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Appendix 19A: Cumulative Effects Assessment (AMEC E&I)

19 SUMMARY OF RESIDUAL EFFECTS

19.1 Summary of Potential Residual Effects

This section of the (Application) provides a tabular summary of the residual environmental, economic, social, heritage, or health effects anticipated to result from the proposed Blackwater Gold Project (the Project) (**Table 19.1-1** to **Table 19.1-7**).

The summary tables in this section refer to key mitigation measures that have been taken into account in the assessment of effects. The tables identify concluding statements related to significance including Significant or Not Significant (Negligible, Minor, or Moderate) for residual effects predicted to occur to Valued Components (VC) as a result of the Project including:

- Health pillar residual effects:
 - Four Not Significant (negligible);
 - Zero Not Significant (minor, moderate);
 - Zero Significant determinations;
- Heritage pillar residual effects:
 - Three Not Significant (negligible);
 - Zero Not Significant (minor, moderate);
 - Zero Significance determinations.
- Social pillar residual effects:
 - 17 Not Significant (negligible);
 - 44 Not Significant (minor);
 - Seven Not Significant (moderate);
 - Zero Significance determinations.
- Economic pillar residual effects:
 - Two Not Significant (negligible);
 - One Not Significant (minor);
 - Zero Not Significant (moderate);
 - Zero Significant determinations;
- Environmental pillar residual effects:
 - 30 Not Significant (negligible);
 - 36 Not Significant (minor);
 - 25 Not Significant (moderate); and
 - Zero Significance determination.

Conclusions related to the significance of residual effects carried into the Cumulative Effects Assessment (CEA) for the environmental pillar are:

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- One Not Significant (negligible);
- 14 Not Significant (minor);
- Four Not Significant (moderate); and
- One Significant determinations.

The significance determination is for grizzly bear mortality risk.

The significance of residual effects carried into the CEA in the social pillar concluded:

- One Not Significant (negligible);
- Seven Not Significant (minor);
- Five Not Significant (moderate); and
- One Significant determination.

The significance determination is for Current Land and Resource Use for Traditional Purposes (CLRUTP) in relation to TR0512T014 held by a Lhoosk'uz Dene Nation (LDN) member.

The three remaining pillars did not result in residual effects that are carried into the CEA. **Appendix 19A** summarizes the findings of the CEA conducted for the Project and provides concluding statements related to cumulative effects.

Table 19.1-8 provides a summary of the following criteria required by the federal Environmental Impact Statement (EIS) Guidelines (Agency 2012):

- Changes to components of the environment within federal jurisdiction;
- Changes to the environment that would occur on federal or transboundary lands;
- Changes to the environment that are directly linked or necessarily incidental to federal decisions; and
- Effects of changes to the environment on Aboriginal peoples.

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Table 19.1-1: Summary of Atmospheric and Acoustic Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Noise and vibration		Mine site	C	Noise above guidelines	Operate and maintain noise abatement systems on equipment and facilities. Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Noise and Vibration Management Measures (Section 5.2.2) 	Yes Noise above baseline	Low	Local	Medium - term	Continuous	Yes	Low	Not Significant (minor)	High	Medium
			O				Moderate	Local	Long - term	Continuous	Yes	Low	Not Significant (minor)	High	Medium
			CL				Low	Local	Medium - term	Continuous	Yes	Low	Not Significant (minor)	High	Medium
		Offsite infrastructure	C				Low	Local	Medium - term	Continuous	Yes	Low	Not Significant (minor)	High	Medium
			O				Moderate	Regional	Long - term	Continuous	Yes	Low	Not Significant (negligible)	High	Medium
			CL				Low	Local	Medium - term	Continuous	Yes	Low	Not Significant (minor)	High	Medium
Climate change		All	C; O; CL; PC	Production of GHG emissions from the combustion of fossil fuels that produce carbon dioxide (CO ₂), methane (CH ₄), and nitrous oxide (N ₂ O)	Purchase and maintain energy efficient equipment. Implement energy management programs. Adhere to the following EMP: <ul style="list-style-type: none"> Air Quality and Emissions Management Plan (AQEMP) (Section 12.2.1.18.4.9) Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) 	Yes Production of GHG emissions	Negligible	Global	Chronic	Continuous	No	Low	Not Significant (negligible)	Moderate	Moderate
Air quality		All	C; O; CL; PC	Changes in concentrations of the substances in the LSA.	Control dust through road maintenance including watering. Operate and maintain emission control equipment as per manufacturer's requirements (e.g. refuse incinerator). Adhere to the following EMP: <ul style="list-style-type: none"> Air Quality and Emissions Management Plan (AQEMP) (Section 12.2.1.18.4.9) Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) 	Yes Emissions of assessed pollutants	High	Local	Medium - term	Continuous	Yes	Low	Not significant (minor)	High	Moderate

Notes: ^{(2) to ⁽⁶⁾} refer to full definitions in Section 4 Methods.
⁽¹⁾ Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEAA 2012
⁽²⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)
⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure
⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.
⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity
⁽⁶⁾ Residual effect: Yes; No
⁽⁷⁾ Magnitude: Negligible; Low; Medium; High
⁽⁸⁾ Geographic Extent: Point: 100 m²; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA
⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent)
⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous
⁽¹¹⁾ Reversibility: Yes; No
⁽¹²⁾ Context: Low; Medium; High; n/a (not applicable)
⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant
⁽¹⁴⁾ Likelihood: Low; Moderate; High; n/a (not applicable)
⁽¹⁵⁾ Confidence: High; Moderate; Low

Table 19.1-2: Summary of Aquatic Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Surface water flow	✓	All	C	Change in surface water flow Davidson Creek (WMN 1-DC)	Maintain IFN in Davidson Creek by pumping water from Tatelkuz Lake. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Davidson Creek (WMN 1-DC) - Decrease in mean annual, peak and low surface water flow	Medium	Local	Short	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	C	Change in surface water flow Creek 705 (WMN 1-705)	No mine infrastructure within Creek 705 catchment. Reverse flow in Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT (from Davidson Creek to Creek 705).	Yes Creek 705 (WMN 1-705) - Increase in mean annual, peak and low surface water flow	Low	Regional	Short	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	O	Change in surface water flow Davidson Creek (WMN 1-DC)	Maintain IFN in Davidson Creek by pumping water from Tatelkuz Lake. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Davidson Creek (WMN 1-DC) - Decrease in mean annual, peak and low surface water flow	High	Local	Medium	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	O	Change in surface water flow Creek 661 (WMN 1-661)	Minimize mine infrastructure in Creek 661 catchment. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Creek 661 (WMN 1-661) - Decrease in mean annual, peak and low surface water flow	Low	Local	Medium	Continuous	No	*Context not applicable	Not significant (minor)	High	High
		All	O	Change in surface water flow Creek 705 (WMN 1-705)	No mine infrastructure within Creek 705 catchment. Reverse flow in Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT (from Davidson Creek to Creek 705).	Yes Creek 705 (WMN 1-705) - Increase in mean annual, peak and low surface water flow	Low	Regional	Medium	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	O	Change in surface water flow Chedakuz Creek (WN H5)	Add flow to Davidson Creek from reservoir during low flow conditions to reduce the impact. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Chedakuz Creek (WN H5) - Decrease in mean annual and low surface water flow	Medium	Regional	Medium	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	O	Change in surface water flow Tatelkuz Lake	Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Tatelkuz Lake	Negligible	Local	Medium	Continuous	Yes	*Context not applicable	Not significant (negligible)	High	High
Surface water flow	✓	All	CL	Change in surface water flow Davidson Creek (WMN 1-DC)	Maintain IFN in Davidson Creek by pumping water from Tatelkuz Lake. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Davidson Creek (WMN 1-DC) - Decrease in mean annual, peak and low surface water flow	High	Local	Long	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	CL	Change in surface water flow Creek 661 (WMN 1-661)	Minimize mine infrastructure in Creek 661 catchment. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Creek 661 (WMN 1-661) - Decrease in mean annual and peak surface water flow	Medium	Local	Long	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	CL	Change in surface water flow Creek 705 (WMN 1-705)	No mine infrastructure within Creek 705 catchment. Reverse flow in Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT (from Davidson Creek to Creek 705).	Yes Creek 705 (WMN 1-705) - Increase in mean annual, peak and low surface water flow	Low	Regional	Long	Continuous	No	*Context not applicable	Not significant (moderate)	High	High
		All	CL	Surface water flow Chedakuz Creek (WN H5)	Add flow to Davidson Creek from reservoir during low flow conditions to reduce the impact. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Chedakuz Creek (WN H5) - Decrease in mean annual and low surface water flow	Medium	Regional	Long	Continuous	Yes	*Context not applicable	Not significant (moderate)	High	High
		All	CL	Change in surface water flow	Adhere to the following EMP:	Yes Surface water flow	Negligible	Local	Long	Continuous	Yes	*Context not applicable	Not significant (negligible)	High	High

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾	
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾				
				Tatelkuz Lake	<ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Tatelkuz Lake										
Surface water flow	√	All	PC	Change in surface water flow Davidson Creek (WMN 1-DC)	Discharge TSF supernatant and seepage to restore flows in Davidson Creek. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Davidson Creek (WMN 1-DC) - Decrease in mean annual and low surface water flow	Low	Local	Chronic	Continuous	No	*Context not applicable	Not significant (minor)	High	High	
		All	PC	Change in surface water flow Creek 661 (WMN 1-661)	Discharge runoff and seepage from East Dump to restore flows in Creek 661. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Creek 661 (WMN 1-661) - Decrease in mean annual and low surface water flow	Medium	Local	Chronic	Continuous	No	*Context not applicable	Not significant (moderate)	High	High	
		All	PC	Change in surface water flow Creek 705 (WMN 1-705)	No mine infrastructure within Creek 705 catchment. Reverse flow in Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT (from Davidson Creek to Creek 705).	Yes Creek 705 (WMN 1-705) - Increase in mean annual, peak and low surface water flow	Low	Regional	Chronic	Continuous	No	*Context not applicable	Not significant (moderate)	High	High	
		All	PC	Change in surface water flow Chedakuz Creek (WN H5)	Discharge TSF supernatant and seepage to restore flows in Davidson and Chedakuz Creeks. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Surface water flow Chedakuz Creek (WN H5) - Decrease in low surface water flow	Low	Regional	Chronic	Continuous	No	*Context not applicable	Not significant (moderate)	High	High	
Surface water quality	√	All	PC	Change in water quality	<ul style="list-style-type: none"> Construct power line, water supply pipeline, new road alignment, and airstrip according to BMPs Implement erosion and sediment control plan during construction phase. No surface water discharged from the TSF, and all site contact surface water captured during operations and closure phases. Construct wetlands in Pond C, Pond D, ECD and water reservoir during the closure period and to polish seepage from the TSF. Minimize seepage release from mine facilities Adhere to the following EMP: <ul style="list-style-type: none"> Water Quality and Liquid Discharges Management Plan (WQLDMP) (Section 12.2.1.18.4.10) Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes Residual effects relate to potential exceedances of water quality guidelines, and are parameter-specific - sulphate	Low	Local	Chronic	Periodic	Yes	Low	Not significant (minor)	Moderate - High	Moderate - High	
Sediment quality	√	All	PC	Change in sediment quality	<ul style="list-style-type: none"> Limit sediment export during all phases by implementing erosion and sediment control plan during construction and no surface water discharge during operations and closure phases. Adhere to the following EMP: <ul style="list-style-type: none"> Water Quality and Liquid Discharges Management Plan (WQLDMP) (Section 12.2.1.18.4.10) Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) 	Yes Residual effects relate to potential exceedances of sediment guidelines (which are not presently above those guidelines) and are parameter-specific.	Low	Local	Chronic	Periodic	Yes	Low	Not significant (minor)	Low-Moderate	Moderate	

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾	
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾				
Groundwater Quantity	√	All	C	Change in groundwater flow	<ul style="list-style-type: none"> Cluster mine site components to reduce footprint. Establish seepage collection and pump back systems (e.g. ECD). Construct TSF dam cut-off wall; Establish water reservoir and Tatalkuz Lake pumping system to maintain surface and groundwater flows in Davidson Creek; Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes	Residual effects relate to very localized changes in groundwater flow, and are TSF-specific.	Negligible	Local	Short	Continuous	Yes	Low	Not Significant (negligible)	High	High
		All	O; CL;	Change in groundwater flow	<ul style="list-style-type: none"> Cluster mine site components to reduce footprint. Establish seepage collection and pump back systems (e.g. ECD). Construct TSF dam cut-off wall; Establish water reservoir and Tatalkuz Lake pumping system to maintain surface and groundwater flows in Davidson Creek; Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes	Residual effects relate to very localized changes in groundwater flow, and are TSF-specific.	Low	Local	Long	Continuous	Yes	Low	Not Significant (minor)	High	High
		All	PC	Change in groundwater flow	Adhere to the following EMP: <ul style="list-style-type: none"> Mine Water Management Plan (MWAMP) (Section 12.2.1.18.4.18) 	Yes	Residual effects relate to very localized changes in groundwater flow, and are TSF-specific.	Low	Local	Long	Continuous	Yes	Low	Not Significant (minor)	High	High
Groundwater quality	√	All	O; CL;	Change in groundwater quality	<ul style="list-style-type: none"> Naturally drain and route seepage from mine sources to the TSF by gravity or collection systems Segregate and submerge PAG/ML tailings and waste rock in TSF. Implement rapid assisted filling of pit lake in closure to minimize exposure of PAG walls and protect pit lake quality Treat process plant and LGO stockpile drainage prior to discharge to TSF. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) 	Yes	Residual effects here refer to changes in groundwater quality after mitigation that can reasonably be ascribed to the Project and not a result of natural groundwater quality variations.	Low	Local	Long	Continuous	Yes	Low	Not Significant (minor)	High	High
		All	PC	Change in groundwater quality	Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan (MWMP) (Section 12.2.1.18.4.17) 	Yes	Residual effects here refer to changes in groundwater quality after mitigation that can reasonably be ascribed to the Project and not a result of natural groundwater quality variations.	Low	Local	Long	Continuous	Yes	Low	Not Significant (minor)	High	High
Wetlands	√	All	C; O; CL	Loss of extent and wetland functions, and degraded wetland ecological, hydrological, biochemical, and habitat functions.	<ul style="list-style-type: none"> Avoid, minimize impacts, and compensate effects on wetlands. Adhere to the following EMP: <ul style="list-style-type: none"> Mine Waste Management Plan Wetlands Management Plan (WMP) (Section 12.2.1.18.4.3) 	Yes	Loss of wetland functions	Medium	Local	Long-term	Intermittent	Yes	Medium	Not Significant (moderate)	High	High
		All	PC	Loss of extent and wetland functions Degraded wetland ecological, hydrological, biochemical habitat functions.	<ul style="list-style-type: none"> Mine Waste Management Plan Wetlands Management Plan (WMP) (Section 12.2.1.18.4.3) 	Yes	Loss of wetland functions	Low	Local	Long-term	Intermittent	Yes	Medium	Not Significant (minor)	Moderate	Moderate
Fish	√	Mine Site	C; O; CL; PC	Loss of fish habitat (and hence of fish production) Mortality of individual fish or fish eggs under the mine footprint Fish mortality during fish salvage Mortality of individual fish or fish eggs due to stranding	<ul style="list-style-type: none"> Create, enhance and rehabilitate fish habitat, as described in the Fisheries Mitigation and Offsetting Plan (FMOP). Where instream construction is required, isolate work areas and salvage fish prior to starting work. Conduct instream construction during the Reduced Risk Timing Window for rainbow trout (15 July to 15 April of the following year) to avoid interruptions to spawning migrations and egg mortalities. Adhere to the following EMP:	Yes	Loss of fish on the mine site	High	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	No	Low	Not Significant (minor)	Moderate	High

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾				
					<ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 											
	√	Mine Site	O; CL	Direct mortality or injury to fish or fish eggs due to blasting	Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Disruption of salmonid homing to Davidson (Rainbow Trout & Kokanee)	Medium	Local	Medium-term (O) Long-term (CL)	Continuous	Yes	Low	Not Significant (moderate)	High	Moderate
		Mine Site	C; O; CL; PC	Interruption of fish passage upstream of the mine site footprint and alteration of fish migration patterns Reduced growth and survival of fish due to spills or leakage of fuels or deleterious substances into watercourses	<ul style="list-style-type: none"> Divert Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT of the Creek 705 Watershed to ensure downstream connectivity for these water bodies. Implement seepage management system including seepage collection ponds, seepage collection trenches, and an ECD to minimize seepage releases. Implement sediment and erosion control plans and no surface water discharge during operations and closure phases. Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Mercury mobilization in Lake 01682LNRS	Low	Local	Short-term (C) Medium-term (O; CL; PC)	Continuous	Yes	Medium	Not Significant (minor)	High	Moderate
		Freshwater Supply System	C; O; CL; PC	Adverse effects on fish health and mortality of fish embryos caused by increased sediment erosion	Implement erosion and sediment control measures. Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Changes in water temperature in Davidson Creek (Rainbow Trout & Kokanee)	Low	Local	(Rainbow Trout) Chronic (Kokanee) Short-term (C) Medium-term (O) Long-term (CL) Chronic (PC)	(Rainbow Trout) Once (C) Intermittent (O; CL) Continuous (PC) (Kokanee) Continuous (C; O; CL; PC)	(Rainbow Trout) N/A (C, O, CL) No (PC) (Kokanee) No	Low	Not Significant (minor)	High	Moderate
		Freshwater Supply System	C; O; CL	Reduced growth and survival caused by spills or leakage of fuels or deleterious substances into Tatelkuz Lake Mortality due to impingement of fish on intake pipe screens and entrainment into pumps	Install screens as required by DFO (1995, 2013) for intake pipes. Adherence to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Reduction in littoral fish habitat of Tatelkuz lake (Rainbow Trout & Kokanee)	Negligible	Local	Medium-term (O) Long-term (CL)	Continuous	Yes	Medium	Not Significant (negligible)	High	High
Fish habitat	√	Mine Site	C; O; CL; PC	Permanent alteration or destruction of fish habitat under the mine site components.	<ul style="list-style-type: none"> Cluster mine site components to reduce footprint and minimize the number of watersheds affected. Where no mitigation possible, implement the FMOP through construction of replacement habitat in Davidson Creek and other watersheds Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Loss of fish habitat under the mine site	High	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	No	Low	Not Significant (minor)	Moderate	High
		Mine Site	C; O; CL; PC	Isolation of fish habitat in: <ul style="list-style-type: none"> Reach 12 of Davidson Creek, including the headwater Lake 01682LNRS by the TSF Tributary Creeks 668328 and 636713 by the TSF Creek 704454 by the West Dump 	<ul style="list-style-type: none"> Divert Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT of the Creek 705 Watershed to ensure downstream connectivity for these water bodies. Offsetting plan, construction of replacement habitat in Davidson Creek and other watersheds in the region Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Change in fish habitat quality and availability in Davidson Creek as a result of changes in flows	(Rainbow Trout) Medium (C; PC) Low (O; CL) (Kokanee) Low (C; O; CL) Medium (PC)	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	N/A (C; O; CL) Yes (PC)	Low	Not Significant (moderate)	High	Moderate

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾					
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾								
Fish habitat	√	Mine Site	C; O; CL; PC	Change in water quality, including TSS, metals, and nutrients, in Davidson Creek as a result of seepage from the mine site	<ul style="list-style-type: none"> No surface discharge during operations and closure. Implement seepage management system Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) 	Yes	Change in fish habitat quality and availability in Creek 661 downstream of Creek 505659 as a result of changes in flows	Low	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	N/A (C; O; CL) Yes (PC)	Low	Not Significant (moderate)	High	Moderate				
				Change in water quality in Davidson Creek as a result of Tatelkuz Lake water input via the FSS		Change in water quality, including TSS, metals and nutrients, in Creek 661 as a result of upstream mine site activities	Change in water quality, including TSS, metals, and nutrients in Creek 705 as a result of diversion of Lake 01682LNRS into the Creek 705 watershed	Change to periphyton density, biomass and taxonomic composition in Davidson Creek, Creek 705 and Creek 661 as a result of change in water chemistry	Change to BMI density, biomass, and taxonomic composition in Davidson Creek, Creek 705 and Creek 661 as a result of change in water chemistry	Yes	Change in fish habitat quality and availability in Creek 661 upstream of Creek 505659 as a result of changes in flows	Low (C; O; CL) Negligible (PC)	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	N/A (C; O; CL) Yes (PC)	Low	Not Significant (moderate) (C; O; CL) Not Significant (negligible) (PC)	High	Moderate (C; O; CL) High (PC)
				Change in water temperature in Davidson Creek as a result of Tatelkuz Lake water input		Change to periphyton density, biomass and taxonomic composition as a result of water temperature changes	Change to BMI density, biomass and taxonomic composition as a result of water temperature change	Yes	Change in fish habitat quality and availability in Creek 705 as a result of changes in flows	Low	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	No	Low	Not Significant (moderate)	High	Moderate		
				Change in water temperature in Davidson Creek as a result of Tatelkuz Lake water input		Change to periphyton density, biomass and taxonomic composition as a result of water temperature changes	Change to BMI density, biomass and taxonomic composition as a result of water temperature change	Yes	Mercury mobilization in Lake 01682LNRS	Low	Local	Short-term (C) Medium-term (O; CL; PC)	Continuous	Yes	Medium	Not Significant (minor)	High	Moderate		
		Freshwater Supply System	C; O; CL	Loss of riparian habitat along the shoreline during construction, operations and closure Change in sediment composition and erosion around intake pipe Change in access to littoral habitat including, decreased food supply, cover and structure for fish due to intake pipes	<ul style="list-style-type: none"> Minimize disturbance during construction and control sediment and erosion. Install screens on intake pipelines. Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) Mine Water Management Plan (MWAMP) 	Yes	Change in fish habitat quality and availability in lower Chedakuz Creek as a result of changes in flows	Low	Local	Short-term (C) Medium-term (O) Long-term (CL) Permanent (PC)	Continuous	N/A (C; O; CL) Yes (PC)	Low	Not Significant (moderate)	High	Moderate				

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Fish Habitat		Freshwater Supply System	C; O; CL; PC	Increased sedimentation during construction of pipeline and housing structure	<ul style="list-style-type: none"> Minimize disturbance during construction and control sediment and erosion Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) Mine Water Management Plan (MWAMP) 	Yes Changes in water temperature in Davidson Creek	Low	Local	Chronic	Once (C) Intermittent (O; CL) Continuous (PC)	No	Low	Not Significant (minor)	High	High
		Freshwater Supply System	O; CL	Change in flow around pipe intake	Adhere to the following EMP: <ul style="list-style-type: none"> Aquatic Resources Management Plan (ARMP) (Section 12.2.1.18.4.2) Mine Water Management Plan (MWAMP) 	Yes Reduction in littoral fish habitat of Tatelkuz Lake	Negligible	Local	Medium-term (O) Long-term (CL)	Continuous	Yes	Low	Not Significant (negligible)	High	High

Notes: ⁽²⁾ to ⁽¹⁶⁾ refer to full definitions in Section 4 Methods.

⁽¹⁾ Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEAA 2012

⁽³⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)

⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure

⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.

⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity

⁽⁶⁾ Residual effect: Yes; No

⁽⁷⁾ Magnitude: Negligible; Low; Medium; High

⁽⁸⁾ Geographic Extent: Point: 100 m²; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA

⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent)

⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous

⁽¹¹⁾ Reversibility: Yes; No

⁽¹²⁾ Context: Low; Medium; High; n/a (not applicable)

⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant

⁽¹⁴⁾ Likelihood: Low; Moderate; High

⁽¹⁵⁾ Confidence: High; Moderate; Low

*Context not applicable - Refer to the EA sections dependent on surface water flow for ecological context.

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Table 19.1-3: Summary of Terrestrial Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾	
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾				
Physiography and topography		All	C; O; CL; PC	Alteration of baseline landscape. Terrain instability and accelerated erosion	<ul style="list-style-type: none"> A clearly defined, compact Project footprint minimizes the overall impact on terrain and landscape features. Maintain exposed slopes to prevent accelerated erosion of soils and surficial materials until permanent vegetation is established. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) 	Yes	Alteration of Landscape from Baseline Condition	Medium	Local	Chronic	Continuous	No	Medium	Not significant (moderate)	High	High
		All	C; O; CL; PC	Alteration of baseline landscape. Terrain instability and accelerated erosion		Yes	Terrain Stability and Accelerated Erosion	Low	Point	Short-term	Intermittent	Yes	Low	Not significant (negligible)	Low	High
Surficial geology and soil cover		All	C; O; CL; PC	Removal of overburden material; terrain instability and accelerated erosion; re-contouring land surface	<ul style="list-style-type: none"> Minimize disturbance to surficial deposits by minimizing the aerial extent of the Project footprint, utilizing areas of disturbance, and incorporating Project design features. Collect and store surface materials in ways that will maximize their effectiveness for use during reclamation as a growth medium to the extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) 	Yes	Removal and Relocation of Overburden Material	Low	Local	Chronic	Continuous	Yes	Low	Not significant (negligible)	High	High
		All	C; O	Soil disturbance		Yes	Soil disturbance	Low	Local	Chronic	Once (C) Intermittent (O)	Yes	Low	Not significant (negligible)	High	High
		All	CL	Soil replacement		Yes	Soil Redistribution	Low	Local	Chronic	Once	Yes	Low	Not significant (negligible)	High	High
Soil quality		All	C; O; CL; PC	Soil Contamination	<ul style="list-style-type: none"> Minimize disturbance to surficial deposits by minimizing the aerial extent of the Project footprint, utilizing areas of disturbance, and incorporating Project design features. Collect and store surface materials in ways that will maximize their effectiveness for use during reclamation as a growth medium to the extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Emergency and Spill Preparedness and Response Plan (ESPRP) (Section 12.2.1.18.4.13) 	Yes	Changes in the chemical or physical composition of the soil may affect vegetation Quality of reclamation material	Low	Point	Short-term	Intermittent	Yes	Low	Not significant (negligible)	High	High
		All	C; O; CL; PC	Terrain stability and accelerated erosion		Yes	Alteration and Loss of Soil due to Terrain Stability and Accelerated Erosion	Low	Point	Short-term	Intermittent	Yes	Low	Not significant (negligible)	Low	High
		All	C; O; CL	Dust deposition		Yes	Soil Contamination due to Dust Deposition	Negligible	Regional	Chronic	Intermittent (C; CL) Continuous (O)	Yes	Low	Not significant (negligible)	Low	High
		All	C; O	Soil Disturbance		Yes	Chemical and Physical Alteration due to Soil Disturbance	Low	Local	Long-term	Continuous (C) Intermittent (O)	Yes	Low	Not significant (negligible)	High	High
		All	CL	Soil redistribution		Yes	Physical Alteration due to Soil Redistribution	Low	Local	Chronic	Once	Yes	Low	Not significant (negligible)	High	High
Ecosystem composition	√	All	PC	Ecosystem loss	<ul style="list-style-type: none"> Minimize the mine footprint, the clearing of linear ROWs and access and areas of disturbance outside or adjacent to areas targeted for clearing Collect and store surface materials in ways that will maximize their effectiveness for use during reclamation as a growth medium to the extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Invasive Species Management Plan (ISMP) (Section 12.2.1.18.4.5) 	Yes	Ecosystem distribution Riparian ecosystems Old growth forest Traditional use plant habitat	Medium	Local	Long-term/Chronic	Once	Mine-related landforms (no) Natural landforms (yes)	Medium	Not significant (moderate)	High	Moderate
		All	PC	Nitrogen deposition		Yes	Ecosystem distribution Riparian ecosystems Traditional use plant habitat	Low	Local	Long-term	Intermittent	Yes	Low	Not significant (minor)	Moderate	Moderate

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
		All	PC	Spread invasive plants	Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Invasive Species Management Plan (ISMP) (Section 12.2.1.18.4.5) 	Yes Ecosystem distribution Riparian area Traditional use plant habitat	Low	Regional	Long-term	Intermittent	Yes	Low	Not significant (minor)	Moderate	Moderate
Plant species and ecosystems at risk	√	All	PC	Ecosystem loss	<ul style="list-style-type: none"> Reclaim whitebark pine loss due to clearing during construction and operations. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Invasive Species Management Plan (ISMP) (Section 12.2.1.18.4.5) 	Yes Ecosystem Loss on Plant Species and Ecosystems at Risk VC	Medium	Local	Chronic	Once	mine-related landforms – no natural landforms – yes	High	Not significant (moderate)	Moderate	Moderate
		All	PC	Nitrogen Deposition	Adhere to the following EMP: <ul style="list-style-type: none"> Air Quality and Emissions Management Plan (AQEMP) Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4) 	Yes Nitrogen Deposition on Whitebark Pine	Low	Local	Long-term	Once	Yes	High	Not significant (minor)	Moderate	Moderate
		All	PC	Whitebark pine regeneration	<ul style="list-style-type: none"> Reclaim the whitebark pine trees lost, as well as measures aimed at maintaining the existing population of Clark's nutcracker including supplemental feeding after mine operations and during reclamation until trees mature and produce sufficient seeds to the extent feasible. 	Yes Whitebark Pine Regeneration on Whitebark Pine	Medium	Local	Chronic	Once	Yes	High	Not significant (moderate)	Moderate	Low
Amphibians	√	All	C; O	Habitat loss and alteration	<ul style="list-style-type: none"> Avoid large scale clearing of old-growth forest to the extent feasible and implement wetland compensation measures. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of wetland and forest breeding, living and hibernation habitat	Negligible	Site-specific	Short-term	One time	Yes	Medium	Not significant (negligible)	Low	High
		All	C; O; CL; PC	Mortality risk	<ul style="list-style-type: none"> Implement adaptive management for possible road crossings, pre-construction surveys and salvage during breeding season. Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Direct mortality from collisions	Negligible	Site-specific	Short-term	Intermittent	Yes	Medium	Not significant (negligible)	Low	High
		All	C; O; CL; PC	Amphibian movements	<ul style="list-style-type: none"> Manage attractants Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable indirect mortality of amphibians	Negligible	Local	Short-term	Intermittent	Yes	Medium	Not significant (negligible)	Low	High
Water Birds		All	C; O; CL; PC	Habitat loss and alteration	<ul style="list-style-type: none"> Avoid wetlands and waterbodies to extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) Conceptual Wetlands Compensation Plan (Appendix 5.3.7A) 	Yes Unavoidable loss of habitat	Low	Site-specific	Short-term	Once	Yes	Low	Not significant (minor)	Moderate	High
		All	C; O; CL; PC	Mortality risk	<ul style="list-style-type: none"> Enforce speed limits Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Potential for increased mortality caused by vehicle and aircraft collisions, and increased hunter access.	Negligible	Site-specific	Short-term	Intermittent	Yes	Low	Not significant (negligible)	Low	High
		All	C; O; CL; PC	Changes in population dynamics	<ul style="list-style-type: none"> Manage chemicals such as road salt to reduce leaching into waterbodies. Adhere to the following EMP: <ul style="list-style-type: none"> Emergency and Spill Preparedness and Response Plan (ESPRP) (Section 12.2.1.18.4.13) 	Yes Potential for increased mortality caused by increased predator access related to alternate prey increases near roads.	Negligible	Site-specific	Short-term	Intermittent	Yes	Low	Not significant (negligible)	Low	High

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Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Forest and Grassland Birds	√	All	C; O; CL; PC	Habitat loss and alteration	<ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat Forest and Grassland Birds (not including Clark's Nutcracker)	Low	Local	Chronic	One time	Yes (mine site, transmission line, freshwater supply pipeline and access road) No (FSR)	Low	Not significant (minor)	High	High
		All	C; O; CL; PC		<ul style="list-style-type: none"> Progressive reclamation with appropriate species, maintain forest function and vegetation cover. Replanting of whitebark pine during operations, closure and post closure. Potential for supplemental feeding and augmentation if needed, radio-tagging and monitoring use and movement of nutcrackers. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat for Clark's Nutcracker	Moderate	Local	Chronic	One time	Yes	Medium	Not significant (moderate)	High	Low
Moose	√	All	C; O; CL; PC	Habitat loss and alteration	<ul style="list-style-type: none"> Avoid large scale clearing of old-growth forest and implement wetland compensation measures. Implement adaptive measures to respond to presence of moose in proximity to the mine or access issues along transmission ROW or fresh water pipeline ROW. Adhere to the following EMP: <ul style="list-style-type: none"> Sediment and Erosion Control Plan (SECP) (Section 12.2.1.18.4.1) Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss or degradation of habitat	Low	Local	Short-term	One time	Yes long-term (mine site, airstrip, transmission line and access road) No (FSR)	Medium	Not significant (negligible)	Low	High
		All	C; O; CL; PC	Mortality risk	<ul style="list-style-type: none"> Manage chemical hazards and attractants and their use on roadways and around the mine site. Restrict access to only individuals working directly for the Proponent; gate access points and close mine roads when no longer required after mine reclamation Implement no hunting and no firearm policy Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) Reclamation and Closure Plan (RCP) (Section 2.6) Country Food Monitoring Plan (CFMP) (Appendix 9.2.2B) 	Yes Unavoidable direct mortality of moose	Low	Local	Long-term	Intermittent	Yes	Medium	Not significant (minor)	Low	Moderate
		All	C; O; CL	Changes in Moose Movement Patterns	<ul style="list-style-type: none"> Minimize Project footprint. Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable displacement from habitats near mine site, access road or airstrip	Low	Local	Long-term	Intermittent	Yes	Medium	Not significant (minor)	Low	High
		All	C; O; CL; PC	Changes in Moose Population Dynamics	Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable indirect mortality of moose Change in predator-prey dynamics	Low	Local	Long-term	Intermittent	Yes	Medium	Not significant (minor)	Low	High
Caribou	√	All	C; O; CL; PC	Habitat Loss and Alteration	<ul style="list-style-type: none"> Implement progressive reclamation with appropriate species to accelerate reclamation of preferred caribou habitat through silviculture methods. Avoid large scale clearing of old-growth forest and lichen rich stands to extent feasible. Implement adaptive measures to respond to presence of caribou in proximity to the mine. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) Reclamation and Closure Plan (RCP) (Section 2.6) 	Yes Unavoidable loss of lichen habitat during the life of the Project	Low	Local	Chronic	One time	Yes	High	Not significant (moderate)	High	High

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
		All	C; O; CL	Change in Caribou Mortality Risk	<ul style="list-style-type: none"> Restrict access to only individuals working directly for the Proponent; gate access points and close mine roads when no longer required after mine reclamation Implement no hunting policy Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Direct mortality from collisions or poaching	Low	Local	Long-term	Intermittent	Yes	High	Not significant (negligible)	Low	High
		All	C; O; CL	Changes in Caribou Population Dynamics	Commitment to work with other resource users, government and First Nations on metapopulation studies and mitigation Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable indirect mortality of caribou due to increases in prey density or wolves	Low	Local	Long-term	Intermittent	Yes	High	Not significant (minor)	Low	High
Grizzly Bear		All	C; O; CL	Habitat Loss and Alteration	<ul style="list-style-type: none"> Avoid large scale clearing of old-growth forest to the extent feasible. Primary areas of concern are mature and old-growth forests in the mine site and the transmission line. Avoid clearing and development in berry and Kokanee areas to the extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat	Low	Local	Chronic	One time	Yes (mine site, transmission line, freshwater supply pipeline and access road) No (Forest Service Road)	Low	Not significant (minor)	High	High
		All	C; O; CL	Grizzly Bear Mortality	<ul style="list-style-type: none"> Restrict access to only individuals working directly for the Proponent; gate access points and close mine roads when no longer required after mine reclamation Implement no hunting policy Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable mortality of grizzly bears	Low	Local	Long-term	Continuous	Yes	Low	Not significant (minor)	High	High
Furbearers		All	C; O; CL; PC	Habitat Loss and Alteration (Except Beaver)	<ul style="list-style-type: none"> Avoid large scale clearing of old-growth forest to the extent feasible. Primary areas of concern are mature and old-growth forests in the mine site and the transmission line. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat (except Beaver)	Negligible	Local	Chronic	One time	Yes	Low	Not significant (minor)	High	High
		All	C; O; CL; PC	Habitat Loss and Alteration (Beaver)	<ul style="list-style-type: none"> Avoid large scale clearing of old-growth forest to the extent feasible Primary areas of concern are mature and old-growth forests in the mine site and the transmission line. Avoid clearing and development of berry and kokanee areas. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat for beaver	Negligible	Local	Chronic	One time	Yes	Low	Not significant (negligible)	High	High
		All	C; O; CL; PC	Mortality Risk (Beaver)	<ul style="list-style-type: none"> Restrict access to only individuals working directly for the Proponent; gate access points and close mine roads when no longer required after mine reclamation Implement no hunting policy Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable direct mortality of beaver	Negligible	Local	Long-term	Intermittent	Yes	Low	Not significant (minor)	Low	High
		All	C; O; CL; PC	Changes in Beaver Health	<ul style="list-style-type: none"> Manage attractants during construction, operation, and decommissioning and closure. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMP) (Section 12.2.1.18.4.4) Reclamation and Closure Plan (RCP) (Section 2.6) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) Emergency and Spill Preparedness and Response Plan (ESPRP) (Section 12.2.1.18.4.13) 	Yes Unavoidable indirect mortality of beaver	Negligible	Local	Long-term	Intermittent	Yes	Low	Not significant (negligible)	Low	High

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Bats		All	C; O; CL	Habitat Loss and Alteration	<ul style="list-style-type: none"> Provide bat roost and maternal boxes in suitable habitat near clearings. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat	Negligible	Local	Short-term	Once	Yes	Low	Not significant (negligible)	High	High
		All	C; O; CL	Mortality Risk	Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable mortality	Negligible	Local	Short-term	Intermittent	Yes	Low	Not significant (negligible)	Low	High
Invertebrates		All	C; O; CL; PC	Habitat Loss and Alteration	Avoid black spruce bogs and wetlands, or maintain hydrologic functions to the extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable loss of habitat	Low	Local	Chronic	Once	Yes	Low	Not significant (minor)	High	Moderate
		All	C; O; CL	Mortality Risk	Avoid black spruce bogs and wetlands, or maintain hydrologic functions to the extent feasible. Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Unavoidable mortalities	Low	Site-specific	Ongoing	Intermittent	Yes	Low	Not significant (negligible)	Low	High
		All	C; O; CL	Invertebrate Health	Adhere to the following EMP: <ul style="list-style-type: none"> Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) Water Quality and Liquid Discharges Management Plan (WQLDMP) (Section 12.2.1.18.4.10) 	Yes Unavoidable mortalities	Low	Site-specific	Ongoing	Intermittent	Yes	Low	Not significant (negligible)	Low	High

Notes: ^{(2) to ⁽¹⁶⁾} refer to full definitions in Section 4 Methods.

⁽¹⁾ Indicate by a check mark which valued components can be considered “environmental effects” as defined in section 5 of CEEA 2012

⁽²⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)

⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure

⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.

⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity

⁽⁶⁾ Residual effect: Yes; No

⁽⁷⁾ Magnitude: Negligible; Low; Medium; High

⁽⁸⁾ Geographic Extent: Point: 100 m² ; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA

⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent)

⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous

⁽¹¹⁾ Reversibility: Yes; No

⁽¹²⁾ Context: Low; Medium; High; Wildlife VCs use the word “Moderate” as opposed to “Medium” in their assessment

⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant

⁽¹⁴⁾ Likelihood: Low; Moderate; High

⁽¹⁵⁾ Confidence: High; Moderate; Low

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Table 19.1-4: Summary of Economic Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Provincial economy		All	CL	Direct effects: these are associated with employment, expenditures, and payments to governments directly by the proponent and industries directly supplying goods and services used by the Project; Indirect effects: these are associated with all industries in the supply chain that are ultimately supplying the goods and services used by the industries that will directly supply the proposed Project.	Negative effects of mine closure on economic activity, employment, and government revenue are unavoidable. Mitigating these effects occurs at a regional level, and not at a provincial level.	Yes	Low	Provincial	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	High	High
Regional and local employment and businesses		All	CL	The direct effects of the Project have been estimated based on Project information on employment requirements, and expectations for employment of local and regional residents in the context of other current and reasonably anticipated projects and activities in the Project area. Project effects on local and regional businesses have been estimated in terms of indirect economic impacts, based on the amount of Project-related purchases of goods and services, and impact estimates from the BC IOM. Potential induced effects have been estimated using regional impact ratios that BC Stats developed for LERs based on 2006 census information.	The overall net effects of Project construction and operations on regional and local employment and businesses are positive and do not require mitigation. While mitigation is not required, there are opportunities for enhancement of local and regional benefits through increasing the percentage of direct employment and procurement of Project goods and services acquired from regional suppliers.	Yes	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	Moderate
Regional and local government finance		All	CL	The Project is anticipated to have no adverse effects on local or municipal government finances, either directly or indirectly.	Overall net effects of Project construction and operations on local and regional government revenues are neutral and positive and do not require mitigation. Negative effects on regional and local government revenues that would result from mine closure are unavoidable and cannot be mitigated.	Yes	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	High	High

Notes: ⁽²⁾ to ⁽¹⁶⁾ 2-15 refer to full definitions in Section 4 Methods.

⁽¹⁾ Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEAA 2012

⁽²⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)

⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure

⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.

⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity

⁽⁶⁾ Residual effect: Yes; No

⁽⁷⁾ Magnitude: Negligible; Low; Medium; High

⁽⁸⁾ Geographic Extent: Point: 100 m²; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA

⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent)

⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous

⁽¹¹⁾ Reversibility: Yes; No; n/a = not applicable

⁽¹²⁾ Context: Neutral; High;

⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant

⁽¹⁴⁾ Likelihood: Low; Moderate; High

⁽¹⁵⁾ Confidence: High; Moderate; Low

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Table 19.1-5: Summary of Social Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Demographics		All	C	In-migration of construction workers	<ul style="list-style-type: none"> Establish a construction camp. Establish an airstrip to transport construction workers from outside the SERSA Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes No appreciable population effect on the communities of the SERSA is expected	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
		All	O	In-migration of workers and their dependents	<ul style="list-style-type: none"> Develop and hire the majority of the operations workforce from within the SERSA to the extent feasible. Establish an operations camp to accommodate workers Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes In-migration of workers and their dependants would create minor changes in the SERSA population	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High
		All	CL	Out-migration of operations workers and their dependents	<ul style="list-style-type: none"> Hire the majority of the CL workforce from within the SERSA. Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Out-migration of operation workers could create minor changes in the SERSA population	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (negligible)	Moderate	High
Regional and community infrastructure		All	C	In-migration creates additional housing demand	<ul style="list-style-type: none"> Establish a construction camp. Establish an airstrip to transport construction workers from outside the SERSA Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes No appreciable increase in housing demand is expected	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
		All	O	In-migration of workers and dependants creates additional housing demand	<ul style="list-style-type: none"> Develop and hire the majority of the operations workforce from within the SERSA. Establish an operations camp to accommodate workers Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Increase in housing demands that are within the current SERSA capacity and approved expansion plans	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
		All	CL	Out-migration of workers decreases housing demand	<ul style="list-style-type: none"> Work with the SERSA communities to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Decrease in housing demands due to potential out-migration of workers	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (negligible)	Moderate	High

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Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Key Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects After Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Regional and community infrastructure		All	C	In-migration creates additional demand for utilities	<ul style="list-style-type: none"> Establish a construction camp to accommodate workers to offset Project's demands for utility services Establish an to transport construction workers from outside the SERSA Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes No appreciable increase in demand for utilities is expected	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
		All	O	In-migration creates additional demand for utility services Project activities could create additional demand for solid waste disposal facilities	<ul style="list-style-type: none"> Hire the majority of the operations workforce from within the SERSA to the extent feasible Provide incentives and inducements for workers who are interested in moving in permanently to the LSA Adhere to the following EMP: <ul style="list-style-type: none"> Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) Industrial and Domestic Waste Management Plan (Section 12.2.1.18.4.11) 	Yes Increase in demands for utility services that are within the current SERSA capacity and approved expansion plans	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
		All	CL	Out-migration decreases demand for utility services	No mitigation required	Yes Out-migration of workers could reduce demands for utilities	Low	Regional	Long-term	Continuous	Yes	High	Not Significant (negligible)	Moderate	High
Regional and community infrastructure		All	C	In-migration creates additional demand for recreation and leisure services	<ul style="list-style-type: none"> Establish a construction camp to accommodate workers to offset Project's demands for recreation and leisure services Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes No appreciable increase in demand for recreation and leisure services is expected	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
		All	O	In-migration creates additional demand for recreation and leisure services	<ul style="list-style-type: none"> Hire the majority of the operations workforce from within the SERSA to the extent feasible Establish an operations camp with indoor and outdoor recreation facilities to offset Project's demands for recreation and leisure services Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Increase in demands for recreational facilities that are within the current SERSA capacity and approved expansion plans	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
		All	CL	Out-migration decreases demand for recreation and leisure services	<ul style="list-style-type: none"> Work with local service providers to incorporate potential decline in population in planning during closure Work with the community to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Out-migration of workers could reduce demands for recreational and leisure services	Low	Regional	Long-term	Continuous	Yes	High	Not Significant (negligible)	Moderate	High

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Regional and community infrastructure	All	All	C	Transportation of workers, equipment, services and materials to/from mine site and off site infrastructure creates additional vehicle traffic, increased potential for motor vehicle accidents, and increased road wear and maintenance	<ul style="list-style-type: none"> Bus construction workers from Vanderhoof and establish an airstrip to reduce traffic volume Upgrade a bridge and small section of Kluskus FSR Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Risk of motor vehicle accidents and road wear within normal range for Hwy 16 and FSRs	Low - Medium	Local - Regional	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	Low	High
	All	All	O	Transportation of workers, equipment, services and materials to/from mine site creates additional vehicle traffic, increased potential for motor vehicle accidents and increased road wear and maintenance	<ul style="list-style-type: none"> Bus operations workers between Vanderhoof and mine to reduce traffic volume Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Risk of motor vehicle accidents and road wear within normal range for Hwy 16 and FSRs	Low - Medium	Local - Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Low	High
	All	All	CL	Transportation of workers, equipment, services and materials to/from mine site and off site infrastructure creates additional vehicle traffic, increased potential for motor vehicle accidents and increased road wear and maintenance	<ul style="list-style-type: none"> Provide busing for closure workers between Vanderhoof and mine to reduce traffic volume Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes With sharp decline in workforce and truck traffic, no noticeable effect on motor vehicle safety and road wear	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
Regional and local services	All	All	C	In-migration affects demand for education services	<ul style="list-style-type: none"> Establish a construction camp to limit in-migration and any related demands for school services. Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes No appreciable increase pressures for education services is expected	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
	All	All	CL	Out-migration decreases demand for education services	<ul style="list-style-type: none"> Work with local service providers to incorporate decline in population in planning during closure. Work with the community to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine. Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Out-migration of workers could slightly reduce demands for education services	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (negligible)	Moderate	High
	All	All	C	In-migration affects demand for health services	<ul style="list-style-type: none"> Establish a construction camp and worker rotation policies to offset Project's demands for health services. Adhere to the following EMP: <ul style="list-style-type: none"> Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes Increase in demands for health services that are within the current SERSA capacity	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Moderate	High
	All	All	O	In-migration creates additional demand for health services	<ul style="list-style-type: none"> Establish an operations camp to offset Project's demands for health services. 	Yes Increase in demands for health services that are within the current SERSA capacity	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High
	All	All	CL	Out-migration decreases demand for health services	<ul style="list-style-type: none"> Work with local service providers to incorporate decline in population in planning during mine closure. Work with the community to develop a mine closure plan that identifies strategies and 	Yes Out-migration of workers could reduce demands for health services	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹¹²⁾				
					actions to help minimize the potential adverse effects of closing the mine.											
	All		C	Traffic volumes to and from mine site increase demand for protective services if accidents occur	<ul style="list-style-type: none"> Work closely with Northern Health, local fire departments, RCMP, and BC Ambulance to ensure that the appropriate information on the changes in area transportation volumes, mine operations, and the change to the local population are considered. Provide full firefighting equipment and trained personnel to meet all onsite fire and rescue needs. Provide at the mine site trained mine rescue personnel and mine rescue equipment as well as onsite security. 	Yes Increase in demands for protective services	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Moderate	High	
	All		O	In-migration creates additional demand for protective services	<ul style="list-style-type: none"> Hire the majority of the operations workforce from within the SERSA to the extent feasible. 	Yes Traffic volume, mine operations, and in-migration create demand for regional services	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High	
	All		CL	Out-migration decreases demand for protective services	<ul style="list-style-type: none"> Work with local service providers to incorporate decline in population in planning during mine closure. Work with the community to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine. 	Yes Decline in traffic volume and closure of mine operations, and out-migration of population decrease demand for regional services	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High	
	All		C	In-migration creates additional demand for social services	<ul style="list-style-type: none"> Establish a construction camp to offset Project's demands for social services. Implement a no alcohol or drugs onsite policy. Establish a respectful workplace, no harassment, safety and security, multi-cultural workforce considerations, and Aboriginal awareness training. 	Yes No appreciable increase in demand for social services is expected	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High	
	All		O	In-migration creates additional demand for social services	<ul style="list-style-type: none"> Hire the majority of the operations workforce from within the SERSA to the extent feasible. Establish an operations camp to offset Project's demands for social services 	Yes Increase in demands for social services that are within the current SERSA capacity	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High	
	All		CL	Out-migration decreases demand for social services	<ul style="list-style-type: none"> Work with local service providers to incorporate decline in population in planning during mine closure. Work with the community to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine. 	Yes Out-migration of workers could reduce demands for social services	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High	

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Family and community well-being	All	All	CL	Loss of jobs and income could increase economic hardship and income assistance dependency	<ul style="list-style-type: none"> Work with the community to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine; and Work with local education providers to facilitate access to training programs and skills upgrading 	Yes Reduction of employment income and potential increase of economic hardship	Low - Medium	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High
	All	All	C	Influx of workers could create negative behavioural changes and reduce family and community well-being if transient population engages in socially disruptive or illegal activities	<ul style="list-style-type: none"> Offer counselling services as well as cultural awareness training and harassment-free workplace to employees; and Work with local agencies to assist in monitoring community well-being and to take corrective actions where appropriate. 	Yes No substantial increase in disruptive or illegal activities is expected since no appreciable migration is anticipated during construction	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
	All	All	O	Influx of workers could create behavioural changes that affect family and community well-being	<ul style="list-style-type: none"> Offer counselling services as well as cultural awareness training and harassment-free workplace to employees; and Work with local agencies to assist in monitoring community well-being and to take corrective actions where appropriate. 	Yes Reduction of community well-being if in-migrant families engaged in socially disruptive activities or families spend their additional income in disruptive or illegal activities	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	Moderate
	All	All	C	Separation of workers from family and dependants for extended periods of time could lead to deterioration of family relationships.	<ul style="list-style-type: none"> Offer counselling services as well as cultural awareness training and harassment-free workplace to its employees; and Work with local agencies to assist in monitoring community well-being and to take corrective actions where appropriate. 	Yes Potential deterioration of family relationships	Low	Regional	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	Moderate
	All	All	O	Separation of workers from family and dependants for extended periods of time could lead to deterioration of family relationships	<ul style="list-style-type: none"> Deposit workers' salaries in their bank accounts and provide access to money management training; Offer reasonably short shift rotations to minimize separation from family (14 days on/14 days off and 4 days on/3 days off) and allow flexibility to accommodate hard to fill positions; Ensure phone and Internet services are available to enable employees to communicate with their families 	Yes Potential deterioration of family relationships	Low	Regional	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	Moderate

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Non-traditional land and resource use	√	Mine site study area	C, O, CL	Disruption and potential loss of trapping, guide outfitting areas and fishing areas. Disturbance and disruption to agricultural and range land practices, equipment, and livestock, disturbance or compaction of topsoils and subsoils, and the potential spread of noxious weeds.	Ongoing communication with trappers, guide outfitters, farmers, ranchers, livestock and stakeholders to resolve issues when required and/or if applicable. Inform water-based recreational stakeholders about construction activities in advance i.e., Northwest Brigade Paddling Club, nearby lodges, the local offices of BC FLNRO. Adhere to the following EMP: <ul style="list-style-type: none"> • Transportation and Access Management Plan (TAMP) (Section 12.2.1.18.4.14) • Landscape, Soils and Vegetation Management and Restoration Plan (LSVMRP) (Section 12.2.1.18.4.4) • Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) 	Yes Recreation/Tourism Use; Hunting, Trapping, and Guide Outfitting	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
						Yes Mining Exploration and Mineral Tenures; Forestry and Timber Resource Use	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
	√	Mine site access road	C, O, CL	Contribution to spreading of the mountain pine beetle infestation, associated with all Project components; disruption of forestry-related activities, forestry access, and FSRs.		Yes Recreation/Tourism Use; Agriculture and Grazing	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
	Yes Forestry and Timber Resource Use					Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High	
	√	Mine site access road	C, CL	Noise effects and emissions and dust generation associated with all Project components' infrastructure development may temporarily disrupt land and resource use activities (i.e., trapping, guide outfitting, mining exploration and forestry, and recreation and tourism activities), users, and local residents.		Yes Hunting, Trapping, and Guide Outfitting	Low	Local	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
						Yes Recreational and Commercial Use of Waterways	Low	Local	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
	√	Airstrip	C, O, CL	Loss and disruption of Crown tenure lands and activities, associated with mine footprint, transmission line, water supply line, access roads, and airstrip.		Yes Recreation/Tourism Use; Agriculture and Grazing	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
						Yes Mining Exploration and Mineral Tenures; Forestry and Timber Resource Use	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
	√	Water Supply	C, O, CL	Disturbance to water use areas (licensed groundwater wells) during construction. Impediment to safe navigation and temporary access restrictions across waterways that interact with Project crossings and facilities. Transmission corridor and access roads will create new linear access where access corridors are currently non-existent. This enhances consumptive and non-consumptive recreational uses as a result of year-round access and may lead to conflicts between resource users		Yes Hunting, Trapping, and Guide Outfitting	Low	Local	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
						Yes Recreation/Tourism Use; Agriculture and Grazing	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
	√	Transmission Line	C, O, CL			Yes Mining Exploration and Mineral Tenures; Forestry and Timber Resource Use	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
						Yes Land Ownership (Private Lands)	Medium	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
	√	FSR	C, O, CL			Yes Surface Water and Groundwater Resource Use	Low	Local	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	High	High
						Yes Recreational and Commercial Use of Waterways	Low	Local	Short-term	Continuous	Yes	Neutral	Not Significant (minor)	High	Moderate
	√					Yes Transportation and Access	Low	Local	Long-term	Intermittent	Yes	Neutral	Not Significant (minor)	High	High
Yes Land Ownership (Private Lands)					Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	Moderate		
√				Yes Recreation/Tourism Use; Forestry and Timber Resource Use; Agriculture and Grazing; Transportation and Access	Low	Local	Long-term	Continuous	Yes	Neutral	Not Significant (minor)	Moderate	High		

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							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Current Land and Resource Use for Traditional Purposes	✓	All	C; O; CL; PC	Lhoosk'uz Dene Nation (LDN): Change in area for traditional land and resource uses (hunting, trapping, fishing and plant harvesting)	<ul style="list-style-type: none"> Establish a group including potentially affected Stakeholders and Aboriginal group representatives to discuss access management for the transmission line corridor. Wildlife Management Plan (WLMP) (Section 12.2.1.18.4.6) Adhere to the following EMP:	Yes LDN - Hunting	Medium	Local	Long-term	Continuous	Yes	High	Not Significant (moderate)	High	Moderate
		All	C; O; CL; PC	Change in access to areas used for traditional uses (hunting, trapping, fishing and plant harvesting)		Yes LDN - Trapping	Low/Medium	Site- specific	Long term	Continuous	Yes	High	Not Significant (minor)	High	High
		All	C; O; CL; PC	Change to wildlife and aquatic habitat		Yes LDN - Fishing	Low	Site- specific	Permanent	Continuous	No	High	Not Significant (minor)	High	Moderate
		All	C; O; CL; PC	Change to wildlife and aquatic habitat		Yes LDN - Plant Gathering	Low	Site- specific	Long term	Continuous	Yes	High	Not Significant (minor)	High	Moderate
		All	C			Yes LDN - Other Cultural and Traditional Uses of the Land (trails)	Low	Site- specific	Shor term	Once	Yes	High	Not Significant (negligible)	High	High
		All	C; O; CL; PC	Ulkatcho First Nation (UFN): Change in area for traditional land and resource uses (hunting, trapping, fishing and plant harvesting)		Yes UFN - Hunting	Medium	Local	Long-term	Continuous	Yes	High	Not Significant (moderate)	High	Moderate
		All	C; O; CL; PC	Change in access to areas used for traditional uses (hunting, trapping, fishing and plant harvesting)		Yes UFN - Trapping	Low/Medium	Local	Long-term	Continuous	Yes	High	Not Significant (minor)	High	Moderate
		All	C; O; CL; PC	Change to wildlife and aquatic habitat		Yes UFN - Fishing	Low	Site- specific	Permanent	Continuous	No	High	Not Significant (minor)	High	Moderate
		All	C; O; CL; PC	Change to wildlife and aquatic habitat		Yes UFN – Plant Gathering	Low	Site- specific	Long-term	Continuous	Yes	High	Not Significant (minor)	High	Moderate
		All	C; O; CL; PC			Yes UFN - Other Cultural and Traditional Uses of the Land (trail at mine site and CMTs)	Low	Site- specific	Permanent	Continuous	No	High	Not Significant (minor)	High	Moderate
All	C		Yes UFN - Other Cultural and Traditional Uses of the Land (Messue Wagon Trail)	Low	Site- specific	Short-term	Once	Yes	High	Not Significant (negligible)	High	High			
Visual resources		Transmission Line	C; O; CL; PC	Evaluation site is the Stellako River and the sensitive receptor is the Stellako River Crossing	Adhere to the following EMP: <ul style="list-style-type: none"> Visual Resources and Aesthetics Management Plan (VRAMP) (Section 12.2.1.18.4.8) 	Yes Stellako River Crossing Point	Medium	Local	Long-term	Intermittent	Yes	Neutral	Not Significant (moderate)	High	High
		Transmission Line	C; O; CL; PC	Evaluation site is the Cheslatta Trail and the sensitive receptor is the Recreation/Heritage Trail		Yes Cheslatta Trail Crossing Point	Low	Local	Long-term	Intermittent	Yes	Neutral	Not Significant (minor)	High	High
		Transmission Line	C; O; CL; PC	Evaluation site is the Nechako River Valley and the sensitive receptor is the Nechako River Crossing Point		Yes Nechako River Crossing Point	Medium	Local	Long-term	Intermittent	Yes	Neutral	Not Significant (moderate)	High	High
		Transmission Line	C; O; CL; PC	Evaluation site is the Brewster Lake and the sensitive receptor is the Brewster Lake Recreation Site		Yes Brewster Lake Recreation Site	Low	Local	Long-term	Intermittent	Yes	Neutral	Not Significant (minor)	Low	Moderate
		All	C; O; CL; PC	Evaluation site Tatelkuz Lake with various sensitive receptors including the following: Tatelkuz Lake Ranch Resort		Yes Tatelkus Lake Southeast Recreation Reserve	Medium	Local	Chronic (permanent)	Continuous	No	Neutral	Not Significant (moderate)	Moderate	Moderate
		All	C; O; CL; PC	Tatelkuz Lake South Recreation Site		Yes Dykam Ranch	Medium	Local	Chronic (permanent)	Frequent	No	Neutral	Not Significant (moderate)	Moderate	Moderate
		All	C; O; CL; PC	Messue Wagon Road Trail Tatelkus Lake Southeast Recreation Reserve Dykan Ranch Tatelkus Lake Reserve IR#28		Yes Tatelkus Lake Reserve IR#28	Medium	Local	Chronic (permanent)	Frequent	No	Neutral	Not Significant (moderate)	Moderate	Moderate

Notes: ⁽²⁾ to ⁽¹⁶⁾ refer to full definitions in Section 4 Methods.

⁽¹⁾ Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEEA 2012

⁽²⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)

⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure

⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.

⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity

⁽⁶⁾ Residual effect: Yes; No

⁽⁷⁾ Magnitude: Negligible; Low; Medium; High

⁽⁸⁾ Geographic Extent: Point: 100 m²; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA

⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent)

⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous

⁽¹¹⁾ Reversibility: Yes; No

⁽¹²⁾ Context: Neutral; High

⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant

⁽¹⁴⁾ Likelihood: Low; Moderate; High

⁽¹⁵⁾ Confidence: High; Moderate; Low

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Table 19.1-6: Summary of Heritage Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects after Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Archaeological sites	√	All	C; O	Land-altering activities impact archaeological sites	<ul style="list-style-type: none"> Implement archaeological site protection as required. Conduct systematic data recovery. Implement a Chance Find procedure Adhere to the following EMP: <ul style="list-style-type: none"> Archaeology and Heritage Resources Management Plan (AHRMP) (Section 12.2.1.18.4.7) 	Yes	High	Point or Site-specific	Chronic	Once	No	High	Not Significant (negligible)	Low	High
Historic heritage sites	√	All	C; O	Land-altering activities impact historic heritage sites	<ul style="list-style-type: none"> Implement historic heritage site protection as required. Conduct systematic data recovery. Implement a Chance Find procedure. Adhere to the following EMP: <ul style="list-style-type: none"> Archaeology and Heritage Resources Management Plan (AHRMP) (Section 12.2.1.18.4.7) 	Yes	High	Point or Site-specific	Chronic	Once	No	High	Not Significant (negligible)	Low	High
Paleontological resources	√	All	C; O	Land-altering activities impact paleontological sites	<ul style="list-style-type: none"> As there are no known potential project effects on palaeontological sites, no mitigation measures are required for this VC. Implement a Chance Find procedure. Adhere to the following EMP: <ul style="list-style-type: none"> Archaeology and Heritage Resources Management Plan (AHRMP) (Section 12.2.1.18.4.7) 	Yes	Moderate	Point or Site Specific	Chronic	Once	No	High	Not Significant (negligible)	Low	High

Notes: ⁽²⁾ to ⁽¹⁶⁾ refer to full definitions in Section 4 Methods.

⁽¹⁾ Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEAA, 2012

⁽²⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)

⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure

⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.

⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity

⁽⁶⁾ Residual effect: Yes; No

⁽⁷⁾ Magnitude: Negligible; Low; Medium; High; ; n/a = not applicable

⁽⁸⁾ Geographic Extent: Point: 100 m²; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA; ; n/a = not applicable

⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent); ; n/a = not applicable

⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous; ; n/a = not applicable

⁽¹¹⁾ Reversibility: Yes; No; ; n/a = not applicable

⁽¹²⁾ Context: Low; Medium; High; ; n/a = not applicable

⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant; ; n/a = not applicable

⁽¹⁴⁾ Likelihood: Low; Moderate; High; ; n/a = not applicable

⁽¹⁵⁾ Confidence: High; Moderate; Low; n/a = not applicable

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Table 19.1-7: Summary of Health Residual Effects

Valued Component	Area of Federal Jurisdiction ⁽¹⁾	Contributing Project Activity or Physical Works/Project Component ⁽²⁾	Phase (timing) ⁽³⁾	Potential Effects ⁽⁴⁾	Proposed Mitigation ⁽⁵⁾	Residual Effect ⁽⁶⁾	Predicted Degree of Effects after Mitigation						Significance of Residual Adverse Effect ⁽¹³⁾	Likelihood ⁽¹⁴⁾	Confidence ⁽¹⁵⁾
							Magnitude ⁽⁷⁾	Geographic Extent ⁽⁸⁾	Duration ⁽⁹⁾	Frequency ⁽¹⁰⁾	Reversibility ⁽¹¹⁾	Context ⁽¹²⁾			
Environmental exposures		All	C, O, CL	Project-related noise	<ul style="list-style-type: none"> Meet air and water standards. No surface water discharge during operations and closure. Adhere to the following EMP: <ul style="list-style-type: none"> Air Quality and Emissions Management Plan (AQEMP) (Section 12.2.1.18.4.9) Country Food Monitoring Plan (Appendix 9.2.2B) Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes	Low	Local	Short-term	Intermittent	Yes	Neutral	Not Significant (negligible)	High	High
		All	C, O, CL	Project-related environmental contaminants		Yes	Negligible	Local	Long-term	Continuous	Yes	Neutral	Not Significant (negligible)	Low	High
Workers health and safety		All	C, CL	Potential hazards in the construction industry including exposure to welding fumes, dusts, and vapours noise, heat and cold, radiation, and vibration.	Adhere to the following EMP: <ul style="list-style-type: none"> Occupational Health and Safety Management Plan (OHSMP) (Section 12.2.1.18.4.15) 	Yes	Low	Site-specific	Short-term	Continuous	Yes	Neutral	Not Significant (negligible)	High	Moderate
		All	O	Potential hazards during mine operations including exposure to dust, cyanide and safety conditions.		Yes	Low	Site-specific	Long-term	Continuous	Yes	Neutral	Not Significant (negligible)	High	Moderate

Notes: ⁽²⁾ to ⁽¹⁶⁾ refer to full definitions in Section 4 Methods.

⁽¹⁾ Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEEA, 2012

⁽²⁾ Contributing Project Activity or Physical Works/Project Components: Mine site; Transmission line; Proposed Transmission Line – Mills Ranch Re-route; Proposed Transmission Line – Stellako River Re-route; Mine access road; Airstrip; Freshwater supply system; Project Access Road (Kluskus FSR)

⁽³⁾ Phase (timing): C= construction; O = operations; CL = closure; PC = post-closure

⁽⁴⁾ Potential effects: Potential Project effects are assessed quantitatively or qualitatively as appropriate to the nature of the indicator and/or factor selected for each VC. Limitations and assumptions for models used to quantitatively estimate Project effects have been clearly stated for each VC.

⁽⁵⁾ Proposed mitigation: Mitigation includes any action taken to avoid, minimize, restore on-site, compensate, or offset the adverse effects of a project or activity

⁽⁶⁾ Residual effect: Yes; No

⁽⁷⁾ Magnitude: Negligible; Low; Medium; High

⁽⁸⁾ Geographic Extent: Point: 100 m²; Site-Specific: Within the Project Site; Local: Within LSA; Regional: Within the RSA

⁽⁹⁾ Duration: Short-term; Medium-term; Long-term; Chronic (permanent)

⁽¹⁰⁾ Frequency: Once; Intermittent; Continuous

⁽¹¹⁾ Reversibility: Yes; No

⁽¹²⁾ Context: Low; Medium; High; ; n/a = not applicable

⁽¹³⁾ Significance of residual adverse effect: Not Significant (negligible); Not Significant (minor); Not Significant (moderate); Significant

⁽¹⁴⁾ Likelihood: Low; Moderate; High

⁽¹⁵⁾ Confidence: High; Moderate; Low

Table 19.1-8: Summary of Federal Requirements⁽¹⁾

Valued Components	Area of Federal Jurisdiction ⁽¹⁾	On Federal or Transboundary Lands	Directly or Necessarily Incidental to Federal Decisions	Effects on Aboriginal peoples
• Noise and vibration	N	N	N	P
• Climate change	N	N	N	N
• Air quality	N	N	N	P
• Surface water flow	Y	N	Y; there is often a linkage between groundwater and surface water. Y; Authorizations may be required under the <i>Fisheries Act</i>	N
• Surface water quality	Y	N	Y; there is often a linkage between groundwater and surface water. Y; Authorizations may be required under the <i>Fisheries Act</i>	N
• Sediment quality	Y	N	N	N
• Groundwater quantity	Y	N	Y; there is often a linkage between groundwater and surface water. Y; Authorizations may be required under the <i>Fisheries Act</i>	N
• Groundwater quality	Y	N	Y; there is often a linkage between groundwater and surface water. Y; Authorizations may be required under the <i>Fisheries Act</i>	N
• Wetlands	Y	N	N	N
• Fish habitat	Y	N	Y; Authorizations may be required under the <i>Fisheries Act</i>	P
• Fish	Y	N	Y; Authorizations may be required under the <i>Fisheries Act</i>	P
• Physiography and topography	N	N	N	N
• Surficial geology and soil cover	N	N	N	N
• Soil quality	N	N	N	N
• Ecosystem composition	Y	N	N	P
• Plant species and ecosystems at risk	Y	N	N	P
• Amphibians	Y	N	N	P
• Water Birds	N	N	N	P
• Forest and Grassland Birds	Y	N	N	P
• Moose	N	N	N	P
• Caribou	Y	N	N	P
• Grizzly Bear	N	N	N	P
• Furbearers	N	N	N	P
• Bats	N	N	N	P
• Invertebrates	N	N	N	P

Valued Components	Area of Federal Jurisdiction ⁽¹⁾	On Federal or Transboundary Lands	Directly or Necessarily Incidental to Federal Decisions	Effects on Aboriginal peoples
• Provincial economy	N	N	N	N
• Regional and local employment and businesses	N	N	N	N
• Regional and local government finance	N	N	N	N
• Demographics	N	N	N	N
• Regional and community infrastructure	N	N	N	N
• Regional and local services	N	N	N	N
• Family and community well-being	N	N	N	N
• Non-traditional land and resource use	Y	N	Y; <i>Navigation Protection Act</i> (Amended <i>Navigable Waters Protection Act</i> on 1 April 2014)	N
• Current Land and Resource Use for Traditional Purposes	Y	N	N	Y
• Visual resources	N	N	N	P
• Archaeological sites	Y	N	N	P
• Historic heritage sites	Y	N	N	P
• Paleontological resources	Y	N	N	N
• Environmental exposures	N	N	N	P
• Workers health and safety	N	N	N	N

Notes: N = no; P = potentially; Y = yes

Indicate by a check mark which valued components can be considered “environmental effects” as defined in section 5 of *CEAA, 2012*

⁽¹⁾ Changes of components of the environment within federal jurisdiction, Changes to the environment that would occur on federal or transboundary lands, Changes to the environment that are directly linked or necessarily incidental to federal decisions, and Effects of changes to the environment on Aboriginal people.

19.2 Outstanding Aboriginal Issues and Public Concern

New Gold Inc. (Proponent) has addressed the issues and concerns raised by government agencies, the public and Aboriginal groups by conducting an assessment of residual Project and cumulative effects for each of the selected VCs. Results of the effects assessment and proposed mitigation for some selected VCs have been shared with stakeholders as part of the consultation and engagement process and feedback has been incorporated into the assessment as appropriate. During the Application/EIS review phase, government agencies, the public and Aboriginal groups will have the opportunity to review in detail the outcomes of the Environmental Assessment (EA) and make questions or request clarification if necessary. It is expected that any issues or concerns considered outstanding by stakeholders would be resolved during the Application review phase.

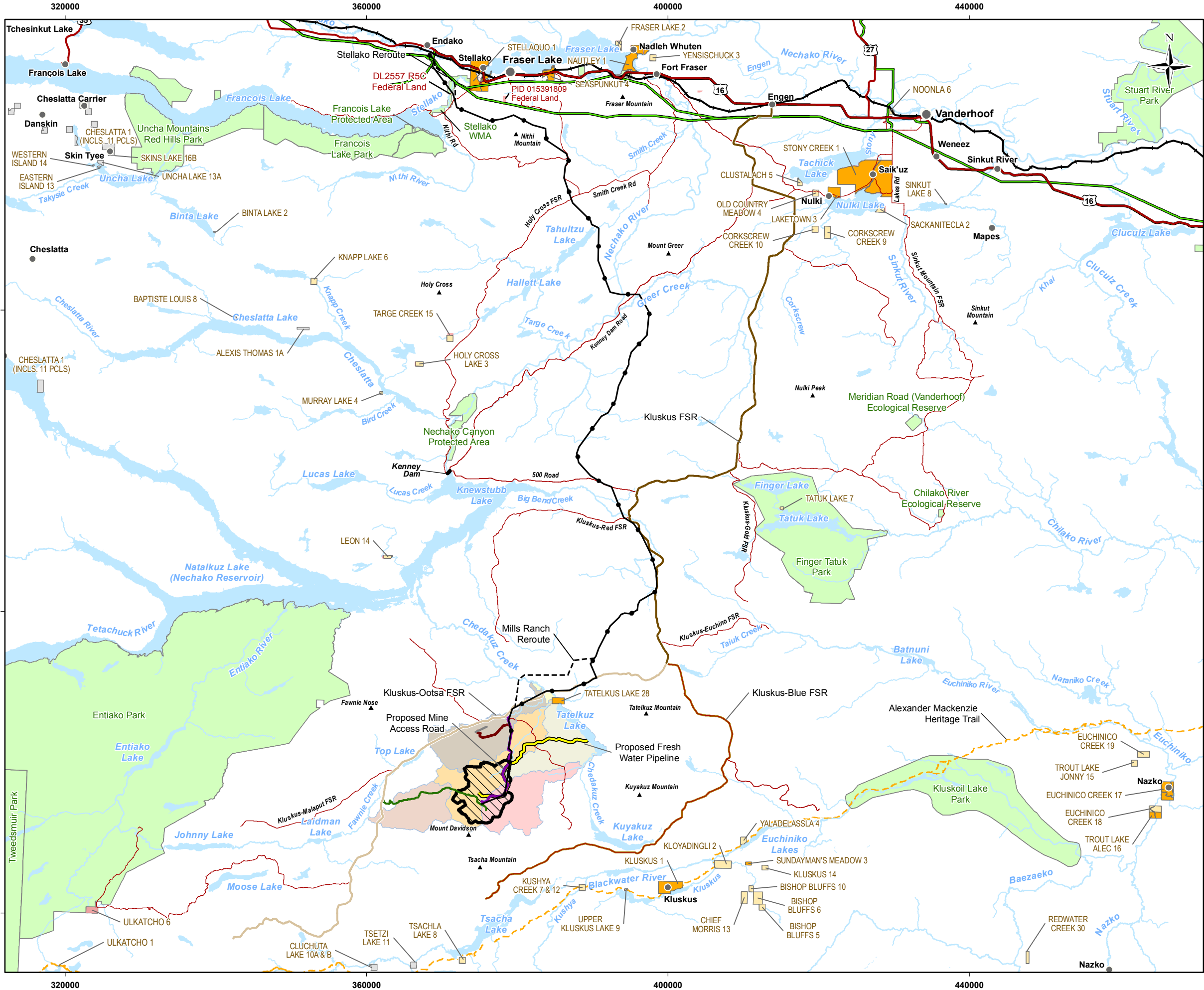
19.3 Summary of Effects to Federal Lands

This section of the Application provides a summary of the environmental, economic, social, heritage, and/or health effects anticipated to federal lands as a result of the proposed Project. Federal lands are addressed in **Sections 7.1.2.9** and **7.2.6.2.10** of the Application/EIS. **Table 19.3-1** summarizes the overlaps of each VC's LSA and RSA with federal land parcels. **Figure 19.3-3** shows the locations of the Indian reserves (IRs) and federal lands that overlap with the Project LSAs and RSAs.

Under Section 2 of the *CEAA 2012* (Government of Canada, 2012), federal lands are defined as follows:

- “a) lands that belong to Her Majesty in right of Canada, or that Her Majesty in right of Canada has the power to dispose of, and all waters on and airspace above those lands, other than lands under the administration and control of the Commissioner of Yukon, the Northwest Territories or Nunavut;
- b) the following lands and areas:
 - i) the internal waters of Canada, in any area of the sea not within a province,
 - ii) the territorial sea of Canada, in any area of the sea not within a province,
 - iii) the exclusive economic zone of Canada, and
 - iv) the continental shelf of Canada; and
- c) reserves, surrendered lands and any other lands that are set apart for the use and benefit of a band and that are subject to the Indian Act, and all waters on and airspace above those reserves or lands.”

This summary presents the residual effects to each VC when they occur on federal lands. The summary also includes any mitigation measures proposed to minimize effects to federal lands.



- ### Legend
- Populated Place
 - ⬮ Highway
 - Kluskus FSR
 - Kluskus-Blue FSR
 - Kluskus-Ootsa FSR
 - Other FSRs
 - ⬮ Railway
 - Existing Transmission Line
 - Alexander Mackenzie Heritage Trail
 - Stream
 - Waterbody
 - Parks and Protected Areas
 - Populated Indian Reserve
 - Unpopulated Indian Reserve
 - Unknown Population Indian Reserve
 - Federal land
 - Project Components
 - Exploration Road
 - Proposed Mine Access Road
 - ⬮ Proposed Transmission Line
 - ⬮ Proposed Transmission Line Reroute
 - Proposed Fresh Water Pipeline
 - Proposed Airstrip Access Road
 - ⬮ Proposed Airstrip Extent
 - ⬮ Proposed Mine Site
 - Watersheds
 - Chedakuz Creek Local
 - Creek 661
 - Creek 705
 - Davidson Creek
 - Tatelkuz Lake Tributaries
 - Turtle Creek



Reference
BC Government GeoBC Data Distribution

CLIENT: **newgold**

PROJECT: **Blackwater Gold Project**

Federal Parcels and Indian Reserves

DATE: October, 2015	ANALYST: MY	Figure 19.3-1
JOB No: VE52277	QA/QC: NC	
GIS FILE: Other-100-148_federal_land.mxd		amec
PROJECTION: UTM Zone 10	DATUM: NAD83	

Y:\GIS\Projects\VE52277\Rightfield_Blackwater\Mapping\Other\Other-100-148_federal_land.mxd

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Table 19.3-1: Summary of LSA and RSA Overlaps with Indian Reserves and Other Federal Lands Parcels for Each Valued Component

Pillar	VC	LSA	Indian Reserves and/or Federal Lands Parcels in LSA	RSA	Indian Reserves and/or Federal Lands Parcels in RSA but Outside of LSA
Environmental	Noise and vibration	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	PID015391809; Stellaquo IR#1
	Climate change	Not applicable because climate change was assessed at a Provincial and National level given the global nature of this VC.			
	Air quality	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Surface water flow	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Surface water and sediment quality	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Groundwater quantity	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Groundwater quality	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Wetlands	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Fish	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Fish habitat	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	
	Physiography and topography	Yes	Land Act Parcel DL 2557 R5C	Yes	
	Surficial geology and soil cover	Yes	Land Act Parcel DL 2557 R5C	Yes	
	Soil quality	Yes	Land Act Parcel DL 2557 R5C	Yes	
	Ecosystem composition	Yes	Land Act Parcel DL 2557 R5C	Yes	
	Plant species and ecosystems at risk	Yes	Land Act Parcel DL 2557 R5C	Yes	
	Amphibians	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809
	Water birds	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809
	Forest and grassland birds	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809
	Moose	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809

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Pillar	VC	LSA	Indian Reserves and/or Federal Lands Parcels in LSA	RSA	Indian Reserves and/or Federal Lands Parcels in RSA but Outside of LSA
	Caribou	No		Yes	Tatelkus Lake IR#28; Kluskus 1 reserve; Sundayman's Meadow 3 reserve
	Grizzly bear	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve; Nak'azdli (Necoslie) 1 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Furbearers	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809
	Bats	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809
	Invertebrates	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809
Economic	Provincial economy	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Regional and local employment and businesses	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Regional and local government finance	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve

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Pillar	VC	LSA	Indian Reserves and/or Federal Lands Parcels in LSA	RSA	Indian Reserves and/or Federal Lands Parcels in RSA but Outside of LSA
Social	Demographics	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Regional and community infrastructure	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Regional and local services	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Family and community well-being	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Non-traditional land and resource use	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28; PID015391809; Stellaquo IR#1
	Current Land and Resource Use for Traditional Purposes	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C	Yes	PID015391809
	Visual resources	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1	Yes	
	Heritage	Archaeological sites	Yes	Land Act Parcel DL 2557 R5C	Yes
Historic heritage sites		Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28

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Pillar	VC	LSA	Indian Reserves and/or Federal Lands Parcels in LSA	RSA	Indian Reserves and/or Federal Lands Parcels in RSA but Outside of LSA
	Paleontological resources	Yes	Land Act Parcel DL 2557 R5C	Yes	Tatelkus Lake IR#28
Health	Environmental exposures	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve
	Workers health and safety	Yes	Tatelkus Lake IR#28; Land Act Parcel DL 2557 R5C; PID015391809; Stellaquo IR#1; Kluskus 1 reserve; Sundayman's Meadow 3 reserve; Euchinico Creek 17 reserve; Trout Lake Alec 16; Nazco 20 reserve; Stony Creek 1 reserve; Laketown 3 reserve; Nautley (Fort Fraser) 1 reserve; Seaspunkut 4 reserve	Yes	Nak'azdli (Necoslie) 1 reserve; Sowchea 3 reserve; William Prairie Meadow 1A reserve; North Takla Lake 7 reserve; Dzitline Lee 9 reserve; Tache 1 reserve; Binchie 2 (Pinchie 2) reserve; Ye Koo Che 3 reserve; Burns Lake 18 reserve; Woyenne 27 reserve; Duncan Lake 2 reserve; Palling 1 reserve

19.3.1 Noise and Vibration

There are two federal land parcels that are located within the LSA and RSA for the Noise and Vibration VC: Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. There are two additional parcels that are located within the RSA for this VC: Stellaquo IR#1 and PID015391809. The locations of these lands are shown in **Figure 19.3-1**.

19.3.1.1 Tatelkus Lake IR#28

Tatelkus Lake IR#28 overlaps the LSA for the Noise and Vibration VC. Tatelkus Lake IR#28 is shown in **Figure 19.3-2**. Effects of noise and vibration to Tatelkus Lake IR#28 are limited to the construction, operations, and closure of the airstrip, transmission line, and associated access roads. No effects are anticipated during post-closure.

For the construction and operations phases noise generated at the mine site is not perceptible at Tatelkus Lake IR#28. Based on the modelled results, sound levels at Tatelkus Lake IR#28 will be below 30 dBA which is similar to baseline levels.

Construction of the transmission line and associated access roads will look much like a moving assembly line and will therefore be in the vicinity of Tatelkus Lake IR#28 for only a short period of time. Construction phase noise impacts would result largely from noise generated by mechanized equipment such as loaders, bulldozers, sidebooms, generators, and trucks. Operation of a 140-km, 230 kV power transmission line system will be noise-free except for some minor occurrences involving corona, insulator, and Aeolian noise. Therefore, the residual effect of increased noise on Tatelkus Lake IR#28 is determined to be negligible.

Noise generated by the pumphouse for the freshwater supply system during the construction and operations phases will not be perceptible at Tatelkus Lake IR#28. The noise will be below 30 dBA and similar to baseline noise levels. Therefore, noise effects to Tatelkus Lake IR#28 from the pumphouse are negligible.

Construction of the airstrip will be at a fixed area within which the permanent and mobile noise sources will be located. The noise impacted area will be adjacent to the airstrip site. A Noise Exposure Forecast (NEF) model was used to determine the potential impact of airstrip noise and related perceptions during the operations of the project. It showed that the NEF isopleth of 25 is located very close to the airstrip. No annoyance is experienced for a NEF below the 25 level. Based on the sound exposure level and NEF predictions, and the short-term durations of landings and takeoffs (no more than one flight per day), none of the families living in the RSA, including those living at Tatelkus Lake IR#28, will be exposed to noise levels above the permissible criteria, i.e., a daytime PSL of 45 dBA and NEF of 25, and effects are therefore negligible. The rating is based on a low magnitude, the site-specific nature of the noise source, a long-term duration because the airstrip will be operated from the construction phase through to closure, and a low context.

Noise levels during the closure phase will be similar to the construction phase impacts. However, noise effects will be lower in the closure phase because high-level noise sources such as drills and blasting will be absent. Therefore, the construction phase noise assessment can be used as

a conservative assessment of noise during the closure phase for all project components and would be negligible at Tatelkus Lake IR#28. No post-closure impacts are anticipated, since no noise-generating activities or equipment will be present when the Project is decommissioned.

Mitigation measures to reduce noise effects from the airstrip to Tatelkus Lake IR#28 include:

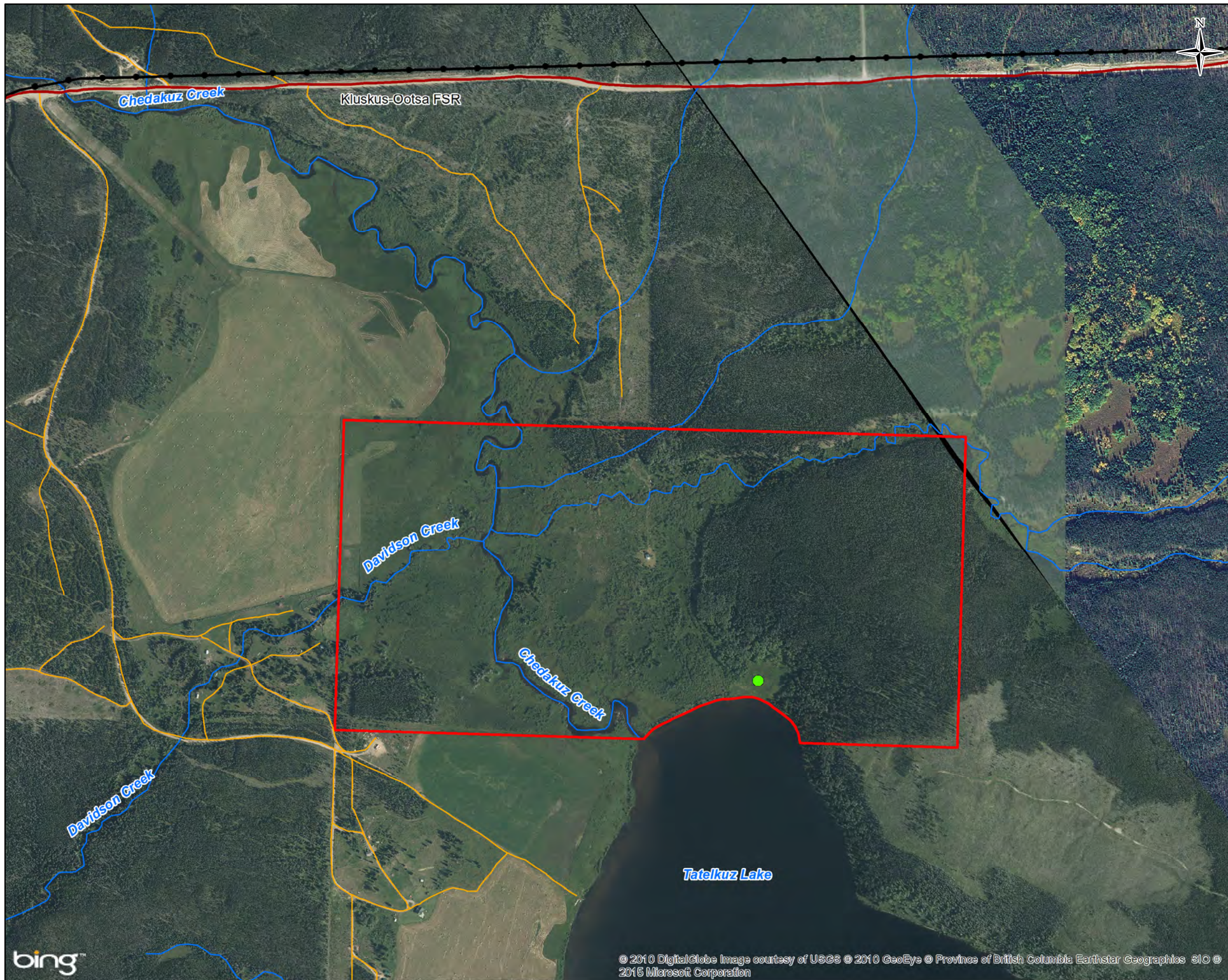
- Implementing airstrip construction noise mitigation measures identical to those for the mine site, wherever relevant;
- Avoiding low altitude flights except on final approach and take off;
- Using smaller aircraft (e.g., Dash 8-100) instead of larger (Boeing 737) whenever possible;
- Limiting taxiing time; and
- Using low-noise supporting ground equipment (e.g., power generator with muffler).

Mitigation measures to reduce the effects of noise from transmission line construction and operations on Tatelkus Lake IR#28 include:

- Positioning noisy equipment in sheltered or enclosed locations if practicable;
- Maintaining equipment in good working condition;
- Turning equipment off when not in use if practicable;
- Selecting equipment with industry standard noise abatement technology, including exhaust and compressor/fan noise;
- Operating equipment within specification and capacities (i.e., do not overload machines); and
- Use of noise-abatement accessories, such as sound hoods, jackets, and mufflers.

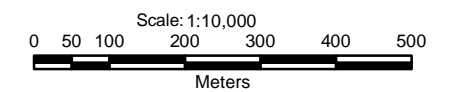
19.3.1.2 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C overlaps the LSA for the Noise and Vibration VC. The location of Land Act Parcel DL 2557 R5C is shown in **Figure 19.3-3**. Effects of noise and vibration to Land Act Parcel DL 2557 R5C is limited to the construction, operations, and closure of the transmission line and associated access roads. Construction of the transmission line and associated access roads will move along as the line segments are complete and are short-term in nature; therefore, they will be in the vicinity of Land Act Parcel DL 2557 R5C for only a short period of time. Construction phase noise impacts would result largely from noise generated by mechanized equipment. Operations of the transmission line will be, for the most part, noise-free except for some minor occurrences involving corona, insulator, and Aeolian noise. The residual effect of increased noise on Land Act Parcel DL 2557 R5C is determined to be negligible during the operations phase. Closure and Post-Closure effects to noise are not anticipated in the vicinity of this federal parcel. Mitigation measures to reduce the effects of noise from transmission line construction and operations to federal Land Act Parcel DL 2557 R5C would be the same as described above for Tatelkus Lake IR#28. The Proponent will work with the federal government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.



Legend

- Visual Aesthetics Receptor
- Proposed Transmission Line
- Kluskus-Ootsa FSR
- Existing Roads
- Stream
- Federal land



Reference

BC Government GeoBC Data Distribution

CLIENT:



PROJECT:

Blackwater Gold Project

Tatelkuz Lake IR#28

DATE:
October, 2015

ANALYST:
MY

Figure 19.3-2

JOB No:
VE52277

QA/QC:
NC

PDF FILE:
Other-100-150_federal_land_IR28.pdf

GIS FILE:
Other-100-150_federal_land_IR28.mxd

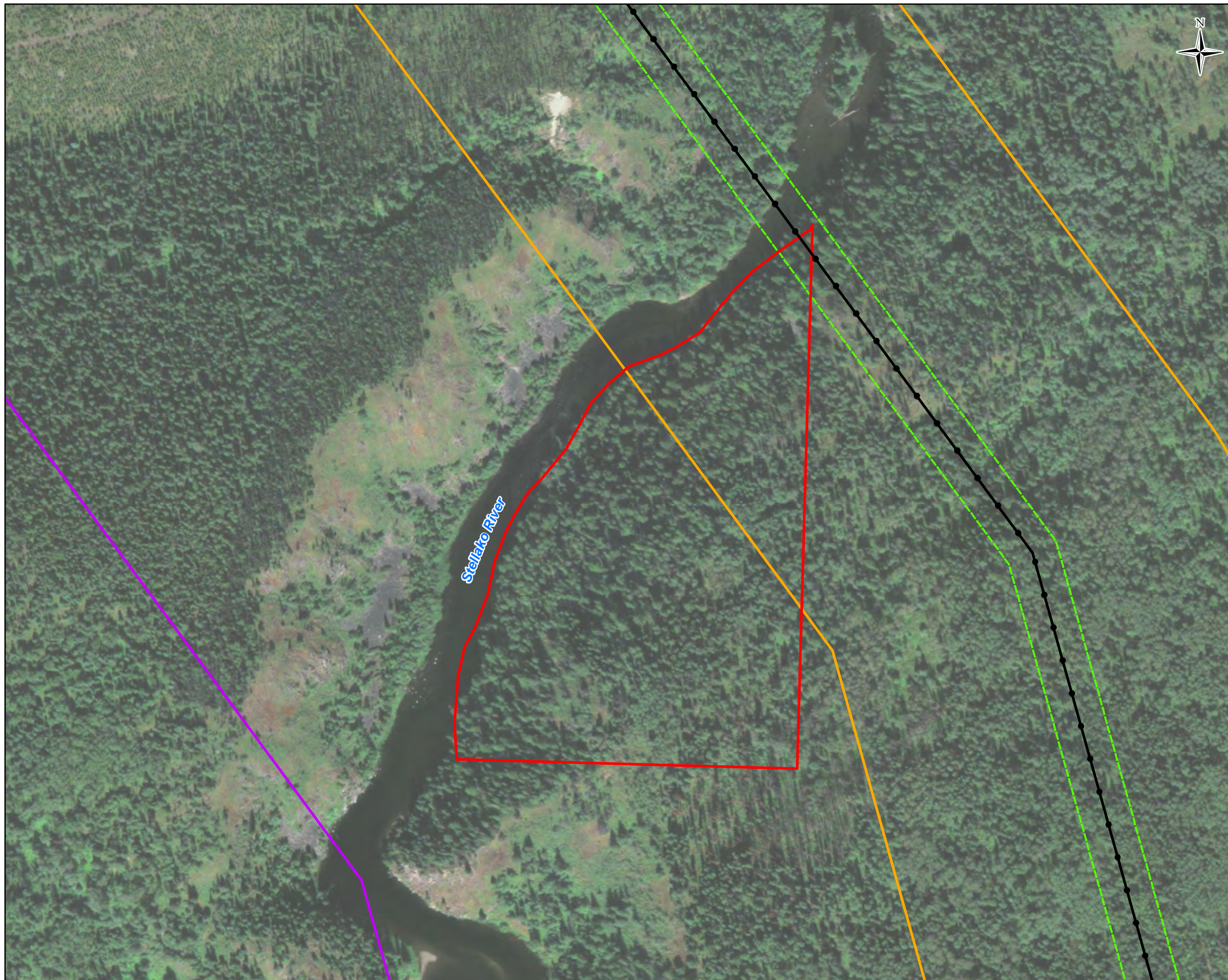
PROJECTION:
UTM Zone 10

DATUM:
NAD83



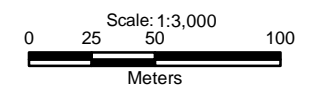
© 2010 DigitalGlobe Image courtesy of USGS © 2010 GeoEye © Province of British Columbia Earthstar Geographics SIO © 2015 Microsoft Corporation

Y:\GIS\Projects\VE\VE52095_Richtfield_Blackwater\Mapping\Other\100-150_federal_land_IR28.mxd



Legend

- Proposed Transmission Line
- ▭ Proposed Transmission Line ROW
- ▭ Federal land
- ▭ Expanded Vegetation LSA
- ▭ Expanded Vegetation RSA



Reference

BC Government GeoBC Data Distribution

CLIENT:



PROJECT:

Blackwater Gold Project

Federal Land Act Parcel DL 2557 R5C

DATE: November, 2015	ANALYST: MY	Figure 19.3-3
JOB No: VE52277	QA/QC: NC	
GIS FILE: Other-100-149_federal_land_DL2557_v2.mxd		PDF FILE: Other-100-149_federal_land_DL2557_v2.pdf
PROJECTION: UTM Zone 10	DATUM: NAD83	

19.3.1.3 Stellaquo IR#1 and PID015391809

Stellaquo IR#1 and federal parcel PID015391809 are outside the LSA but within the RSA for Noise and Vibration. Cumulative effects from noise are not expected because effects of the Project are negligible in this portion of the LSA, and community or industrial noise sources within the local and regional study areas that could add to the Project noise are absent. No other present and future projects or activities emitting noise/vibration will overlap in time and space with the Project; therefore, no CEA is required.

19.3.2 Air Quality

As shown in **Table 19.3-1**, there are two federal land parcels that are located within the LSA and RSA for the Air Quality VC: Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. The locations of these lands are shown in **Figure 19.3-1**.

19.3.2.1 Tatelkus Lake IR#28

In general, key and moderate interactions of the Project on the VCs during the construction, operations, closure, and post-closure phases are related to the mine site activities during the construction and operations phases that will generate most of the air quality emissions. Results presented in the Air Quality Modelling Report in **Appendix 5.2.4A** show that no provincial or federal air quality guidelines are exceeded at Tatelkus Lake IR#28 from the mine site during operations. The impact ratings for all other Project components and Project phases are not larger than mine operations, as mine operations have the largest emissions; therefore mine operations are used as a conservative predictor of air quality effects due to the Project. Effects at Tatelkus Lake IR#28 are negligible for all Project components and phases due to the low context, medium magnitude, local extent, medium-term duration, and because effects are reversible at closure.

Mitigation measures include the following to minimize effects to Tatelkus Lake IR#28: Off-road vehicles (such as the mine fleet) will meet the most recent and stringent emission standards, commonly referred to as Tier 4; all off-road vehicles will use ultra-low sulphur diesel (15 ppm maximum), as required under the EC regulation; vehicle speeds will be controlled throughout the mine site; unpaved road surfaces will be wetted as needed to control dust emissions when conditions are not wet or frozen, and the wetting agent may include a chemical to extend and improve dust control over using water alone; materials will be wetted before handling to dramatically reduce PM emissions; and road surfaces will be constructed of coarse aggregate with very low silt content.

The mine operations phase is rated as having not significant (minor) effects because changes in predicted ground-level concentrations are >10% above background and/or exceed a listed AAQO in the LSA, and effects are local and reversible. These effects, based on the results of the air quality modelling, were shown to be less at Tatelkus Lake IR#28; therefore, residual effects would be negligible. It is important to note that modelling tends to provide over-predictions of effects due to conservative assumptions in methodology.

19.3.2.2 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA for the Air Quality VC. Effects of air quality to Land Act Parcel DL 2557 R5C is limited to the construction, operations, closure, and post-closure of the transmission line and associated access roads. The construction phase for all project components, including the transmission line and associated access roads, was considered to have significantly lower emissions than the operations phase. Therefore, operations phase emission estimates can be used as a conservative estimate for emissions for all Project phases. The operations phase results in Section 6 of **Appendix 5.2.4A** demonstrated that emissions for the transmission line are negligible and not included in the assessment. Effects to federal Land Act Parcel DL 2557 R5C are negligible for all Project phases. The mitigation measures described above for Tatelkus Lake IR#28 apply to Land Act Parcel DL 2557 R5C as well. The Proponent will work with the federal government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

19.3.3 Surface Water Flow

Federal lands that are located within the Surface Water Flow LSA and RSA are shown in **Table 19.3-1** and include Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. The locations of these lands are shown in **Figure 19.3-1**.

The surface water flow LSA for the Project includes five watersheds: Turtle Creek, Davidson Creek, Creek 661, Creek 705, and Chedakuz Creek (includes Tatelkus Lake). The project is within these watersheds as shown in **Figure 19.3-1**.

19.3.3.1 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is on the east side of Chedakuz Creek, below Tatelkus Lake. The land parcel is crossed by Davidson Creek and Chedakuz Creek, and is on the northern banks of Tatelkus Lake (**Figure 19.3-2**). The Project has the potential, with its water diversion, water management, and water withdrawal activities, to change surface water flows within these watersheds and Tatelkus Lake levels during the construction, operations, closure, and post-closure phases.

19.3.3.1.1 Davidson Creek

Analyses (**Section 5.3.2**) show that the mean annual surface water flows in the Davidson Creek Watershed are expected to decrease below baseline flows from construction through post-closure. During construction, the decrease in mean annual flows could range from -23% immediately downstream of the TSF (H2) to -16% at the mouth of Davidson Creek (1-DC). During operations, with freshwater mitigation in place, the decrease in mean annual flows could range from -26% immediately downstream of the TSF (H2) to -23% at the mouth of Davidson Creek (1-DC). During closure, with freshwater mitigation in place, the decrease in mean annual flows could range from -26% immediately downstream of the TSF (H2) to -20% at the mouth of Davidson Creek (1-DC). These decreases are attributed to the construction of the TSF, which will reduce the drainage area of the Davidson Creek Watershed. These decreased flows are greater than the 1:5-year dry baseline flows estimated for the creek. During post-closure, the freshwater supply system will be decommissioned. The decrease in mean annual flows could range from -9% immediately downstream of the TSF (H2) to -10% at the mouth of Davidson Creek (1-DC).

The mitigation measures that will be employed to avoid or reduce potential Project effects on Davidson Creek are:

- The implementation of the Mine Water Management Plan; and
- Pumping water from Tatelkuz Lake to meet instream flow needs (IFN).

Residual effects on flows in Davidson Creek after mitigation are projected to be Not Significant (moderate) during average flows, peak flows, and low flows due to high magnitude, the continuous duration, and because the effects cannot be reversed.

19.3.3.1.2 Chedakuz Creek

Analyses in **Section 5.3.2** show that the Project is expected to decrease mean annual flows below baseline flows from construction through post-closure on Chedakuz Creek (H5). H5 is the last node within the LSA in the Chedakuz Creek Watershed. During construction and post-closure, the decreases in mean annual flows could range from -2% to -1%. These changes can be attributed to the reduction in drainage area in the Davidson Creek watershed during construction and post-closure. As the changes in flows are less than 5%, they are considered undetectable in flow measurements. With the freshwater system in place, the changes in mean annual flows are expected to be -14% during operations and closure. These decreases are attributed to the downstream impacts of the Project on Davidson Creek, whose flows are expected to be affected by the reduction in drainage area due to the TSF. These decreased flows are greater than the 1:5-year dry baseline flows estimated for the creek.

It is proposed that to minimize and mitigate effects during low flow conditions, additional flow be released to Davidson Creek from the freshwater reservoir.

Residual effects on flows in Chedakuz Creek after mitigation are projected to be Not Significant (moderate) during average flows and low flows. The rating is based on a medium magnitude, irreversible effects and a regional geographic extent.

19.3.3.1.3 Tatelkuz Lake Levels

Tatelkuz Lake is the primary source of supplemental freshwater for the Project. A freshwater supply system will only be required during the operations and closure phases of the Project to meet the needs of mining water requirements (during operations), to meet IFN in Davidson Creek (during operations and closure), and to aid in open pit flooding (during closure).

Analyses in **Section 5.3.2** show that the Project will decrease Tatelkuz Lake mean and 1:50-year dry annual levels during operations and closure. During operations and closure, the mean annual Tatelkuz Lake level is expected to decrease by approximately 4 cm, or -3%, over baseline fluctuations. During operations, the annual 1:50-year dry Tatelkuz Lake level is expected to decrease by approximately 6 cm, or -4%, below baseline fluctuations. During closure, the annual 1:50-year dry Tatelkuz Lake level is expected to decrease by approximately 5 cm, or -3%, below baseline fluctuations. These changes in annual Tatelkuz Lake levels are less than 5%.

Residual effects on Tatelkuz Lake levels are projected to be Not Significant (negligible). The rating is based on a negligible magnitude, reversible effects, and local geographic extent.

19.3.3.2 Land Act Parcel DL 2557 R5C

Federal Land Act Parcel DL 2557 R5C is located within the Surface Water Flow RSA. The parcel is immediately adjacent to the Stellako River; however, there are no streams or waterbodies within Land Act Parcel DL 2557 R5C. Therefore, no effects on surface water flow are possible within this federal land.

19.3.4 Surface Water Quality

Federal lands that are located within the Surface Water Quality LSA and RSA are the same as those overlapped by Surface Water Flows and include Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. The locations of these lands are shown in **Figure 19.3-1**.

19.3.4.1 Tatelkus Lake IR#28

All parameters are predicted to meet BC FWG and CCME, except where background concentrations are naturally above these guidelines. Since Health Canada drinking water guidelines are higher than protection of aquatic life, these latter guidelines will be met as well, again, except where background concentrations have exceedances. BC protection of wildlife guidelines will all be met with the exception of molybdenum in the TSF during operations, which may be marginally exceeded under the conservative assumptions modelled. The restricted access of wildlife to the TSF will ensure any exposures are not significant.

An exception to this generality is sulphate, which under the conservative assumption of no reduction in the TSF or wetlands at post closure, could potentially exceed BC FWG, hardness-adjusted guideline for both modelled scenarios. Predicted exceedances are at the Plunge Pool and WQ7; WQ9 in Chedakuz Creek remains below the guideline. With natural reduction of sulphate in the TSF, subsurface materials and wetlands sulphate is expected to meet water quality objectives during all mine phases.

Based on background water quality, dissolved aluminum, total cadmium, total copper, and total zinc will require site-specific water quality objectives. Background total iron occasionally exceeded CCME and drinking water guidelines (0.300 mg/L). Background total mercury occasionally exceed BC FWG.

No Project-caused exceedances are predicted at WQ10/plunge pool (equivalent location to the ECD) during any phase (except as noted), thus assuring downstream water quality guidelines that are not naturally exceeded will be met. Sites at the mouth of Davidson Creek (WQ7) and on Chedakuz Creek downstream of Davidson Creek mouth (WQ9) were also modelled, confirming this result. Chedakuz Creek discharges to the Nechako Reservoir 42 km stream thalweg distance downstream from the Chedakuz and Davidson Creek junction; any effects from the proposed Project would not be measurable at the mouth of Chedakuz Creek and would be well within natural variations in water quality parameters.

19.3.4.2 Land Act Parcel DL 2557 R5C

Based on the discussion above, there will be no measurable effects of water quality downstream of Davidson Creek mouth in the Chedakuz watershed and, therefore, no measurable water quality effects from the Project in the lower Nechako watershed and Land Act Parcel DL 2557 R5C.

19.3.5 Sediment Quality

Federal lands that are overlapped by the Sediment Quality LSA and RSA are Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. The locations of these lands are shown in **Figure 19.3-1**.

19.3.5.1 Tatelkus Lake IR#28

Figure 19.3-2 shows the water bodies that are within Tatelkus Lake IR#28, which includes Davidson Creek, Chedakuz Creek and the shores of Tatelkus Lake.

During the construction phase, one of the construction-period ponds will be directly in Davidson Creek. With the proposed controls, there are no impacts predicted from sediment export to site water bodies. Further, any sediment that is exported will be of similar chemistry to baseline sediments in area streams and no changes in sediment quality (metals concentrations) are expected during construction.

At the proposed mine site during operation, all contact water will be routed to the TSF, and as a result, there will be no opportunity for sediment export to the receiving environment, including Davidson Creek. The TSF will operate with no surface water discharge and only very limited seepage. TSF seepage, due to the filtering effect of tailings and subsurface sands and gravels, will not contain suspended sediment. Water pumped from Tatelkus Lake will be from the subsurface, but well above the lake bottom where suspended sediments would not be expected to be routinely drawn into the intake.

Over all, capture and pump back of seepage is the proposed mitigation to limit metals uptake by stream sediments.

Discharges during Project construction will be routed through sediment control ponds and will meet federal MMER criteria, thus they are not expected to reach Davidson or Chedakuz Creeks in any measurable amount. Best management practices will be followed for all linear facilities construction, in order to minimize, to the extent possible, any sediment export to affected streams during construction and subsequent activities. Significance of sediment export given mitigation is projected to be Not Significant (minor) during all mining phases.

19.3.5.2 Land Act Parcel DL 2557 R5C

Based on the discussion above, there will be no measurable effects on sediment in the Stellako River ascribable to the Project, nor will there be any effect to Land Act Parcel DL 2557 R5C.

19.3.6 Groundwater Quantity and Quality

Federal lands that are located within the Groundwater Quantity and Quality LSAs and RSAs are Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. The locations of these lands are shown in **Figure 19.3-1**.

19.3.6.1 Tatelkus Lake IR#28

No groundwater effects from the Blackwater Project are possible on Tatelkus Lake IR#28. Any anticipated groundwater effects are contained within the watershed boundaries of Turtle Creek, Creek 661 and Creek 705, which define the groundwater modeled perimeter for the project site. Davidson Creek watershed is contained within this project site perimeter. Groundwater flow divides are inferred to be coincident with the watershed boundaries. Tatelkus Lake IR#28 is on the east side of Chedakuz Creek from the Blackwater Project and is separated from the project site by a groundwater divide. The Blackwater Project will only affect groundwater within the watershed boundaries noted above particularly around the open pit, which will form a cone of depression surrounding the pit acting as sink for groundwater. The cone of depression will not extend to Tatelkuz Lake and Chedakuz Creek. Groundwater impacted by mine-contact water associated with the Tailings Storage Facility along Davidson Creek will be mitigated by seepage capture in the form of a pump-back system, thereby preventing migration of mine-contact water beyond the Davidson Creek watershed. The transmission line and other linear components will not affect groundwater quality or quantity.

19.3.6.2 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located close to the Stellako River at the northern end of the transmission line. The Land Act Parcel is on the Stellako River downstream of the Nechako Reservoir which Chedakuz Creek flows into. Therefore, there can be no groundwater effects from the Project on the Stellako River. The transmission line and other linear components will not affect groundwater quality or quantity.

19.3.7 Wetlands

Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C are located within the wetlands LSA and RSA, as shown in **Table 19.3-1**. The locations of these lands are shown in **Figure 19.3-1**.

19.3.7.1 Tatelkus Lake IR#28

Tatelkus Lake IR#28, which has a total area of 126.11 ha, was found to contain wetland areas of 12.36 ha within the LSA and 39.02 ha within the RSA. These wetlands occur at the northern end of Tatelkuz Lake and areas adjacent to Chedakuz and Davidson Creeks, which flow through Tatelkus Lake IR#28. Within Tatelkus Lake IR#28, wetlands account for 34.47% of the LSA and 43.24% of the RSA. Project component LSAs that overlap with Tatelkus Lake IR#28 are the mine site, and the transmission line and associated access roads.

Direct loss of wetland extent is not anticipated within Tatelkus Lake IR#28 from construction, operations, closure, or post-closure of the mine site or transmission line components. No mine site

infrastructure or access roads scheduled for upgrading or construction are within the boundaries of Tatelkus Lake IR#28.

Indirect effects related to changes in hydrological regimes relating to Davidson Creek are anticipated downstream of the mine site. Surface water flows may also be minimally altered in Chedakuz Creek downstream of Tatelkuz Lake due to effects from the freshwater supply system. Based on the analyses from the Surface Water Flow VC, Not Significant (moderate) effects were determined for surface flows in both Davidson and Chedakuz creeks.

In terms of species and ecosystems at risk, a single population of swollen-beaked sedge (*Carex rostrata*) (Blue-listed) was identified within the transmission line corridor, but it did not occur within Tatelkus Lake IR#28. No ecosystems or species at risk are found in Tatelkus Lake IR#28.

When all activities are considered, Tatelkus Lake IR#28 will not be subject to any additional effects outside of those identified within the Application and effects to wetlands at this site would be negligible. Mitigation measures to minimize effects to wetlands include avoidance, minimization, and compensation.

19.3.7.2 Land Act Parcel DL 2557 R5C

No wetlands were found to occur within the boundaries of Land Act Parcel DL 2557 R5C; therefore, effects to wetlands are not possible.

19.3.8 Fish and Fish Habitat

Federal lands that are located within the Fish and Fish Habitat LSAs and RSAs are the same as those located within the study areas of other aquatic VCs, which include Tatelkus Lake IR#28 and Land Act Parcel DL 2557 R5C. The locations of these lands are shown in **Figure 19.3-1**.

The fish and fish habitat LSA for the Project includes five watersheds: Turtle Creek, Davidson Creek, Creek 661, Creek 705, and Chedakuz Creek (includes Tatelkuz Lake). The extent and locations of these watersheds are shown on **Figure 19.3-1**.

19.3.8.1 Tatelkus Lake IR#28

Lower Chedakuz Creek and Lower Davidson Creek flow through Tatelkus Lake IR#28 (**Figure 19.3-2**); the potential Project effects on fish and fish habitat of the waterbodies within Tatelkus Lake IR#28 are the following:

- Reductions in water surface elevation (WSE) of Tatelkuz Lake due to the volume of water that will be pumped from Tatelkuz Lake into the freshwater reservoir of the Freshwater Supply System (FSS), and then pumped from the reservoir to the mine site or released into Davidson Creek to augment natural flows;
- Mortality of some fish salvaged from upper Davidson Creek prior to construction of the mine site and moved downstream to lower Davidson Creek;

- Reductions in flows in lower Davidson Creek due to loss of upper Davidson Creek as a result of development of the mine site and the diversion of Lake 01682LNRS into Lake 01538UEUT of the Creek 705 Watershed;
- Reductions of flows in lower Chedakuz Creek due to changes in outflows of Tatelkuz Lake and changes in flows of Davidson Creek due to flow augmentation of Davidson Creek with water pumped from Tatelkuz Lake;
- Changes in water temperature of lower Davidson Creek and lower Chedakuz Creek;
- Changes in water quality of lower Davidson Creek and lower Chedakuz Creek; and
- Potential disruption of homing by rainbow trout and kokanee spawners to lower Davidson Creek as a result of flow augmentation of Davidson Creek with water pumped from Tatelkuz Lake.

The mitigation measures that will be employed to avoid or reduce potential Project effects on the three waterbodies of Tatelkus Lake IR#28 are shown in **Table 19.3-2**.

Table 19.3-2: Summary of Mitigation Measures to Minimize Effects to Water Bodies within Tatelkus Lake IR#28

Valued Component	Indicator	Water Body	Mitigation Measures	Section of the Application where Mitigation is Described
Fish and Fish Habitat		Tatelkuz Lake	Select as water source as it results in the least effect on flows, lake volumes, and associated environmental conditions.	Section 5.3.8.3.4.2.2; Section 5.3.9.3.4.2.2
			Limit the volume of water that will be withdrawn from Tatelkuz Lake should adverse effects on the littoral zone be anticipated.	Section 5.3.8.3.4.2.2; Section 5.3.9.3.4.2.2
Fish		Lower Davidson Creek; Lower Chedakuz Creek	For fish salvages: <ul style="list-style-type: none"> • use experienced fish salvage teams; • collect fish using appropriate, non-destructive gear; and • transport fish in a safe manner and to return those fish to lower Davidson Creek with minimal handling. 	Section 5.3.8.3.2.1.2
			A seepage management system consisting of seepage collection ponds, a seepage collection trench, and an ECD will be installed to prevent surface water discharges or sediment contributions to downstream receiving environments.	Section 5.3.8.3.2.1.2
			To avoid adverse effects caused by spills or leakage of deleterious substances during maintenance of roads and stream crossings, a suite of mitigation measures will be	Section 5.3.8.3.3.2

			used that are commonly and widely used around BC during road and bridge construction.	
	Spawner Homing	Lower Davidson Creek; Lower Chedakuz Creek	Monitor the two salmonid populations to evaluate the effects to salmonid homing in Davidson Creek.	Section 5.3.8.3.2.4.2
			In the event of observed adverse effects, initiate management options such as adult or egg transfers and the use of artificial homing agents.	Section 5.3.8.3.2.4.2
Fish Habitat	Flows	Lower Davidson Creek; Lower Chedakuz Creek	Pump water from Tatelkuz Lake via the FSS to augment flows in Davidson Creek.	Section 5.3.9.3.2.2.2
			Pump water from Tatelkuz Lake to the open pit during closure.	Section 5.3.9.3.4.2.2
	Temperature	Lower Davidson Creek; Lower Chedakuz Creek	Intake pipes located at depth in Tatelkuz Lake that will produce temperatures in creeks most similar to baseline.	Section 5.3.9.3.2.4.2
			Operation of Temperature and Flow Control System.	Section 5.3.9.3.2.4.2
	Water Quality	Lower Davidson Creek; Lower Chedakuz Creek	No surface discharge during operations and closure.	Section 5.3.9.3.2.3.2
			A seepage management system will ensure no surface discharge during operations and closure.	Section 5.3.9.3.2.3.2
			Construction of sediment control ponds, and erosion and sediment control measures, based on the Erosion and Sediment Control Plan, will be used to protect erodible soils and minimize erosion of soils within the mine site.	Section 5.3.9.3.2.3.2
			ECD will capture downstream seepage and pump it back to the TSF.	Section 5.3.9.3.2.3.2
		Treatment wetlands will be constructed downstream of the TSF during later Operations and Closure and will be used to polish water discharged from the TSF during Closure and Post-Closure.	Section 5.3.9.3.2.3.2 Appendix 2.6C	

19.3.8.1.1 Tatelkuz Lake

The magnitude, frequency and ultimate consequence of the residual effects on fish and fish habitat of the littoral zone of Tatelkuz Lake depends on the magnitude and frequency of the WSE drawdown. There will be no pumping during construction and post-closure phases; therefore, no change in WSE outside the natural range. The annual drawdown in Tatelkuz Lake during operations and closure phases is predicted to be on the order of tens of centimetres, based on the magnitude of withdrawals and modelling based on a detailed lake bathymetry, so all potential effects will occur in the upper 1 m of the littoral zone.

To assess the magnitude of potential disruption of fish habitat (and so of fish food) in the upper 1 m of the littoral zone, an analysis was conducted of the change in number of habitat units (HU) of the upper littoral zone for an average hydrological year and a 1:50 dry year. (HU are the product of habitat area and Habitat Suitability Indices or HSIs ranging in value from 0 for low quality habitat to a value of 1 for excellent quality habitat.) This analysis showed that the loss of HU as a result of pumping water from the lake to the FSS reservoir is small enough that it will fall within the natural range of variability of the lake's WSE. However, in 1:50 dry years there will be a small loss in habitat in the upper 1 m that cannot be mitigated.

In summary, there are negligible residual effects of drawdown of Tatelkuz Lake WSE for construction and post-closure phases. Therefore, those residual effects were not carried forward into the residual effects assessment.

During operations and closure phases the effects are a small loss of HU in the upper 1 m of the littoral zone of Tatelkuz Lake during the 1:50 dry year, even if that loss is predicted to be negligible in magnitude. A "negligible" qualifier is attached to that assessment because the effect is of negligible magnitude, local, reversible, but continuous during the pumping period.

19.3.8.1.2 Lower Davidson Creek and Lower Chedakuz Creek

The use of flow augmentation to mitigate reductions of flow in Davidson Creek is unlikely to disrupt homing of salmonids to spawning grounds in a way that has long-term effects. What is less certain is whether spawners will migrate upstream against a decreasing olfactory gradient. The residual Project effect of flow augmentation using Tatelkuz Lake water on homing behaviour is assessed as Not Significant (moderate) for both rainbow trout and kokanee because it is assessed as unlikely, and capable of being managed should it occur. The rating of the effect is based on low context, medium magnitude, local extent, medium-term in duration, and reversible and continuous rankings.

After mitigation by flow augmentation, there will be residual changes in flows and fish habitat of lower Davidson Creek and lower Chedakuz Creek. However, with mitigation, all flow-related changes in rainbow trout habitat within lower Davidson Creek will be less than the 10% significance threshold.

To determine whether or not a residual change represents an adverse effect on fish habitat, a threshold for acceptable change must be defined. This was defined as a 10% reduction in total habitat availability over relevant stanzas for rainbow trout spawning and juvenile rearing, and for kokanee spawning.

The rationale for a reduction of 10% being not significant is based on the same assumptions applied to develop Davidson Creek IFN. Flow/habitat models represent theoretical habitat availability; when applied to a time series of flows, they assume that habitat availability is independent of conditions earlier in the time series. In reality, there is high variability in baseline flow conditions. Given the range of baseline variability, no significant adverse effect to ecological function or biological populations is expected from reductions in total modelled habitat availability of 10% or less. As habitat availability varies naturally, effective habitat is always less than what is modelled by flow/habitat relationships. Therefore, 10% is a conservative estimate of the reduction in modelled productivity that does not result in ecological change.

During construction, operations, and closure, effects on kokanee spawning habitat will also be less than the 10% threshold. Reduced late-summer flows at post-closure will cause a 13% reduction in kokanee spawning habitat. The pre-Project watershed will largely be restored at post-closure.

Changes to the flow regime in Davidson Creek are a design feature of the Project, even after mitigation, and are certain to occur. The potential effects of these changes on rainbow trout and kokanee are assessed as Not Significant (moderate) for construction, operations, closure, and post-closure.

With mitigation, all Project-related reductions in rainbow trout and kokanee habitat within Chedakuz Creek downstream of Tatelkuz Lake will be less than 5%.

Due to the low magnitude of flow changes in lower Chedakuz Creek no physical effects on fish habitat are anticipated. Changes in peak flows will be negligible. Changes are certain to occur to the flow regime in Chedakuz Creek and were assessed as Not Significant (moderate) for construction, operations, closure, and post-closure phases.

Since winter water temperatures in Davidson Creek will be higher than baseline during flow augmentation, regardless of intake depth (and assuming a single intake depth in the absence of a designed TFCS), the residual effects of changing temperatures in lower Davidson Creek were carried forward to the residual effects assessment.

The residual effect of changes in water temperature on fish habitat in Davidson Creek is predicted to be Not Significant (minor) because it is low in magnitude and local in extent, even though it is chronic in duration and irreversible.

With mitigation, there will be no residual effects on fish and fish habitat in lower Davidson Creek due to changes in water quality.

19.3.8.2 Land Act Parcel DL 2557 R5C

Federal Land Act Parcel DL 2557 R5C is located within with the Fish and Fish Habitat VCs LSA and RSA. The parcel is immediately adjacent to the Stellako River; however, there are no streams or waterbodies within Land Act Parcel DL 2557 R5C and no effects to fish or fish habitat are possible within this federal land.

19.3.9 Physiography and Topography

The only federal land parcel that is located within the Physiography and Topography LSA and RSA is Land Act Parcel DL 2557 R5C. The location of this land is shown in **Figure 19.3-1**.

19.3.9.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is the only federal land parcel that is located within the Physiography and Topography LSA and RSA. The parcel is overlapped by the northern portion of the transmission line close to the Stellako River (**Figure 19.3-1**). Potential effects would occur through the construction of new and the upgrading of existing transmission line access roads. These changes are expected to be consistent along the length of the Project transmission line.

The addition of the transmission line access roads will potentially increase the alteration of the baseline landscape and erosion with the construction of new roads, and is considered a residual effect for the Project. The Project effect on physiography and topography is rated as Not Significant (negligible) for the residual effect. This determination is consistent with the rating of the effect throughout the Project RSA. With implementation of erosion and sediment control mitigations, it is expected that minimal decreased stability and accelerated erosion will occur.

The Reclamation and Closure Plan (RCP) (**Section 2.6**) incorporates measures to develop the reversible landscape alterations into new features that are physically and functionally integrated with the adjacent, undisturbed landscape. The Sediment and Erosion Control Plan (SECP) (**Section 12.2.1.18.4.1**) incorporates engineering designs and secondary control structures to maintain slope stability and control erosion. Through proper implementation of mitigation techniques, the effects on the Physiography and Topography VC within the Project footprint can be minimized and managed to effectively reduce any negative effects. The Proponent is also committed to working with the federal government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

19.3.10 Surficial Geology and Soil Cover

The only federal land parcel that is located within the Surficial Geology and Soil Cover LSA and RSA is Land Act Parcel DL 2557 R5C. The location of this land is shown in **Figure 19.3-1**.

19.3.10.1 Land Act Parcel DL 2557 R5C

Federal parcel DL 2557 R5C is the only federal land that overlaps with the Surficial Geology and Soil Cover LSA and RSA. Three residual effects are expected to this VC: the removal of overburden, soil disturbance, and soil redistribution. These effects will occur throughout all phases of the Project and are expected to be consistent along the length of the Project transmission line.

The construction and subsequent decommissioning of the Project transmission lines and associated access roads have implications on the native soils within the Project area, as any altered soil or overburden cannot be replaced to the exact pre-disturbance condition. The Project effect on this VC is rated as Not Significant (negligible) for the residual effect. It is expected that with proper implementation of mitigations, a landscape that functions consistently with the pre-disturbance state can be established after closure.

The following mitigation measures are identified as part of Project with regard to the removal and redistribution of surficial deposits, and the disturbance and redistribution of soil:

- Minimization of the Project footprint;
- A soil salvage plan;
- Salvage and storage of overburden materials;
- Erosion control measures and maintenance of slope gradients; and
- Site reclamation following mine closure.

The Proponent is also committed to working with the federal government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

19.3.11 Soil Quality

The only federal land parcel that is located within the Soil Quality LSA and RSA is Land Act Parcel DL 2557 R5C. The location of this land is shown in **Figure 19.3-1**.

19.3.11.1 Land Act Parcel DL 2557 R5C

The potential effects on the Soil Quality VC are presented below. The effects on soil quality can be described in terms of soil contamination or physical alteration of the soil profile and include:

- Soil contamination;
- Terrain stability and accelerated erosion;
- Dust deposition;
- Soil disturbance; and
- Soil replacement.

Although it is anticipated that localized point disturbances will occur with the construction of Project facilities and access roads, it is expected that any detrimental effect to the soil quality within this feature will be mitigated with the Project Environmental Management Plans (EMPs).

Residual effects on the Soil Quality VC are expected to be short term and localized in nature. With proper implementation of mitigation plans and EMPs, it is not expected that any residual effects will remain. The significance for all proposed Project effects is considered Not Significant (negligible) with a high level of confidence. This is consistent with the determination of the significance of the residual effect within all Project areas, including within federal lands. Functionality of the soil material is expected to be consistent with baseline conditions (with mitigations).

Specific EMPs to mitigate the effects of the Project within Federal Lands include:

- Emergency and Spill Preparedness Response Management Plan (ESPRMP);
- Landscape, Soil, Vegetation and Restoration Management Plan (LSVRMP);
- Air Quality and Emissions Management Plan (AQEMP);
- Sediment and Erosion Control Plan (SECP); and
- Reclamation and Closure Plan (RCP).

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

19.3.12 Ecosystem Composition

The only federal land parcel that is located within the Ecosystem Composition LSA and RSA is Land Act Parcel DL 2557 R5C. The location of this land is shown in **Figure 19.3-1**.

19.3.12.1 Land Act Parcel DL 2557 R5C

This section focuses on the potential effects on the Ecosystem Composition VC within Land Act Parcel DL 2557 R5C that may be caused by the Project. For this federal parcel, potential effects of the project are limited to the construction of the transmission line, new roads, and upgrades to roads required to support the construction and operation of the transmission line. There are five indicators associated with the Ecosystem Composition VC: ecosystem distribution, riparian areas, old growth forests, sparsely vegetated ecosystems, and traditional use plant habitat.

The total area of Land Act Parcel DL 2557 R5C in the vicinity of the proposed transmission line is 7.70 ha, of which 0.07 ha intersects the proposed ROW, 1.97 ha is contained in the surrounding LSA, and 5.67 ha falls outside of this but within the RSA. All of these areas are in the SBSdw3 (Stuart Dry Warm Sub-Boreal Spruce variant) biogeoclimatic unit (BGC).

Of the total 7.70 ha comprising Land Act Parcel DL 2557 R5C, upland ecosystems cover approximately 7.41 ha (96%) and non-vegetated (river) units cover approximately 0.29 ha (4%). The Hybrid white spruce – ricegrass ecosystem was the only upland ecosystem intersected along the ROW occupying a mere 0.05 ha (**Table 19.3-2**). This was also the dominant ecosystem in the surrounding LSA (1.56 ha) and RSA (3.48 ha).

There is a small amount of riparian area adjacent to a stream in Land Act Parcel DL 2557 R5C, accounting for 0.06 ha intersected by the ROW and a further 0.46 ha in the surrounding LSA. There are no old growth forest or sparsely vegetated ecosystems encountered in Land Act Parcel DL 2557 R5C for either the ROW, LSA or RSA. As a result, these two indicators are excluded from further assessment. There are three ecosystems in Land Act Parcel DL 2557 R5C that have potential traditional plant habitat based on berry-producing ecosystems. One of these includes the hybrid white spruce - ricegrass ecosystem intersected by the ROW (**Table 19.3-2**).

Table 19.3-3: Baseline Distribution of Ecosystems within Land Act Parcel DL 2557 R5C in the Vicinity of the Transmission Line

BGC Unit	Ecosystem Description	Site Series	Map Code	ROW	LSA	RSA	Total
				(ha)	(ha)	(ha)	(ha)
SBSdw3	Hybrid white spruce - Douglas fir - Pinegrass	01 ¹	SP	0.00	0.04	0.88	0.93
SBSdw3	Douglas fir - Lodgepole pine - Cladonia	02 ²	DC*	0.00	0.09	1.13	1.22
SBSdw3	Lodgepole pine - Feathermoss - Cladina	03 ^{1,2}	LC	0.00	0.17	0.00	0.17
SBSdw3	Hybrid white spruce – Ricegrass	04 ^{1,2}	SR	0.05	1.56	3.48	5.09
SBSdw3 Upland				0.05	1.87	5.49	7.41
SBSdw3 Non-Vegetated and Anthropogenic				0.02	0.10	0.17	0.29
SBSdw3 Total				0.07	1.97	5.66	7.70

Note: BGC = Biogeoclimatic, SBSdw3 = Stuart Dry Warm Sub-Boreal Spruce variant, ha – hectares

* Considered to be an ecosystem at risk

¹ Potential to contain traditional use plants

² Potential to contain species at risk

Numbers are rounded for presentation purposes, and as a result it may appear that the totals do not equal the sum of the individual values

There are four primary potential effects to the Ecosystem Composition VC: ecosystem loss, dust deposition, nitrogen deposition, and spread of invasive plants. Ecosystem loss is due to the removal of existing vegetation during the construction phase, which for the transmission line is mainly site clearing, but could also include a minor amount of salvage and stripping of surface soil for site grading and stockpiling of salvaged materials. Dust deposition can occur during construction, operation, and decommissioning of roads associated with the construction of the transmission line. Potential effects are expected to be negligible. Therefore, the effects of dust are excluded from further assessment. No effects are anticipated due to nitrogen deposition, as the only potential exceedances of nitrogen based on the air emission modeling occurred in the mine site LSA and none were predicted to occur along the linear features (**Section 5.2.4** of the Application). Therefore, the effects of nitrogen deposition are excluded from further assessment. The addition of the transmission line and their associated access roads will potentially increase the risk of the introduction of invasive plants. The risk posed by invasive plants can be mitigated by implementing an Invasive Species Management Plan (ISMP; **Section 12.2.1.18.4.5** of the Application) for all Project components, including the transmission line. Therefore, the effects of invasive species are excluded from further assessment.

19.3.12.1.1 Indicator 1: Ecosystem Distribution

Table 19.3-19 provides a summary of the ecosystem loss based on the ecosystems intersected along the 40 m transmission line ROW. The total amount of transmission line ROW intersected is 0.07 ha or 0.9% of the total 7.70 ha of Land Act Parcel DL 2557 R5C. Most of the intersected area (0.05 ha) contains the hybrid white spruce – ricegrass ecosystem within the SBSdw3 BGC unit. In the Post-Closure Case, the ecosystems are anticipated to be reclaimed to their pre-disturbance state with the implementation of mitigation measures described below.

19.3.12.1.2 Indicator 2: Riparian Areas

The total amount of riparian habitat that will be intersected is 0.06 ha, which is 12% of the amount of riparian area in Land Act Parcel DL 2557 R5C. The riparian areas is not expected to be affected by activities associated with construction of the transmission line, as poles would not typically be placed in these areas. With the implementation of mitigation measures described below, these riparian areas are expected to return to their former condition following decommissioning.

19.3.12.1.3 Indicator 3: Traditional Use Plant Habitat

Traditional use plant habitat was included as an indicator of ecosystem composition because plants are used by Aboriginal groups for food and medicinal purposes. The hybrid white spruce – ricegrass ecosystem has the potential to support traditional use plant species (i.e., berries). Clearing of the transmission line ROW may impact the use of this area for traditional use. However, the area intersected (0.05 ha) represents only 1% of the total area (5.09 ha) of this ecosystem in Land Act Parcel DL 2557 R5C.

The rating for all effect attributes is consistent for all indicators assessed. The magnitude is considered low because only 1% or less of the sensitive land within Land Act Parcel DL 2557 R5C is intersected by the ROW. The duration of the residual effect is rated long-term, because the site

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will remain cleared until the end of operations and reclamation success is uncertain. The likelihood of occurrence and degree of certainty (level of confidence for likelihood) is high, as the effect of the clearing is well known.

Overall the effects are considered Not Significant (minor) and the level of confidence for significance is moderate. The most noteworthy effect is the long-term loss of traditional use habitat along the small area (0.05 ha, 0.6% of the total area affected) intersected by the transmission line ROW.

Mitigation measures for the Project comprise actions that eliminate, reduce, or control the adverse environmental effects of a project, and include actions taken to replace, restore, or compensate for any adverse effects. This process is typically summarized as the mitigation hierarchy, which entails four steps with the intention of identifying opportunities to avoid, minimize, restore on-site, and compensate for or offset potential adverse environmental impacts (BC Ministry of Environment [BC MOE], 2012). Mitigation measures to minimize potential effects to Ecosystem Composition include:

- Minimize areas of disturbance outside or adjacent to areas targeted for clearing (i.e., movement of machinery and equipment, or extent of grubbing and stripping) by clearing flagging falling boundaries;
- Minimizing the clearing of linear ROWs and access roads by clearly flagging falling boundaries and road centre lines;
- In areas requiring clearing only (e.g., the transmission line), retain the topsoil and vegetation root mat whenever and wherever possible;
- Revegetation and progressive reclamation as described in **Sections 2.6.7** and **2.6.8**.
- Prevent the initial introduction and spread of invasive plants as described in the ISMRP (**Section 12.2.18.4.5**);
- Include well-demarcated no-work zones and management work zones (with restrictions such as no heavy machinery, etc.) and setbacks in accordance with Forest and Range Practices Act BMPs;
- Implement construction BMPs to mitigate for altered hydrology. For example, installing appropriate culverts where required, and maintaining functioning water tables and drainage;
- Follow the Approved Work Practices for Managing Riparian Vegetation (BC Hydro, 2003); and
- Maintain natural drainage patterns by minimizing the linear extent of roads crossing or paralleling riparian areas.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

19.3.13 Plant Species and Ecosystems at Risk

The only federal land parcel that is located within the Plant Species and Ecosystems at Risk LSA and RSA is Land Act Parcel DL 2557 R5C. The location of this land is shown in **Figure 19.3-1**.

19.3.13.1 Land Act Parcel DL 2557 R5C

This section focuses on the potential effects on the Plant Species and Ecosystems at Risk VC within Land Act Parcel DL 2557 R5C that may be caused by the Project. For this federal parcel, potential effects of the project are limited to the construction of the transmission line, new roads, and upgrades to roads required to support the construction and operation of the transmission line.

There are no BC Conservation Data Centre (BC CDC) element occurrence records for plant species at risk or ecological communities at risk in Land Act Parcel DL 2557 R5C in either the ROW, LSA, or RSA. Three of the ecosystems encountered in Land Act Parcel DL 2557 R5C have the potential to contain plant species at risk including the hybrid white spruce - ricegrass ecosystem intersected by the ROW. As shown in **Table 19.3-2**, the total amount of the ROW intersected is 0.07 ha of which 0.05 ha is an ecosystem with potential species at risk habitat. This represents 1% of the total area of this ecosystem (5.09 ha) within Land Act Parcel DL 2557 R5C. At post-closure, this ecosystem is anticipated to be reclaimed to its pre-disturbance state with the implementation of mitigation measures.

The Douglas fir – lodgepole pine – cladonia ecosystem is considered to be an ecosystem at risk and is present in small amounts in the LSA (0.09 ha) and RSA (1.13 ha) (**Table 19.3-2**). The patches of this ecosystem type are not intersected by the transmission line ROW; therefore, no effects are anticipated.

The rating for all effects attributes is based on the potential loss of plant species at risk. The ecological context is high because the Project could affect Red-listed plant species at risk. The magnitude is low because the total amount of transmission line ROW intersected is less than 1% of the potential species at risk habitat within Land Act Parcel DL 2557 R5C. Geographic extent is local, as effects are limited to the ROW. Duration is considered chronic because if species at risk are lost they are considered unlikely to return. The likelihood determination and level of confidence are ranked as moderate. Overall the effects are considered Not Significant (minor).

Mitigation measures to minimize the potential effects to plant species and ecosystems at risk include:

- Minimize disturbance and the extent of grubbing, stripping, and the removal of shrubs and herbaceous species within the mine site area and along Project related linear features;
- In areas requiring clearing only (e.g., the transmission line), retain the humus layer and vegetation root mat whenever and wherever possible;
- Prevent the initial introduction and spread of invasive plants as described in the ISMRP (**Section 12.2.1.18.4.5**);

- Monitor and apply control measures as described in the ISMP (**Section 12.2.1.18.4.5**); and
- Revegetation and progressive reclamation as described in **Sections 2.6.7** and **2.6.8**.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

19.3.14 Amphibians

Federal land parcel Land Act Parcel DL 2557 R5C is located within the Ecosystem Composition LSA and RSA. Tatelkus Lake IR#28 and PID015391809 and located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the Project on amphibians is described in **Section 5.4.7** of the Application. This assessment examines the potential effects of the Project on amphibians, using western toad (*Anaxyrus boreas*) as an indicator species.

19.3.14.1 Land Act Parcel DL 2557 R5C

The LSA for amphibians overlaps Land Act Parcel DL 2557 R5C. Construction of the transmission line and associated access roads have the potential to result in effects to amphibians. Wetlands are the limiting factor in determining the presence of amphibian habitat, and as a result, mitigation measures are largely focused around wetland protection and limiting disturbance to the wetlands.

The assessment indicates that potential high value western toad habitat occurs throughout the Project LSA and RSA; however, no wetlands are found within Land Act Parcel DL 2557 R5C. Consistent with other industrial applications, the assessment assumed a conservative, worst case scenario. The Proponent will use the modelled habitat distribution to target areas that may require pre-clearing and pre-construction surveys for western toad.

The Proponent is committed to following mitigation measures provided in the guidance document *Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia* (Cox and Cullington, 2009) to minimize adverse effects on wetland functions. Western toad habitat loss will be minimized through the following mitigation measures:

- When possible, road design using existing roads and cleared areas, and proposed access roads, transmission lines, and poles located away from wetland areas and riparian areas or spanning wetlands;
- Restricting the clearing of terrestrial amphibian breeding habitats to periods outside the amphibian breeding season (1 May to 31 August) or conduct pre-construction and pre-clearing surveys and amphibian salvage if during the breeding season;
- Modifying the timing of wetland draining where feasible would allow amphibians to move to other wetlands, otherwise conduct pre-construction and pre-clearing surveys and amphibian salvage if during the breeding season;

- Applying erosion and sediment control measures; and
- Implementing the Wetland Compensation Plan (**Appendix 5.3.7A**).

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

Pre-clearance surveys and salvage programs, combined with low traffic volumes along the transmission line access roads and no wetland habitat within Land Act Parcel DL 2557 R5C lead to a conclusion of a Not Significant (negligible) effect to western toads within this federal land parcel.

19.3.14.2 Tatelkus Lake IR#28

The assessment indicates that potential high value western toad habitat occurs throughout the Project LSA and RSA. Tatelkus Lake IR#28 overlaps with the RSA for Amphibians. No project activities occur at Tatelkus Lake IR#28; therefore, there are no effects to habitat loss, increased mortality risk, or alterations to amphibian movement anticipated.

As the residual effect of habitat loss and alteration, mortality risk, and amphibian movement in Tatelkus Lake IR#28 are rated as having a Not Significant (negligible) residual effect, the Project does not contribute to cumulative effects in the RSA.

19.3.14.3 PID015391809

PID015391809 overlaps with the RSA for the Amphibians VC. The Application concluded the Project as a whole (mine site, Kluskus FSR, water lines, transmission lines, and all access roads) would have a Not Significant (negligible) effect on western toads. Therefore, the project does not contribute to cumulative effects within Federal Land Parcel PID015391809.

19.3.15 Water Birds

Land Act Parcel DL 2557 R5C is found within the LSA and RSA for the Water Birds. Tatelkus Lake IR#28 and PID015391809 are located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the overall Project on water birds is described in **Section 5.4.8** of the Application. This assessment examines the potential effects of the Project on water birds, using ring-necked duck (*Aythya collaris*) and yellow rail (*Coturnicops noveboracensis*) as indicator species.

Water birds as a bird group were considered for inventory in the study area. This group of birds includes migratory waterfowl, pelicans, grebes, cormorants, loons, gulls, and shorebirds. There are no previously published records of water bird species of conservation concern within the study areas; however, seven species of concern may potentially occur within the study areas including, great blue heron, long-billed curlew, American golden-plover, American bittern, horned

grebe, and yellow rail (BC CDC, 2013). Water birds and their habitats are represented by the migratory water birds, specifically yellow rail and ring-necked ducks.

19.3.15.1 Land Act Parcel DL 2557 R5C

The LSA for water birds overlaps Land Act Parcel DL 2557 R5C. The overall Project is anticipated to remove <1% of available yellow rail and ring-necked duck habitat in the RSA. There is no wetland habitat in this federal parcel. The magnitude of habitat loss and alternation of water bird habitat in Land Act Parcel DL 2557 R5C is significantly less than 1%. Therefore, effects to Land Act Parcel DL 2557 R5C are negligible.

Mitigation measures to minimize effects to water birds on federal lands include:

- Avoiding active water bird nests by conducting clearing outside breeding periods (1 April to 31 August) or through pre-construction surveys for nests in suitable habitat when clearing is required within the breeding period;
- Minimizing disturbance to hydrology and vegetation at breeding sites.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

With these measures in place, several potential effects were deemed to be unlikely to produce residual effects.

19.3.15.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is located within the RSA for water birds. The residual project effects on water bird habitat loss for all project components is rated as Not Significant (minor). For the project as a whole, there is minimal loss of wetlands associated with forestry, agricultural, and mineral exploration; the significance determination for cumulative effects is Not Significant (minor). This incorporates the onsite and offsite mitigation measures described in the Conceptual Wetland Compensation Plan (**Appendix 5.3.7A**), other environmental management plans for the Project, as well as the recommended mitigation measures outlined above for the other activities. However, no wetlands will be lost within Tatelkus Lake IR#28 from this project or any other past, present, or future projects in the area and cumulative effects would be negligible.

19.3.15.3 PID015391809

PID015391809 is located within the RSA for water birds. The residual project effects on water bird habitat loss for all project components is rated as Not Significant (minor). The significance of the Project's contribution to cumulative effects in the RSA was determined at the post-closure phase for this assessment as wetlands mitigation and compensation will occur prior to and concurrent with construction, and during operations and closure. For the project as a whole, the minimal loss of wetlands associated with forestry, agricultural, and mineral exploration; the significance determination for cumulative effects is Not Significant (minor). This incorporates the onsite and offsite mitigation measures described in the Conceptual Wetland Compensation Plan (**Appendix**

5.3.7A), other environmental management plans for the Project, as well as the recommended mitigation measures outlined above for the other activities.

19.3.16 Forest and Grassland Birds

Land Act Parcel DL 2557 R5C is found within the LSA and RSA for the Forest and Grassland Birds. Tatelkus Lake IR#28 and PID015391809 are located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the overall Project on forest and grassland birds is described in **Section 5.4.9** of the Application. Forest and grassland birds are a well-known group of birds with respect to taxonomy, ecology, biology, and conservation status and include songbirds, raptors, and upland game birds (e.g., grouse). They are commonly grouped together as forest and grassland birds due to shared habitat requirements and predator-prey relationships. Effects on migratory forest birds and their habitats are represented by olive-sided flycatchers and red-tailed hawk, while resident forest birds are represented by Clark's nutcracker. Other resident forest bird habitat is also represented by habitat assessments for olive-sided flycatchers and red-tailed hawk.

19.3.16.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA for Forest and Grassland Birds in the northern portion of the main transmission line alignment. The olive-sided flycatcher (*Contopus cooperi*) and red-tailed hawk (*Buteo jamaicensis*) were selected as indicators for forest and grassland birds due to their representative habitat found within the RSA. Both species are abundant and require a mosaic of forest habitat consisting of late successional coniferous forest in close proximity to open areas such as wetlands, burns, or clearcuts, including Land Act Parcel DL 2557 R5C. The conservation of these two species and associated protective actions help preserve other forest and grassland birds in the Project area, including several other species of conservational concern that use similar habitat.

Habitat suitability mapping for a third species selected as an indicator, Clark's nutcracker (*Nucifraga columbiana*), was completed due to the limited habitat availability of whitebark pine in the LSA and RSA. In the area of Mt. Davidson, whitebark pine is the only coniferous tree species that the Clark's nutcracker harvests cones from and caches seeds for winter use. No moderate or high suitability Clark's nutcracker habitat is found in Land Act Parcel DL 2557 R5C.

The overall Project is anticipated to remove <2% of available forest and grassland bird habitat in the RSA. In this broader regional context, the magnitude of habitat loss and alternation of forest bird habitat in Land Act Parcel DL 2557 R5C is 'negligible', and the significance determination for the effects to this parcel on forest and grassland bird habitat is Not Significant (negligible) as a result.

Mitigation measures will be implemented to minimize potential effects to all forest and grassland birds and are specific to the potential effects carried through the assessment and potential effects on federal lands. The most important of these mitigation measures are:

- Designating well demarcated no-work zones and management work zones; and
- Implementing pre-clearing nest tree surveys of areas to be cleared during the bird breeding seasons (February to August) to identify any nests or listed species to allow avoidance or adaptive management.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

With these measures in place, several potential effects were deemed to be unlikely to produce residual effects.

19.3.16.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is located within the RSA for forest and grassland birds. The residual project effects on forest and grassland bird habitat loss for all project components is rated as Not Significant (minor). The Project will contribute to additional loss of forest and grassland bird habitat in combination with the past, present, and future activities (e.g., forestry, agricultural, and mineral exploration) identified in the RSA for this CEA. However, none of these activities will take place on Tatelkus Lake IR#28. There will therefore be no loss of forest and grassland bird habitat and residual cumulative effects on IR#28 are determined to Not Significant (negligible).

19.3.16.3 PID015391809

PID015391809 is located within the RSA for forest and grassland birds. The residual project effects on forest and grassland bird habitat loss for all project components is rated as Not Significant (minor). The significance of the Project's contribution to cumulative effects in the RSA was determined at the post-closure phase for this assessment, as forests and other habitat loss will be mitigated through reclamation primarily during closure. Logging activities in the RSA have generated loss of habitat; however, application of BMPs (BC MFLNRO, 2014) will protect the key habitats needed by forest and grassland bird species by minimizing disturbance, increasing success of reforestation, and minimizing the duration of disturbance. Although Project effects and the effects of other activities in the RSA may be cumulative, no additional adverse residual effects on forest and grassland birds are anticipated because of the Project. Due to the loss of forest and grassland bird habitat associated with MPB, forestry, agricultural, and mineral exploration, the significance determination for residual cumulative effects is Not Significant (minor) as a result of Project implementation.

19.3.17 Moose

Land Act Parcel DL 2557 R5C is found within the LSA and RSA for the Forest and Grassland Birds. Tatelkus Lake IR#28 and PID015391809 are located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the overall Project on moose (*Alces americanus*) is described in **Section 5.4.10** of the Application. Moose were selected as a representative ungulate VC because of their ecological and social importance for traditional harvest and importance for

recreational harvest by resident and non-resident hunters. They are year-round residents within the Project area that are dependent upon upland and lowland habitats for their survival. Moose use both forest and open habitats (e.g., wetlands, burns, and clearcuts) to satisfy their life requisites. Habitat loss and fragmentation through logging and mining exploration have altered the amount of habitat available to many ungulates in the area. Creation of abundant young forest through logging in the region has created suitable feeding habitat for moose but is offset by increased access for predators and hunters and loss of thermal habitat.

19.3.17.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA and RSA for the Moose. The overall Project is concluded to have the following residual impacts:

1. The effects of habitat loss and alteration on moose due to Project effects would be Not Significant (negligible).
2. The effects of mortality risk on moose due to the Project would be Not Significant (minor).
3. The effects of changes to moose movement due to the Project would be Not Significant (moderate).
4. The effects of changes to predator-prey dynamics due to the construction of the Project would be Not Significant (minor).

The overall Project is anticipated to remove <1% of available moose habitat in the RSA. In this broader regional context, the magnitude of habitat loss and alternation of moose habitat in federal Land Act Parcel DL 2557 R5C is 'negligible', and the significance determination for the effects of the overall Project on moose habitat loss is Not Significant (negligible) as a result.

The main transmission line alignment overlaps with Land Act Parcel DL 2557 R5C. The transmission corridor may increase the potential for direct mortality risk related to vehicle collisions and increased access for hunters, as well as indirect effects related to increased predator efficiency and hunting access. However, no new transmission line access roads or upgrades to existing roads are proposed within this federal land parcel. The context within this federal parcel would be low, as no listed species or ecosystems are present, the geographic extent is negligible, and very low in magnitude; therefore, effects on moose mortality in Land Act Parcel DL 2557 R5C are Not Significant (negligible).

Changes to moose movement in Land Act Parcel DL 2557 would be limited to the construction phase of the transmission line. Due to the short-term nature of the moving assembly line of the transmission line construction, the negligible areas of habitat lost in the parcel, and the lack of permanent access roads within the parcel, the effect on moose movement patterns on this Federal Land Act Parcel DL 2557 R5C is Not Significant (negligible).

Risk associated with the increased ease of access to moose habitat by predators will most likely occur along the proposed access road and transmission line. The geographic extent of this effect

within Federal Land Act Parcel DL 2557 R5C is negligible; therefore, effects changes to predator-prey dynamics would be Not Significant (negligible).

With the implementation of proposed mitigation measures, residual effects associated with changes to moose health are not anticipated. The biology and habitat of moose is relatively well understood and the mitigation measures for moose have been used, monitored and deemed successful on a variety of civil and industrial sites worldwide. The most important of these mitigation measures that apply to federal lands are:

- Designing access roads to use existing roads and cleared areas wherever possible, and locating proposed access roads and transmission lines away from wetland, mature spruce and riparian areas or spanning wetlands where feasible;
- Implementing a wetland compensation plan for offsetting high value habitat for moose; and
- Implementing BMPs for road surface maintenance to allow good vehicle line of sight and control, and reduced speeds limits to help reduce potential collisions with moose.

The Proponent is also committed to working with the federal government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

19.3.17.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is located within the RSA for moose. The residual effects on Moose mortality risk, movement patterns and population dynamics are all rated as Not Significant (minor) and were subject to a CEA. The Project will contribute to additional loss of moose habitat in combination with the past, present, and future activities (e.g., forestry, agricultural, and mineral exploration) identified in the RSA for this CEA. However, none of these activities will take place on Tatelkus Lake IR#28. There will be no loss of moose habitat, and residual cumulative effects on IR#28 are determined to be Not Significant (negligible).

19.3.17.3 PID015391809

PID015391809 is located within the RSA for moose. The residual effects on Moose mortality risk, movement patterns and population dynamics are all rated as Not Significant (minor) and were subject to a CEA. The Project will contribute to increased moose mortality, and changes in moose movement patterns and population dynamics in combination with the past, present, and future activities (e.g., forestry, agricultural, and mineral exploration) identified in the RSA for this CEA. The significance of the Project's contribution to cumulative effects in the RSA was determined at the post-closure phase for this assessment, as forests and other habitat mitigation and compensation will occur primarily during closure. Logging activities in the RSA have generated loss of habitat; however, the application of BMPs (BC MFLNRO, 2014) will protect the key habitats needed by moose. Although Project effects and the effects of other activities in the RSA may be cumulative, no additional adverse residual effects on moose are anticipated because of the Project. Due to the minimal changes in mortality risk, movement patterns or population dynamics associated with forestry, agricultural, and mineral exploration, the significance determination for

residual cumulative effects is Not Significant (minor). This assumes effective implementation of the mitigation and compensation measures (e.g., Wildlife Management Plan, Vegetation Management and Restoration Plan, and Sediment and Erosion Control Plan) for the Project.

19.3.18 Caribou

No Indian reserves or federal parcels are located within the LSA for Caribou, as shown in **Table 19.3-1**. Tatelkuz Lake IR#28, Kluskus 1 reserve, and Sundayman's Meadow 3 reserve are located within the RSA for the Caribou VC. The locations of these Indian reserves are shown on **Figure 19.3-1**.

The assessment of potential effects of the overall Project on caribou is described in **Section 5.4.11** of the Application. The Project has a potential to directly affect the Tweedsmuir-Entiako subpopulation and indirectly affect the Itcha-Ilgachuz subpopulation of northern caribou. The Tweedsmuir-Entiako and Itcha-Ilgachuz caribou subpopulations are part of the Threatened Southern Mountain Population/Northern Group of Northern Mountain DU7, and part of the provincially Blue-listed northern ecotype. The Tweedsmuir subpopulation is a local population unit and the Itcha-Ilgachuz subpopulation is a component of the Chilcotin local population unit within the northern group of the Southern Mountain Population. Caribou are year-round residents within the Project area and are dependent on mature and old coniferous forests, although deciduous and mixed forests are also used to satisfy their life requisites. Pre-existing habitat loss and fragmentation due to logging and road development have altered the amount of potential habitat within the Project area.

19.3.18.1 Tatelkus Lake IR#28

No federal lands are located within the LSA of the Project, but Tatelkuz Lake IR#28 is within the RSA. There is a very small amount of moderate suitability caribou habitat within Tatelkus Lake IR#28. For the assessment, any residual loss of moderate to high value suitable caribou habitat in the RSA is considered important, and caribou habitat loss and alteration are carried forward to the CEA to determine loss relative to the Caribou Recovery Strategy objective of less than 35% cumulative total disturbance. For the Project, residual effects to caribou habitat loss are rated as Not Significant (moderate). Clearing of vegetation may result in increased foraging habitat, which could result in changes to local moose populations which may affect predators and caribou. In addition, clearing may increase access for predators to certain areas within the mine site and increase the risk of predation for caribou within these areas. The residual Project effects of a change in population dynamics are rated as Not Significant (minor). The Project will not contribute to habitat loss or vegetation clearing at Tatelkus Lake IR#28 or any other Indian reserves; therefore, cumulative effects on these lands would be negligible.

Proposed mitigation measures to minimize project effects to caribou that apply to federal lands include:

- Avoid clearing of old growth forested habitat that supports important arboreal lichen distribution and minimizing ground clearing that may remove terrestrial lichens;

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- Minimizing the creation of new access for hunters and predators into previously undisturbed habitat; and
- Ensuring roads are adequately monitored and managed to prevent incidental mortalities.

19.3.18.2 Kluskus 1 reserve

Project areas overlap with Kluskus 1 reserve within the RSA. The same effects and mitigation measures described in **Section 19.3.18.1** apply to Kluskus 1 reserve.

19.3.18.3 Sundayman's Meadow 3 reserve

Project areas overlap with Sundayman's Meadow 3 reserve within the RSA. The same effects and mitigation measures described in **Section 19.3.18.1** apply to Sundayman's Meadow 3 reserve.

19.3.19 Grizzly Bear

Land Act Parcel DL 2557 R5C is located within the Grizzly Bear LSA and RSA. Tatelkuz Lake IR#28, PID015391809, Stellaquo IR#1; Kluskus 1 reserve, Sundayman's Meadow 3 reserve, Euchinico Creek 17 reserve, Trout Lake Alec 16, Nazco 20 reserve, Stony Creek 1 reserve, Laketown 3 reserve, Nautley (Fort Fraser) 1 reserve, Seaspunkut 4 reserve, Nak'azdli (Necoslie) 1 reserve, Burns Lake 18 reserve, Woyenne 27 reserve, Duncan Lake 2 reserve, and Palling 1 reserve are located within the RSA for this VC. The locations of these Indian reserves are shown on **Figure 19.3-1**.

Grizzly bear populations across BC are divided into 56 Grizzly Bear Population Units (GBPUs) (BC MFLNRO, 2012). The mine site is located in the Blackwater–West Chilcotin GBPU. The transmission line corridor traverses the Blackwater-West Chilcotin GBPU, the Nulki GBPU, and ends just inside the Francois GBPU.

19.3.19.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA for grizzly bear and is within the Nulki GBPU. The Nulki GBPU contains a high density of roads, has an estimated population of 44 bears, with a density of 3 bears per 1,000 km² and has been closed to hunting.

The overall Project is anticipated to remove <1% of available grizzly bear habitat in the RSA. In this broader regional context, the magnitude of habitat loss and alternation of grizzly bear habitat in Federal Land Act Parcel DL 2557 R5C is 'negligible', and the significance determination for the effects on grizzly bears is Not Significant (negligible) as a result.

Proposed mitigation measures to minimize project effects to grizzly bear that apply to federal lands include:

- Management of attractants to avoid potential conflicts between grizzly bears and Project sites;

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- Minimize the extent of clearing and density of linear features to maintain habitat effectiveness, which includes foraging, denning, and security cover; and
- Ensuring roads are adequately monitored and managed to prevent incidental mortalities.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

With these measures in place several potential effects were deemed to be unlikely to produce residual effects.

19.3.19.2 Tatelkus Lake IR#28, Kluskus 1 Reserve, Sundayman's Meadow 3 Reserve, Euchinico Creek 17 Reserve, Trout Lake Alec 16 and Nazco 20 Reserve

Tatelkus Lake IR#28, Kluskus 1 Reserve, Sundayman's Meadow 3 Reserve, Euchinico Creek 17 Reserve, Trout Lake Alec 16 and Nazco 20 Reserve are within the Grizzly Bear RSA and are within the Blackwater-West Chilcotin GBPU. The Blackwater–West Chilcotin GBPU is designated as provincially Threatened and closed to hunting to prevent further range contraction and ensure long-term population viability (BC MFLNRO, 2012). The Threatened status represents a population estimate for the area that is at 25% to 50% of its minimum habitat capability (Grizzly Bear Recovery Team, 2004). The Blackwater–West Chilcotin GBPU has an estimated population of 53 bears, with a density of less than 3 bears per 1,000 km² (BC MFLNRO, 2012).

The residual effects of the Project as a whole were determined to be Not Significant (minor) for Grizzly Bear habitat loss and Not Significant (minor) for mortality risk. These effects are carried into the CEA.

The significance of the Project's contribution to cumulative effects in the RSA was determined at the post-closure phase for this assessment as habitat mitigation and compensation will occur primarily during closure. Logging activities in the RSA have increased grizzly bear mortality and generated loss of habitat; however, application of BMPs (BC MFLNRO, 2014) will reduce the potential for any future increases in grizzly bear mortality and protect key habitats. Although Project effects and the effects of other activities in the RSA may be cumulative, the Project is not expected to affect the viability of this species due to the widespread and common extent of grizzly bears and their habitat within the RSA. Cumulative effects for habitat loss and alternation are anticipated to be Not Significant (minor).

Baseline levels of linear disturbance are currently above the threshold (i.e., >0.6 km/km²) identified by BC MFLNRO (2012). On this basis alone, the existing effects on grizzly bears within these three GBPUs may be considered Significant. Due to the minimal increase in mortality associated with forestry, agricultural, and mineral exploration activities, and the implementation of mitigation measures by the Proponent to minimize potential effects of the Project on bear mortality, the overall cumulative effects remain unchanged with the addition of the Project. Because the Project is predicted to increase linear density by no more than 0.1 to 0.3% in the GBPUs, its contribution

to cumulative effects is conservatively rated as Not Significant (minor). The level of confidence is moderate due to the implementation of the grizzly bear mitigation measures.

Broad regional collaborative mitigation measures may include:

- Maximizing reforestation, particularly in MPB and wildfire-affected areas;
- Developing and implementing operating guidelines for industrial development and access within grizzly bear habitat;
- Participating in land-use planning to identify areas within grizzly bear habitat where grizzly bear conservation is prioritized;
- Maintaining hunting closures and restrictions in areas that remain open to hunting;
- Reducing speed zones on road sections in important grizzly bear habitat;
- Developing cooperative stewardship agreements, memoranda of understanding, and activities to support the engagement of Aboriginal organizations, recreational stakeholders, and other stakeholders in the monitoring, management, and conservation of grizzly bears;
- Preparing and providing outreach materials relating to grizzly bear and distribution to interest groups, recreational organizations, and the general public, including education on how to avoid disturbing grizzly bears; and
- Supporting ongoing research relating to grizzly bear habitat, ecology, and limiting factors.

19.3.19.3 PID015391809, Stellaquo IR#1, Stony Creek 1 Reserve, Laketown 3 Reserve, Nautley (Fort Fraser) 1 Reserve, Seaspunkut 4 Reserve, Nak'azdli (Necoslie) 1 Reserve

PID015391809, Stellaquo IR#1, Stony Creek 1 Reserve, Laketown 3 Reserve, Nautley (Fort Fraser) 1 Reserve, Seaspunkut 4 Reserve, and Nak'azdli (Necoslie) 1 Reserve are within the Grizzly Bear RSA and fall within the Nulki GBPU. The Nulki GBPU is described above in **Section 19.3.19.1**.

The residual effects of the Project as a whole were determined to be Not Significant (minor) for Grizzly Bear habitat loss and Not Significant (minor) for mortality risk. These effects are carried into the CEA.

Potential cumulative effects as they apply to federal lands are described in **Section 19.3.19.2** and the mitigation measures described there apply to these federal parcels as well.

19.3.19.4 Burns Lake 18 Reserve, Woyenne 27 Reserve, Duncan Lake 2 Reserve, Palling 1 Reserve

Burns Lake 18 Reserve, Woyenne 27 Reserve, Duncan Lake 2 Reserve, and Palling 1 Reserve are located within the Grizzly Bear RSA and overlap with the Francois GBPU. The Francois GBPU is considered viable with an estimated population of 58 bears and a density of 7 bears per 1,000 km², but has a road density greater than the threshold of 0.6 km/km² recommended to maintain

sufficient core habitat for the conservation of grizzly bear (BC MFLNRO, 2012). As a result, this population is also closed to hunting.

The residual effects of the Project as a whole were determined to be Not Significant (minor) for Grizzly Bear habitat loss and Not Significant (minor) for mortality risk. These effects are carried into the CEA.

Potential cumulative effects as they apply to federal lands are described in **Section 19.3.19.2** and the mitigation measures described there apply to these federal parcels as well.

19.3.20 Furbearers

Land Act Parcel DL 2557 R5C is located within the LSA and RSA for Furbearers. Tatelus Lake IR#28 and PID015391809 are located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the overall Project on furbearers is described in **Section 5.4.13** of the Application. This supplemental report assesses the potential effects on furbearers, using marten (*Martes americana*) and beaver (*Castor canadensis*) as indicator species. These furbearers are year-round residents in the Project area and are indicative of the winter mammal carrying capacity and habitat connectivity of the landscape. Beaver was also selected as an additional indicator species for furbearers due to its economic importance to First Nations and local trappers, and its representative habitat within wetlands and other waterbodies in the RSA.

19.3.20.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA for furbearers. The EA Application concluded the Project as a whole (mine site, Kluskus FSR, water lines, transmission lines, and all access roads) would have a Not Significant (minor) effect on furbearer habitat (except beaver), and a Not Significant (negligible) effect on beaver. Operationally, however, these results do not change how mitigation measures will be considered or implemented.

Mitigation measures for furbearers address habitat loss and alteration, and mortality risk. Purpose-designed environmental management plans are in place to control invasive plant species, protect wildlife habitat, protect in-stream resources, and to impose controls over access and vegetation along linear features, as well as notification and monitoring of activities and their effects. The most important of these mitigation measures for the effects of habitat loss, alteration, and mortality are:

- Road design using existing roads and cleared areas where possible, and, when not avoidable, locating proposed access roads and transmission lines away from wetland and riparian areas or spanning wetlands with transmission lines, and
- Restricting and controlling road access by gating main access roads to ensure no unauthorized traffic use of the road. All traffic flow on the FSR will be monitored and controlled via radio communications. Reporting observations of wildlife along the road to environmental staff.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

19.3.20.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is located within the RSA for furbearers. Residual effects of the Project as a whole are determined to be Not Significant (minor) for loss of furbearer (except beaver) habitat. Loss and degradation of moderate to high value furbearer habitat will occur during the construction phase primarily in the mine site area and these effects will be evident through operations. Regionally, these moderate to high value habitats are widespread and available throughout the RSA. Residual effects to beaver mortality are rated as Not Significant (minor). Mortality of beaver may occur intermittently from construction phase through to closure phase. The clearing of forest around riparian areas, as well as creating linear corridors, may increase predator accessibility to these areas (e.g., wolves, coyotes). The mortality impacts will have a local effect and will be limited to specific areas that are cleared for the Project and within beaver habitat. No clearing or habitat loss will take place on Tatelkus Lake IR#28. There will be no loss of furbearer habitat and residual cumulative effects on IR#28 are determined to be Not Significant (negligible).

19.3.20.3 PID015391809

PID015391809 is located within the RSA for furbearers. Residual effects of the Project as a whole are determined to be Not Significant (minor) for loss of furbearer (except beaver) habitat. Loss and degradation of moderate to high value furbearer habitat will occur during the construction phase primarily in the mine site area and these effects will be evident through operations. Regionally, these moderate to high value habitats are widespread and available throughout the RSA. Residual effects to beaver mortality are rated as Not Significant (minor). Mortality of beaver may occur intermittently from construction phase through to closure phase. The clearing of forest around riparian areas, as well as creating linear corridors, may increase predator accessibility to these areas (e.g., wolves, coyotes). The mortality impacts will have a local effect and will be limited to specific areas that are cleared for the Project and within beaver habitat. Logging activities in the RSA have likely caused some loss of marten habitat; however, application of BMPs (BC MFLNRO, 2014) will protect key forest and wetland habitats needed by furbearers. Although Project effects and the effects of other activities in the RSA may be cumulative, no additional adverse residual effects on furbearers are anticipated due to the Project. Due to the minimal loss of furbearer habitat associated with forestry, agricultural, and mineral exploration, the significance determination for residual cumulative effects is Not Significant (minor) as a result of Project implementation.

19.3.21 Bats

Land Act Parcel DL 2557 R5C is located within the LSA and RSA for Bats. Tatelkus Lake IR#28 and PID015391809 are located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the overall Project on bats is described in **Section 5.4.14** of the Application. This supplemental report assesses the potential effects of the Project on bats, using the little brown myotis (*Myotis lucifugus*) as an indicator species.

19.3.21.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA for bats. The overall Project is anticipated to remove <2% of available bat habitat in the RSA. The magnitude of habitat loss and alternation of bat habitat is 'negligible', and the significance determination for the effects of the Project on bats is Not-Significant (negligible) as a result.

Mitigation measures for bats have been used, monitored and deemed successful on a variety of civil and industrial sites throughout BC. The most important of these mitigation measures are:

- Avoid clearing of old growth forested stands that support roosting sites;
- Pre-clearing surveys for roosting bats;
- Avoid disturbance to cave hibernacula, and
- Measures to prevent the introduction of white nose syndrome, a known pathogen of bats.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

With these measures in place several potential effects were deemed to be unlikely to produce residual effects.

19.3.21.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is located within the RSA for bats. With the implementation of the proposed mitigation measures, the residual effects of the Project are predicted to be Not Significant (negligible); therefore, no cumulative effects are expected.

19.3.21.3 PID015391809

PID015391809 is located within the RSA for bats. With the implementation of the proposed mitigation measures, the residual effects of the Project are predicted to be Not Significant (negligible); therefore, no cumulative effects are expected.

19.3.22 Invertebrates

Land Act Parcel DL 2557 R5C is located within the LSA and RSA for Invertebrates. Tatelkus Lake IR#28 and PID015391809 are found within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-1**.

The assessment of potential effects of the overall Project on invertebrates is described in **Section 5.4.15** of the Application. This assessment examines the potential effects of the Project on invertebrates, using the jutta Arctic (*Oeneis jutta*) butterfly and the American emerald (*Cordulia shurtleffii*) dragonfly as indicator species.

19.3.22.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the LSA for invertebrates. Invertebrate populations and habitats will not be significantly affected through habitat loss, increases in mortality, or health effects during the life of the Project. The maximum potential reduction of useable habitat within the RSA is <1%. Low physical mortality effects were predicted to invertebrates through increased mortality due to collisions and to invertebrate health through changes in water and air quality. Mitigation measures that include no net loss of aquatic habitat, limited loss of terrestrial habitat, and the predicted limited vehicular traffic related to the transmission line and access roads indicate no significant effects to invertebrates on Land Act Parcel DL 2557 R5C.

Mitigation measures for invertebrates address habitat loss and alteration. The most important of these mitigation measures are:

- Avoiding wetland breeding sites in the design of roads and infrastructure; and
- Minimizing disturbance to hydrology and vegetation at breeding sites.

The Proponent is also committed to working with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

19.3.22.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is located within the RSA but outside the LSA for invertebrates. Residual effects of the Project are rated as Not Significant (minor) for invertebrate habitat loss and alteration. The Project will contribute to additional loss of invertebrate habitat in combination with the past, present, and future activities (e.g., forestry, agricultural, and mineral exploration) identified in the RSA for this CEA. However, none of these activities will take place on Tatelkus Lake IR#28. There will be no loss of invertebrate habitat and residual cumulative effects on IR#28 are determined to be Not Significant (negligible).

19.3.22.3 PID015391809

PID015391809 is located within the RSA but outside the LSA for invertebrates. Residual effects of the Project are rated as Not Significant (minor) for invertebrate habitat loss and alteration. The Project will contribute to additional loss of invertebrate habitat in combination with the past, present, and future activities (e.g., forestry, agricultural, and mineral exploration) identified in the RSA for this CEA. The significance of the Project's contribution to cumulative effects in the RSA was determined at the post-closure phase for this assessment as wetlands mitigation and compensation will occur prior to and concurrent with construction, and during operations and closure. Logging activities in the RSA have generated loss of habitat; however, application of BMPs (BC MFLNRO, 2014) will protect the key wetland habitats needed by invertebrate species by minimizing disturbance, increasing success of reforestation, and minimizing the duration of disturbance. Due to the minimal loss of invertebrate habitat associated with forestry, agricultural, and mineral exploration, the significance determination for cumulative effects is Not Significant (minor) as a result of Project implementation.

19.3.23 Provincial Economy

Tatelkuz Lake IR#28, Land Act Parcel DL 2557 R5C, PID015391809, Stellaquo IR#1, Kluskus 1 reserve, Sundayman's Meadow 3 reserve, Euchinico Creek 17 reserve, Trout Lake Alec 16, Nazco 20 reserve, Stony Creek 1 reserve, Laketown 3 reserve, Nautley (Fort Fraser) 1 reserve, and Seaspunkut 4 reserve are located within the LSA and RSA for the Provincial Economy VC. The Indian reserves that are located within the RSA for this VC are summarized in **Table 19.3-1**. The locations of the lands are shown on **Figure 19.3-1**.

Provincial Economy describes the economic contributions that the Project is expected to bring to the province of BC and the rest of Canada. Key indicators of these economic effects include contributions to Gross Domestic Product (GDP), employment (in full-time equivalents), and government tax revenue (i.e., federal, provincial and local taxes). These indicators are not applicable to federal lands; therefore, they are not assessed here.

19.3.24 Regional and Local Employment and Businesses

The LSA and RSA for Regional and Local Employment and Businesses overlap with the same parcels described under **Section 19.3.23**.

Project construction and operations will have net positive effects on local and regional employment and businesses in the SERSA. During the two years of construction, the Project will provide 485 PYs of employment for SERSA residents, and will purchase \$339 million in goods and services from local and regional businesses. During operations, the Project will provide opportunities for long-term employment for SERSA residents. On an annual basis, the Project will employ 420 current and new residents of the SERSA, and will spend \$75 million to purchase goods and services from local and regional businesses. A number of these jobs and business opportunities are expected to benefit residents of Indian reserves.

As the Project enters the decommissioning and closure phase, potential adverse effects associated with the reduction in Project-related employment are anticipated. Loss of operational employment would result in a large net decrease in local and regional employment. The extent to which this will result in increased unemployment rates at that time will, depend on what percentage of the Project workforce may decide to retire and on available employment opportunities at other projects in the SERSA.

Given the potential significance of mine closure, the Proponent will commit to working with the affected communities, including First Nation Communities, and government agencies to develop a mine closure plan that includes a strategy for buffering the effects of eventually losing 420 mining jobs. Elements of the plan could include such things as continuing to offer skills upgrading to workers to provide them with the capacity to find other non-mining jobs after mine closure, assisting in the development of new economic development opportunities, and working with other regional employers to find new jobs for mine employees (**Section 6.2.3**). This adverse residual effect is rated as Not Significant (minor) for the overall SERSA and is not expected to be of higher significance on the people residing on federal lands (refer to **Table 19.3-1** for a list of Indian reserves that overlap with the Regional and Local Employment and Businesses LSA).

19.3.25 Regional and Local Government Finance

The LSA and RSA for Regional and Local Government Finance contain the same parcels described under **Section 19.3.23**.

The Project will affect regional and local government finances through payment of property taxes and through the use of regional landfill facilities. These indicators are not applicable to Indian reserves; therefore, no effects are anticipated.

19.3.26 Demographics

The LSA and RSA for Demographics contain the same parcels described under **Section 19.3.23**.

Changes to population and demographics within federal lands are not anticipated to be noticeable from baseline conditions. Given the short duration of the construction phase and the use of a camp, the effect on demographics during construction is considered to be Not Significant (negligible) for the overall SERSA, including federal lands. During the operations phase, a number of workers and their families are predicted to relocate to the SERSA (up to 100 families or 290 people); however, these in-migrants are expected to relocate to urban communities within the SERSA, in particular Prince George and Vanderhoof. Therefore, minimal population changes are anticipated on Indian reserves. The residual Project effect on demographics during the Operations phase is rated as Not Significant (minor) for the overall SERSA. This effect is not expected to be higher on the people residing on federal lands.

19.3.27 Regional and Community Infrastructure

The LSA and RSA for Regional and Community Infrastructure contain the same parcels described under **Section 19.3.23**.

The Project has been designed to minimize direct use of regional and local infrastructure. It will be self-contained, with its own accommodations and water and sewage facilities and its own access road and electrical transmission line to site. Project effects on regional and community infrastructure would be linked to the Project-related influx of population that could result in additional pressure on regional and local infrastructure (e.g., housing and temporary accommodation, municipal infrastructure, etc.) and to the use of regional transportation infrastructure for Project transportation activities.

During the construction phase, the provision of camps and the short duration of construction will create no population effects on the SERSA and will have no effects on federal lands community infrastructure.

During the operations phase, up to 290 people (100 families) may choose to relocate to the SERSA and could create additional demands on regional and community infrastructure services including housing, utilities, and recreational facilities. These in-migrants are predicted to relocate to urban communities within the SERSA, in particular Prince George and Vanderhoof, and minimal

population changes are anticipated on Indian reserves. Therefore, no additional strain on community infrastructure on federal lands is anticipated.

Transportation of workers, equipment, services and materials to and from the mine site will create additional vehicle traffic, resulting in increased potential for motor vehicle accidents and increased road wear and maintenance. Predicted traffic volume is within normal range on Hwy 16 and is substantial on the FSR, but proposed mitigation for FSRs and mine access road effectively addresses potential effects. The residual effect of transportation activities on federal lands is not anticipated to be higher than for the overall SERSA.

19.3.28 Regional and Local Services

The LSA and RSA for Regional and Local Services contain the same parcels described under **Section 19.3.23**.

As discussed in **Section 19.3.26**, population increases during construction are expected to be immaterial and would not cause a noticeable effect on regional and local services on federal lands or the overall SERSA.

Operations workers who choose to relocate to the SERSA will create a population impact, thus increasing the demand for regional public services (e.g. health, education, policing, emergency, etc.). In addition, changes in traffic on area roads could result in higher demands for public safety and health services if there is an increase in accidents. The Project needs for qualified workers would also increase the demand for regional educational services. Finally, Project operations could place additional demands on health services if accidents at the worksite occur. These effects could increase pressure on regional services and affect the delivery of services to on-reserve populations, who access services off-reserve; however, the effects are not expected to be higher than those for the overall SERSA.

During operations, the Proponent intends to hire the majority of the workers from within the SERSA and provide a self-contained camp for workers at the site; however, up to 290 people (100 families) are expected to relocate to the SERSA. This corresponds to approximately 0.3% of the current population, which represents a very small increase over baseline conditions. Further, population increases are predicted to be focused in Prince George and Vanderhoof, and minimal population changes are anticipated on Indian reserves; therefore, no direct effects are expected on services on federal lands. Populations living on federal lands who access services based in Prince George and Vanderhoof (e.g. hospital services, schools, emergency and policing services, etc.) could face indirect effects.

To mitigate these effects, the Proponent will implement a number of measures discussed in detail in **Section 7.2.4.3.3**, and summarized below:

- Work closely on an ongoing basis with Northern Health (NH), local fire departments, RCMP, and BC Ambulance to ensure that the appropriate information on the changes in area transportation volumes, mine operations, and the change to the local population are considered.

- Providing security services at the mine site, and have health and medical equipment and personnel to meet the requirements of the “Health, Safety and Reclamation Code for Mines in British Columbia” and WorkSafeBC.
- Provide full firefighting equipment and trained personnel to meet all onsite fire and rescue needs, as well as trained mine rescue personnel and mine rescue equipment that will be part and parcel of regional emergency response planning.
- The Proponent is committed to preparing and submitting a Health and Medical Services Plan, informed by the Health and Medical Services Plan Best Management Guide for Industrial Camps provided by NH (November 2014), prior to construction.
- Use adaptive management to monitor and address any incremental health care service demands directly attributable to the Project.
- Implement a no onsite alcohol and drug policy and no hunting and fishing policy, including related activities, for construction and operations staff and contractors while on company business or staying in accommodations provided by the company. There will be policies and guidelines for ensuring a respectful workplace: no harassment, safety and security, multi-cultural workforce considerations, and Aboriginal awareness training.
- Work closely with regional training institutions to implement a training strategy for regional residents.

With the implementation of mitigation measures, no additional risk of adverse effects to people residing on federal lands is anticipated (refer to **Table 19.3-1** for a list of Indian reserves that are located within the Regional and Local Services LSA). Residual effects on Regional and Local Services to people residing on federal lands is determined to be Not Significant (negligible).

19.3.29 Family and Community Well-being

The LSA and RSA for Family and Community Well-being contain the same parcels described under **Section 19.3.23**.

Anticipated Project effects on family and community well-being are linked to new project-related income and work schedule requirements and, to a lesser extent, linked to the Project-related influx of population. Residual effects on populations residing on federal lands are anticipated to be similar to the effects identified for the overall SERSA, although the magnitude of effects are expected to be lower, since in-migration to Indian reserves is predicted to be limited.

For both construction and operations the net income effects are considered positive since employment income will increase families’ economic capacity and quality of life. The net loss of employment following mine closure is considered adverse but Not Significant (minor). With minimal population impacts, the residual effects related to population influx and an associated increase of disruptive or illegal activities are considered negative but Not Significant (minor). Effects on family relationships associated to separation of workers from their families would be negative; however, with mitigation measures in place the effects are expected to be Not Significant (minor). This determination is consistent with the rating of the effects throughout the SERSA.

The Proponent will work with local agencies to assist in monitoring community well-being and to take corrective actions where appropriate (adaptive management). The following measures will be implemented (Refer to **Section 7.2.5.3.4** for additional details):

- Deposit workers' salaries directly to their bank accounts and provide access to money management training;
- Facilitate and maintain communication between the construction workers and their families by providing cell phone and internet services onsite;
- Offer short shift rotations (14 days on and 14 days off for most positions and 4 days on and 3 days off for staff positions) and allow flexibility to accommodate hard to fill positions;
- Implement a hiring strategy that will include sourcing and training under-represented groups;
- Offer counselling services to employees as well as cultural awareness training and harassment-free workplace environment;
- Work with local agencies to assist in monitoring community well-being and to take corrective actions where appropriate including developing a health and well-being management plan based on guidelines from Northern Health; and
- The Proponent is also pursuing opportunity agreements with Aboriginal groups potentially affected by the Project to define common objectives and working arrangements, and to promote the development of the Aboriginal workforce and businesses.

With the implementation of mitigation measures no additional risk of adverse effects on people residing on federal lands is anticipated (refer to **Table 19.3-1** for a list of Indian reserves that overlap with the Family and Community Well-being LSA). Residual effects on Family and Community Well-being to people residing on federal lands are determined to be Not Significant (minor).

19.3.30 Non-traditional Land and Resource Use

Land Act Parcel DL 2557 R5C is located within the Non-traditional Land and Resource Use LSA and RSA. Tatelkus Lake IR#28, Stellaquo IR#1, and PID015391809 are located within the RSA for this VC. The locations of these lands are shown in **Figure 19.3-1**.

From a federal perspective, there are no designated National Parks (National Parks System Plan, 3rd Edition, undated), National Historic Sites (National Historic Sites of Canada System Plan, undated), National Marine Conservation Areas (Parks Canada, 2013), National Wildlife Areas (Environment Canada, 2013a), or Migratory Bird Sanctuaries (Environment Canada 2013b) proximate to the Project. The Nechako Migratory Bird Sanctuary, which has traditionally attracted very large numbers of spring migrating Canada geese, is located within the town limits of Vanderhoof, approximately 20 km east of where the Kluskus FSR connects with Hwy. 16 and more than 100 km (straight line measurement) north of the proposed mine site (**Figure 19.3-1**).

19.3.30.1 Land Act Parcel DL 2557 R5C

Land Act Parcel DL 2557 R5C is located within the NTLRU LSA and is adjacent to the northeast side of the Provincial Stellako Wildlife Management Area that would be crossed by the transmission line. Construction effects as listed below could impact the area for a short period when the transmission line construction occurs in the federal land.

During construction, Land Act Parcel DL 2557 R5C may be affected by:

- Disruption of the use of tenures in the area of the transmission line and associated access roads;
- Ongoing monitoring and maintenance of ROW corridors, surface installations, access roads, and related facilities;
- Emissions, and dust generation from equipment operation;
- Noise from vehicles and equipment during routine operations; and
- Project traffic and improved access.

During operations, Land Act Parcel DL 2557 R5C may be affected by:

- Disruption of the use of tenures in the area of the transmission line and associated access roads;
- Ongoing monitoring and maintenance of ROW corridors, surface installations, access roads, and related facilities; and
- Project traffic and improved access.

The Proponent will work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

None of these activities will affect Land Act Parcel DL 2557 R5C (or activities on this parcel) in the LSA. Effects to the parcel are negligible.

19.3.30.2 Tatelkus Lake IR#28 and Stellaquo IR#1

Tatelkus Lake IR#28 and Stellaquo IR#1 are located outside of the LSA but within the RSA for NTLRU. Non-traditional land and resource use activities do not take place within IRs; therefore, no effects are anticipated to NTLRU within Tatelkus Lake IR#28 or Stellaquo IR#1.

19.3.30.3 PID015391809

Federal parcel PID015391809 is not located within the LSA for NTLRU but is within the RSA for this VC. PID015391809 is located within the expanded RSA for the transmission line and associated access roads. Residual Not Significant (minor) effects were determined for Recreation/Tourism Use, Mining Exploration and Mineral Tenures, Forestry and Timber Resource Use, Hunting, Trapping and Guide Outfitting, Agriculture and Grazing, and Transportation and

Access. Cumulative effects to this parcel would remain unchanged to the significance ratings determined in **Section 7.2.6** of the Application.

19.3.31 Current Land and Resource Use for Traditional Purposes

Current Aboriginal Use refers to Aboriginal peoples' land based practices, including fishing practices, hunting and trapping practices, gathering practices, social and ceremonial practices, and traveling and habitation practices. The Aboriginal groups considered in this assessment include:

- Lhoosk'uz Dene Nation (LDN);
- Nadleh Whut'en First Nation (NWFN);
- Saik'uz First Nation (SFN);
- Stelat'en First Nation (StFN);
- Ulkatcho First Nation (UFN);
- Nazko First Nation (NFN);
- Skin Tyee Nation (STN);
- Tsilhqot'in National Government (TNG); and
- Métis Nation British Columbia (MNBC).

This summary of the assessment on Current Land and Resource Use for Traditional Purposes (CLRUTP) is based on information presented in **Section 7.2.7** of the Application/EIS as well as **Appendix – Supplemental Report on Transmission Line Access Roads**. The presence of federal parcels and Indian Reserves (IR)¹ within the CLRUTP LSA and RSA for each of the traditional territories of the Aboriginal Groups are summarized in **Table 19.3-4**. The effects assessment for IRs are presented in the section corresponding to the Aboriginal group for which the land has been set apart for use and benefit.

¹ According to the *Indian Act* (Government of Canada, 1985), an Indian Reserve refers to a "tract of land, the legal title to which is vested in Her Majesty, that has been set apart by Her Majesty for the use and benefit of a band"

Table 19.3-4: Summary of Indian Reserves and Other Federal Lands Parcels that overlap Aboriginal Traditional Territory, in the LSA and RSA

Aboriginal Group	LSA	Outside of LSA but Within RSA
Lhoosk'uz Dene Nation (LDN)	Tatelkus Lake IR#28 ¹	n/a ^{2,3}
Nadleh Whut'en First Nation (NWFN)	Land Act Parcel DL 2557 R5C	PID015391809
Saik'uz First Nation (SFN)	n/a ^{2,3}	n/a ^{2,3}
Stellat'en First Nation (StFN)	Land Act Parcel DL 2557 R5C	PID015391809
Ulkatcho First Nation (UFN)	n/a ^{2,3}	n/a ^{2,3}
Nazko First Nation (NFN)	n/a ^{2,3}	n/a ^{2,3}
Skin Tyee Nation (STN)	n/a ^{2,3}	n/a ^{2,3}
Tsilhqot'in National Government (TNG)	n/a ^{2,3}	n/a ^{2,3}
Métis Nation British Columbia (MNBC)	n/a ^{2,3}	n/a ^{2,3}

Notes: ¹ Tatelkus Lake IR#28 is set apart for the use and benefit of the Lhoosk'uz Dene Nation;
² No Indian Reserves set apart for the use and benefit of this Aboriginal Group, within the LSA and/or the RSA for this VC;
³ No other federal lands parcels fall within the LSA and/or the RSA for this VC within the traditional territory for this Aboriginal Group.

19.3.31.1 Lhoosk'uz Dene Nation (LDN)

Tatelkus Lake IR#28 is located within the traditional territory of the LDN and within the LSA and RSA for CLRUTP. The location of this Indian Reserve within the LDN traditional territory is shown in **Figure 19.3-4**.

19.3.31.1.1 Tatelkus Lake IR#28

19.3.31.1.1.1 Hunting

Species that were identified as harvested by LDN included caribou, moose and beaver. The potential changes in the availability of harvested resources for LDN in federal lands is quantified through spatial analysis of habitat losses in Tatelkus Lake IR#28. As stated in **Sections 19.3.17, 19.3.18** and **19.3.20** above, no habitat loss for caribou, moose or beaver is taking place within Tatelkus Lake IR#28; therefore, there will be no change in the availability of harvested resources on this land.

Access to Tatelkus Lake IR#28 or the resources within will not change.

The assessment on Noise and Vibration presented in **Section 19.3.1** above indicates that residual effects of noise on Tatelkus Lake IR#28 will be Not Significant (negligible). With respect to visual effects on the experience, the assessment in **Section 7.2.8, Figure 7.2.8-15** demonstrates that the viewshed for the mine does not overlap with Tatelkus Lake IR#28 with the exception of the high ground where the fishing cabin is located; therefore, no effects are anticipated in the vast majority of IR#28. The magnitude of the effect will be lower than the medium magnitude determined for the viewpoint at the fishing cabin.

Potential changes to the quality – in this case, contamination of wildlife for human consumption – was assessed through a Human Health and Ecological Risk Assessment (HHERA). The HHERA concluded that residual effects to human health for the residents of Tatelkus Lake IR#28 were Not Significant (negligible).

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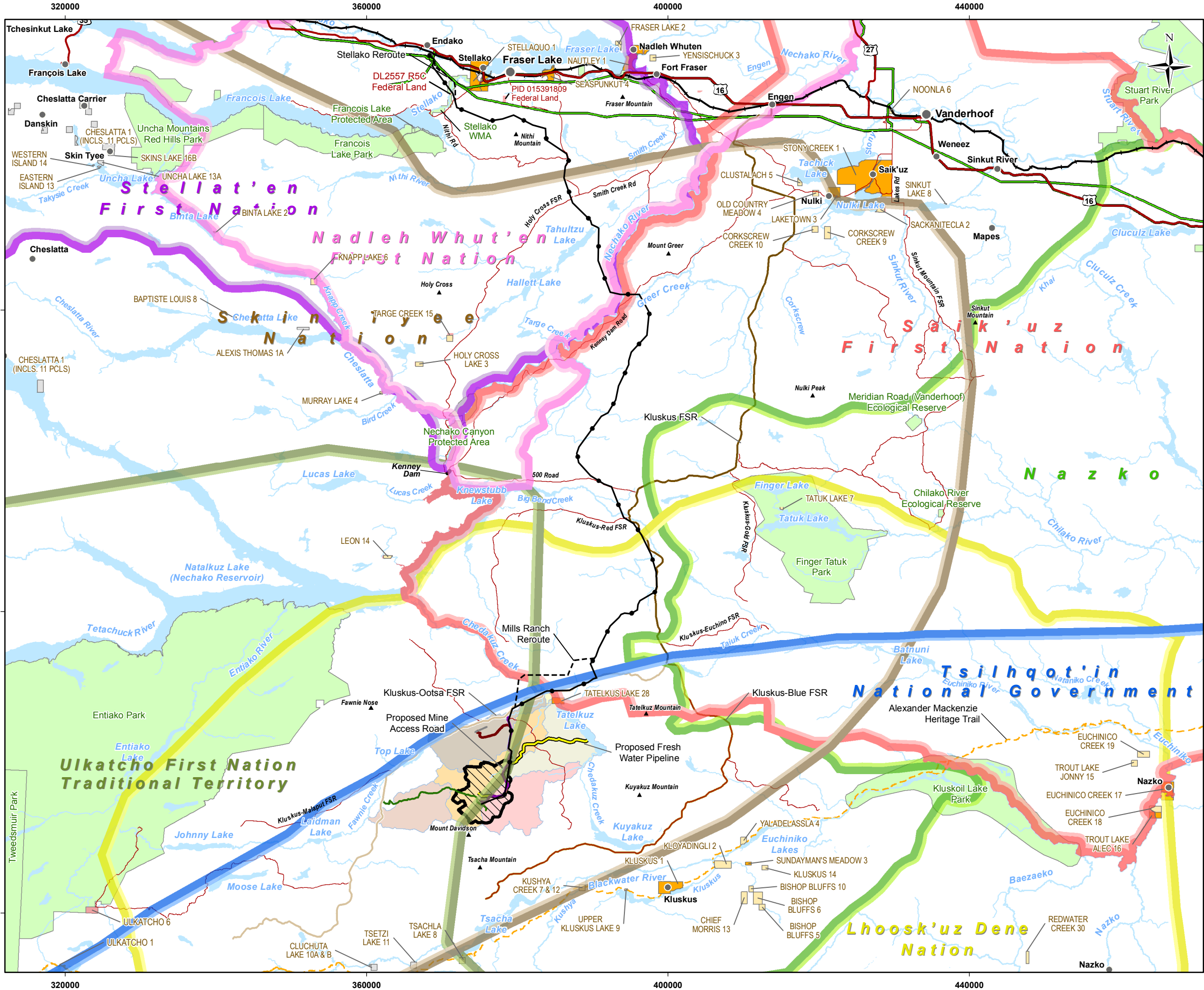
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Mitigation measures proposed to minimize effects on Tatelkus Lake IR#28 include:

- Establishing a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Developing mitigation and avoidance strategies through ongoing discussions with the Caribou Sub-Working Group;
- Setting reclamation goals to re-establish later winter habitat;
- Participating in regional wildlife and resource management initiatives (specifically for ungulates);
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing the respective EMP presented in **Section 12.2.1**, addressing air quality and emissions management, transportation and access management, landscape, soils and vegetation management and restoration, wildlife management, and visual resources and aesthetics management;
- Implementing a Country Food Monitoring Program around the mine site (**Appendix 9.2.2.B**); and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The overall residual effect of the Project on hunting for LDN is determined to be Not Significant (moderate) due to Project overlaps with areas that are used for hunting, such as Mount Davidson, the local geographic extent of the effect, and long-term duration. However, these overlaps do not occur within Tatelkus Lake IR#28 and no residual effects on hunting for LDN at this location are anticipated.



Legend

- Populated Place
- 16 Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Other FSRs
- Railway
- Existing Transmission Line
- Alexander Mackenzie Heritage Trail
- Stream
- Waterbody
- Parks and Protected Areas
- Populated Indian Reserve
- Unpopulated Indian Reserve
- Unknown Population Indian Reserve
- Federal land

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Transmission Line Reroute
- Proposed Fresh Water Pipeline
- Proposed Airstrip Access Road
- Proposed Airstrip Extent
- Proposed Mine Site

Watersheds

- Chedakuz Creek Local
- Creek 661
- Creek 705
- Davidson Creek
- Tatelkuz Lake Tributaries
- Turtle Creek

First Nation Boundaries

- Lhoosk'uz Dene
- Nadleh Whut'en
- Nazko
- Saikuz
- Skin Tye
- Stellat'en
- Tsilhqot'in
- Ulkatcho



Reference
BC Government GeoBC Data Distribution

CLIENT: **newgold**

PROJECT: **Blackwater Gold Project**

Federal Parcels and Indian Reserves within the Traditional Territories of LDN, NWFN, SFN, SIFN, UFN, NFN, STN, and TNG

DATE: November, 2015	ANALYST: MY	Figure 19.3-4
JOB No: VE52277	QA/QC: NC	PDF FILE: 15-200-017_federal_land_TT.pdf
GIS FILE: 15-200-017_federal_land_TT.mxd		amec
PROJECTION: UTM Zone 10	DATUM: NAD83	

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19.3.31.1.1.2 Trapping

No traplines held by members of LDN overlap with Tatelkus Lake IR#28. Species identified as important to LDN trapping are bear, marten, and beaver. Based on the assessment summarized in **Sections 19.3.19** and **19.3.20** above, no habitat loss is anticipated for any of these species in Tatelkus Lake IR#28; therefore, availability of trapped species on these lands will not be altered.

It is not expected that the Project activities will affect users in accessing trapping areas within Tatelkus Lake IR#28 as no road access will be impeded.

There will not be any effect on noise at Tatelkus Lake IR#28. The assessment on Noise and Vibration presented in **Section 19.3.1** above indicates that residual effects of noise on Tatelkus Lake IR#28 will be Not Significant (negligible). With respect to visual effects on the experience, the assessment in **Section 7.2.8, Figure 7.2.8-15** demonstrates that the viewshed for the mine does not overlap with Tatelkus Lake IR#28 with the exception of the high ground where the fishing cabin is located; therefore, no effects are anticipated in the vast majority of IR#28. The magnitude of the effect will be lower than the medium magnitude determined for the viewpoint at the fishing cabin.

Potential changes to the quality – in this case, contamination of wildlife for human consumption – was assessed through a HHERA. The HHERA concluded that residual effects to human health for the residents of Tatelkus Lake IR#28 were Not Significant (negligible).

Mitigation measures proposed to minimize potential Project effects that are relevant at Tatelkus Lake IR#28 are:

- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing the respective EMP (**Section 12.2.1**), addressing air quality and emissions management, transportation and access management landscape, soils and vegetation management and restoration, wildlife management and visual resources and aesthetics management.
- Implementing a Country Food Monitoring Program around the mine site (**Appendix 9.2.2.B**); and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The overall residual effect of the Project on trapping for LDN is determined to be Not Significant (minor) due to Project overlaps with limited portions of traplines and keyoh. This rating is based on a low to medium magnitude, site specific geographic extent and the fact that the effect is reversible at mine closure. However, there are no overlaps of project activities within Tatelkus Lake IR#28 and no residual effects on trapping for LDN at this location are anticipated.

19.3.31.1.1.3 Fishing

The LDN identified Tatelkuz Lake, Chedakuz Creek and portions of Davidson Creek as key fishing locations. Lower Chedakuz Creek, lower Davidson Creek and Tatelkuz Lake are the three main waterbodies associated with Tatelkus Lake IR#28. As summarized in **Section 19.3.8** above, the drawdown of water to feed the freshwater supply system from Tatelkuz Lake will have negligible effects to fish habitat in Tatelkuz Lake. No effects to availability of kokanee, trout, suckers, mountain whitefish, ling cod and burbot are predicted in Tatelkuz Lake. Due to there being no change to water levels in Tatelkuz Lake, the lower reaches of Chedakuz Creek, which are fed by the lake (**Figure 19.3-2**), will not be affected and no physical effects on fish habitat or fish populations are anticipated.

Based on input by LDN, the Proponent designed the Project to avoid the lower reaches of Davidson Creek. It was found that LDN fisheries values were higher in the lower reaches of Davidson Creek where Kokanee salmon spawning occurs and the Project was designed to avoid effects in this area. The effects assessment in **Section 5.3.8** maintains that the existing fish population levels will be preserved in the lower reaches of Davidson Creek by flow augmentation. A rigorous Aquatic Effects Monitoring Plan (AEMP), described in **Section 13**, will be implemented. The purpose of the AEMP is to test predictions of the Application regarding potential Project effects on water flows, water quality, sediment quality, fish and fish habitat during operations, closure and early post-closure phases. If monitoring finds changes in fish population levels in the flow augmented stream, mitigation measures will be discussed with First Nations and regulators and implemented accordingly. Therefore, fish availability will not change in Tatelkus Lake IR#28.

Access to lower Chedakuz Creek, lower Davidson Creek and Tatelkuz Lake will not be changed by the Project. The residents of IR#28 utilize Tatelkuz Lake for navigation activities such as canoeing and boating. No effects to navigation in this lake are anticipated.

The assessment on Noise and Vibration presented in **Section 19.3.1** above indicates that residual effects of noise on Tatelkus Lake IR#28 will be Not Significant (negligible). With respect to visual effects on the experience, the assessment in **Section 7.2.8**, **Figure 7.2.8-15** demonstrates that the viewshed for the mine does not overlap with Tatelkus Lake IR#28, with the exception of the high ground where the fishing cabin is located. Therefore no effects are anticipated in the vast majority of IR#28. The magnitude of the effect will be lower than the medium magnitude determined for the viewpoint at the fishing cabin.

Potential changes to the quality of fish for human consumption were assessed through the HHERA described above. The HHERA concluded that residual effects to human health for the residents of Tatelkus Lake IR#28 were Not Significant (negligible).

Effects on fish and fish habitat at Tatelkus Lake IR#28 will be mitigated as described in **Section 5.3.8** and **Section 5.3.9** and will include measures such as:

- Fisheries Mitigation and Offsetting Plan (FMOP) (**Appendix 5.1.2.6C**) will be implemented during the construction phase to compensate for lost fish habitat occurring at the mine site;

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- Implementation of the Aquatic Effects Monitoring Program (**Section 13**);
- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Ongoing surface and groundwater monitoring for the life of the Project;
- Results of all water quality sampling will continue to be posted for working group and Aboriginal groups review;
- Surface water and sediment quality will meet applicable provincial and federal standards downstream of the proposed mine site to avoid effects on fish, furbearers, or animals that use those waters;
- The proposed mine site will aim to operate as a zero discharge facility during operations and closure;
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing erosion and sediment control measures, including erosion control matting, rip rap, and hydro seeding, to protect erodible soils from entering water bodies;
- Implementing a Country Food Monitoring Program around the mine site (**Appendix 9.2.2.B**); and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

Many of these measures are outlined in the EMPs in **Section 12.2.1** that address the following topics:

- Mine water management;
- Water quality and liquid discharges management;
- Transportation and access management;
- Emergency and spill preparedness and response;
- Landscape, soils and vegetation management and restoration;
- Erosion and sediment control;
- Aquatic resources management; and
- Wetlands management.

The residual effect on current LDN fishing practices within Tatelkus Lake IR#28 is considered Not Significant (negligible). The magnitude of the impact is low since the overall Project affects a very small area relative to overall number of water bodies used for fishing in the area (the mine site), and will not impede fishing in the other areas of the RSA or LSA including Tatelkus Lake IR#28. The effect is site specific, confined to the area directly disturbed/affected by the Project (footprint

as well as areas now inaccessible due to Project), and is permanent. The effect is considered Not Significant (negligible) since the effect is low in magnitude and site specific in geographic extent.

19.3.31.1.1.4 Plant Gathering

The LDN noted they harvest a wide range of plants for food, medicine, and building materials. Plant gathering occurs “all over,” and is particularly plentiful around Tatelkuz Lake, and along trails—the Messue Wagon Trail, specifically. Tatelkuz Lake and the trail are within Tatelkus Lake IR#28. However, no vegetation clearing for the mine site, mine site access road, airstrip, nor airstrip access road will occur in IR#28 and availability of traditional use plants will remain unchanged within these lands.

Project related activities will not reduce accessibility to Tatelkus Lake IR#28 or traditional use plant harvesting locations therein.

The construction, operations, and closure phases of the Project are not expected to affect gathering locations at Tatelkus Lake IR#28. No auditory effects are anticipated from Project activities at this location as described in **Section 19.3.1** above. With respect to visual effects on the experience, the assessment in **Section 7.2.8, Figure 7.2.8-15** demonstrates that the viewshed for the mine does not overlap with Tatelkus Lake IR#28, with the exception of the high ground where the fishing cabin is located. Therefore, no effects are anticipated in the vast majority of IR#28. The magnitude of the effect will be lower than the medium magnitude determined for the viewpoint at the fishing cabin. The HHERA, which examined potential changes to the quality of resources harvested for human consumption, concluded that residual effects to human health for the residents of Tatelkus Lake IR#28 were Not Significant (negligible).

The following measures will be implemented to minimize or avoid effects on plants and plant gathering for traditional purposes at Tatelkus Lake IR#28:

- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Implementing EMPs to reduce dust deposition, nitrogen deposition, and invasive species proliferation (**Section 12.2.1**);
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing a Country Food Monitoring Program around the mine site (**Appendix 9.2.2.B**); and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

Overall the effect on plant gathering for LDN traditional purposes is considered negative, since there is a loss of areas used for plant gathering within the LSA. The magnitude of the effect is considered low, but overall does not impede the activity, since traditionally used plants are widespread in the areas surrounding Tatelkuz Lake and along the upper portion of the Messue

Wagon Trail towards Kuyakuz Lake and the Kluskus IR#1. The geographic extent of the effect is site specific since the effect is confined to the transmission line ROW crossing over the Messue Wagon Trail, and is long-term, reversible, and continuous. Given the low magnitude and geographic extent, the effect is considered highly likely and Not Significant (minor). However, at Tatelkus Lake IR#28, there will be no effect on the availability of traditional use plants, access to traditional use plant gathering sites, experience of plant gathering, or quality of the plants gathered. Residual effects to plant gathering for LDN at Tatelkus Lake IR#28 are not anticipated

19.3.31.1.1.5 Other Cultural and Traditional Uses of the Land

During interviews with LDN elders (2013) and in Consultation activities and interviews with LDN elders (2013), the north shore of Tatelkuz Lake was identified as a site of cultural importance. The site is sacred and ceremonial activities may occur there. In addition, the historic Messue Wagon Trail is used to connect IR#28 to Knewstubb Lake to the north and runs through Tatelkus Lake IR#28. This trail is of cultural and historic importance to LDN people. Canoeing and boating on Tatelkuz Lake was noted as a traditional use. Boating on this lake will not be affected by the Project, and there are no anticipated residual effects.

It is not expected that the Project activities will affect users from accessing or using any of the other sites identified above for ceremonial, sacred, or navigational purposes.

The assessment on Noise and Vibration presented in **Section 19.3.1** above indicates that residual effects of noise on Tatelkus Lake IR#28 will be Not Significant (negligible). With respect to visual effects on the experience, the assessment in **Section 7.2.8, Figure 7.2.8-15** demonstrates that the viewshed for the mine does not overlap with Tatelkus Lake IR#28, with the exception of the high ground where the fishing cabin is located. Therefore no effects are anticipated in the vast majority of IR#28. The magnitude of the effect will be lower than the medium magnitude determined for the viewpoint at the fishing cabin.

No changes to the quality of the areas identified for ceremonial purposes are anticipated at Tatelkus Lake IR#28.

The following measures will be implemented to minimize or avoid effects on other traditional land and resources at Tatelkus Lake IR#28:

- Physical remains of cultural sites, such as cabins, archaeological sites, culturally modified trees, and trails identified through Heritage Effects Assessments, will be recorded, analyzed, and mitigated. The EMPs (**Section 12.2.1.18.4.7**) addressing archaeological and heritage resource management will provide further opportunities to address cultural sites that may be identified;
- Informing workers of sensitive cultural areas, and implementing a policy of reporting and respectful use;
- Implementing the respective EMPs, addressing air quality and emissions management (**Section 12.2.1.18.4.9**), transportation and access management (**Section 12.2.1.18.4.14**), and visual resources and aesthetics management

(**Section 12.2.1.18.4.8**) to address potential noise, emissions, and effects on visual resources;

- Developing alternative access plans with Aboriginal groups, where access to or use of specific cultural sites needs to be altered or is impeded; and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The residual effect on the ceremonial use at Tatelkus Lake IR#28, is negative and low in magnitude, but will not impede ceremonial use. The effect is site specific in geographic extent. The effect is long-term because it extends into the closure phase. The likelihood of occurrence is high and the effect is rated as Not Significant (negligible).

19.3.31.2 Nadleh Whut'en First Nation (NWFN)

Land Act Parcel DL 2557 R5C is located within the traditional territory of the NWFN and within the LSA and RSA for CLRUTP. PID015391809 is located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-4** and **Figure 19.3-5**.

19.3.31.2.1 Land Act Parcel DL 2557 R5C

19.3.31.2.1.1 Hunting

Moose, caribou, and bear were identified by NWFN as key harvested resources. Based on the assessments for these species presented above in **Sections 19.3.17, 19.3.18, and 19.3.19**, there will be negligible habitat losses within Land Act Parcel DL 2557 R5C. The approach in **Section 7.2.7** uses quantitative habitat losses as a measure of change in availability of harvested resources; therefore, the availability of these harvested resources will not be affected.

Access to hunting opportunities within Land Act Parcel DL 2557 R5C will be increased with the construction of the transmission line. The Proponent is establishing an access management working group to discuss these issues with NWFN and to obtain input for the TAMP.

The construction, operations, and closure phases associated with the transmission line ROW may produce a change in the visual experience of using lands and resources for hunting purposes. The construction of the transmission line ROW will last approximately 12 months and disturbance at a certain location will be temporary (i.e., weeks). Noise during the construction of the transmission line will also increase but will be short-term and temporary.

The construction and operation of the transmission line does not have the potential to generate COPCs in quantities that could affect the health of hunted animals within Land Act Parcel DL 2557 R5C. Effects to the quality of the harvested resource is negligible.

Mitigation measures proposed to minimize the potential affects to NWFN hunting relevant to Land Act Parcel DL 2557 R5C include the following:

BLACKWATER GOLD PROJECT

APPLICATION FOR AN
ENVIRONMENTAL ASSESSMENT CERTIFICATE /
ENVIRONMENTAL IMPACT STATEMENT
SUMMARY OF RESIDUAL EFFECTS



- Establishing a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Developing mitigation and avoidance strategies through ongoing discussions with the Caribou Sub-Working Group;
- Setting reclamation goals to re-establish later winter habitat;
- Participating in regional wildlife and resource management initiatives (specifically for ungulates);
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing the respective EMP presented in **Section 12.2.1**, addressing air quality and emissions management, transportation and access management, landscape, soils and vegetation management and restoration, wildlife management, and visual resources and aesthetics management; and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The Proponent will work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

Given the lack of site specific hunting information for NWFN, it is difficult to assess the overall Project effects to current hunting practices. In Land Act Parcel DL 2557 R5C, the lack of effects to resource availability, access to the harvested resources, the temporary and short-term nature of changes to the experience of harvesting this resource, and the lack of effects to the quality of the harvested resource result in no residual effects to NWFN hunting within Land Act Parcel DL 2557 R5C.

19.3.31.2.1.2 Trapping

Information regarding NWFN's trapping activity was not available at the time of writing and has not been assessed in **Section 7.2.7**. No traplines held by members of the NWFN overlap with Land Act Parcel DL2557 R5C.

Very little high value habitat for furbearers is predicted to be lost in Land Act Parcel DL 2557 R5C as a result of the Project as described above in **Section 19.3.20**. It is expected that Project activities may increase access to trapping within the federal parcel and road access will not be impeded. The construction, operations, and closure phases associated with the transmission line ROW may produce a change in the visual experience of using lands and resources for hunting purposes. The construction of the transmission line ROW will last approximately 12 months and disturbances at a certain location will be temporary (i.e., weeks). Noise during the construction of the transmission line will also increase but will be short-term and temporary. The construction and operation of the transmission line does not have the potential to generate COPCs in quantities that could affect the health of trapped animals within Land Act Parcel DL 2557 R5C. Effects to the quality of the harvested resource are negligible.

Measures to mitigate the potential affects to NWFN trapping in Land Act Parcel DL 2557 R5C include the following:

- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Locating and maintaining breaks in the rollback along the transmission line corridor to facilitate access to trapping trails during clearing;
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing the respective EMP (**Section 12.2.1**), addressing air quality and emissions management, transportation and access management landscape, soils and vegetation management and restoration, wildlife management and visual resources and aesthetics management; and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The Proponent will also work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

No residual effects are anticipated for NWFN trapping in Federal Land Act Parcel DL 2557 R5C.

19.3.31.2.1.3 Fishing

As described in **Section 19.3.8** above, Land Act Parcel DL 2557 R5C is immediately adjacent to the Stellako River; however, there are no streams or waterbodies within the federal parcel. Therefore, there are no opportunities for NWFN fisheries within this federal parcel and no effects to NWFN current use fishing are possible within this federal land.

19.3.31.2.1.4 Plant Gathering

At the time of writing, no known areas of NWFN plant harvesting were identified. In **Section 19.3.12** above, the assessment concludes that project activities overlap with only 1% of the total area (5.09 ha) of potential traditional use ecosystem in Land Act Parcel DL 2557 R5C. Therefore, traditional use plant loss and alteration of traditional use plant habitat is anticipated to be negligible within Land Act Parcel DL 2557 R5C. The development of the transmission line may indirectly increase access by non-Aboriginals to Land Act Parcel DL 2557 R5C, which may increase competition for harvested resources.

The NWFN may experience intermittent interference with their access to gathering areas in Land Act Parcel DL 2557 R5C during the construction of the transmission line, should NWFN members currently gather plants in the proposed ROW or cross the proposed ROW to access traditional gathering areas.

The Project has the potential to affect the quality of NWFN gathering experience in Land Act Parcel DL 2557 R5C due to visual effects relating to the construction, operations, and closure phases related to the transmission line. There are potential visual effects associated with overhead cables of proposed transmission line.

The construction and operation of the transmission line and associated access roads, and the transportation of workers and materials along access roads, do not have the potential to generate COPCs in quantities that could affect the quality of plants harvested by NWFN and no effects on the quality of traditional use plants are anticipated.

The following measures will be implemented to minimize or avoid effects on plants and plant gathering for traditional purposes within Federal Land Act Parcel DL 2557 R5C:

- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Implement re-vegetation of areas disturbed by the Project during the closure phase using native plants (including traditional plants) to revegetate (**Section 2.6**);
- Implementing EMPs to reduce dust deposition, nitrogen deposition, and invasive species proliferation (**Section 12.2.1**);
- Including traditional use plant species habitat in reclamation prescriptions;
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**); and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The Proponent will also work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

Residual effects on the harvesting of traditional use plants are assessed as Not Significant (moderate) for NWFN, in part due to the length of the transmission line overlapping with the traditional territory. The residual effects are of low to moderate magnitude, site-specific extent, long term duration, and occur intermittently. The likelihood that a residual effect on quality of gathering experience will occur is rated as moderate for NWFN, and the confidence rating is medium. While information is available about predicted effects on the abundance of harvestable resources, little data exists on current Aboriginal harvesters' success rates. However, within Land Act Parcel DL 2557 R5C the geographic extent is extremely limited; therefore, effects to traditional use plant gathering on this parcel are rated as Not Significant (negligible).

19.3.31.2.1.5 Other Cultural and Traditional Uses of the Land

At the time of writing, no information on other NWFN current traditional land and resource use (i.e. sacred sites) was available.

Given limited interference during the construction and deconstruction of the transmission line, the Project is not anticipated to affect NWFN access cultural or traditional land use sites.

19.3.31.2.2 PID015391809

19.3.31.2.2.1 Hunting

PID015391809 is within the RSA for the CLRUTP VC overlapping with the cumulative effects assessment area (**Figure 19.3-5**), and in consideration of the proximity to the proposed transmission line, the approach and rating criteria for characterizing effects to the CLRUTP VC are drawn from Table 2.2-3 in **Appendix – Supplemental Report on Transmission Line Access Roads**.

Residual effects on NWFN Current Aboriginal Use that have been carried forward into the CEA include:

- Reduced hunting success due to a change in the abundance and distribution of wildlife species; and
- Reduced quality of experience while hunting.

PID015391809 is crossed by one existing access road. Projects and associated activities considered in the CEA may contribute cumulatively to wildlife habitat loss, alteration, or direct mortality. Cumulative effects to wildlife species are discussed in **Section 4.3** of the Supplemental Report on Transmission Line Access Roads (**Appendix – Supplemental Report on Transmission Line Access Roads**) and **Sections 5.4.10 to 5.4.13** of the Application. Consultation with Aboriginal groups identified concern with potential cumulative effects on wildlife. The potential cumulative effects are summarized in relation to potential past, present, and future projects and activities.

Forestry-related activities, agricultural activities, mineral prospecting, and recreation-related activities considered in the CEA may temporarily alter and degrade wildlife habitat. Regionally there will be increased habitat fragmentation, and increased potential for direct mortality of wildlife.

The CEA found that the quality of the experience of NWFN using the land and resources may be adversely affected by the construction, operation and decommissioning of various projects in the region. Consultation with Aboriginal groups identified concern that projects may negatively affect prime habitat areas or facilitate access of non-Aboriginal users (e.g., harvesters and recreational users) to the area, which may have an overall effect on their experience using the land and resources. Increased vehicle traffic associated with the projects and activities may reduce the quality of experience of NWFN members using of the land. Therefore, other foreseeable projects and activities, including mining, forestry, and the development of pipelines and associated transportation infrastructure, have the potential to act cumulatively with the Project and reduce the quality of experience for Aboriginal groups using their traditional lands.

Cumulative effects mitigation requires the input and participation of a range of industry parties (in this case forestry, mining, energy, etc.) and measures proposed to minimize effects on hunting that are relevant to federal parcel PID015391809 include:

- Supporting and participating in regional and resource management initiatives (e.g., regional initiatives for ungulates);
- Implementing a Wildlife Management Plan for the Project and providing mitigation recommendations for all components and phases of the Project. Other management plans (e.g., Landscape, Soils and Vegetation Management and Restoration, Sediment and Erosion Control) also provide relevant recommendations for project mitigation;
- Adhering to BC MFLNRO forestry BMPs, such as maintaining drainage pathways and wetland hydrology by installing appropriately sized culverts for stream and wetland crossings, avoiding harvesting in wetland and riparian areas, replanting native vegetation to expedite succession, installing road signs to alert drivers of speed limits and of wildlife sensitive areas, including wildlife awareness training for drivers during regular safety and environmental meetings, decommissioning roads when they are no longer in use and providing breaks in snow banks along the access road to allow wildlife to escape;
- Mineral exploration mitigations, which are typical permit conditions under the Mines Act (1996), include pre-planning to avoid important wildlife areas (e.g., wetlands, salt licks), minimizing stream crossings for access roads, avoiding work during critical breeding and rearing seasons for wildlife, limiting the production of excess drilling fluids, avoiding discharges of drilling fluids into aquatic systems, installing road signs to alert drivers of speed limits and of wildlife sensitive areas, including wildlife awareness training for drivers during regular safety and environmental meetings, decommissioning roads when they are no longer in use and providing breaks in snow banks along the access road to allow wildlife to escape; and
- Forestry and mineral exploration companies are also required to implement reclamation and revegetation measures once they complete activities in a specific area.

19.3.31.2.2.1.1 *Characterization of Reduced Hunting Success for NWFN*

In the event that all reasonably foreseeable projects start on time and as designed, and in consideration of all current activities continue in the future, there will potentially be a reduction in the availability of wildlife, which may reduce the success of NWFN hunting within or nearby PID015391809. The potential incremental contribution of the transmission line and access roads to this effect is anticipated to be small, given its relatively small footprint.

The potential for residual cumulative effects to hunting success is moderate in context as harvesting by Aboriginal groups may diminish from current conditions. The magnitude is determined to be moderate as some hunting behaviours may be altered within the area of the transmission line, and the duration permanent, given that the effects are anticipated to be longer than 35 years, in consideration of various project timelines. The effects are anticipated to be continuous and regional. They are reversible in the long-term. The determination of the cumulative residual effect on NWFN hunting success is characterized the same way with or without the Project

(i.e., Not Significant (moderate)) and the likelihood is moderate. The confidence rating of this cumulative effect rating is medium given the limited amount of information about proposed projects.

19.3.31.2.2.1.2 Characterization of Reduced Quality of Hunting Experience for NWFN

In the event that all reasonably foreseeable projects start on time and as designed, there will be additional disturbance to NWFN using land and resources within their traditional territories. Disturbances may include visual effects (e.g., mining and/or forestry access roads, proposed pipeline projects). The potential incremental contribution of the Project to this effect is anticipated to be small, given its relatively small footprint and limited contribution to visual effects during the construction of the transmission line.

In consideration of existing conditions, the context is considered to be low, and the magnitude is low as few behavioural changes are expected. The duration of the effects are anticipated to be permanent and continuous. The extent is determined to be regional and will be reversible in the long term. The determination of the cumulative residual effect on the quality of Aboriginal harvesters' experience is rated as Not Significant (minor). The likelihood given the presence of proposed and existing projects and activities, and confidence rating is medium given the limited amount of information about proposed projects.

19.3.31.2.2.2 Trapping

PID015391809 overlaps with the RSA for the CLRUTP VC overlapping with the cumulative effects assessment area. Residual effects on NWFN Current Aboriginal Use that have been carried forward into the CEA include:

- Reduced trapping success due to a change in the abundance and distribution of wildlife species; and
- Reduced quality of experience while trapping.

The CEA for trapping for NWFN is the same as that described for hunting above. Reduced trapping success for NWFN is rated as Not Significant (moderate) while the effect to the quality of the experience of NWFN trapping within PID015391809 is rated as Not Significant (minor). The mitigation measures described to minimize cumulative effects to hunting are also applicable to trapping.

19.3.31.2.2.3 Fishing

There are no streams or waterbodies within the area of the CLRUTP RSA that overlaps federal parcel PID015391809; therefore, there are no potential effects on fishing.

19.3.31.2.2.4 Plant Gathering

Residual effects on NWFN Current Aboriginal Use that have been carried forward into the CEA relevant to plant gathering is a reduced quality of experience while plant gathering.

The quality of the experience of NWFN using the land and resources may be adversely affected by the construction, operation and decommissioning of various projects in the region. Consultation with Aboriginal groups identified concern that projects may negatively affect prime habitat areas or facilitate access of non-Aboriginal users (e.g., harvesters and recreational users) to the area, which may have an overall effect on their experience using the land and resources. Increased vehicle traffic associated with the projects and activities may reduce the quality of experience of Aboriginal group members using of the land. Therefore, other foreseeable projects and activities, including mining, forestry, and the development of pipelines and associated transportation infrastructure, have the potential to act cumulatively with the Project and reduce the quality of experience for Aboriginal groups using their traditional lands.

Cumulative effects mitigation requires the input and participation of a range of industry parties (in this case forestry, mining, energy etc.) and measures proposed to minimize effects on traditional use plant harvesting relevant to federal parcel PID015391809 include:

- Implementing a Landscape, Soils and Vegetation Management and Restoration Plan and Sediment and Erosion Control Plan and to provide relevant recommendations for project mitigation;
- Adhering to BC MFLNRO forestry BMPs, such as maintaining drainage pathways and wetland hydrology by installing appropriately sized culverts for stream and wetland crossings, avoiding harvesting in wetland and riparian areas, replanting native vegetation to expedite succession; and
- Forestry and mineral exploration companies are also required to implement reclamation and revegetation measures once they complete activities in a specific area.

Characterization of Reduced Quality of Gathering Experience for NWFN

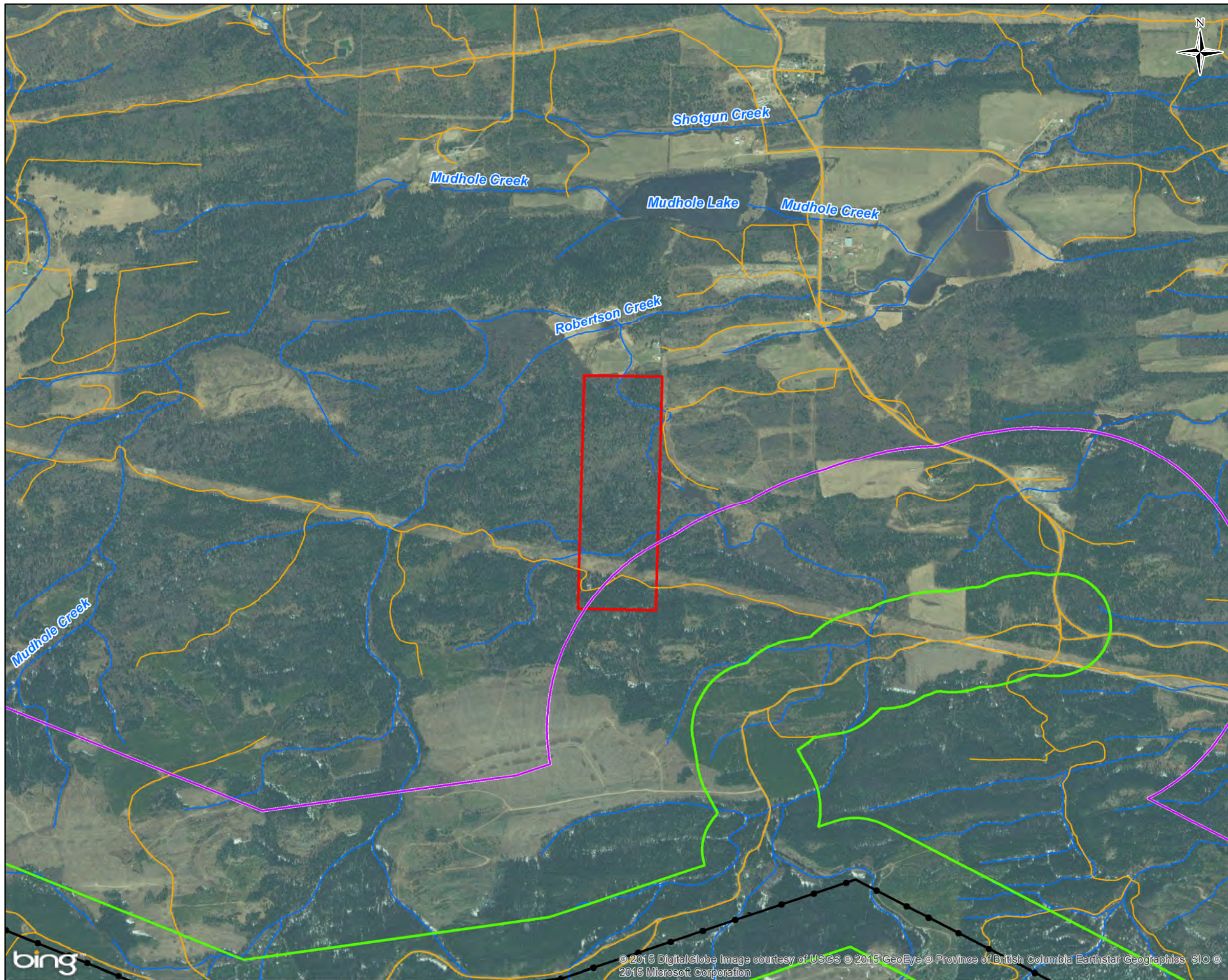
In the event that all reasonably foreseeable projects start on time and as designed, there will be additional disturbance to NWFN using land and resources within their traditional territories, including within or nearby PID015391809. Disturbances may include visual effects (e.g., access roads and the proposed pipeline projects). The potential incremental contribution of the Project to this effect is anticipated to be small, given its relatively small footprint and limited contribution to visual effects during the construction of the transmission line.

In consideration of existing conditions, the context is considered to be low, and the magnitude is low as few behavioural changes are expected. The duration of the effects are anticipated to be permanent and continuous. The extent is determined to be regional and will be reversible in the long term. The determination of the cumulative residual effect on the quality of Aboriginal harvesters' experience is rated as Not Significant (minor). The likelihood given the presence of proposed and existing projects and activities, and confidence rating is medium given the limited amount of information about proposed projects.

19.3.31.2.2.5 Other Cultural and Traditional Uses of the Land

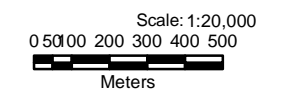
At the time of writing, no information on other NWFN current traditional land and resource use (i.e., sacred sites) relevant to federal parcel PID015391809 was available.

Cumulative effects on other cultural and traditional uses of the land would include changes in the quality of the experience in using the lands. The CEA, including mitigation measures to the change in the experience of NWFN using the land and resources is described in detail under Plant Gathering above and applies to other cultural and traditional uses of the land.



Legend

- Proposed Transmission Line
- Kluskus-Ootsa FSR
- Existing Roads
- Stream
- Federal land
- Expanded CLRUTP LSA
- Expanded CLRUTP RSA



Reference

BC Government GeoBC Data Distribution

CLIENT: 		
PROJECT: Blackwater Gold Project		
Federal Parcel 015391809		
DATE: November, 2015	ANALYST: MY	Figure 19.3-5
JOB No: VE52277	QA/QC: NC	
GIS FILE: Other-100-153_federal_land_015391809.mxd		PDF FILE: Other-100-153_federal_land_015391809.pdf
PROJECTION: UTM Zone 10	DATUM: NAD83	

19.3.31.3 Saik'uz First Nation (SFN)

No federal parcels are located within the CLRUTP LSA or RSA in the SFN traditional territory. The CLRUTP LSA does overlap with Tatelukus Lake IR#28 in SFN traditional territory but this IR is not set apart for use and benefits SFN.

19.3.31.4 Stelat'en First Nation (StFN)

Land Act Parcel DL 2557 R5C is located within the traditional territory of the StFN and within the LSA and RSA for CLRUTP. PID015391809 are located within the RSA for this VC. The locations of these parcels are shown in **Figure 19.3-4** and **Figure 19.3-5**.

19.3.31.4.1 Land Act Parcel DL 2557 R5C

19.3.31.4.1.1 Hunting

Moose, caribou and bear were identified by StFN as key harvested resources. Based on the assessments for these species presented above in **Sections 19.3.17, 19.3.18, and 19.3.19**, there will be negligible habitat losses within Land Act Parcel DL 2557 R5C; therefore, the availability of these harvested resources will not be affected.

Access to hunting opportunities within Land Act Parcel DL 2557 R5C will be increased with the construction of the transmission line. The Proponent is establishing an access management working group (of which StFN representatives will be invited to participate in) to discuss access management issues.

The construction, operations, and closure phases associated with the transmission line ROW may produce a change in the visual experience of using lands and resources for hunting purposes. The construction of the transmission line ROW will last approximately 12 months and disturbance at a certain location will be temporary (i.e., weeks). Noise during the construction of the transmission line will also increase but will be short-term and temporary.

The construction and operation of the transmission line does not have the potential to generate COPCs in quantities that could affect the health of hunted animals within Land Act Parcel DL 2557 R5C. Effects to the quality of the harvested resource are negligible.

Mitigation measures proposed to minimize the potential affects to StFN hunting relevant to Land Act Parcel DL 2557 R5C include the following:

- Establishing a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Developing mitigation and avoidance strategies through ongoing discussions with the Caribou Sub-Working Group;
- Setting reclamation goals to re-establish later winter habitat;
- Participating in regional wildlife and resource management initiatives (specifically for ungulates);

- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing the respective EMP presented in **Section 12.2.1**, addressing air quality and emissions management, transportation and access management, landscape, soils and vegetation management and restoration, wildlife management, and visual resources and aesthetics management; and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The Proponent will also work with the federal government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

Given the lack of site specific hunting information for StFN, it is difficult to assess the overall Project effects to current hunting practices. In Land Act Parcel DL 2557 R5C, the lack of effects to resource availability, access to the harvested resources, the temporary and short-term nature of changes to the experience of harvesting this resource, and the lack of effects to the quality of the harvested resource result in a Not Significant (negligible) residual effect to StFN hunting within Land Act Parcel DL 2557 R5C.

19.3.31.4.1.2 Trapping

StFN traditionally trapped beaver and muskrat in the marshy areas surrounding the Abuntl'at. These species were used for both food and fur. Additionally, wolverine is an important fur-bearing species (Triton, 2014). The StFN LRUS (Proponent Version; Triton, 2014) does not identify specific trapping locations.

One provincially-registered trapline (TR0712T040) overlaps with Land Act Parcel DL 2557 R5C is believed to be held by a StFN member. It is not known if this registered trapline aligns with the traditional Stellat'en trapping areas (Triton, 2014).

Very little high value habitat for furbearers is predicted to be lost in Land Act Parcel DL 2557 R5C as a result of the Project as described above in **Section 19.3.20**.

It is expected that Project activities may increase access to trapping within the federal parcel and road access will not be impeded. The construction, operations, and closure phases associated with the transmission line ROW may produce a change in the visual experience of using lands and resources for hunting purposes. The construction of the transmission line ROW will last approximately 12 months and disturbance at a certain location will be temporary (i.e., weeks). Noise during the construction of the transmission line will also increase but will be short-term and temporary. The construction and operation of the transmission line does not have the potential to generate COPCs in quantities that could affect the health of trapped animals within Land Act Parcel DL 2557 R5C. Effects to the quality of the harvested resource are negligible.

Measures to mitigate the potential affects to StFN trapping on Land Act Parcel DL 2557 R5C include the following:

- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Informing holders of affected trapline areas of Project activities, schedules, and locations;
- Compensating affected trapline holders in accordance with industry and provincial protocols with associated proof of lost revenue;
- Locating and maintaining breaks in the rollback along the transmission line corridor to facilitate access to trapping trails during clearing;
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**);
- Implementing the respective EMP (**Section 12.2.1**), addressing air quality and emissions management, transportation and access management landscape, soils and vegetation management and restoration, wildlife management and visual resources and aesthetics management; and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The Proponent will also work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

Given the lack of site specific trapping information for StFN, it is difficult to assess the overall Project effects to current trapping practices. Land Act Parcel DL 2557 R5C is within a registered trapline held by a member of the StFN; however, the lack of effects to resource availability, access to the harvested resources, the temporary and short-term nature of changes to the experience of harvesting this resource, and the lack of effects to the quality of the harvested resource result in a Not Significant (negligible) residual effect to StFN trapping within Land Act Parcel DL 2557 R5C.

19.3.31.4.1.3 Fishing

As described in **Section 19.3.8** above, Land Act Parcel DL 2557 R5C is immediately adjacent to the Stellako River, however there are no streams or waterbodies within the federal parcel. Therefore, there are no opportunities for StFN fisheries within this federal parcel and no effects to StFN current use fishing are possible within this federal land.

19.3.31.4.1.4 Plant Gathering

Plants are an important cultural resource for the StFN and are used for both food and medicine (Triton, 2014). There are many important species of berries (e.g., soapberries, huckleberries, blueberries, raspberries, thimbleberries, blackberries, currants, gooseberries, saskatoon berries, and cranberries), bulbs and stems (e.g., various species of lily, water plantain, bulrush, cattail, and spring-beauty), and, historically, edible tree lichens (Triton, 2014). These species provide many different nutrients to the StFN diet. Triton (2014:39) notes, "There are many areas of contemporary and intense use that lie within the proposed transmission line due to the proximity of the alignment to the Stellaquo reserve and the habitat quality it crosses."

The StFN LRUS (Proponent Version; Triton, 2014) does not identify specific plant gathering locations. In **Section 19.3.12** above, the assessment concludes that project activities overlap with only 1% of the total area (5.09 ha) of the potential traditional use ecosystem in Land Act Parcel DL 2557 R5C. Therefore, traditional use plant loss and alteration of traditional use plant habitat is anticipated to be negligible within Land Act Parcel DL 2557 R5C. The development of the transmission line may indirectly increase access by non-Aboriginals to Land Act Parcel DL 2557 R5C, which may increase competition for harvested resources.

The StFN may experience intermittent interference with their access to gathering areas in Land Act Parcel DL 2557 R5C during the construction of the transmission line, should StFN members currently gather plants in the proposed ROW or cross the proposed ROW to access traditional gathering areas.

The Project has the potential to affect the quality of StFN gathering experience in Land Act Parcel DL 2557 R5C due to visual effects relating to the construction, operations, and closure phases related to the transmission line. There are potential visual effects associated with overhead cables of proposed transmission line.

The construction and operation of the transmission line and associated access roads, and the transportation of workers and materials along access roads, do not have the potential to generate COPCs in quantities that could affect the quality of plants harvested by StFN and no effects on the quality of traditional use plants are anticipated.

The following measures will be implemented to minimize or avoid effects on plants and plant gathering for traditional purposes within Federal Land Act Parcel DL 2557 R5C:

- Establish a group including affected Aboriginal group representatives to discuss access management for the transmission line corridor and mine site area;
- Implement re-vegetation of areas disturbed by the Project during the closure phase using native plants (including traditional plants) to revegetate (**Section 2.6**);
- Implementing EMPs to reduce dust deposition, nitrogen deposition, and invasive species proliferation (**Section 12.2.1**);
- Including traditional use plant species habitat in reclamation prescriptions;
- Implementing design and operational procedures to limit risks associated with malfunctions and accidents (**Section 10**); and
- Establishing a TK/TLU Committee with participation of Aboriginal groups on which territory the Project is located to monitor Project development to ensure that the commitments made by the Proponent in regards to TK/TLU are being complied with.

The Proponent will also work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

Residual effects on the harvesting of traditional use plants are assessed as Not Significant (moderate) for StFN, in part due to the length of the transmission line overlapping the traditional

territory. The residual effects are of low to moderate magnitude, site-specific extent, long term duration, and occur intermittently. The likelihood that a residual effect on quality of gathering experience will occur is rated as moderate for StFN, and the confidence rating is medium. While information is available about predicted effects on the abundance of harvestable resources, little data exists on current Aboriginal harvesters' success rates. However, within Land Act Parcel DL 2557 R5 the geographic extent is extremely limited therefore effects to traditional use plant gathering on this parcel are rated as Not Significant (negligible).

19.3.31.4.1.5 Other Cultural and Traditional Uses of the Land

The StFN LRUS (Proponent Version; Triton 2014) does not identify specific cultural uses that may interact with the Project; however, traplines/keyoh may be used for cultural purposes. StFN trapline holders of TR0712T040 may experience intermittent interference with their access to their trapline/keyoh for cultural or traditional purposes during the construction of the transmission line. The construction phase is expected to last 12 months, so construction work at any particular location will be temporary (i.e., weeks) as the construction crews will advance at a speed of approximately 2.5 km per week. Given limited interference during the construction and deconstruction of the transmission line, the Proponent does not anticipate effects to StFN accessing cultural or traditional land use sites for StFN. The visual effect of the transmission line on the portion of Land Act Parcel DL 2557 R5C that is within trapline TR0712T040 is considered to be Not Significant (minor) on other cultural and traditional uses of the land.

The Proponent will also work with the Federal Government and other stakeholders on transmission line routing in and around this parcel with a view to avoiding or minimizing impacts.

19.3.31.4.2 PID015391809

19.3.31.4.2.1 Hunting

PID015391809 is within the RSA for the CLRUTP VC overlapping with the cumulative effects assessment area (**Figure 19.3-5**). The approach and rating criteria for characterizing effects to the CLRUTP VC are provided in Table 2.2-3 in **Appendix – Supplemental Report on Transmission Line Access Roads**. Residual effects on StFN Current Aboriginal Use that have been carried forward into the CEA include:

- Reduced hunting success due to a change in the abundance and distribution of wildlife species; and
- Reduced quality of experience while hunting.

There is currently an access road within PID015391809. Projects and associated activities considered in the CEA may contribute cumulatively to wildlife habitat loss, alteration, or direct mortality. Cumulative effects to wildlife species are discussed in **Section 4.3** of the Supplemental Report on Transmission Line Access Roads (**Appendix – Supplemental Report on Transmission Line Access Roads**) and **Sections 5.4.10** to **5.4.13** of the Application. Consultation with Aboriginal groups identified concern with potential cumulative effects on wildlife. The potential cumulative effects are summarized in relation to potential past, present, and future projects and activities.

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Forestry-related activities, agricultural activities, mineral prospecting, and recreation-related activities considered in the CEA may temporarily alter and degrade wildlife habitat. There will be increased habitat fragmentation, and increased potential for direct mortality of wildlife.

The quality of the experience of StFN using the land and resources may be adversely affected by the construction, operation, and decommissioning of various projects in the region. Consultation with Aboriginal groups identified concern that projects may negatively affect prime habitat areas or facilitate access of non-Aboriginal users (e.g., harvesters and recreational users) to the area, which may have an overall effect on their experience using the land and resources. Increased vehicle traffic associated with the projects and activities may reduce the quality of experience of StFN members using of the land. Therefore, other foreseeable projects and activities, including mining, forestry, and the development of pipelines and associated transportation infrastructure, have the potential to act cumulatively with the Project and reduce the quality of experience for StFN using their traditional lands.

Cumulative effects mitigation requires the input and participation of a range of industry parties (in this case forestry, mining, energy etc.) and measures proposed to minimize effects relevant to federal parcel PID015391809 include:

- Supporting and participating in regional and resource management initiatives (e.g., regional initiatives for ungulates);
- Implementing a Wildlife Management Plan for the Project and providing mitigation recommendations for all components and phases of the Project. Other management plans (e.g., Landscape, Soils and Vegetation Management and Restoration, Sediment and Erosion Control) also provide relevant recommendations for project mitigation;
- Adhering to BC MFLNRO forestry BMPs, such as maintaining drainage pathways and wetland hydrology by installing appropriately sized culverts for stream and wetland crossings, avoiding harvesting in wetland and riparian areas, replanting native vegetation to expedite succession, installing road signs to alert drivers of speed limits and of wildlife sensitive areas, including wildlife awareness training for drivers during regular safety and environmental meetings, decommissioning roads when they are no longer in use and providing breaks in snow banks along the access road to allow wildlife to escape;
- Mineral exploration mitigations, which are typical permit conditions under the *Mines Act* (1996), include pre-planning to avoid important wildlife areas (e.g., wetlands, salt licks), minimizing stream crossings for access roads, avoiding work during critical breeding and rearing seasons for wildlife, limiting the production of excess drilling fluids, avoiding discharges of drilling fluids into aquatic systems, installing road signs to alert drivers of speed limits and of wildlife sensitive areas, including wildlife awareness training for drivers during regular safety and environmental meetings, decommissioning roads when they are no longer in use and providing breaks in snow banks along the access road to allow wildlife to escape;
- Forestry and mineral exploration companies are also required to implement reclamation and revegetation measures once they complete activities in a specific area.

19.3.31.4.2.1.1 *Characterization of Reduced Hunting Success for StFN*

In the event that all reasonably foreseeable projects start on time and as designed, and in consideration of all current activities continue in the future, there will potentially be a reduction in the availability of wildlife, which may reduce the success of StFN hunting within or nearby PID015391809. The potential incremental contribution of the transmission line and access roads to this effect is anticipated to be small, given its relatively small footprint.

The potential for residual cumulative effects is moderate in context as harvesting by StFN may diminish from current conditions. The magnitude is determined to be moderate as some behaviours may be altered and the duration permanent, given that the effects are anticipated to be longer than 35 years, in consideration of various project timelines. The effects are anticipated to be continuous and regional. They are reversible in the long-term. The determination of the cumulative residual effect on StFN hunting success is characterized the same way with or without the Project (i.e., Not Significant (moderate) and the likelihood is moderate. The confidence rating of this cumulative effect rating is medium given the limited amount of information about proposed projects.

19.3.31.4.2.1.2 *Characterization of Reduced Quality of Hunting Experience for StFN*

In the event that all reasonably foreseeable projects start on time and as designed, there will be additional disturbance to StFN hunting within their traditional territories. Disturbances may include visual effects (e.g., access roads and the proposed pipeline projects). The potential incremental contribution of the Project to this effect is anticipated to be small, given its relatively small footprint and limited contribution to visual effects during the construction of the transmission line.

In consideration of existing conditions, the context is considered to be low, and the magnitude is low as few behavioural changes are expected. The duration of the effects are anticipated to be permanent and continuous, when Aboriginal groups are using the lands and resources in the areas of projects or activities. The extent is determined to be regional and will be reversible in the long term. The determination of the cumulative residual effect on the quality of StFN hunters' experience is rated as Not Significant (minor). The likelihood given the presence of proposed and existing projects and activities, and confidence rating is medium given the limited amount of information about proposed projects.

19.3.31.4.2.2 *Trapping*

PID015391809 overlaps with the RSA for the CLRUTP VC overlapping with the cumulative effects assessment area. Residual effects on StFN Current Aboriginal Use that have been carried forward into the CEA include:

- Reduced trapping success due to a change in the abundance and distribution of wildlife species; and
- Reduced quality of experience while trapping.

The CEA for trapping for StFN is the same as that described for hunting above. Reduced trapping success for StFN trappers is rated as Not Significant (moderate) while the effect to the quality of

the experience of StFN trapping within PID015391809 is rated as Not Significant (minor). The mitigation measures described to minimize cumulative effects to hunting are also applicable to trapping.

19.3.31.4.2.3 Fishing

There are no streams or waterbodies within the area of the CLRUTP RSA that overlaps federal parcel PID015391809; therefore, there are no potential effects on fishing.

19.3.31.4.2.4 Plant Gathering

Residual effects on StFN Current Aboriginal Use that have been carried forward into the CEA relevant to plant gathering is a reduced quality of experience while plant gathering.

The quality of the experience of StFN using the land and resources may be adversely affected by the construction, operation, and decommissioning of various projects in the region. Consultation with Aboriginal groups identified concern that projects may negatively affect prime habitat areas or facilitate access of non-Aboriginal users (e.g., harvesters and recreational users) to the area, which may have an overall effect on their experience using the land and resources. Increased vehicle traffic associated with the projects and activities may reduce the quality of experience of Aboriginal group members using of the land. Therefore, other foreseeable projects and activities, including mining, forestry and the development of pipelines and associated transportation infrastructure, have the potential to act cumulatively with the Project and reduce the quality of experience for Aboriginal groups using their traditional lands.

Cumulative effects mitigation requires the input and participation of a range of industry parties (in this case forestry, mining, energy, etc.) and measures proposed to minimize effects on traditional use plant harvesting relevant to federal parcel PID015391809 include:

- Implementing a Landscape, Soils and Vegetation Management and Restoration Plan and Sediment and Erosion Control Plan and to provide relevant recommendations for project mitigation;
- Adhering to BC MFLNRO forestry BMPs, such as maintaining drainage pathways and wetland hydrology by installing appropriately sized culverts for stream and wetland crossings, avoiding harvesting in wetland and riparian areas, replanting native vegetation to expedite succession; and
- Forestry and mineral exploration companies are also required to implement reclamation and revegetation measures once they complete activities in a specific area.

19.3.31.4.2.4.1 *Characterization of Reduced Quality of Gathering Experience for StFN*

In the event that all reasonably foreseeable projects start on time and as designed, there will be additional disturbance to StFN using land and resources within their traditional territories. Disturbances may include visual effects (e.g., access roads and the proposed pipeline projects). The potential incremental contribution of the Project to this effect is anticipated to be small, given its relatively small footprint and limited contribution to visual effects during the construction of the transmission line.

In consideration of existing conditions, the context is considered to be low, and the magnitude is low as few behavioural changes are expected. The duration of the effects are anticipated to be permanent and continuous, when Aboriginal groups are using the lands and resources in the areas of projects or activities. The extent is determined to be regional and will be reversible in the long term. The determination of the cumulative residual effect on the quality of StFN harvesters' experience is rated as Not Significant (minor). The likelihood given the presence of proposed and existing projects and activities, and confidence rating is medium given the limited amount of information about proposed projects.

19.3.31.4.2.5 *Other Cultural and Traditional Uses of the Land*

At the time of writing, no information on other StFN current traditional land and resource use (i.e. sacred sites) relevant to federal parcel PID015391809 was available.

Cumulative effects on other cultural and traditional uses of the land would include changes in the quality of the experience in using the lands. The CEA, including mitigation measures to the change in the experience of StFN using the land and resources is described in detail under Plant Gathering above and applies to other cultural and traditional uses of the land.

19.3.31.5 **Ulkatcho First Nation (UFN)**

No federal parcels or Indian reserves set apart for use and benefit of UFN are located within the CLRUTP LSA or RSA within the UFN traditional territory; therefore, no effects are possible to UFN CLRUTP on federal lands.

19.3.31.6 **Nazko First Nation (NFN)**

No federal parcels or Indian reserves set apart for use and benefit of NFN are located within the CLRUTP LSA or RSA within the NFN traditional territory; therefore, no effects are possible to NFN CLRUTP on federal lands.

19.3.31.7 **Skin Tye Nation (STN)**

No federal parcels are located within the CLRUTP LSA or RSA in the STN traditional territory. The CLRUTP LSA does overlap with Tatelkus Lake IR#28 in STN traditional territory but this IR is not set apart for use and benefit of STN.

19.3.31.8 Tsilhqot'in National Government (TNG)

No federal parcels are located within the CLRUTP LSA or RSA in the TNG traditional territory. The CLRUTP LSA does overlap with Tatelkus Lake IR#28 in TNG traditional territory but this IR is not set apart for use and benefit of TNG.

19.3.31.9 Métis Nation British Columbia (MNBC)

Three Métis communities have been identified that may access the RSA to continue traditional harvesting. There are community associations affiliated with the MNBC in Prince George and Quesnel.

The Métis people's involvement in the fur trade industry went beyond trapping. Other Métis activities associated with the fur trade included berry picking, making pemmican, and canoe manufacturing. Métis people from northern BC harvest deer, elk, moose, fish, medicinal plants, berries, small game, timber, and firewood, as well as bear, birds, bison caribou, and sheep (BC Hydro, 2013).

At the time of writing, the MNBC had not identified hunting, trapping, and plant gathering rights that may be affected by the Project; therefore, no effects were assessed to MNBC CLRUTP.

19.3.32 Visual Resources

The LSA and RSA for Visual Resources overlaps with two Indian Reserves, Tatelkus Lake IR#28 and Stellaquo IR#1, as well as two federal crown parcels, Land Act Parcel DL 2557 R5C and PID015391809. **Figure 19.3-1** shows the locations of these lands.

19.3.32.1 Land Act Parcel DL 2557 R5C

Federal Land Act Parcel DL 2557 R5C is within the Visual Resources transmission line LSA. The route intersects the north corner of the parcel, after crossing the Stellako River. Site 1 of the visual resource effects assessment (**Section 7.2.7.3.2.1**) determines potential effects on the Stellako River valley. Due to proximity, certain aspects of this significance determination also apply to the federal land parcel. Magnitude is considered Moderate as the transmission line will be visible in a Local geographic extent within a Visually Sensitive Unit with High sensitivity and a Retention Objective. This prescribes that new structures should not be visually evident to avoid alteration that could cause public concern.

As the parcel is undeveloped without existing facilities or access, the opportunity to view the structure will be restricted to individuals travelling along the river in watercraft. Views from the land parcel will be Intermittent due to dense vegetation cover throughout the parcel. A Not Significant (minor) effect will result given these circumstances.

The following mitigation measures will minimize effects to federal lands:

- Paint or stain structures to blend with the character of the surrounding environment;

- Investigate site-specific measures and designs to soften effects from a river level vantage point, where structure might breach the natural ridgelines of the river valley;
- Investigate measures to soften the visual effects associated with overhead cables.

The Proponent will also work with the federal government and other stakeholders on transmission line routing in and around this parcel with a view of avoiding or minimizing impacts.

19.3.32.2 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is within the Visual Resources mine site LSA. Site 8 of the visual resource effects assessment (**Section 7.2.7.3.2.8**) determines potential effects on Tatelkus Lake IR#28 from the mine site, located on the east facing slopes of Mount Davidson. The Tailings Storage Facility (TSF) and Open Pit of the proposed mine site is 13.2 km and 17.3 km to the southwest, respectively. The area is influenced by current land use practices related to forestry and agricultural.

A viewshed analysis from Tatelkus Lake IR#28 toward the mine site indicate line of sight with a section of the Site D Main Dam of the TSF, the Open Pit and East and West Rock Storage Facilities. Magnitude is considered Medium as visibility will be constrained by distance. Geographic extent is considered Local as line of sight falls within the mine site LSA. Artificial light emanating from the mine site may be visible in the southwest skyline at night. Although distant, due to the physical size of the prominent mine site facilities; the effect is assigned Not Significant (moderate).

Mitigation measures recommended in the Visual Resources EMP can moderate effects on Tatelkus Lake IR#28

- Where possible, re-vegetate cleared land to establish a composition consistent with the surroundings;
- Select materials and paint structures to blend with the color and character of surroundings;
- Direct artificial light only where needed and eliminate emission above the horizontal plane of the source with appropriate fixtures. Limit to minimum required with automated timers and motion detectors.

19.3.32.3 Stellaquo IR#1 and PID015391809

Viewshed analyses from elevated locations within Stellaquo IR#1 and Parcel PID015391809 indicated that line of sight will not occur with the transmission line, routing between 1.6 km and 2.8 km to the south.

19.3.33 Archaeological Sites

Potential project impacts to archaeological sites are point locations. Federal Land Act Parcel DL 2557 R5C is located within the Archaeological Sites LSA while Tatelkus Lake IR#28 is located

within the RSA. No archaeological sites were found within these federal parcels. There are no effects to archaeological sites on federal lands.

19.3.34 Historic Sites

Potential project impacts to historic sites are point locations. Federal Land Act Parcel DL 2557 R5C is located within the Historic Sites LSA while Tatelkus Lake IR#28 is located within the RSA. No historic sites were found within these federal parcels. There are no effects to historic sites on federal lands.

19.3.35 Paleontological Resources

Potential project impacts to paleontological resources are point locations. Federal Land Act Parcel DL 2557 R5C is located within the Paleontological Resources LSA while Tatelkus Lake IR#28 is located within the RSA. No paleontological resources were found within these parcels. There are no effects to paleontological resources on federal lands.

19.3.36 Environmental Exposures

The same parcels described under **Section 19.3.23** are located within the LSA and RSA for Environmental Exposures. The assessment below focuses on the federal lands closest to the mine site.

Effects of the Project on human health are considered in the context of affecting change in population health (i.e., annoyance, injury, or disease).

19.3.36.1 Tatelkus Lake IR#28

Tatelkus Lake IR#28 is home to the closest residents to the mine site. Tatelkus Lake IR#28 was one of the receptors for the Human Health and Ecological Risk Assessment (HHERA). A conservative or reasonable worst-case approach was taken in identifying the primary exposure scenarios of concern for the Project. Due to its proximity to the mine site, effects to Tatelkuz Lake IR 28 were considered to be the worst-case scenario for all the other IRs in the LSA. Overall, health effects for environmental exposures for Aboriginal peoples living at Tatelkuz IR#28 are qualitatively rated as negative but Not Significant (negligible), based on quantitative evaluations.

Mitigation measures are based on improving air quality and surface water quality. Air quality mitigation measures are presented in **Section 5.2.4**, and include provisions to minimize emission of combustion gases. There will be no surface water discharges from the Project during the operations phase and seepage from mine facilities will be managed. Water quality in streams downstream of the project is predicted to meet BC Freshwater Guidelines or site-specific water quality objectives throughout all phases of the Project. Therefore, this is not expected to result in harmful accumulation and release of metals from downstream surface water or sediments. A Country Food Monitoring Plan (**Appendix 9.2.2B**) will be developed and submitted for review with relevant agencies and designated Aboriginal groups. Country Foods Monitoring Plan will be implemented prior to mine operations and provide results of monitoring within one year of

completion of the monitoring to those groups. A monitoring program will enable environmental contaminant concentrations in air, water, and country foods to be observed, reported, and evaluated.

A CEA for environmental health is not considered because the residual effects are expected to be Not Significant (negligible) during the construction, operation, closure, and post-closure phases of the Project and that there are no other significant sources of emissions of COPCs around the Project area that may impact human health.

19.3.36.2 Land Act Parcel DL 2557 R5C and PID015391809

Land Act Parcel DL 2557 R5C and PID015391809 are both federal parcels that fall within the Environmental Exposures LSA. There are no people residing within these parcels; therefore, there is no receptor. No effects to these parcels are anticipated.

19.3.37 Worker Health and Safety

The LSA and RSA for Worker Health and Safety overlap with the same parcels described under **Section 19.3.23**.

Potential Project workers include Aboriginal peoples residing on lands held by the Federal Government. Under the *Indian Act*, Indian Reserve Lands are held by the Crown for the use and benefit of the respective Aboriginal bands. It is assumed that some potential Project workers residing on Indian Reserves could be currently employed in the construction, mining, forestry and public sectors or new entrants to the labour force. Future employees gaining project related employment during the construction phase (whom are currently employed in the mining and public sectors) will have increased likelihood of injury and disease as a result of exposure to workplace hazards in the construction sector. Due to good safety performance of open-pit mining operations in British Columbia, in general, future employees in the operation phase who are currently employed will be less likely to incur a workplace injury or disease at the Project than at their current workplace. In all phases, new, young, and inexperienced employees will be most at-risk (WorkSafeBC, 2013a). Workers exposed to multiple hazards, such as maintenance workers, are vulnerable (BC MEM, 2008).

19.3.38 Conclusion

The determination of significance presented for each of the VCs as discussed in the summaries above applies to the federal land parcels listed in **Table 19.3-1**. The assessment concludes that there is no higher risk of significant adverse effects specifically within federal lands.