



PORT of
vancouver

PROJECT AND ENVIRONMENTAL REVIEW REPORT

PER NO. 17-093

ANNACIS ISLAND WASTEWATER TREATMENT PLANT NEW OUTFALL SYSTEM

Prepared for: Director, Environmental Programs

March 10, 2019

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 VANCOUVER FRASER PORT AUTHORITY PROJECT AND ENVIRONMENTAL REVIEW REPORT	
PER No.:	17-093
Tenant:	Metro Vancouver
Project:	Annacis Island Wastewater Treatment Plant New Outfall System
Project Location	Downriver of the Alex Fraser Bridge, north side of the Fraser River, Delta
VFPA SID No.:	DEL322
Land Use Designation:	Industrial, Port Water
Applicant(s):	Metro Vancouver
Category of Review:	C
Recommendation:	That PER No. 17-093 for the Annacis Island Wastewater Treatment Plant New Outfall System be approved.

1 INTRODUCTION

The Vancouver Fraser Port Authority (VFPA), a federal port authority, manages lands under the purview of the *Canada Marine Act*, which imparts responsibilities for environmental protection. VFPA accordingly conducts project and environmental reviews of works and activities undertaken on these lands to ensure that the works and activities will not likely cause significant adverse environmental effects. This project and environmental review report documents VFPA's project and environmental review of PER No. 17-093: Annacis Island Wastewater Treatment Plant New Outfall System (the Project) proposed by Metro Vancouver (the Applicant).

This project and environmental review was carried out to address VFPA's responsibilities under the *Canada Marine Act*, and to meet the requirements of the *Canadian Environmental Assessment Act*, 2012 (CEAA 2012), as applicable. The proposed Project is not a CEAA 2012 "designated project" and an environmental assessment as described in CEAA 2012 is not required. However, VFPA authorization is required for the proposed Project to proceed and in such circumstances, where applicable, Section 67 of CEAA 2012 requires federal authorities to assure themselves that projects will not likely cause significant adverse environmental effects. This review provides that assurance. In addition, VFPA considers other interests, impacts and mitigations through the project and environmental review.

The project and environmental review considered the application along with supporting studies, assessments and consultations carried out or commissioned by the Applicant, as well as other information provided by the Applicant. In addition, this project and environmental review considered other information available to VFPA and other consultations carried out by VFPA. A full list of information sources germane to the review is provided in Appendix B.

This project and environmental review report is NOT a project authorization. It is a prerequisite to the issuance of a project permit (the Permit) and the conclusions described in this report require compliance with the conditions in the Permit.

2 PROJECT DESCRIPTION

As part of upgrades to increase the secondary treatment capacity of the Annacis Island wastewater treatment plant, Metro Vancouver proposes to construct a new outfall system in the Fraser River. The new outfall system will replace the existing outfall which was constructed in 1974 and does not provide the required capacity nor meet current design criteria with respect to seismic requirements and dilution requirements. The new outfall system has been designed with an increased capacity to serve current and future treatment plant upgrades, achieve required dilution ratios, and meet seismic criteria. Project components located on lands and waters administered by VFPA include a section of the outfall tunnel, the river riser, and the diffuser manifolds.

2.1 Proposed Works and Activities

The proposed works include the following components and activities:

2.1.1 Outfall Tunnel

- A new outfall tunnel with an inside diameter of 4.2 m will be constructed utilizing a tunnel boring machine (TBM). The tunnel will extend from an outfall shaft located on the upland to a river riser located approximately 160 m south of the north bank of the Fraser River. The tunnel will be approximately 30 m below the ground surface on the upland and 15 m below the riverbed.
- For seismic purposes, a steel liner, approximately 50 m in length, will be installed within the outfall tunnel where it connects with the river riser.
- Upon completion of drilling, the TBM shield and cutting head will be removed or abandoned in place below the riverbed in the area of the riser.

2.1.2 River Riser

- A river riser, consisting of a vertical steel riser pipe and riser cap within a concrete support structure, will be installed. The support structure will consist of a concrete block, approximately 12 m by 19 m, founded on 24 concrete-filled steel piles with a diameter of 760 mm (30 inches).
- The river riser structure will be constructed within a temporary (in-river) cofferdam over an estimated 6 to 8 months. The area within the temporary coffer dam will be excavated to an estimated depth of 23 m below the riverbed and backfilled in sequence with structural concrete.
- Once the outfall tunnel and river riser are connected, the area above the concrete block will be backfilled with river sand and capped with riprap.

2.1.3 Diffuser Manifold

- Dredging to a depth of approximately 4.5 m below the riverbed will be conducted using clamshell equipment to facilitate the installation of two diffuser manifolds, each approximately 130 m long and 2.5 m in diameter. To limit the extent of excavation, temporary shoring will be installed on the landward side of the trench and removed as diffuser installation progresses. A 1:6 slope will be maintained on the riverward side. The total estimated dredge footprint is 12,750 m². Dredged material will be temporarily stored on a barge in the interim between being dredged and being deposited back into the diffuser trench as backfill. Dredged material that is not used as backfill will be disposed of under valid disposal at sea permit or on the upland.
- Bedding material (sand and gravel) will be placed at the base of the dredged trench, with subsequent installation of pre-assembled sections of the diffuser manifolds. Once the

diffuser manifolds are installed, the trench will be backfilled with river sand and covered with armour rock. The diffuser manifolds will be aligned approximately parallel with and immediately landward of the northern boundary of the navigation channel.

- Concrete diffuser protective covers and flexible diffuser ports with check valves will be installed. Upon completion, the protective covers and diffuser ports will protrude from the riverbed to an elevation of approximately 8.6 m below chart datum. During operation, they will discharge horizontally towards the navigation channel, rather than the water surface, as in the existing outfall. The diffuser design allows for the outfall system capacity to be increased in the future by opening more ports in the structure. These ports will be preinstalled and blind-flanged (i.e., sealed).
- Following the completion of tunnel mining, the tunnel will be connected to the river riser pipe and diffuser manifold. This will include flooding the tunnel, removing the riser cap, equalizing the water pressure, removing the two bulkheads within the riser pipe, and reinstalling the riser cap.

2.1.4 Existing Outfall Rehabilitation

- Once the new outfall is commissioned, the existing outfall will be rehabilitated by installing new flexible valves on top of the existing 21 steel riser pipes to allow it to serve as an emergency influent bypass.

2.2 Construction Details

Non-tunneling construction is expected to be conducted within the hours of 6 a.m. to 8 p.m. Monday to Saturday. During tunnel advancement, work may proceed up to 7 days a week, 24 hours a day. Tunnel mining and on-land construction are anticipated to commence in 2019.

Construction of the new outfall system is planned to be conducted during three or four in-river construction windows commencing in 2020. In-river activities to be conducted during the phases include:

- Season 1 (2020): River riser installation
- Season 2 (2021): Diffuser installation
- Season 3 (2022): Diffuser connection
- Season 3/4 (2022/2023): Existing outfall rehabilitation

Operation of the new outfall is anticipated to commence in mid-2022.

2.3 Project Context

The Project is located downriver of the Alex Fraser Bridge and the South Surrey Interceptor, which is an underwater pipe that conveys sewage from communities south of the Fraser River to the Annacis Island wastewater treatment plant. Geomorphological studies were conducted to evaluate sediment transport and potential impacts of the new diffuser system on hydraulics and geomorphology in the area. The studies indicated that the river bed near the project site has lowered at least 20 m over the last 40 years in response to three main factors:

- Construction of the ship collision structures at the Alex Fraser Bridge in 1984, which created a notable constriction and zone of flow separation along the south bank.
- Construction of a raised riprap apron over the South Surrey Interceptor around 1995 that has acted as a sill.
- Ongoing dredging and navigation channel improvements, which have lowered the riverbed by 2 to 3 metres upriver of the site.

The proposed outfall diffuser location on the north side of the navigation channel was determined to be in a relatively stable section of the river compared to the south side and locations further downriver. Since the mid-1980s, the bed elevation has varied up to 2 m, with no clear association with reach-wide patterns, local infrastructure change, or flood flows. The river bed in the Project area is currently near a historical low, suggesting that aggradation could occur in the absence of continued reach-wide degradation. Short-term periodic scour and fill by dunes (sand-waves) that migrate through the reach is anticipated to occur.

The Project will include construction and staging activities within the safety and navigation channels, and in proximity to railcar barge operations performed by Seaspan at Southern Railway's railcar barge terminal. A navigation impact assessment was conducted to identify potential navigation impacts and mitigation measures to be implemented during construction and operation. A navigation protection plan will be developed prior to the start of construction to address anticipated marine navigation activities between barge or vessel loading sites along the Fraser River and the Project area.

The Project is located within an important area for adult White Sturgeon holding in the Fraser River. To reduce potential impacts to White Sturgeon, mitigation measures, such as imaging sonar surveys and "soft-start" or "ramp-up" procedures, will be implemented.

The shoreline adjacent to the river riser and diffuser installation is classified as yellow-coded moderate productivity habitat under the Fraser River Estuary Management Program (FREMP) classification system. Dredging and installation activities will be conducted in deep water (minimum depth of 10 m below the mean water level) more than 100 m from the shoreline.

The Project will not include the removal of the existing outfall system, or the removal or alteration of the South Surrey Interceptor or its riprap apron.

Other components of the overall Annacis Island wastewater treatment plant upgrade project, such as the effluent shaft, outfall shaft, level control structure and effluent tunnel, are described in the application package but are not located on lands administered by VFPA. The Applicant is solely responsible for obtaining any and all required permits, authorizations and approvals for activities proposed to be undertaken on lands not administered by VFPA.

3 VANCOUVER FRASER PORT AUTHORITY INTERNAL REVIEWS

The following VFPA departments have reviewed the application and have the following project considerations.

3.1 Planning

Planning has reviewed the application and has the following land use comments.

Planning supports the recommendation to approve the Project subject to adherence to the project and environmental conditions in the Permit.

3.1.1 Land Use Designation

The proposed Project, once constructed, would cross over two land use designations within the river channel, "Industrial" and "Port Water" in Vancouver Fraser Port Authority's Land Use Plan. The Project conforms to the designation of "Industrial". No designation amendment is required for

the part of the Project located in "Port Water" as it is a public utility that is proposed to be installed.

3.1.2 Building Permit Requirements

There is no requirement for a building permit for the Project.

3.2 Engineering

Engineering has reviewed the application and requires the Applicant to submit the following:

- Signed and sealed drawings; and,
- Record drawings.

These are reflected in Conditions 19 and 45 in the Permit.

Engineering supports the recommendation to approve the Project subject to adherence to the listed project and environmental conditions in the Permit.

3.3 Marine Operations

The Project involves the use of barge-mounted equipment within the navigation channel and the temporary installation of an in-river coffer dam.

Marine Operations has reviewed the application and requires the Applicant to implement the following:

- The outfall system shall not reduce the depth of water in the safety channel to be shallower than -8.7 m chart datum.
- Material shall not be placed so that the navigation channel is shallower than -12.85 m chart datum.
- A Notice to Shipping ("NOTSHIP") shall be issued.
- A navigation protection plan shall be submitted to VFPA.
- A marine construction and staging plan, or equivalent, shall be submitted to VFPA.
- A marine users work group shall be established for the purposes of communicating relevant in-water work activities to local marine operators.
- A plan describing how the recommendations from the maneuvering analysis report will be implemented shall be submitted to VFPA.
- Notices shall be posted and maintained at the beginning of each phase of in-river work.
- Vessels and equipment shall be appropriately lit and positioned so as not to impede navigation.
- Temporary works shall be appropriately lit.
- A stand-by tug shall be made available during appropriate periods.
- Hydrographic surveys shall be undertaken and provided to VFPA at appropriate intervals.

These are reflected in Conditions 17, 18, 22, 25, 27, 28, 29, 30, 35, 36, 37 and 43 in the Permit.

Marine Operations supports the recommendation to approve the Project subject to adherence to the listed project and environmental conditions in the Permit.

3.4 Environmental Programs

The review of the proposed project by Environmental Programs is reflected in Section 7, Environmental Review.

4 STAKEHOLDER CONSULTATION

The proposed Project was assessed to have potential impacts to stakeholders and the local community and consultation activities were determined to be required. The following sections describe the stakeholder and public consultation activities undertaken by the Applicant and VFPA as part of the project and environmental review.

4.1 Municipal Consultation

The proposed Project was assessed by VFPA to have potential impacts to municipal interests. A referral letter was sent to the City of Delta on April 6, 2018 notifying them of the proposed Project. The comments provided by the City of Delta, and the ways in which they have been considered as part of the project and environmental review, are summarized in the table below.

Issue	Mitigations and Permit Conditions	Rationale
Water quality <ul style="list-style-type: none"> Ensure outfall discharge does not adversely affect downstream irrigation water quality at intakes 	Metro Vancouver will adhere to the requirements of the amended Operational Certificate to be issued by the BC Ministry of Environment and Climate Change Strategy prior to commencing and during operation of the new diffuser.	The Applicant's environmental impact studies indicated that uses of the receiving environment are not expected to be impaired from the operation of the outfall.
Channel flow and sediment transport <ul style="list-style-type: none"> Ensure that installations will not affect channel flow or the sediment transport in the river (e.g., cause a build-up of sediment that may affect drainage outlets) 	None required.	An assessment of the potential impacts of the new diffuser system on hydraulics and geomorphology determined that while some small local deposition may occur around the diffuser ports and for some distance downstream, no major impacts to overall river morphology, the navigation channel or the adjacent railcar barge terminal are expected.

4.2 Federal and Provincial Agency Referrals

Information on the Project was submitted to the following agencies for review and comment:

- BC Ministry of Environment and Climate Change Strategy (formerly Ministry of Environment (MOE))
- Environment and Climate Change Canada (ECCC)
- Transport Canada
- Fisheries and Oceans Canada (DFO)

- BC Ministry of Transportation and Infrastructure (MOTI)

The Applicant submitted a Stage 1 and Stage 2 Environmental Impact Study to MOE in support of an application for the amendment of Operational Certificate 387. VFPA understands that Metro Vancouver will address comments from MOE and adhere to the requirements of the amended Operational Certificate prior to commencing and during operation of the new diffuser.

VFPA provided information on the Project to ECCC. On April 20, 2016, ECCC responded that they will not be involved in reviewing the application, but directed VFPA to relevant legislation and provided general water quality advice for projects involving construction in and around water. ECCC’s response was shared with the Applicant and considered by VFPA in determining Project mitigation measures.

The Applicant submitted a Notice of Works to Transport Canada’s Navigation Protection Program. Transport Canada confirmed that an Approval under the *Navigation Protection Act* is required.

The Applicant submitted a Request for Review and supplemental information to DFO. In response, DFO provided advice to reduce potential impacts to fish and fish habitat, which was considered by VFPA in determining Project mitigation measures.

The BC MOTI had initial concerns with previous alignment options that placed the outfall closer to the Alex Fraser Bridge. The location and alignment of the outfall was subsequently revised. The outfall location as illustrated and described in the permit application has been deemed to be far enough away from the bridge, and downstream from it, that its influence on the foundations and shoreline protection works should not be a concern.

4.3 Adjacent Tenant Consultation

The proposed Project was assessed by VFPA to have potential impacts to adjacent VFPA tenant operations. A referral letter was sent to the following VFPA tenants on April 6, 2018 notifying them of the proposed Project:

- Delta Cedar Products Ltd.
- Seaspan ULC
- Southern Railway of British Columbia Ltd. (SRY)

SRY responded with comments on the proposed Project. Below is a table summarizing the comments received and how they were considered as part of the project and environmental review.

Issue	Mitigations and Permit Conditions	Rationale
<p>The project design should take into account railway engineering standards applicable to SRY’s infrastructure on the surface where sub-surface project work is proposed.</p> <p>The work should be carried out in a manner that will monitor for and protect against impacts such as</p>	<p>Condition 5 of the Permit holds the applicant responsible for repair or replacement of any damage to existing marine berthing dolphins and dock structure of Southern Railway of British Columbia, to the satisfaction of VFPA, that result from construction and operation of the Project.</p>	<p>The Project is not expected to adversely affect SRY infrastructure, but the additional permit condition will help ensure that potential effects to the safety or efficiency of railway operations, or the integrity of railway infrastructure are avoided or mitigated.</p>

<p>settlement or deflection of the track, particularly during the bored tunneling phase.</p> <p>To the extent the project involves work or workers in the vicinity of the operating track, the project proponent should adhere to safety standards for protecting against the movement of trains.</p> <p>The project proponent should also have an adequate safety management system and emergency response procedures.</p> <p>Should there be any work that does result in damage to railway infrastructure, SRY should be contacted immediately.</p>		
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4.4 Marine Users Consultation

The proposed Project was assessed by VFPA to have potential impacts to marine users. A referral letter was sent to the Fraser River Pilots Committee on April 6, 2018 notifying them of the proposed Project.

The Applicant was also required to consult directly with the Marine Users Group. A meeting was held on May 11, 2017.

The Marine Users Group provided comments on the proposed Project. Below is a table summarizing the comments received and how they were considered as part of the project and environmental review.

Issue	Mitigations and Permit Conditions	Rationale
Communication during work periods	Condition 22 of the Permit requires the Applicant to contact the appropriate Canadian Coast Guard, Marine Communications and Traffic Services centre regarding the issuance of a Notice to Shipping to advise the marine community of potential hazards associated with the	

	Project. In addition, Condition 30 of the Permit requires the Applicant to post notices at the beginning of each phase of in-river work to notify recreational marine users.	
Speed of deep sea traffic and the resulting hydraulic effect	None required.	River pilots must retain enough speed to maintain steerage and therefore there will always be some interaction felt from a passing ship due to the deep draft compared to the local tug traffic.

4.5 Port Community Liaison Committee Consultation

The proposed Project was assessed by Project Consultation/Planning to be of potential interest to the Port Community Liaison Committee in Delta. The Applicant presented the Project to the Committee on July 12, 2018.

The Committee responded with comments on the proposed Project. Below is a table summarizing the comments received and how they were considered as part of the project and environmental review.

Issue	Mitigations and Permit Conditions	Rationale
Question raised as to whether the proposed Project would change water quality for irrigation	None required.	The Applicant’s environmental impact studies indicated that the uses of the receiving environment are not expected to be impaired from the operation of the outfall.
Question raised as to whether the proposed project would result in increased odour levels	None required.	The Applicant has indicated that the larger wastewater treatment plant upgrade project will improve existing odour levels. The treatment plant is not located on lands and waters administered by VFPA.

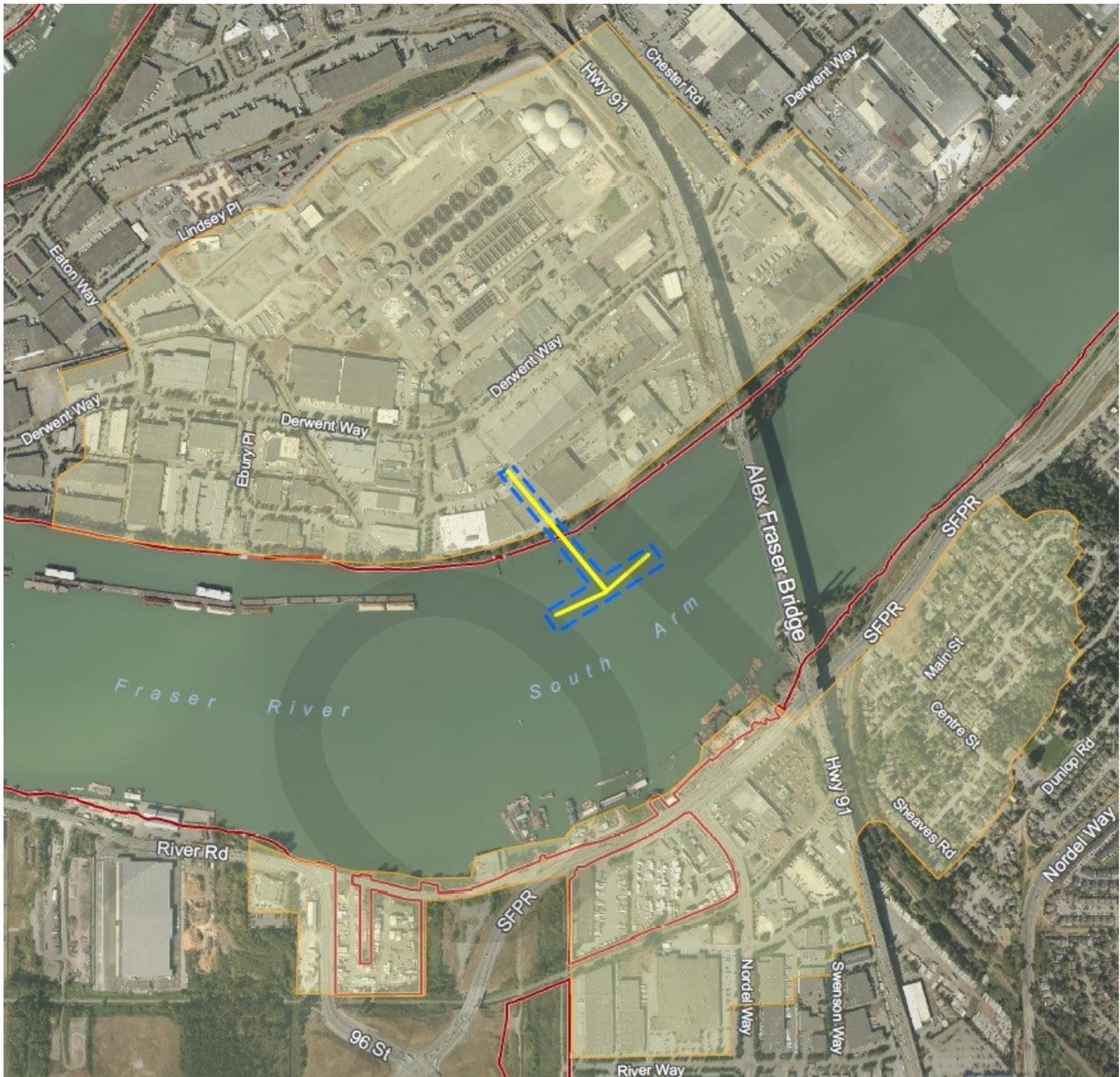
5 PUBLIC CONSULTATION

The proposed Project was assessed by VFPA to have minimal or no potential impacts to community interests upon its completion. Therefore public consultation was not required to be conducted by the Applicant during the permit review.

The proposed Project was assessed by VFPA to have potential impacts to community interests during construction. These include potential impacts such as visibility and noise.

As a result, the Applicant is required to send a construction notice to adjacent residents and businesses in Delta as shown by the yellow shaded area in the map below. The construction notice shall be distributed by the Applicant at least ten business days prior to the start of the works. Due to the multi-year phased nature of construction, the Applicant may be required to send multiple notices to keep the community apprised of activities over the duration of construction. The construction notice will be posted on the Applicant's website. These are Conditions 20 and 21 in the Permit.

Figure 1 Map of notification area



6 ABORIGINAL CONSULTATION

The proposed Project was determined to have the potential to adversely impact Aboriginal or Treaty rights. Therefore, Aboriginal consultation was required.

The Applicant, Metro Vancouver, led the Aboriginal consultation activities for the proposed Project. VFPA reviewed and considered the Applicant's record of consultation to ensure that the duty to consult was met.

The information below summarizes the Applicant's consultation.

6.1 Objectives

The Applicant's objectives were to share information and engage with Aboriginal groups in a manner consistent with the following principles:

- Metro Vancouver is aware that Aboriginal groups have asserted claims that intersect the lands and waters where the Project is proposed to be constructed.
- Metro Vancouver recognizes that information sharing and engagement with Aboriginal groups is different and separate from public consultation.
- Metro Vancouver will enter into the engagement process in good faith.
- Metro Vancouver will engage with Aboriginal groups whose Consultative Areas include the Project site early and consider ways to mitigate impacts of construction on Aboriginal groups' interests.
- Metro Vancouver's engagement process will be coordinated with VFPA and the Ministry of Forests, Lands, Natural Resource Operations & Rural Development.

6.2 Scope of Consultation

Prior to submitting a permit application to VFPA, the Applicant conducted preliminary engagement activities. Initial engagement with Aboriginal groups on the Project took place between July and October 2015. At that time, the following 21 First Nations, Tribal Councils and a Treaty Group were identified as having a possible interest in the Project. These groups were identified from the BC First Nation Consultative Area database:

- Cowichan Tribes
- Halalt First Nation
- Hul'qumi'num Treaty Group*
- Katzie First Nation
- Kwantlen First Nation
- Kwikwetlem First Nation
- Lake Cowichan First Nation
- Lyackson First Nation
- Musqueam Indian Band
- Penelakut First Nation
- Seabird Island Band
- Semiahmoo First Nation
- Shxw'ow'hamel First Nation
- Skawahlook First Nation
- Soowahlie First Nation
- Squamish Nation
- Sto:lo Nation Society
- Sto:lo Tribal Council
- Stz'uminus First Nation
- Tsawwassen First Nation
- Tsleil-Waututh Nation

* The Hul'qumi'num Treaty Group no longer addresses referrals from proponents. Referrals are to be sent to the six-member First Nations of the Hul'qumi'num Treaty Group.

In 2017, VFPA identified the following 21 Aboriginal groups and Tribal Councils for engagement on the Project as part of the PER process:

- Cowichan Tribes

- Halalt First Nation
- Katzie First Nation
- Kwantlen First Nation
- Kwikwetlem First Nation
- Lake Cowichan First Nation
- Lyackson First Nation
- Musqueam Indian Band
- Penelakut First Nation
- Qayqayt First Nation
- Seabird Island Band
- Semiahmoo First Nation
- Shxw'ow'hamel First Nation
- Skawahlook First Nation
- Soowahlie First Nation
- Squamish Nation
- Sto:lo Nation Society
- Sto:lo Tribal Council
- Stz'uminus First Nation
- Tsawwassen First Nation
- Tseil-Waututh Nation

6.3 Overview of Engagement and Communication Activities

On July 8, 2015, the Applicant sent hard-copy letters to Aboriginal groups to introduce the Project. The letters provided a map of the Project location and invited Aboriginal groups to provide input. Responses were received from Cowichan Tribes, Katzie First Nation, Kwantlen First Nation, Sto:lo Nation Society, and the Sto:lo Tribal Council. The methodology selected for the outfall construction (tunnel boring machine as opposed to open-cut) and the final project alignment were selected in part because of the input received in 2015 and the results of the Archeological Overview Assessment (AOA).

On December 13, 2016, once the outfall location and alignment were confirmed, the Applicant began a second round of engagement. The purpose of this engagement was to notify Aboriginal groups about the results of the AOA, the chosen location for the outfall, and to request input on the use of the proposed in-river construction area by Aboriginal groups.

Between December 2016 and September 2018, the Applicant offered a number of engagement opportunities with the intention of keeping Aboriginal groups informed about the Project. The engagement also offered opportunities to provide input during the early design phase so that the Applicant had time to explore ways to prevent, minimize or mitigate impacts. Activities conducted by the Applicant included hard-copy letter correspondence, phone calls, in-person meetings and presentations, and an application for a Heritage Inspection Permit (which included a request for input from Aboriginal groups). The AOA was shared via email and all technical reports were uploaded to a project specific webpage as they became available.

Following receipt of a PER application, VFPA sent letters to Aboriginal groups on April 3, 2018 which provided an overview of the Project and information on the PER process. The letters also informed Aboriginal groups that VFPA was delegating procedural aspects of Aboriginal consultation to the Applicant.

6.4 Summary of Commitments

The Applicant made a number of commitments to Aboriginal groups during consultation activities, summarized in a submission to VFPA in December 2018. A summary of those commitments follows:

- Share revised plans with Aboriginal groups for review and comment, including the navigation protection plan, construction environmental management plan (CEMP), and environmental protection plan
- Notify Aboriginal groups if an Archaeological Impact Assessment (AIA) is conducted or archaeological and/or cultural materials are encountered during construction
- Work with Aboriginal groups to minimize in-river construction activities during fishery openings and establish a communications protocol
- Conduct surveys, including sonar imaging and hydroacoustic monitoring, at relevant periods in advance of and during construction
- Work with Aboriginal groups with respect to involvement in monitoring during construction
- Share Project updates, Project timing and construction activities, including notification of any spills or exceedances of runoff criteria during construction

Permit condition No. 16 requires that the Applicant honor the commitments made to Aboriginal groups.

6.5 Summary of Issues Raised

Below is a table summarizing the comments provided by Aboriginal groups and how they were considered as part of the project and environmental review.

Issue	VFPA Considerations	Mitigations and Permit Conditions
<p>Cumulative impacts Cumulative impacts of all projects taking place along the Fraser River on fish, fish habitat and Aboriginal groups' right to fish</p>	<p>Though VFPA does not have a legislative requirement to explicitly consider cumulative effects, the past and current effects of development on the environment provides the context for VFPA's assessment of project effects, and so consideration of cumulative effects is inherently integrated into VFPA's environmental reviews and decisions.</p>	<p>None.</p>
<p>Fish and fish habitat / water quality Short and long-term impacts of construction and operation of the outfall (the discharge of effluent from the Annacis Island Wastewater Treatment Plant) on fish, fish habitat and Aboriginal groups' right to fish</p>	<p>VFPA understands that the Project has the potential to impact fish and fish habitat which could affect Aboriginal fishing activities.</p> <p>Potential adverse effects will be reduced through the implementation of mitigation measures outlined in the construction environmental management plan and</p>	<p>Permit condition 40 requires the Applicant to carry out the Project in accordance with the construction environmental management plan.</p> <p>Condition 16 requires the Applicant to adhere to all commitments made to Aboriginal groups.</p>

<p>Upgrades to the Annacis Island Wastewater Treatment Plant do not include plans to upgrade the facility to tertiary treatment</p>	<p>environmental protection plan. The Applicant has committed to implementing mitigation measures, such as conducting imaging sonar surveys between June 16 and October 31, to reduce potential effects on white sturgeon.</p> <p>The Applicant has committed to working with Aboriginal groups to establish a communications protocol and to minimize in-river construction activities during fishery openings.</p> <p>The Applicant’s environmental impact studies determined that adverse effects on aquatic life, wildlife, people consuming fish from the Fraser River and impairment of other receiving environment uses are not expected once the outfall is in operation.</p> <p>The Annacis Island Wastewater Treatment Plant and related upgrades are not located on lands and waters administered by VFPA.</p>	
<p>Process (Capacity Funding) Lack of funding provided to Aboriginal groups to review project materials and complete an impact assessment will result in lack of meaningful engagement</p>	<p>The amount of participant funding offered by VFPA was based on capacity assistance offered for similar Category C projects. VFPA considers requests for participant funding outside the range normally offered, provided they include detailed cost estimates for the review services required.</p>	<p>None.</p>
<p>Archaeology Potential impacts of construction on archaeological resources</p>	<p>An assessment of archaeological potential in the Project area was carried out by a consulting firm with a qualified archaeologist. The consultant’s assessment indicated a low potential for encountering archaeological resources in offshore locations in the Fraser River channel due</p>	<p>While there is low potential for discovering archaeological resources during construction of Project components located on lands and waters administered by VFPA, Permit condition 34 requires the Applicant to carry out the Project in accordance with the</p>

	to natural erosion and the effects of dredging.	archaeological chance find procedure. Condition 16 requires the Applicant to adhere to all commitments made to Aboriginal groups.
Socio-economic conditions Economic opportunities or benefits associated with the Project	The Applicant has committed to exploring opportunities for Aboriginal involvement in environmental and Aboriginal monitoring during construction of the Project.	Condition 16 requires the Applicant to adhere to all commitments made to Aboriginal groups.

6.6 Conclusion

The Applicant has made a meaningful effort to consult with potentially affected Aboriginal groups. Following the implementation of mitigation measures, including permit conditions, adverse impacts to Aboriginal rights, Treaty rights and factors set out in subsection 5(1)(c) of CEAA 2012 are not expected. Based on the record of consultation, VFPA is of the view that the duty to consult has been met.

7 ENVIRONMENTAL REVIEW

To fulfill its responsibilities under the *Canada Marine Act* and CEAA 2012, VFPA must make a determination on the potential environmental effects of a proposed project on VFPA managed lands and waters prior to authorizing those works to proceed. To make that determination, VFPA considers the residual adverse effects of the project, that is, the effects after mitigation measures have been taken into account. In addition, should a project be approved, VFPA includes additional environmental conditions in the project permit to further reduce the identified potential impacts.

This section of the project and environmental review report summarizes the environmental review conducted for the Project, and provides the environmental review decision in Section 7.3. The environmental review also considered the information provided in the previous sections of this report.

7.1 Scope of Environmental Review

The environmental review includes consideration of the potential environmental effects of the proposed Project, taking into account mitigation measures to avoid or reduce those effects. This review considered the Project components and physical activities described in Section 2. Additional Project information pertinent to the environmental review includes the following:

- The Project and Environmental Review Application report and Construction Environmental Management Plan submitted as part of the Project application identified specific mitigation measures to be implemented, including: scheduling activities to occur within least-risk work windows for aquatic species, undertaking environmental monitoring by a qualified professional, implementing spill prevention planning, and developing a Project-specific environmental protection plan.
- A Request for Review and supplemental information was submitted to DFO. In response, DFO recommended mitigations to be implemented to reduce potential impacts to fish and fish habitat.

- A habitat assessment determined that wildlife species and their habitat would not be impacted by the Project. Fish mortality during construction was determined to be avoidable through the application of appropriate, well-established best management practices. In addition, mitigation measures to be implemented during construction were recommended.
- Stage 1 and 2 environmental impact studies evaluated potential effluent-related impacts on the receiving environment and public health from the new outfall diffuser system. The studies determined that adverse effects on aquatic life, wildlife, people consuming fish from the Fraser River are not expected and that other uses of the receiving environment would not be impaired. Metro Vancouver will address comments from the BC Ministry of Environment and Climate Change Strategy and adhere to the requirements of the amended Operational Certificate prior to commencing and during operation of the new diffuser.
- A sediment characterization program determined that the proposed dredged sediment meets the disposal at sea action levels for contaminants.
- An assessment of the potential impacts of the new diffuser system on river hydraulics and geomorphology determined that while some small local deposition may occur around the diffuser ports and for some distance downstream, no major impacts to overall river morphology, the navigation channel or the adjacent railcar barge terminal are expected.

The temporal scope of the review included Project construction, rehabilitation of the existing outfall, and operation of the new outfall.

The environmental review considered the potential adverse environmental and social effects of the project on 14 environmental components (e.g., species with special status, aquatic species and their habitat, recreational interests, etc.) and from Accidents and Malfunctions. The environmental components are aspects of the biophysical and socio-economic environment considered to have ecological, economic, social, cultural, archaeological, or historical importance.

The environmental components assessed by VFPA are presented in Section 7.2 and include the environmental effects listed in section 5(1) and 5(2) of CEEA 2012.

Section 7.2 summarizes the results of the review.

7.2 Environmental Effects Summary

The following table summarizes the potential environmental effects the Project could have on the identified environmental components.

Environmental Component	Potential Adverse Effects?		Overview of Potential Adverse Effects, Mitigation Measures, and Residual Adverse Effects	Significant Residual Adverse Effects?	
	Yes	No		Yes	No
Air quality Assessed as required under subsection 5(1) and 5(2) of CEAA 2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The equipment used for the Project will result in air emissions during construction. Because this is a relatively small scale project to be undertaken in phases over several years, the air emissions will not have a measurable effect on the air quality of the local air shed.</p> <p>After Project completion, no new air emission sources will remain on site.</p> <p>With mitigation measures in place, residual adverse effects on air quality are anticipated to be not significant.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Lighting Assessed as required under subsection 5(1) and 5(2) of CEAA 2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>No permanent new lighting will be installed as part of the Project. Mitigation measures will be implemented during construction to minimize potential impacts from lighting during night works, which will be located in the river and not in close proximity to residents.</p> <p>After Project completion, no lighting sources will remain on site.</p> <p>With mitigation measures in place, residual adverse effects from Project-related lighting are anticipated to be not significant.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Noise Assessed as required under subsection 5(1) and 5(2) of CEAA 2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The Project is located approximately 600 m from residences and other noise sensitive areas. The noise environment in the nearest residential area is anticipated to be dominated by the presence of South Fraser Perimeter Road. The upland adjacent to the Project to the north is zoned heavy industrial by the City of Delta.</p> <p>After Project completion, no noise sources will remain on site.</p> <p>With mitigation in place, residual adverse effects on the acoustic environment are anticipated to be not significant.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Soils	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>The Project is not anticipated to affect soils.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Environmental Component	Potential Adverse Effects?		Overview of Potential Adverse Effects, Mitigation Measures, and Residual Adverse Effects	Significant Residual Adverse Effects?	
	Yes	No		Yes	No
<p>Sediments</p> <p>Assessed as required under subsection 5(1) and 5(2) of CEAA 2012</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>Dredging and sediment placement activities could change the quality of sediments in the Project footprint and adjacent areas, either directly, through the removal and placement of sediments, or through deposition of re-suspended sediments. Characterization of the dredge pocket determined that sediment meets applicable sediment quality criteria.</p> <p>The stage 1 and 2 environmental impact studies determined that adverse effects on: aquatic life, wildlife, people consuming fish from the Fraser River, and other uses of the receiving environment are not expected once the outfall is in operation.</p> <p>With mitigation measures in place, the residual adverse effects of the Project on sediments are anticipated to be not significant.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Ground water</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>The Project is not anticipated to affect ground water.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Surface water and water bodies</p> <p>Assessed as required under subsection 5(1) and 5(2) of CEAA 2012</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>Dredging, sediment placement, diffuser manifold installation, coffer dam installation, riprap placement and diffuser connection activities have the potential to induce turbidity and change water quality.</p> <p>Potential adverse effects will be reduced through the implementation of mitigation measures outlined in the construction environmental management plan and environmental protection plan. Residual effects from turbidity will be largely confined to the Project footprint and immediate vicinity.</p> <p>The stage 1 and 2 environmental impact studies determined that adverse effects on: aquatic life, wildlife, people consuming fish from the Fraser River, and other uses of the receiving environment are not expected once the outfall is in operation.</p> <p>With mitigation measures in place, the residual adverse effects of the Project on surface water and water bodies are anticipated to be not significant.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Environmental Component	Potential Adverse Effects?		Overview of Potential Adverse Effects, Mitigation Measures, and Residual Adverse Effects	Significant Residual Adverse Effects?	
	Yes	No		Yes	No
<p>Species/habitat with special status</p> <p>Assessed as required under subsection 5(1) of CEAA 2012</p> <p>Assessed under section 79 of the <i>Species at Risk Act</i>, as applicable</p>	■	<input type="checkbox"/>	<p>The Project is located within an important holding area for juvenile and adult White Sturgeon in the Fraser River.</p> <p>Mitigation measures, provided as advice from DFO, will be employed to avoid potential effects on White Sturgeon and other aquatic species. This includes conducting imaging sonar surveys and implementing “soft-start” or “ramp-up” procedures during in-water activities conducted between June 16 and October 31.</p> <p>With mitigation measures in place, the residual adverse effects of the Project on White Sturgeon are anticipated to be not significant.</p>	<input type="checkbox"/>	■
<p>Terrestrial resources (e.g., vegetation, wildlife, etc.)</p> <p>Assessed as required under subsection 5(1) of CEAA 2012</p> <p>Assessed under section 79 of the <i>Species at Risk Act</i>, as applicable</p>	■	<input type="checkbox"/>	<p>A bald eagle nest is located on the south shore of Annacis Island upriver of the Alex Fraser bridge, approximately 700 m from the Project. A baseline noise assessment was conducted in close proximity of the nest to measure existing ambient noise levels. The anticipated increase in noise levels during Project construction is not predicted to have a significant impact on bald eagles.</p> <p>After Project completion, no noise sources will remain on site.</p> <p>With mitigation in place, residual adverse effects on terrestrial resources are anticipated to be not significant.</p>	<input type="checkbox"/>	■
Wetlands	<input type="checkbox"/>	■	The Project is not anticipated to affect wetlands.	<input type="checkbox"/>	■

Environmental Component	Potential Adverse Effects?		Overview of Potential Adverse Effects, Mitigation Measures, and Residual Adverse Effects	Significant Residual Adverse Effects?	
	Yes	No		Yes	No
<p>Aquatic resources (e.g., aquatic plants, fish and fish habitat, waterbirds, marine mammals, etc.)</p> <p>Assessed as required under subsection 5(1) of CEAA 2012</p> <p>Assessed under section 79 of the Species at Risk Act, as applicable</p>	■	□	<p>Project-related activities have the potential to disturb aquatic species and fish habitat (e.g., through induced turbidity and other changes to water quality, disruption to migrating fish populations, sensory disturbance of marine mammals, displacement of habitat for benthic organisms where riprap will be placed, and accidental spills).</p> <p>Potential adverse effects will be reduced through the implementation of mitigation measures outlined in the construction environmental management plan and environmental protection plan, as well as through avoiding the period of peak juvenile salmonid migration in the area (March to mid-June). Mitigation measures such as imaging sonar surveys and “soft-start” or “ramp-up” procedures will be implemented during in-water activities conducted between June 16 and October 31 to reduce potential effects on White Sturgeon.</p> <p>Dredging will take place outside the sensitive period for fish. Residual effects from turbidity will be largely confined to the dredge footprint and immediate Project vicinity. Bottom sediments that serve as habitat for benthic communities are considered transitory, with depopulation of and recolonization by benthic invertebrates a frequent recurring event. Given the abundance of similar habitat in the Project area, the permanent loss of habitat for benthic communities within the riprap area is not anticipated to impair life history stages or the productive capacity of benthic communities.</p> <p>The stage 1 and 2 environmental impact studies determined that adverse effects on: aquatic life, wildlife, people consuming fish from the Fraser River, and other uses of the receiving environment are not expected once the outfall is in operation.</p> <p>With mitigation measures in place, the residual adverse effects of the Project on aquatic resources are anticipated to be not significant.</p>	□	■

Environmental Component	Potential Adverse Effects?		Overview of Potential Adverse Effects, Mitigation Measures, and Residual Adverse Effects	Significant Residual Adverse Effects?	
	Yes	No		Yes	No
<p>Health and socio-economic conditions</p> <p>Assessed as required under subsection 5(1) and 5(2) of CEAA 2012</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Based on the low magnitude of residual effects on air, noise, surface water, sediment and aquatic resources, the Project is not expected to cause adverse effects on the health of people, including Aboriginal people.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Archaeological, physical, and cultural heritage resources</p> <p>Assessed as required under subsection 5(1) and 5(2) of CEAA 2012</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The Project is not anticipated to affect archaeological, physical, and cultural heritage resources.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Current use of lands and resources for traditional purposes by Aboriginal peoples</p> <p>Assessed as required under subsection 5(1) of CEAA 2012</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>Section 6 provides an overview of the concerns raised by Aboriginal groups during consultation about the Project.</p> <p>After Project completion, no construction equipment which could affect Aboriginal fishing activities will remain in-river.</p> <p>With mitigation measures in place (as described in Section 6), the residual adverse effects of the Project on Aboriginal group interests are anticipated to be not significant.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Environmental Component	Potential Adverse Effects?		Overview of Potential Adverse Effects, Mitigation Measures, and Residual Adverse Effects	Significant Residual Adverse Effects?	
	Yes	No		Yes	No
<p>Accidents and malfunctions</p> <p>Assessed as required by the <i>Canada Marine Act</i></p>	■	<input type="checkbox"/>	<p>There is potential for adverse effects on surface water and sediment from accidental equipment leaks or spills, or spills resulting from collisions. Mitigation measures will be implemented to reduce potential adverse, Project-related effects due to accidents, including an appropriate spill prevention, containment, and clean-up contingency plan for hydrocarbon products and other deleterious substances, and minimizing the likelihood of collisions.</p> <p>With mitigation in place, the residual adverse effect, if it occurs, is expected to be not significant. Remediation of any residual adverse effect is anticipated to be achievable.</p>	<input type="checkbox"/>	■

Residual adverse effects (i.e., effects that remain with mitigation in place) were identified for the following environmental components:

- Air quality;
- Lighting;
- Noise;
- Sediments;
- Surface water and water bodies;
- Species at risk (White Sturgeon);
- Terrestrial resources;
- Aquatic resources; and,
- Current use of lands and resources for traditional purposes by Aboriginal peoples.

Overall, the residual adverse effects of the Project on the environmental components are characterized as:

- Low in magnitude and primarily due to the presence of in-river construction equipment, riverbed physical disturbance and the associated potential effects on aquatic resources during construction;
- Local in geographic extent because the effects will be limited to the Project footprint and immediate vicinity;
- Short-term in duration because the effects will primarily occur during construction;
- Isolated in frequency because the effects will largely be confined to the construction period; and
- Residual adverse effects of the Project would be reversible once the Project is completed.

In conclusion, based on the characterization above, the mitigation measures proposed by the Applicant and the permit conditions, the residual adverse effects of the Project are anticipated to be not significant.

7.3 Environmental Review Decision

In completing the environmental review, VFPA has reviewed and taken into account relevant information available on the proposed project, proposed mitigations provided by the Applicant, and additional technically and economically feasible mitigation measures. In accordance with section 67 of CEAA 2012, VFPA concludes that with the implementation of proposed mitigation measures and Permit conditions, the Project is not likely to cause significant adverse environmental effects.

ORIGINAL COPY SIGNED

February 26, 2019

CHRIS BARLOW
MANAGER, ENVIRONMENTAL PROGRAMS

DATE OF DECISION

8 RECOMMENDATION

In completing the project and environmental review, VFPA concludes that with the implementation of proposed mitigation measures and conditions described in the Permit, the Project has appropriately addressed all identified concerns.

The review team recommends that this application be approved subject to conformance with the project and environmental conditions listed in project permit **PER No. 17-093**.

APPENDIX A
Location Plan



17-093

**Metro Vancouver
Annacis Island
Wastewater
Treatment Plant
New Outfall System**

Jan 23 2018

- Project Location
- VFPA Boundary
- Safety Channel
- Deep Sea Channel
- Deep Sea Channel Centre Line

0 25 50 100 Meters

Burnaby New Westminster
Richmond Surrey
Delta

**PORT of
vancouver**

VFPA Spatial Data Group
January 19, 2018
Last updated Jan 23, 2018
PLAN # 62018-003
Prepared by: NB

Any areas marked "proposed" represent approximate locations.

APPENDIX B
List of Information Sources

VFPA has relied on the following sources of information in the project and environmental review of the Project:

- Application form and materials submitted by Applicant on January 11, 2018, February 19, 2018, and March 14, 2018.
- All Project correspondence from January 11, 2018 to January 30, 2019.

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