Pacific Gateway Constructors	**Highway 91/17 Upgrade Project**

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REVISION LOG

Version #	Date	Revised By	Reviewed By	Revised Section
0	07 January 2022	Nuzhat Beig, M. Eng, EIT	Patty Burt, RP Bio, AQP	
1	11 January 2022	Patty Burt, RP Bio, AQP	Werner Beukes RP Bio.	Section 2.2: Updated Section 4.4: Water Quality Management updated Section 4.9: Tervita changed to Secure Energy
2	20 January 2022	Werner Beukes RP Bio.		Appendix 7 updated to include holiday shut down water monitoring results. Reporting period date updated in Section 2.1 Comment added to Section 2.1 regarding Holiday site shut down Comment removed: offloading spoil material on site Section 3.4 toolbox talk topics updated, opportunities for improvement updated Section 4.4 significant rainfall events and volumes for December added Section 4.4 comment added: Erosion repairs done to problem areas identified in November 2021

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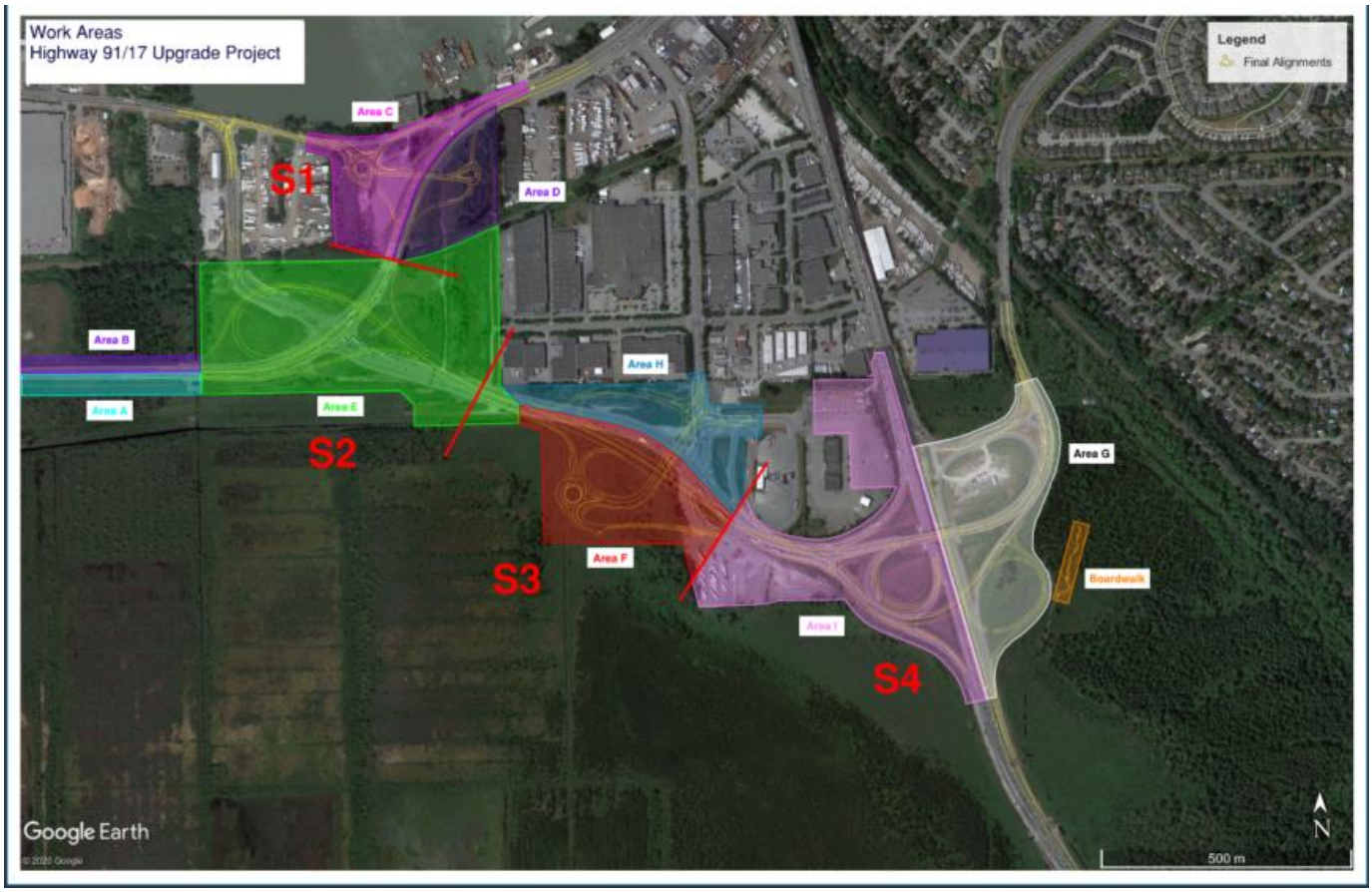
1.0 INTRODUCTION

This report covers all construction activities that had occurred from 01 to 31 December 2021 on the Highway 91/17 Upgrades project. During this period works occurred in Areas C, D, E, F, G, H, and I. For the purposes of this report, the following areas shall be defined as:

- Area C: Portion of River Road West of Highway 17 (Includes L250, L275, L325, L350, part of L375);
- Area D: East of Silda Ditch (L375, L450 & L475)
- Area E: Sunbury Mounds L500, L575 and L550;
- Area F: MK Delta (L1150S/1160/1170/1400) and C01 Detour;
- Area G: Delta Nature Reserve (L2300/2400);
- Area H: L1300 Weigh Scale and
- Area I: West side of Hwy 91, truck parking area, E02 and E04 Detour (L2100/L2200/L600E and W).



- A Key Plan has been included showing the project alignments (See ***Appendix 1***).

2.0 CONSTRUCTION ACTIVITIES

2.1 Activities for this Period

The following works took place within Section 1 from 01 to 23 December 2021. Representative Photos 01 and 02 are in Section 7:

Area C

- L250: Barriers on both sides are in place and tied-in to existing and new traffic light at L250/Hwy 17.
- L325: Barriers finished being placed adjacent to the jug handle. Topsoil was received from S3 and stockpiled at the laydown area. Silt fence and coco mats were installed around the ditch and bioswale adjacent laydown area. Shouldering was completed.
- L325/L350: Topsoil continues to be placed at the multiuse pathway on the North side of the roundabout.
- L375: All Roads finished pouring the curb, paving the jug handle, and various asphalt repairs at the roundabout.
- L250/L375: Finished line painting, moved and placed barriers, finished traffic light installation, installed signs, and opened all road alignments to live traffic.
- Installed traffic lights at various locations

Area D

- L375, L450 & L475: Finished line painting, moved and placed barriers, finished traffic light installation, installed signs, and opened all road alignments to live traffic. The crash attenuator was installed at the South end of L450.
- L450/L475: Blue Pine finished the hydroseeding at the roundabout alignments – this completes the major landscaping activities for Section 1. Various traffic signs continued to be constructed and installed. Barriers continued to be installed. Various general site cleanup tasks were completed to prepare for the road opening.
- Installed traffic lights at various locations

The following works took place within Section 2 from 01 to 23 December 2021. Representative Photos from 03 to 07 are in Section 7:

Area A

- No works in Area A.

Area B

- No works in Area B.

Area E

- L100: Seal-tec onsite sealed the asphalt cracks on Hwy 17 westbound. Hydrovac exposed streetlight conduit for preload removal.
- L425: Fully closed 96th Street to the public.
- L500: Placed and compacted sand lifts Wall 203 area, and stockpiled sand for dayshift use. The third and fourth rows of lock blocks were placed on top of the East MSE wall of S2 bridge, sand and geogrid was placed behind the wall. The ramp behind the West MSE wall of the bridge was backfilled with preload sand. CDI installed drilled shafts for S2 bridge. Jacob Brothers started installing needle beams under the work deck. Sand was placed and compacted with geogrid behind the 3rd/4th row of lock blocks. Tarmac mobilized to site and started milling the asphalt on the South side of 96th Street, Island removal continued at the North end, and TWE

removed streetlights. CDI drilled shaft on the West side of the S2 bridge, and sand and geogrid was placed behind the lock blocks on top of the East.

- L500E: Completed preload placement on Wall 203 and received, placed, and compacted sand from S4 L600 East on 96th Street, and received spoil from L2250.
- L500W: Formwork removal for the columns for the S2 bridge's on the West abutment, site clean-up and covering stockpiles with poly.
- L525: Received, placed, and compacted sand from S4 L600 East on 96th St.
- L550: Equipment mobbed in, set up silt fence around preload area and stripped material to subgrade. Built temporary pedestrian access to Insta-space. Removed preload sand and placed preload and embankment.
- L400/L525: Continued placing embankment sand and excavating material to stabilize the 96th Street excavation.
- L425/L525: Hydrovacked Roger's fiber cables, and repaired washouts on the embankment on West MSE wall. Placed and compacted preload beside west MSE wall of S2 Bridge, material continued to be received, and JB dewatered and prepared equipment/formwork for the West column splices of the bridge.
- L400/L500/L525: Continued placing embankment sand and preload.

The following works took place within Section 3 from 01 to 23 December 2021. Representative Photos of 08 and 09 are in Section 7:

<u>Area F</u>

- L500M/L1400: Jacob Brothers continued installing a row of panels and lock blocks for the West MSE wall of the S3 bridge.
- L500: – Finished excavating and placing topsoil in the ditch east of STM 313. Hauled sand and spoil to 96th St area
- L1150/L1450: – Continued with surcharge removal.
- L1150: JB placed final lift of sand behind concrete panels for the West MSE wall of S3 bridge and CDI drilled shafts for the S3 bridge. FRPD installed new sheet piles around guide sign.
- L1160: Topsoil continued to be hauled from the stockpile to S1
- L1400: STM 332 was backfilled, installed one catch basins and catch basin leads, stockpiled material in old truck parking, site clean-up.
- Truck Park – CDI drilled shaft and moved lock block.

<u>Area H</u>

- L1300 – Fixed fish screens and covered stockpiles with poly.

The following works took place in Section 4 from 01 to 23 December 2021. Representative Photos 10 to 16 are in Section 7:

<u>Area I</u>

- L2200: Loaded sand & spoil to 96th St area and general site clean-up. Shaped and fixed minor washouts along embankment.
- L2250: Installed STM 417 and backfilled excavation. Completed preload placement, and general site clean-up.

Area G

- L600E: The small ramp on the North side of the embankment was excavated. Sand preload continued to be removed from behind Wall 407. Covered stockpile with poly, fixed embankment washouts and ESC fencing.
- L2200: Ditching continued in the wetland compensation area.
- L2300 Fully hauled sand stockpile to S2 L500 East placement area.
- L2400: A streetlight was removed from the area beside embankment.

No work activities took place during the Holiday Site Shutdown 24 December- 4 January 2022

- Routine water monitoring was done on 27 December 2021 by the PGC standby crew.
- Activities were restricted to site and erosion monitoring only.

2.2 Upcoming Activities

Section 1:

No planned activities

Section 2:

L575- Hydroseeding to continue.

L550 (West) Excavation, fine grade placement & subgrade embankment fill. Headwall installation to continue.

L400 Preload surcharge removal & culvert extension. Preload period at 96th Street.

L425S Excavation, subgrade embankment fill, preload fill.

Section 3:

L1300 Preload removal & subgrade preparation.

L1150 Preload surcharge removal. Culvert 320 installation & ditching. L1160 Preload surcharge removal.

L500 Weigh scale overpass- formwork, rebar placement and concrete pouring. Form columns (east). Preload surcharge removal.

Section 4:

L600 (E) Preload surcharge removal.

L600 (W) Lock block wall 406 & preload removal.

L2200 Topsoil placement, drainage installation (spillways & ditching), hydroseeding and planting.

3.0 ENVIRONMENTAL ISSUES

3.1 Environmental Incidents

- 1 December 2021: (Nightshift) During the refueling equipment around 01:00 am, the fuel nozzle of a fuel truck dripped diesel fuel on the right-hand lane of detour C03 while the hose was being retracted. This resulted in approximately 1 liter of diesel fuel to be spilled onto asphalt. Action taken: The spill was contained and cleaned using granular absorbent. All used absorbent material were disposed of at the waste management area for later disposal by a service provider.

- 2 December 2021: (Dayshift) A haul truck experienced a hydraulic seal failure around 15:00 along the west side of road alignment L375. This resulted in approximately 3 L of hydraulic fluid being released from the truck onto the asphalt shoulder. A temporary soil berm was constructed to contain the spill from flowing downhill, and a drip tray was placed under the leaking part capturing an additional 20 L of fluid. The spill was cleaned using absorbent pads and granular absorbents (Photo 2). All used absorbent material, soil and used hydraulic fluids were disposed of at the waste management area for later disposal by a third party.

- 14 December 2021: An excavator experienced an oil leak on its swing gear around 02:30 on Wall 407, resulting in approximately 250 mL of hydraulic oil being released onto the muddy ground. The crew immediately shut the equipment down and placed a drip tray and absorbent pads under the equipment to clean the spill. Additional residue on the equipment was cleaned using absorbent pads. All used absorbent material and contaminated soil were disposed of at the waste management area for later disposal by a third party.

- 14 December 2021: Around 11:45, a telehandler's moisture drainage screw loosened on its fuel tank during operation. The resulted in approximately 2 L of diesel fuel being released onto the asphalted shoulder, west of Highway 17 and 91C. The crew used absorbent pads and granular absorbent to clean the spill area and placed boom downhill to prevent potential runoff's due to the rain. All used absorbent material and contaminated soil were disposed of at the waste management area for later disposal by a third party.

3.2 Non-Compliance

- No Non-Compliance to report for the month of December 2021.

3.3 Non-Conformance

- No Non-Conformance to report for the month of December 2021.

3.4 Opportunities for Improvement

Toolbox training is staying relevant with the activities on site, proof of training in ***Appendix 8***. Training for the month included stormwater management, concrete management, hazardous materials storage, spill tray management, and working around sensitive habitats (Burns Bog & Delta Nature Reserve)
Opportunities for improvement were identified and will be addressed in January 2022. These items would include refueling of equipment and concrete management

3.5 Outstanding Environmental Issues

The following ongoing monitoring is being conducted (***Table 1***):

Table 1: Environmental Issues Tracking Table

Item No	Date 2021	Environmental Issue or Required Action	Corrective Action	Projected Closure Date	Open/ Closed	Comments
120	1 December	During the refueling equipment around 01:00 am, the fuel nozzle of a fuel truck dripped diesel fuel on the right-hand lane of detour C03 while the hose was being	The spill was contained and cleaned using granular absorbent. All used absorbent material were disposed of at the waste management area for later disposal by a third party.	1 December	Closed	Meeting will be arranged with the Pro-Quip sub-contractor about proper re-fueling procedures

		retracted. This resulted in approximately 1 liter of diesel fuel to be spilled onto asphalt.				
121	2 December	A haul truck experienced a hydraulic seal failure around 15:00 along the west side of road alignment L375. This resulted in approximately 3 L of hydraulic fluid being released from the truck onto the asphalt shoulder.	A temporary soil berm was constructed to contain the spill from flowing downhill, and a drip tray was placed under the leaking part capturing an additional 20 L of fluid. The spill was cleaned using absorbent pads and granular absorbents. All used absorbent material, soil & used hydraulic fluids were disposed of at the waste management area for later disposal by a third party.	2 December	Closed	A reminder to equipment operators to be proactive in vehicle inspection and preventative maintenance.
122	14 December	An excavator experienced an oil leak on its swing gear around 02:30 on Wall 407, resulting in approximately 250 mL of oil being released onto the muddy ground.	The crew immediately shut the equipment down and placed a drip tray and absorbent pads under the equipment to clean the spill. Additional residue on the equipment was cleaned using absorbent pads. All used absorbent material and contaminated soil were disposed of at the waste management area for later disposal by a third party.	14 December	Closed	The equipment was repaired and cleaned in the morning before being returned to service.
123	14 December	A forklift's moisture drainage screw loosened on its fuel tank during operation. The resulted in approximately 2 L of diesel fuel being released onto the asphalted shoulder, west of Highway 17 and 91C.	The crew used absorbent pads and granular absorbent to clean the spill area and placed boom downhill to prevent potential runoff's due to the rain. All used absorbent material and contaminated soil were disposed of at the waste management area for later disposal by a third party.	14 December	Closed	A reminder to equipment operators to be proactive in vehicle inspection and preventative maintenance.

4.0 ENVIRONMENTAL MONITORING AND INSPECTION RESULTS

Daily site inspections were held during the reporting period by PGC (a representative was available during the day and night shift, as applicable). All operators and equipment were visited/inspected numerous times during the reporting period to ensure that all BMPs are being followed. Project spill kits were inspected in Sections 1, 2, 3 and 4 during the reporting period and confirmed that they were compliant with the CEMP.

PGC has continued with weekly inspections at the L2400 preload-bog interface. During the last week of the reporting period, the water level in the Delta Nature Reserve (DNR) was lower than the previous week but remained too high and frozen to conduct repairs on the interface materials. PGC plans to reassess the damage to the liner once the water level further lowers and allows for safe repairs to be done. No erosion could be seen affecting the surrounding DNR.

MESL conducted site visits on 07, 14 and 21 December 2021 (site was shut down from 23 December 2021 to the new year for the holidays) to get an update on the current site activities, reminder that secondary containments are filling with water and need to be attended. Attention to those large spill kits and garbage containers that are accessible

to the public, checking on their compliance regularly or removing for the location when dormant. Machinery and equipment are also inspected regularly to ensure they are equipped with a spill kit, spill tray and fire extinguisher, with deficiencies corrected immediately. Inspection results are kept on record by PGC. Tarmac mobilised new equipment to start milling the asphalt of 96th St. FRPD mobilized piling equipment to the S3 bridge laydown area. All newly mobilised equipment were inspected and found to be in good condition. Additional drip trays and spill kit were brought to these locations.

4.1 Air Quality and Dust Control

During the onset of the wet season, no issues were recorded during the month of December. Water trailers were still available onsite but not required.

4.2 Noise and Vibration Management

Monthly noise monitoring was conducted over a 24-hour period on December 12/13, 2021. Results are in ***Table 2*** below. All recorded noise levels were below the baseline data.

***Grey shaded**: New revised baseline data (PGC letter Rev01 PGC-COR-000174 to MoTI - dated April 28, 2021)*
***Green shaded**: Noise monitoring data not exceeding 15% of the baseline data*
***Yellow shaded** (not used): Noise monitoring data is between 15%-30% of the baseline data*
***Red shaded** (not used): Noise monitoring data exceeds 30% of the baseline data*

Table 2. Monthly Noise Monitoring Data.

Start time	Location	Description	Ambient noise	GPS, Lat Long	BASELINE			RESULTS (Night) 12 December		
					Avg. (dB)	Min. (dB)	Max. (dB)	Avg. (dB)	Min. (dB)	Max. (dB)
0:27:00	2	Sunbury Mounds (Section 2)	Traffic light work and highway traffic	49.149799° -122.955889°	68.2	53.3	93.9	45.7	45.4	53.2
1:21:00	4	Nordel Road Interchange (Section 4)	Excavator, compactor, general work, and highway traffic	49.144169° -122.939111°	60.2	54.9	87.9	47.7	45.4	76.1
1:59:00	6	Nordel Way North (Section 4)	Excavator, haul trucks, and highway traffic	49.147917° -122.943025°	78.6	52.3	73.2	51.9	45.4	73.1
Start time	**Location**	**Description**	**Ambient noise**	**GPS, Lat Long**	**BASELINE**			**RESULTS (Day) 13 December**		
					Avg. (dB)	**Min. (dB)**	**Max. (dB)**	**Avg. (dB)**	**Min. (dB)**	**Max. (dB)**
11:13:00	4	Nordel Road Interchange (Section 4)	Highway traffic and excavator	49.144169° -122.939111°	68.1	64.7	73.9	54.9	46.8	73.8
12:36:00	6	Nordel Way North (Section 4)	Highway traffic, pedestrians, and haul trucks	49.147917° -122.943025°	76	69.4	87.5	58.3	51.7	68.3
13:14:00	2	Sunbury Mounds (Section 2)	Compactor, excavator, bulldozer, and general construction	49.149799° -122.955889°	73.6	65.8	86.7	58.1	50.8	64.3
14:50:00	5	Nordel Road Interchange (Section 4)	Highway traffic, general bridge work	49.147573° -122.942903°	63.9	49.8	84.9	60.0	52.0	76.8

4.3 Erosion and Sediment Control

PGC Environmental Representatives, Site Supervisors, and Foreman conduct daily monitoring of installed sediment control fences in affected areas to make sure they are fully functional and effective. Fences have been installed in active areas to prevent sediment run-off from clearing and grubbing activities in addition to containment of preload, stockpiles, and isolation of wildlife. Silt fencing has been kept in place and maintained to deter salvaged wildlife from

reentering active construction areas. Various erosion repairs were conducted throughout the site by placing coco matting on vulnerable and eroded areas, and high-risk slopes were stabilized and covered with poly before the holiday shut-down. Catch basin insert have been inspected and appears to be functioning correctly. Additional ESC fencing was installed along the western portion of L550 in section 2 prior to work commencing.

Paved surfaces were observed in overall clean condition and TSI has been routinely observed at the site actively sweeping public roadways during night shifts. PGC has indicated that paved surfaces are also swept at the end of each night shift. Most areas were relatively stable having been covered with preload sand which when wet was generally absorbed the erosive forces of the rain and was well draining. Toolbox training for the reporting period focused on *Storm Water Control* **(*Appendix 8*)**.

4.4 Water Quality Management

During the reporting period, five significant rain events were recorded on the project:

December 01-56.0 mm	December 10-30.8 mm
December 14-26.3 mm	December 18-48.8 mm
December 22-29.8 mm	

These events were not only present in the Delta region but throughout the southwestern portions of BC. PGC prepared for these events by maintaining existing silt fences, installing additional silt fences and placing coco matting in high-risk areas of the project. No new erosion damages and washouts were identified, most of the ESC fences remained in place and the risk was reduced substantially. PGC spent considerable time repairing previously identified erosion damage identified on the project in November 2021. During the reporting period PGC has been maintaining silt fences prior to and during the holiday site shut-down period.

Water quality results can be found in ***Appendix 7***.

Figure 2: Water sampling locations for the Month of December 2021.

4.5 Wildlife and Habitat Management

No wildlife salvage efforts to report on for this reporting period.

4.6 Vegetation Management.

Nothing to report for this reporting period. Toolbox Training for the reporting period focused on the importance of *Burns Bog and Delta Nature Reserve* (***Appendix 8***).

4.7 Fisheries Habitat Management

No fish salvage efforts to report on for this reporting period.

4.8 Concrete Works and Grouting Management

The concrete on L375 roundabout were covered overnight for curing. Concrete pour of the S2 bridge drill shafts contained within drill shaft's openings. The levelling pad for the West MSE wall of S3 bridge were poured and covered overnight for curing.

Broken concrete from 96th Street were stockpiled within a small excavation and covered at the end of their shifts. Concrete pour of the columns of the S2 bridge are contained within the formwork of the columns, and excess concrete placed in containment area and covered with poly overnight to prevent runoff.

Waste concrete from S2 bridge support pouring is being contained, and broken concrete from 96th Street is covered with poly. Toolbox training for the reporting period focused on *Concrete Management on Site* **(*Appendix 8*)**.

4.9 Waste Management

Yellow wheelie bins were readily available and fully stocked at each active work location while mobile equipment was also equipped with spill kits. PGC has provided checklists based on the CEMP (Rev 6) and ensures that any depleted supplies within these bins are restocked immediately (as per the inventory posted on the inside of the lid). Spill kits were inspected in Section 1, 2, 3 & 4 during the reporting period. Secure Energy collected oily plastic and used absorbents from waste management area for disposal.

It is MESL understanding that mobile equipment is frequently moved, extra drip trays were observed in equipment storage locations, crews are being reminded that drip trays are readily available should they encounter a piece of equipment that is missing one. Used aerosol cans were taken to Scott Road Bottle Depot in Surrey for recycling.

Table 3: Hazardous Waste Storage and Disposal Tracking

Dates (2020/21)	Location	Haz-Material Stored	Volume m^3	Comments	Date of Disposal
13 July 20	PGC Site Office Yard	Spent Absorbents	N/A	Approximately 2-3 L of diesel was spilt on the pavement. Spent absorbents to be collected by Tervita	24 September 2020- 3 barrels
28 July 20	L575 Pre-load Area	Spent Absorbents	N/A	Less than 1 L of oil to spill tray, absorbent pads used to mitigate spill to ground. Spent absorbent pads to be collected by Tervita.	24 September 2020- 3 barrels
17 Sept 20	Burns Bog perimeter ditch	Spent Absorbents	N/A	~100 mL of engine oil to water. Spent absorbent pads to be collected by Tervita.	24 September 2020- 3 barrels
21 Sept 20	Site office waste area	Spent Absorbents	N/A	Excess pads that were placed in spill trays. Spent absorbent pads to be collected by Tervita.	24 September 2020- 3 barrels
24 Sept 20	Site office waste area	Spent Absorbents	N/A	Excess pads that were placed in spill trays. Spent absorbent pads to be collected by Tervita.	24 September 2020- 3 barrels
24 Sept 20	Site office waste area	Used aerosols	N/A	Spray paint cans that had collected to date.	24 September 2020- 3/4 of a bin
25 Oct 20	PGC Site Office Yard	Used aerosol paint cans, contaminated soil, and plastic oil containers.	55 m^3	Spray paint cans that had collected to date, damaged drum with the soil and empty containers.	25 October 2020-
3 Nov 20	Site office waste area	Wood waste bin	N/A	Pallets and other wood by-products	03 November 2020
2 Dec 20	Site office waste area	Spent absorbents, drum contaminated soil, plastic oil containers, bags with contaminated soil.	1.7 m^3	Used spill response materials and contaminated soils.	02 December 2020
11 Feb 21	PGC Site Office Yard	Used spill pads, aerosols, oily plastics, & contaminated soil	N/A	Aerosols taken to recycling depot by PGC, spill pads, oily plastic and soil removed from site by Tervita	11 February 2020
21 March 21	PGC Site Office Yard	Hazardous Waste	N/A	All hazardous waste was removed from the site by Tervita: manifest #BC064745-5	21 March 2021
24 June 21	PGC Site Office Yard	Used spill pads, used aerosols and contaminated soil	150 kg, 0.35 m^3 & 1500 kg	All hazardous waste was removed from the site by Tervita. Aerosol paint cans were taken by PGC to the Surrey Waste Transfer Station for recycling	24 June 2021
3 Nov 21	PGC Site Office Yard	Used Spill Pads, used aerosols and oily rags/plastic	100 kg, 0.25 m^3 & 50 kg	All hazardous waste was removed from the site by Tervita. Aerosol paint cans were taken by PGC to the Surrey Waste Transfer Station for recycling	03 November 2021
6 Dec 21	PGC Site Office Yard	Used Spill Pads, used aerosols and oily rags/plastic	300 kg, 0.50 m^3 & 50 kg	All hazardous waste was removed from the site by Tervita. Aerosol paint cans were taken by PGC to the Scott Road Bottle Depot for recycling	06 December 2021

4.10 Emergency Response

No emergency responses were recorded during this reporting period.

4.11 Contaminated Sites Management

Table 4: Contaminated Sites Tracking

Date	Soil	Water
Section 1		
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Section 2		
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Section3		
--	--	--
Section 4		
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5.0 ENVIRONMENTAL PERMITS

5.1 Status Update

A Permit Tracker is provided in ***Appendix 4***. No new permits were obtained during this reporting period.

A Permit Conditions Tracker is included as ***Appendix 5*** outlining all DFO and WSA permit terms and conditions.

5.2 Status of the Table of Commitments and Assurances

The status of completed and ongoing commitments in the Table of Commitments and Assurances is provided in ***Appendix 6***.

6.0 CONCLUDING REMARKS

Immediate actions are being taken by PGC when deficiencies are observed with many issues being closed once it had received attention from PGC upper management. PGC continues to issue an internal tracking list that is related to the respective sections. This will provide information pertaining to all open issues on the respective work fronts. When new issues are highlighted this list and remaining pending items will be sent to each section's site superintendent for action. PGC has observed that this is an effective way to highlight open items to the responsible people on site.

7.0 SITE PHOTOS

Photo 1: L375 (C). Spill cleanup.

Photo 2: L325 (C) ESC fencing and erosion repairs

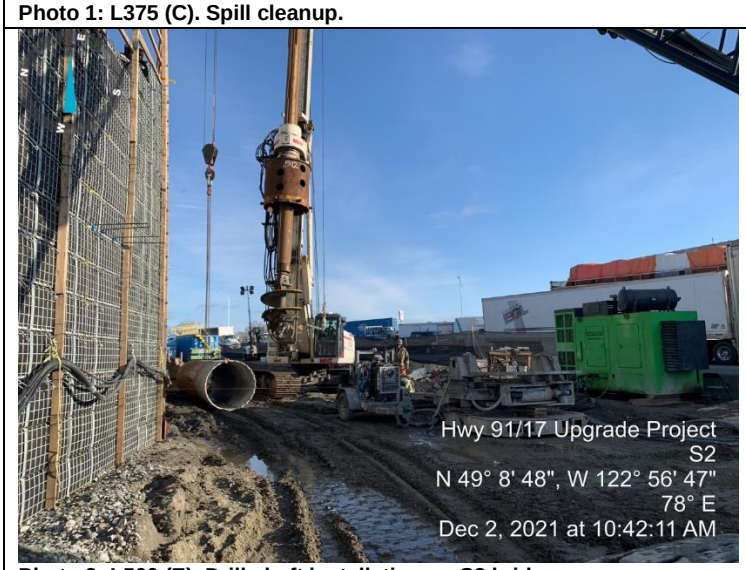


Photo 3: L500 (E). Drill shaft installation on S2 bridge.

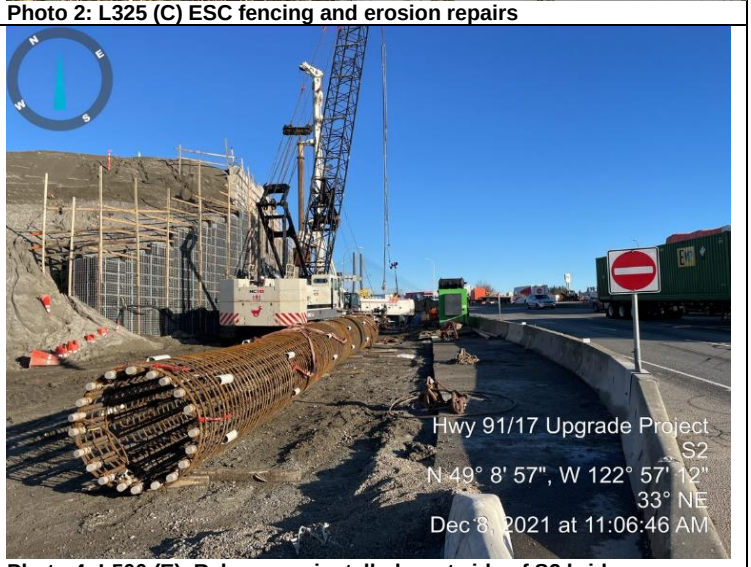


Photo 4: L500 (E). Rebar cage installed west side of S2 bridge

Photo 5: L500W (E). Hydrovacked utilities

Photo 6: L500 (E). Installing columns rebar cage for S2 bridge

Photo 7: L500 (E). Topsoil stripping and ESC fencing placement

Photo 8: L500M (F). Drainpipe installation

Photo 9: L500 (F). CDI drilling drilled shaft for S3 bridge.

Photo 10: L600E (G). Access ramp and wire basket removal

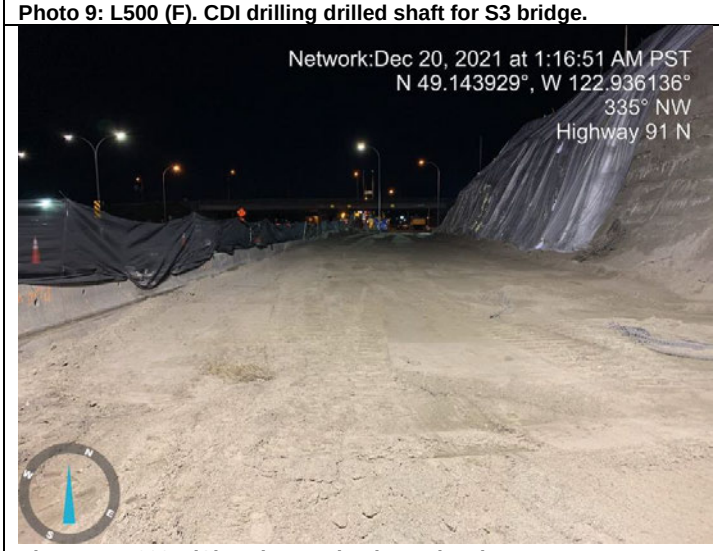


Photo 11: L600E (G). Reinstated poly on the slope

Photo 12: L2250 (I). Installed a dewatering sump.

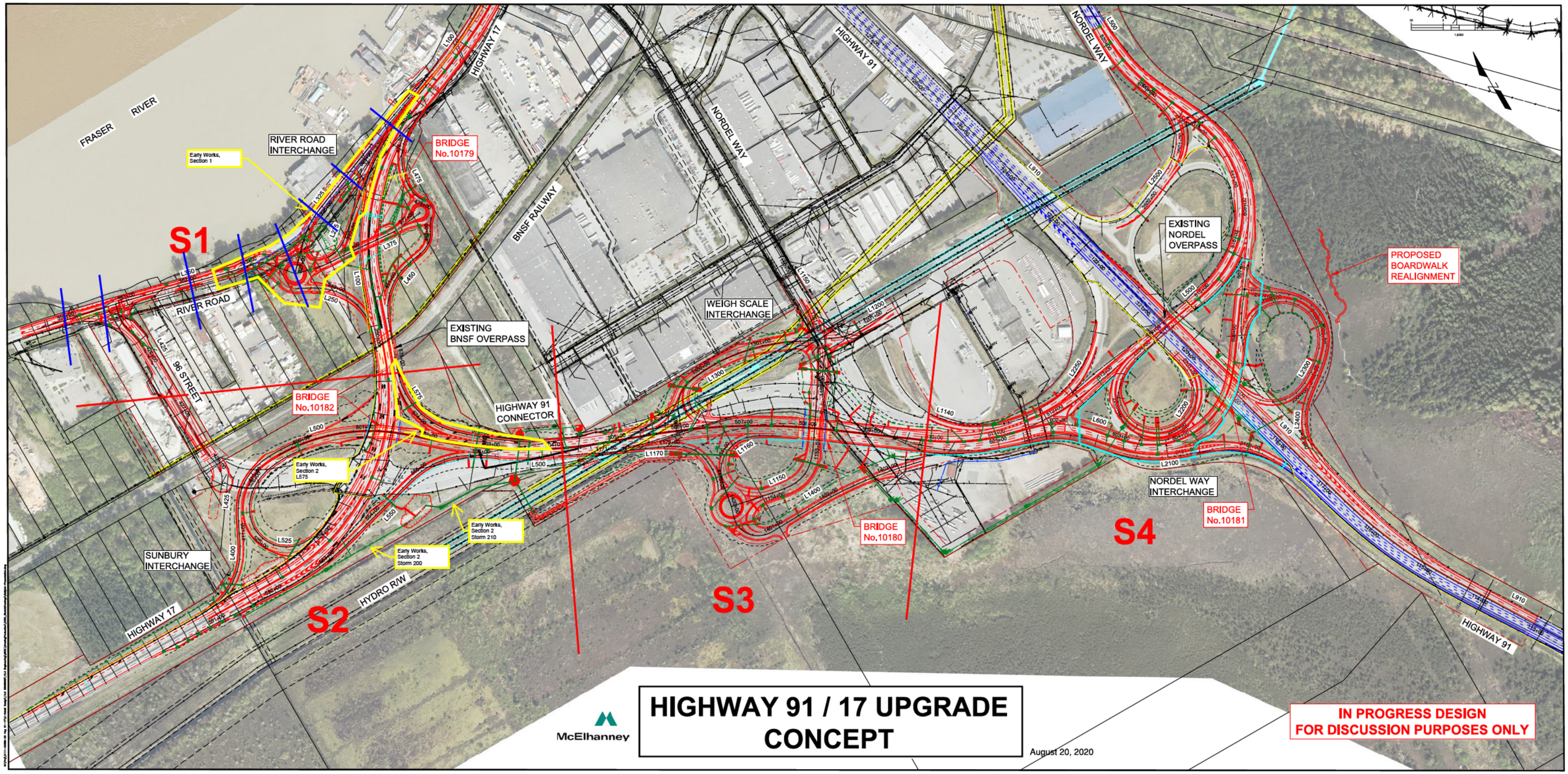
Photo 13: L2250 (I). Installed the STM 417 pipes.

Photo 14:L2250 (I). Installed section of STM 417 pipes

Photo 15: L2250 (I).STM 417 pipe placement

Photo 16: L2200 (I) Embankment shaping at the wetland compensation area

APPENDIX 1: KEY PLAN DRAWING


FRASER RIVER
RIVER ROAD INTERCHANGE
Early Works, Section 1
BRIDGE No.10179
HIGHWAY 17
BNSF RAILWAY
NORDEL WAY
HIGHWAY 91
NORDEL WAY
EXISTING NORDEL OVERPASS
PROPOSED BOARDWALK REALIGNMENT
S1
RIVER ROAD
96 STREET
EXISTING BNSF OVERPASS
WEIGH SCALE INTERCHANGE
BRIDGE No.10182
HIGHWAY 91 CONNECTOR
Early Works, Section 2 L575
Early Works, Section 2 Storm 210
Early Works, Section 2 Storm 200
SUNBURY INTERCHANGE
HYDRO R/W
HIGHWAY 17
S2
S3
BRIDGE No.10180
NORDEL WAY INTERCHANGE
BRIDGE No.10181
S4
HIGHWAY 91
McElhanney
HIGHWAY 91 / 17 UPGRADE CONCEPT
August 20, 2020
IN PROGRESS DESIGN FOR DISCUSSION PURPOSES ONLY

APPENDIX 2: SPILL AND INCIDENT TRACKER

HWY 91/17 SITE
Environmental Spill and Incident Tracking

Planner Incident #	Date Of Event	Date Reported	Date Initial Notification Issued	Shift	Approx. Time	Contractor	Sub-Contractor	Classification	Description of Event	Location	Fluid Amount (L)	Fluid Type	Type of Equipment	Causal Factors	Action Taken	Corrective Actions Date Complete	Previous Incident #
43	4-Jan-21	4-Jan-21	5-Jan-21	Night	20:31-21:00	PGC	Delta Aggregate	Minor spill (<1L)	Hydraulic line broke	S3 L1400	<500mL	Hydraulic fluid	Rock truck (Volvo T-13)	Normal wear and tear on moving machine parts (hydraulic line); unforeseen circumstances.	Leaking hydraulic line noticed during pre-shift inspection. Operator shut down the machine immediately and placed spill pads on the leak source and on the ground below the leak. Machine was parked with its box up how leak was found and in the locked position. A spill tray was placed below the leak, and contaminated pads and sand below were removed for disposal. Mechanic repaired the broken line in the morning (05 Jan 2021)	5-Jan-21	43
44	6-Jan-21	6-Jan-21	6-Jan-21	Day	9:01-9:30	PGC		Minor spill (<1L)	Hydraulic line broke	S2 L500 preload	<500mL	Hydraulic fluid	Excavator (CAT 320E)	Normal wear and tear on moving machine parts (hydraulic line); unforeseen circumstances.	Leaking hydraulic line noticed on boom during operation. Operator shut down the machine immediately and placed spill pads on the leak source and on the ground below the leak. Machine was taken out of service, and a spill tray was placed below the leak. Contaminated pads and sand below were removed for disposal. Mechanic repaired the broken line later in the day.	6-Jan-21	44
45	12-Jan-21	12-Jan-21		Night	00:01-00:30	PGC			Silty water released to 96th St ditch	S2 adjacent to 96th st ditch	unknown quantity of water	silty water		not following silt practices. No EM present. Working during heavy rain event	Work was immediately stopped and pumps turned off.	Jan 17 - EM will be present for operations to resume with a dewatering plan in place.	45
46	14-Jan-21	14-Jan-21	14-Jan-21	Day	14:31-15:00	PGC		Spill (1.1 L - 5L)	Hydraulic hose broke	S2 L500 preload	<5L	Hydraulic fluid	Dump truck	Normal wear and tear on moving machine parts (hydraulic line); unforseen circumstances.	Hydraulic line burst while raising box of dump truck to offload sand. Machine was immediately turned off. Hydraulic fluid spilled onto machine and preload sand. Spill pads were applied to ground and machine. Contaminated sand that had absorbed oil was quickly removed and bagged for disposal. Oil was fully cleaned off machine and surrounding ground.	Trucking company took machine out of service and will complete repairs offsite.	46
54	10-Feb-21	10-Feb-21	11-Feb-21	Night	3:31-4:00	PGC	Nordel Trucking	Spill (1.1 L - 5L)	Tandem truck failed to lower box causing collision with bridge	Underside of the Nordel Way overpass	3-4L	Hydraulic fluid	Dump truck	Damage to the bridge and the fluid release	It is unclear at this point what immediate action was taken by the sub-contractor after the incident occurred. This incident is currently under investigation. The dayshift crew observed the spill on the asphalt and the road shoulder. A cleanup was initiated and approximately 2-3 m³ of contaminated soil was collected and placed into super sack bags. The bags were taken to the PGC waste management area and placed under polyethene plastic. The removal of the contaminated soil by the PGC service provider has been requested.	Incident is currently under investigation	54
56	16-Feb-21	16-Feb-21	16-Feb-21	Night	11:01-11:30	PGC	Delta Aggregate	Minor spill (<1L)	Mechanical failure caused oil to spill into spill tray	L1400 pre-load	approx. 500ml	Engine oil	Rock truck (Volvo T-13)	Mechanical failure	At approximately 11:15 pm a small amount of engine oil spilled onto the placed preload sand. This was because of a mechanical failure of a stationary rock truck not in use. The oil was dripping into the drip tray and approximately 500 mm of oil was spilled on the preload surface.	Equipment maintenance	56
57	17-Feb-21	17-Feb-21	17-Feb-21	Day	8:31-9:00	PGC	Norland	Minor spill (<1L)	Mechanical failure caused hydraulic oil to spill into excavator bucket	L-550 culvert installation	approx. 500ml	Hydraulic fluid	Excavator (CAT 328D)	Mechanical failure	At approximately 8:57am a spill occurred during a bucket change on an excavator which resulted in less than 1L of hydraulic oil making contact with the ground. Luckily the excavator arm was above the bucket and the majority of the hydraulic oil dripped into the excavator bucket. Spill pads were immediately deployed, and the spill was cleaned up.	The Excavator was repaired	57
XX	23-Mar-21	23-Mar-21	23-Mar-21	Night	13:31-14:00	PGC	Norland	Large Spill (5.1L - 99.9L)	Mechanical failure caused hydraulic oil to spill into asphalt	L-2400 on the highway off ramp	approx. 10L	Hydraulic fluid	Haul truck	Mechanical failure	At approximately 13:45 a spill occurred when a dump truck was unloading sand for preload placement. The hydraulic oil spill released approximately 10L to the asphalt. Luckily the asphalt was covered in fine sand which absorbed the spilled material. Spill pads were immediately deployed, and the contaminated sand was excavated by hand bagged and stored on site for later disposal to an appropriate off site facility.	The Dump truck was removed from site and sent to a facility for repairs	XX
XX	23-Mar-21	23-Mar-21	23-Mar-21	Night	21:31-22:00	PGC	Nordel Trucking	Spill (1.1 L - 5L)	Mechanical failure caused hydraulic oil to spill into asphalt	L-2400 on the highway off ramp	3-5 L	Hydraulic fluid	Haul truck	Mechanical failure	At approximately 21:45 a tandem truck was busy offloading preload sand- While lifting the load box a hydraulic line burst open causing approximately 3-5 L of hydraulic fluid to spill onto the asphalt area. Absorbent pads were placed at the spill area and all contaminated soils were removed. A hazardous waste pickup is scheduled by Tervita	The Dump truck was removed from site and sent to a facility for repairs	XX
XX	26-Mar-21	26-Mar-21	26-Mar-21	Day	16:01-16:30	PGC	Menard	Large Spill (5.1L - 99.9L)	Mechanical failure caused a diesel spill onto soil	L910 on the shoulder of the road	approx. 10-20 L	Diesel Fuel	Dump Truck	Mechanical failure	At approximately 16:00 a spill occurred when a dump truck drove off the road. The spill released approximately 20L of diesel to the ground. The spill did to affect the nearby waterway and the spill was contained to the immediate area. Menard immediately responded to the incident and contained the spill. Spill pads, booms and a drip tray were immediately deployed, and the contaminated soil was excavated with a hydro-vac and sent off-site for disposal to an appropriate off-site facility.	Truck immediately removed from site and will be repaired by a mechanic in the morning.	XX

HWY 91/17 SITE
Environmental Spill and Incident Tracking

Planner Incident #	Date Of Event	Date Reported	Date Initial Notification Issued	Shift	Approx. Time	Contractor	Sub-Contractor	Classification	Description of Event	Location	Fluid Amount (L)	Fluid Type	Type of Equipment	Causal Factors	Action Taken	Corrective Actions Date Complete	Previous Incident #
XX	14-Apr-21	14-Apr-21	14-Apr-21	Day	15:31-16:00	PGC	Delta Aggregate	Large Spill (5.1L - 99.9L)	Mechanical failure caused a hydraulic oil spill onto soil	L1400 on the sand preload haul road	approx. 5- 10 L	Hydraulic fluid	Water Truck	Mechanical failure	At approximately 15:30 a spill occurred when a water truck experienced a mechanical failure while spraying water for dust suppression. The spill released approximately 10L of hydraulic fluid to the ground. The spill did not appear to affect any nearby waterways and the spill was contained to the immediate area. PGC immediately responded to the incident and initiated the spill response. The contaminated soil was excavated by hand with a shovel and placed into plastic hazardous waste bags before being stored into a contaminated soil waste bin. The soil will be sent off-site for disposal to an appropriate off-site facility on a later date.	The Water Truck was parked on site and the source of the leak was wrapped in spill pads to prevent more fluid from leaking out. The equipment will be repaired by a mechanic and cleaned before putting back to service.	XX
70	18-Apr-21	18-Apr-21	18-Apr-21	Night	20:31-21:00	PGC	Menard	Large Spill (5.1L - 99.9L)	Improper fueling operations	L2300 and L600W	approx. 10- 20 L	Diesel Fuel	Fuel Truck	Improper Fueling Procedure	At approximately 20:30 three spills were observed under various equipment on site which were not reported to the environmental department. Approximately 20L of Diesel fuel was expected to have been released to the ground and it does not appear to have affected any nearby waterways. The spill was observed to be contained to the immediate area. PGC contacted the responsible party the following morning when they were present on site to initiate the spill response. The contaminated soil was excavated by hand with a shovel and placed into plastic Haz waste bags before being stored into a contaminated soil waste bin. The soil will be sent off-site for disposal to an appropriate off-site facility on a later date.	PGC will be issuing a spill response and refueling toolbox topic for the subcontractor to present to their employees which will be required to sign and acknowledge their environmental obligations on this site.	70
71	20-Apr-21	20-Apr-21	20-Apr-21	Night	2:01-2:30	PGC	Pro Quip	Spill (1.1 L - 5L)	Improper fueling operations	Truck parking (old)	approx. 2L	Diesel Fuel	Excavator	Improper Fueling Procedure	Improper fueling practices at truck parking. Spill to asphalt- absorbent powder placed on spill- all contaminants scooped up with a shovel and taken to the Hazardous waste management area for proper disposal.	Easy to clean.Proquip refuelling company to be reminded of proper fuelling procedures.	71
XX	25-Apr-21	26-Apr-21	26-Apr-21	Night	2:01-2:30	PGC	Steamer Transport	Large Spill (5.1L - 99.9L)	Hydraulic line failure	L2200	10-15L	Hydraulic fluid	Gravel haul truck	Hydolic mechanical failure	Contaminated sand removed. Spill contained. Absorbent pads paced on surface	At approximately… 2am one of the sub-contractor gravel trucks hauling sand from the L2200, developed a leak while attempting to offload. (Steamer Transport, unit 404, plate number MM 9854). We estimate about 10 to 15 liters of hydraulic oil was spilled to ground. Immediate response was taken with absorbent pads put down. A visual inspection of the truck was done and determined it was a line coming from the trucks PTO. It was noticed that so if it remained disengaged there was no further chance of additional leakage, the truck was sent away for repairs. Pads were cleaned up and disposed of as to our plans and the soil was removed and placed in a large tote and brought to our yard for disposal.	XX
80	5-May-21	6-May-21	6-May-21	Night	20:01-20:30	PGC	Steamer Transport	Spill (1.1 L - 5L)	Mechanical failure- spill to preload	L2300	2L	Hydraulic fluid	Sand delivery truck	Mechanical failure	At approximately 20:25 a Sand delivery truck and trailer had a mechanical failure and spilled approximately two liters of hydraulic fluid onto the placed preload. The spill was contained, and absorbent spill pads were placed on the surface to absorb any surface fluid. All the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	The spill was contained, and absorbent spill pads were placed on the surface to absorb any surface fluid. All the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	80
85	3-Jun-21	3-Jun-21	3-Jun-21	Day	10:31-11:00	PGC		Minor spill (<1L)	Small hydro-carbo spill while relocating the pipe puller machine	L500	<100ml	Hydraulic fluid	Pipe puller	Mechanical failure	Spill pads were used to wipe down the machine and to remove residue spills from the ground surface. Contaminated soil removed.	Machine currently off-line, mechanic was mobilized to repair the machine before it is used again.	85
96	8-Jun-21	8-Jun-21	8-Jun-21	Day	15:01-15:30	PGC		Minor spill (<1L)	Small grease spill from excavator.	L2300 Loop	<250ml	Hydraulic fluid	Excavator	Mechanical failure	Excavator mechanical failure on main boom hydraulic. A few drops of hydraulic dropped on the ground. The drops were and contaminated soil was removed from site for disposal and the excavator was repaired.	The excavator was repaired, cleaned, and removed from site by sub-contractor. Sub-contractor have been advised not to conduct on-site repairs.	96
97	16-Jun-21	16-Jun-21	16-Jun-21	Day	9:01-9:30	PGC		Minor spill (<1L)	Diesel leak from backhoe	L325	~200ml	Diesel Fuel	Backhoe	Improper Fueling Procedure	At approximately 9:00, a fuel spill from a backhoe was identified on sand covered asphalt at the L325 southern shoulder. The spills residue from the ground surface and contaminated soil were removed, and disposed of at the PGC waste management yard.	The spill was contained to the immediate area and all the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	97
98	16-Jun-21	16-Jun-21	16-Jun-21	Day	14:01-14:30	PGC		Spill (1.1 L - 5L)	Small hydraulic leak from excavator	L325	>2,000ml	Hydraulic fluid	Excavator	Mechanical failure	At approximately 14:00, a mechanical failure on the main boom arm of an excavator caused a hydraulic fluid leak on the southern shoulder of L325. Spill pads were used to wipe down the machine and to remove residue spills from the ground surface. Contaminated soil removed.	The excavator was repaired and all contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	98
99	22-Jun-21	22-Jun-21	22-Jun-21	Day	3:01-3:30	PGC	Menard	Large Spill (5.1L - 99.9L)	Hydraulic leak from haul truck	L2200	5L	Hydraulic fluid	Haul truck	Mechanical failure	Absorbent materials as been placed on the stained asphalt, and contaminated sand is being removed and disposed of.	PGC is requesting that all of Menard's field crews and supervisors go through our safety orientation again.	99
100	22-Jun-21	22-Jun-21	22-Jun-21	Day	20:31-21:00	PGC	Menard	Minor spill (<1L)	Hydraulic Leak from Zoomboom	L2200	~100ml	Hydraulic fluid	Zoomboom	Mechanical failure	The small amount of contaminated soil was excavated and removed.	PGC requested the equipment be removed from site Menard agreed to remove the equipment on June 24th on night shift.	100
101	30-Jun-21	30-Jun-21	30-Jun-21	Day	8:01-8:30	PGC	All-Road	Minor spill (<1L)	Diesel leak from backhoe	L325	~200ml	Diesel Fuel	Backhoe	Improper Fueling Procedure	At approximately 8:00, a fuel spill from a backhoe was identified on sand covered asphalt at the L325 southern shoulder. The contaminated soil was removed and disposed of at the PGC waste management yard.	The spill was contained to the immediate area and all the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	101

HWY 91/17 SITE
Environmental Spill and Incident Tracking

Planner Incident #	Date Of Event	Date Reported	Date Initial Notification Issued	Shift	Approx. Time	Contractor	Sub-Contractor	Classification	Description of Event	Location	Fluid Amount (L)	Fluid Type	Type of Equipment	Causal Factors	Action Taken	Corrective Actions Date Complete	Previous Incident #
102	11-Jul-21	11-Jul-21	11-Jul-21	Night	20:01-20:30	PGC	Henry Drilling	Spill (1.1 L - 5L)	Diesel Spill from Drill Rig	L575	~1L	Diesel Fuel	Drill Rig	Improper Fueling Procedure	At approximately 20:00, a fuel spill from a drill rig was identified on S2 west stone colomn laydown area. The contaminated soil was removed and disposed of at the PGC waste management yard.	The spill was contained to the immediate area and all the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	102
103	27-Jul-21	27-Jul-21	27-Jul-21	Day	3:31-4:00	PGC	Jacob Brother	Spill (1.1 L - 5L)	Hydraulic leak from concrete truck	L375	~4L	Hydraulic fluid	Concrete Truck	Mechanical failure	Driving into site, a concrete truck had a hydraulic failure on the asphalt section of the roundabout before driving onto the gravel/sand portion of the site under the S1 Bridge. Absorbent material and pads were immediately placed on the spill area and the environmental team was contacted to assess the situation.	The spill was contained to the immediate area and all the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	103
104	29-Jul-21	29-Jul-21	29-Jul-21	Day	5:01-5:30	PGC	Jacob Brother	Spill (1.1 L - 5L)	Hydraulic leak from concrete pump	L100N	2-3L	Hydraulic fluid	Concrete Pump	Mechanical failure	The Gastaldo concrete pump sprung a hydraulic leak this morning at the south side of the river road bridge after the pump failed to prime. The crew immediately placed drip trays under the equipment to catch the leak; however, 2-3 litres of fluid spilled on the graveled ground. Absorbent pads were used to collect the spill, and contaminated soil was picked-up and placed into bags for later disposal.	The spill was contained to the immediate area and all the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	104
105	4-Aug-21	4-Aug-21	4-Aug-21	Day	11:01-11:30	PGC	CDI	Minor spill (<1L)	Hydraulic leak from drill rig	L500W	~250ml	Hydraulic fluid	Drill Rig	Mechanical failure	A drill rig from CDI experienced a mechanical failure on its hydraulic system. The majority of fluids were captured using driptrays and absorbent pads; however, approximately 250ml spilled onto the sandy ground.	All the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor. The drill rig was repaired and cleaned before being put back into operations.	105
106	15-Jul-21	5-Aug-21	5-Aug-21	Day	7:31-8:00	PGC	Jacob Brother	Spill (1.1 L - 5L)	Use of an Unapproved Material to Reduce pH	L375	~4L	Sodium Sulphate	N/A	During the S1 bridge curing procedure it was noticed that a pond of high pH water accumulated below the bridge construction area. When the water was tested it was found to have a pH>11. The Sub-Contractor proceeded to use a non- approved product (Sodium Sulphate) to reduce the pH<8. According to the CEMP and EWP this product has not previously been approved to replace the CO2 bubbler method. Treatment of the high pH occurred July 15-17 and curing of concrete continued for the next 5 days with an acceptable <8pH.	Going forward the use of unapproved methods/products e.g., Sodium Sulphate will not be permitted on site. The only allowable method to treat high pH water will be with CO2 diffusion. Sub-contractors will be reminded of this requirement.		
107	15-Aug-21	15-Aug-21	15-Aug-21	Night	19:01-19:30	PGC	All Roads	Spill (1.1 L - 5L)	Tack Spill on Road Shoulder	L500W	~2L	Tack Fluid	Asphalt tack spray nozzle	Mechanical Failure: The tack pray nozzle was accidently hit by one of the worker's arms and started spraying tack fluid on the gravel ground	The nozzle was quickly turned off, and all spill fluid was absorbed using absorbent pads, absorbent socks and granular absorbent.	The spill was contained to the immediate area and all the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor.	107
108	17-Aug-21	17-Aug-21	17-Aug-21	Day	7:01-7:30	PGC	Henry Drilling	Minor spill (<1L)	Drill Rig Hydraulic Leak	L500W	<1L	Hydraulic fluid	Drill Rig	Mechanical Failure: A small spill occurred when an o-ring seal failure occurred while the drilling system was under pressure.	The spill was contained and cleaned up using absorbent pads.	All the contaminated soil was dug out and sent to the PGC waste management for disposal by the sub-contractor. The drill rig was repaired and cleaned before being put back into operations.	108
109	17-Aug-21	17-Aug-21	17-Aug-21	Night	21:31-22:00	PGC	Wetdown Water Services	Spill (1.1 L - 5L)	Water Truck Fuel Leak	L500E	~4L	Fuel	Water Truck	Mechanical Failure: Vibration from the rear spray motor on the water truck caused a fuel valve to open and spill to the eastbound closed lane of Highway 91C.	The spill was cleaned from the asphalt with absorbent pads and granular absorbent, and a absorbent sock was placed downstream of the leak to eliminate any possibility of fuel entering a catch basin.	Absorbent used to clean this spill from the asphalt was sent to the PGC waste management for disposal by the sub-contractor.	109
110	7-Sep-21	7-Sep-21	7-Sep-21	Night	17:31-18:00	PGC	Menard	Spill (1.1 L - 5L)	Water pump fuel leak	L500W	~2L	Fuel	Water Pump	Misshandling, Mechanical Failure: When moving the pump the fuel inside of the tank leaked out from the gas cap which appears to be defective	The spill was cleaned with absorbent pads and the contaminated gravel was excavated and stored for later dispossal to an offiste facility.	Absorbent pads used to clean this spill from the asphalt. The leaking gas cap was tempoarily taped to seal off the leak and the gas cap wil be replaced on a later date.	110
111	22-Sep-21	22-Sep-21	22-Sep-21	Day	12:31-13:00	PGC	Nordel Trucking	Minor spill (<1L)	Hydraulic spill at L1300 Spoil material placement area	L1300	<1L	Hydraulic fluid	Dump truck	While offloading spoil material a hydraulic hose raptured causing a spill of approximately 1 L of hydraulic fluid onto compacted haul road. A small amount was of hydraulic liquid was leaked into a small rain puddle on site.	White absorbent pads were used to remove all surface residue. Grey absorbent pads were applied to the contaminated puddle and all potentially contaminated water & hydraulic fluid was removed. An interlocking spill boom was used to prevent any contaminants from entering the down stream low lying area .	Splill mitigation done sucesfully and no hydro-carbons entered any water courses or sensitive areas	111

HWY 91/17 SITE
Environmental Spill and Incident Tracking

Planner Incident #	Date Of Event	Date Reported	Date Initial Notification Issued	Shift	Approx. Time	Contractor	Sub-Contractor	Classification	Description of Event	Location	Fluid Amount (L)	Fluid Type	Type of Equipment	Causal Factors	Action Taken	Corrective Actions Date Complete	Previous Incident #
112	27-Sep-21	28-Sep-21	28-Sep-21	Night	22:31-23:00	PGC	PGC	Significant Spill (To water or >100L)	Sediment released into silda ditch	L1300	5-8m3	Sand & Gravel	Godwin Pump	At approximately 11:00pm placed preload sediment (sand & gravel) was released into the Silda Ditch when a Godwin pump hose experienced a water surge while diverting water flow during night shift.	During this event the discharge hose moved from the discharge position out onto the sand/gravel bank causing embankment scouring. Approximately between 5-8m³ of sand and gravel washed down the bank and into the ditch. The ditch is isolated with fish screen both upstream and downstream. Future instream work is planned for this area during the installation of habitat enhancement features and permanent drainage that connects to Silda ditch.	A one lane closure is planned for night shift (28 Sept) to initiate immediate repairs to the embankment fill that was washed away. Monitoring (Dayshift and Nightshift) will be done downstream to ensure that there is no environmental impact to downstream Silda ditch. To avoid unnecessary disturbance to the ditch substrate no sand/gravel will be removed from the Silda ditch area at this stage but, will be completed during instream landscaping work in that area which would include excavations.	112
113	12-Oct-21	12-Oct-21	12-Oct-21	Day	9:01-9:30	PGC	PGC	Minor spill (<1L)	Hydraulic spill at L2100	L2100	~250ml	Hydraulic fluid	Dump truck	At approximately 9:00AM a dump truck experienced a hydraulic leak when unloading gravel on site. This resulted from a mechanical failure which spilled approximately 250ml of hydraulic oil to the asphalt.	The haul truck was immediately stopped when the ground crew noticed it leaking and they placed plug and dyke on it to temporarily seal it. The spill was contained an cleaned up using white spill pads and the truck was sent off site to a mechanic for repair. All of the contaminated pill pads were disposed of at PGC waste management area for disposal by a sub contractor.	Splill mitigation done sucesfully and no hydro-carbons entered any water courses or sensitive areas	113
114	18-Oct-21	18-Oct-21	18-Oct-21	Day	13:31-14:00	PGC	PGC	Significant Spill (To water or >100L)	L1300 Turbid Water Release	L1300	>100L	High turbidity water release	Godwin Pump	During an in-stream trenching activity at the L1300 high NTU water was released into the downstream-Silda ditch area. The activity formed part of a routine stream diversion; however, during the trenching of the ditch all downstream isolation was removed. In addition, the two 6" Godwin pumps that	When the problem was noticed the pumps were turned off immediately and downstream monitoring was conducted by the PGC Environmental Coordinator. NCR 73 has been opened and this incident is currently receiving attention from PGC upper management. Downstream monitoring was done, and the turbidity (NTU) returned to normalcy at around 23:07pm data is available for reference.	18-Oct-21	
115	20-Nov-21	20-Nov-21	20-Nov-21	Day	1:01-1:30	PGC	PGC	Significant Spill (To water or >100L)	High pH Water in L1300 Lightweight Cell	L1300	>100L	High pH Water	N/A	After September 17 heavy rain, the lightweight concrete in the L1300 northern cell broke when it filled with water.	This water is now at a pH of ~10.0 and needs to be treated with CO2 before being pumped out. Comments: The pH of Silda Ditch downstream and midstream were measure at pH 7.2 on Monday morning.	20-Nov-21	
116	2-Nov-21	2-Nov-21	2-Nov-21	Night	1:01-1:30	PGC	Delta Aggregate	Spill (1.1 L - 5L)	Hydraulic spill at L375	L375	<5L	Hydraulic fluid	Dump truck	At approximately 01:30, a haul truck experienced a hydraulic leak when unloading gravel on site. The leak resulted a snagged hose resulting in a spill of approximately 3L of hydraulic fluid onto gravel.	The haul truck was immediately stopped after the ground crew noticed a leak. The crew placed spill pads over the hose and duct taped the hose to temporarily stop the leak. The spill was contained and cleaned up using spill pads and hand excavation. The truck was then sent off site to a mechanic for repair. All of the contaminated soil and spill pads were disposed of at the PGC waste management area for later disposal by a third party.	2-Nov-21	115
117	9-Nov-21	9-Nov-21	10-Nov-21	Day	12:01-12:30	PGC		Large Spill (5.1L - 99.9L)	117-Overflowing of oil/water separator causing oil to accumulate in containment pond	Truck parking (old)	5-7L	Waste oil	Oil Water Seperator	During an inspection by the PGC Structures General Superintendent it was discovered that the oil/water separator at the truck parking overflowed. Excess waste oil was spilled onto asphalt and flowed towards a collection pond directly northeast of the separator. This pond is not connected to any stream, and it is estimated that approximately 5-7 liters of oil was spilled.	The PGC Environmental Coordinator has placed absorbent pads and interlockable boom socks on the surface of the water to contain the spill. PGC is currently in the process of arranging a hydrovac truck to empty the oil/water separator and to remove contaminated water and substrate from the pond. All areas will be inspected to ensure that oil residue is removed and cleaned from all surfaces.	12-Nov-21	116
118	19-Nov-21	19-Nov-21	19-Nov-21	Day	10:01-10:30	PGC		Spill (1.1 L - 5L)	Diesel spill from excavator refuelling	L375	~1 litre	Diesel Fuel	Excavator	During the refueling of an excavator at 10:00, the fuel nozzle of the refueling truck got stuck in the open position. This resulted in the excavator's fuel tank overfilling, spilling approximately 1 litre of diesel onto muddy ground, south of L375.	The spill was contained and cleaned using spill pads, granular absorbent, and hand excavation. The tracks of the excavator were cleaned, and all contaminated soil and absorbent material were disposed of at the waste management area for later disposal by a third party. Workers were reminded to place drip trays under equipment during refueling.	19-Nov-21	
119	19-Nov-21	19-Nov-21	19-Nov	Night	00:01-00:30	PGC	All-Roads	Spill (5.1L - 99.9L)	Tack Spill as the result of spraying durring rain event	L475	5 - 10L	Tack Fluid		Durring the application of tack it began to rain despite the fact that rain was not forcated in the weather report. This resulted in ~10L of tack releasing into ditches from L475 paving activity.	The spill was contained with oil booms and cleaned using spill pads, granular absorbent, and hand excavation. All contaminated soil and absorbent material were disposed of at the waste management area for later disposal by a third party.		

HWY 91/17 SITE
Environmental Spill and Incident Tracking

Planner Incident #	Date Of Event	Date Reported	Date Initial Notification Issued	Shift	Approx. Time	Contractor	Sub-Contractor	Classification	Description of Event	Location	Fluid Amount (L)	Fluid Type	Type of Equipment	Causal Factors	Action Taken	Corrective Actions Date Complete	Previous Incident #
120	1-Dec-21	1-Dec-21	1-Dec-21	Night	01:01-00:30	PGC	ProQuip	Minor spill (<1L)	Diesel fuel spill during refuelling	L500	>1L	Diesel Fuel	Fuel Truck	During the refueling equipment around 01:00, the fuel nozzle of a fuel truck dripped diesel fuel on the right-hand lane of detour CO3 while the hose was being retracted. This resulted in approximately 1 litre of diesel fuel to be spilled onto asphalt.	The spill was contained and cleaned using granular absorbent. All used absorbent material were disposed of at the waste management area for later disposal by a third party.		
121	2-Dec-21	2-Dec-21	2-Dec-21	Day	15:01-15:30	PGC		Spill (1.1 L - 5L)	Hydraulic Spill	L375	~3 litres	Hydraulic fluid	Tandem Truck	During the delivery of gravel a tandem truck's engine seal malfunctioned casing hydraulic fluid to spill to asphalt. The truck was brought to an immediate stop.	A drip tray was immediately placed under the leaking point capturing 20 liters of fluid, with the remaining 3 liters falling on the asphalted road. A temporary soil berm was constructed to contain the spill from flowing downhill. The spill on the affected asphalt was cleaned using absorbent pads and granular absorbents. All used absorbent material, soil and used hydraulic fluids were disposed of at the waste management area for later disposal by a third party.		
122	14-Dec-21	14-Dec-21	14-Dec-21	Night	2:01-2:30	PGC	Delta Aggregate	Minor spill (<1L)	Excavator Swing Gear Leak	L600E	<250ml	Hydraulic Oil	Excavator	An excavator experienced an oil leak on its swing gear around 02:30 on Wall 407, resulting in approximately 250ml of oil being released onto the muddy ground.	The crew immediately shut the equipment down and placed a drip tray and absorbent pads under the equipment to clean the spill. Additional residue on the equipment was cleaned using absorbent pads. All used absorbent material and contaminated soil were disposed of at the waste management area for later disposal by a third party.		
123	14-Dec-21	14-Dec-21	14-Dec-21	Day	11:01-11:30	PGC	Jacob Brother	Minor spill (<1L)	Forklift Diesel Leak	L500W	~2 litres	Diesel Fuel	Forklift	A forklift's moisture drainage screw loosened on its fuel tank during operation. The resulted in approximately 2 litres of diesel fuel being released onto the asphalted shoulder, west of highway 17 and 91C.	The crew used absorbent pads and granular absorbent to clean the spill area, and placed boom downhill to prevent potential runoff's due to the rain. All used absorbent material and contaminated soil were disposed of at the waste management area for later disposal by a third party.		

SUMMARY

Totals	Unit/Value	**Total**
Total Volume	L	**0**
Total Spills	#	**15**
Classification		**Total**
Minor Spill (<1L)	#	**4**
Spill (1.1L-5L)	#	**0**
Large Spill (5.1L-99.9L)	#	**5**
Significant Spill (To water or >100L)	#	**0**
Total	#	**9**
Fluid Type		**Total**
Hydraulic	#	**10**
Antifreeze	#	**0**
Diesel	#	**3**
Oil	#	**1**
Gasoline	#	**0**
Black Water	#	**0**
Glycol	#	**0**
Unknown	#	**0**
Total	#	**14**

APPENDIX 3: WILDLIFE SALVAGE RESULTS

APPENDIX 4: PERMIT TRACKER

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APPENDIX 5: PERMIT CONDITIONS TRACKER

DFO 20-HPAC-00095

Subject: River Road Interchange (Section 1), Site C -Watercourse Infilling and Highway Upgrades, Fraser River, Delta - Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

	Conditions	Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2	Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3	If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	PGC
a	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b	Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecraneng.html).	PGC/Brybil
d	When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	PGC
4	Complete the works as quickly as possible once they are started.	PGC
5	Undertake works during dry weather and low water conditions.	PGC
6	Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	PGC
7	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13	While the Program recommends works be conducted during the least risk to fish instream work window of August 1 – September 15 where possible. It is recognized instream works will be required to commence upland works. Therefore, if works are proposed for outside the least risk window, work should especially be conducted under the direction of an appropriately qualified professional as per item 12 above.	PGC
14	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC, weekly audit MESL
15	If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume following implementation of appropriate mitigation measures and under the direction of an appropriately qualified professional.	PGC
16	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC

DFO 20-HPAC-00303

Subject: Highway 91/17 – Site F – Wetland Infilling, Burns Bog Ditches, Delta - Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

	Conditions	Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2	Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3	If instream works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	PGC
a	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b	Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecraneng.html).	PGC/Brybil
d	When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	PGC
4	Complete the works as quickly as possible once they are started.	PGC
5	Undertake works during dry weather and low water conditions.	PGC
6	Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	PGC
7	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13	The Program recommends works within fish-bearing or potentially fish-bearing watercourses be completed during the least risk to fish instream work window of August 1 – September 15 where possible. However, it is recognized that there are proposed instream works outside this window. Therefore, if works are proposed for outside this time window, additional measures should be implemented under the direction of an appropriately qualified professional, as per item 12 above.	PGC
14	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC, weekly audit MESL
15	If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume following implementation of appropriate mitigation measures and under the direction of an appropriately qualified professional.	PGC
16	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
17	Use non-acid rock drainage and metal leaching (non-ARD/ML) riprap.	

DFO 20-HPAC-00304

Subject: Highway 91/17 – Site G – Wetland Infilling, Burns Bog, Delta - Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

	Conditions	Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2	Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3	If works in the roadside ditches are not conducted in the dry, works are to be conducted in isolation of flow. When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	PGC
4	Complete the works as quickly as possible once they are started.	PGC
5	Undertake works during dry weather and low water conditions.	PGC
6	Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	PGC
7	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	Brybil -develop PGC - lead and implement
10	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC, weekly audit MESL
12	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13	If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume under the direction of an appropriately qualified professional, as per Item 12 above, with the following measures in place:	PGC
a	Works are to be conducted in isolation of flow.	PGC
b	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. Use appropriate fish handling techniques and relocate salvaged fish to a nearby undisturbed location. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
c	Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
d	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html).	PGC, Brybil
e	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC
f	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
g	Ensure that flows are maintained to downstream fish habitat in East Ditch, West Ditch, Silda Ditch, and 96 Street Ditch.	PGC
14	Use non-acid rock drainage and metal leaching (non-ARD/ML) riprap.	PGC

DFO 20-HPAC-00694

Subject: Highway 91/17 - Sites A, B, D & E (Sections 1 and 2) -Watercourse Infilling and Highway Upgrades, Fraser River, Delta - Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

	Conditions	Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	
2	Whenever possible, works are to be conducted when the watercourse is dry.	
3	If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	
a	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	
b	Dewater the isolated area gradually to reduce the potential for stranding fish.	
c	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecraneng.html).	
d	When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	
4	Complete the works as quickly as possible once they are started.	
5	Undertake works during dry weather and low water conditions.	
6	Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	
7	For works in fish-bearing waters, fish passage is to be maintained through any culverts in fish-bearing waters upon completion of works.	
8	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	
9	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	
10	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	
11	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	
12	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	
13	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	
14	While the Program recommends works be conducted during the least risk to fish instream work window of August 1 – September 15 where possible. It is recognized that there are proposed instream works outside this window. Therefore, if works are proposed for outside the least risk window, work should especially be conducted under the direction of an appropriately qualified professional and additional measure should be implemented, as per item 13 above.	
15	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area	
16	If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume following implementation of appropriate mitigation measures and under the direction of an appropriately qualified professional.	
17	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	
18	Use non-acid rock drainage and metal leaching (non-ARD/ML) riprap.	

DFO 20-HPAC-00349

Highway 91/17 Upgrades – Site I, Nordel Ditches & West Ditch – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

	Conditions	Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2	Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3	If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented	PGC/Brybil
a	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b	Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfompo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html).	PGC
d	When diverting flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat, both upstream and downstream of the isolated work area.	PGC
4	Complete the works as quickly as possible once they are started.	PGC
5	Undertake works during dry weather and low water conditions.	PGC
6	Equipment is to be situated in the dry stream channel within the footprint of the works or operated from the top of the bank.	PGC
7	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC
14	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
15	Use non-acid rock drainage and metal leaching (non-ARD/ML) rip rap.	PGC

DFO 20-HPAC-00350

Highway 91/17 Upgrades – Site H, Unnamed Tributary Ditches to Silda Ditch – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

	Conditions	Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2	Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3	If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	PGC/Brybil
a	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b	Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www dfompo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html).	PGC
d	When diverting flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat, both upstream and downstream of the isolated work area.	PGC
4	Complete the works as quickly as possible once they are started.	PGC
5	Undertake works during dry weather and low water conditions.	PGC
6	Equipment is to be situated in the dry stream channel within the footprint of the works or operated from the top of the bank.	PGC
7	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC
14	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
15	Use non-acid rock drainage and metal leaching (non-ARD/ML) rip rap.	PGC

WSA Notification 100310655
Notice to Habitat Officer / Changes in and about a Stream under Part 3 Water Sustainability Regulation

	Conditions	Responsibility
1	Any work associated with the proposed changes in and about a stream must not cause stream channel instability or increase the risk of sedimentation into the stream.	PGC
2	During work onsite, erosion and sediment control materials must be available on site at all times and must be installed if sedimentation is likely to occur into the stream. A contingency plan must be developed outlining the measures to be taken by workers when carrying out any work to control erosion and sediment.	PGC
3	Soil disturbance must not occur in heavy rain conditions and any soil removed must be placed in a location that ensures that sedimentor debris does not enter the stream.	PGC
4	Within a work area, water that contains sediment must be pumped to a vegetated area away from the stream where it can seep into the ground, or to a settling pond that is sufficiently far from the stream to allow sediment to settle out before the water returns to the stream.	PGC
5	The disturbance of stream bank vegetation must not occur or be minimized as much as possible.	PGC
6	Any areas that are disturbed during the work (such as exposed soil) must be promptly restored at a minimum to the pre-disturbance condition. Note: Guidance is provided in the Enhancement Section of the Best Management Practices Instream Works	PGC
7	If possible, work must be conducted on, and equipment located and operated from, dry land (no water present) and the worksite must be isolated from flowing water.	PGC
8	Any equipment used in conducting work must be in good mechanical condition and, when operating in close proximity to the wetted perimeter of a stream, the operator must prevent entry of any substance, sediment, debris or material (e.g., hydrocarbons, silt) into the stream so as to prevent harm to fish, wildlife or the aquatic ecosystem of a stream. Note that Section 46 of the Water Sustainability Act prohibits the introduction of foreign matter into a stream. Failure to comply may result in a remediation order and it is also an offence to do so.	PGC
9	The original rate of water flow in the stream (existing prior to commencing work) must be maintained upstream and downstream of the worksite during all phases of instream activity associated with the work.	PGC
10	When work requires de-watering or isolation of the worksite in the stream, a permit for the salvage of fish and wildlife must be obtained prior to commencing work. All required salvage permits must be obtained from Front Counter BC :http://www.frontcounterbc gov.bc.ca/. Any salvage must be carried out by a qualified environmental professional (such as an R.P.Bio.).	Brybil
11	Following de-watering or isolation of the worksite, stream flow must be returned gradually to the de-watered or isolated area within the stream and not in a single sudden rush so as to avoid erosion of the stream channel and sediment delivery to the stream.	PGC
12	The stream channel width must not change as a result of the work.	PGC
13	Any materials, such as riprap or gabion rock, placed within the stream must be clean and not contain substances that could be harmful to fish, wildlife or the aquatic ecosystem of the stream.	PGC
14	Any areas disturbed as part of the work must be restored as close as possible to their pre-disturbance condition. Any soil exposed at the worksite must be promptly re-vegetated.	PGC
15	Subject to section 16 and 17 below, the work must be completed during the timing window for the stream in respect of which the changes are proposed. The applicable timing window (by region and/or by stream) are specified in the following links (see below) and are designed to protect fish, wildlife or the aquatic ecosystem of a stream. To determine the timing window, please select the relevant region from the map: http://www.frontcounterbc ca/pdf/RegionMap.pdfand then determine the applicable timing window:*Regional Timing Windows:http://www2 gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/working-around-water/regional-terms-conditions-timing-windows< <for that region and for the stream where the proposed changes will be made. For projects proposed to take place outside these timing windows, please see section 16 and 17 below	PGC
16	In addition to the timing windows specified in section 15 above, work may be carried out during the following times provided these requirements are met when the changes are carried out:	PGC
i.	If the stream channel is naturally dry (no flow) or frozen to the bottom at the worksite and the instream work / activity associated with the proposed change will not adversely impact fish, wildlife or the aquatic ecosystem of the stream (e.g. not result in any substance, sediment, debris or other material entering or leaching into the stream that would adversely affect fish, wildlife or the aquatic ecosystem),	PGC
ii.	In the construction of a winter crossing, the stream channel is frozen to the bottom at the worksite and related work does not adversely impact the stream channel (including stream bed and banks), or fish, wildlife or the aquatic ecosystem of the stream, or impede their passage (in both directions) in the stream.	PGC
17	If your work is proposed outside of the timing window (as described in section 15 above), you must retain a qualified environmental professional (such as an R.P. Bio.). The professional will be responsible for providing a written technical rational that assesses and addresses the risks of the proposed changes in and about a stream, including proposing site specific mitigation (e.g. an Erosion Control Plan that identifies contingency measures and emergency procedures related to the proposal) and onsite monitoring of their implementation. This document must be submitted to the Habitat Officer via Front Counter B.C. with reference to your file number (shown on top of this document).	PGC

WSA Approval 2007795
Change Approval -Changes In and About 96th Street Ditch and Silda Ditch (Sites B, D, and E)

Legend	
	Difference between Approval 2007783 & 2007795
	Difference between Approval 2007749 & 2007795
	Difference between Approval 2007770 & 2007795
	Difference between Approval 2007755 & 2007795

		Conditions	Responsibility
		If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	PGC, Brybil
	d	The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	PGC
	e	All works associated with the Environmental Enhancement Management Plan, as outlined in clause (m) and required in clause (oo) below, shall be completed on or before December 31, 2033 (based on 10 years).	PGC, Brybil - development of plan
	f	Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	PGC - implementation Brybil/MESL - provide input
	1	Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 15; or	
	2	Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
	i	An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
	ii	The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
	iii	Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
	iv	The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
	g	All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	PGC
	h	Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train on site staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	PGC
	i	The works shall not result in depressions that have the ability to trap fish and other aquatic life.	PGC
	j	The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	PGC
	k	Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	PGC
	l	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize, and it shall be managed to avoid entry into any stream or watercourse.	PGC
	m	All works shall be completed in accordance with	PGC
	1	ENG DWG Site E Culvert Plan and Profile, 2020-01-27	PGC
	2	ENG DWG Site B Culvert Plan and Profile, 2020-01-27	PGC
	3	ENG DWG Site D River Road Interchange Silda Wetland Encroachment, 2020-02-19	PGC
	4	Report Section 11 Approval Application Highway 91/17 Upgrades, Section 1 And 2, By Brybil Projects Ltd., February 21, 2020	PGC
	5	Stormwater Management Plan, McElhanney May 6, 2020	PGC
	6	CEMP, 3rd Revision, May, 2020	PGC
	7	Surface Water Quality & Sediment Control Plan (of CEMP)	PGC
	8	Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	PGC
	9	Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	PGC
	10	Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020	PGC
	n	The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	PGC
	o	All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http //www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf.	PGC
	p	The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another July 23, 2020 Job Number 114324 File Number 20077955 of 10 Ministry of Forests, Lands, Natural Resource Operations, and Rural Development Water Management Mailing Address 200-10428 153 Street, Surrey BC V3R 1E1 Location 200-10428 153 Street, Surrey BC V3R 1E1 Phone (604) 586-4400 Fax (604) 586-4444 Web https //www2.gov.bc.ca/gov/content/environment/air-land-water/waterqualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	PGC
	1	Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	PGC
	2	Where applicable, assist in the isolation of the stream prior to the commencement of works.	PGC
	3	Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	PGC
	4	Supervise all instream works authorized under this Approval.	PGC
	5	When the works involve temporary diversions to isolate the work site,	PGC
	i	Monitor all diversion works daily to ensure pumps & flow by passes are inproper working condition;	PGC
	ii	Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater"(Fisheries and Oceans Canada, 2020);and	PGC
	iii	Ensure fish are prevented from entering the works.	PGC
	6	When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	PGC
	i	Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	PGC, Brybil
	ii	Obtain any permits needed prior to undertaking the salvage(s); and	Brybil
	iii	Inspect the extraction area for fish stranding at least once after water levels have declined.	PGC,Brybil
	7	In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	PGC
	8	Be granted authority to stop the work authorized under this Approval if deemed necessary toaddress risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	PGC, MESL
	q	Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	PGC
	r	All equipment and machinery used in or near the stream channel	PGC
	1	Must be in good operating condition and free of leaks, excess oil and grease;	PGC

2	Must have a spill containment kit readily accessible on-site;	PGC
3	May not be refuelled within 30 meters of any watercourse; and	PGC
4	Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	PGC
s	Any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities must be reported to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	PGC
t	Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	PGC
u	Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	PGC
v	Care shall be exercised during sediment screening so that fine size fractions are not introduced into wetted areas or left in dry areas of the stream channel following the completion of work.	PGC
w	Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https //www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https //www2.gov.bc.ca/assets/gov/environment/air-land water/water/waterquality/wqgs-wqos/approved-wqgs/turbitity-or.pdf) and/or the applicable Local Government Bylaw(s).	PGC
	Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined asbeing equal to or greater than 25 millimetres of rainfall within a24-hourperiod.	PGC
x	All excavated material and debris shall be removed from the site or placed in a stable area above the high-watermark of the stream. Mitigative measures must be applied July 23, 2020 Job Number 114324 File Number 20077957of Ministry of Forests, Lands, Natural Resource Operations, and Rural Development Water Management Mailing Address 200-10428 153 Street, Surrey BC V3R 1E1 Location 200-10428 153 Street, Surrey BC V3R 1E1 Phone (604) 586-4400 Fax (604) 586-4444 Web https //www2.gov.bc.ca/gov/content/environment/air-land-water/waterto protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	PGC
y	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	PGC
z	Measures must be taken to ensure that no harmful material (e.g. fuel and other hydrocarbons, soil, road fill, or sediment) which could adversely impact water quality, fish and other aquatic life, and/or fish habitat, be allowed to enter the wetted perimeter as a result of the project activities. All staff must be trained in handling and applying a spill kit appropriately to any spills/incidents.	PGC
aa	Site preparation is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.	PGC
bb	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.	PGC
cc	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.	PGC
dd	Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.	PGC
ee	All disturbed areas of the banks of the stream shall be restored to their original condition.	PGC
ff	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.	MESL Design, PGC implementation
gg	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).	MESL Design, PGC implementation
hh	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.	PGC
ii	All rock used in the works shall be clean and free of sediment producing material, durable, non-acid generating and suitably graded.	PGC
jj	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.	PGC
kk	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.	PGC
ll	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented	PGC
1	Where possible and feasible, piles should be installed using a vibratory hammer.	PGC
2	Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).	PGC
3	Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.	PGC
4	Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.	PGC
5	Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.	PGC
6	In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.	PGC
mm	The holder of this Approval shall be responsible for the repair, operation and maintenance of works to the satisfaction of the Water Manager.	PGC
nn	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca.	PGC
	That report shall include a signed statement from an appropriately Qualified Professional summarizing	PGC
1	The in-stream works undertaken,	PGC
2	The timing of those works,	PGC
3	The total in-stream area directly affected,	PGC
4	The volume of gravel or sediment removed (if applicable),	PGC
5	The frequency of monitoring including who the QP or EM was;	PGC
6	The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),	PGC
7	Representative site photographs;	PGC
8	Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and	PGC
9	A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.	PGC
oo	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval.	Brybil Development, PGC Implementation
	The effectiveness monitoring term required for this approval is 10 years, ending on Dec. 31, 2033, or 10 years following the completion of construction, whichever is later. Monitoring for riparian, instream, and wetland habitats should occur on years 1, 2, 3, 6, 7, and 10.	Province
	Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email. The reports shall include	Province
1	Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.	Province
2	Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.	Province

3	Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.	Province
4	Amphibian species presence by egg mass surveys,	Province
5	Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,	Province
6	Monitoring, maintenance and implementation of the above recommendations if required.	Province
7	Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.	Province
pp	To address the permanent in stream and riparian impacts associated with the project, the holder of this Approval must	
1	Retain one or more appropriately qualified professionals to develop an offsetting plan that includes	
i	The creation of a minimum of 206 m2 of instream, 2,705 m2 of wetland, and 1,082 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.	Brybil/PGC
ii	A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures.	Province
iii	A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.	Province
2	Develop the offsetting plan in collaboration with interested First Nations and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.	Brybil/PGC
3	Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.	Brybil/PGC

WSA Approval 2007783
Change Approval - Changes In and About East West Perimeter Ditch and Burns Bog (Site F)

Legend	
	Difference between Approval 2007795 & 2007783
	Difference between Approval 2007749 & 2007783
	Difference between Approval 2007770 & 2007783
	Difference between Approval 2007755 & 2007783

	Conditions	Responsibility
	If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
d	The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	
e	All works associated with the Environmental Enhancement Management Plan, as outlined in clause (m) and requirements in clause (jj) below, shall be completed on or before December 31, 2033 (based on 10 years).	
f	Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1	Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 15; or	
2	Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i	An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
ii	The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii	Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv	The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g	All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	
h	Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
i	The works shall not result in depressions that have the ability to trap fish and other aquatic life.	
j	The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	
k	Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	
l	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
m	All works shall be completed in accordance with	
1	Reference ENG DWGs Site F Key Plan/Drawing Index 2020-02-14; Plan 2020-02-14; Profiles 2020-02-14; Typical sections 2020-02-14; Culvert Plan and Profiles, 2020-02-14	
2	Report Section 11 Approval Application Highway 91/17 Upgrades, Section 3, Site F, By Brybil Projects Ltd., February 28, 2020	
3	Stormwater Management Plan, McElhanney May 6, 2020	
4	CEMP, 3rd Revision, May 2020	
5	Surface Water Quality & Sediment Control Plan (of CEMP)	
6	Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
7	Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
8	Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020	
n	The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
o	All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http //www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf.	
p	The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1	Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2	Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3	Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4	Supervise all instream works authorized under this Approval.	
5	When the works involve temporary diversions to isolate the work site,	
i	Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii	Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii	Ensure fish are prevented from entering the works.	
6	When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i	Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii	Obtain any permits needed prior to undertaking the salvage(s); and	
iii	Inspect the extraction area for fish stranding at least once after water levels have declined.	
7	In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8	Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
q	Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
r	All equipment and machinery used in or near the stream channel	
1	Must be in good operating condition and free of leaks, excess oil and grease;	
2	Must have a spill containment kit readily accessible on-site;	
3	May not be refuelled within 30 meters of any watercourse; and	
4	Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	

s	Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	
t	Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	
u	Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https //www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https //www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbitity-or.pdf) and/or the applicable Local Government Bylaw(s). Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.	
v	All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	
w	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
x	Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.	
y	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.	
z	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.	
aa	Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.	
bb	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.	
cc	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).	
dd	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.	
ee	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.	
ff	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.	
gg	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented	
1	Where possible and feasible, piles should be installed using a vibratory hammer.	
2	Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).	
3	Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.	
4	Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.	
5	Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.	
6	In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.	
hh	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca. That report shall include a signed statement from an appropriately Qualified Professional summarizing	
1	The in-stream works undertaken,	
2	The timing of those works,	
3	The total in-stream area directly affected,	
4	The volume of gravel or sediment removed (if applicable),	
5	The frequency of monitoring including who the QP or EM was;	
6	The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),	
7	Representative site photographs;	
8	Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and	
9	A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.	
ii	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval. The effectiveness monitoring term required for this approval is 10 years, ending on Dec. 31, 2033, or 10 years following the completion of construction, whichever is later. Monitoring for riparian, instream, and wetland habitats should occur on years 1, 2, 3, 6, 7, and 10. Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email. The reports shall include	
1	Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.	
2	Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.	
3	Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.	
4	Amphibian species presence by egg mass surveys,	
5	Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,	
6	Monitoring, maintenance and implementation of the above recommendations if required.	
7	Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.	
jj	To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must	
1	Retain one or more appropriately qualified professionals to develop an offsetting plan that includes	
i	The creation of a minimum of 382 m2 of instream, 21,648 m2 of wetland, and 52 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.	
ii	A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures. Monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Results of initial monitoring will determine how much further monitoring may be required until enhancement habitats are self-sustaining.	

iii	A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.	
2	Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.	
3	Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.	
kk	Effectiveness monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Targets include	
1	Plant survival is ≥ 80%; Tree survival rate of 100 %.	
2	Native plant cover is two thirds greater than invasive species cover within 5 years;	
3	Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools, creating cover for fish and habitat for amphibians; and	
4	Fish are present in instream areas and there are no new barriers to movement.	

WSA Approval 2007749
Change Approval - Changes In and About a Stream (Site G)

Legend	
	Difference between Approval 2007795 & 2007749
	Difference between Approval 2007783 & 2007749
	Difference between Approval 2007770 & 2007749
	Difference between Approval 2007755 & 2007749

		Conditions	Responsibility
		If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
	d	The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	
	e	All works associated with the Environmental Enhancement Management Plan, as outlined in clause (m) and requirements in clause (jj) below, shall be completed on or before December 31, 2033 (based on 10 years).	
	f	Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
	1	Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 15; or	
	2	Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
	i	An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
	ii	The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
	iii	Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
	iv	The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
	g	All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	
	h	Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
	i	The works shall not result in depressions that have the ability to trap fish and other aquatic life.	
	j	The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	
	k	Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	
	l	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
	m	All works shall be completed in accordance with	
	1	Reference ENG DWGs Site G Key Plan/Drawing Index 2020-02-14; Plan 2020-02-14; Profiles 2020-02-14; Typical sections 2020-02-14; Culvert Plan and Profiles, 2020-02-14	
	2	Report Section 11 Approval Application Highway 91/17 Upgrades, Section 4, Site G, By Brybil Projects Ltd., February 28, 2020	
	3	Stormwater Management Plan, McElhanney May 6, 2020	
	4	CEMP, 3rd Revision, May 2020	
	5	Surface Water Quality & Sediment Control Plan (of CEMP)	
	6	Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
	7	Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
	8	Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020	
	n	The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
	o	All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http //www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf.	
	p	The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
	1	Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
	2	Where applicable, assist in the isolation of the stream prior to the commencement of works.	
	3	Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
	4	Supervise all instream works authorized under this Approval.	
	5	When the works involve temporary diversions to isolate the work site,	
	i	Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
	ii	Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
	iii	Ensure fish are prevented from entering the works.	
	6	When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
	i	Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
	ii	Obtain any permits needed prior to undertaking the salvage(s); and	
	iii	Inspect the extraction area for fish stranding at least once after water levels have declined.	
	7	In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
	8	Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
	q	Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
	r	All equipment and machinery used in or near the stream channel	
	1	Must be in good operating condition and free of leaks, excess oil and grease;	
	2	Must have a spill containment kit readily accessible on-site;	
	3	May not be refuelled within 30 meters of any watercourse; and	
	4	Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	

s	Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincia "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	
t	Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	
u	Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https //www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https //www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbitity-or.pdf) and/or the applicable Local Government Bylaw(s).	
	Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.	
v	All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	
w	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
x	Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.	
y	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.	
z	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.	
aa	Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.	
bb	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.	
cc	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).	
dd	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.	
ee	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.	
ff	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.	
gg	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented	
1	Where possible and feasible, piles should be installed using a vibratory hammer or helical (screw) method.	
2	Piles installed using an impact hammer must implement the following mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa)	
i	Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.	
ii	Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.	
iii	Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.	
3	In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.	
hh	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca.	
	That report shall include a signed statement from an appropriately Qualified Professional summarizing	
1	The in-stream works undertaken,	
2	The timing of those works,	
3	The total in-stream area directly affected,	
4	The volume of gravel or sediment removed (if applicable),	
5	The frequency of monitoring including who the QP or EM was;	
6	The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),	
7	Representative site photographs;	
8	Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and	
9	A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.	
ii	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval.	
	The effectiveness monitoring term required for this approval is 10 years, ending on Dec. 31, 2033, or 10 years following the completion of construction, whichever is later. Monitoring for riparian, instream, and wetland habitats should occur on years 1, 2, 3, 6, 7, and 10.	
	Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email.	
	The reports shall include	
1	Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.	
2	Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.	
3	Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.	
4	Amphibian species presence by egg mass surveys,	
5	Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,	
6	Monitoring, maintenance and implementation of the above recommendations if required.	
7	Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.	
jj	To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must	
1	Retain one or more appropriately Qualified Professionals to develop an offsetting plan that includes	
i	The creation of a minimum of, 7,617 m2 of wetland habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and/or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.	
ii	A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures.	
iii	A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.	
2	Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.	

3	Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.	
kk	Effectiveness monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Targets include	
1	Plant survival is ≥ 80%; Tree survival rate of 100 %.	
2	Native plant cover is two thirds greater than invasive species cover within 5 years;	
3	Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively	
4	creating riffles and pools and creating cover for fish and habitat for amphibians; and	
5	Fish are present in instream areas and there are no new barriers to movement	

WSA Approval 2007770
Change Approval - Changes In and About a Stream (Site I)

Legend	
	Difference between Approval 2007795 & 2007770
	Difference between Approval 2007783 & 2007770
	Difference between Approval 2007749 & 2007770
	Difference between Approval 2007755 & 2007749

	Conditions	Responsibility
	If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
	If it is possible amphibians may be present in the streams, such as Nordel Ditches, an amphibian salvage must be undertaken prior to works taking place.	
d	The works authorized shall be completed on or before December 31, 2023.	
e	All works associated with an authorized Environmental Enhancement Management Plan, as outlined in clause (n) and required in clause (ff) below shall be completed on or before December 31, 2033 (based on 10 years).	
f	Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1	Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 30; or	
2	Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i	An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
ii	The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii	Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv	The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g	All works shall be completed in accordance with	
1	Reference ENG DWGs Site I Plan 2020-02-27, Profiles 2020-02-27, Typical Sections 2020-02-27, Culvert/ Storm Plans and Profiles 2020-02-27	
2	Report Section 11 Approval Application Highway 91/17 Upgrades, Section 4, Site I, By Brybil Projects Ltd., March 10, 2020	
3	Stormwater Management Plan, McElhanney May 6, 2020	
4	CEMP, 3rd Revision, May, 2020	
5	Surface Water Quality & Sediment Control Plan (of CEMP)	
6	Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
7	Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
8	Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020	
h	The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
i	All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http //www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf.	
j	The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1	Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2	Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3	Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4	Supervise all instream works authorized under this Approval.	
5	When the works involve temporary diversions to isolate the work site,	
i	Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii	Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii	Ensure fish are prevented from entering the works.	
6	When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i	Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii	Obtain any permits needed prior to undertaking the salvage(s); and	
iii	Inspect the extraction area for fish stranding at least once after water levels have declined.	
7	In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8	Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
k	All equipment and machinery used in or near the stream channel	
1	Must be in good operating condition and free of leaks, excess oil and grease;	
2	Must have a spill containment kit readily accessible on-site;	
3	May not be refuelled within 30 meters of any watercourse; and	
4	Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	
l	Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
m	Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
n	Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	
o	Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	
p	All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	
q	Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https //www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https //www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbitity-or.pdf) and/or the applicable Local Government Bylaw(s).	

	Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.		
r	The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.		
s	Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.		
t	The works shall not result in depressions that have the ability to trap fish and other aquatic life.		
u	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.		
v	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.		
w	Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.		
x	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.		
y	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).		
z	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.		
aa	All rock used in the works shall be clean and free of sediment producing material, durable, non-acid generating and suitably graded.		
bb	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.		
cc	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.		
dd	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented		
1	Where possible and feasible, piles should be installed using a vibratory hammer.		
2	Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).		
3	Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.		
4	Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.		
5	Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.		
6	In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.		
ee	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca.		
	That report shall include a signed statement from an appropriately Qualified Professional summarizing		
1	The in-stream works undertaken,		
2	The timing of those works,		
3	The total in-stream area directly affected,		
4	The volume of gravel or sediment removed (if applicable),		
5	The frequency of monitoring including who the QP or EM was;		
6	The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),		
7	Representative site photographs;		
8	Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and		
9	A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.		
ff	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval.		
	The effectiveness monitoring term required for this approval is 10 years following the completion of construction of the offsetting habitat. Monitoring for riparian, instream, and wetland habitat should occur for 5 years, over a 10-year period following the completion of construction of the habitat offsetting unless a Qualified Professional deems the site functional prior to the end of the 5 years of monitoring. Monitoring must occur until the habitat is deemed functional at like for like or like for greater than the original habitat by a Qualified Professional.		
	Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email.		
	The reports shall include		
1	Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.		
2	Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.		
3	Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.		
4	Amphibian species presence by egg mass surveys,		
5	Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,		
6	Monitoring, maintenance and implementation of the above recommendations if required.		
7	Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.		
gg	To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must		
1	Retain one or more appropriately qualified professionals to develop an offsetting plan that includes		
i	The creation of a minimum of 1,310 m2 of instream, 2,274 m2 of wetland, and 743 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.		
ii	A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures.		
iii	A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.		
2	Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.		
3	Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.		
hh	Effectiveness monitoring must take place during the same time of year each year to provide comparable data.		
	Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Results of initial monitoring will determine how much further monitoring may be required until enhancement habitats are self-sustaining. Targets include		
1	Plant survival is ≥ 80%; Tree survival rate of 100 %.		
2	Native plant cover is two thirds greater than invasive species cover within 5 years;		
3	Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools and creating cover for fish and habitat for amphibians; and		
4	Fish are present in instream areas and there are no new barriers to movement		

WSA Approval 2007755
Change Approval - Changes In and About SFPR Offset site FC239, and drainage between SFPR Offset site FC239 and Silda Ditch (Site H)

Legend	
	Difference between Approval 2007795 & 2007755
	Difference between Approval 2007783 & 2007755
	Difference between Approval 2007749 & 2007755
	Difference between Approval 2007770 & 2007755

	Conditions	Responsibility
	If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
d	The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	
e	All works associated with an Environmental Enhancement Management Plan, as outlined in clause (m) and requirements in clause (jj) below shall be completed on or before December 31, 2033 (based on 10 years).	
f	Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1	Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 30; or	
2	Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i	An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
ii	The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii	Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv	The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g	All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	
h	Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
i	The works shall not result in depressions that have the ability to trap fish and other aquatic life.	
j	The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	
k	Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	
l	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
m	All works shall be completed in accordance with	
1	ENG DWG Site H Key Plan/Drawing Index, by McElhanney, 2020-02-20	
2	ENG DWG Site H Plan, by McElhanney, 2020-02-20	
3	ENG DWG Site H Profile, by McElhanney, 2020-02-20	
4	ENG DWG Site H Typical Sections, by McElhanney, 2020-02-20	
5	ENG DWG Site H Culvert Plan and Profiles, by McElhanney, 2020-02-20	
6	Report Section 11 Approval Application Highway 91/17 Upgrades, Section 1 And 2, By Brybil Projects Ltd., February 21, 2020	
7	Stormwater Management Plan, McElhanney May 6, 2020	
8	CEMP, 3rd Revision, May 2020	
9	Surface Water Quality & Sediment Control Plan (of CEMP)	
10	Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
11	Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
12	Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020; and	
13	Any other documents related to the File No. 2007755.	
n	The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
o	All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http //www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf.	
p	The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1	Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2	Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3	Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4	Supervise all instream works authorized under this Approval.	
5	When the works involve temporary diversions to isolate the work site,	
i	Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii	Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii	Ensure fish are prevented from entering the works.	
6	When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i	Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii	Obtain any permits needed prior to undertaking the salvage(s); and	
iii	Inspect the extraction area for fish stranding at least once after water levels have declined.	
7	In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8	Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
q	Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
r	All equipment and machinery used in or near the stream channel	
1	Must be in good operating condition and free of leaks, excess oil and grease;	
2	Must have a spill containment kit readily accessible on-site;	

	3	May not be refuelled within 30 meters of any watercourse; and	
	4	Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	
	s	Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	
	t	Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	
	u	Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https //www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https //www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbitity-or.pdf) and/or the applicable Local Government Bylaw(s).	
		be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.	
	v	All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	
	w	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
	x	Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.	
	y	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.	
	z	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.	
	aa	Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.	
	bb	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.	
	cc	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).	
	dd	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.	
	ee	All rock used in the works shall be clean and free of sediment producing material, durable, non-acid generating and suitably graded.	
	ff	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.	
	gg	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.	
	hh	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented	
	1	Where possible and feasible, piles should be installed using a vibratory hammer.	
	2	Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).	
	3	Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.	
	4	Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.	
	5	Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.	
	6	In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.	
	ii	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca.	
		That report shall include a signed statement from an appropriately Qualified Professional summarizing	
	1	The in-stream works undertaken,	
	2	The timing of those works,	
	3	The total in-stream area directly affected,	
	4	The volume of gravel or sediment removed (if applicable),	
	5	The frequency of monitoring including who the QP or EM was;	
	6	The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),	
	7	Representative site photographs;	
	8	Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and	
	9	A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.	
	jj	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval.	
		The effectiveness monitoring term required for this approval is 10 years following the completion of construction of the offsetting habitat. Monitoring for riparian, instream, and wetland habitat should occur for 5 years, over a 10-year period following the completion of construction of the habitat offsetting unless a Qualified Professional deems the site functional prior to the end of the 5 years of monitoring. Monitoring must occur until the habitat is deemed functional at like for like or like for greater than the original habitat by a Qualified Professional.	
		Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email.	
		The reports shall include	
	1	Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.	
	2	Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.	
	3	Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.	
	4	Amphibian species presence by egg mass surveys,	
	5	Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,	
	6	Monitoring, maintenance and implementation of the above recommendations if required.	
	7	Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.	
	kk	To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must	
	1	Retain one or more appropriately qualified professionals to develop an offsetting plan that includes	
	i	The creation of a minimum of 406 m2 of instream, 702 m2 of wetland, and 5,495 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.	

ii	A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures. Monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Results of initial monitoring will determine how much further monitoring may be required until enhancement habitats are self-sustaining.		
iii	A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.		
2	Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.		
3	Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.		
II	Effectiveness monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Targets include		
1	Plant survival is ≥ 80%; Tree survival rate of 100 %.		
2	Native plant cover is two thirds greater than invasive species cover within 5 years;		
3	Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools, creating cover for fish and habitat for amphibians; and		
4	Fish are present in instream areas and there are no new barriers to movement		

APPENDIX 6: STATUS OF TOCA COMMITMENTS TABLE

Ref	Objective Commitments & Assurances	Timing	Delivered By	Status Update	
				Ongoing	Complete
1.0 Responsible Environmental Management					
1.1	Develop, implement, and maintain an Environmental Management Plan (EMP) for the Project to demonstrate how the design, construction and operation, including maintenance, of the Project: - Will be carried out to avoid or mitigate negative impacts; - Will be carried out in an environmentally responsible manner, in accordance with DBSS 165 [Protection of the Environment]; - Will employ Best Management Practices (BMPs3); and - Will comply with federal and provincial legislation, permits, approvals and authorizations, including the Environmental Assessment Certificate (EAC).	All phases	Contractor	X	
1.2	Prepare and implement a Construction Environmental Management Plan (CEMP), (which is a component of the EMP), including relevant sub-plans, for the Project prior to the start of relevant construction activities.	Pre-construction	Contractor	X	
1.3	Obtain required statutory permits, approvals, and authorizations before proceeding with construction that requires such permits.	All phases	Contractor	X	
1.4	Adhere to the terms and conditions of the: EAC; federal screening report; the EMP; DBSS 165 [Protection of the Environment]; and any other applicable permits, licenses and approvals.	Pre-construction, construction	Contractor	X	
1.5	Establish an Inter-Agency Environmental Review Committee (IAERC), in accordance with the Terms of Reference developed during Application review, to provide for agency review and comment on plans and designs prior to construction, including but not limited to: - Detailed design of stormwater management infrastructure;	Pre-construction, construction	MOTI / Contractor	N/A	

	- Detailed vegetation and wildlife mitigation plans and mitigation monitoring plans; and - Environmental management plans.				
1.6	Provide all project related EMPs, including component EMPs, to applicable regulatory agencies in the IAERC for review and comment, at least 30 calendar days prior to the start of construction that requires such plans.	Pre-construction	Contractor	N/A	
1.7	Relevant sub-plans to be included in the CEMP will include those to address environmental issues identified in the Application and supporting documentation submitted to the EAO during the Application review, and described in the Application (Section 11, pg. 523), including but not limited to: - Agriculture Mitigation Plan; - Air Quality and Dust Control Plan; - Archaeological Mitigation / Monitoring Plan; - Construction and Hazardous Waste Management Plan; - Contaminated Sites Management Plan; - Contractor Awareness and Education Plan; - Environmental Monitoring Plan; - Fisheries Habitat Mitigation and Compensation Plan; - Health and Safety Plan; - Invasive Species Management Plan; - Noise and Vibration Management Plan; - Spill Management and Emergency Response Plan; - Surface Water Quality and Sediment Control Plan; - Wildlife and Habitat Management Plan.	Pre-construction	Contractor	X	
1.8	Manage contamination encountered during project development, regardless of the current assessment of potential contamination, in accordance with applicable regulatory requirements.	All phases	Contractor	X	
1.9	Prepare and implement an Operational Environmental Management Plan, prior to operation and maintenance activities. Provide the operational EMP to relevant reviewing and regulatory agencies, for review and comment, at least 30 calendar days prior to the onset of operation and maintenance activities.	Pre-construction	Contractor	TBD	
1.10	At a minimum, review the Wildlife and Habitat Management Plan and modify if required, three years post- construction and make a decision regarding the next review date and/or determine the closure date for the plan(s). The method for review, modification, and decision on closure of the plan(s) will be defined by the applicable regulatory agencies within the IAERC	Operations	Contractor	N/A	
2.0 Monitoring					
2.1	Ensure that environmental monitoring and reporting for the Project will be conducted, with respect to the terms and conditions of the EAC and other regulatory permits, approvals and authorizations as applicable.	Construction	Contractor	X	
2.2	Incorporate a monitoring component into all applicable sub-plans of the construction EMP developed for the construction phase of the Project.	Pre-construction	Contractor	X	
2.3	Outline in each of the sub-plans of the construction EMP: - Rationale for monitoring; - Parameters to be monitored;	Pre-construction	Contractor	X	

	- Monitoring program details; and - Required follow-up actions.				
2.4	The Owner will engage an Environmental Monitor for the construction phases of the Project to undertake environmental monitoring activities and oversee implementation of each of component plans of the EMP developed for the Project. The Environmental Monitor will monitor, evaluate, and report to the owner on construction activities and the effectiveness of the environmental management strategies and mitigation measures, with respect to the terms and conditions of the Application and other regulatory Permits, Approvals and Authorizations that may apply. The Monitor will be responsible for making onsite decisions and taking on-site action to avoid/respond to potential environmental effects which could include temporary stop work orders if necessary.	Construction	Contractor	X	
2.5	Implement environmental quality management program through monitoring, auditing and reporting activities for the Project with respect to the terms and conditions of the EAC and other regulatory permits, approvals and authorizations.	All phases	Contractor	X	
3.0 Incident Management					
3.1	Respond to environmental incidents, including spill incidents in accordance with the Emergency Response Plan to minimize effects and risks to the general public, on-site workers and the environment.	All phases	Contractor	X	
3.2	Include protocols, consistent with the BC Spill Reporting Regulation, for reporting spills to appropriate emergency response authorities, including; - The Provincial Emergency Program, in the case of any spills of reportable deleterious substances into waters frequented by fish, regardless of the amount of the spill; and - To adjacent property owners and occupiers, including local government, where utilities cross the highway and there is a potential for an incident to extend beyond the Project boundaries.	Pre-construction	Contractor	X	
3.3	Train all field Project personnel regarding implementation of the Construction and Hazardous Waste Management and Spill Management and Emergency Response Plans.	All phases	Contractor	X	
3.4	Incorporate relevant municipal contacts into the emergency contacts for the Construction and Hazardous Waste Management and Spill Management and Emergency Response Plans prepared for construction of the Project.	Pre-construction	Contractor	X	
3.5	Follow applicable DBSS 165 and Canadian Council of Ministers of Environment codes and procedures if temporary fuel storage/fueling facilities are required during construction. Where there is a difference in standards, the most stringent measure for environmental protection will take precedence.	Construction	Contractor	X	
4.0 Community Consultation					
4.1	Consult with local governments, stakeholders and the public during all stages of Project development.	Pre-construction; construction	MoT, Contractor	X	
4.2	Conduct community open houses and information sessions during the design review stage to obtain input on design refinements, during the preliminary and final design review stages.	Pre-construction	MoT, Contractor	N/A	
4.3	Provide regular public information updates on the progress of construction, the schedule, and upcoming milestones.	Construction	MoT, Contractor	X	

4.4	Consult with the Corporation of Delta (CoD) and the City of Surrey (CoS) during all stages of project development and construction.	Pre-construction; construction	Contractor	X	
4.5	Provide updated media information materials, as part of the Project commitment to making project information available to the public.	All phases	Contractor	X	
4.6	Track project enquiries and responses.	All phases	Contractor	X	
4.7	Discuss potential economic opportunities generated by the Project with participating First Nations throughout the Post-EA Certification, Design and Construction Phases of the Project.	Pre-construction; construction	MoT, Contractor	X	
4.8	Obtain input from participating First Nations to identify appropriate measures to mitigate potential project related impacts on their previously identified interests in relation to fisheries and habitat matters.	Pre-construction	Contractor	X	
5.0 Stormwater Management					
5.1	Ensure that the design, construction and maintenance of stormwater management infrastructure for the Project takes an integrated approach to stormwater management and contributes to maintaining, or improving, drainage and water quality conditions directly adjacent to the corridor.	All phases	Contractor	TBD	
5.2	Design, construct and maintain stormwater management infrastructure, such that it to meets the performance objectives outlined in the Stormwater Management Plan Outline (July, 2007) and the Application. Monitoring of the infrastructure will be undertaken to confirm performance objectives are met or, if necessary, additional steps are taken to ensure performance objectives are achieved.	All phases	Contractor	X	
5.3	Consult with municipalities adjacent to the new construction area such that the approach to the management of stormwater and drainage design is complementary to, and can be integrated with, adjacent municipal stormwater infrastructure.	Pre-construction	Contractor	TBD	
5.4	Provide final designs for stormwater management infrastructure to relevant First Nations and reviewing and regulatory agencies for review and comment at least 30 calendar days prior to relevant construction activities in order to verify that the proposed infrastructure achieves agreed upon performance measures identified in the Stormwater Management Plan Outline (July 2007).	Pre-construction	Contractor	TBD	
5.5	Drain stormwater and road runoff away from red and blue listed plant communities and do not construct integrated stormwater management infrastructure in such habitat areas.	Construction; operation	Contractor	TBD	
5.6	Obtain input from participating First Nations regarding mitigation measures outlined in the stormwater and drainage plan and effective integration of those measures into the design and operation of the Project.	Pre-construction	Contractor	TBD	
6.0 Agriculture					
6.1	Consult with the Agricultural Land Commission (ALC), Ministry of Agriculture and Lands (MAL), Delta Farmers' Institute (DFI), individual farm owners and the CoD, through all future stages of Project development, construction and operation, to ensure impacts to agricultural lands and operations are minimized where possible and appropriately addressed where impacts are unavoidable.	All phases	MoT, Contractor	X	
6.2	Obtain ALC approvals regarding areas within the Agricultural Land Reserve (ALR) required for the project, prior to construction.	Pre-construction	MoT, Contractor		X

6.3	Develop and implement an Agricultural Mitigation Plan as outlined in the Application that identifies potential impacts to agriculture as a result of project construction activities and measures for avoiding and addressing such impacts where possible. The scope will include those measures outlined in the Application and the Agricultural Enhancement Strategy (April 2008), including but not limited to mitigation measures focused on: - Road access; - Drainage and irrigation; - Utilities; and - Maintaining the agricultural land base.	Pre-construction	Contractor	X	
6.4	Finalize and implement specific agricultural enhancement initiatives, including but not limited to, compensation mechanisms focused on improving road access and drainage and irrigation, as part of the application process to the ALC and summarily as part of the Agricultural Enhancement Strategy (April 2008).	Pre-construction; construction	MoT	X	
6.5	Retain the services of a Professional Agrologist to: - Liaise with the owner, Design-Builder and farmer(s); - Oversee a consultation and dispute resolution process for individual farmers affected by the Project; and - Oversee monitoring and effectiveness of measures proposed to address impacts to agriculture during design, construction and operation.	All phases	MoT	X	
6.6	Avoid, to the extent possible, using agricultural lands outside of the Right-Of-Way (ROW), for staging areas. For all agricultural lands that are required for use as staging areas, implement construction BMPs (as noted in the Agriculture Mitigation Plan in the EMP) to manage potential construction related effects and restore lands to pre-construction condition, or better agricultural capability, upon completion of project works.	Pre-construction; construction	Contractor	X	
6.7	Consult with individual farm owners, as well as MAL, ALC, CoD, DFI and other stakeholders, to identify potential impacts to agricultural operations and infrastructure and ensure that such impacts are avoided, mitigated for, or appropriately addressed during future stages of design and construction of the Project. The scope of potential impacts to farm operations includes, but is not limited to: - Agricultural drainage; - Utilities; - Road Access; and - Pollinators.	Pre-construction; construction	MoT; contractor	X	
6.8	Undertake reasonable measures to facilitate the consolidation of parcels of isolated agricultural lands, to promote continued agricultural use of such lands.	All phases	MoT	X	
6.9	Undertake reasonable measure to minimize potential loss of ALR lands, including existing farm(s) by: - Refining the Project footprint where feasible; and - Optimizing use of existing ROW.	Pre-construction; construction	Contractor	X	
7.0 Air Quality					
7.1	Ensure that the construction works and operations for the Project are conducted in compliance with environmental permits and approvals and that all reasonable measures are taken to address project-related effects on air quality.	Construction, operation	Contractor	X	

7.2	Develop and implement an Air Quality and Dust Control Plan for the construction phase of the project. The plan will: - Include an air quality monitoring program with thresholds, which if exceeded, will trigger the implementation of additional mitigation and corrective measures; - Commit to the best available, known and effective, measures for mitigating construction related air emissions, including diesel particulate matter (PM), as identified by relevant regulatory agencies. This would include, where practical, the use of diesel oxidation catalysts (DOCs) or diesel particulate filters (DPFs) on all on-road and off-road project equipment in combination with use of a B20 biodiesel blend; - Include an anti-idling policy for construction equipment and other vehicles associated with construction related activities; - Commit to fugitive dust minimization strategies (e.g. wheel wash and sweeping), and dust suppression techniques (e.g. watering) on roads; and - Identify site specific considerations, where applicable, such as proximity to sensitive environmental or human receptors.	Pre-construction; construction	Contractor	X	
7.3	Provide the Air Quality and Dust Control Plan to Metro Vancouver, Environment Canada (EC), Ministry of Environment (MoE), Transport Canada, Health Canada (HC) and other relevant agencies for review and comment at least 30 calendar days prior to relevant construction activities.	Pre-construction	MoT, Contractor	X	
7.4	Avoid burning as a means for disposing of land clearing debris.	Construction	Contractor	X	
8.0 Traffic Management					
8.1	Ensure that the design of the Project is integrated with local road networks, and that construction of the proposed project includes measures for avoiding or minimizing impacts to local road networks.	Pre-construction; construction	MoT, Contractor	X	
8.2	Prepare and implement a Traffic Management Plan in coordination with CoS and CoD to address construction related traffic conditions.	Pre-construction; construction	Contractor	X	
8.3	Consult with the CoD, CoS, MoT district office, and other stakeholders to design and construct project infrastructure so that it is effectively integrated with existing and planned local road networks.	Pre-construction; construction	Contractor	X	
9.0 Noise and Vibration					
9.1	Ensure that potential noise impacts associated with the project are considered and mitigation provided for during design, construction and operation of the project.	All phases	Contractor	X	
9.2	Prepare and implement a Noise and Vibration Management Plan for the construction phase of the Project that will include specific mitigation measures, and locations where they will be applied to address construction related noise.	Pre-construction; construction	Contractor	X	
9.3	Prepare a noise complaint protocol as part of the CEMP Noise and Vibration Management Plan to respond in a timely manner to concerns and complaints raised by residents and take reasonable actions to reduce the Project-related construction noise in question.	Pre-construction	Contractor	X	
9.4	Provide the construction Noise and Vibration Management Plan to the CoS, CoD and other stakeholders for review and comment 30 calendar days prior to the onset of relevant construction activities.	Pre-construction	Contractor	X	

9.5	Design and construct mitigation measures to address potential operational noise impacts on residential areas as part of the project according to the MoT Noise Policy (1993) [referenced as the Noise Policy in this Agreement].	Pre-construction; construction	Contractor	TBD	
9.6	Conduct noise monitoring at the baseline sites during the first year after construction is complete to assess the effectiveness of mitigation measures, with a commitment to further mitigation if necessary, technically feasible and practical.	Operation	Contractor	TBD	
9.7	Consult with the CoD and CoS to look for opportunities to use tree planting and landscaping to mitigate potential visual, noise and air quality impacts.	Pre-construction; construction	Contractor		
9.8	Participate in meetings with affected communities and residents to address site-specific noise issues in the event that late evening or night time construction works prove necessary in the vicinity of residential areas.	Pre-construction; construction	Contractor	TBD	
9.10	Perform pre-condition surveys to document existing state of buildings and facilities in the vicinity of SFPR construction activities as per standard geotechnical BMPs. This will form the baseline conditions, against which post-construction condition surveys will be carried out to assess any vibration impacts to buildings and facilities as a result of Project construction.	Pre-construction	Contractor	X	
9.11	Monitor ground vibrations, as per standard geotechnical BMPs, adjacent to buildings to confirm that vibration levels are within ranges expected to avoid construction-related vibration.	Construction	Contractor	X	
10.0 Contaminated Sites and Property Acquisition					
10.1	Ensure that potential site contamination is investigated, and managed in compliance with the Contaminated Sites Regulation (Environmental Management Act), during all stages of project development including property acquisition, design and construction.	All phases	Contractor	X	
10.2	Assess all Tier 1 and Tier 2 properties required for the ROW for potential contamination prior to construction and take steps, as required, to investigate and address site contamination that may exist.	Pre-construction; construction	MoT; Contractor	X	
10.3	Manage any contaminated groundwater encountered in accordance with the requirements of the Environmental Management Act and associated regulations.	Pre-construction; construction	MoT; Contractor	X	
10.4	Undertake risk assessment and remediation activities, as required, and manage potential contamination in compliance with the provincial Environmental Management Act and Contaminated Sites Regulation.	Pre-construction; construction	MoT; Contractor	X	
10.5	Should contaminated groundwater be identified along the route, include measures to control/mitigate the potential for impacts to surface water in future stormwater design.	All phases	MoT; Contractor	X	
10.6	Notify MoE of potential migration of contaminants from known or identified Tier 1 off-corridor properties of concern discovered during supplementary investigations or Project-related activities and use information to manage and mitigate contaminated sites issues prior to construction.	Pre-construction	Contractor	X	
10.7	As part of the CEMP, the Contaminated Sites Management, Construction and Hazardous Waste Management and Spill Management and Emergency Response Plans, develop and implement a protocol for identifying and managing contaminated and potentially contaminated materials during the construction phase of the Project.	Pre-construction; construction	Contractor	X	
11.0 Fisheries					

11.1	Ensure that all works and activities associated with the construction, operation and maintenance of the project are conducted in compliance with the Fisheries Act. This includes implementing mitigation measures and best management practices to ensure that the project does not cause any unauthorized harmful alteration, disruption or destruction of fish habitat, that the project does not cause any harm or mortality to fish, and that the project does not cause or result in the deposit of a deleterious substance of any type, including sediment, into a watercourse that is frequented by fish.	All phases	Contractor	X	
11.2	Obtain an authorization under subsection 35(2) of the Fisheries Act for any unavoidable harmful alteration, disruption or destruction of fish habitat prior to relevant construction works or activities.	All phases	Contractor	X	
11.3	Develop and construct fish habitat compensation measures that offset all project impacts to fish habitat. These fish habitat compensation measures will be constructed by the proponent as directed by Fisheries and Oceans Canada and in accordance with any s. 35(2) Fisheries Act authorizations.	Pre-construction; construction	Contractor	X	
11.4	Implement appropriate measures to adequately mitigate the effects of the creation of impervious surfaces on volume of surface runoff, rate of runoff, and water quality. These will meet performance targets established in the Stormwater Management Plan Outline (July, 2007) for the project.	Pre-construction; construction; operation	Contractor	TBD	
11.5	Establish and maintain riparian setback areas from drainage channels and watercourses in accordance with regulatory requirements.	Pre-construction; construction; operation	Contractor	X	
11.6	Take all reasonable measures to prevent substances that may be harmful to fish from entering the aquatic environment at the construction sites in the proximity to fish and aquatic habitat, paying particular attention to discharges of suspended sediments, construction waste, handling of uncured concrete and other deleterious substances.	Construction	Contractor	X	
11.7	Construct bridges for watercourse crosses in the vicinity of Delta Ravines (i.e. Norum, McAdam, Collings, Nelson View and Gunderson Creeks), as shown in plans attached to the Application (Technical Volume 1) and over a minimum 450 m portion of the Fraser Heights Wetlands, using the design and the construction methods outlined in the draft Fraser Heights Wetlands Bridge Preliminary Design Report.	Pre-construction; construction	Contractor	N/A	
11.8	Obtain input from the Musqueam Indian Band and other participating First Nations to identify appropriate measures to mitigate potential project related impacts on the identified interests of the Musqueam Band in relation to fisheries and habitat matters. Identify potential opportunities for mutually agreeable opportunities to assist in advancing the fisheries interests of the Musqueam Indian Band or other participating First Nations.	All phases	MoT, contractor	X	
11.9	Review with the applicable regulatory agencies, including but not limited to DFO and MOE, proposals for compensation habitat, including opportunities for habitat to be constructed in advance of other Project construction (i.e. “habitat banking”), to determine the ratio of habitat types and to which drainage compensation will apply.	Pre-construction	Contractor	X	
11.10	Follow BMPs in the construction of all new ditches and stormwater watercourses.	Construction	Contractor	X	

11.11	Retain maintenance responsibility for compensation sites within the Project limits. For sites constructed in areas outside of the Project limits, establish site-specific agreements for access and maintenance with the relevant stakeholder/landowner.	Operations	Contractor		
12.0 Water Quality					
12.1	Ensure that the construction works and operations for the Project are conducted in compliance with environmental requirements and BMPs in order to avoid impacts to water quality.	All phases	Contractor	X	
12.2	Develop and implement a Surface Water Quality and Sediment Control Plan and provide the plan for review and comment by relevant environmental agencies at least 30 calendar days prior to the start of relevant construction activities.	Pre-construction	Contractor	X	
12.3	Sample water from potentially impacted drinking water wells to assess potential adverse effects to water quality associated with during construction and operation phases of the project. Provide sampling water quality data to the local health authority for review and comment.	Construction; operation	Contractor	TBD	
12.4	The Surface Water Quality and Sediment Control Plan will at a minimum: - Identify requirements for additional water quality monitoring prior to and during construction to ensure preventative and mitigation measures can be taken as appropriate, to avoid impacts to water quality; - Identify potential water quality contaminants of concern generated by construction activities and associated preventative and mitigative measures; - Include a BMP maintenance plan to ensure BMPs implemented are functioning as designed and corrective actions are taken when required; and - Be submitted to the applicable regulatory agencies at least 30 calendar days prior to start of construction activities for review.	Pre-construction; construction	Contractor	X	
13.0 Wildlife and Vegetation					
13.1	Ensure that the design, construction, and operation of the project, avoids where practical and technically feasible, impacts to vegetation and wildlife.	All phases	Contractor	X	
13.2	Prepare and implement a Wildlife and Habitat Management Plan to avoid and, where necessary, mitigate potential impacts to vegetation, wildlife and wildlife habitat. Provide the Plan to relevant regulatory and reviewing agencies for review and comment at least 30 calendar days prior to relevant construction activities beginning. The Wildlife and Habitat Management Plan will include best practices including but not limited to those identified in the Application (Table 7.717, draft Wildlife Mitigation Crossing Plan (April 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)], and Zones of Influence memo (July 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)] in order to avoid, and where necessary, mitigate potential effects on vegetation and wildlife. This plan will also identify protocols for the survey and salvage of vegetation and wildlife as appropriate and required.	Pre-construction; construction	Contractor	X	
13.3	Develop and implement mitigation measures to avoid and minimize impacts to wildlife during construction and operation of the project including, but not limited to those measures identified in the Application (September, 2006), draft Wildlife Mitigation Crossing Plan (April 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)] and Zones of Influence Assessment memo (July 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)].	Pre-construction; construction	Contractor	X	

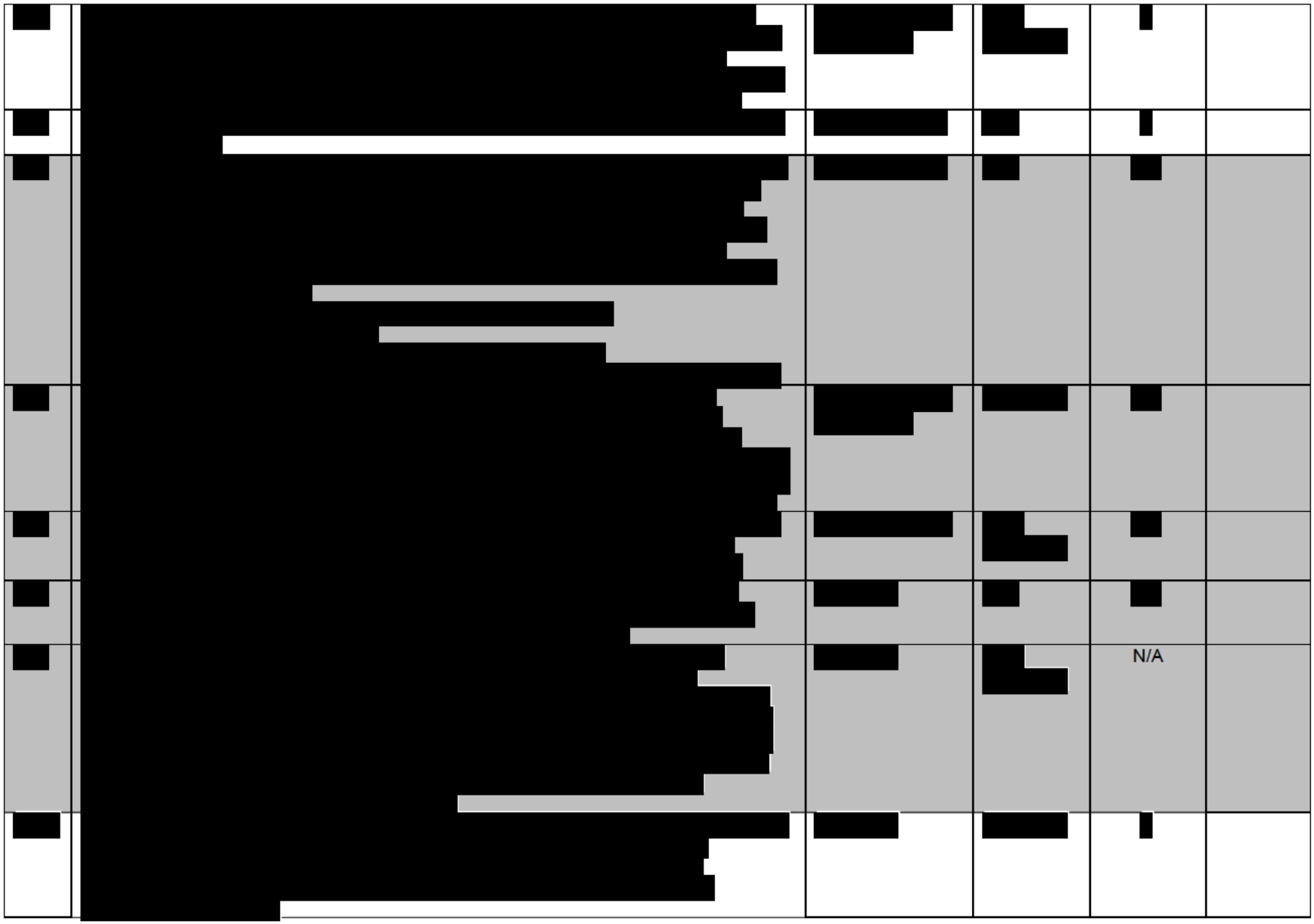
13.4	During the design phase, MoT will finalize its determination of the type and location of sound barriers to be constructed along the perimeter of Burns Bog. For the south-western alignment (adjacent to Crescent Slough), this design will include the construction of a solid sound barrier or a barrier that will provide equivalent mitigation. MoT will ensure on-going consultation with TC, EC, MoE and other IAERC members as appropriate, during design regarding the proposed type and location of sound barriers to be installed around Burns Bog.	Pre-construction	MoT, Contractor	TBD	
13.5	Consult with the MoE and the Canadian Wildlife Service (CWS) of Environment Canada, to identify suitable compensation, including but not limited to that identified in the Wildlife and Habitat Management Plan and Habitat Compensation Plan (February, 2007) [replaced by Habitat Compensation Plan (May 2007)], to address residual effects on vegetation and wildlife as a result of the Project.	Pre-construction	Contractor	X	
13.6	Work with reviewing and regulatory agencies to develop and implement a comprehensive and long term Mitigation Monitoring Plan (MMP) [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan], based on the Vegetation and Wildlife Mitigation Monitoring Strategy (April 2007) [replaced by the SFPR Vegetation and Wildlife Mitigation Monitoring Plan], to monitor the effectiveness of proposed mitigation measures in addressing Project-related effects on vegetation and wildlife, including species at risk. Data collection and monitoring in support of the implementation of the MMP will begin prior to construction and continue for a period of time, to be determined with relevant regulatory agencies, during operation. Information collected in relation to the MMP will be used to guide detailed planning of mitigation, assess the effectiveness of such mitigation, and determine where additional measures may be required. The MMP will include scientifically defensible thresholds or performance measures to facilitate the evaluation of the effectiveness of mitigation.	All phases	Contractor	X	
13.7	Undertake site-specific vegetation surveys in accordance with the regionally supported Protocols for Rare Plants Surveys, to identify the presence and distribution of red- and blue-listed plants species prior to final design and construction. Provide information on the presence and distribution of such plants species to MoE for review and use the information to guide final design and construction to avoid or mitigate impacts to these species.	Pre-construction	Contractor	X	
13.8	Avoid direct impacts to sensitive red and blue listed plant communities where possible and adhere to construction exclusion windows determined by regulators.	Construction	Contractor	X	
13.9	Develop a plan for salvaging plants and seeds, for review by MoE, where impacts to red and blue listed plant species cannot be avoided, for replanting off-alignment.	Pre-construction	Contractor		
13.10	Make all reasonable efforts to avoid impacts to confirmed streambank lupine habitat and confirmed stream bank lupine seed banks in the project corridor, as identified in consultation with the Streambank lupine recovery team, during design construction and operation of the Project. Where impacts to such areas cannot be avoided, work with the Ministry of Environment and the Streambank Lupine Recovery team to identify and carry out appropriate mitigation measures including, but not limited to, the stockpiling of soil containing streambank lupine seeds.	Construction	Contractor	X	

13.11	Undertake pre-construction bird nest surveys and restrict clearing during the breeding season. Pre- construction bird nest surveys will include, but not necessarily be limited to the following: - Conduct pre-construction raptor, heron or any listed species nest and roost tree surveys, consistent with applicable BMPs, to determine presence of active/inactive raptor and heron nests in the corridor and work scheduling with respect to the nest locations and applicable timing restrictions; - Prepare pre-construction bird nest survey protocols should works include clearing of vegetation during the general bird breeding time period as determined by MOE; - Conduct pre-construction bird nest surveys to the satisfaction of the MOE should the Design-Builder intend to seek approval from the MOE for vegetation clearing within the bird breeding time period (defined by MOE) in any year during the Term.	Pre-construction	Contractor	X	
13.12	Consult with MoE on the development and implementation of an Invasive Species Management Plan to address potential effects of the project related to the spread of invasive plant and aquatic wildlife species within the project corridor.	Pre-construction; construction	Contractor	X	
13.13	Include large mammal crossings adjacent to the perimeter of Burns Bog. The final number and location of wildlife crossings will be identified in the Wildlife Mitigation Crossing Plan [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)] which will be finalized in consultation with MoE and EC.	Pre-construction	Contractor	X	
13.14	Follow the design criteria outlined in the MOT Manual of Aesthetic Design Practice and the MOT Landscape Policy and Design Standards that form the landscape and site restoration design criteria for the Project.	Pre-construction; construction	Contractor	X	
13.15	Use data collected through the MOT administered Wildlife Accident Reporting System to identify areas of increased wildlife collisions and to monitor direct effects on wildlife.	Operations	Contractor	TBD	
13.16	Identify the location of sensitive wildlife habitats, including but not limited to habitat for species at risk, red and blue listed plant communities and high biodiversity habitats, on detailed design drawings in order to avoid or minimize potential effects to these areas.	Pre-construction	Contractor	X	
14.0 Species at Risk					
14.1	Ensure that all reasonable measures are taken to avoid or lessen effects of the Project on listed wildlife species and their critical habitat and that potential effects that could occur are monitored. All mitigation and monitoring measures will be undertaken in a manner that is consistent with applicable recovery strategy and actions plans.	Pre-construction; construction	MoT, contractor	X	
14.2	Undertake a salvage program for Pacific water shrew from, at a minimum, high and moderate-rated habitat adjacent to the SFPR. Other areas potentially requiring salvage will include lower-rated habitat, connected to higher-rated habitat, and will be determined in consultation with MoE and the PWS Recovery Team.	Pre-construction; construction	Contractor	X	
14.3	Consult with MoE regarding the mitigation of potential effects on Pacific water shrew, and take all practical steps to apply the most recent Pacific water shrew best management practices to address potential effects, including identifying additional opportunities to avoid direct effects to areas, designated as critical habitat by the PWS Recovery Team, during design, construction and operation.	Pre-construction; construction	Contractor	TBD	

14.4	Consult with MOE to develop a mitigation and compensation strategy for Pacific water shrew, where opportunities are available, based on habitat quality and connectivity to surrounding habitat. Undertake sampling program, where required, to determine the presence and distribution of Pacific water shrew to support detailed design of mitigation.	Pre-construction; construction	MoT, Contractor	TBD	
14.5	Detailed design of wildlife crossing mitigation for southern red-backed vole (RBV) will be conducted assuming the presence of RBV in high and moderate rated habitat identified in the EA. Monitoring of the use of wildlife crossing structures will include provisions for assessing the use of such structures by RBV.	Pre-construction	Contractor	TBD	
14.6	Undertake a review of local museum specimens to confirm the distribution of *Sorex rowheri* within the Lower Fraser Valley. Where possible, use findings to support detailed design of mitigation.	Pre-construction	Contractor	TBD	
14.7	Use information obtained through the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)] to support detailed planning of mitigation to address potential noise, visual and collision effects of the project on barn owl. Undertake long term monitoring of the effectiveness of such mitigation as part of the implementation of the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)].	All phases	Contractor	TBD	
14.8	Use information obtained through the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)] to support detailed planning of mitigation, including pre-construction salvage where appropriate, to address potential effects of the project, including those related to collision and changes in hydrology, on red-legged frog and western toad. Undertake long term monitoring of the effectiveness of such mitigation as part of the implementation of the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)].	All phases	Contractor	X	
14.9	Consult with MOE to plan and undertake at least one preconstruction, one construction and two operational inventories of at-risk aquatic insects in habitat known to or suspected of supporting such species and potentially affected by the project, including but not necessarily limited to the Fraser Heights Wetland, to confirm the findings of the environmental assessment and to monitor potential impacts of the project on aquatic insects.	All phases	Contractor	X	
14.10	Consult with the Canadian Wildlife Service to develop and implement a Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan] to monitor and assess the effectiveness of measures proposed to avoid or mitigate potential effects on Sandhill Crane. The Plan will identify: - species habitat requirements; - existing conditions in the project area; - potential project related effects and mitigation; - core indicators for assessing the effectiveness of mitigation; and - proposed study methodology and data interpretation and reporting protocols.	Pre-construction; construction	MoT	TBD	
15.0 Burns Bog					
15.1	Avoid potentially significant impacts to hydrological and ecological values associated with Burns Bog (i.e. alignment refinements to avoid ecological and hydrological values, development of hydrological mitigation that meet the hydrologic objectives identified).	All phases	MoT, Contractor	X	

15.2	Consult with the MV, CoD, MoE, EC, and the Burns Bog Management Planning Committee (BBMPC) and Scientific Advisory Panel (SAP) to ensure design, construction and operation of the Project complements long term management objectives established for the Burns Bog Ecological Conservation Area.	All phases	Contractor	TBD	
15.3	Consult with the reviewing agencies to finalize construction and post construction monitoring requirements related to Burns Bog including, but not limited to, those identified in the Vegetation and Wildlife Mitigation Monitoring Strategy (April 2007) [replaced by the SFPR Vegetation and Wildlife Mitigation Monitoring Plan]. Monitoring requirements with respect to Burns Bog will include but not be limited to those relating to: air quality, water quality, water levels, red-listed plant communities, and wildlife	Construction, operation	Contractor	X	
15.4	Share environmental data from Burns Bog collected as part of the development of the SFPR project, with agencies responsible for the management of the Burns Bog Ecological Conservancy Area in order to support the implementation of the long term management plan for the Bog.	All phases	Contractor	TBD	
15.5	Design, construct and operate hydrology mitigation infrastructure, to mitigate potential effects of the project on the hydrology of Burns Bog, in a way that meets the following performance objectives: - Site specific solutions – the design, construction and operation of hydrology mitigation will be based on, and take into account, site specific conditions. - Compatibility between highway water management and bog water management – Providing for active water level controls in the Bog that are independent of SFPR-related water management. - Prevention of mineral migration into the Bog. – Where indicated, providing a low permeability barrier between the SFPR highway ditch and the lagg ponds/ditches by: using material to construct the berm that supports appropriate vegetation on the berm and prevents the introduction of mineral material into the Bog; and maintaining hydraulic gradients so that Type 1 bog waters flow toward the highway at all times. - Resilience – Providing a design that is sufficiently robust to maintain and actively manage water levels under average and extreme conditions and if Bog conditions change. - Highway and mitigation construction does not preclude future restoration of Burns Bog – Providing flexibility of design that allows, for example, for future water control structures that allow for raising of water level as part of future bog restoration. - Holistic design – Hydrology mitigation concepts are designed in way that ensure they will be compatible with, and help achieve multiple, mitigation requirements. As the design of hydrology mitigation is advanced, it will be documented in a Hydrology Work Plan [currently known as Hydrology Workplan (Burns Bog)]. This document will be finalized prior to commencement of pre-load activities around Burns Bog.	All phases	MoT	TBD	
15.6	Pre-load activities around Burns Bog, including areas north of the Highway 99 interchange and west of Nordel Way, will not commence until TC (and other decision-making authorities as required) has reviewed and is satisfied with the final Hydrology Work Plan and the status of the hydrology mitigation design.	Pre-construction	MoT	TBD	

15.7	Provide opportunities for the active involvement of agencies responsible for the management of the Burns Bog Ecological Conservancy Area, and the Scientific Advisory Panel (SAP), in the design, construction and operation of project related works adjacent to Burns Bog including but not limited to those proposed as mitigation for potential project related effects.	All phases	MoT, contractor	TBD	
15.8	Consult with MV, CoD, EC and MoE on the development of a water balance model and a drainage model to support the design, construction and operation of hydrology mitigation infrastructure adjacent to Burns Bog and support implementation of the Burns Bog Ecological Conservancy Area Management Plan.	Pre-construction	Contractor	TBD	
15.9	Finalize an Air Quality Management Plan [currently known as SFPR Air Quality Management Plan (Burns Bog Segment)], in consultation with TC, EC and other IAERC members as appropriate, prior to commencing pre-loading activities around Burns Bog. This document will identify all technically and economically feasible mitigation measures to be implemented to prevent generation and transmission of dust during the pre-load and construction phases of the project.	Pre-construction	MoT, contractor		X
15.10	Collect a minimum of 4 months of baseline dust fall monitoring between June and September 2008. Following the collection of this information, the MoT will meet with TC and EC to discuss the baseline monitoring information collected and the approach for continued data collection, prior to the commencement of pre- loading activities around Burns Bog (i.e., north of the Highway 99 interchange and west of Nordel Way).	Pre-construction	MoT		X
15.11	Work co-operatively with the Tsawwassen First Nation to maintain appropriate access for TFN members to Burns Bog to facilitate TFN's harvesting rights pursuant to the Tsawwassen Final Agreement.	All phases	MoT, Contractor	TBD	
15.12	Ensure that the development and operation of Stormwater management infrastructure does not compromise the ability to achieve hydrology mitigation objectives adjacent to Burns Bog.	All phases	MoT, Contractor	TBD	
15.13	Implement the monitoring and follow-up activities identified in the Screening document, for a period of five years after the project has commenced operation, to ensure the effectiveness of mitigation measures related to aerial deposition, hydrology, and Sandhill crane in the vicinity of Burns Bog.	All phases	MoT, Contractor	TBD	
[redacted]					
[redacted]					


N/A

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
[redacted]	[redacted]			[redacted]	
17.0 Heritage					
17.1	Ensure that the design, construction and operation of the proposed project is advanced in a way that avoids, or minimizes potential impacts to heritage buildings	All phases	MoT, contractor	X	
17.2	Consult with the Delta Heritage Advisory Commission and the Surrey Heritage Committee to define heritage interests and work with the Delta Museum and Archive to develop a photo record and inventory of potentially affected heritage houses.	Pre-construction, construction	Contractor	N/A	
17.3	Prior to construction, undertake pre-condition surveys with respect to heritage buildings, as further described in commitment 9.9.	Pre-construction	Contractor	N/A	
17.4	Avoid, where practical and technically feasible, direct impacts to heritage buildings.	All phases	Contractor	NA/	
18.0 Navigable Waters					
18.1	Obtain regulatory approval related to crossings of designated Navigable Waters pursuant to the Navigable Waters Protection Act (NWPA), including but not necessarily limited to, McAdam Creek, Collings Creek, Manson Canal, and Crescent Slough, prior to commencement of works.	Pre-construction, construction	MoT, Contractor	N/A	
19.0 Socio-economic					
19.1	Mitigate potential Project-related visual/lighting impacts through use of screening, fencing and landscaping in consultation with local government. Use dark-sky compliant lighting for the Project.	Pre-construction, construction	Contractor	TBD	
19.2	Manage potential impacts to emergency response services by: - Ensuring emergency response plans (including a Spill Response Management and Emergency Response Plan) are in place during the construction phase of the Project, and updated annually, at a minimum; - Consulting first responders in Traffic Management Plan development; and - Consulting with local fire departments to ensure adequate access.	Pre-construction, construction	Contractor	X	
20.0 Rail					
20.1	Avoid or minimize potential impacts from Project works and activities to rail corridors.	All phases	Contractor	X	
20.2	Notify Transport Canada of project works as required under the *Notice of Railway Works Regulations*. Notify the public and affected stakeholders in accordance with the *Railway Safety Act*.	All phases	Contractor	TBD	
20.3	Comply with Canadian transportation standards and regulations as well as the design specifications of the respective railway with regard to vertical and horizontal railroad clearance of new or upgraded infrastructure.	Pre-construction	Contractor	TBD	
20.4	Minimize railroad closures during construction.	Construction	Contractor	X	

APPENDIX 7: WATER QUALITY DATA

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
WQ-12	Fortis Culvert DS	02/11/2020	01:00	9.6	4.38	0.35	4.75	0.17	3.0	Sampling done during night shift
WQ-12	Fortis Culvert DS	02/11/2020	03:00	8.4	4.25	0.45	4.80	0.25	5.2	Sampling done during night shift
WQ-2	Silda DitchMS	02/11/2020	13:15	11.6	4.98	0.22	7.20	0.16	7.9	
WQ-3	Silda DitchDS	02/11/2020	13:20	11.7	6.77	0.16	6.91	0.09	12.1	
WQ-4	Fraser RrInlet	02/11/2020	13:00	11.4	8.37	0.26	7.84	0.13	92.8	High tide, coming in
WQ-11	Fortis Culvert US	02/11/2020	13:30	12.4	4.06	0.10	5.08	0.06	3.0	No instream works today
WQ-12	Fortis Culvert DS	02/11/2020	13:35	12.1	5.98	0.11	4.71	0.05	3.5	No instream works today.
WQ-11	Fortis Culvert US	03/11/2020	01:30	11.4	4.53	0.80	4.95	0.07	3.8	Nightshift- dewatering and Instream works
WQ-12	Fortis Culvert DS	03/11/2020	01:00	11.5	4.09	0.73	4.85	0.11	5.9	Nightshift- dewatering and instream works
WQ-2	Silda DitchMS	03/11/2020	11:00	10.7	7.00	0.31	6.69	0.15	36.2	Heavy rain while sampling
WQ-12	Fortis Culvert DS	02/11/2020	01:00	9.6	4.38	0.35	4.75	0.17	3.0	Sampling done during night shift
WQ-3	Silda DitchDS	03/11/2020	10:50	10.6	6.99	0.32	6.67	0.16	64.5	Heavy rain while sampling. Sand washouts noticed ~6 m US. Observed turbidity passing through straw waddle into stream from washout direction. Dispatched crew to re- build washout, remove sediment in runoff path, and install ESC measures.
WQ-4	Fraser RrInlet	03/11/2020	10:00	10.6	8.77	0.16	8.00	0.08	95.5	High tide, going out. Heavy rain while sampling.
WQ-11	Fortis Culvert US	03/11/2020	10:30	9.6	5.60	0.10	5.32	0.05	8.5	Heavy rain while sampling. No instream works.
WQ-12	Fortis Culvert DS	03/11/2020	10:30	9.1	8.21	0.10	5.29	0.05	3.4	Heavy rain while sampling. No instream works.
WQ-2	Silda DitchMS	04/11/2020	13:05	10.9	4.23	0.28	6.73	0.12	19.8	Heavy rain during sampling and Fraser River high tide moving out had an impact on the turbidity as water levels were higher than normal.
WQ-3	Silda DitchDS	04/11/2020	13:00	11.1	6.17	0.22	6.82	0.16	25.6	Heavy rain during sampling and Fraser River high tide moving out had an impact on the turbidity as water levels were higher than normal.
WQ-4	Fraser RrInlet	04/11/2020	10:30	11.5	7.85	0.14	7.95	0.07	70.6	High tide, going out. Heavy rain while sampling.
WQ-11	Fortis Culvert US	04/11/2020	11:15	11.2	5.76	0.11	5.22	0.06	4.8	No instreamworks.
WQ-12	Fortis Culvert DS	04/11/2020	11:15	11.0	7.22	0.10	5.06	0.05	2.6	No instreamworks.
WQ-2	Silda DitchMS	05/11/2020	11:25	9.6	4.97	0.13	6.79	0.08	5.9	
WQ-3	Silda DitchDS	05/11/2020	11:30	9.5	5.21	0.13	6.92	0.08	7.1	Spillway installed at previous washouts onnightshift prior to sampling
WQ-4	Fraser RrInlet	05/11/2020	10:30	9.2	8.49	0.04	7.59	0.04	70.6	High tide
WQ-11	Fortis Culvert US	05/11/2020	10:50	9.2	5.09	0.10	5.46	0.05	2.9	No instreamworks.
WQ-12	Fortis Culvert DS	05/11/2020	10:45	9.4	4.07	0.10	4.83	0.05	3.2	No instreamworks.
WQ-2	Silda DitchMS	06/11/2020	10:00	9.4	4.77	0.14	6.65	0.07	6.4	
WQ-3	Silda DitchDS	06/11/2020	10:05	9.2	5.96	0.16	6.68	0.08	6.8	
WQ-4	Fraser RrInlet	06/11/2020	10:20	9.2	8.49	0.04	7.59	0.04	1.8	High tide
WQ-11	Fortis Culvert US	06/11/2020	10:55	9.2	4.87	0.10	5.50	0.05	2.5	No instreamworks
WQ-12	Fortis Culvert DS	06/11/2020	11:00	9.5	3.59	0.09	4.65	0.04	1.4	No instreamworks
WQ-2	Silda DitchMS	08/11/2020	13:00	7.1	5.87	0.13	6.59	0.06	5.9	-
WQ-3	Silda DitchDS	08/11/2020	13:05	7.6	4.69	0.15	6.98	0.08	11.6	-
WQ-4	Fraser RrInlet	08/11/2020	12:00	8.9	9.12	0.06	7.94	0.05	92.4	High tide
WQ-11	Fortis Culvert US	08/11/2020	12:10	7.4	4.11	0.10	5.23	0.06	3.7	-
WQ-12	Fortis Culvert DS	08/11/2020	12:15	7.5	3.90	0.10	4.99	0.05	3.6	Sampling location in grass along bank
WQ-2	Silda DitchMS	09/11/2020	12:00	7.4	6.06	0.33	6.58	0.16	8.9	-
WQ-3	Silda DitchDS	09/11/2020	11:55	7.4	9.06	0.34	6.54	0.17	13.4	-

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
WQ-4	Fraser RrInlet	09/11/2020	10:45	8.7	9.54	0.14	7.23	0.07	80.2	Mid-tide, coming in
WQ-11	Fortis Culvert US	09/11/2020	11:15	7.4	5.59	0.10	5.20	0.05	4.1	-
WQ-12	Fortis Culvert DS	09/11/2020	11:10	6.7	5.22	0.09	4.71	0.05	1.8	Sampling location in grass along bank
WQ-2	Silda DitchMS	12/11/2020	12:25	6.9	6.57	0.29	6.42	0.16	12.4	Raining whilesampling
WQ-3	Silda DitchDS	12/11/2020	12:30	7.0	8.73	0.32	6.71	0.16	20.1	Raining whilesampling
WQ-4	Fraser RrInlet	12/11/2020	8:00	7.9	9.66	0.15	7.86	0.06	81.7	Low tide, coming in
WQ-2	Silda DitchMS	13/11/2020	14:55	9.1	7.77	0.16	6.46	0.08	12.2	Ditch runninghigh ~50mm of rain in 24 hr
WQ-3	Silda DitchDS	13/11/2020	15:00	10.3	6.73	0.15	6.41	0.07	14.3	Ditch runninghigh ~50mm of rain in 24 hr
WQ-4	Fraser RrInlet	13/11/2020	13:40	7.7	9.05	0.15	7.18	0.07	47.0	High tide,coming in
WQ-2	Silda DitchMS	16/11/2020	14:25	8.1	7.83	0.07	5.52	0.04	4.3	Ditch runninghigh, raining
WQ-3	Silda DitchDS	16/11/2020	14:30	8.7	6.73	0.08	5.66	0.04	5.2	Ditch runninghigh, raining
WQ-4	Fraser RrInlet	16/11/2020	13:30	8.9	9.14	0.19	7.04	0.10	27.3*	High-tide, coming in,raining
WQ-2	Silda DitchMS	17/11/2020	12:30	7.9	7.13	0.19	5.67	0.09	4.0	Ditch runninghigh, raining
WQ-3	Silda DitchDS	17/11/2020	12:25	8.2	5.84	0.18	5.92	0.09	5.8	Ditch runninghigh, raining
WQ-4	Fraser RrInlet	17/11/2020	12:15	8.4	8.99	0.24	7.26	0.12	43.8*	High-tide, coming in,raining
WQ-2	Silda DitchMS	18/11/2020	15:35	9.2	6.24	0.11	5.99	0.05	9.7	Ditch runninghigh, raining
WQ-3	Silda DitchDS	18/11/2020	15:30	9.5	6.39	0.12	6.23	0.06	14.2	Ditch runninghigh, raining
WQ-4	Fraser RrInlet	18/11/2020	14:00	8.1	8.16	0.15	6.91	0.07	23.3*	High tide, coming in,raining
WQ-2	Silda DitchMS	19/11/2020	14:40	9.0	6.03	0.11	5.95	0.06	9.2	-
WQ-3	Silda DitchDS	19/11/2020	14:35	9.6	4.51	0.12	6.17	0.06	6.9	-
WQ-4	Fraser RrInlet	19/11/2020	14:00	8.9	8.49	0.12	6.76	0.06	17.5*	High tidegoing out
WQ-2	Silda DitchMS	20/11/2020	11:45	8.6	6.27	0.11	6.01	0.06	9.7	-
WQ-3	Silda DitchDS	20/11/2020	11:50	8.4	5.12	0.11	6.12	0.05	8.7	-
WQ-4	Fraser RrInlet	20/11/2020	11:00	8.8	9.01	0.13	7.06	0.06	30.1*	Mid-tide, coming in
WQ-2	Silda DitchMS	23/11/2020	16:00	8.2	7.16	0.25	6.35	0.12	12.1	
WQ-3	Silda DitchDS	23/11/2020	16:05	8.7	5.38	0.24	6.28	0.12	8.3	
WQ-4	Fraser Rr Inlet	23/11/2020	12:30	8.4	4.03	0.13	7.05	0.07	20.4	High tide
WQ-3	West Ditch (Area I3)	23/11/2020	15:50	10.2	4.53	0.12	6.14	0.06	6.7	
WQ-2	Silda DitchMS	24/11/2020	13:20	8.9	3.95	0.24	6.33	0.12	11.0	
WQ-3	Silda DitchDS	24/11/2020	13:15	9.4	4.25	0.22	6.58	0.11	10.0	
WQ-4	Fraser RrInlet	24/11/2020	11:50	8.7	6.33	0.14	7.17	0.07	13.8	High tide coming in
WQ-2	Silda DitchMS	25/11/2020	9:00	8.7	4.12	0.24	6.29	0.13	7.6	
WQ-3	Silda DitchDS	25/11/2020	9:05	9.1	5.06	0.23	6.48	0.12	8.2	
WQ-4	Fraser RrInlet	25/11/2020	8:30	8.6	8.97	0.14	7.03	0.07	14.9	Mid-tide, coming in
WQ-2	Silda DitchMS	26/11/2020	14:40	10.1	9.24	0.23	6.13	0.11	8.3	Raining whilesampling
WQ-3	Silda DitchDS	26/11/2020	14:35	11.1	4.69	0.23	6.29	0.11	7.3	Raining whilesampling
WQ-4	Fraser River Inlet	26/11/2020	13:45	10.9	8.35	0.13	6.93	0.07	11.2	High tide coming in. Raining whilesampling.
WQ-2	Silda DitchMS	27/11/2020	7:45	8.8	4.59	0.24	6.24	0.12	7.6	
WQ-3	Silda DitchDS	27/11/2020	7:50	9.0	5.19	0.23	6.51	0.12	8.4	
WQ-4	Fraser RrInlet	27/11/2020	8:00	8.6	9.06	0.14	7.09	0.07	19.7	Mid-tide going out
WQ-2	Silda DitchMS	01/12/2020	9:45	8.8	4.59	0.24	6.24	0.12	7.6	
WQ-3	Silda DitchDS	01/12/2020	9:50	9.0	5.19	0.23	6.51	0.12	8.4	
WQ-4	Fraser RrInlet	01/12/2020	9:00	8.6	9.06	0.14	7.09	0.07	19.7	High tide coming in
WQ-2	Silda DitchMS	03/12/2020	11:15	8.6	4.61	0.23	6.16	0.12	7.1	
WQ-3	Silda Ditch DS	03/12/2020	11:20	8.5	5.94	0.24	6.43	0.12	7.9	
WQ-4	Fraser RrInlet	03/12/2020	10:45	8.7	8.77	0.13	7.39	0.07	22.5	Mid tide going out
WQ-2	Silda DitchMS	08/12/2020	14:40	10.1	9.24	0.23	6.13	0.11	8.3	-
WQ-3	Silda DitchDS	08/12/2020	14:35	11.1	4.69	0.23	6.29	0.11	7.3	-
WQ-4	Fraser RrInlet	08/12/2020	13:45	10.9	8.35	0.13	6.93	0.07	11.2	Mid tide going out
WQ-2	Silda DitchMS	10/12/2020	12:30	10.4	8.71	0.24	6.19	0.12	9.1	-
WQ-3	Silda DitchDS	10/12/2020	12:35	11.3	5.43	0.23	6.33	0.11	6.9	-
WQ-4	Fraser RrInlet	10/12/2020	13:15	11.2	9.12	0.14	6.98	0.07	13.9	High tide
WQ-2	Silda DitchMS	15/12/2020	15:10	9.4	6.69	0.30	6.41	0.15	10.9	
WQ-3	Silda DitchDS	15/12/2020	15:15	11.1	4.84	0.31	6.35	0.16	22.2*	Likely due to rain/wind with potentialto disturb sediment & turbid river athigh tide mixing at Siteinterface. No work occurring between mid-& DS locations.
WQ-4	Fraser RrInlet	15/12/2020	15:30	8.1	5.67	0.17	7.30	0.08	37.1*	High tide
WQ-2	Silda DitchMS	17/12/2020	13:45	10.2	7.12	0.20	6.34	0.10	11.1	
WQ-3	Silda DitchDS	17/12/2020	13:40	11.0	7.01	0.19	6.37	0.09	10.40	
WQ-4	Fraser RrInlet	17/12/2020	14:00	7.3	13.81	0.13	7.25	0.06	47.4*	Mid tide, inflow
WQ-2	Silda DitchMS	22/12/2020	12:40	6.9	12.28	0.15	6.31	0.08	3.8	
WQ-3	Silda Ditch	22/12/2020	12:35	7.2	6.92	0.26	6.44	0.13	7.77	

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
	DS									
WQ-4	Fraser RrInlet	22/12/2020	12:10	7.3	8.34	0.13	6.50	0.06	11.2	High tide
2	Silda ditch MS	05/01/2021	10:45	7.0	9.63	0.12	6.77	0.06	8.7	
3	Silda ditch DS	05/01/2021	10:30	7.5	7.70	0.16	6.64	0.08	10.30	
4	Fraser River	05/01/2021	10:20	7.6	7.82	0.36	7.01	0.18	**37.4**	Mid tide coming in
-	S4 pump intake	06/01/2021	7:30	8.29	-	-	-	-	-	-
-	S4 pump discharge after passing through channel	06/01/2021	7:35		10.6	-	-	-	-	-
-	Cougar Creek US Of effluent	06/01/2021	8:30		2.36	-	-	-	-	-
-	Cougar Creek DS of effluent	06/01/2021	9:00		3.60	-	-	-	-	-
2	Silda ditch MS	07/01/2021	13:35	7.2	4.99	0.14	6.93	0.07	**42.2**	High tide
3	Silda ditch DS	07/01/2021	13:30	7.9	5.82	0.18	6.71	0.09	7.94	
4	Fraser River	07/01/2021	13:00	7.6	8.71	0.34	6.86	0.17	9.21	High tide
2	Silda ditch MS	2021/01/12	9:00	7.2	3.67	0.12	6.58	0.06	10.4	
3	Silda ditch DS	2021/01/12	9:05	7.8	4.83	0.16	6.79	0.08	7.94	
4	Fraser River	2021/01/12	8:30	7.6	7.21	0.32	7.08	0.16	36.3	Mid tide going out
13	Cougar Creek US	2021/01/13	13:30	-	-	-	-	-	3.64	No pumpingfrom S4 for past 48 hours
14	Cougar Creek DS	2021/01/13	13:40	-	-	-	-	-	2.04	no pumpingfrom S4 for past 48hours
N/A	96 Street US	17-JAN-21	20:00	9.2	6.25	0.19	6.23	0.25	2.8	Dewateringactivities
N/A	96th Street DS	17-JAN-21	20:15	9.5	6.20	0.10	6.67	0.36	3.0	Dewateringactivities
2	Silda DitchMS	18-JAN-21	10:00	6.4	6.67	0.37	6.50	0.18	8.36	-
3	Silda DitchDS	18-JAN-21	10:00	6.6	8.22	0.18	6.74	0.09	13.10	-
4	Fraser River	18-JAN-21	10:30	5.4	11.03	0.13	7.19	0.06	9.58	Mid-tide going out
5	96 Street US	18-JAN-21	11:15	6.4	7.12	0.03	4.51	0.02	1.30	No dewateringactivities
6	96th Street DS	18-JAN-21	11:00	6.4	12.42	0.05	5.24	0.02	1.54	No dewateringactivities
13	Cougar Creek US	18-JAN-21	10:15	6.8	9.64	0.20	6.98	0.10	1.34	No dewateringactivities
14	Cougar Creek DS	18-JAN-21	10:20	6.9	9.24	0.21	7.02	0.11	2.24	No dewateringactivities
TEMP	A	18-JAN-21	11:30	6.4	8.39	0.02	4.29	0.01	0.77	-
TEMP	B	18-JAN-21	11:20	6.8	4.85	0.21	5.57	0.10	6.02	-
TEMP	C	18-JAN-21	11:50	7.0	6.40	0.11	5.64	0.06	2.14	-
TEMP	D	18-JAN-21	11:55	6.7	9.27	0.10	5.72	0.05	5.66	-
TEMP	E	18-JAN-21	12:00	7.3	10.60	0.10	5.52	0.05	2.29	-
TEMP	F	18-JAN-21	12:30	7.6	3.36	0.14	5.72	0.07	3.38	-
TEMP	G	18-JAN-21	12:40	7.1	5.97	0.37	5.75	0.18	9.89	-
TEMP	H	18-JAN-21	13:00	9.2	6.36	0.19	5.81	0.09	7.83	-
TEMP	I	18-JAN-21	12:55	8.2	8.28	0.08	5.37	0.04	1.14	-
TEMP	J	18-JAN-21	13:30	8.0	6.43	0.06	5.34	0.03	1.14	-
TEMP	K	18-JAN-21	13:20	7.4	5.24	0.11	5.69	0.05	4.20	-
TEMP	L	18-JAN-21	13:40	7.9	3.72	0.04	3.94	0.02	1.74	-
TEMP	M	18-JAN-21	13:35	9.6	4.80	0.20	5.64	0.10	1.90	-
TEMP	N	18-JAN-21	14:00	8.5	5.63	0.09	5.31	0.05	1.02	-
N/A	96 Street US	18-JAN-21	23:30	4.8	6.66	0.85	6.63	0.15	3.6	Dewatering activities
N/A	96th Street DS	18-JAN-21	23:45	4.2	5.59	0.59	6.69	0.16	4.3	Dewatering activities
N/A	96 Street US	19-JAN-21	23:45	5.1	6.00	0.23	6.60	0.45	4.6	Dewateringactivities
N/A	96th Street DS	19-JAN-21	23:15	5.3	5.23	0.22	6.45	0.46	7.3	Dewateringactivities
N/A	Fraser River Inlet	20-JAN-21	10:20	6.9	5.29	0.13	6.91	0.06	8.78	-
N/A	Cougar Creek DS	20-JAN-21	10:20	8.8	6.93	0.22	6.64	0.11	1.38	No dewateringactivities
N/A	Cougar Creek US	20-JAN-21	10:15	9.4	6.62	0.22	6.43	0.11	1.67	No dewateringactivities
N/A	96th Street DS	20-JAN-21	13:30	7.3	0.48	0.04	5.50	0.02	0.96	-
N/A	96 Street US	20-JAN-21	13:45	7.4	0.24	0.04	5.12	0.02	0.93	-
N/A	Silda DitchMS	20-JAN-21	12:35	9.0	2.70	0.42	6.31	0.21	7.87	-
N/A	Silda Ditch DS	20-JAN-21	12:40	7.6	2.95	0.26	6.50	0.13	9.26	-
N/A	96 Street US	21-JAN-21	00:30	5.9	7.01	0.75	6.03	0.35	1.8	Dewateringactivities
N/A	96 StreetDS	21-JAN-21	00:55	4.7	6.25	0.34	6.17	0.46	1.3	Dewateringactivities
N/A	96 Street US	21-JAN-21	21:30	3.8	3.45	0.95	5.67	0.32	1.90	Dewateringactivities

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
N/A	96 Street DS	21-JAN-21	22:00	3.6	4.05	0.72	0.04	0.35	1.25	Dewateringactivities
NA	96 StreetUS	24-Jan-21	23:30	2.3	3.00	0.23	6.33	0.75	1.8	Dewateringactivities
NA	96 StreetDS	24-Jan-21	23:55	2.5	2.45	0.19	6.37	0.86	2.3	Dewateringactivities
NA	Silda DitchDS	25-Jan-21	11:05	6.8	6.01	0.51	6.39	0.26	9.27	
NA	Silda DitchMS	25-Jan-21	11:00	6.8	8.21	0.52	6.45	0.26	9.75	
NA	Fraser River Inlet	25-Jan-21	11:40	6.1	13.93	1.17	6.87	0.59	4.98	Mid-tide going out
NA	96 StreetDS	25-Jan-21	12:00	5.5	9.21	0.06	5.65	0.03	0.78	
NA	96 StreetUS	25-Jan-21	12:15	5.0	5.91	0.05	5.11	0.03	0.99	
NA	Cougar CkDS	25-Jan-21	10:35	7.5	13.25	0.43	6.56	0.21	4.46	
NA	Cougar CkUS	25-Jan-21	10:40	8.2	14.02	0.41	6.35	0.21	4.02	
NA	96 StreetUS	26-Jan-21	13:30	2.1	1.11	0.33	6.63	0.88	0.9	Dewateringactivities
NA	96 StreetDS	26-Jan-21	13:55	2.1	1.98	0.32	6.39	0.79	1.3	Dewateringactivities
NA	96 StreetDS	27-Jan-21	00:25	2.5	7.31	0.17	5.95	0.63	2.90	Dewateringactivities
NA	96 StreetUS	27-Jan-21	00:45	2.3	6.51	0.25	5.74	0.53	1.95	Dewateringactivities
NA	96 StreetDS	28-Jan-21	02:00	4.1	4.44	0.22	6.13	0.33	3.90	Dewateringactivities
NA	96 StreetUS	28-Jan-21	02:35	4.3	7.90	0.14	6.00	0.48	2.10	Dewateringactivities
NA	Silda Ditch DS	29-Jan-21	11:05	8.4	8.38	0.24	6.27	0.12	7.56	
NA	Silda DitchMS	29-Jan-21	11:10	7.7	3.28	0.50	6.30	0.25	15.60	
NA	Fraser RrInlet	29-Jan-21	11:30	6.0	7.91	0.66	6.71	0.33	8.37	
NA	96 St DS	29-Jan-21	11:45	6.0	0.90	0.05	5.65	0.03	1.32	Dewateringactivities
NA	96 St DS	29-Jan-21	21:00	6.4	2.41	0.04	5.19	0.02	1.12	Dewateringactivities
NA	96 StreetDS	31-Jan-21	21:00	3.5	0.33	0.91	5.78	0.23	1.89	Dewateringactivities
NA	96 StreetUS	31-Jan-21	21:45	3.2	1.99	0.67	5.39	0.42	1.45	Dewateringactivities
NA	96 StreetUS	1-Feb-21	23:00	3.0	0.11	0.75	5.89	0.08	2.90	Dewateringactivities
NA	96 StreetDS	1-Feb-21	23:30	3.0	0.89	0.95	5.79	0.06	1.90	Dewateringactivities
NA	96 StreetUS	2-Feb-21	15:17	7.5	-	0.06	6.05	0.03	1.79	DO meter notrecording
NA	96 StreetDS	2-Feb-21	15:34	8	-	0.07	6.07	0.03	3.84	DO meter notrecording
NA	Silda DitchUS	3-Feb-21	12:20	8.9	3.37	0.3	6.49	0.15	9.72	Baseline
NA	Silda DitchDS	3-Feb-21	11:30	7.6	4.9	0.29	6.32	0.15	11.20	Baseline
NA	96 StreetUS	3-Feb-21	2:45	6.0	0.55	0.09	6.04	0.44	2.10	Dewateringactivities
NA	96 StreetDS	3-Feb-21	3:15	5.9	0.47	0.03	6.02	0.56	2.16	Dewateringactivities
NA	96 StreetUS	3-Feb-21	4:41	5.5	0.52	0.45	5.98	0.57	1.65	Isolated ditchtie in to 96 St ditch
NA	96 StreetDS	3-Feb-21	3:45	5.3	0.59	0.34	5.90	0.78	2.35	Isolated ditchtie in to 96 Street ditch
NA	L1300 US	3-Feb-21	22:00	6.2	1.15	0.14	6.37	0.14	25.35	Upcoming ditch infilling activities baseline data stagnantwater
NA	L1300 DS	3-Feb-21	22:30	6.2	1.28	0.59	6.25	0.59	28.00	Upcoming ditch infilling activities baseline data stagnant water
NA	Cougar Crk US	4-Feb-21	11:12	8.2	1.76	0.20	5.96	0.10	1.88	Institute sampling
NA	Cougar Crk DS	4-Feb-21	11:26	8.3	0.81	0.20	5.94	0.10	1.92	Institute sampling
NA	L2100 Rd side Ditch US	2021-02-08	1:00	7.4	0.12	0.30	6.30	0.18	21.0	Installing road plates and access pad
NA	L2100 Rd side Ditch DS	2021-02-08	12:45	7.4	0.13	0.34	6.25	0.20	25.23	Installing road plates and access pad
NA	L2100 Road Side Ditch US	2021-02-08	2:00	6.9	0.10	0.28	6.60	0.17	21.0	Installing road plates and access pad - completed
NA	L2100 Road Side Ditch DS	2021-02-08	2:15	6.5	0.12	0.29	6.75	0.25	23.5	Installing road plates and access pad - completed
NA	L2100 Road Side Ditch US	2021-02-09	21:00	6.8	0.12	0.45	6.78	0.18	21.45	Installing road plates and access pad - completed
NA	L2100 Road Side Ditch DS	2021-02-09	21:15	6.9	0.34	0.25	6.34	.23	25.10	Installing road plates and access pad - completed
NA	L2100 Road Side Ditch US	2021-02-09	23:00	2.4	0.11	0.35	6.30	0.20	21.39	Installing road plates and access pad - completed
NA	L2100 Road Side Ditch DS	2021-02-09	23:15	2.5	0.10	0.27	6.44	0.34	22.90	Installing road plates and access pad - completed
NA	Silda Ditch DS	2021-02-12	10:40	4.4	NA	0.35	6.79	0.18	9.04	-
NA	Silda Ditch MS	2021-02-12	10:55	3.3	NA	0.47	6.73	0.23	8.91	-
NA	Fraser River Inlet	2021-02-12	9:40	4.2	NA	1.64	6.72	0.82	1.19	-
NA	96th Street DS	2021-02-12	8:30	3.8	NA	0.06	6.25	0.03	2.75	-
NA	Silda Ditch US	2021-02-12	8:45	0.7	NA	0.03	4.70	0.01	2.18	-

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	L100 DS	2021-02-12	8:50	0.3	NA	0.98	6.21	0.52	59.8	Broke ice to get sample. No works occurring. Resampling will occur when temperatures increase.
NA	L100 US	2021-02-12	9:00	2.1	NA	1.62	6.44	0.81	79.6	Broke ice to get sample. No works occurring. Resampling will occur when temperatures increase.
NA	Cougar Creek US	2021-02-12	13:33	4.9	NA	0.25	6.94	0.12	3.79	New gravel fill was placed on the trail next to the creek
NA	Cougar Creek 10 m	2021-02-12	13:40	3.0	NA	0.25	7.26	0.13	1.92	Discharge
NA	Cougar Creek 90 m	2021-02-12	13:50	2.7	NA	0.25	7.30	0.12	1.61	New gravel fill was placed on The trail next to the creek
NA	E04 wet area discharge L2100 (Pre work baseline)	2021-02-16	20:30	2.6	-	0.56	6.23	0.19	18.9	Baseline discharge area data
NA	E04 wet area discharge L2100	2021-02-16	21:45	2.4	-	0.45	6.45	0.18	22.3	Discharge to vegetation
NA	E04 wet area discharge L2100	2021-02-17	02:00	0.5	-	0.42	6.33	0.25	24.8	Discharge to sediment bag
NA	E04 wet area discharge L2100	2021-02-17	3:30	0.3	-	0.14	6.34	0.17	23.7	Discharge to sediment bag
NA	E04 wet area discharge L2100 (Pre work baseline)	2021-02-17	20:30	5.9	-	0.91	6.25	0.37	25.5	Discharge to sediment bag - low water levels at submersible pump
NA	E04 wet area discharge L2100	2021-02-18	02:30	2.4	-	0.14	6.34	0.17	23.7	Discharge to sediment bag - low water levels at submersible pump
NA	E04 wet area discharge L2100 (Pre work baseline)	2021-02-18	21:00	3.8	-	0.23	6.67	0.22	22.8	Baseline discharge area data
NA	E04 wet area discharge L2100	2021-02-19	03:00	3.2	-	0.45	6.53	0.36	23.7	Discharge to sediment bag - low water levels at submersible pump
NA	Cougar Creek - US	2021-02-19	09:50	8.4	-	0.49	6.38	0.24	3.60	Baseline
NA	Cougar Creek – 10m	2021-02-19	10:00	7.1	-	0.49	6.46	0.24	3.49	Baseline
NA	Cougar Creek – 90m	2021-02-19	10:10	6.2	-	0.48	6.60	0.24	3.20	Baseline
NA	Fraser River Inlet	2021-02-18	9:25	6.6	-	0.46	6.43	0.23	6.0	Baseline
NA	96 St DS	2021-02-18	9:35	3.7	-	0.04	6.25	0.03	1.75	Baseline
NA	96 St US	2021-02-18	9:45	3.2	-	0.05	6.04	0.02	1.00	Baseline
NA	Silda ditch upstream	2021-02-18	10:30	3.8	-	0.79	6.73	0.40	7.9	Baseline
NA	Silda ditch downstream	2021-02-18	10:45	5.6	-	0.81	6.5	0.41	11.90	Baseline
NA	E04 wet area discharge L2100	2021-02-21	21:15	8.78	-	0.56	6.62	0.34	11.8	Discharge to sediment bag – large pool of stagnant water from weekend rainfall
NA	E04 wet area discharge L2100	021-02-21	02:30	7.23	-	0.45	6.53	0.36	12.7	Discharge to sediment bag – large pool of stagnant waterfrom weekend rainfall
NA	E04 wet area discharge L2100	2021-02-23	21:45	7.22	-	0.45	6.23	0.23	10.9	Discharge to sediment bag – limited dewatering due to low levels of groundwater in trench
NA	E04 wet area discharge L2100	2021-02-23	01:30	7.05	-	0.67	6.11	0.39	11.2	Discharge to sediment bag – limited dewatering due to low levels of groundwater in trench
NA	E04 wet area discharge L2100	2021-02-23	22:30	7.05	-	0.67	6.11	0.39	11.2	Discharge to sediment bag – limited dewatering due to low levels of groundwater in trench

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	E04 wet area discharge L2100	2021-02-24	02:45	5.25	-	0.33	7.03	0.43	10.3	Discharge to sediment bag – limited dewatering due to low levels of groundwater in trench
NA	Fraser River Inlet	2021-02-24	9:25	7.0	-	0.24	6.79	0.12	13.80	-
NA	96 Street DS	2021-02-24	12:30	6.7	-	0.05	4.73	0.03	2.20	-
NA	96 Street US	2021-02-24	12:45	6.3	-	0.04	4.70	0.02	0.75	-
NA	Silda Ditch US	2021-02-24	14:10	8.9	-	0.78	6.68	0.41	12.00	-
NA	Silda Ditch DS	2021-02-24	14:20	8.4	-	0.71	6.52	0.35	13.30	-
NA	L100 DS	2021-02-24	13:10	7.0	-	0.83	6.13	0.42	48.70	-
NA	L100 US	2021-02-24	13:15	7.8	-	0.82	6.15	0.45	42.30	-
NA	Cougar Creek US	2021-02-24	14:40	7.8	-	0.32	7.16	0.16	1.37	-
NA	Cougar Creek 10m	2021-02-24	14:48	7.1	-	0.32	7.12	0.16	1.24	-
NA	Cougar Creek 90m	2021-02-24	14:54	7.4	-	0.32	7.12	0.16	1.20	-
NA	E04 wet area discharge L2100	2021-02-24	20:15	5.80	-	0.10	7.13	0.13	10.9	Discharge to sediment bag – limited dewatering due to low levels of groundwater in trench
NA	E04 wet area discharge L2100	2021-02-25	02:45	5.25	-	0.27	7.01	0.3	12.2	Discharge to sediment bag – limited dewatering due to low levels of ground water in trench
NA	Fraser River Inlet	2021-03-02	09:25	7.8	-	3.43	6.68	1.71	16.40	Low Tide -2:27 High Tide -21:02
NA	96 Street DS	2021-03-02	12:30	7.2	-	0.06	6.11	0.03	2.83	Low Tide -2:27 High Tide -21:02
NA	96 Street US	2021-03-02	12:45	7.8	-	0.06	5.27	0.03	1.29	Low Tide -2:27 High Tide -21:02
NA	L100 DS	2021-03-02	13:10	7.9	-	0.95	6.15	0.48	82.0	High turbidity recorded in ditch, water stagnant. Water quality tested in 96thSt Ditch and no issues observed. ESC measures being added to ditch.
NA	L100 US	2021-03-02	13:15	8.2	-	0.95	6.23	0.49	102.3	High turbidity recorded in ditch, water stagnant. Water quality tested in 96thSt Ditch and no issues observed. ESC measures being added to ditch.
NA	Cougar Creek US	2021-03-04	14:40	8.4	-	0.29	6.40	0.15	1.52	-
NA	Cougar Creek 10 m	2021-03-04	14:48	7.9	-	0.30	6.62	0.30	1.85	-
NA	Cougar Creek 90 m	2021-03-04	14:54	7.8	-	0.30	6.69	0.15	1.90	-
NA	Silda Ditch US	2021-03-04	14:10	7.7	-	0.23	6.18	0.14	6.43	Low tide -15:56 High tide -22:57
NA	Silda Ditch DS	2021-03-04	14:20	7.7	-	0.18	6.14	0.09	5.64	Low tide -15:56 High tide –22:57
NA	Fraser River Inlet	2021-03-10	10:30	7.7	-	4.00	6.81	2.00	27.70	Low tide –10:30 High tide -14:57
NA	96 Street DS	2021-03-10	10:40	8.0	-	0.12	6.28	0.06	4.70	-
NA	96 Street US	2021-03-10	10:50	7.9	-	0.04	5.47	0.02	0.98	-
NA	Silda Ditch US	2021-03-10	11:45	7.8		0.67	6.64	0.33	12.30	Low tide –10:30 High tide -14:57
NA	Silda Ditch DS	2021-03-10	11:35	7.5		0.67	6.73	0.33	12.30	Low tide –10:30 High tide -14:57
NA	L100 DS	2021-03-10	11:35	7.5	-	0.94	6.30	0.47	99.30	High turbidity recorded in ditch, water stagnant. Water quality tested in 96thSt Ditch and no issues observed. ESC measures being added to ditch. Sediment fence added along the side ofpreload.
NA	L100 US	2021-03-10	11:10	8.0	-	1.06	6.31	0.53	80.20	-

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Cougar Creek US	2021-03-10	11:20	10.1	-	0.26	6.61	0.13	2.38	-
NA	Cougar Creek 10 m	2021-03-10	13:45	8.3	-	0.26	6.86	0.14	2.07	-
NA	Cougar Creek 90 m	2021-03-10	13:50	8.9	-	0.26	6.97	0.13	1.65	-
NA	L	2021-03-10	14:05	8.9	-	-	-	-	-	-
NA	M	2021-03-10	14:30	-	-	0.45	6.05	0.20	-	-
NA	N	2021-03-10	14:35	-	-	-	-	-	-	-
NA	K	2021-03-10	14:40	-	-	3.86	7.48	1.98	-	-
NA	K	2021-03-10	14:45	-	-	0.11	6.02	0.06	-	-
NA	J	2021-03-10	14:50	-	-	0.12	5.82	0.06	-	-
NA	Fraser River Inlet	2021-03-17	10:30	6.1	11.62	0.90	7.20	0.45	11.50	High tide -8:57 Low tide -16:41
NA	96 Street DS	2021-03-17	10:45	7.2	7.15	0.11	6.20	0.05	4.78	-
NA	96 Street US	2021-03-17	11:05	6.7	4.88	0.03	4.50	0.02	4.51	-
NA	Silda Ditch US	2021-03-17	9:50	6.5	11.40	0.32	7.21	0.16	12.50	High tide -8:57 Low tide -16:41
NA	Silda Ditch DS	2021-03-17	10:10	7.7	4.80	0.72	6.44	0.36	22.00	High tide -8:57 Low tide -16:41
NA	L100 DS	2021-03-17	11:10	6.2	3.68	0.84	6.15	0.42	72.30	Stagnant ditch. ESC measures have been installed including sediment fence and straw wattles. Check dam in place at the inlet to 96th ditch. No water quality issues observed in 96th ditch.
NA	L100 US	2021-03-17	11:40	6.8	4.23	0.88	6.53	0.51	103.50	Stagnant ditch. ESC measures have been installed including sediment fence and straw wattles. Check dam in place at the inlet to 96th ditch. No water quality issues observed in96th ditch.
NA	Cougar Creek US	2021-03-17	13:45	9.3	9.36	0.30	6.89	0.15	3.19	-
NA	Cougar Creek 10 m	2021-03-17	13:50	8.8	9.71	0.28	7.05	0.14	3.68	-
NA	Cougar Creek 90 m	2021-03-17	14:05	8.8	9.68	0.28	7.04	0.14	3.70	-
NA	Fraser River Inlet	2021-03-25	9:10	6.1	11.62	0.90	7.20	0.45	11.50	Low tide -10:02 High tide -16:27
NA	96 Street DS	2021-03-25	9:40	8.1	6.13	0.25	6.31	0.12	5.24	
NA	96 Street US	2021-03-25	9:55	8.1	5.37	0.06	5.08	0.03	1.39	
NA	Silda Ditch US	2021-03-25	8:40	8.4	5.64	0.33	6.38	0.17	24.50	Low tide -10:02 High tide -16:27
NA	Silda Ditch DS	2021-03-25	8:50	8.9	5.83	0.28	6.78	0.14	21.30	Low tide -10:02 High tide -16:27
NA	L100 DS	2021-03-25	10:00	7.9	4.89	0.76	6.36	0.38	71.30	
NA	L100 US	2021-03-25	10:15	8.3	5.44	0.78	6.53	0.36	88.60	
NA	Cougar Creek US	2021-03-25	14:00	10.7	9.43	0.20	7.00	0.10	8.52	
NA	Cougar Creek 10 m	2021-03-25	14:10	10.4	9.35	0.20	6.84	0.10	7.66	
NA	Cougar Creek 90 m	2021-03-25	14:20	10.4	9.68	0.20	6.88	0.10	7.23	
NA	Ditch dewatering for culvert 105 DS	30-Mar-21	9:30	8.3	5.83	0.13	6.94	0.32	322	Dewatering to the base of preload.
NA	Ditch dewatering for culvert 105US	30-Mar-21	9:35	8.8	5.32	0.08	6.88	0.12	64.3	Dewatering to a storm waterdrain east of the ditch.

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Ditch dewatering for culvert 105 DS	31-Mar-21	10:00	10.4		0.68	6.33	0.33	384	
NA	Ditch dewatering for culvert 105 US	31-Mar-21	10:25	10.3		0.45	6.27	0.24	3.10	
NA	Fraser River Inlet	31-Mar-21	10:15	9.4	10.58	0.17	7.03	0.08	30.50	
NA	96 Street DS	31-Mar-21	10:30	8.7	6.19	0.06	5.70	0.03	8.50	
NA	96 Street US	31-Mar-21	10:45	8.6	6.05	0.03	4.28	0.02	1.14	
NA	L100 DS	31-Mar-21	10:50	7.8	5.07	1.08	6.07	0.54	87.50	
NA	L100 US	31-Mar-21	11:05	8.5	5.83	1.88	6.13	0.75	103.2	
NA	Ditch dewatering for culvert105 DS	01-April - 21	10:00	12.1	6.15	0.56	6.24	0.28	173	Dewatering to the base of preload.
NA	Ditch dewatering for Culvert 105 US	01-April - 21	10:25	10.3	6.23	0.45	6.27	0.24	116	Dewatering to a storm waterdrain east of the ditch
NA	Silda ditch US	1-Apr-21	9:15	7.7	4.87	0.17	6.18	0.09	5.64	High tide -7:25 Low tide -14:22
NA	Silda ditch DS	1-Apr-21	9:30	7.7	4.37	0.23	6.14	0.14	6.83	High tide -7:25 Low tide -14:22
NA	Cougar Creek - US	1-Apr-21	11:00	8.5	9.38	0.26	6.45	0.14	2.65	
NA	Cougar Creek - 10m	1-Apr-21	11:10	8.0	9.36	0.26	6.60	0.13	2.19	
NA	Cougar Creek - 90m	1-Apr-21	11:20	8.1	9.37	0.25	6.52	0.14	2.68	
NA	J - Off Site	8-Apr-21	1:00AM	7.9	4.76	0.13	5.92	0.07	4.37	
NA	K - Off Site	8-Apr-21	1:15AM	7.8	4.74	0.14	5.74	0.07	37.1	Stagnant water, no flows.
NA	L - Off Site	8-Apr-21	1:40AM	5.0	4.11	0.3	6.01	0.15	20.6	Stagnant water, no flows.
NA	M - Off Site	8-Apr-21	2:20AM	5.8	4.32	0.3	6.28	0.1	40.3	Stagnant water, no flows.
NA	N - Off Site	8-Apr-21	3:20AM	6.3	4.58	0.18	5.78	0.11	20.3	Stagnant water, no flows.
NA	K - On Site	8-Apr-21	1:20AM	7.8	9.6	4.24	7.64	2.12	3.03	Clear, transparent water
NA	O - On Site	8-Apr-21	2:35AM	5.8	6.33	0.28	7.08	0.07	16.4	Stagnant water, no flows.
NA	P - On Site	8-Apr-21	2:50AM	6.8	6.3	0.33	6.68	0.35	60.3	Turbid water with light brown color
NA	Fraser River Inlet	9-Apr-21	12:50	7.5	9.68	0.65	6.29	0.33	20.10	High tide -5:23 Low tide -11:48
NA	96 Street DS	9-Apr-21	1:05	9.0	8.44	0.07	6.01	0.03	4.43	
NA	96 Street US	9-Apr-21	1:20	8.8	6.38	0.08	6.03	0.03	2.21	
NA	Silda ditch US	9-Apr-21	1:50	8.7	7.37	0.77	6.31	0.38	28.50	High tide -5:23 Low tide -11:48
NA	Silda ditch DS	9-Apr-21	2:10	8.7	6.22	0.83	6.28	0.41	35.40	High tide -5:23 Low tide -11:48
NA	L100 DS	9-Apr-21	1:35	8.5	5.33	1.06	6.90	0.53	84.60	High tide -5:23 Low tide -11:48
NA	L100 US	9-Apr-21	1:45	8.3	4.21	3.21	6.77	0.72	82.10	High tide -5:23 Low tide -11:48
NA	Cougar Creek - US	9-Apr-21	2:45	8.7	9.74	0.36	7.93	0.16	3.84	
NA	Cougar Creek - 10m	9-Apr-21	2:55	8.6	9.92	0.36	7.88	0.16	1.97	
NA	Cougar Creek - 90m	9-Apr-21	3:05	8.6	9.86	0.36	7.88	0.16	1.60	
NA	Fraser River Inlet	15-Apr-21	14:18	11.7	9.36	0.88	7.36	0.44	67.30	High tide -7:33 Low tide -14:44
NA	96 Street DS	16-Apr-21	14:30	15.5	4.27	0.07	6.20	0.04	4.63	High tide -7:50 Low tide -15:16
NA	96 Street US	16-Apr-21	14:40	15.2	3.61	0.04	5.41	0.02	1.41	High tide -7:50 Low tide -15:16
NA	Silda ditch US	15-Apr-21	20:05	17.2	1.83	0.67	6.95	0.33	30.60	Low tide -14:44 High tide - 21:49
NA	Silda ditch DS	15-Apr-21	19:50	16.2	2.02	0.71	6.34	0.35	67.30	Low tide -14:44 High tide - 21:49
NA	L100 DS	16-Apr-21	14:45	20.0	5.22	0.95	6.91	0.47	41.50	See first line in Section 4.5
NA	L100 US	16-Apr-21	14:55	21.3	6.14	1.37	6.92	0.51	71.40	See first line in Section 4.5

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Cougar Creek - US	15-Apr-21	18:15	14.3	8.89	0.23	6.44	0.12	3.39	
NA	Cougar Ck - 10 m	15-Apr-21	18:25	14.0	8.28	0.24	6.60	0.12	3.46	
NA	Cougar Ck – 90 m	15-Apr-21	18:35	14.0	8.26	0.23	6.60	0.12	3.44	
NA	Fraser River Inlet	22-Apr-21	15:00	13.3	9.93	0.14	7.16	0.07	206.00	High tide -13:36 Low tide -20:16
NA	Silda ditch upstream	22-Apr-21	16:10	20.2	6.81	0.64	6.71	0.39	44.30	High tide -13:36 Low tide -20:16
NA	Silda ditch DS	22-Apr-21	16:00	20.9	7.36	0.72	6.76	0.36	57.90	High tide -13:36 Low tide - 20:16- High NTU reading due to Fraser River highNTU during high tide
NA	Cougar Creek - US	22-Apr-21	16:25	16.3	8.17	0.24	7.07	0.12	7.69	
NA	Cougar Creek – 10m	22-Apr-21	16:35	16.2	7.60	0.25	7.05	0.12	3.63	
NA	Cougar Creek – 90m	22-Apr-21	16:45	16.3	7.82	0.25	7.04	0.12	4.31	
NA	J - Off Site	22-Apr-21	6:30PM	18.1	2.8	0.26	5.79	0.13	14.3	Water contains orange tannins and floating organics
NA	K - Off Site	22-Apr-21	6:40PM	18.1	3.67	0.1	6.13	0.19	16.8	Water contains orange tannins and floating organics
NA	L - Off Site	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The area is dry therefore no sample was collected
NA	M - Off Site	22-Apr-21	7:15PM	15.3	3.71	0.34	6.51	0.18	28.3	Water contains orange tannins and fine floating organics- mostly stagnant water
NA	N - Off Site	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The area is dry therefore no sample was collected
NA	K - On Site	22-Apr-21	6:50PM	18	5.74	5.58	7.48	2.8	5.62	Clear transparent water
NA	O - On Site	22-Apr-21	6:55 PM	16.4	4.51	0.13	7.4	0.11	5.22	Transparent with yellow tannins
NA	P - On Site	22-Apr-21	7:30 PM	16.6	4.66	0.36	6.48	0.41	1.6	Turbid water with light brown tannins-Stagnant water- not flowing
NA	Fraser River Inlet	28-Apr-2021	14:40	10.3	10.28	0.93	7.06	0.68	29.20	Please refer to Table 5.1. Low tide moving out
NA	Silda ditch US	28-Apr-2021	18:40	12.8	4.17	0.30	6.37	0.44	37.20	Please refer to Table 5.1. High tide moving in
NA	Silda ditch DS	28-Apr-2021	18:20	12.4	4.33	0.16	6.33	0.35	41.40	Please refer to Table 5.1. High tide moving in
NA	Cougar Creek - US	28-Apr-2021	18:55	10.8	9.76	0.22	6.93	0.18	5.13	
NA	Cougar Creek - 10m	28-Apr-2021	19:10	10.8	9.89	0.28	6.85	0.16	5.44	
NA	Cougar Creek - 90m	28-Apr-2021	19:20	10.6	9.25	0.28	6.84	0.16	3.38	
NA	L550 Ditch – US	5 May	7:49	13.5	1.88	0.34	6.50	0.44	17.5	The water has brown tannins but is mostly clear with small sized floating organics. No instream activities that will influence water quality
NA	L550 Ditch – DS	5 May	8:00	11.9	1.75	0.27	6.80	0.10	22.3	The water has brown tannins but is mostly clear with small sized floating organics. No instream activities that will influence water quality
NA	L550 Ditch – US	5 May	14:35	15.0	0.68	0.36	6.71	0.42	21.1	The water has brown tannins but is mostly clear with small sized floating organics. No instream activities that will influence water quality
NA	L2100 Ditch DS	6 May	07:30	14.7	4.18	0.80	6.50	0.40	31.2	DS baseline data- prior to road plate installation- Pre work baseline data.
NA	L2100 DS	6 May	12:00	17.0	4.18	0.77	7.19	0.39	11.2	Water has brown tannins and is transparent
NA	L2100 DS	6 May	16:30	15.2	8.92	0.76	7.28	0.38	10.9	Water has brown tannins and is transparent
NA	Silda Ditch Upper-US	6 May	11:30	14.7	1.27	0.71	6.33	0.35	32.40	Water is brown and turbid

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda ditch US	6 May	11:45	13.6	2.68	0.73	6.58	0.37	31.20	Water is brown and turbid
NA	Silda ditch DS	6 May	11:55	13.8	7.53	0.72	7.01	0.35	20.80	Water is brownish grey and opaque
NA	Fraser River Inlet	7 May	7:16	9.1	10.81	0.13	7.73	0.06	111.00	
NA	Silda Ditch Upper-US	7 May	7:01	11.3	0.58	0.70	6.36	0.35	47.80	Water is brown and turbid
NA	Silda Ditch US	7 May	6:35	10.4	2.18	0.75	6.53	0.37	33.90	Water is brown and turbid
NA	Silda Ditch DS	7 May	6:10	8.8	10.07	0.16	7.54	0.08	74.50	Water is brownish grey and opaque. High NTU contributed to Fraser river water influx during high tide
NA	Cougar Ck – US	7 May	8:07	10.9	6.99	0.16	6.84	0.08	8.04	
NA	Cougar Ck – 10m	7 May	8:15	11.0	6.39	0.16	6.99	0.08	7.71	
NA	Cougar Ck – 90m	7 May	8:40	11.0	7.30	0.16	7.01	0.08	7.76	
NA	J – Off Site	6 May	9:35	12	2.65	0.15	6	0.08	7.97	Water contains orange tannins and floating organics
NA	K – Off Site	6 May	9:45	11.9	1.09	0.21	5.98	0.1	3.61	Water contains orange tannins and floating organics
NA	L – Off Site	6 May	10:05	11.2	2.83	0.86	6.63	0.43	13	Water is slightly grey with fine floating organics. Water was stagnant during monitoring
NA	M – Off Site	6 May	10:15	10.3	1.35	0.21	6.04	0.1	17.4	Water contains orange tannins and fine floating organics
NA	N – Off Site	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The area is dry therefore no sample was collected
NA	K – On Site	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The area is dry therefore no sample was collected
NA	O – On Site	6 May	10:00	12.5	2.91	0.2	6.32	0.1	4.21	Transparent with yellow tannins
NA	P – On Site	6 May	10:30	11.6	1.03	0.42	6.68	0.53	20.8	Turbid water with light brown tannins. Water was stagnant during monitoring
NA	Fraser River Inlet	13-May-21	17:40	17.2	9.10	0.25	7.00	0.13	67.80	Water is Brown/ grey and turbid
NA	Silda ditch Upper-US	13-May-21	15:40	16.5	8.94	0.78	6.46	0.39	68.2	Water is brown and turbid – Slow-flowing almost stagnant
NA	Silda ditch US	13-May-21	16:50	15.4	10.20	1.01	6.76	0.50	55.00	Water is brown and turbid
NA	Silda ditch DS	13-May-21	16:15	17.4	9.53	0.74	7.09	0.38	45.1	Water is brown and turbid
NA	Fraser River Inlet	18-May-21	17:35	14.6	8.60	0.29	5.78	0.14	68.80	Water is grey and turbid
NA	Silda Ditch Upper-US	18-May-21	18:40	16.7	9.10	0.70	6.60	0.35	69.70	Water is brown and opaque, stagnant
NA	Silda Ditch US	18-May-21	18:20	16.0	9.54	0.78	6.43	0.39	44.80	Water is brown and opaque
NA	Silda Ditch DS	18-May-21	18:10	17.4	7.30	0.62	6.77	0.31	29.70	Water is brown and opaque
NA	Nordel Ditches -east of Nordel Way	26-May-21	09:58	-	-	-	-	-	31.7	Additional monitoring done to determine high NTU readings in Silda ditch Upstream- Not associated with construction activities
NA	Silda ditch US	26-May-21	10:03	-	-	-	-	-	61.6	Additional monitoring done to determine high NTU readings in Silda ditch Upstream- Large pond area at the culvert inlet. Mostly stagnant water.
NA	Nordel weigh bridge ditches	26-May-21	10:10	-	-	-	-	-	17.7	Additional monitoring done to determine high NTU readings in Silda ditch Upstream. Stagnant water
NA	Nordel Ditch Tr butary (Planet Ice)	26-May-21	10:36	-	-	-	-	-	29.1	Additional monitoring done to determine high NTU readings in Silda ditch Upstream. Mostly slow flowing water with high occurrences of ferrous oxide residue.
NA	Fraser River Inlet	28-May-21	12:30	17.3	10.42	0.88	7.15	0.56	108.00	Water is grey and turbid
NA	Silda ditch Upper-US	28-May-21	13:25	20.5	7.88	0.45	6.20	0.22	92.90	Water is brownish grey and turbid

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda ditch US	28-May-21	13:15	22.0	4.74	0.53	6.21	0.27	102.00	Water is brownish grey and turbid
NA	Silda ditch DS	28-May-21	13:00	20.2	7.34	0.42	6.03	0.21	92.90	Water is brownish grey and turbid
NA	Fraser River Inlet	3-Jun-21	14:45	15.2	9.49	0.10	6.49	0.05	60.20	Water was turbid & gray in color and opaque
NA	Silda ditch US	3-Jun-21	16:30	24.1	5.33	0.45	6.21	0.22	74.80	Water was turbid and brown in color & opaque
NA	Silda ditch MS	3-Jun-21	16:10	27.5	7.64	1.00	6.46	0.50	53.70	Water was turbid and brown in color & opaque
NA	Silda ditch DS	3-Jun-21	15:20	18.2	6.31	0.36	6.37	0.18	25.10	Water was turbid and brown in color & opaque
NA	Silda Ditch 1	3-Jun-21	16:50	26.0	8.43	0.40	6.54	0.20	30.4	Water was turbid and brown in color & opaque.
NA	Silda Ditch 3	3-Jun-21	17:10	23.9	3.62	0.53	6.23	0.27	29.7	Water was turbid and brown in color & opaque.
NA	Silda Ditch 2	3-Jun-21	17:20	25.0	3.11	0.30	6.88	0.15	37.1	Water was turbid and brown in color & opaque.
NA	Silda Ditch 4	3-Jun-21	17:40	22.2	2.81	0.29	6.35	0.14	18.6	Water was turbid and brown in color & opaque.
NA	J off-site	3-Jun-21	7:45 PM	19.3	1.08	0.19	6.08	0.1	52.8	Water was turbid due to water collection; many organics were put into suspension resulting in a high turbidity reading
NA	K off-site	3-Jun-21	8:05 PM	20.5	1.44	0.35	6	0.17	6.35	Water was transparent with brown tannins
NA	K on-site	3-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	L off-site	3-Jun-21	8:15 PM	21.5	2.86	0.1	5.53	0.05	5.78	Water was transparent with brown tannins
NA	M off-site	3-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	N off-site	3-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	P on-site	3-Jun-21	8:45 PM	20.4	3.3	1.28	6.19	0.64	18.6	Water was turbid due to water collection; many organics were put into suspension resulting in a high turbidity reading
NA	O on-site	3-Jun-21	8:20 PM	21	3.18	0.2	6.04	0.1	5.44	Water was transparent with brown tannins
NA	Fraser River Inlet	11-Jun-21	12:20	15.7	10.21	0.13	5.66	0.06	79.65	Water was turbid and gray in color and opaque
NA	Silda ditch US	11-Jun-21	13:10	17.3	7.22	0.54	6.52	0.27	128.00	Water was turbid and brown in color and opaque
NA	Silda ditch MS	11-Jun-21	12:54	17.3	8.83	0.54	6.57	0.27	124.00	Water was turbid and brown in color and opaque
NA	Silda ditch DS	11-Jun-21	12:40	16.8	8.65	0.52	6.35	0.26	58.60	Water was turbid and brown in color and opaque
NA	Fraser River Inlet	16-Jun-21	20:32	15.8	10.74	0.13	7.01	0.07	46.20	Water was turbid and gray in color and opaque
NA	Silda ditch US	16-Jun-21	20:10	18.0	4.31	0.27	6.47	0.13	12.90	Water was transparent and brown colored with tannins
NA	Silda ditch MS	16-Jun-21	19:50	19.7	4.47	0.38	6.71	0.19	17.10	Water was transparent and brown colored with tannins
NA	Silda ditch DS	16-Jun-21	19:35	22.2	5.82	0.36	6.66	0.17	12.20	Water was transparent and brown colored with tannins
NA	Silda Ditch 1	16-Jun-21	21:10	17.1	4.20	0.28	6.23	0.14	14.00	Water was transparent and brown colored with tannins
NA	J off-site	17-Jun-21	8:45 PM	19.3	1.08	0.19	6.08	0.1	52.8	Water was turbid due to water collection; many organics were put into suspension resulting in a high turbidity reading
NA	K off-site	17-Jun-21	8:00 PM	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	K on-site	17-Jun-21	7:45 PM	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	L off-site	17-Jun-21	9:15 PM	20.6	5.33	1	6.11	0.5	5.15	Water was transparent with brown tannins
NA	L on-site	17-Jun-21	9:10 PM	22.6	5.84	0.82	7.25	0.41	1.23	
NA	M off-site	17-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	N off-site	17-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	P on-site	17-Jun-21	9:00 PM	20.8	4.86	1.61	5.79	0.81	7.46	Water was transparent with brown tannins
NA	O on-site	17-Jun-21	8:20 PM	21	5.42	0.91	6.41	0.1	6.61	Water was transparent with brown tannins
NA	Fraser River Inlet	24 -Jun-21	19:00	17.2	9.44	0.12	7.02	0.06	60.6	Water was turbid and gray in color and opaque
NA	Silda ditch DS	24 -Jun-21	19:15	21.3	5.44	0.33	6.88	0.15	34.2	Water was transparent and brown colored with tannins
NA	Silda ditch MS	24 -Jun-21	19:25	19.8	4.82	0.38	6.51	0.19	14.8	Water was transparent and brown colored with tannins
NA	Silda ditch US	24 -Jun-21	19:35	19.0	4.46	0.33	6.48	0.15	12.3	Water was transparent and brown colored with tannins
NA	Silda ditch 1 (off-site)	24 -Jun-21	19:50	18.5	4.44	0.30	6.42	0.15	12.1	Water was transparent and brown colored with tannins
NA	Silda ditch downstream	30-Jun-21	10:50	18.4	10.12	0.10	6.99	0.05	28.5	
NA	Silda ditch midstream	30-Jun-21	11:15	21.8	4.71	0.67	6.98	0.33	32.8	
NA	Silda ditch upstream	30-Jun-21	12:50	24.2	2.78	0.69	6.22	0.39	30.7	
NA	Silda ditch 1	30-Jun-21	13:30	28.8	5.53	0.66	6.51	0.33	58.9	
NA	Fraser River Inlet	30-Jun-21	11:35	22.5	9.27	0.10	7.77	0.05	43.3	High Tide
NA	J off-site	30-Jun-21	3:55 PM	26.2	6.00	0.10	5.04	0.06	6.73	
NA	K off-site	30-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	K on-site	30-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	L off-site	30-Jun-21	3:20 PM	27.00	5.92	0.11	5.03	0.06	7.81	
NA	L on-site	30-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	M off-site	30-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	N off-site	30-Jun-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	P on-site	30-Jun-21	3:40 PM	26.4	4.48	1.06	6.05	0.60	5.04	
NA	O on-site	30-Jun-21	3:30 PM	27.2	5.90	0.20	5.54	0.10	9.14	
NA	Silda Ditch 1 (Off site)	7-July-21	18:25	23.3	8.75	0.84	6.31	0.42	45.0	--
NA	Silda Ditch US	7-July-21	19:00	21.0	4.20	0.95	6.64	0.47	107.0	Stagnant ponded water during dry season
NA	Silda Ditch MS	7-July-21	18:35	21.9	2.52	0.95	6.44	0.47	47.4	--
NA	Silda Ditch DS	7-July-21	18:45	18.8	9.65	0.10	7.69	0.05	87.7	High tide moving in
NA	Fraser River	7-July-21	19:15	19.4	9.97	0.10	7.77	0.05	81.0	High tide moving in
NA	Silda ditch 1 (Off Site)	13-July-21	19:45	24.6	7.27	0.94	6.90	0.47	34.2	
NA	Silda ditch US	13-July-21	20:20	22.0	2.03	1.03	6.90	0.52	94.9	Stagnant turbid water- Dry season
NA	Silda ditch MS	13-July-21	19:55	22.1	2.32	1.28	6.51	0.64	51.8	
NA	Silda ditch DS	13-July-21	20:05	50.4	7.83	0.14	7.88	0.07	52.5	
NA	Fraser River Inlet	13-July-21	20:35	20.3	9.45	0.12	7.80	0.06	45.5	High Tide moving in
NA	J off-site	14-July-21	6:40 PM	25.7	11.09	0.55	7.42	0.27	8.42	
NA	K off-site	14-July-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	K on-site	14-July-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	L off-site	14-July-21	18:20	23.9	7.4	1.16	7.38	0.58	6.26	
NA	L on-site	14-July-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	M off-site	14-July-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	N off-site	14-July-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	P on-site	14-July-21	5:50 PM	27.7	7.34	0.22	6.97	0.11	8.47	
NA	O on-site	14-July-21	6:10 PM	26.3	7.98	1.07	7.6	0.53	3.73	
NA	Silda ditch 1	23-Jul-21	14:10	30.6	6.61	1.05	6.70	0.53	20.4	
NA	Silda ditch upstream	23-Jul-21	14:15	23.6	7.37	1.20	6.49	0.6	50.6	Stagnant turbid water
NA	Silda ditch midstream	23-Jul-21	16:05	26.2	3.11	1.26	6.67	0.63	56.7	Slow flowing stream with limited movement.
NA	Silda ditch downstream	23-Jul-21	16:15	25.2	5.88	0.44	7.25	0.22	12.3	
NA	Fraser River Inlet	23-Jul-21	14:40	23.5	6.32	0.23	6.52	0.11	23.0	Low Tide
NA	Silda ditch 1- off-site	28-Jul-21	9:50	22.4	4.01	1.01	7.00	0.51	50.4	
NA	Silda ditch US	28-Jul-21	10:10	18.8	4.11	1.26	6.83	0.63	46.0	Stagnant water not flowing- Upstream and mid-stream is currently not connected
NA	Silda ditch MS	28-Jul-21	10:30	21.8	3.17	1.21	6.7	0.6	27.4	
NA	Silda ditch DS	28-Jul-21	10:20	19.8	8.77	0.12	8.15	0.06	22.3	
NA	Fraser River Inlet	28-Jul-21	11:00	22.0	9.14	0.11	7.96	0.06	56.0	High Tide
NA	J off-site	29-Jul-21	5:45 PM	22.1	4.48	0.15	5.73	0.08	17.1	
NA	K off-site	29-Jul-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	K on-site	29-Jul-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	L off-site	29-Jul-21	18:05	22	6.71	0.12	5.2	0.06	10.1	
NA	L on-site	29-Jul-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	M off-site	29-Jul-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	N off-site	29-Jul-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	P on-site	29-Jul-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dry
NA	O on-site	29-Jul-21	6:10 PM	26.3	6.22	0.21	5.56	0.10	14.6	
NA	Silda ditch US	5-Aug-21	20:35	20.5	4.01	0.51	6.9	0.63	55.3	Stagnant water puddle. Not flowing or connected
NA	Silda ditch MS	5-Aug-21	20:30	21.3	4.44	0.10	7	0.06	4.0	High Tide
NA	Silda ditch DS	5-Aug-21	20:25	21.3	9.22	0.12	7.48	0.06	17.2	High Tide
NA	Fraser River Inlet	5-Aug-21	20:45	21.3	9.83	0.11	7.15	0.06	29.8	High Tide
NA	Silda ditch 1 (Off-Site)	11-Aug	17:45	26.4	7.30	0.30	5.82	0.15	8.5	
NA	Silda ditch US	11-Aug	18:30	25.4	12.34	0.31	6.72	0.15	30.1	Location dry, monitoring conducted 15m east from usual location
NA	Silda ditch MS	11-Aug	17:55	24.7	1.61	1.25	6.53	0.63	153.0	Stagnant water pond, not connected to upstream ditch or Silda ditch
NA	Silda ditch DS	11-Aug	18:15	25.0	10.05	0.45	7.46	0.22	11.2	Upstream and downstream of this location are dry.
NA	Fraser River Inlet	11-Aug	18:45	23.1	8.74	0.12	7.19	0.06	34.0	High tide
NA	J off-site	11-Aug	5:45 PM	25.9	7.60	0.57	6.75	0.25	6.8	Area G
NA	O on-site	11-Aug	6:10 PM	26.2	7.42	0.87	7.77	0.43	4.39	Area G
NA	Silda ditch 1 - Off site	20-Aug	12:08	18.8	0.00	0.39	6.11	0.2	26.8	
NA	Silda ditch US	20-Aug	12:42	19.2	0.00	0.48	6.42	0.24	26.0	

Site Code	Site	Date	Time	Water Temp (°C)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda ditch MS	20-Aug	12:34	18.8	2.30	0.70	6.51	0.35	36.8	Temporary flow during small rain event. Sampling occurred when flow stopped, and puddle was not connected to downstream.
NA	Silda ditch DS	20-Aug	12:18	18.3	4.11	0.72	6.66	0.36	20.0	
NA	Fraser River Inlet	20-Aug	13:00	19.2	7.34	0.13	7.07	0.06	37.5	
NA	Silda ditch 1 - Off site	26-Aug	15:30	18.8	4.88	0.55	6.41	0.2	60.8	Water is brown in color, cloudy, odorless
NA	Silda ditch US	26-Aug	14:30	18.8	4.84	0.55	6.42	0.2	62.2	Water is brown in color, cloudy, odorless
NA	Silda ditch MS	26-Aug	14:15	18.3	7.31	0.40	6.32	0.22	6.8	Water is brown, transparent, and odorless
NA	Silda ditch DS	26-Aug	14:00	18.8	6.42	0.40	6.2	0.2	8.1	Water is brown, transparent, and odorless
NA	Fraser River Inlet	26-Aug	14:45	19.8	10.33	0.15	7.18	0.06	40.2	Low tide
NA	J Off Site	26-Aug	15:10	18.4	8.88	0.59	7.13	0.27	8.51	Water is brown, transparent, and odorless
NA	O On Site	26-Aug	15:15	18.6	8.31	0.95	7.72	0.44	5.26	Water is brown, transparent, and odorless
NA	Silda ditch 1-Off-Site	September 1, 2021	18:50	20.7	7.65	0.49	6.25	0.24	62.5	
NA	Up-Stream	September 1, 2021	19:20	19.6	2.80	0.48	6.9	0.24	24.6	3 fish observed in the water
NA	Mid-Stream	September 1, 2021	19:10	18.7	2.30	1.30	6.45	0.65	31.6	
NA	Down-Stream	September 1, 2021	19:00	18.7	7.30	0.13	7.07	0.07	13.3	
NA	Frazer River	September 1, 2021	19:30	18.1	10.23	0.47	7.46	0.23	13.7	High Tide
NA	DNR Perimeter Ditch L2400	9-Sep-21	8:00	18.9	0.25	0.1	5.79	0.05	4.8	Pre-Discharge (Baseline)
NA	DNR Perimeter Ditch L2400	9-Sep-21	10:32	20.0	1.82	0.09	5.79	0.04	4.3	Mid-Discharge
NA	DNR Perimeter Ditch L2400	9-Sep-21	14:00	24.2	2.75	0.09	5.84	0.04	4.1	Mid-Discharge
NA	Silda ditch 1 Off site	9-Sep-21	17:55	22.8	2.31	0.43	6.2	0.21	167.0	Stagnant not flowing
NA	Silda ditch upstream	9-Sep-21	17:25	24.0	2.45	0.48	6.47	0.24	30.2	
NA	Silda ditch midstream	9-Sep-21	16:55	24.1	2.7	1.29	6.05	0.65	45.8	Temporary L1300 trench dewatering via silt bag into ponded Midstream area caused temporary isolated high NTU
NA	Silda ditch downstream	9-Sep-21	16:36	25.4	7.77	0.6	6.22	0.3	8.0	
NA	Fraser River Inlet	9-Sep-21	17:45	21.3	8.91	0.13	7.27	0.07	13.2	High Tide moving in
NA	J off-site	10-Sep-21	12:10	18.9	1.27	0.23	5.57	0.11	3.48	
NA	O on-site	10-Sep-21	12:05	19.1	2.18	0.37	5.78	0.19	8.64	
NA	DNR Perimeter Ditch	13-Sep	9:45	16.3	1.80	0.07	5.64	0.04	4.33	Mid-Discharge. Pump turned off last night and restarted this morning.
NA	DNR Perimeter Ditch	14-Sep	17:50	16.4	0.72	0.07	5.39	0.03	3.89	Mid-Discharge
NA	DNR Perimeter Ditch	14-Sep	17:50	14.5	2.11	0.07	5.46	0.03	4.42	Mid-Discharge. Pump turned off at the start of the nightshift.
NA	DNR Perimeter Ditch	15-Sep	9:30	16.2	2.15	0.06	5.82	0.03	15.40	Mid-Discharge, pump shut-off for 1 hour to reduce turbidity.
NA	DNR Perimeter Ditch	16-Sep	9:45	14.7	0.66	0.07	5.38	0.03	6.98	Mid-discharge
NA	Silda ditch 1- Off Site	16-Sep	19:15	15.8	1.55	0.38	0.38	6.47	97.40	Water is brown in color, cloudy, odorless
NA	Silda ditch US	16-Sep	19:10	16.3	8.55	0.51	0.51	6.84	101.30	Water is brown in color, cloudy, odorless
NA	Silda ditch MS	16-Sep	18:55	16.3	3.86	0.72	0.72	6.60	66.10	Water is brown in color, cloudy, odorless
NA	Silda ditch DS	16-Sep	18:40	17.2	10.11	0.12	0.12	6.57	7.71	
NA	Fraser River Inlet	16-Sep	18:20	17.9	7.11	0.12	0.12	6.33	6.88	High Tide

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	DNR Perimeter Ditch	16-Sep	13.1	0.82	0.07	5.39	0.03	4.21	13.1	Mid discharge
NA	DNR Perimeter Ditch	17-Sep	13.6	8.19	0.01	6.08	0.01	19.90	13.6	Mid discharge
NA	DNR Perimeter Ditch	20-Sep	11:35	15.2	2.10	0.18	6.60	0.09	3.16	Discharge during culvert installations STM410.
NA	DNR Perimeter Ditch	20-Sep	20:20	14.2	2.44	0.20	5.82	0.1	4.98	Discharge during culvert installations STM410.
NA	DNR Perimeter Ditch	21-Sep	20:00	15.6	1.64	0.20	7.33	0.1	42.20	Mid-discharge - All activities were stopped for the remainder of the night shift to allow NTU readings to return to normal.
NA	DNR Perimeter Ditch	22-Sep	9:00	14.5	6.77	0.15	7.60	0.08	12.50	Mid-discharge, Dewatering bag changed
NA	Fraser River Inlet	22-Sep	18:20	17.9	7.11	0.12	6.33	0.06	6.88	High tide moving out
NA	Silda ditch Offsite- 1	22-Sep	10:14	15.3	0.12	0.38	6.90	0.19	11.30	High sediment residue from the past dry season still remains in lower lying areas.
NA	Silda ditch US	22-Sep	11:30	16.4	1.51	0.45	6.88	0.23	15.90	High sediment residue from the past dry season still remains in lower lying areas.
NA	Silda ditch MS	22-Sep	10:51	15.4	3.19	0.41	6.84	0.21	15.58	High sediment residue from the past dry season still remains in lower lying areas.
NA	Silda ditch DS	22-Sep	11:00	15.4	3.97	0.38	6.98	0.19	17.20	High tide moving out
NA	DNR Perimeter Ditch	23-Sep	8:30	14.4	0.00	0.16	5.3	0.08	3.44	Discharge during culvert installations STM410.
NA	Site O on-site	23-Sep	21:00	14.3	1.62	0.44	5.8	0.15	3.31	Area G
NA	Site J on site	23-Sep	21:15	14.3	1.22	0.22	5.61	0.13	3.53	Area G
NA	DNR Perimeter Ditch	24-Sep	9:50	13.4	0.00	Not Tested	5.60	Not Tested	2.77	Discharge during culvert installations STM410.
NA	Silda ditch MS	28-Sept	15:05	16.6	4.37	0.11	7.65	0.06	7.87	
NA	Silda ditch DS	28-Sept	15:3	16.6	3.89	0.11	7.66	0.05	8.74	
NA	Silda ditch Offsite 1	28-Sept	19:35	15.0	0.00	0.11	7.28	0.05	5.16	
NA	Silda ditch US	28-Sept	19:57	14.1	1.33	0.13	7.17	0.06	4.50	
NA	Silda ditch MS	28-Sept	19:50	14.7	5.14	0.12	7.36	0.06	7.72	
NA	Silda ditch DS	28-Sept	19:44	14.8	5.27	0.12	7.49	0.06	6.18	
NA	Fraser River Inlet	28-Sept	20:18	14.0	7.21	0.12	8.03	0.06	15.80	High tide moving in
NA	Silda ditch Offsite- 1	6-Oct	21:29	13.3	0.00	0.5	6.35	0.25	6.0	
NA	Silda ditch US	6-Oct	21:58	12.7	2.22	0.47	6.44	0.23	9.2	
NA	Silda ditch MS	6-Oct	21:37	13.0	4.11	0.45	6.54	0.22	9.0	
NA	Silda ditch DS	6-Oct	21:47	12.5	4.94	0.39	6.78	0.20	10.1	
NA	Fraser River Inlet	6-Oct	22:25	12.1	7.67	0.13	7.72	0.06	11.1	Mid-tide, coming out
NA	Silda ditch Off-site 1	12-Oct	18:53	10.5	1.30	0.21	6.54	0.1	13.20	
NA	Silda ditch US	12-Oct	18:45	9.5	1.25	0.16	6.78	0.25	42.88	Samples taken during heavy rain. Drainage from road entering Silda US
NA	Silda ditch MS	12-Oct	18:59	9.5	8.02	0.18	6.64	0.09	48.60	Samples taken during heavy rain.
NA	Silda ditch Off-site 1	13-Oct	13:20	10.3	0.82	0.26	6.42	0.13	11.97	
NA	Silda ditch MS	13-Oct	13:48	9.8	3.34	0.22	6.51	0.11	11.06	
NA	Silda ditch US	14-Oct	13:08	10.1	0.20	0.32	6.32	0.16	10.60	Water is brown in color from the organic tannins, no odor, and a Ferris oxide sheen present on the water surface.

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda ditch US	15-Oct	16:45	11.4	4.76	0.09	6.68	-	30.1	
NA	Silda ditch MS	15-Oct	16:36	11.4	8.69	0.12	6.37	0.06	24.1	
NA	Silda ditch DS	15-Oct	16:23	11.6	9.58	0.07	6.81	0.03	40.4	Large sediment laden pool at the Silda ditch DS site causes big sediment plume when high tide moved in.
NA	Fraser River Inlet	15-Oct	15:12	10.5	11.70	0.11	7.39	0.05	15.1	
NA	96 St Ditch DS	15-Oct	15:24	10.6	0.41	0.15	6.26	0.08	40.8	Additional ESC measures have been installed at the Sunbury east mounds work site to lower NTU.
NA	96 St Ditch MS	15-Oct	15:42	10.4	4.62	0.09	6.00	0.05	15.2	
NA	96 St Ditch US	15-Oct	15:52	10.4	5.02	0.11	7.35	0.06	10.4	
NA	Silda ditch MS	17 Oct	19:39	11.6	5.43	0.06	6.68	0.10	8.73	
NA	Silda ditch DS	17 Oct	20:02	11.8	4.86	0.07	6.94	0.09	12.2	A Beaver has started building a dam about 10 meters up stream of this sample location.
NA	Silda ditch US	17 Oct	19:15	11.8	3.27	0.07	6.58	0.10	8.60	
NA	Silda ditch DS	18 Oct	17:57	11.7	2.08	0.126	2.58	-	70.0	High tide moving in
NA	Silda ditch MS	18 Oct	18:16	11.1	2.38	0.109	5.55	-	23.9	Water is transparent and brown color in tannins.
NA	Silda ditch US	18 Oct	18:27	10.5	0.73	0.07	5.57	-	4.37	
NA	Silda ditch DS	18 Oct	22:42	10.1	4.20	0.119	6.05	-	17.3	High tide out
NA	Silda ditch MS	18 Oct	22:56	10.0	2.37	0.190	5.84	-	12.3	
NA	Silda ditch US	18 Oct	23:07	9.9	1.50	0.143	5.80	-	5.45	
NA	Silda ditch DS	19 Oct	20:51	10.1	3.89	0.137	6.00	-	22.1	
NA	Silda ditch MS	19 Oct	21:04	9.9	3.63	0.147	5.92	-	20.7	Higher than usual NTU recorded at the pump discharge.
NA	Silda ditch US	19 Oct	21:17	9.6	1.33	0.137	5.67	-	13.81	
NA	96 St ditch DS	19 Oct	21:30	10.2	5.22	0.096	4.59	-	2.47	
NA	96 St ditch MS	19 Oct	21:43	10.0	4.33	0.088	4.22	-	1.44	
NA	96 St ditch US	19 Oct	21:50	9.9	3.50	0.091	4.43	-	3.85	
NA	DNR Site N	19 Oct	22:11	9.5	1.60	0.059	4.66	-	3.88	
NA	DNR Site M	19 Oct	22:16	9.9	1.80	0.073	4.84	-	4.77	
NA	DNR Site L	19 Oct	22:23	9.5	1.91	0.082	5.83	-	3.33	
NA	DNR Site K	19 Oct	22:31	10.4	6.83	0.168	.37	-	2.79	
NA	DNR Site J	19 Oct	22:32	9.9	4.33	0.056	4.90	-	4.60	
NA	Silda ditch US	20 Oct	20:38	10.0	2.01	0.160	5.72	-	4.33	
NA	Silda ditch DS	20 Oct	20:57	10.7	4.88	0.184	5.96	-	15.0	
NA	Silda ditch MS	20 Oct	21:15	10.5	5.56	0.179	5.90	-	10.7	
NA	Silda ditch offsite 1	20 Oct	21:24	10.1	1.43	0.158	5.70	-	4.30	
NA	Silda ditch offsite 2	20 Oct	21:37	11.8	3.04	0.130	6.17	-	41.5	Background sample before works start in the area. The water has an opaque brown color.
NA	Fraser River Inlet	21 Oct	21:23	10.5	11.9	0.106	6.07	-	10.30	
NA	Silda ditch DS	21 Oct	21:34	10.9	4.89	0.121	5.86	-	19.8	

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda ditch MS	21 Oct	22:07	11.3	4.78	0.196	6.06	-	26.5	Sample taken at the start of a rain event which may have carried sediments from upstream ditch stabilization work.
NA	Silda ditch US	21 Oct	22:28	10.8	0.90	0.148	5.92	-	14.70	
NA	Silda ditch MS	22 Oct	13:53	12.6	3.24	0.203	6.01	-	18.08	Higher than usual NTU recorded at the pump discharge.
NA	Silda ditch US	22 Oct	14:12	11.5	1.24	0.187	5.77	-	10.65	
NA	Silda Ditch DS	24 Oct	22:12	10.6	4.24	0.176	6.17	-	10.50	
NA	Silda Ditch MD	24 Oct	22:24	10.6	5.93	0.196	6.11	-	7.31	
NA	Silda Ditch US	26 Oct	0:02	10.4	1.37	0.143	5.88	-	5.82	
NA	Silda Ditch DS	26 Oct	0:59	10.5	4.20	0.237	6.33	-	21.30	
NA	Silda Ditch MS	26 Oct	1:22	10.7	4.53	0.149	6.07	-	10.90	
NA	Silda Ditch US	26 Oct	1:32	10.4	1.36	0.148	5.92	-	6.45	
NA	Silda Ditch Off site 1	26 Oct	1:51	11.6	1.07	0.341	6.37	-	73.80	Plugged upstream fish screen resulted in higher NTU due to the damming effect of the water before entering the site.
NA	Silda Ditch DS	26 Oct	22:55	10.4	3.74	0.139	6.2	-	22.30	Water seems to be impacted by two beaver dams that were constructed upstream of the sampling location. See Table 5.2 & Figure 4
NA	Silda Ditch MD	26 Oct	23:08	10.4	2.82	0.151	5.97	-	11.50	
NA	Silda Ditch US	26 Oct	23:20	13.3	1.83	0.141	5.83	-	7.62	
NA	Silda Ditch DS	27 Oct	21:35	10.4	5.66	0.135	6.1	-	5.36	
NA	Silda Ditch MS	27 Oct	21:44	10.4	6.33	0.17	5.88	-	7.96	
NA	Silda Ditch US	27 Oct	23:00	10.2	1.62	0.15	6.01	-	5.62	
NA	Fraser River Inlet	27 Oct	22:04	9.7	9.72	0.124	6.24	-	5.64	
NA	96 St Ditch DS	27 Oct	22:23	10.1	5.00	0.091	4.71	-	3.34	
NA	96 St Ditch MS	27 Oct	22:35	10.0	5.31	0.049	4.05	-	1.75	
NA	96 St Ditch US	27 Oct	22:44	10.2	3.11	0.109	5.89	-	3.75	
NA	Silda Ditch Off site 1	27 Oct	23:09	11.4	3.04	0.313	6.33	-	29.70	
NA	Silda Ditch DS	28 Oct	22:56	10.2	6.80	0.169	6.38	-	23.50	Water seems to be impacted by two new beaver dams that were constructed upstream of the sampling location. See Table 5.2 & Figure 4
NA	Silda Ditch MS	28 Oct	23:09	10.4	6.29	0.109	6.18	-	11.50	
NA	Silda Ditch US	28 Oct	23:54	10.3	1.64	0.094	6.18	-	4.75	
NA	Silda Ditch DS	29 Oct	15:24	12.4	4.87	0.2	6.95	0.1	15.40	No flow in sampling area due to high tide.
NA	Silda Ditch MS	29 Oct	15:30	11.7	5.33	0.17	6.7	0.09	10.10	
NA	Silda Ditch US	29 Oct	15:36	11.8	3.16	0.14	6.61	0.07	7.36	
NA	Fraser River Inlet	29 Oct	15:48	10.3	10.07	0.1	7.63	0.05	19.00	Peak high tide
NA	96 St Ditch DS	29 Oct	15:58	10.3	4.74	0.06	5.04	0.03	7.26	
NA	Silda ditch DS	2 Nov	00:23	8.9	6.51	0.2	6.71	0.1	13.00	
NA	Silda ditch MS	2 Nov	00:32	8.9	3.72	0.2	6.67	0.1	9.32	

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda ditch US	2 Nov	00:39	7.9	2.37	0.16	6.52	0.08	13.40	
NA	Fraser River Inlet	3 Nov	21:30	9.7	4.89	0.78	7.05	0.23	45.85	
NA	Silda ditch DS	3 Nov	21:55	10.3	6.32	0.29	6.95	0.15	56.90	High tide moving out
NA	Silda ditch MS	3 Nov	22:09	10.6	6.66	0.33	6.7	0.16	36.80	Slightly higher NTU data due to stream diversion discharge
NA	Silda ditch US	3 Nov	22:28	10.3	6.89	0.16	6.65	0.08	12.60	
NA	Silda ditch Offsite 1	3 Nov	22:40	11.2	4.73	0.22	6.89	0.11	46.40	Water sample is within background levels for ditch
NA	Silda ditch Offsite 2	3 Nov	22:54	10.3	4.45	0.14	6.47	0.07	10.90	
NA	Fraser River Inlet	3 Nov	22:16	10.4	10.07	0.1	7.63	0.05	19.00	
NA	Silda ditch Off	3 Nov	22:13	10.4	6.27	009	6.91	0.05	14.80	
NA	Silda ditch DS	3 Nov	22:34	9.3	6.74	0.16	6.72	0.08	22.20	
NA	Silda ditch MS	3 Nov	23:02	8.8	6.81	0.14	6.62	0.07	12.30	
NA	Silda ditch US	3 Nov	2:26	8.8	5.28	0.12	6.52	0.06	10.80	
NA	Silda ditch US	4 Nov	22:01	6.2	5.59	0.08	6.18	0.04	5.23	
NA	Fraser River Inlet	4 Nov	22:24	8.8	7.31	0.12	7.01	0.06	33.80	
NA	Silda ditch DS	4 Nov	22:42	10.0	6.60	0.26	6.89	0.13	32.80	Comparable to Fraser River during high tide
NA	Silda ditch MD	4 Nov	22:50	10.1	4.64	0.2	6.68	0.1	8.90	
NA	Silda Off-site 1	5 Nov	9:16	9.2	2.07	0.09	6.32	0.04	11.40	
NA	Silda Ditch DS	5 Nov	9:16	9.4	5.24	0.1	6.64	0.05	27.40	No flow, sample location flooded due to high tide. Beaver dams still present.
NA	Silda Ditch MS	5 Nov	9:26	9.7	4.19	0.24	6.77	0.12	17.20	
NA	Silda US Upstream	5 Nov	9:49	9.4	0.11	0.11	6.27	0.05	9.18	
NA	Fraser River Inlet	5 Nov	9:56	9.0	8.51	0.09	7.29	0.04	8.96	High tide, coming out
NA	96 St Ditch DS	5 Nov	10:06	9.3	5.51	0.06	5.65	0.03	4.14	
NA	96 St Ditch MS	5 Nov	10:14	9.4	4.58	0.05	5.01	0.02	2.09	
NA	96 St Ditch US	5 Nov	10:28	9.4	5.10	0.05	4.65	0.02	2.03	
NA	Silda ditch-Offsite 1	7 Nov	22:50	8.2	0.00	0.13	6.33	0.07	6.32	
NA	Silda Ditch US	7 Nov	23:03	7.9	0.97	0.14	644	0.07	8.14	
NA	Silda Ditch MS	7 Nov	22:55	9.1	2.93	0.99	6.85	0.5	13.90	Low flow due to the majority of the water course now flowing through industrial park culvert.
NA	Silda ditch US	8 Nov	21:19	8.8	1.32	0.89	6.82	0.44	8.15	
NA	Silda ditch MS	8 Nov	21:24	8.1	1.86	0.17	6.52	0.08	3.52	
NA	Silda ditch-Offsite1	9 Nov	20:05	8.7	1.78	0.09	6.19	0.04	3.92	
NA	Silda ditch US	9 Nov	20:18	8.1	3.56	0.1	6.33	0.05	3.73	
NA	Silda ditch MS	9 Nov	20:12	8.6	3.85	0.24	6.69	0.12	16.90	Low flow due to the majority of the water course now flowing through industrial park culvert.
NA	Silda Ditch DS	9 Nov	20:30	8.6	4.43	0.26	6.83	0.13	22.70	Low flow due to the majority of the water course now flowing through industrial park culvert. High tide
NA	Fraser River Inlet	9 Nov	20:38	8.5	9.91	0.11	7.45	0.06	7.17	High tide
NA	96 St Ditch DS	9 Nov	23:34	8.1	6.02	0.08	6.5	0.04	5.42	

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	96 St Ditch MS	9 Nov	23:40	7.8	5.17	0.06	5.86	0.03	5.61	
NA	96 St Ditch US	9 Nov	23:46	7.5	6.09	0.05	4.66	0.02	1.38	
NA	Fraser River Inlet	14 Nov	21:44	8.5	6.63	0.12	6.83	0.06	19.70	
NA	96 Street Ditch DS	14 Nov	21:55	8.7	8.20	0.04	5.68	0.02	5.06	
NA	96 Street Ditch MD	14 Nov	22:06	8.7	7.37	0.04	5.67	0.03	3.08	
NA	96 Street Ditch US	14 Nov	22:18	8.3	3.69	0.05	6.37	0.03	10.30	
NA	L500 Culvert	14 Nov	23:18	10.0	6.44	0.07	7.44	0.03	688.00	Turbidity is high due to work activity in the area, all work was shut down as a result. Measurement taken during SRE at the site run-off before entering the 96 St culvert.
NA	Silda Ditch US	15 Nov	1:43	10.0	6.75	0.1	6.82	0.05	43.50	High turbidity suspected due to the flooding from rain
NA	Silda Ditch MS	15 Nov	1:55	9.5	7.30	0.08	6.82	0.04	36.90	High turbidity suspected due to the flooding from rain during the reporting period
NA	Silda Ditch DS	15 Nov	2:05	9.4	6.42	0.05	6.43	0.02	4.25	
NA	Silda ditch 1 (Off-Site)	15 Nov	12:43	9.8	0.47	0.04	6.61	0.02	3.61	Highly flooded
NA	96 Street Ditch DS	15 Nov	12:56	9.9	6.42	0.03	5.33	0.02	8.31	
NA	96 Street Ditch MS	15 Nov	13:05	9.6	6.47	0.03	4.82	0.02	2.50	
NA	96 Street Ditch US	15 Nov	13:13	9.3	6.54	0.03	4.69	0.02	2.48	
NA	Silda Ditch US	16 Nov	22:40	9.2	4.83	0.06	6.35	0.03	4.50	
NA	Silda Ditch MS	16 Nov	22:30	9.2	6.22	0.06	6.35	0.03	15.70	High turbidity suspected due to the flooding from rain during the reporting period
NA	Silda Ditch DS	16 Nov	21:50	8.0	6.38	0.07	6.48	0.04	40.20	High turbidity suspected due to the flooding from rain during the reporting period
NA	J off-site	18 Nov	9:23	6.7	0.34	0.11	6.38	0.05	9.33	
NA	K off-site	18 Nov	9:29	7.0	0.78	0.06	5.99	0.03	4.64	
NA	O on-site	18 Nov	9:34	6.8	4.56	0.15	6.55	0.07	7.29	
NA	M off-site	18 Nov	10:01	7.0	2.56	0.07	4.23	0.04	0.84	
NA	L off-site	18 Nov	10:06	6.2	1.0	0.05	5.21	0.03	1.64	
NA	N off-site	18 Nov	10:16	7.8	6.43	0.2	6.87	0.1	1.42	
NA	Fraser River Inlet	18 Nov	21:08	8.4	9.90	0.09	7.03	0.06	15.02	
NA	Silda Ditch US	18 Nov	21:41	8.0	6.56	0.03	6.36	0.06	4.73	
NA	Silda Ditch MS	18 Nov	21:35	8.1	6.85	0.03	6.62	0.05	15.20	High turbidity suspected due to the flooding from rain during the reporting period
NA	Silda Ditch DS	18 Nov	21:22	8.2	6.43	0.04	6.81	0.05	23.50	High turbidity suspected due to the flooding during the reporting period
NA	96 Street Ditch DS	18 Nov	23:10	8.9	6.40	0.04	5.58	0.03	7.83	
NA	96 Street Ditch MS	18 Nov	23:18	8.6	6.45	0.04	5.32	0.03	3.40	
NA	96 Street Ditch US	18 Nov	23:26	8.3	6.02	0.12	5.39	0.07	8.70	
NA	Silda ditch off-site 1	22-Nov	23:15	7.8	1.47	0.29	6.61	0.14	5.83	
NA	Silda Ditch US	22-Nov	23:30	7.7	2.12	0.32	6.75	0.16	5.05	
NA	Silda Ditch MD	22-Nov	23:21	9.8	1.76	1.46	6.83	0.73	6.20	

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	Silda Ditch DS	22-Nov	23:41	8.2	4.43	1.2	7.13	0.6	9.32	
NA	Fraser River Inlet	22-Nov	23:50	8.1	7.10	0.35	6.97	0.17	128.00	Lowering tide
NA	96 Street Ditch DS	22-Nov	23:57	6.8	7.21	0.05	5.89	0.03	2.21	High flow rate
NA	96 Street Ditch MS	22-Nov	00:07	6.5	6.78	0.05	5.81	0.02	1.43	
NA	96 Street Ditch US	22-Nov	00:15	6.4	7.49	0.03	4.77	0.02	0.93	
NA	Silda ditch off-site 1	25-Nov	20:56	7.1	5.11	0.15	6.51	0.07	10.40	
NA	Silda Ditch US	25-Nov	21:07	7.1	4.87	0.16	6.63	0.08	13.00	
NA	Silda Ditch MS	25-Nov	21:00	7.2	5.63	0.23	6.79	0.12	31.90	High flow volume into Silda ditch with water influx from various discharge points during the rain resulting in higher NTU
NA	Silda Ditch DS	25-Nov	21:13	7.6	6.67	0.14	6.62	0.07	30.70	Low flow.
NA	Fraser River Inlet	25-Nov	21:29	8.0	10.71	0.12	7.35	0.06	32.60	Low tide
NA	96 Street Ditch DS	25-Nov	21:26	6.9	8.08	0.05	6.12	0.02	7.10	Higher NTU recorded at confluence monitoring point during significant rainfall event.
NA	96 Street Ditch MS	25-Nov	21:44	6.6	7.06	0.05	6.03	0.02	3.10	
NA	96 Street Ditch US	25-Nov	21:51	6.4	6.01	0.03	4.75	0.02	1.37	
NA	Silda ditch 1	28-Nov	21:05	11.5	2.99	0.12	6.35	0.06	6.67	
NA	Silda Ditch US	28-Nov	21:20	9.8	3.03	0.12	6.51	0.06	6.35	
NA	Silda Ditch MS	28-Nov	21:12	10.7	3.12	0.21	6.68	0.1	9.38	
NA	Silda Ditch DS	28-Nov	21:28	10.2	4.78	0.21	6.8	0.1	10.50	
NA	Fraser River Inlet	28-Nov	21:36	8.8	9.04	0.11	7.3	0.06	37.60	Flood tide
NA	96 Street Ditch DS	28-Nov	21:43	9.4	6.43	0.03	5.65	0.02	4.91	High water flow
NA	96 Street Ditch MS	28-Nov	21:51	9.2	5.43	0.02	5.09	0.01	4.33	
NA	96 Street Ditch US	28-Nov	21:57	9.6	5.87	0.03	4.67	0.01	1.46	Water level at top of culvert
NA	Silda ditch 1	29-Nov	10:27	10.2	1.02	0.14	6.35	0.07	7.15	
NA	Silda Ditch US	29-Nov	10:38	9.8	1.17	0.15	6.7	0.07	6.64	
NA	Silda Ditch MS	29-Nov	10:31	10.2	2.76	0.2	6.66	0.13	7.73	
NA	Silda Ditch DS	29-Nov	10:48	10.3	4.02	0.25	6.85	0.13	20.90	High turbidity coming from the flood tide and the opening of the L475 ditch.
NA	Fraser River Inlet	29-Nov	10:56	8.7	9.25	0.15	7.05	0.07	259	Flood tide
NA	96 Street Ditch DS	29-Nov	11:04	9.9	8.37	0.03	5.56	0.01	6.95	
NA	96 Street Ditch MS	29-Nov	11:14	10.1	6.51	0.03	4.93	0.01	3.67	
NA	96 Street Ditch US	29-Nov	11:20	4.8	5.23	0.03	4.75	0.01	1.77	
NA	Silda Ditch Off-Site 1	1-Dec	2:28	10.7	3.72	0.13	6.65	0.06	10.7	
NA	Silda Ditch US	1-Dec	1:07	10.7	3.43	0.14	6.48	0.07	10.7	
NA	Silda Ditch MS	1-Dec	2:21	11.2	4.02	0.23	6.6	0.12	11.2	
NA	Silda Ditch DS	1-Dec	1:39	11.3	6.70	0.24	6.89	0.12	11.3	Very little flow, with high turbidity water coming from newly opened ditch.
NA	Fraser River Inlet	1-Dec	1:49	10.9	6.17	0.15	6.90	0.08	10.9	High tide
NA	96 Street Ditch DS	1-Dec	1:54	10.3	6.29	0.03	5.7	0.01	10.3	

Site Code	Site	Date	Time	Water Temp (oC)	DO (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	96 Street Ditch MS	1-Dec	2:01	10.4	6.09	0.02	4.94	0.01	10.4	
NA	96 Street Ditch US	1-Dec	2:06	10.1	5.82	0.03	4.64	0.01	10.1	Water level at top of culvert
NA	96 Street Ditch DS	7-Dec	11:47	6.0	7.08	0.06	5.68	0.02	2.23	
NA	96 Street Ditch MS	7-Dec	11:41	5.8	7.27	0.05	5.8	0.02	2.14	
NA	96 Street Ditch US	7-Dec	11:57	6.2	7.62	0.03	4.78	0.01	1.34	
NA	Silda Ditch Off-Site 1	8-Dec	2:06	8.0	1.73	0.37	6.86	0.18	8.71	
NA	Silda Ditch US	8-Dec	1:07	7.8	2.71	0.42	6.88	0.18	8.71	
NA	Silda Ditch MS	8-Dec	1:02	9.8	2.46	0.92	6.77	0.46	14.40	Very little flow
NA	Silda Ditch DS	8-Dec	1:29	9.2	5.29	0.97	7.14	0.48	14.10	Low tide, water level at bottom of culvert
NA	Fraser River Inlet	8-Dec	1:17	7.7	9.34	0.23	7.18	0.11	50.00	Low tide
NA	96 Street Ditch DS	10-Dec	00:58	3.9	8.12	0.04	5.85	0.02	2.35	
NA	96 Street Ditch MS	10-Dec	00:49	4.0	6.92	0.04	5.85	0.02	2.66	Beaver seen upstream
NA	96 Street Ditch US	10-Dec	1:04	4.1	7.75	0.03	5.12	0.01	1.40	
NA	96 St Ditch DS	14-Dec	12:43	6.4	6.90	0.07	6.13	0.04	6.17	
NA	96 St Ditch MS	14-Dec	13:06	3.5	7.38	0.1	6.64	0.05	17.10	Sample taken after heavy rain event, high turbidity water observed coming from off-site location.
NA	96 St Ditch US	14-Dec	13:45	4.7	8.01	0.03	5.14	0.01	2.27	
NA	Fraser River Inlet	14-Dec	12:58	5.3	9.91	0.12	6.95	0.05	22.00	High Flood Tide
NA	96 St Ditch DS	15-Dec	8:32	7.5	5.75	0.07	6.26	0.04	5.15	
NA	96 St Ditch MS	15-Dec	8:50	3.7	7.02	0.03	5.48	0.01	1.08	
NA	96 St Ditch US	15-Dec	9:40	3.5	7.01	0.03	4.87	0.01	0.79	
NA	96 St Ditch DS	19-Dec	9:12	4.4	7.66	0.06	6.16	0.03	3.32	
NA	96 St Ditch MS	19-Dec	9:21	3.2	7.51	0.04	5.81	0.04	4.62	
NA	96 St Ditch US	19-Dec	9:33	3.4	8.26	0.03	5.06	0.01	3.46	
NA	96 St Ditch DS	20-Dec	13:29	2.0	9.13	0.08	6.37	0.04	2.48	
NA	96 St Ditch MS	20-Dec	13:22	2.0	8.60	0.05	6.10	0.02	1.13	
NA	96 St Ditch US	20-Dec	13:59	2.8	10.02	0.04	5.27	0.02	1.65	
NA	Fraser River Inlet	20-Dec	13:52	4.2	11.89	0.25	7.12	0.12	11.20	High Tide

***Tidal Chart data collected from:** https://www.tides.gc.ca/eng/station?sid=7654

01 December 2021		
Time	Height	
PDT	(m)	(ft)
04:06	2.3	7.5
09:22	1.6	5.2
15:02	3.0	9.8
22:57	0.6	2.0

07 December 2021			8 December 2021			10 December 2021		
Time	Height		Time	Height		Time	Height	
PDT	(m)	(ft)	PDT	(m)	(ft)	PDT	(m)	(ft)
03:04	0.3	1.0	03:49	0.3	1.0	2:09	0.7	2.30
09:38	3.2	10.5	10:30	3.2	10.5	9:12	4.4	14.44
15:14	2.2	7.2	16:38	2.1	6.9	14:22	3.1	10.17
19:07	2.6	8.5	20:02	2.4	7.9	19:29	4.3	14.11

14 December 2021			15 December 2021			19 December 2021			20 December 2021		
Time	Height		Time	Height		Time	Height		Time	Height	
PDT	(m)	(ft)	PDT	(m)	(ft)	PDT	(m)	(ft)	PDT	(m)	(ft)
04:02	2.0	6.6	05:14	2.3	7.5	01:09	0.5	1.6	00:04	0.6	1.97
08:33	1.7	5.6	09:31	1.9	6.2	07:55	3.0	9.8	07:44	4.7	15.42
14:31	2.8	9.2	14:57	2.8	9.2	12:38	2.3	7.5	12:57	3.7	12.14
22:43	0.6	2.0	23:20	0.5	1.6	16:43	2.7	8.9	16:42	4.0	13.12

APPENDIX 8: TOOLBOX TRAINING RECORDS

Information available upon request.

APPENDIX 9: INCIDENT REPORTS (*Including Spills larger than 5L*)