

Water Power - Investigative

MANAGEMENT PLAN

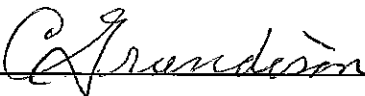
FILE # 6408748
LICENCE #
DATE: March 21, 2015

ACCEPTED BY:

SIGNED on behalf of HER MAJESTY THE QUEEN IN RIGHT OF THE **PROVINCE OF BRITISH COLUMBIA** by Crown Land Adjudication, Ministry of Forests, Lands and Natural Resource Operations, authorized representative of the minister responsible for the *Land Act*.

Authorized Signatory
Crown Land Adjudication
Ministry of Forests, Lands and Natural Resource Operations

SIGNED on behalf of **ALASKA HYDRO CORPORATION**
by a duly authorized signatory



containing pages (including this page)

Investigative Use Plan for More Creek Hydroelectric Project

The Application and any subsequent requests for replacement for the Investigative Licence (IL) on the area noted in the application is for the sole purpose of investigating the viability of land and water resources to evaluate the potential for future development and generation of energy from More Creek.

1. Project Overview and Purpose

A hydroelectric project with reservoir storage is proposed on More Creek approximately 130 km north of the town of Stewart in northwestern British Columbia. More Creek flows primarily in a south easterly direction before discharging into the Iskut River. The Project will store water at the head of the More Creek canyon using an 84 m high concrete dam to create a water storage reservoir. The anticipated size of the water storage reservoir will be approximately 2680 ha (revised from 3000 ha) at full operating level with a live storage (useable) volume of approximately 870 million m³.

There are no existing water licenses for the purpose of power-general that exist on More Creek. The following is a summary of the More Creek hydroelectric project.

Power Output:	75 MW
Energy Output:	306 GW-hr/yr
Max Diverted Flow:	80 m ³ /s
Gross Head:	118 m
Reservoir Elevation:	498 m AMSL
Powerhouse (tailwater elevation):	~ 380 m AMSL
Power Tunnel/penstock Length:	1000 m
Powerline Length/Voltage:	13 km/ 138 kV
Intake Structures:	Dam/ spillway/ integral chute/ intake

Concurrently with this Investigative Use License of Occupation, the Proponent has applied for a Water License Application (Tracking No. 100115402). The purpose of the Investigative Use Licence is to gather the necessary information for a Development Plan in support of the Water Licence Application submitted concurrently with this application, for the More Creek Hydroelectric project. In addition, the Development Plan will also be used to adjudicate the application for the water-power Crown Land Tenure application.

2. Location and Size of Project

A hydroelectric project is proposed on More Creek as shown on the site location map (Figure 1).

The project will consist of an access road, dam, diversion structure, intake, penstock, powerhouse containing three turbines and a fenced switchyard, reservoir, spillway, switch yard, tailrace, transmission line, power tunnel, and laydown and spoil area all located on unsurveyed Crown Land. Access to the powerhouse will be through an 11.5 km access road of which approximately 5 km is existing forestry road that intersects Highway 37 just north of Devil Creek and heads east to the ridge above the Iskut River. The intake will be located approximately 2.5 km upstream of More Creek's confluence with the Iskut River. Intake access will require new road construction from the powerhouse (Figure 2). There will be an approximate 13 km 138 kV transmission line that will connect the project to the Bob Quinn substation. The Bob Quinn substation is owned by BC Hydro and the project connection is subject to a future interconnection study by BC Hydro. The purpose of this hydropower project is to sell power to BC Hydro under the standing offer program or to sell power to a LNG producer. An agreement will be negotiated by the Proponent. The project layout and Crown Land Application area is provided in Figure 3.

The project is located entirely on unsurveyed Crown Land within the Cassiar District. The Investigative Use Licence will allow Alaska Hydro Corp. to undertake the necessary investigations required to complete a more detailed design on all aspects of the project including all the major infrastructure pieces.

The Investigative Use License is for an area of 4803.03 ha. Please note that this area has been revised (previously 3078 ha) since the electronic submission (Tracking No. 11115438). This area encompasses all potential Project works and potential placement options. All investigative work will take place within this area. This area does not represent the final land requirement of the Project. During the detailed design phase, the project footprint will be reduced.

3. Investigation Schedule

The investigation plans are expected to take place over the next 5 years. The following is planned to take place over the 5 year period: water level data collection and discharge measurements, which are required to record a minimum of 2 years worth of *in situ* flow data, necessary impact studies on local wildlife populations near the project site (~ 2 years of studies), fish and fish habitat assessments (~ 2 years of studies), archaeological assessments and a geomorphology study of the Project area. Access in and around the project area for the impact studies will be on foot. A summary table of the schedule for the investigative studies is attached.

4. Summary of Investigations

Field investigations for the project engineering and environmental impact studies will involve vehicle access to the project area and the transmission line and accessing the locations of proposed project works (intake, powerhouse, power tunnel route, and

transmission line) by foot. At this time there are no plans for any test pitting or geotechnical drilling. The Investigative Use Licence will be amended should preliminary site investigations require additional geotechnical investigative work.

The following field investigations relating to the environmental attributes of the project area are planned: flow monitoring, wildlife and vegetation, fish and fish habitat, archaeological assessments and geomorphology. Each of these studies is broken down into further detail below. These lists describe what is typically included in each of the field investigations; they are not necessarily exhaustive.

Water Flow Monitoring

- Installation of (a) stream gauge(s)
- Velocity measurements using portable flow meter or salt dilution.
- Measure the creek depth and velocity using a swoffer meter at multiple sites.
- Conducted over multiple seasons.
- There may be some disturbance to the site during installation of stream gauge, but overall negligible impact to the land.

Wildlife and Vegetation

- View the areas potentially affected by the project.
- Investigate the project site for animal signs.
- Investigate the project site for conspicuous nest sites (e.g., bald eagle and great-blue heron).
- Conduct raptor call-playback surveys for raptors with inconspicuous nests (e.g., Queen Charlotte goshawk and northern pygmy-owl).
- Conducted over multiple seasons (Spring/Summer/Fall)
- Observation of wildlife and wildlife habitats is not expected to have any impacts to the land.

Fish and Fish Habitat

- Conduct sampling to determine fish presence/absence.
- If fish present, conduct sampling to determine fish abundance and distribution.
- Measure creek depth and velocity using a swoffer meter at multiple sites.
- Conducted over multiple seasons (Spring/Summer/Fall)
- Fish and fish habitat assessments are not expected to have any impacts to the land.

Archaeological Assessment

- Archaeological Overview Assessment and/or Archaeological Impact Assessment
- If the Project is deemed to be feasible, a Tahltan Land Use and Occupancy study will be undertaken prior to the application for the General Area Licence of Occupation.

- Site visits by foot.
- Archaeological assessments are not expected to have any impacts to the land.

Geomorphology

- Site visits by foot.
- Geomorphology assessments are not expected to have any impacts to the land.

Site Visits

- Consult with agencies, First Nations, and other stakeholders.
- No impacts to the land

Please note that using a vehicle to access the sites has the potential to result in hydrocarbon leakage (soil and water contamination) and wildlife collisions.

Site visits are expected to occur at least once each season for general maintenance of stream gauges and to conduct stream flow tests. Additional visits will be required to undertake the other investigative work listed above.

5. Identification of Site Access

The project is approximately 130 km north of the town of Stewart. Access to More Creek will be by vehicle along Highway 37 and existing forestry roads. Once at the site all the investigation works will be carried out on foot.

TABLE 1. More Creek Investigative Studies Timeline

Investigative Studies	2018			2019			2020			2021															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
INVESTIGATIVE STUDIES																									
Archaeological Studies																									
Archaeological Overview Assessment																									
Archaeological Impact Assessment																									
Hydrological Studies																									
Gauge Installation																									
Hydrologic Data Downloads and Flow Measurements																									
Fish and Fish Habitat Studies																									
Pre-Review Assessment																									
Second Year - In-stream fish study																									
Wildlife and Wildlife Habitat Studies																									
First Year - banding study (includes vegetation, wildlife)																									
Second Year - banding study (includes vegetation, wildlife)																									
Geomorphology Studies																									
Preliminary Site Visit																									
Site Visits																									
Fish Nekton, Aquatics, other stake holders																									

An archeological overview assessment ("AOA") will be conducted early on in the investigation studies. Based on the recommendations from the AOA, an archeological impact assessment ("AIA") will be conducted. If the project is deemed to be feasible, a Tenthon Land Use and Occupancy study will be undertaken prior to the application for the General Area License of Occupation.

Following the hydrologic gauge installation, the gauge will be downloaded periodically to develop a long-term flow record for More Creek. A minimum of one-to-two years of historical flow record will be collected prior to Development Plan submission. Flow measurements will be recorded for the duration of the investigative studies and thereafter, during lump phases of the Project.

Fish and fish habitat studies require a minimum of two years of baseline data prior to the submission of the Development Plan. As part of these investigative studies, annual sampling will be conducted.

Wildlife and Wildlife Habitat Studies require a minimum of two years of assessed investigations prior to the submission of the Development Plan. Seasonal investigations will ensure that vegetation and wildlife that may use the area during specific times of the year are documented.

A preliminary geomorphology study will be conducted early in the Project's investigative studies. More in-depth geomorphology studies will be scheduled following the recommendations of the preliminary site visit, geomorphology assessment.

Community consultation is integral to the Project. Therefore, the first year of investigative studies will act as a primary focus on informing the local community, stakeholders, agencies, and other stakeholders regarding the Project.