x-plexes, laneway units, etc.), will take about 38% of new unit growth, increasing the share of housing stock from about 29% to 34%. The share of single detached units is projected to decrease from 29% to 15% of the total housing stock through the same period. Projections beyond 2050 assume that the land base will remain stable, the forms development will continue and that increasing intensification and resulting densities will be accommodated.

Figure 8 shows the projected change in housing stock to the year 2050. As residential growth is primarily through redevelopment and intensification, it is anticipated a large portion of the existing single detached housing (one unit/one lot) stock will gradually be redeveloped or renovated toward multi-unit ground oriented structures (secondary units, laneway, x-plexes, row houses).

Figure 8. Metro Vancouver Baseline Scenario - Projected Dwelling Units by Structure Type 2016 - 2050

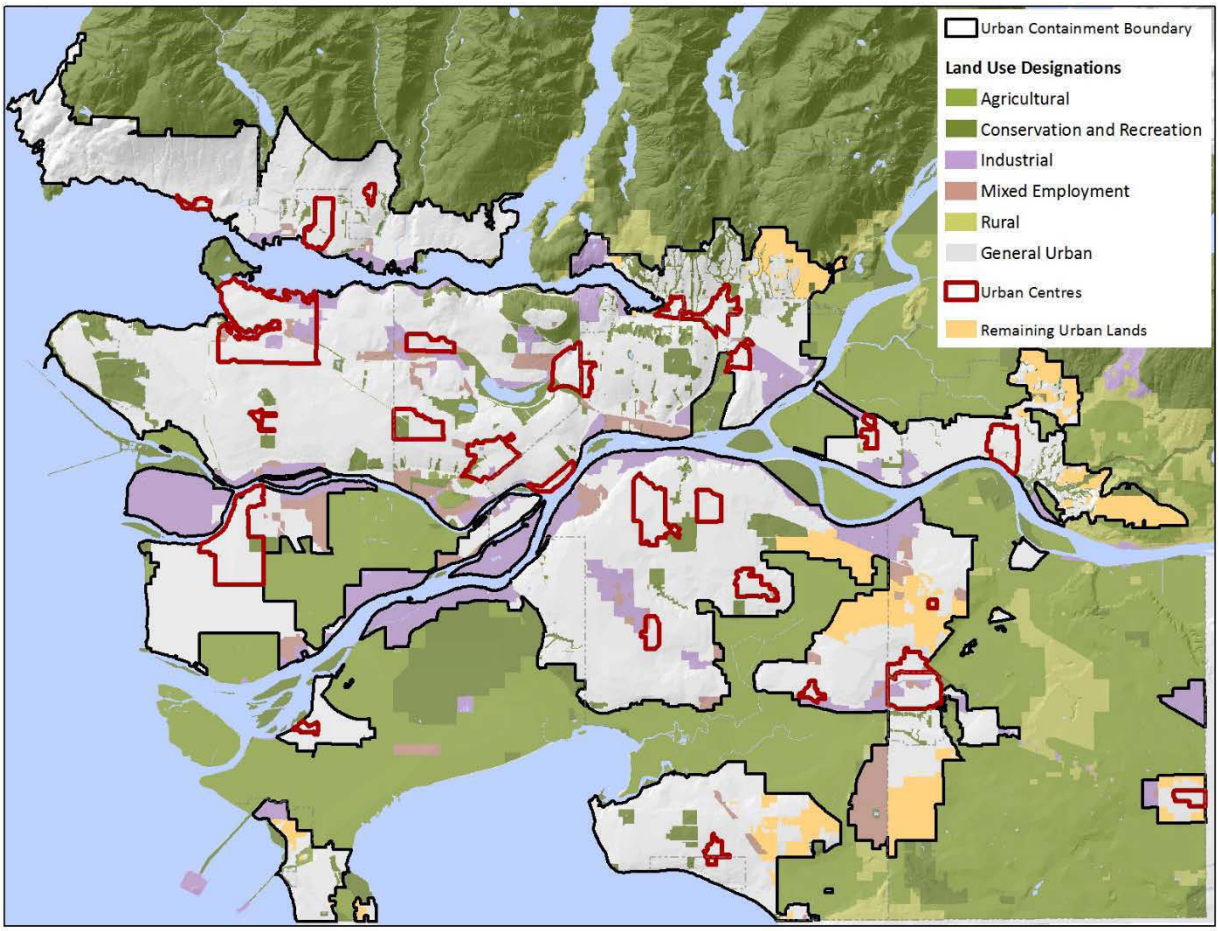


1.3 Land Base and Residential Growth

It is assumed that the existing land base for growth as set out in *Metro 2040* can accommodate the projected population / housing demand through the projection period. The *Metro 2040* growth concept has been incorporated into the respective municipal OCPs to contain 99% of housing growth within the UCB, to have about 40% of new dwelling units within designated Urban Centres, 28% along major transit corridors, and about 30% through intensification of the remaining urban-designated areas. The relative shares of housing growth within each municipality will vary according to the number of Urban Centres, the major transit services available, the availability of undeveloped urban lands, and housing intensification patterns.

There are currently about 6,000 hectares of lands designated General Urban within the UCB that are currently undeveloped or rural and planned for future urban growth. Over the past 20 years Metro Vancouver's growth has been about 20% through new urban development and 80% through intensification of the established / developed areas. It is assumed that the remaining urban lands within the UCB will be largely developed over the next 15-20 years.

Figure 9. Metro Vancouver's "General Urban" Land Base



1.4 Employment

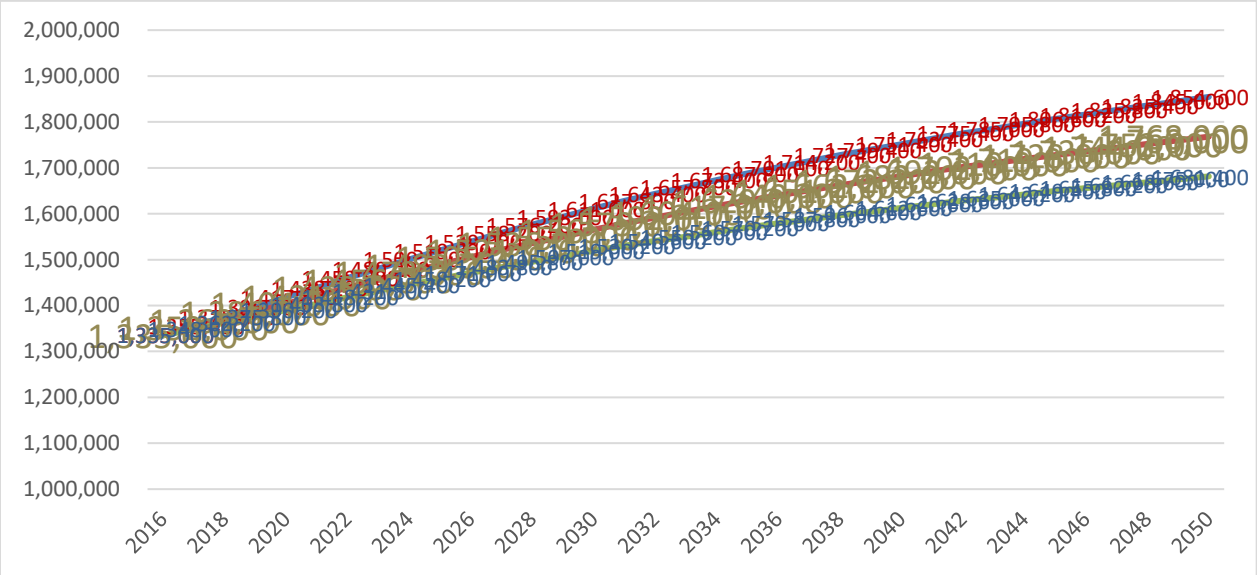
Projecting future employment growth is inter-related between the type and level of economic activity in the region, trends in employment demand, and the regional population labour force. Although all projection work is speculative, employment projections are much more speculative in relation to indicators, trends and monitoring data, and more volatile in relation to periodic fluctuations in the regional economy.

Metro Vancouver establishes a Census baseline for labour force and allocations of employed labour force by industry and occupation sectors of the regional economy, as well as the inter-regional residence-work flow. The Statistics Canada Labour Force Survey is used as an inter-censal monitor of employment activity. However, as this a small sample survey, it is used only to estimate total employment estimates at the regional level, and to assess employment sector trending at the regional level.

Under the Baseline Scenario, it has been assumed that Metro Vancouver's regional economic growth and sectoral composition will be relatively stable in future years, with some trending projected

among the component industry sector shares of regional economic / employment activity. Significant factors such as technology, aging population / labour force, and the part-time / gig employment will affect employment demand trends, but the projections do not attempt a detailed modelling of these factors. Although they are multi-dimensional, it is generally and simply assumed that the economy and employment will be proportionately consistent with the current status, but with trends in sector composition, employment demand and labour force demographics reducing overall employment in relation to population / labour force.

Figure 10. Metro Vancouver Baseline Scenario – Employment Projections 2016 – 2050



Metro Vancouver's sectoral employment trends and projected population / labour force is used as a reference for estimating regional employment. Assumptions on the proportional share for growth among industry sectors, and in the proportions of jobs within each sector, are used to estimate future employment in the region. This work is informed and supplemented by analysis commissioned from external agencies including the Conference Board of Canada and local consultants, and compared to other available studies and projections – including existing municipal economic development studies or strategies which include employment goals or projections.

The regional level growth projections are assumed to distribute among municipalities according to the share of industry employment in each municipality, and share of population growth in each municipality. Employment in each industry sector is assessed according to the likelihood that future employment will be location dependent (e.g. ports, agriculture, education institutions) or population serving (e.g. retail, food services). Subsequently, the employment in those sectors is proportionately allocated to municipalities based on the shares of industry related employment within that municipality and that municipality's share of projected regional population growth. The draft results are discussed with member jurisdiction staff and iterated with consideration for existing local plans, policies and studies.

From a 2016 base of 1,335,000 jobs, Metro Vancouver's Baseline Scenario assumes an increase in the range of 460,000 for a total of about 1.8 million jobs by the year 2050. However, implicit in this total is a general assumption that there will be a decreasing ratio of jobs to population and a much higher proportion of part-time in relation to full time jobs. Metro Vancouver will be exploring employment trends and potential scenarios through 2019.

Conclusion

Metro Vancouver's projections are updated on a regular basis, as new sources of data become available and as the Census is undertaken. The projections are not static, but rather evolve over time. The currency of the projections is critical to utility, transportation, housing and other forms of long range planning in the region. Metro Vancouver continues to work closely with member jurisdictions, other regional agencies and key stakeholders to provide and share data to build accurate and consistent population, housing and employment projections.