# FROSST CREEK HYDROELECTRIC PROJECT DEVELOPMENT PLAN TEMPLATE



Submitted by Frosst Creek Hydro Inc. RO November 8, 2014 R1 March 11, 2014 R2 April 4, 2014

# LETTER OF TRANSMITTAL

A cover letter to be submitted with the Development Plan will include:

- An outline of the Project's proposal;
- A list of provincial authorizations being requested as part of the application process;
- The Proponent's contact information; and,
- Reference to any pertinent Project-specific components of the development.

## EXECUTIVE SUMMARY

The Executive Summary will contain the following information:

- 1. A concise statement outlining the purpose of the Development Plan, including a brief summary of the Project's purpose (e.g., expected MW), key components as outlined in the "Project Description" and proposed total footprint (in hectares).
- 2. A concise description of engagement/consultations with First Nations, the public, stakeholders and government agencies including a summary table of the issues raised, solutions suggested or actioned, issues outstanding, and information distribution activities, including public meetings or open houses.
- 3. A general overview of key impact effects and proposed effect management measures or future studies and/or monitoring, which will address mitigation strategies and any residual effects.
- 4. Maps showing both regional context and site-specific setting.
- 5. Estimated total direct labour force in person years (PY) required during construction and operation, and decommissioning where applicable.
- 6. Estimated capital cost of the Project.
- 7. Estimated Project benefits (social, environmental and economic).
- 8. The Qualified Professionals' (QPs) conclusions from the environmental and socio-economic assessments.
- 9. The following tables:

#### Table 1 Summary of Agency Issues

Agency	Authorization/ Approval Requested	Status	Comments	Contact

#### Table 2 Summary of issues raised during public/stakeholder engagement phase.

Group consulted and contact names	Dates of meetings, calls, correspondence	Summary of issue raised and proposed solutions	Mitigative measures adopted/rationale for not adopting	Proponent's Comments

#### Table 3 Summary of issues raised during engagement/consultation with First Nations.

First Nation consulted and contact names	Dates of meetings, calls, correspondence	Summary of issue raised and proposed	Mitigative measures adopted/rationale for not adopting	Proponent's Comments
contact hames		3010110113		

# PROFESSIONAL CERTIFICATION

The Proponent will identify every qualified professional (QP) contributing to the Development Plan. The Proponent will also specify which information the QPs have contributed to the Development Plan by means of studies and reports.

	Section(s) of			
Name	Accreditation and Professional Association #	Area of Expertise	Signature	Plan Responsible for: Title(s)/Page number(s)

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C.F.		PROVIDE		ГА
SE C.	INFORMATION REQUIREMENT	D	COMMENT	EA REF.
		(Y/N/P)		
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3.2	Environmental Assessment methodology	Y		3.2
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4.1	Aquatic Environment	Y		4.1
4.1 .1	Aquatic Habitat	P	It is anticipated that the Diversion and Upstream Reaches of Frosst Creek are non-fish bearing; hence, Fish & Fish Habitat was selected as a VC and will include a discussion on Aquatic Habitat.	4.1.1
4.1 .2	Aquatic Fauna	Р	It is anticipated that the Diversion and Upstream Reaches of Frosst Creek are non-fish bearing; hence, Fish & Fish Habitat was selected as a VC and will include a discussion on Aquatic Fauna.	4.1.1 & 4.4.2
4.1 .2. 1	Fish and Fish Habitat	Y	Invertebrate Species have been identified as a Project VC and as such will be discussed in a separate section (4.5.4).	4.1.1 & 4.5.4
4.1 .2. 2	Other Aquatic Species	Y	Amphibian Species have been identified as a VC under Wildlife, reference Section 4.5.1.	4.5.1
4.1 .3	Aquatic Vegetation	Р	It is anticipated that the Diversion and Upstream Reaches of Frosst Creek are non-fish bearing; hence, Fish & Fish Habitat was selected as a VC and will include a discussion on Aquatic Vegetation.	4.1.1 & 4.4.2
4.1 .4	Water Quality	Y	To be discussed in Section 4.1.2	4.1.2
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4.3 .2	Geotechnical / slope stability	Y		4.3.2
4.3 .3	Geomorphology	Y		4.3.3
4.3 .4	Geology and Geochemistry	Р	Underground works (such as a tunnel) are not required for the Project and therefore Geology and Geochemistry was not selected as a VC. A general description of the geology of the area, including potential impacts of acid rock drainage (ARD), will be included in section 4.3.4. Section 4.1.2 (Water Quality) will also provide information on ARD.	4.3.4, 4.1.2

4.4	Terrestrial Environment	Y		4.4
4.4 .1	Wildlife and Wildlife Habitat	Y	FCHI has identified Wildlife & Wildlife Habitat as a subject area (Section 4.5) and identified VCs under this subject area, including Amphibians (Section 4.5.1), Avian (Section 4.5.2), Mammals (Section 4.5.3).	4.5
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4.4 .3. 3	Forest Resource Features	Y		4.4.2
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5	SOCIO-ECONOMIC ASSESSMENT	Y		
5.1	Regional Economy	Y		5.1
5.2	Resource Objectives, Land Use Plans or Other Designations	Y	Discussion provided under Section 5.2 of the Project Development Plan (Recreation & Access)	5.2
5.3	Implications for Adjacent or Overlapping Crown land and Resource Values	Y	Discussion provided under Section 5.3 of the Project Development Plan (Forestry Opportunities)	5.3
5.3 .1	Wildfire Protection	Y	Discussion provided under Section 4.4.2 of the Project Development Plan (Forest & Range Considerations).	4.4.2
5.4	Navigation, Transportation, and Access	Y	Discussion provided under Section 5.2 of the DVP (Recreation & Access)	5.2
5.4 .1	Roads, Bridges and Railroad	Y	Discussion provided under Sections 5.2 of the DVP (Recreation & Access)	5.2
5.4 .2	Flight Path	Ν	Not applicable to the Project.	N/A
5.4 .3	Public Access	Y	A portion of the Project is on private land and access has been identified as a VC with Recreation.	5.2

5.5	Water Rights	Y		5.5
5.6	Human Health and Safety	Y		5.4
5.7	Summary of Socio-economic Effects, Mitigation, and Significance	Y		5.6
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	APPENDICES	Ν	To be provided with the Project Development Plan	
1	Private/Federal Land Requirements	N	A portion of the Project is on private land and owned by the Proponent. Details will be included in the Project Development Plan.	2.1.2
2	Additional Considerations for Crown Land Resources	Ν	To be provided with the Project Development Plan, if applicable.	
3	Matrix of Project activities and VCs	Ν	To be provided with the Project Development Plan in sections 4 and 5.	4.6 & 5.6
4	Residual Impact Assessment Table	Ν	To be provided with the Project	4 & 5

	Template		Development Plan within each respective VC section.	
5	Region-Specific Requirements	N	To be provided with the Project Development Plan, if applicable.	

# LIST OF COMMONLY USED ACRONYMS AND KEY DEFINITIONS

Acronym	Explanation
7Q10	Seven-day Consecutive Low Flow with Ten Year Return Frequency
AIR	Application Information Requirements
AIA	Archeological Index Assessment
AOA	Archeological Overview Assessment
BEC	Biogeoclimatic Ecosystem Classification
BMP	Best Management Practices
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Act
CEMP	Construction Environmental Management Plan
CEP	Clean Energy Project
COSEWIC	Committee on the Status of Endangered Species in Canada
СР	Cut Permit
DFO	Department of Fisheries and Oceans (Canada)
FRPA	Forest and Range Practices Act (Provincial)
FSR	Forest Service Road
НСМР	Habitat Compensation and Mitigation Plan
HDPE	High Density Polyethylene (Thermoplastic Pipe)
IFR	Instream Flow Regime
IL	Investigative Licence
kV	Kilovolt
LTAC	Long-Term Activity Center
LSA	Local Study Area
LPS	Liters Per Second
Μ	Meter
MAD	Mean Annual Discharge
MASL	Meters Above Sea Level
MIF	Minimum Instream Flow
MMD	Mean Monthly Discharge
MoE	Ministry of Environment (BC)
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
MW	Megawatt
OEMP	Operational Environmental Monitoring Plan
OGMA	Old Growth Management Area
OPP	Operational Procedures and Parameters
PLC	Programmable Logic Controller
QP	Qualified Professional
RISC	Resource Information Standards Committee
RoW	Right-of-Way
RSA	Regional Study Area
SARA	Species At Risk Act
SOP	Standing Offer Program
TUS	Traditional Use Study
UWR	Ungulate Winter Range
VC	Valued Component
VEC	Valued Ecosystem Component
WHA	Wildlife Habitat Area
WSC	Water Survey Canada
WSD	Water Stewardship Division

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# LIST OF STUDIES AND CONSULTANT REPORTS

The Proponent will provide a list of all studies and consultant reports prepared for the Development Plan and include contact(s) for the QP responsible for the studies and reports.

# LIST OF MAPS<sup>1</sup>

- Map 1. Project Location
- Map 2. General Site Plan and Access
- Map 3. Frosst Creek Watershed Area

<sup>&</sup>lt;sup>1</sup> FCHI will provide updated versions of Maps 1, 2 & 3 as well as additional maps in the Frosst Creek Hydroelectric Project Development Plan. These maps will be consistent with the mapping requirements of the Province of British Columbia's *Clean Energy Project Development Plan Information Requirements* (Updated August 2013).

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# SECTION 1 – PROJECT SUMMARY

## **1.1 PROJECT PROPONENT**

Frosst Creek Hydro Inc. (Incorporation Number: BC0937055) is the Project applicant and Proponent. Ryan Mowat can be contacted for further information regarding the Project.

## Ryan Mowat, M.Sc., P.Eng.

Project Engineer Frosst Creek Hydro Inc. Unit 3 – 30528 Great Northern Ave. Abbotsford, BC V2T 6H4 Cell: (604) 897-4101 Email: rmowat@zellacorp.com

## **1.2 OVERVIEW OF THE PROPOSED PROJECT**

The Proponent will provide the following information in the Development Plan:

- Formal Project name
- The legal description of the area under application, including a legal description and status of land appurtenant to the powerhouse, and any private or federal land affected by the works
- A concise statement outlining the purpose of the Development Plan, including a brief summary of the Project's purpose and rationale
- A summary of the key components and proposed total footprint (in hectares), including the proposed length of power lines
- Maximum proposed quantity of water to be diverted and amount of energy production required for the Project
- A statement as to whether the Project will be submitted to the Provincial Environmental Assessment Office (EAO) or Canadian Environmental Assessment Agency for review
- A summary of prevailing climate conditions
- A general description of the activities associated with the development including construction, clearing, alteration of land, upgrading of existing infrastructure
- An estimate of capital construction costs
- An estimated time frame for each phase of development
- An assessment of the direct employment in PY that the Project will create during construction, operation and decommissioning, where applicable, including key job categories
- Engineering drawings and overview maps for reference where appropriate
- A list of other developments and water use in the regional study area (RSA)

## **1.3 SUMMARY OF NON-PROVINCIAL AUTHORIZATIONS/APPROVALS**

The Development Plan will discuss and summarize applicable approvals, authorizations or best management practices from other jurisdictions (e.g., local and federal governments) that are associated with the construction and/or operation of the Project.

A preliminary summary of applicable approvals/authorizations, to be finalized in the Development Plan, is provided in the table below.

Agency	Nature of Authorization	Status	Comments	Contact
Fisheries and Oceans Canada (DFO)	Operational Statements			
Navigable Waters Protection Program (Transport Canada)	Navigable Waters Protection Act Section 5(2) Exemption			
Fraser Valley Regional District	Building Permit			
Natural Resources Canada (Explosives Act)	Temporary (Explosives) Magazine Licence			

#### Table 4 Summary of non-Provincial authorizations/approvals:

## **1.4 SUMMARY OF PROVINCIAL AUTHORIZATIONS**

The Development Plan will discuss applicable Provincial authorizations that will need to be considered for the Project.

A preliminary summary of applicable approvals/authorizations, to be finalized in the Development Plan, is provided in the table below.

## Table 5 Summary of Provincial authorizations

Authorization Required	Statute/Regulation	Status	Prerequisites	Development Plan Reference
Conditional Water Licence	Water Act	Application Submitted May, 2012		
Investigative Licence of Occupation for Investigative Phase	Land Act	Licence Received March, 2013 (File 2410785)		
Approval for Changes in or about a Stream	Water Act			
Short Term Water Use Approval	Water Act			
Licence of Occupation (Crown Land Tenure)	Land Act			
Statutory Right of Way	Land Act			
Occupant Licence to Cut	Forest Act			
Works Permit	Forest Act			
Inspection Permit	Heritage Conservation Act			
Electrical Work Permit/ Authorization to Use Electrical Equipment	Safety Standards Act, Electrical Safety Regulation			
Application by a Land Owner under the Agricultural land Commission Act to use land in the ALR for non-farm purposes (Buried Power Line)	Agricultural Land Commission Act	Application Received by ALC Dec. 4 <sup>th</sup> , 2013 (File No. 53548)		

# SECTION 2 – PROJECT DESCRIPTION

The information included in Section 2 will be included in the Development Plan and will be updated where necessary.

Technical components of the proposed Project are summarized in the table below.

Project Name	Frosst Creek Hydroelectric Project	
Project Location	Chilliwack, BC	
Water Source	Frosst Creek	
Project Type	Run-of-River	
Drainage Area	14.2 km <sup>2</sup>	
Gross Head	380 m	
Turbine Design Flow	1.4 m <sup>3</sup> /s	
Mean Annual Discharge (MAD)	0.86 m <sup>3</sup> /s	
Hydroelectric Plant Capacity	4 MW	
Average Annual Energy Output	14 GWh/y	
Turbine Design	Horizontal Pelton	
Water Convoyance System	2320 m of 25-35" Diameter HDPE and Steel	
Water Conveyance System	Pipe	
Power Line		
(Upgrade existing single phase line to 3 phase	2.7 km	
line)		
Power Line	0.5 km	
(Powerhouse to POI)	U.3 KIII	

#### Table 6 Frosst Creek Hydroelectric Project summary

## 2.1 PROJECT PLANNING AND DESIGN APPROACH

## 2.1.1 PROJECT BACKGROUND AND RATIONALE

The purpose of the Project is to produce clean energy by utilizing the natural flow and elevation drop of the creek in order to deliver renewable power to the BC Hydro distribution system. The Project will contribute to the Province of British Columbia's goals of becoming energy self-sufficient and meeting its clean energy needs in an environmentally and socially responsible manner.

Frosst Creek is a viable source of clean energy due to its favorable location and geomorphology. Specifically, the Project:

- Is eligible for BC Hydro's Standing Offer Program (SOP), as the Project capacity is greater than 0.05 MW and less than 15 MW.
- Uses land previously disturbed by logging

- Has existing access, including old skidder trails and logging roads, throughout the Project area
- Is located within the Fraser River delta, a main corridor of power consumption which includes greater Vancouver and the Fraser Valley
- Has the potential to provide electrical power to Columbia Valley residents during outages (islanding)
- Is driven by rain-dominated flows during the fall and winter months, as well as by high snowmelt flows during the spring freshet.
- Uses existing 'non-status' roads
- Is near a BC Hydro 25 kV distribution line suitable for a power interconnection.
- Is partially located on private land (Project works including the powerhouse, the point of interconnection (POI) and a portion of the penstock will be located at 42892 Frost Rd., owned by the Proponent)

A summary table of the Project history is provided below.

#### Table 7 Frosst Creek Hydroelectric Project history.

Project Milestone	Date
Submission of Water Licence Application	May 2, 2012
Receipt of Investigative Licence	May 15, 2013
Submission of Development Plan Template (DPT)	November 8, 2013
Received feedback on DPT from FrontCounter BC	February 4, 2014
Submission of Revised DPT	March 11, 2014

## 2.1.2 LOCATION OF PROJECT AND MAPPING

The proposed run-of river Project is located on Frosst Creek near Lindell Beach, BC, which is a small community 3 km southeast of Cultus Lake. More specifically, the proposed Project is located at the base of Isar Mountain and International Ridge. Frosst Creek flows down Isar Mountain and International Ridge from an elevation of approximately 1200 meters above sea level (MASL) to 45 MASL, from which elevation point it flows into Cultus Lake.

The Project is also located within the traditional territory of the Ts'elxwéyeqw Tribe, which is comprised of seven Indian Bands, including the Aitchelitz First Nation, Skowkale First Nation, Skway Village, Soowahlie Indian Band, Squiala First Nation, Tzeachten First Nation, and Yakweakwioose First Nation. These bands comprising the Ts'elxwéyeqw Tribe belong to the Stó:lō Nation.

The Project Investigative Licence area is that part of Section 4, Township 22, east of the Coast Meridian, together with that parcel or tract of land in the vicinity of Frosst Creek, together with unsurveyed foreshore or land covered by water being part of the bed of Frosst Creek, Group 1, New Westminster District, containing 110.4 hectares, more or less. Location in UTM coordinates is summarized in the table below:

Project Component	Zone	Easting	Northing	<b>Elevations</b> (metres above sea level)
Intake	10	572617	5428554	640
Powerhouse	10	570455	5428992	260
Tailrace	10	570815	5428747	248

#### Table 8 UTM coordinates to the location of Project components.

The actual footprint of the Project will be finalized during design and will be smaller than the Investigative Licence (IL) area. The Project footprint, within which all Project activities will occur and infrastructure will be placed, will be shown on Maps/Figures and further defined in the Development Plan. Maps 1 and 2 of the Development Plan Template show the proposed Project's regional location and general arrangement of components, respectively.

Access to the proposed Project is via the Trans-Canada Highway from Vancouver to Hope, exiting at Exit 104 to No. 3 Road (East). Access to upper and lower sections of the proposed Project, including sections on private and Crown land, is through the Proponent's private property at 42892 Frost Road. Directions to the private property are as follows:

Take Exit 104 off of Highway #1. Follow No. 3 Road for 5.2 km and turn left onto Yarrow Central Road. After 2.9 km on Yarrow Central Road, continue for 4.4 km onto Vedder Mountain Road. Turn right onto Columbia Valley Highway/Cultus Lake Road and continue for about 11.6 km. Turn left onto Frost Road and continue for 4.5 km to reach the Proponent's private property at 42892 Frost Road.

## 2.1.3 PROJECT FACILITIES

The proposed Project is an approximate 4 MW run-of-river hydroelectric facility. The Development Plan will provide further details (including diagrams, schematics, maps, and figures where appropriate) of all Project components including:

## 1. Intake/Weir & Intake Pond

- Proposed intake structure location is on the south bank of Frosst Creek at approximately 640 MASL
- Weir height is approximately 3.5 m high
- The V-shaped intake structure is approximately 30 m long
- The natural wetted width of Frosst Creek at the intake location is approximately 18 m
- The intake will include a sluiceway structure, sluice gate, regulation chamber/head tank, and transition pipe
- Instream Flow Release (IFR) is located immediately downstream of the intake weir and downstream gauging site and will be an integral design component of the intake

- Intake pond area is approximately 350 m<sup>2</sup>
- Options for IFR release arrangements and their suitability to avoid potential blockage due to debris and/or sedimentation during Operation will also be discussed, as will IFR Verification/monitoring arrangements

## 2. Water Conveyance System

- Located along the north bank of Frosst Creek
- Penstock alignment will cross Frosst Creek approximately 80 m downstream of the intake structure, from the south to the north bank
- Proposed penstock length is approximately 2320 m, including:
  - Approximately 1200 m of 0.91 m (36 inch) diameter HDPE pipe
  - Approximately 230 m of 0.81 m (32 inch) diameter HDPE pipe
  - Approximately 380 m of 0.66 m (26 inch) diameter steel pipe
  - Approximately 510 m of 0.61 m (24 inch) diameter steel pipe

## 3. Powerhouse and Tailrace

- The powerhouse will be located on the north bank of Frosst Creek at approximately 260 MASL
- The tailrace will be located on the north bank of Frosst Creek at approximately 248 MASL
- The powerhouse contains the turbine, a generator, inlet valve, controls and associated equipment
- The approximate size of the powerhouse is 10 m by 15 m
- The tailrace pipe is approximately 530 m long and approximately 1 m in diameter
- 100% of the diverted water will be returned to the creek via the tailrace at an identified fish barrier (i.e. waterfall) at Zone 10, 570815 Easting and 5428747 Northing

## 4. Turbine

- Dual nozzle single runner horizontal Pelton turbine
- Nameplate capacity is 4 MW

## 5. Transformers and Switchgear

- Step up transformer is required from 5 kV to 25 kV
- Located adjacent to the powerhouse on the Proponent's private property at 42892
   Frost Road

#### 6. Interconnection to Distribution Line

- Connection to BC Hydro's distribution line requires approximately 0.5 km of 25 kV power line to be built, owned, operated, and maintained by the Proponent
- The power line will be located on the Proponent's private property at 42892 Frost Road

- Connection to BC Hydro's 25 kV feeder (ALZ 25F52) is located at Zone 10, 570425 Easting and 5429357 Northing
- From the POI to the closest BC Hydro station, there is approximately 2.7 km of existing 25 kV single-phase line that requires upgrading to 3-phase for this interconnection
- Underground connection to a wood pole line is to be made on the Proponent's private property
- Routing will be along the driveway on the Proponent's private property at 42892
   Frost Road

## 7. Access Roads

- Access to upper and lower portions of the Project originates from the Proponent's private property at 42892 Frost Road
- Existing skidder trails and a 'non-status' Forest Service Road (FSR) connect the private property to all Project components
- Two existing skidder trails will require improvements. Proposed upgrades from skidder trails to access roads include:
  - Approximately 250 m in the lower Project area, connecting the Proponent's private property to the 'non-status' FSR; and,
  - Approximately 250 m in the upper Project area, connecting the 'non-status' FSR to the intake weir

## 8. Laydown and Staging Areas

- Two proposed staging areas will be located on private property (42892 Frost Rd.), including:
  - One staging area on a natural bench at the southeast corner near to the proposed powerhouse location
  - One staging area approximately 25 m north of the first staging area at approximately 240 MASL, located outside (south) of the ALR boundary
- Four proposed laydown areas are located in pre-disturbed areas along the existing skidder trails and 'non-status' FSR
  - These areas were historically used as logging load out areas

## 9. Stream Crossings

- The proposed penstock route crosses from the south bank to the north bank of Frosst Creek approximately 80 m downstream of the proposed intake location
- The penstock will cross Frosst Creek at 10 U 572533 Easting 5428549 Northing
- The proposed penstock route will also cross small (S6) tributaries

## 10. Proposed Source of Water for Construction

 There is an existing well located at 42892 Frost Rd., owned by the Proponent, which will provide water for construction activities, dust suppression, drinking, etc.

## 11. Other Information

- This section will include, but is not limited to, discussions on the following information:
  - Batch plant (Not required, as an existing ready-mix plant in Chilliwack will provide all concrete required for Project construction)
  - Construction camp (not required)
  - Risk of flooding associated with the Project in the event of dam failure

A Conceptual Screening Assessment was completed by BC Hydro on May 31, 2012 to determine the impact of the Project on the BC Hydro system. It was determined that an acceptable Point of Interconnection (POI) can be made to the BC Hydro's 25 kV feeder ALZ 25F52 (Zone 10, 570425 Easting and 5429357 Northing), which is located within 0.5 km of the powerhouse.

This section of the Development Plan will also summarize the results of evaluations of alternative locations for Project components and identify factors leading to the selection of the preferred option.

## 2.1.4 LABOUR POOL REQUIREMENTS

It is anticipated that some of the labour required to construct the Project will be hired from Lindell Beach, a local community within 3 km of the Project, and from local First Nations communities such as those that comprise the Ts'elxwéyeqw Tribe. Other labour requirements may be hired from the Lower Mainland, specifically the Chilliwack area. The following information will be provided in the Development Plan:

- The anticipated labour pool requirements in PY for construction, operations and maintenance phases
- A description of any relevant employment strategies

Where applicable, the Development Plan will discuss the intended approach and associated logistics for the delivery of services required to support the labour force. This is expected to include such items waste disposal, material requirements and temporary power. An existing well at 42892 Frost Rd. will serve as the drinking water source for the labour pool.

## 2.2 ENVIRONMENTAL SETTING

Frosst Creek flows down Isar Mountain and International Ridge into Cultus Lake, near the small community of Lindell Beach BC, which is approximately 15 km south of Chilliwack, BC. The proposed Project is located along the north bank of Frosst Creek. Project components that will be located within the riparian zone include the intake, the portion of the penstock that crosses Frost Creek, and a portion of the tailrace. All other Project works will be located outside the riparian zone.

Frosst Creek is mainly driven by rain-dominated flows during the fall and winter months, and by high snowmelt flows during the spring freshet. The stream substrate consists primarily of boulders, bedrock outcrops and cobble. Numerous cascades and falls are found throughout the creek.

The general Project area is characterized predominantly by second-growth forest, with an oldgrowth management area (OGMA) and the western boundary of Cultus Lake Provincial Park occurring approximately 200 meters east of the proposed intake site. Frosst Creek is a steep, canyonized creek with rock outcrops throughout Project area.

The proposed Project is located in the Chilliwack Landscape Unit (LU) of the Chilliwack Forest District. The Project is situated within the Georgia Depression Ecoprovince, Lower Mainland Ecoregion, and Fraser Lowland Ecosection. Additionally, the Project is located mainly in the Dry Maritime Coastal Western Hemlock (CWHdm) biogeoclimatic subzone, with the proposed intake area occurring within the Very Wet Maritime Coastal Western Hemlock (CWHvm2) biogeoclimatic subzone.

The CWHdm, which occurs between 220 and 700 MASL, comprises the majority of the Project's IL area (approximately 125 ha). Timber is comprised of second-growth Douglas-fir, Western Hemlock, Western Red Cedar, Big Leaf Maple and Red Alder. Site series is comprised of the Zonal '01' with pockets of the wetter '06' on the upper elevations, while the richer '05'/'07' types are found in the lower elevations of the area. Understory vegetation in the '01' is sparse and includes minor occurrences of Salal, Red Huckleberry, Sword Fern, and Dull Oregon Grape. Step moss and Oregon Beaked moss form the majority of the moss layer on the forest floor. Understory vegetation in the '05'/'07' is moderate to high, with occurrences of Vine Maple, Sword Fern, Spiny Wood Fern, Salmonberry, and Devil's Club. Step moss and Oregon Beaked moss form the majority of the moss layer on the forest floor.

The CWHvm2 comprises 30 ha of the upper elevations (i.e. above 700 MASL) within the northeastern portion of the Project's IL area. The area is composed of Western Red Cedar (20%) and Coastal Douglas-fir (40%). No Yellow Cedar was observed within this area, and Amabilis Fir comprised less than 5% of the forest stands. About 5% of the forest stands are comprised of Big Leaf Maple, Red Alder, and Vine Maple.

Lands surrounding the Proponent's private property at 42892 Frost Road to the north and west consist of private property developments and agricultural land. As mentioned, Cultus Lake Provincial Park borders the Project on the east, while the USA/Canada border borders the Project to the south.

Clearing or grading will be minimized by the use of pre-disturbed areas such as the existing 'nonstatus' FSR. The Development Plan will identify any clearing or grading activities that may have an effect on drainage and/or downstream users.

## 2.3 ENERGY PRODUCTION

The Project is expected to generate approximately 14GWh/y of clean energy, which is enough to power approximately 1,000 homes in British Columbia. Since electricity flows to the closest load, it is reasonable to predict that the power generated by the Project will be consumed mainly by local residences.

The Project is eligible for an Electricity Purchase Agreement (EPA) under the BC Hydro Standing Offer Program (SOP), which encourages the development of clean or renewable power projects of no more than 15 MW located in British Columbia (BC Hydro 2013). All material permits are required to be included in the application for the SOP; therefore, the SOP application and the EPA will not be finalized until authorizations for the Project are issued by Regulatory Agencies.

## 2.4 DESCRIPTION OF LAND REQUIREMENTS

The powerhouse, power line and the lower portion of the penstock alignment are located on private property at 42892 Frost Road. The legal description for 42892 Frost Rd. is as follows:

Land District 36, Section 4, Township 22, West of the Sixth Meridian, New Westminster District

Upstream works and the upper portion of the penstock alignment are located on Crown Land and require Crown Land tenure for construction and operations. The legal description is as follows:

That part of Section 4, Township 22, east of the Coast Meridian, together with that parcel or tract of land in the vicinity of Frosst Creek, together with unsurveyed foreshore or land covered by water being part of the bed of Frosst Creek, Group 1, New Westminster District, containing 110.4 hectares, more or less

## 2.5 PROJECT ACTIVITIES

## 2.5.1 CONSTRUCTION AND COMMISSIONING

The Development Plan will provide a description and discussion of all construction activities associated with the Project, including the following:

#### 2.5.1.1 SITE PREPARATION

- a) Establishment of staging and laydown areas, as well as the clearing of the intake, powerhouse and penstock sites
- b) Surveying of the power line, penstock alignment, Project infrastructure and roads,
- c) Upgrading of existing access

#### 2.5.1.2 INTAKE CONSTRUCTION

- a) Construction of the intake, including the methods for temporary stream diversion
- b) Development of the weir site and dam structure
- c) Dismantling of the temporary stream diversion,
- d) Completion of the intake structure,
- e) Proposed timing for construction and proposed blasting associated with construction
- f) Description of intake structure
- g) Discussion of construction and design considerations associated with the throughput of sediment

## 2.5.1.3 WATER CONVEYANCE SYSTEM

- a) Excavation of trenches,
- b) Construction of thrust blocks and anchors,
- c) Excavation and construction of penstock supports,
- d) Installation of the penstock alignment and any associated blasting activities
- e) Preliminary details of penstock creek crossing structural support and installation methods

#### 2.5.1.4 POWERHOUSE, SWITCHGEAR AND TRANSFORMER

- a) Excavation required for the powerhouse and tailrace sites,
- b) Construction methods of the powerhouse and tailrace structures,
- c) Installation of the turbines, generators, and mechanical systems,
- d) Installation of electrical and telecommunications equipment,
- e) Construction of the switchyard and installation of switchyard equipment
- f) Location of switchgear/transformer

## 2.5.1.5 RECLAMATION, RESTORATION & OFFSETTING

- a) Reclamation of staging, borrow, and spoil areas,
- b) Any planned restoration of species and/or ecosystems affected by the Project,
- c) Any residual or unavoidable environmental effects offset through conservation actions onsite, adjacent to the site, or elsewhere

#### 2.5.1.6 TRANSMISSION CORRIDOR – LINE CONSTRUCTION

a) Installation of electrical conductors and fixtures associated with power line construction

#### 2.5.1.7 Access Management – Site Preparation

a) Construction of access roads. Any new access roads will be designed by a qualified professional and will comply with or exceed provincial requirements as dictated by their use.

#### 2.5.1.8 ACCESS ROAD CORRIDOR – ROAD CONSTRUCTION

- a) Establishment of any rock quarries and crushing plants,
- b) Excavation of new road sub-base,
- c) Construction of any new road base,
- d) Installation of drainage structures

#### 2.5.1.9 TESTING & COMMISSIONING

a) Activities associated with testing and commissioning the Project

#### 2.5.1.10 SCHEDULE FOR ALL PHASES OF CONSTRUCTION

a) Most up-to-date construction schedule estimates for preconstruction, construction, operations, maintenance and refurbishing or removal, considering the fisheries windows and general wildlife measures under the *Wildlife Act* where applicable

## 2.5.2 OPERATIONS AND MAINTENANCE

The Development Plan will discuss the preliminary operations plan including plant start-up under various conditions, plant monitoring and control, and plant/facility shutdown scenarios and methods, including those that will be employed during an emergency.

#### 2.5.2.1 PROJECT MAINTENANCE

The Development Plan will discuss the maintenance of the Project and the maintenance strategy for the life of the Project.

#### 2.5.2.2 TRANSMISSION CORRIDOR AND ROW MAINTENANCE

There is no transmission corridor associated with the Project. The Development Plan will discuss the maintenance activities associated with right of way.

#### 2.5.2.3 ACCESS ROAD CORRIDOR MAINTENANCE

The Development Plan will discuss the maintenance activities associated with the access road corridor, including access road grading and surfacing, vegetation pruning, ditching, inspection and maintenance of culverts and bridges, and signage.

#### 2.5.2.4 SHARED ROAD AND ROW AGREEMENTS

Where applicable, the Development Plan will provide details of agreements to share the existing RoW with other users.

## 2.5.3 FUTURE PROJECT PHASES

The Proponent has no plans for any future phases of this Project.

## 2.5.4 DECOMMISSIONING ACTIVITIES

The proposed Project has an anticipated operational life of 40 years, or, in other words, the duration of the Conditional Water Licence. However, Project renewal may be considered by the Proponent after the expiration of the initial Conditional Water Licence, as well maintained hydroelectric projects have long-term life spans (i.e. greater than 100 years). If the proposed

Project can continue producing clean energy for the Province of British Columbia in an effective and environmentally sound manner after the expected operational life, an application will be submitted to renew the Conditional Water Licence. This application will include consultation with the appropriate First Nations and provincial government agencies.

If/when the Project must be decommissioned, it is anticipated that all above-ground components on Crown Land will be dismantled and removed and the area returned to its pre-development state. Some below-ground components such as concrete foundations may remain in place to minimize disturbance if they do not pose a risk to the environment or potential land users.

## 2.6 SCHEDULE FOR DEVELOPMENT

The Project timelines, including the preconstruction, construction, operation, monitoring, and decommissioning phases, are summarized in Table 9 below. The Development Plan will include a Project schedule.

#### Table 9 Project timelines for the Frosst Creek Hydroelectric Project

Preconstruction (Development)	2 Years
Construction	18 Months
Commissioning	3 Months
Operational	40 Years
Monitoring	5 Years
Decommissioning	18 Months

# SECTION 3 – SCOPE OF ASSESSMENT

## 3.1 SCOPE OF ISSUES AND VALUED COMPONENTS

Valued Components (VCs) are elements or aspects of the environmental, cultural, or socioeconomic landscape that are important and are therefore managed. They incorporate ecological conservation, regional concerns, land use, and socio-cultural values. VCs are selected based on legislation, regulation, and input provided by the Proponent, the public, and local, provincial, federal and First Nation governments.

The table below provides a list of VCs that have been identified based on Project team experience on run-of-river hydroelectric projects; knowledge and review of existing government standards and guidelines; input and advice provided by the First Nations; and comments and concerns identified by the public. The table also identifies the sections in the Development Plan where each VC will be assessed. Rationale for the selection of each VC will be discussed in the Development Plan in the respective sections (Sections 4, 5 and 7) for each VC.

## Table 10 Valued Components for the Frosst Creek Hydroelectric Project

Section	Subject Area	Valued Component	Subcomponents
4.1	Aquatic	Fish & Fish Habitat	-
4.1	Environment	Water Quality	-
4.2	Atmospheric Environment	Air Quality	-
	Geophysical	Surface Hydrology &	-
4.3	Environment	Geotechnical & Slope Stability	_
		Geomorphology	_
		Rare Plants, Plant Communities	<i>Tall Bugbane</i> (not listed)
		& Ecosystems at Risk	Phantom Orchid (threatened)
4.4 Terr Enviro	Terrestrial Environment	Forest & Range Considerations	Forest Health Invasive Plants Forest Resource Features Range and Forage
4.5	Wildlife & Wildlife Habitat	Amphibian Species	Coastal Tailed Frog(special concern) Western Toad (special concern) Coastal Giant Salamander (threatened)
		Avian Species	Northern Goshawk (laingi subspecies) (threatened) Western Screech Owl (kennicottii subspecies)(special concern) Spotted Owl (endangered)
		Mammal Species	Mountain Beaver(special concern) Pacific Water Shrew (endangered) Wolverine (luscus subspecies)(special concern) Grizzly Bear (special concern)
		Invertebrate Species	Scarletback Taildropper (not listed) Oregon Forest Snail (endangered) Pacific Sideband (not listed)
		Regional Economy	-
	Socio Economic	Recreation & Access	-
5.1-5		Forestry Opportunities	-
	Environment	Human Health & Safety	-
		Water Rights	
7.4	Cultural Heritage	Archeological Resources	-

Notes:

- Provincial listings (CDC) are indicated by color (blue listed species are considered 'special concern;' red listed species are considered 'extirpated, endangered, or threatened')
- Federal listings (SARA) are indicated in parenthesis

## 3.1.1 SPATIAL BOUNDARIES

The Development Plan will identify and describe, in addition to the provision of maps where appropriate, the spatial boundaries used for the assessment for each VC and the rationale for selecting the boundaries.

## 3.1.2 TEMPORAL BOUNDARIES

The Development Plan will provide:

- A description of the temporal extent of the assessment relative to the VCs for the life of the Project, specifically for each of the following phases of the proposed Project: planning and design, construction, operations, and decommissioning and closure.
- A description of any annual or seasonal variation related to VCs and biophysical constraints for all phases of the proposed Project (e.g., migration patterns, breeding patterns, freeze-thaw cycles).

## 3.1.3 BASELINE ENVIRONMENTAL CONDITIONS

The Development Plan will describe the existing environmental conditions in the proposed Project area as an understanding of the general environmental setting and characteristics of the Project area. Baseline conditions for each VC will be discussed in the respective section of the Development Plan and will be based on information obtained from previous studies, databases, and field studies or programs.

Supporting documents will be referenced and, where applicable, attached as appendices to the Development Plan.

## 3.2 ENVIRONMENTAL ASSESSMENT METHODOLOGY

## 3.2.1 ENVIRONMENTAL EFFECT ASSESSMENT

The Environmental Assessment methodology to be used in completing Sections 4, 5 and 7 is described in the 5 steps listed below:

## Step 1 – Existing Conditions/Baseline Information

• Existing conditions and/or baseline information will be described for each VC, as per Section 3.1.3
#### Step 2 – Project Effects Assessment

- The interactions of both the Project components and setting with each VC will be described
- The Project effects assessment will detail the direct and indirect effects of the Project on each VC for all phases of the Project and will evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VCs
- Where it is not possible to fully assess all effects from the Project, the Proponent will provide commitments in the Development Plan for additional studies

#### Step 3 – Proposed Mitigation

- Any environmental mitigation and offsetting that the Proponent may propose to undertake to mitigate potential adverse environmental effects on identified VCs will be discussed in this section
- This discussion may include the following, in order of priority: avoidance; on-site mitigative measures; off-site mitigative measures; restoration; compensation; actions to offset residual or unavoidable effects on-site, adjacent to, or elsewhere; in lieu fees to offset residual or unavoidable effects; and additional conservation actions
- Further, any efforts to minimize effects through changes to Project design along with rationale to support said changes will also be described

#### Step 4 – Significance of Potential Residual Adverse Effects

The significance of potential residual adverse effects of each VC is evaluated to determine whether any residual adverse effects would be significant, after accounting for mitigation and/or compensation/offsetting.

Significance determination is assessed by the recommended environmental assessment factors:

- *Magnitude*: This refers to the magnitude or severity of the effect. Low magnitude effects may have no impact, while high magnitude effects may have an impact.
- *Geographic Extent*: This refers to the extent of change over the geographic areas of the proposed Project. The geographic extent of effects can be local or regional. Local effects may have a lower impact than regional effects.
- *Duration and Frequency*: This refers to the length of time of the effect and how often the effect occurs. The duration of an effect can be short term or long term. The frequency of an effect can be frequent or infrequent. Short term and/or infrequent effects may have a lower impact than long term and/or frequent effects.
- *Reversibility*: This refers to the degree to which the effect is reversible. Effects can be reversible or permanent. Reversible effects may have lower impact than irreversible or permanent effects.
- *Context*: This refers to the ability of the environment to accept change. For example, the effects of a Project may have an impact if they occur in areas that are ecologically sensitive, which often have little resilience to imposed stresses.
- *Probability*: This refers to the likelihood that an adverse effect will occur in circumstances where it is not certain that the effect will materialize.

#### Step 5 – Summary

• The findings of the Environmental Assessment will be summarized and any other relevant information on the VC will be included.

# SECTION 4 – ENVIRONMENTAL ASSESSMENT

## **4.1 AQUATIC ENVIRONMENT**

The Proponent and Qualified Professional (QP) will reference the following guidelines to complete the baseline data collection and effects assessment for Fish and Fish Habitat and Water Quality:

- "Guidelines for the collection and analysis of fish and fish habitat for the purpose of assessing impacts from small hydropower Projects in British Columbia." (Hatfield et al. 2007);
- "Assessment methods for aquatic habitat and instream flow characteristics in support of applications to dam, divert, or extract water from streams in British Columbia." (Lewis et al. 2004);
- Section 9 of the *Water Act*;
- Instream Works Windows and Guidelines;
- "Working Near Water in BC and Yukon" (Fisheries and Oceans Canada 2013);
- RISC Manual of British Columbia Hydrometric Standards;
- Provincial Conservation Framework;
- Species at Risk Registry; and,
- Best Management Practices (BMPs).

#### 4.1.1 FISH AND FISH HABITAT

The Development Plan will provide the following information:

- The rationale for choosing fish and fish habitat as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.1.1.1 EXISTING CONDITIONS/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.1.1.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.1.1.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.1.1.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.1.1.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### 4.1.2 WATER QUALITY

The Development Plan will provide the following information:

- The rationale for choosing water quality as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.1.2.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.1.2.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.1.2.3 PROPOSED MITIGATION

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.1.2.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.1.2.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### **4.2 ATMOSPHERIC ENVIRONMENT**

The Proponent will reference the following guidelines to complete the baseline data collection and effects assessment for Air Quality:

- BC Provincial atmosphere and air quality guidelines and standards;
- Existing air quality management plans; and,
- BMPs

#### 4.2.1 AIR QUALITY

The Development Plan will provide the following information:

- The rationale for choosing air quality as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.2.1.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.2.1.2 PROJECT EFFECTS ASSESSMENT

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.2.1.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.2.1.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.2.1.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

## **4.3 GEOPHYSICAL ENVIRONMENT**

The Proponent and Qualified Professional (QP) will reference the following guidelines to complete the baseline data collection and effects assessment for Surface Hydrology and Hydrogeology, Geotechnical and Slope Stability and Geomorphology:

- "Guidelines for the collection and analysis of fish and fish habitat for the purpose of assessing impacts from small hydropower Projects in British Columbia." (Hatfield et al. 2007);
- "Assessment methods for aquatic habitat and instream flow characteristics in support of applications to dam, divert, or extract water from streams in British Columbia." (Lewis et al. 2004);
- RISC Manual of British Columbia Hydrometric Standards; and,
- Hydrological Guidelines for Waterpower Projects (Land and Water BC 2005).

## 4.3.1 SURFACE HYDROLOGY AND HYDROGEOLOGY

- The rationale for choosing surface hydrology and hydrogeology as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.3.1.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A description of the methods used to collect baseline information
- A summary of the existing conditions and/or baseline information including:
  - A minimum of one year on-site continuous hydrometric data relating to the proposed intake location, including regional snow data for basins that have snowmelt influence on the hydrograph
  - A regional analysis including a map of candidate long-term WSC hydrometric stations in the areas of interest showing stations selected for regional hydrology analysis
  - The maximum quantity of water to be diverted, including timing of maximum diversions
  - Mean monthly discharge (MMD)
  - Mean annual discharge (MAD)
  - 7-day average low flow (mean annual, 7Q10, 5, 20 & 50 years)
  - 200 year instantaneous peak flow
  - Ecosection, ecoregion & ecoprovince of diversion reach: support for proposed unit runoff, seasonal flow regime & fish productivity

#### 4.3.1.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC
- Provide flow exceendence curves for each month and determine 80% exceedence flow in  $\rm m^3/s$  and %MAD
- Provide elevations and relative catchments of intake and powerhouse
- Provide discharge estimates, integrating onsite data & regional analysis
- Evaluate the potential effects of climate change on water supply
- Evaluate the potential effects of changes to glacial- and snow-melt water contributions on water supply, given current trends
- Provide a discussion on groundwater

#### 4.3.1.3 PROPOSED MITIGATION

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.3.1.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability.

#### 4.3.1.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project.

#### 4.3.2 GEOTECHNICAL AND SLOPE STABILITY

The Development Plan will provide the following information:

- The rationale for selecting geotechnical and slope stability as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.3.2.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A description of the methods used to collect baseline information
- A summary of the existing conditions and/or baseline information, including:
  - Maps that present information on geotechnical elemements (stability, erosion, etc.) and natural hazards (seismology, flood avalanche, landslide, etc.)
  - Where applicable, the identification and description of natural hazards present in the Project area including landslides, avalanches, steep terrain and seismology.
  - Information on bedrock regarding the potential for acid rock drainage/metal leaching
  - Other physical processes occurring in the Project area

#### 4.3.2.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will identify direct and indirect effects of the Project on the VC for all phases of the Project, evaluating the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC. The effects assessment will:

- Identify and describe, where applicable, terrain stability as a function of proposed land use
- Identify if the Project is likely to result in new avalanche paths
- Include a discussion of the potential for acid rock drainage and metal leaching if bedrock will be exposed or quarried for road, penstock and other construction
- Describe modifications to road sections affected by works that will be required to prevent landslides
- Ensure that a probability assessment of the Project being over-topped by landslide (using a probabilistic assessment, not qualitative rating) is included in the impact assessment

#### 4.3.2.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.3.2.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.3.2.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### 4.3.3 GEOMORPHOLOGY

The Development Plan will provide the following information:

- The rationale for selecting geomorphology as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.3.3.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

• A summary of the existing conditions and/or baseline information

• A description of the methods used to collect baseline information

#### 4.3.3.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.3.3.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.3.3.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.3.3.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### 4.3.4 GEOLOGY AND GEOCHEMISTRY

- Potential impacts associated with acid rock drainage and metal leaching, including relevant mitigation strategies
- Acid rock drilling and core sampling predictive studies have not been proposed as baseline studies because the blasting areas are very minimal and it has been shown that ARD prediction studies are poor predictors of the actual risks of acid rock drainage (see "Acid Mine Drainage Prediction" by the U.S. Environmental Protection Agency (1994) for more information).
- If blasting is required, the Proponent will commit to mitigation measures, which will be described in the DP.

## **4.4 TERRESTRIAL ENVIRONMENT**

The Proponent and Qualified Professional will reference the following guidelines to complete the baseline data collection and effects assessment for Rare Plants, Plant Communities and Ecosystems at Risk and Forest and Range Considerations:

- Species at Risk Act;
- Provincial Conservation Framework;
- Species at Risk Registry;
- Forest and Range Practices Act;
- Terrestrial Ecosystem Mapping;
- Resource Management and Land Use Plans;
- Wildfire Act;
- Wildfire Management Plans; and,
- Best Management Practices.

## 4.4.1 RARE PLANTS, PLANT COMMUNITIES AND ECOSYSTEMS AT RISK

The Development Plan will provide the following information:

- The rationale for choosing rare plants, plant communities and ecosystems at risk as a VC, with Tall Bugbane and Phantom Orchid as subcomponents
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.4.1.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.4.1.2 PROJECT EFFECTS ASSESSMENT

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.4.1.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.4.1.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.4.1.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### 4.4.2 FOREST AND RANGE CONSIDERATIONS

The Development Plan will provide the following information:

- The rationale for choosing forest and range considerations as a VC, including a discussion on forest health, invasive plants, wildfire protection, forest resource features, and range and forage
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.4.2.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.4.2.2 PROJECT EFFECTS ASSESSMENT

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.4.2.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.4.2.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.4.2.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

## 4.5 WILDLIFE AND WILDLIFE HABITAT

The Proponent and Qualified Professional will reference the following guidelines to complete the baseline data collection and effects assessment for Amphibian Species, Avian Species and Mammal Species:

- Species at Risk Act;
- Species at Risk Registry;
- Forest and Range Practices Act;
- Resource Management and Land Use Plans;
- Wildlife Act;
- Migratory Birds Convention Act;
- "Guidelines for the collection and analysis of fish and fish habitat for the purpose of assessing impacts from small hydropower Projects in British Columbia." (Hatfield et al. 2007); and,
- BMPs.

#### 4.5.1 AMPHIBIAN SPECIES

The Development Plan will provide the following information:

• The rationale for choosing amphibian species as a VC, with Coastal Tailed Frog, Western Toad, and Coastal Giant Salamander as subcomponents

- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.5.1.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.5.1.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.5.1.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.5.1.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.5.1.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### 4.5.2 AVIAN SPECIES

- The rationale for choosing avian species as a VC, with Northern Goshawk (*laingi* subspecies), Western Screech Owl (*kennicottii* subspecies) and Spotted Owl as subcomponents
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.5.2.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.5.2.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.5.2.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.5.2.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.5.2.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project.

#### 4.5.3 MAMMAL SPECIES

- The rationale for choosing mammal species as a VC, with Mountain Beaver, Pacific Water Shrew, Wolverine (luscus subspecies) and Grizzly Bear as subcomponents
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.5.3.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.5.3.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.5.3.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.5.3.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.5.3.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

#### 4.5.4 INVERTEBRATE SPECIES

- The rationale for choosing invertebrate species as a VC, with Scarletback Taildropper, Oregon Forest snail and Pacific Sideband as subcomponents
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 4.5.4.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information
- A description of the methods used to collect baseline information

#### 4.5.4.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC

#### 4.5.4.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project

#### 4.5.4.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability

#### 4.5.4.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project

## 4.6 SUMMARY OF ENVIRONMENTAL EFFECTS, MITIGATION AND SIGNIFICANCE

The Development Plan will provide a summary of the assessment findings (see Table 11) as described in Section 4, including:

- 1. An overview of the potential environmental effects.
- 2. Mitigation strategies.
- 3. The significance of any residual environment effects that cannot or will not be mitigated.
- 4. Additional information deemed to have relevance.

Project Facility	Project Activity / Physical Works	Effect Description	Mitigation Measure(s)	Residual Effect		
	-	Construction Pha	se			
Commissioning Phase						
Operations Phase						
Decommissioning Phase						

#### Table 11 Summary of potential environmental effects and proposed mitigation measures

# SECTION 5 – SOCIO-ECONOMIC ASSESSMENT

The Development Plan will provide an assessment of socio-economic factors pertinent to the proposed Project, as well as potential implications of the Project on the local and regional economy and communities. The Proponent will reference the following for guidance:

- Statistics Canada;
- "Navigational Impact Assessment Requirements for Privately Operated Hydro Electric Facilities" (Transport Canada, Navigable Water Protection Division 2013);
- "Working Near Water in BC and Yukon" (Fisheries and Oceans Canada 2013); and,
- Land Use Plans.

## 5.1 REGIONAL ECONOMY

The Development Plan will provide the following information:

- The rationale for choosing regional economy as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 5.1.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information, specifically of the following elements:
  - Local and regional economy, including economic drivers within the Project boundaries, and at a regional scale
  - Regional labour market, including unemployment rates, labour supply, and training opportunities
  - Existing economic undertakings in the area that could be affected by development of the Project
- A description of the methods used to collect baseline information.

#### 5.1.2 PROJECT EFFECTS ASSESSMENT

- Identify direct and indirect effects of the Project on the VC for all phases of the Project.
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC.

#### 5.1.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects.
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project.

#### 5.1.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability.

#### 5.1.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project.

#### 5.2 RECREATION AND ACCESS

The Development Plan will provide the following information:

- The rationale for choosing recreation and access as a VC, including a discussion on applicable resource objectives, land use plans or other designations
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 5.2.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information, specifically of the following elements:
  - Frequency of land use (e.g. hunting, trapping, fishing, logging, tourism or commercial recreation uses, boating, vacationing), as well as harvesting of species through hunting, fishing, trapping and gathering
  - Transportation and travel axis in the study area (e.g. commercial shipping/fishing routes, winter roads, recreational boating, sport fishing areas, kayak routes)
  - Effect on future access to the forest land base by industrial users and recreational interests, including off-road motorized users

• A description of the methods used to collect baseline information.

#### 5.2.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project.
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC.

#### 5.2.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects.
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project.

#### 5.2.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability.

#### 5.2.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project.

## **5.3 FORESTRY OPPORTUNITIES**

The Development Plan will provide the following information:

- The rationale for choosing forestry opportunities as a VC, including implications for adjacent or overlapping crown land and resource values
- The spatial boundaries for the study
- The temporal boundaries for the study, if different from Section 3.1.2

#### 5.3.1. EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information, specifically the following elements:
  - Effects on timber harvesting opportunities, forestry operations and delivered wood costs
  - Effects on timber harvesting operations in the immediate vicinity of the works and/or within the watershed due to the installation of roads to access the penstock, power lines, and other works
- A description of the methods used to collect baseline information.

#### 5.3.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project.
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC.

#### 5.3.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects.
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project.

#### 5.3.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability.

#### 5.3.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project.

## 5.4 HUMAN HEALTH AND SAFETY

- The rationale for choosing human health and safety as a VC
- The spatial boundaries for the study

• The temporal boundaries, if different from Section 3.1.2 for the study

#### 5.4.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information.
- A description of the methods used to collect baseline information.
- A Downstream Hazard Assessment.

#### 5.4.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project.
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC.
- Include a Dam Safety Assessment.

#### 5.4.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects.
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project.

## 5.5 WATER RIGHTS

The Development Plan will provide the following information:

- The rationale for choosing water rights as a VC
- The spatial boundaries for the study
- The temporal boundaries, if different from Section 3.1.2 for the study

#### 5.5.1 EXISTING CONDITION/BASELINE INFORMATION

The Development Plan will provide:

- A summary of the existing conditions and/or baseline information, including but not limited to:
  - A discussion on other existing water licences on Frosst Creek
  - A discussion on the existing OIC877-1925.
- A description of the methods used to collect baseline information.

• A Downstream Hazard Assessment.

### 5.5.2 PROJECT EFFECTS ASSESSMENT

The Development Plan will:

- Identify direct and indirect effects of the Project on the VC for all phases of the Project.
- Evaluate the effects of the proposed CEP activities (construction, operation, maintenance and decommissioning) on the VC.
- Include a Dam Safety Assessment.

## 5.5.3 PROPOSED MITIGATION

The Development Plan will:

- Propose any measures the Proponent will commit to undertaking to avoid or mitigate the identified potential adverse Project effects.
- Provide commitments for additional studies where it is not possible to fully assess all effects of the Project.

## 5.5.4 SIGNIFICANCE OF POTENTIAL RESIDUAL ADVERSE EFFECTS

Where potential residual adverse effects have been identified, the Development Plan will:

• Assess the potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability.

#### 5.5.5 SUMMARY

The Development Plan will:

• Summarize the findings and include any other relevant information on the VC that is relevant to the Project.

# 5.6 SUMMARY OF SOCIO-ECONOMIC EFFECTS, MITIGATION AND SIGNIFICANCE

The Development Plan will summarize assessment findings (see Table 12) as described in Section 5, including:

- The potential socio-economic effects of the Project at local, regional and provincial scales, where appropriate.
- Potential health and safety effects.
- Mitigation strategies.
- The significance of any residual socio-economic effects.

Project Facility	Project Activity / Physical Works	Effect Description	Mitigation Measure(s)	Residual Effect			
		Construction Phas	se				
		Commissioning Pha	ase				
	Operations Phase						
Decommissioning Phase							

#### Table 12 Summary of potential socio-economic effects and proposed mitigation measures

# SECTION 6 – PROJECT ENGAGEMENT ACTIVITIES

## 6.1 RECORD OF ENGAGEMENT ACTIVITIES

This section will summarize the Proponent's past and proposed engagement initiatives with the public, stakeholders, and various levels of government.

The Development Plan will describe any engagement or information sharing activities that took place with federal, provincial, regional, local government agencies including BC Parks, and with the public. It will also include information on public meetings and open houses, one-on-one meetings with government staff or interested parties, publication of articles on the Project in the written media, (e.g. community newspapers), participation in community events, etc.

The Development Plan will also include:

- Any correspondence with other water licensees and riparian landowners who might be affected by the Project.
- Details of the arrangements with private landowners to use the land for the Project, or components of the Project.
- The Project's potential implications with respect to existing water rights.
- The outcomes of discussions with BC Parks regarding the Cultus Lake Provincial Park Boundary

This section will also include a description of the issues and solutions presented during engagement and how these will be addressed in the final Project plan. If the issues raised during Project engagement activities are not addressed in the final Project plan, rationale will be provided. See Table 13 for the format of the summary table. See Section 7 for First Nation consultation requirements and reporting methods.

#### Table 13 Summary of issues raised during public or stakeholder engagement

Group Consulted/ Contact Names	Engagement Status (U/F/C)	Date of Engagement Activity	Method of Engagement	lssue Raised	Proposed Solution	Mitigative Measures	Comments

*Note: U* = Engagement Underway; *F* = Engagement Planned for Future Date; *C* = Engagement Complete.

## SECTION 7 – FIRST NATION INFORMATION REQUIREMENTS

## 7.1 CONSULTATION OBLIGATIONS OF THE PROVINCE

The Province of BC is legally required to consult with First Nations prior to making decisions on Crown land and resources that have the potential to affect Aboriginal Interests (claimed or proven rights or Treaty rights). Recent case law states that the Province may delegate certain operational aspects of consultation with First Nations to Proponents, acknowledging that Proponents often have access to more detailed information on the planned phases and components of the Project.

The Development Plan will include consultation between the Proponent and First Nations groups who have interest in the Project area. The Proponent is willing to share information about the Project with First Nations and is willing to attempt to address First Nations concerns that may be raised. The Proponent will document all aspects of information sharing and the Proponent's efforts to address First Nation concerns.

The Proponent has initiated conversations with the Ts'elxwéyeqw Tribe, which is comprised of seven Indian Bands, including the Aitchelitz First Nation, Skowkale First Nation, Skway Village, Soowahlie Indian Band, Squiala First Nation, Tzeachten First Nation, and Yakweakwioose First Nation. Further information on the First Nations with whom the Proponent will be consulting will be provided in the Development Plan.

## 7.2 IDENTIFICATION OF FIRST NATIONS

According to information provided by the First Nations Relations Advisor at the Ministry of Forests, Lands and Natural Resource Operations on October 11, 2013, obtained from the iMapBC Consultative Area Database (CAD), there are 16 First Nation organizations who have been listed as having asserted Aboriginal interests in the Project area, including:

- Boston Bar First Nation
- Nooaitch Indian Band
- Soowahlie First Nation
- Stó:lō Tribal Council
- Stó:lō Nation
- Seabird Island Band
- Skawahlook First Nation
- Shxw'owhamel First Nation
- Tzeachten First Nation
- Yakweakwioose First Nation
- Ts'elxwéyeqw Tribe
- Squiala First Nation
- Shxwha:y Village (Skway First Nation)

- Skowkale First Nation
- Aitchelitz First Nation
- People of the River Referrals Office

# 7.3 TRADITIONAL USE AND ABORIGINAL RIGHTS/TITLE ISSUES IN THE PROJECT AREA

The Proponent retained the Stó:lō Research and Resource Management Centre to conduct an Archaeological Overview Assessment (AOA) and an Archaeological Index Assessment (AIA) for the Project in July 2012 and February 2013, respectively. The AOA and AIA have considered traditional use (TU), traditional knowledge (TK), and traditional land use (TLU) of the Project area, as well as all potential environmental effects. The results of the AOA and AIA will be presented in the Development Plan. All First Nations identified in section 7.2 will be notified of the Project, and will have the opportunity to share TU, TK, and TLU information, as well as to voice interests and concerns they may have with respect to the Project. This information will be provided in the Development Plan.

Additionally, this section will discuss potential impacts of the proposed Project on the treaty rights and interests which may arise under applicable treaties between First Nations, the Province, and Canada.

## 7.4 PROJECT SETTING - ARCHEOLOGICAL RESOURCES

- The rationale for choosing archeological resources as a VC
- The spatial boundaries for the study based on the results from the archaeological overview assessment (AOA) and archaeological index assessment (AIA)
- The temporal boundaries, if different from Section 3.1.2 for the study
- Potential social and/or economic effects to First Nation organizations that may arise as a result of the Project, including a discussion of any factors that may inhibit the flow of economic and other benefits to First Nations communities
- Potential effects on current and proposed uses of land resources by First Nation organizations for traditional purposes, including effects on hunting, fishing, trapping, cultural and other traditional uses of the land, e.g. collection of medicinal plants, picking of mushrooms, use of sacred and spiritual sites
- Potential effects on alterations to access into the area on First Nation organizations
- Potential effects on cultural heritage and archaeological resources in the Project area that are of importance

- Potential residual effects on First Nations, archaeological, cultural heritage, and historical resources
- This section will also provide a summary of currently known archaeological resources, as well as commitments in dealing with new artifacts discovered during Project phases as per the *Heritage Conservation Act*, 1996.

## 7.5 CONSULTATION WITH FIRST NATIONS

The Development Plan will:

- Summarize past and planned aboriginal consultation activities (see table below)
- Describe key First Nation issues with respect to the Project and the mitigation/accommodation of those issues

All consultation activities will be documented and updated in a tracking table.

#### Table 14 Summary of consultations undertaken for the Project between the Proponent and the First Nations

FRIST NATIONS COMMUNICATION LOG						
First Nation	Source	ltem	Date	Comments		

Table 15 Aboriginal concerns and accommodations tracking

First Nation	Consultation Stage	Aboriginal Concern	Analysis of Potential Effect	Potential Accommodation

## 7.6 POTENTIAL PROJECT EFFECTS ON FIRST NATIONS

The Development Plan will:

- Include an assessment and description of identified potential effects of the Project that could directly affect First Nations at any phase of Project development
- This will include a summary of:
  - o Impact assessment findings
  - o Potential residual adverse effects considering magnitude, geographic extent, duration and frequency, reversibility, context and probability
  - Mitigation and management measures proposed to manage the potential effects on First Nations

## 7.7 COMMITMENTS TO FIRST NATIONS:

- Summarize key issues, concerns, and aspects of Project design that could directly affect First Nations at any phase of Project development (A detailed description of key issues, concerns, and Project design interests will be provided in section 7.5)
- Provide a summary table of FCHI's agreements with, and commitments to, First Nations.

# **SECTION 8 – MONITORING PROGRAMS**

## 8.1 CONSTRUCTION ENVIRONMENTAL MONITORING

The Construction Environmental Management Plan (CEMP) will provide details on the BMPs and procedures that will be applied and adhered to during the construction phase of the Project. The goal of the CEMP is to address, prevent or manage potential environmental and socio-economic effects. The CEMP submitted in the Development Plan will be a draft that may be revised based on Provincial review.

The CEMP will include roles and responsibilities, monitoring, reporting, training, and the plans specified as part of the mitigation measures for the assessment. The CEMP may include the following component plans:

- Access Management Plan
- Air Quality and Dust Control Plan
- Surface Water Quality Plan
- Erosion and Sediment / Soil Management Plan
- Contaminated Sites Plan
- Hazardous Materials Management Plan
- Spill Prevention and Emergency Response Plan
- Fuel Storage, Handling and Emergency Spill Response Plan
- Landscape Design and Restoration Plan
- Solid Waste Management Reduction and Recycling Plan
- Surface Erosion Prevention and Sediment Control Plan
- Human-Wildlife Conflict Management Plan
- Wildfire Protection Plan

## 8.2 OPERATIONAL ENVIRONMENTAL MONITORING

The Operational Environmental Management Plan (OEMP), or alternatively the Long-Term Monitoring Plan, will ensure:

- *Compliance Monitoring* Compliance with conditions set forth in the permits and licenes issued to the Proponent enabling the construction and operation of the CEP.
  - A concise annual monitoring report that specifically confirms compliance with regulatory/permit conditions for the life of the Project will be provided.
- *Effectiveness Monitoring* Effectiveness of mitigation measures on key environmental variables and the accuracy of the environmental assessment in predicting the efficacy of measures adopted to avoid or minimize adverse environmental effects.
  - Monitoring will be conducted on key parameters over an initial period of 5 years in order to confirm that licensed operations do not result in unacceptable effects to specified VCs and habitat parameters.

- Subsequent to the initial period of 5 years, the monitoring program will be reviewed to determine which parameters require ongoing monitoring.
- Post-construction monitoring data collection will follow the same methodology used for baseline data collection.
- *Response Monitoring* Long-term monitoring of parameters to determine if the Project is having an effect on the environment and identified VCs.
  - Post-construction monitoring data collection following the same methodology used for baseline data collection.

# **SECTION 9 – FEDERAL REQUIREMENTS**

A summary of federal requirements associated with the Project and information on the status of each requirement and the appropriate federal contact person is provided in Table 16 below.

Agency	Nature of Authorization/ Approval Requested	Status	Comments	Contact
Fisheries and	Operational			
Oceans Canada	Statements			
Navigable Water	Navigable			
Protection	Waters			
Program	Protection Act			
(Transport	Section 5(2)			
Canada)	Exemption			

Table 16 Federal requirements associated with the Frosst Creek Hydroelectric Project
## SECTION 10 – SUMMARY OF COMMITMENTS AND CONCLUSIONS

#### 10.1 SUMMARY OF PROJECT COMMITMENTS

The Development Plan will provide a table summarizing the Proponent's commitments to minimize the potential for the proposed Project to significantly affect environmental, economic, social, heritage or health values.

Table 17 Summary of commitments for the Frosst Creek Hydroelectric Project				
Details of Commitment / Action	Target Date for Completion / Milestones	Agency Requiring Action	Proponent's Project Lead & Contact Information	Status / Comments

#### 10.2 CONCLUDING REMARKS

This section will present a clear conclusion from the Project effects assessments for the consideration of the Responsible Authorities.

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