

APPENDIX A1  
WATERCOURSE CROSSING SUMMARY TABLE  
Pipeline

Watercourse Crossing ID	UPI Unique ID	RK / AK	Watercourse Name	Flow Regime	Class	UTM Coordinates (NAD 83)			Fish Spp. Captured or Observed <sup>(5)</sup> (Previously Documented)	Sensitivity Rating	Morphological Parameters				Provincial Instream Work Window (MoE and DFO)	Least Risk Biological Window Proposed	Construction Season	Pipeline Crossing Method		Vehicle Crossing Method		Navigability Status	Site Specific Comments	Reclamation
						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-753 <sup>(2, SAR)</sup>	W1793.0	RK 1147.37	Salmon River	Perennial	S2	10	529778	5444366	CO, RSC, TSB (CO, DV/BT, ST, CCT, CC, CSU, LSU, NSC, PCC, RSC, CP, BMC, TSB, BNH, SFL, BCB, CH, CM, SK, RB, WCT, L, SSU, NDC, CAS)	High	-	12.00 / 10.50	1.77	No	August 1 - August 31	August 1 - August 31	Summer	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Open-cut with water quality monitoring inside timing window <sup>(4)</sup>	Clear-Span Bridge	Clear-Span Bridge	Navigable	Large perennial watercourse; juvenile CO captured within the ZOI; DFO trap for CO smolt located 50 m downstream from the PPC; high potential for other salmonids and coarse fish species including SSU and NDC; <b>proposed critical habitat for SSU and NDC; avoid SSU and NDC spawning periods of March 31 - July 1 and April 30 - July 15 and adhere to additional mitigation measures to be provided in the final Pipeline EPP for watercourses identified as critical SSU and NDC habitat.</b>	F or G
BC-754	W1794.0	RK 1147.70	Unnamed Drainage (Wetland)	Perennial	NCD-W (FB)	10	529469	5444481	TSB (None)	Low	-	-	-	Yes	None	Open	Summer	Avoid ponded areas	Isolation if water present	Avoid ponded area; Swamp Mats may be required	Swamp Mats or other regulatory approved crossing method	(None)	Golf course ponds; small S4 channel approximately 200 m downslope (west); TSB captured. potential for runoff from golf course to enter channel during flood events. Low concerns for construction as there is low connectivity between ponded areas and stream channel; align centreline construction to avoid ponded areas.	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland reclamation measures.
BC-755	W1795.0	RK 1147.83	Unnamed Drainage	Seasonal	NCD	10	529330	5444497	None (None)	Low	-	-	-	-	None	Open	Summer	Isolation if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert	Ramp and Culvert or other regulatory approved crossing method	(None)	Seasonal drainage; no continuous defined channel; no fish habitat potential.	A or B
BC-755a	W1915.0	RK 1147.90	Unnamed Drainage	-	FB* (TBD)	10	529274	5444537	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; likely low potential for fish; no direct connectivity to fish-bearing watercourse; potential culvert barrier downstream; confirm whether a defined channel exists during final route walk.	-

Watercourse Crossing ID	UPI Unique ID	RK / AK	Watercourse Name	Flow Regime	Class	UTM Coordinates (NAD 83)			Fish Spp. Captured or Observed <sup>(5)</sup> (Previously Documented)	Sensitivity Rating	Morphological Parameters				Provincial Instream Work Window (MoE and DFO)	Least Risk Biological Window Proposed	Construction Season	Pipeline Crossing Method		Vehicle Crossing Method		Navigability Status	Site Specific Comments	Reclamation
						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-755b	W1916.0	AK 1149.99	Unnamed Drainage	-	FB* (TBD)	10	527648	5445518	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Road side ditch; defaulted to fish-bearing; likely low potential for fish; no direct connectivity to fish-bearing watercourse; confirm whether a defined channel exists during final route walk; drainage appears to run parallel to the centre of the PPC and may not be crossed.	-
BC-758a	W1917.0	AK 1150.47	Unnamed Drainage	-	FB* (TBD)	10	527775	5445963	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; likely low potential for fish; situated on Golf Course and no direct connectivity to fish-bearing watercourse; confirm whether a defined channel exists during final route walk.	-
BC-759 <sup>(RM)</sup>	W1796.0	AK 1150.67	Unnamed Drainage	Seasonal	NCD	10	528080	5446116	None (None)	Low	-	-	-	-	None	Open	Summer	Isolation if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert	Ramp and Culvert or other regulatory approved crossing method	(None)	Grassy swale with no defined channel or evidence of scour or discernible flow observed at 222nd St. approximately 475 m downslope from the PPC; the PPC is located adjacent to the Redwoods Golf Club and is bordered by agricultural land to the east; no prominent drainage was viewed using aerial imagery.	A or B
BC-759a	W1918.0	AK 1150.86	Unnamed Drainage	-	FB* (TBD)	10	527821	5446349	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; likely low potential for fish; situated on golf course and no direct connectivity to fish-bearing watercourse; confirm whether a defined channel exists during final route walk.	-
BC-759b	W1919.0	AK 1151.51	Unnamed Drainage	-	FB* (TBD)	10	527897	5446981	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; likely low potential for fish; situated on golf course and no direct connectivity to fish-bearing watercourse; confirm whether a defined channel exists during final route walk.	-
BC-759c	W1920.0	AK 1151.55	Unnamed Drainage	-	FB* (TBD)	10	527899	5447022	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; likely low potential for fish; situated along edge of golf course and no direct connectivity to fish-bearing watercourse; confirm whether a defined channel exists during final route walk.	-
BC-759d	W1921.0	AK 1151.83	Unnamed Drainage	-	FB* (TBD)	10	527849	5447253	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; likely low potential for fish; low-lying area adjacent to CN Railway; no direct connectivity to fish-bearing watercourse; confirm whether a defined channel exists during final route walk.	-

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						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-759e	W1922.0	AK 1152.38	Unnamed Drainage	-	FB* (TBD)	10	527019	5447456	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Road side ditch; defaulted to fish-bearing; may have potential connectivity to BC-766 during flood conditions; confirm whether a defined channel exists during final route walk.	-
BC-766	W1797.0	RK 1152.44	East Munday Creek	Perennial	S3	10	526966	5447469	CCT, TSB (CO, CCT)	High	0.08 (19/07/14)	2.60 / 2.14	0.49	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 2 Non-Navigable	East Monday Creek has moderate habitat potential for CO and CCT; low residual pool depths and DO (5.46 mg/L in July 2014) may be limiting for salmonids during summer months.	D or E
BC-766a	W1923.0	RK 1153.53	Unnamed Drainage (Wetland)	Perennial	NCD-W	10	525901	5447742	None (None)	Low	-	-	-	Yes	None	Open	Summer	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendations	(None)	Low-lying wetland adjacent to BC-766 (FB, 200 m downslope); completely vegetated; some seepage and stagnant water at the centre of the PPC; insufficient depths to allow fish passage and habitat use at the time of survey; no discernible channel sections or ponded areas; area may be prone to flooding which could result in possible fish stranding during peak flood conditions; avoid construction during high flow periods.	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland reclamation measures.
BC-766b	W1925.0	RK 1153.65	Unnamed Drainage	-	NVC	10	525791	5447784	None (None)	None	-	-	-	-	None	Open	Summer	Open-cut	Open-cut	Ford	Ford	(None)	Topographic swale adjacent to 208th Street; no defined channel or prominent fluvial processes at the centre of the PPC; no direct connectivity to fish-bearing watercourse and no fish habitat potential.	A
BC-767	W1798.0	RK 1153.95	West Munday Creek	Perennial	S2	10	525491	5447839	CCT, CO, RL, TSB (CH, CM, CO, CCT, DV/BT, KO, PK, RB, SG, SK, ST)	High	-	9.00 / 5.30	0.20	No	August 1 - August 15	August 1 - August 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Potentially Navigable	West Munday Creek has moderate to high habitat potential for salmonids; the confluence with Yorkson Creek is approximately 900 m downstream; juvenile CO and CCT were captured upstream from the PPC in 2013; adult RL and TSB were captured at the PPC in 2014; anecdotal records of KO and SG.	E or F

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						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-768	W1799.0	RK 1154.26	Yorkson Creek	Perennial	S3	10	525187	5447895	BMC, CCT, CH, CO, TSB (CH, CM, CO, CP, CCT, DV/BT, L, PCC, PK, RB, SK, ST, TSB)	High	0.71 (24/04/14)	3.50 / 3.00	0.60	No	August 1 - August 31	August 1 - August 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 3 Non-Navigable	Yorkson Creek has moderate to high habitat potential for salmonids; low-lying wetland area observed adjacent to channel; swamp mats may be required for construction; SG may use habitat at confluence with Fraser River; least risk biological window proposed is the same West Munday Creek, which has anecdotal records of KO and SG.	E or F
BC-768a <sup>(RM)</sup>	W1926.0	RK 1154.68	Unnamed Drainage (Wetland)	Perennial	NCD-W (FB)	10	524768	5447937	None (None)	High	-	-	-	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	(None)	Wetland may provide seasonal or perennial habitat value for salmonids given close proximity to Yorkson Creek where CCT and CO were captured; coarse fish presence is probable but perennial habitat value for salmonids may be limited during summer months because of poor flow conditions, high water temperatures and low DO. No land access was permitted and site was viewed 100 m upslope from the centre of the PPC at 98a Ave.	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland reclamation measures.
BC-768b	W1927.0	RK 1156.08	Unnamed Channel	Perennial	S2	10	523371	5447791	PMB, TSB (None)	Low	0.03 / (08/10/14)	7.50 / 5.84	1.29	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Existing or Clear-Span Bridge	Existing or Clear-Span Bridge	Potentially Navigable	Moderate seasonal habitat value for salmonids given channel size and close proximity to the Fraser River; abundant cover, suitable spawning substrate and no barriers to migration; no salmonids were captured or observed likely attributed to low DO and high water temperatures recorded at the time of survey; four pipes observed draining into the channel from adjacent industrial areas and high turbidity was noted.	D or E
BC-769	W1800.0	RK 1158.06	Unnamed Drainage	-	NVC	10	521412	5447609	None (None)	None	-	-	-	-	None	Open	Summer	Open-cut	Open-cut	Ford	Ford	(None)	The proposed crossing is situated within an active mill lumber yard; potential for underground stormwater network at the PPC but no defined channel and no fish habitat potential.	A

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						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-770	W1801.0	RK 1158.40	Unnamed Channel	Perennial	S3	10	521076	5447654	BMC, CH, TSB (None)	High	0.02 (03/04/14)	3.30 / 2.15	0.58	No	July 15 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 2 Non-Navigable	Moderate to high habitat potential for salmonids; close proximity to the Fraser River; multiple juvenile salmonids observed; capture of juvenile CH; least risk biological window proposed includes potential for spring spawners (e.g., CCT).	D or E
BC-770a	W1928.0	AK 1158.66	Unnamed Drainage	-	FB* (TBD)	10	520839	5447650	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Unnamed drainage; defaulted to fish-bearing; possible connectivity to the Fraser River; confirm whether a defined channel exists during final route walk.	-
BC-770b	W1929.0	AK 1158.80	Unnamed Drainage	Seasonal	NCD	10	520701	5447628	None (None)	Low	-	-	-	-	None	Open	Summer	Isolation if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert	Ramp and Culvert or other regulatory approved crossing method	(None)	Seasonal drainage; less than 100 m of continuous defined scour; no alluvial deposits; pockets of standing water and overland flow; water seeps into ditch along the upslope side of the Golden Ears Connector.	A or B
BC-770c	W1930.0	AK 1158.93	Unnamed Drainage (Wetland)	Seasonal	NCD-W	10	520652	5447730	None (None)	Low	-	-	-	Yes	None	Open	Summer	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendations	(None)	Vegetated swale through low-lying area; saturated soils, skunk cabbage, horse tail, and sedges; no continuous defined channel greater than 100 m; no fish habitat potential.	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland reclamation measures.
BC-770d	W1931.0	AK 1159.33	Leoran Creek	Perennial	S3	10	520330	5447965	CCT, CO, RB (CCT)	High	0.02 (09/10/14)	4.80 / 4.75	0.64	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Potentially Navigable	Leoran Creek has moderate to high habitat potential for salmonids; juvenile CO, CCT, RB and one adult RB were captured within the ZOI; good channel complexity and shading with abundant cover; constructed step-pools upstream from the PPC provide excellent rearing habitat; pockets of suitable substrate for spawning throughout.	D or E

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						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-770e	W1932.0	AK 1159.47	Unnamed Drainage	Seasonal	NCD	10	520206	5448035	None (None)	Low	-	-	-	-	None	Open	Summer	Isolation if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert	Ramp and Culvert or other regulatory approved crossing method	(None)	Seasonal drainage; no continuous defined channel greater than 100 m; water seeps from base of cemented riprap berm approximately 10 m upslope from centre of the PPC; stagnant ponded area located above berm; downslope from the PPC flow dissipates into ditch along the upslope side of the Golden Ears Connector.	A or B
BC-770f	W1933.0	AK 1159.51	Unnamed Channel	Seasonal	S4	10	520171	5448058	CCT, CO (None)	Low	-	1.45 / 0.97	0.11	No	August 1 - September 15	Open	Summer	Isolation with fish salvage if flowing	Open-cut if dry or frozen to bottom	Ramp and Culvert	Ramp and Culvert or other regulatory approved crossing method	Class 1 Non-Navigable	Small artificially built channel with low habitat potential for salmonids; juvenile CO and CCT captured in pool 150 m downstream (near BC-771), no fish captured upstream from confluence with BC-771; water originates from 250 mm pipe that drains a pond 50 m upstream from PPC; poor discharge and marginal channel definition; conduct precautionary fish salvage if flowing at the time of construction.	B or C
BC-771	W1802.0	AK 1159.66	Unnamed Channel	Seasonal	S4	10	520050	5448205	CCT (None)	High	0.22 (05/11/13)	1.11 / 1.00	0.39	No	August 1 - October 31	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring if flowing <sup>(1)</sup>	Open-cut if dry or frozen to bottom	Clear-Span Bridge	Clear-Span Bridge or other regulatory approved crossing method	Class 1 Non-Navigable	Moderate habitat potential for salmonids; juvenile CCT captured within the LSA; good connectivity to Fraser River; least risk biological window proposed includes potential for Pacific salmon.	C or D
BC-772	W1803.0	RK 1160.60	Unnamed Channel	Perennial	S3	10	519352	5448858	BMC, CH, TSB (None)	High	0.04 (02/04/14)	2.60 / 1.97	0.32	No	July 15 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Existing or Clear-Span Bridge	Existing or Clear-Span Bridge	Potentially Navigable	Moderate habitat potential for salmonids; juvenile CH captured within the LSA; low DO during the summer; least risk biological window proposed includes potential for CCT.	D or E
BC-773	W1804.0	RK 1161.68	Unnamed Drainage (Wetland)	Perennial	NCD-W (FB)	10	518517	5449562	CCT, RL, TSB (CCT, CO, TSB)	High	-	-	-	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	(None)	Large wetland complex with moderate habitat potential for salmonids; juvenile CCT were captured in the LSA in 2014; there are also historical records of CO; site was assessed approximately 200 m upstream from the PPC where three tributaries converge together to form BC-773 wetland complex; multiple beaver dams also observed upstream during 2014 fish and fish habitat assessment; potential beaver dam removal / Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5).	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland reclamation measures.

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						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-773c	W1934.0	AK 1162.77	Unnamed Drainage	-	FB* (TBD)	10	517686	5450105	(None)	Low	-	-	-	-	None	Open	Summer	Isolation with fish salvage if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	TBD	Ditch adjacent to CN Railway; possible connectivity to BC-774a which is fish-bearing (CO); risk manage as low sensitivity fish-bearing watercourse; confirm whether a defined channel exists during final route walk.	-
BC-774a	W1805.0	AK 1162.90	Centre Creek	Perennial	S3	10	517613	5450052	PMB, TSB, CO (None)	High	0.08 (23/05/14)	5.40 / 3.79	0.29	No	July 15 - September 15	July 15 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 3 Non-Navigable	Low to moderate habitat potential for CO; perennial habitat use may be limited by discharge, high water temperatures, and poor dissolved oxygen (3.88 mg/L recorded in May and 1.75 mg/L in July).	D or E
BC-774b	W1935.0	AK 1163.49	Unnamed Channel	Seasonal	S6	10	517145	5450430	None (None)	Low	0.01 (08/10/14)	0.82 / 0.71	0.30	Yes	None	Open	Summer	Isolation if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert or Clear-Span Bridge	Ramp and Culvert or Clear-Span Bridge or other regulatory approved crossing method	Class 1 Non-Navigable	Small seasonal watercourse with overland flow and sections of marginally defined channel; no continuous defined channel at the center of the PPC. Low fish habitat potential attributed to a lack of flow and downstream barriers (0.8 m drop, subsurface flow, riprap barrier and fish exclusion fence downstream from the Fraser Perimeter Road). No fish captured or observed.	B or C
BC-774c	W1936.0	AK 1163.59	Unnamed Drainage	Seasonal	NCD	10	517076	5450497	None (None)	Low	-	-	-	-	None	Open	Summer	Isolation if water present	Open-cut if dry or frozen to bottom	Ramp and Culvert	Ramp and Culvert or other regulatory approved crossing method	(None)	Small seasonal drainage with short sections of scour but no continuous defined channel greater than 100 m; no fish habitat potential attributed to a lack of channelization, poor connectivity and downslope riprap and culvert barriers at the Fraser Perimeter Road.	A or B
BC-776a	W1806.0	AK 1164.68	Unnamed Channel	Perennial	S3	10	516090	5450846	Salmonid (None)	High	-	2.10 / 1.78	0.24	No	August 1 - October 31	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 2 Non-Navigable	Moderate habitat potential for salmonids; close proximity to the Fraser River; least risk biological timing window proposed includes potential for Pacific salmon.	D or E
BC-777	W1807.0	AK 1165.37	Unnamed Channel	Perennial	S3	10	515514	5451070	CCT, CO (None)	High	0.03 (07/11/13)	4.40 / 2.12	0.25	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 1 Non-Navigable	Moderate habitat potential for salmonids; juvenile CO and CCT captured in the ZOI; close proximity to the Fraser River; perennial habitat use may be limited by low discharge and shallow residual pool depths.	C or D

Watercourse Crossing ID	UPI Unique ID	RK / AK	Watercourse Name	Flow Regime	Class	UTM Coordinates (NAD 83)			Fish Spp. Captured or Observed <sup>(5)</sup> (Previously Documented)	Sensitivity Rating	Morphological Parameters				Provincial Instream Work Window (MoE and DFO)	Least Risk Biological Window Proposed	Construction Season	Pipeline Crossing Method		Vehicle Crossing Method		Navigability Status	Site Specific Comments	Reclamation
						Zone	Easting	Northing			Flow (m³/s) (dd/mm/y)	Max / Mean Channel Width (m)	Mean Bank Height (m)	Movement Barriers				Recommended Primary	Recommended Contingency	Recommended Crossing Method Flowing	Recommended Crossing Method Dry/Frozen			
BC-777a	W1938.0	AK 1165.97	Unnamed Drainage (Wetland)	Seasonal	NCD-W	10	514997	5451119	None (None)	Low	-	-	-	Yes	None	Open	Summer	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendation s	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland crossing recommendations	(None)	Vegetated wetland; stagnant water (<10 cm deep) conditions and insufficient pool depths to support fish at the PPC; poor connectivity downslope from the PPC, attributed to a lack of suitable discharge and poor channel definition downslope from Hwy 17; amphibian salvage is recommended during construction.	Refer to Wetland Evaluation Technical Report of Vol. 5C (Filing ID A3S2H5) for general wetland reclamation measures.
BC-778	W1808.0	AK 1167.05	Tributary to Bon Accord Creek	Perennial	S3	10	513854	5451344	CCT, RB, TSB (CAS, CCT, CO, RB, TSB)	High	0.11 (06/11/13)	3.90 / 3.20	0.20	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 1 Non-Navigable	TSB captured at the PPC and juvenile RB and CCT were captured immediately downstream in Bon Accord Creek (35 m downstream); watercourse is not presently crossed by the proposed pipeline corridor.	C or D
BC-779	W1809.0	AK 1167.07	Bon Accord Creek	Perennial	S3	10	513844	5451382	CCT, RB, TSB (CAS, CCT, CO, RB, TSB)	High	0.13 (06/11/13)	3.84 / 3.31	0.27	No	August 1 - September 15	August 1 - September 15	Summer	Isolation with fish salvage and water quality monitoring <sup>(1)</sup>	Isolation with fish salvage and water quality monitoring during low flow <sup>(3)</sup>	Clear-Span Bridge	Clear-Span Bridge	Class 3 Non-Navigable	Moderate to high habitat potential for salmonids; juvenile RB and CCT were captured within the ZOI; abundant cover and suitable gravel exists throughout for spawning; close proximity to the Fraser River; watercourse is not presently crossed by the proposed pipeline corridor.	C or D
BC-780 <sup>(2)</sup>	W1810.0	AK 1167.54	Fraser River	Perennial	S1A	10	513822	5451854	None (BB, BCB, BMC, BNH, BSU, CAL, CAS, CCG, CCT, CH, CLA, CO, CM, CMC, CP, CSU, DV/BT, ESC, EU, GSG, KO, LDC, LKC, LNC, LSM, LSU, MSU, MW, NSC, PCC, PK, PL, PW, RB, RL, RSC, SFL, SH, SK, SST, SSM, ST, STC, TSB, WCT, WSG, WSU)	High	8351.00 (17/07/13)	556.0 / 451.0	2.83	No	August 1 - August 15	August 1 - August 15	Summer	HDD with water quality monitoring	Other regulatory approved trenchless method	Access both banks	Access both banks	Navigable	Important migratory corridor for Pacific salmon; supports multiple species of conservation concern, including EU, WSG, GSG, and MSU; instream construction should avoid key migration periods for Pacific salmon and other species of conservation concern; subject to semi-diurnal tidal movements (meso-tidal ranges).	Comply with Federal and Provincial Regulations

**Notes:**

1

Work should be completed within the least risk biological window proposed

2

Site requires Stage 2 review; refer to Project Design and Execution - Engineering of Volume 4A (Trans Mountain Pipeline ULC 2013; Filing ID A3S0Y8) for explanation and criteria of Stage 2 review crossings

3

Timing variance may be required (DFO Self-Assessment of Serious Harm and NEB/DFO review)

4

DFO Self-Assessment of Serious Harm and NEB/DFO review is required

5

Fish acronym definitions are provided in the Fish Species Acronym List (Page xii of this report)

RM

Risk Management crossings (*i.e.*, land access refusal)

SAR

Crossing has proposed critical habitat for one or more species at risk

\*

Crossing was assigned a precautionary default fish-bearing status, as sampling effort was insufficient to confirm it to be nonfish-bearing