Notice of Work

KSM Snowfields

Tracking Number: 100336902

Applicant Information

If approved, will the authorization be issued to an Individual or Company/Organization?	Company/Organization
What is your relationship to the company/organization?	Employee

APPLICANT COMPANY/ORGANIZATION CONTACT INFORMATION

Applicant is an Individual or an Organization to whom this authorization Permit / Tenure / Licence will be issued, if approved.

Name:	KSM Mining ULC
Doing Business As:	
Phone:	416-367-9292 *(Mine Manager, Tim Dodd's phone number)*
Fax:	416-367-2711
Email:	jessy@seabridgegold.com
BC Incorporation Number:	BC1174031
Extra Provincial Inc. No:	N/A
Society Number:	N/A
GST Registration Number:	N/A
Contact Name:	Jessy Chaplin ** 250-847-4704*
Mailing Address:	400-106 Front Street E Toronto ON M5A1E1

TECHNICAL INFORMATION

APPLICATION INFORMATION

Type of Notice of Work:	Mineral
	Please be advised that exploration for Uranium or Thorium is not permissable.
Is this a New Permit or an Amendment to an existing permit for this property?	New Permit

ONE YEAR, MULTI-YEAR OR MULTI-YEAR AREA BASED PERMIT

One Year Permit

A One Year permit allows you to do your exploration activities over 1 year. You will have to identify the exact location/s for each proposed activity. At the end of the year you will have to submit an Annual Summary outlining the activities done during the previous year.

Multi-Year Permit

A Multi-Year permit allows you to do your exploration activities over 2-5 years. You will have to identify the exact location/s for each proposed activity. At the end of each year you will have to submit an Annual Summary outlining the activities done during the previous year.

Multi-Year, Area Based Permit

A Multi-Year, Area Based permit also allows you to spread your exploration activites over 2-5 years, but you must provide details of all exploration activities proposed in the first year, including proposed disturbances and estimated timber cutting. At the end of each year you will have to submit an Annual Summary and at the beginning of each new year you will have to submit a Multi-Year, Area-Based Work Program Annual Update, outlining your previous activities as well as your plans for the next year.

Type of permit to apply for:	I would like to apply for a Multi-Year, Area Based permit
Term of application:	5 years
Is this the first year of your application?	Yes

MINE INFORMATION

Do you have an existing mine number?	No
Name of the property:	KSM Snowfields
Tenure Numbers:	509216
Crown Grant / District Lot Numbers:	
Directions to site from nearest municipality:	65 km north of Stewart, BC, by air
Geographic Coordinates of Mine:	**Latitude:** 56.5158600 **Longitude:** -130.2034600
Maximum Annual Tonnage Extracted:	0 tonnes

INFORMATION ABOUT PROPOSED ACTIVITIES

Activities to be undertaken:

Access roads, trails, heli pads, air strips and boat ramps
Cut Lines and Induced Polarization Surveys
Exploration Surface Drilling

FIRST AID

Proposed First Aid equipment on site:	Level 3 kit, dressing station, emergency transport vehicle (ETV) equipment and personal First Aid kits
Level of First Aid Certificate held by attendant:	Occupational First Aid Level 3

DESCRIPTION OF WORK PROGRAM

If you prefer to upload a document, please enter "see attached document" and attach the document in the "Document Upload" step later in the application under "Other".

Sufficient details of your work program to enable a good understanding of the types and scope of the activities that will be conducted:

KSM Snowfields is an important mineral tenure which is recently purchased to add to the overall KSM Project land package. The mineral tenure is approximately 4200 m x 3300 m in area and is bounded to the west by KSM Mining Lease 1031440. Exploration activities on this tenure will include approximately 20 km of geophysics testing, grab sampling and up to 150 holes of exploration drilling – combination of exploration and geotechnical drilling over the five-year permit period. Exploration drilling may occur over all seasons. In the first year, 2021 it is expected to drill up to 25 holes. Years 2 – 5 it is expected to drill up to 30 holes per year.

It is expected that drilling will occur on ice, bare rock, or scrub brush. The program will be helicopter assisted as no roads exist along the alignment. Drill pads (approximately 3 x 5 m wide elevated wood bases) will be the only surface disturbance, unless helicopter landing pads are also required. Helicopter pads (approximately 3 m x 3 m wide, elevated wood bases) may be required in some locations. Drill pads will not be left in place for more than one year. A free-use permit for cutting timber is being requested in the event that some alpine trees are required to be cleared. Water for drilling will be sourced locally from snowmelt surface runoff or local ponds.

KSM Mining ULC will use their current plans: Goat Management Plan, Archaeological Chance Find Procedures, Avalanche Management Plan, drill cuttings management plan and a Mine Emergency Response Plan (MERP) developed for the KSM Project (Mine No. 0100108).

No other facilities are required to carry out this program.

TIME OF PROPOSED ACTIVITIES

Proposed start and end date: May 1, 2021 to Mar 31, 2026

Please remember that you need to give 10 days notice to the Inspector of Mines of your intention to start work, and 7 days notice of your intention to stop work.

ACCESS

Access presently gated: No

PRESENT STATE OF LAND

Please identify what the present state of the land is where you would like to undertake your activities. If some of the questions do not apply to you please enter n/a in the space provided.

Present condition of the land: Historical mineral exploration occurred prior to the acquisition of this mineral tenure by KSM Mining ULC in December 2020. The land is vacant and undisturbed. Historical core may be stored at coordinates UTM 9V 424106E, 6264110N.

Type of vegetation: The Snowfield mineral tenure is almost entirely above treeline. It is situated within the Skeena Mountains Ecoregion, which consists of high rugged mountains and moist, coast/interior transition climate, supporting many glaciers.

The Snowfield tenure consists of a high elevation rocky landscape with minimal vegetation.

Physiography: Glaciers drain into Mitchell, Sulphurets and McTagg valleys. The land is mountainous with recently exposed glacial terrain and mineralized rock. Mitchell Creek, draining the Mitchell Glacier is highly turbid, highly mineralized, does not support fish or much other aquatic life. Runoff from Snowfield drains into Mitchell Creek.

Current means of access: Helicopter access only.

Old equipment: Historical core may be stored at coordinates UTM 9V 424106E, 6264110N.

Recreational trails / use: No recreational trails are known.

ACCESS TO TENURE

Do you need to build a road, create stream crossings or other surface disturbance that will not be on your tenure? No

LAND OWNERSHIP

Application area in a community watershed: No

Proposed activities on private land: No

Activities in a park: No

CULTURAL HERITAGE RESOURCES

Cultural Heritage applies to a large spectrum of heritage resources that is defined as "an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people."

The Archaeology Branch of the Ministry of Forests, Land and Natural Resource Operations is responsible for the administration of the Heritage Conservation Act as it applies to archaeological sites. The Archaeology Branch has developed guidelines for companies engaged in natural resource extraction to aid in planning for and avoiding or managing impacts to protected archaeological sites.

Are you aware of any protected archaeological sites that may be affected by the proposed project? No

FIRST NATIONS ENGAGEMENT

In making decisions on authorizations, the government will be fulfilling its responsibility to consult, and where appropriate, accommodate First Nations. The government takes this responsibility seriously and encourages the applicant to engage First Nations early and often as part of any planned development.

Establishing good relations with First Nations who might be affected by a proposed development is a key part of any successful mining operation. The Ministry of Energy and Mines encourages applicants to engage and information share with First Nations that might be affected by a proposed development prior to submitting an application. The earlier in the life of a proposed activity that the avenues of communication are established the greater the likelihood that the relationships formed will be constructive and beneficial to all parties. A lack of information sharing and engagement by the applicant may result in extended timeframes for decision.

Applicants should keep a detailed record of information sharing and engagement with First Nations on their project in the event the government needs to review it. Information on First Nations information sharing and engagement should include the following: a list of First Nations contacted, whether the activity was modified based on feedback from First Nations, and whether the applicant has entered into any informal or formal agreements with First Nations in connection with the project.

The Consultative Areas Database Public Map Service is an online, interactive mapping tool that allows you to identify First Nations who have treaty rights or asserted or proven rights or title on the land base. More information can be found at http://maps.gov.bc.ca/ess/sv/cadb/.

Have you shared information and engaged with First Nations in the area of the proposed activity? Yes

Please tell us about your engagements in the field below or attach a your record of engagement by uploading it at the "Document Upload" step later in the application process. If you are attaching your record later, please enter in the text box "See record attached". Please ensure your record does not contain an individual's personal information such as contact information.

Describe your First Nations engagement activities: KSM Mining ULC maintains active engagement with the local Indigenous groups surrounding the property. KSM Mining ULC signed an impacts benefit agreement with Nisga'a Lisims Government in 2013, a sustainability agreement with Gitanyow Hereditary Chiefs in 2014 and a cooperation and benefits agreement with the Tahltan Nation in 2019. KSM Mining ULC is grateful to the Gitxsan Nation for their continuing support of the KSM Project. Records of Engagement can be provided at a later date.

**Record of Engagement provided, current to Feb. 8, 2021.*

As a result of the engagement, are you aware of any cultural heritage resources in the area where the work is proposed? No

EXPLORATION SURFACE DRILLING

MAPS

Unless this an area based application mark the locations of the proposed surface drilling on the map. The maps will be uploaded at the document upload step later in the application.

ACTIVITIES

Click on the "Add Activity" button to add one or more activities. Select your activity out of the list and enter the disturbed area and timber volume.

Activity	Number of sites	Disturbed Area (ha)	Merchantable timber volume (m^3)
Diamond Drilling - Surface	150	0.23	0.00
Total:	**150**	**0.23**	**0.00**

SUPPORT OF DRILL PROGRAM

The drill program will be: Helicopter supported

RECLAMATION PROGRAM

**Up to three sites to be allowed to overwinter.*

Describe the proposed reclamation and timing for this specific activity: Drill pads will be dismantled and removed from site.

Please describe the location of the Core At existing KSM Exploration Camp UTM 9V 6264600N 422800E

Storage (including latitude and longitude if known):

Estimated cost of reclamation activities described above: $2,300.00

ACCESS ROADS, TRAILS, HELI PADS, AIR STRIPS AND BOAT RAMPS

MAPS

Mark the locations of the proposed access roads and trails on the map. The maps will be uploaded at the document upload step later in the application.

ACTIVITIES

Click on the "Add Activity" button to add one or more activities. Select your activity out of the list and enter the length in km, the total disturbed area and total merchantable timber volume.

Activity	Length (km)	Disturbed Area (ha)	Merchantable timber volume (m^3)
Helicopter Pad(s)		0.14	0.00
Total:		**0.14**	**0.00**

BRIDGES, CULVERTS AND CROSSINGS

Are you proposing any bridges, culverts and/or other river / stream crossings? No

RECLAMATION PROGRAM

Describe the proposed reclamation and timing for this specific activity: Heli pads will be dismantled and removed from site.

Estimated cost of reclamation activities described above: $1,400.00

ADDITIONAL INFORMATION

Please note that you may require a Special Use Permit under the Forest Practices Code of British Columbia Act or a Land Act tenure or other authorization under the legislation to use roads to access your tenure.

For further information please contact FrontCounter BC.

CUT LINES AND INDUCED POLARIZATION

MAPS

Unless this is an area based application mark the locations of the proposed exploration grids on the map. The maps will be uploaded at the document upload step later in the application.

EXPLORATION GRID

Total Line Kilometers: 20.00 km
Total disturbed area: 0.00 ha
Total merchantable timber volume: 0.00 m3

RECLAMATION PROGRAM

Describe the proposed reclamation and timing for None

this specific activity:

Estimated cost of reclamation activities described above: $0.00

TIMBER CUTTING

Total merchantable timber volume: 0.00 m3

No Timber
You have indicated that there is no merchantable timber that will be cut. Therefore a Free Use Permit or a Licence to Cut is not required. If this is not accurate, please correct your entries.

EQUIPMENT

Click on the "Add Equipment" button to add one type of equipment at a time. All equipment must comply with the requirements of the Health, Safety and Reclamation Code.

Quantity	Type	Size / Capacity
4	Drill	To be determined

SUMMARY OF RECLAMATION

Based on the information you have provided on the previous screens the Summary of Reclamation is:

Activity	Total Affected area (ha)	Estimated cost of reclamation ($)
Access roads, trails, etc.	0.14	1,400.00
Exploration Surface Drilling	0.23	2,300.00
Subtotal:	0.37	3,700.00
Unreclaimed disturbance from previous year:	0.00	
Disturbance planned for reclamation this year:	0.37	
Total:	**0.00**	**3,700.00**

OTHER CONTACTS

Please enter the contacts that are applicable to your application.

Contact Info		Type of Contact
Name:	Tim Dodd	Mine manager
Phone:	416-367-9292	
Daytime Phone:		
Fax:		
Email:	tim@seabridgegold.com	
Mailing Address:	400-106 Front Street E Toronto ON M5A1E1	

Name:	Tim Dodd	Site operator
Phone:	416-367-9292	
Daytime Phone:		
Fax:		
Email:	tim@seabridgegold.com	
Mailing Address:	400-106 Front Street E Toronto ON M5A1E1	

Contact Info		Type of Contact
Name:	KSM Mining ULC	Tenure Holder
Doing Business As:		
Phone:	416-367-9292	
Fax:		

Email:	jessy@seabridgegold.com
BC Inc. Number:	
Extra Provincial Number:	
Society Number:	
GST Registration Number:	
Contact Name:	Jessy Chaplin
Mailing Address:	400-106 Front Street E Toronto ON M5A1E1

Name:	KSM Mining ULC	Permittee
Doing Business As:		
Phone:	416-367-9292	
Fax:		
Email:	jessy@seabridgegold.com	
BC Inc. Number:		
Extra Provincial Number:		
Society Number:		
GST Registration Number:		
Contact Name:	Jessy Chaplin	
Mailing Address:	400-106 Front Street E Toronto ON M5A1E1	

LOCATION INFORMATION

LAND DETAILS

Do you have the legal description of the land or the civic address then click on 'Add Land Information'.

Description

Provincial Crown Land
Legal Description: Mineral Tenure 509216
Metes and Bounds: N/A

DRAWINGS

All applications must include the appropriate maps and applications received without maps will be returned. All maps must be in colour, computer generated, with a scale, north arrow and a detailed legend.

For Mineral, Coal and Placer applications you must provide a minimum of 3 maps:
- A Location Map which must show the location of the property in relation to the nearest community with the access route from the community to the work site clearly marked;
- A Tenure Map which must show the boundaries of the tenure(s) and tenure numbers, at a scale of 1:20,000 or less;
- A Map of Proposed Work which must show topography, water courses, existing access, existing disturbance, contour lines, known cultural heritage resources and/or protected heritage property, at a scale of 1:10,000 or 1:5,000. For site specific applications the location of all proposed exploration activities must be shown; for area-based applications the work area must be shown as a polygon, with the location of all proposed exploration activities for year 1 shown, and shape files provided of the area.

For Sand & Gravel/Quarry applications you must provide a Plan View, Cross and Longitudinal Sections and a Land Title/Crown Land Tenure Map. Details of these requirements are listed in the Sand & Gravel/Quarry Operations Activity sheet.

☑ I have one or more files (PDF, JPG, PNG etc.) with my maps

MAP FILES

Do you have a PDF or image file of a drawn map? You can upload it here.

Description	Filename
Location Map	Figure 1 - Location Map.pdf
Tenure Map	Figure 2 - Tenure Map.pdf

☑ I have shape files from my Geographic Information System

SPATIAL FILES

Do you have a spatial file from your GIS system? You can upload it here.

Description	Filename
Mineral Tenure Shape File	WHSE_MINERAL_TENURE_MTA_ACQ...
Snowfield linear water features	TrimWater_Line.shp
Snowfield non-linear water features	TRIM_Water_polygons.shp

ATTACHED DOCUMENTS

Document Type	Description	Filename
Archaeological Chance Find Procedure	Archaeological Chance Find Procedure	KSM - Chance Find Procedure...
Mine Emergency Response Plan	KSM Mine Emergency Response Plan	KSM MERP.pdf
Record of First Nations Engagement	Record of Indigenous Group Engagement	2021 02 08 KSM Snowfields N...

PRIVACY DECLARATION

PRIVACY NOTE FOR THE COLLECTION, USE AND DISCLOSURE OF PERSONAL INFORMATION

Personal information is collected by FrontCounter BC under the legal authority of section 26 (c) and 27 (1)(a)(i) of the Freedom of Information and Protection of Privacy Act (the Act).

The collection, use, and disclosure of personal information is subject to the provisions of the Act. The personal information collected by FrontCounter BC will be used to process your inquiry or application(s). It may also be shared when strictly necessary with partner agencies that are also subject to the provisions of the Act. The personal information supplied in the application package may be used for referrals or notifications as required. Personal information may be used by FrontCounter BC for survey purposes.
For more information regarding the collection, use, and/or disclosure of your personal information by FrontCounter BC, please contact FrontCounter BC at 1-877-855-3222 or at:

FrontCounter BC Program Director
FrontCounter BC, Provincial Operation
441 Columbia Street
Kamloops, BC V2C 2T3

☑ Check here to indicate that you have read and agree to the privacy declaration stated above.

REFERRAL INFORMATION

Some applications may also be passed on to other agencies, ministries or other affected parties for referral or consultation purposes. A referral or notification is necessary when the approval of your application might affect someone else's rights or resources or those of the citizens of BC. An example of someone who could receive your application for referral purposes is a habitat officer who looks after the fish and wildlife in the area of your application. This does not apply to all applications and is done only when required.

Please enter contact information below for the person who would best answer questions about your application that may arise from anyone who received a referral or notification.

Company / Organization:	KSM Mining ULC
Contact Name:	Jessy Chaplin
Contact Address:	400-106 Front Street E Toronto ON M5A1E1
Contact Phone:	416-367-9292
Contact Email:	jessy@seabridgegold.com

☑ **I hereby consent to the disclosure of the information contained in this application to other agencies, government ministries or other affected parties for referral or First Nation consultation purposes.**

IMPORTANT NOTICES

- Once you click 'Next' the application will be locked down and you will NOT be able to edit it any more.

DECLARATION

☑ By submitting this application form, I, declare that the information contained on this form is complete and accurate.

OFFICE

Office to submit application to: Smithers

PROJECT INFORMATION

Is this application for an activity or project which requires more than one natural resource authorization from the Province of BC? No

APPLICANT SIGNATURE

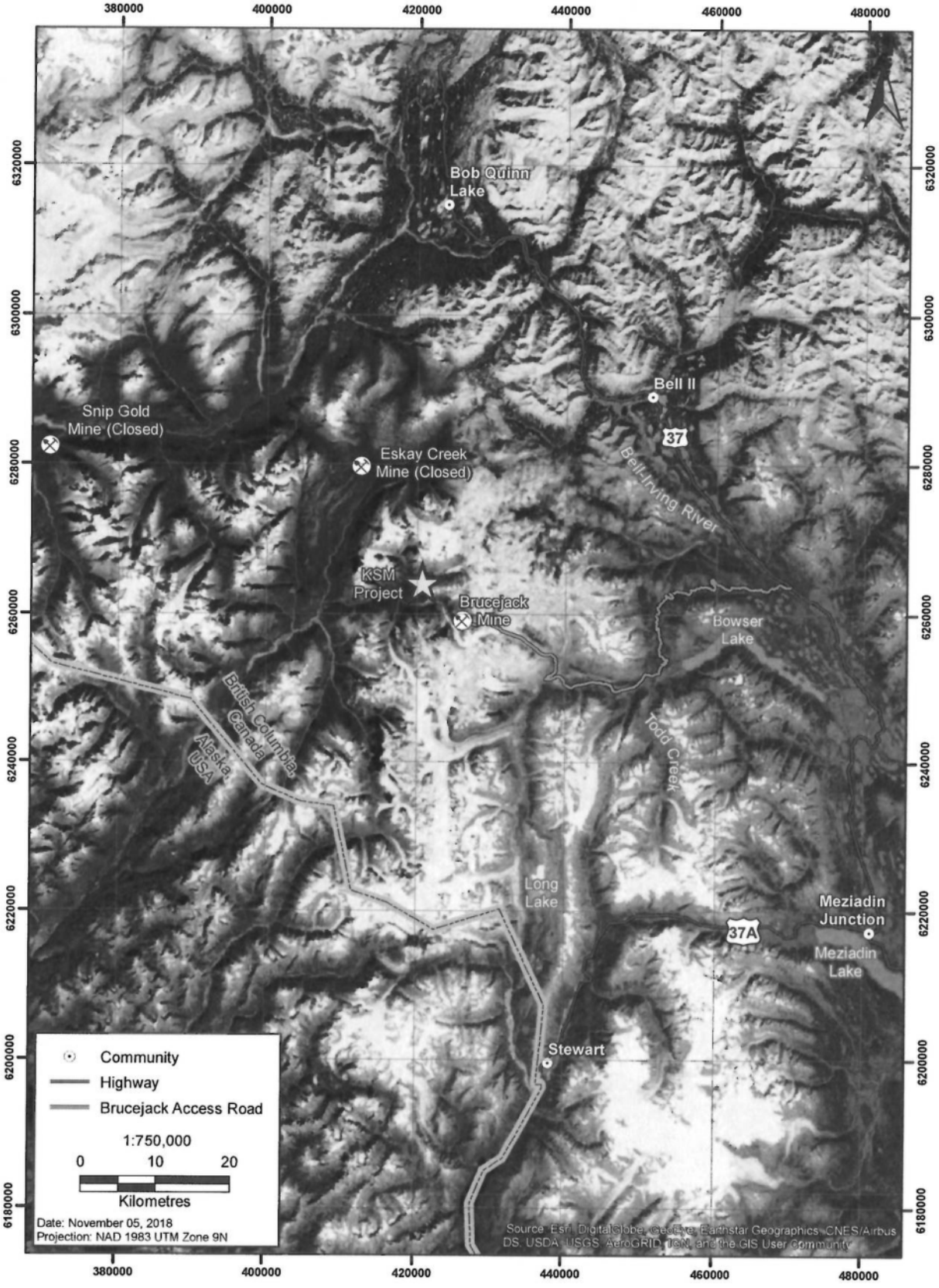
Applicant Signature	**Date**

OFFICE USE ONLY		
Office Smithers	**File Number**	**Project Number**
	Disposition ID	**Client Number**

Figure 1

Location Map

KSM MINING ULC
A SUBSIDIARY OF SEABRIDGE GOLD INC.



KSM Mining ULC

Proj # 0444849-0021 | GIS # KSM-15-456

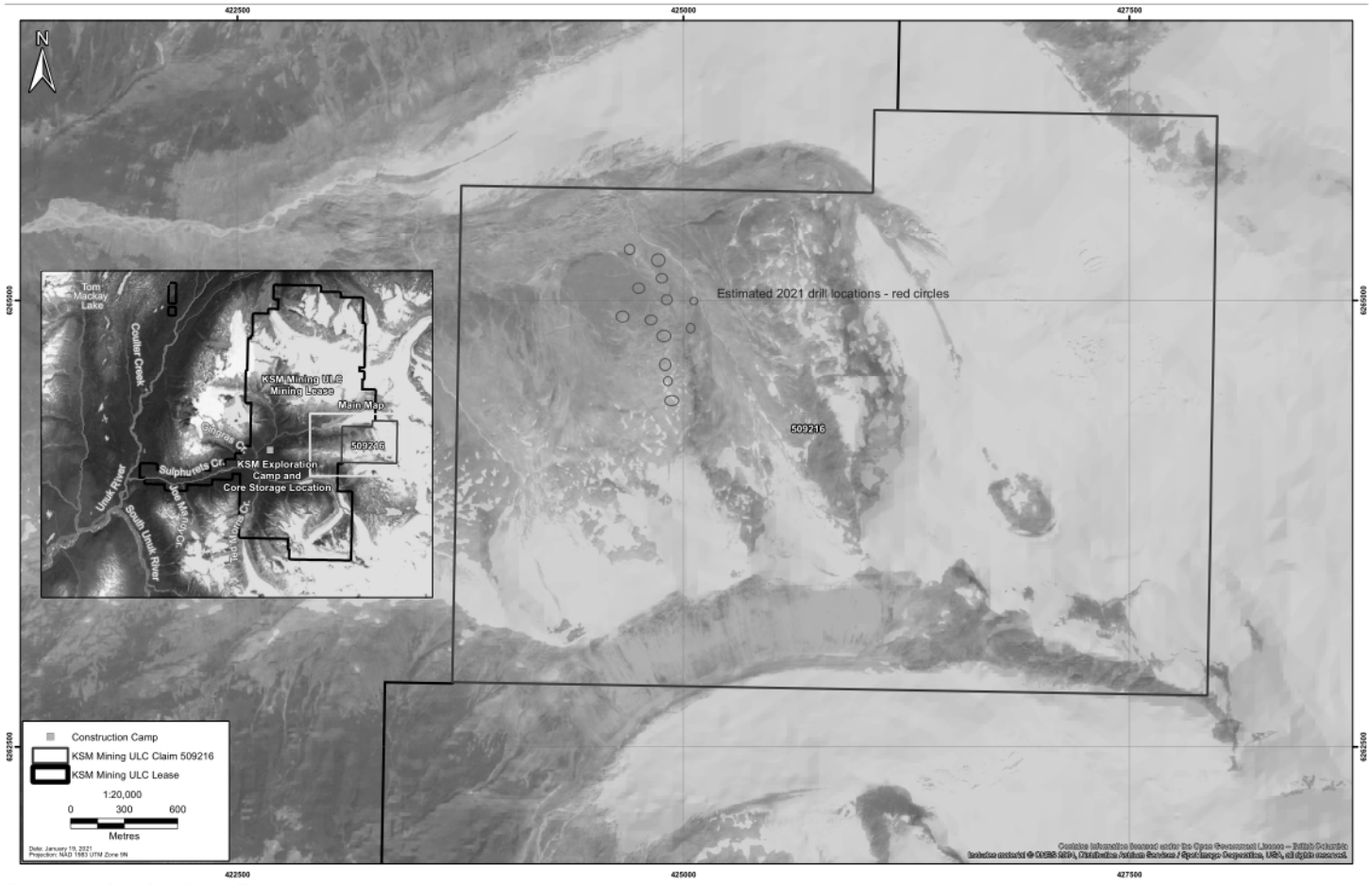


Figure 2 **Snowfield Project Tenure**

www.erm.com Project No.: 0539620-0021 Client: KSM MINING ULC GIS # SNO-15-036

KSM Project Archaeological Chance Find Procedure

There are more than 50,000 archaeological sites currently recorded in British Columbia (BC) with many more being added to the provincial inventory every year. For this reason, it is very likely that you will encounter an archaeological site during your lifetime either knowingly or unknowingly. This protocol has been established to increase awareness of this important resource and to assist in planning future developments. In addition, Archaeological sites are protected under the *Heritage Conservation Act* whether on Provincial Crown or private land, therefore strict protocols must be followed while working on the KSM Project, as described below.

The remnants of BC's earliest cultures are represented in today's landscape by a wide variety of site types, most of which are related to art, habitations, resource gathering and production, tool making, and traditional ceremonial or ritual activities. These sites are of particular cultural importance to indigenous groups in Northwest BC (for example, see also "Tahltan Archaeological Standards" THREAT 2011).

Examples of these site types that may contain archaeological significance include:

- Ice patch and glacier sites.
- Caves and rock shelter sites.
- Trails.
- Rock art, including pictographs and petroglyphs.
- Tree art and Culturally Modified Trees (CMT'S) such as bark stripping and planks.
- Surface features such as depressions created by former habitations, earthen fortifications, rock cairns, fish traps, burned rock and middens.
- Artifacts that have become visible on the land surface owing to erosion or recent land altering activity. These may be produced in a variety of materials such as stone, bone, antler, wood, or shell. Artifacts made of obsidian (volcanic glass) are of importance and common in the region.
- Buried cultural remains that may be sighted in a cut-bank, excavation, eroded shoreline, or other exposed deposit (such as melting out of a glacier).

If you discover a site in the course of your work that you suspect may be a possible archaeological site;

- Stop all work in the area to avoid damaging the site.
- **Do not disturb any archaeological remains that you may encounter.**
- Report your discovery to your supervisor or if they are unavailable, Seabridge Gold's Environmental Manager will provide further instructions and can be reached 250-847-4704.
- Isolate and protect the area.
- Note the location and leave all discoveries in place.
- Prepare an initial Chance Find Form.
- KSM Mining ULC will contact the Project Archaeologist and notify the person designated by the Nisga'a and the Tahltan Nations as the contact for such notice.
- The Project Archaeologist will assess the potential significance of the find. If it is determined to be archaeological in nature they will contact the Archaeology Branch.

- The archaeologist, in consultation with the Archaeology Branch, will conduct an investigation consistent with the Archeology Permit.
- The archaeologist will work with KSM Mining ULC and the Mine Site Manager to prepare a Site Instruction to recommence work in the area.
- A site report will be submitted to KSM Mining ULC, First Nations and the Archeological Branch.

If you discover what you suspect may be a possible human remains in the course of your work;

- Stop all work in the area to avoid damaging the site.
- **Do not disturb any possible human remains that you may encounter.**
- Report your discovery to your supervisor or if they are unavailable, the Company who will provide further instructions.
- If you are unable to contact a Company representative, and the suspected human remains appear to be current, contact the RCMP.
- If you are unable to contact a Company representative, please contact the Archaeology Branch by telephone at 250-953-3334.

The following steps will generally be followed

- The Coroner's Office and local policing authority are notified and the Coroner's Office determines whether the matter is of contemporary forensic concern.
- If the remains are not of forensic concern, the branch will attempt to facilitate disposition of the remains.
- If a cultural affiliation for the remains can be determined, the branch will contact an organization representing that cultural group. If the remains are of aboriginal ancestry, the branch will attempt to contact the relevant First Nation(s).
- Generally, if remains are still buried and are under no immediate threat of further disturbance, they will not be excavated or removed. If the remains have been partially or completely removed, the Branch will facilitate disposition.

Archaeological Chance Find Report Form

Recorder's Name/Affiliation:_____

Date:_____

Location of chance find (Location description, UTM coordinates, road, depth below surface):

_____

_____

_____

Description of find:_____

_____

_____

Method used to mark and protect find:_____

_____

_____

Distribution:

☐	☐	☐	☐	☐	☐
Mine Site Manager	KSM Mining ULC	Site Archaeologist	Archaeology Branch	Tahltan	Nisga'a

Sketch Map	Photo

Photographic Examples of Archaeological Finds near the KSM Project

Plate 1. Archaeologist inspecting the edge of an ice patch in the KSM Project area. Artifacts can be found eroding out of melting ice patches/glaciers.

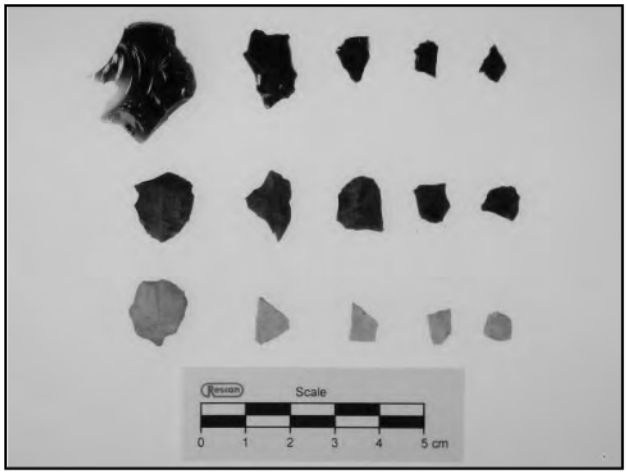


Plate 2. Obsidian flakes (top row), andesite flakes (middle row) and tuff flakes (bottom row) found near the KSM Project.

Plate 3. Obsidian artifacts found near the KSM Project.

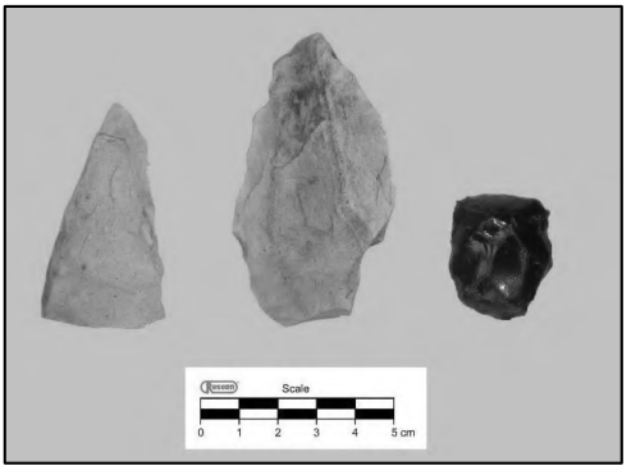


Plate 4. Volcanic tuff and obsidian flakes found near the KSM Project.

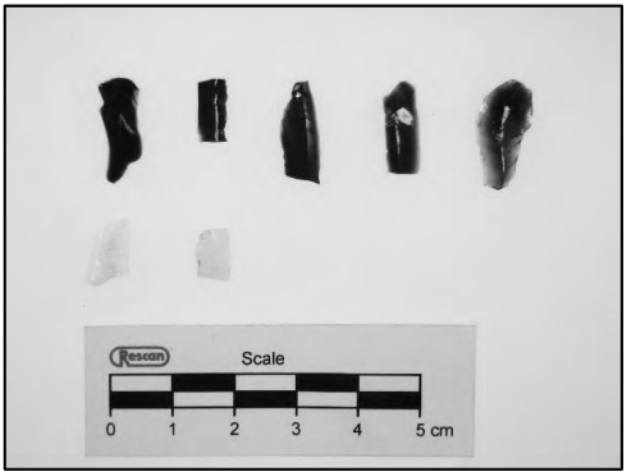


Plate 5. Obsidian and quartz microblades found near the KSM Project.

Plate 6. Obsidian flake with pencil for reference found near the KSM Project.

Plate 7. Petroform (rock wall/alignment) found near the KSM Project.

MINE EMERGENCY PLAN FOR SEABRIDGE GOLD
KSM EXPLORATION PROJECT – 2018

Page

MEDICAL EMERGENCY 1
FIRE EMERGENCY 2
AVIATION EMERGENCY: OVERDUE AIRCRAFT 3
AVALANCHE INCIDENT 4
OVERDUE FIELD CREW CHECK-IN 5
WILDLIFE ENCOUNTERS 6
HYDROCARBON SPILL RESPONSE 7

MEDICAL EMERGENCY

- **ALERT DISPATCHER OF LOCATION AND NATURE OF EMERGENCY, WHO WILL ALERT MINE MANAGER AND LEVEL 3 FIRST AID ATTENDANT IMMEDIATELY**
- **DISPATCHER ORDERS ALL NON-EMERGENCY RELATED RADIO TRANSMISSIONS TO STOP**
- **LEVEL 3 FIRST AID ATTENDANT WILL DETERMINE IF PATIENT IS TO BE BROUGHT IMMEDIATELY TO CAMP OR MUST BE EXAMINED BEFORE TRANSPORT**
- **FIELD WORKERS WILL SECURE AREA AND PROVIDE EMERGENCY FIRST AID AND WAIT FOR INSTRUCTIONS FROM DISPATCHER**
- **ANY OTHER FIELD WORKERS WILL STOP WORK AND WAIT AT SUITABLE HELICOPTER LANDING SITE FOR INSTRUCTIONS**

FIRE EMERGENCY

- **YELL "FIRE, FIRE, FIRE!", GET ASSISTANCE, DO NOT FIGHT FIRE ALONE**

- **ASSESS IMMEDIATE DANGER (FUEL OR EXPLOSIVE SOURCES) AND TAKE APPROPRIATE ACTION**

- **MINE MANAGER IS IN CHARGE AND WILL PROVIDE INSTRUCTIONS TO ANY PERSONNEL ON SITE**

- **TURN OFF FUEL SOURCES**

- **TURN OFF GENERATOR IF FIRE IS ELECTRICAL**

- **CONTROL FIRE WITH EXTINGUISHERS, FIREHOSE, ETC. IF NO IMMEDIATE DANGERS ARE APPARENT**

- **IF FIRE IS OUT OF CONTROL, EVACUATE TO SAFE AREA OPPOSITE OF WIND DIRECTION, NEAR WATER. BRING RADIOS, SATELLITE PHONE, AND FIRE FIGHTING TOOLS, CHAINSAW AND GAS.**

- **IN CASE OF FOREST FIRE, CONTACT BC FOREST HOT LINE: 1-800-663-5555**

AVIATION EMERGENCY: OVERDUE AIRCRAFT

- **OVERDUE AIRCRAFT IS CLASSIFIED AS ONE HALF HOUR LATE OR 30 MINUTES AFTER ETA**

- **DISPATCHER WILL ADVISE MINE MANAGER OF OVERDUE AIRCRAFT AND PROVIDE AIRCRAFT REGISTRATION, PERSONS ON BOARD, ROUTING, LAST CONTACT TIME**

- **MINE MANAGER WILL ADVISE OTHER PILOTS ON PROJECT AND LAKELSE HELICOPTERS TERRACE BASE MANAGER OF SITUATION: 1-250-635-3245**

- **FOLLOW COURSE OF ACTION RECOMMENDED BY LAKELSE HELICOPTERS TERRACE BASE MANAGER**

- **IF LAKELSE BASE MANAGER NOT AVAILABLE, MINE MANAGER WILL CONTACT RESCUE CO-ORDINATION CENTER COMOX: 1-800-567-5111**

- **FOR ADDITIONAL PROCEDURES REFER TO LAKELSE AIR ONSITE EMERGENCY RESPONSE PLAN**

AVALANCHE INCIDENT

- **CONTACT DISPATCH AND REPORT CURRENT LOCATION, WHO IS INVOLVED AND KNOWN FACTS OF INCIDENT.**

- **MINE MANAGER IS CONTACTED AND TAKES CONTROL OF INCIDENT RESPONSE.**

- **RADIO SILENCE EXCEPT FOR EMERGENCY TRAFFIC IS STARTED AND ALL OTHER CREWS SHELTER IN PLACE OR FIND SAFE REFUGE.**

- **RESPONSE TEAM LEAVES FOR INCIDENT SITE ON FIRST AVAILABLE HELICOPTER.**

- **CONTACT OFF SITE RESPONSE TEAMS OR EMERGENCY SERVICES AS NECESSARY.**

- **MINE MANAGER FOLLOWS AVALANCHE INCIDENT RESPONSE PLAN.**

OVERDUE FIELD CREW CHECK-IN

- **AN OVERDUE FIELD CREW CHECK-IN IS DEFINED AS A CREW THAT HAS FAILED TO CONTACT DISPATCH WITHIN 30 MINUTES OF PLANNED CHECK-IN TIME.**

- **DISPATCH WILL ATTEMPT TO CONTACT SAID CREW AND ANY OTHER GROUND OR AIR CREWS THAT MAY BE WITHIN VISUAL OR RADIO RANGE.**

- **IF AFTER 30 MINUTES NO CONTACT IS MADE THE CLOSEST HELICOPTER WILL BE DISPATCHED TO CONDUCT AN AERIAL SEARCH FOR THE CREW. IF HELICOPTER ORIGINATES FROM CAMP IT WILL DEPART WITH FIRST AID ATTENDANT AND JUMP KIT ON BOARD.**

- **IF CONTACT CANNOT BE MADE BY HELICOPTER IN 30 MINUTES THE MINE MANAGER WILL ORDER A GROUND SEARCH AS CONDITIONS PERMIT.**

- **MINE MANAGER WILL MAKE THE DECISION ON WHEN OR IF OUTSIDE ASSISTANCE IS NEEDED.**

WILDLIFE ENCOUNTERS

- **IN CAMP: ADVISE MINE MANAGER IMMEDIATELY OF LOCATION, PERSONNEL INVOLVED, NATURE OF ENCOUNTER, WHO WILL DETERMINE THE APPROPRIATE COURSE OF ACTION**

- **IN THE FIELD: IF AN ANIMAL ENCOUNTER IS DETERMINED TO BE POTENTIALLY DANGEROUS, IMMEDIATELY RADIO CAMP AND ADVISE DISPATCHER OF LOCATION AND SITUATION**

- **IF ANIMAL IS NOT INTIMIDATED BY YOUR PRESENCE, STAND UP AND SPEAK DIRECTLY TO ANIMAL IN CALM BUT ASSERTIVE MANNER. TURN RADIO UP AT FULL VOLUME AND HAVE DISPATCHER SPEAK AS THIS MAY DISTURB AND SCARE OFF THE ANIMAL**

- **IF ANIMAL CONTINUES TO APPROACH, AND IS AT SUFFICIENT DISTANCE (NOT LESS THAN 30 METERS), FIRE CRACKER FLARE TO SCARE OFF**

- **IF ANIMAL APPROACHES WITHIN 10 METERS, USE BEAR SPRAY AIMED AT FACE**

- **IF GRIZZLY BEAR ATTACK IS IMMINENT, TAKE CROUCHING POSITION FACING DOWN AND PROTECT HEAD AND NECK WITH BACKPACK, DO NOT MOVE UNTIL BEAR IS GONE**

- **IF BLACK BEAR ATTACK IS IMMINENT, DO NOT RUN, BUT YELL AGGRESSIVELY AND FIGHT OFF THE ANIMAL WITH WHATEVER ITEMS ARE AT HAND**

HYDROCARBON SPILL RESPONSE

- **ASSESS IMMEDIATE FIRE OR EXPLOSIVE HAZARDS AND TAKE APPROPRIATE ACTION**

- **IF SPILL IS DUE TO LEAK DETERMINE SOURCE AND SHUT OFF VALVES**

- **SMALL SPILLS (< 1 LITRE): MOP UP WITH ABSORBENT MATTING, SPRINKLE GATOR CLAY DRY POWDER, PLACE CONTAMINATED MATERIAL IN CONTAINER FOR DISPOSAL**

- **SPILLS OF 1 TO 100 LITRES: ADVISE MINE MANAGER IMMEDIATELY AND GET ASSISTANCE. CONTAIN WITH DIGGING TOOLS AND ABSORBMENT MATTING, CREATE BERM TO STOP FLOW**

- **LARGE SPILLS (>100 LITRES): ADVISE MINE MANAGER IMMEDIATELY AND GET ASSISTANCE. CONTAIN AS BEST AS CONDITIONS PERMIT.**

- **MINE MANAGER WILL REPORT LARGE SPILLS TO BC ENVIRONMENTAL EMERGENCY HOT LINE:**
  1-800-663-3456

6. EMERGENCY CONTACT LIST

Updated December 18,2020

KSM Project Location	
Geographic Description	650km NW of Vancouver, 65km N-NW of Stewart, at headwaters of Sulphurets Creek
Coordinates	Lat/Long: 56° 29' 13" North 130° 17' 50" West
	Utm Nad 83: 420,000 East 6,261,000 North
Helicopters	Lakelse Helicopters Astar 350. Registration C-NBR,C-BCN, G-MNI, F-XPM, or G-PTC

Project Telephone Numbers / Email					
Mine Manager - Mike Savell /Emily Davidson	msavell@seabridgegold.com	edavidson@mcelhanney.com - 250 847 4040			**778-652-0292**
Camp Manager - Mel Smitzniuk	ksmseabridge@matrixco.ca				**778-652-0287**
Dispatch	ksmdispatch@matrixco.ca				**778-652-0287**
Smithers Admin - Lesli Van Horn	ksmadmin@seabridgegold.com				**250-847-4704**
Radios:				*Rx:*	*Tx:*
C1 Repeater (Ch. 1, KSM)				164.025	169.005
C1 Simplex (Ch. 2, KSM)				164.025	←
C2 Repeater (Ch. 3, Seabee)				164.670	169.650
C2 Simplex (Ch. 4, Seabee)				164.670	←
Lakelse Helicopters (Ch. 5)				153.200	153.200
Eskay Creek Mine (Ch. 6)				165.465	165.465
Medical / Hospitals:					
Air Ambulance Provincial Dispatch					800 561-8011
Stewart Health Centre	On Duty Nurse To Answer Health Questions, ER On-Call				250 636 2221
Terrace Hospital	Non-Emergency				250 635 2211
Terrace Hospital	Emergency Ward				250 638 4060
Co-Ordinates:	Lat/Long: 54° 30' 36" North 128° 35' 45" Wes			Arrival 160°, Departure 340°	
Dease Lake Health Center					250 771 4444
Smithers Hospital					250 847 2611
BC Poison Control					800 567 8911
Fire:					
Forest Fire Hotline					800 663-5555
Dease Lake Fire					250 771 3134
Stewart Fire					250 636 2345
Terrace Fire					250 635 7878
Rescue / Missing Persons:	Example: Call RCC if helicopter is missing (Information given by RCC)				
Rescue Coordination Centre	Call 911 first if medical reason-They assess and call RCC if needed				800 567 5111
Police:					
Stewart RCMP					250 636 2233
Terrace RCMP					250 638 7400
Dease Lake RCMP					250 771 4111
Environmental:					
Environmental Emergency Reporting					800 663-3456
Other Government Agencies:					
Doug Flynn, Mines Inspector		mobile	250-877-9747	office	250 847 7386
Andrea Ross, Mines Inspector		mobile	250-877-1480	office	250-847-7768
BC WCB Notification Of Accident					866 922 4357

Seabridge Management					
Rudi Fronk - Chairman/CEO	Toronto			Office	416 367 9292
Jay Layman – President/COO	Denver			Cell	s.22
Bill Threlkeld – Senior V.P.	Denver	Res.	s.22	Cell	
Peter Williams - Sr VP Tech Ser.	Denver			Cell	
Brent Murphy – V.P. Env.Affairs	Denver			Cell	
Mike Skurski - V.P. Tech Serv.	Denver			Cell	
Mike Savell – Mine Manager 1	Oakville	Res.		Cell	
Tim Dodd – Mine Manager 2	Missoula	Res.		Cell	
Peter J. Erwich – Snowstorm	Denver	Res.		Cell	
Marcus Adam - Iskut Manager	Vancouver			Cell	
Jim Freeman – Geologist		Res.		Cell	
Randy Campbell - Snowstorm	Vancouver			Cell	
Gloria Trujillo - Exec. Secretary	Toronto			Office	416 367 9292
Seabridge Office Smithers	Smithers	Elizabeth Miller, Jessy Chaplin		Office	250 847 4704

Contractors					
Adapt Mountain Safety Services	Invermere	Ken Black	ken@adaptmountain.com		250 344 0708
			@ Brucejack camp		778-724 4186 ext 102
Bandstra Trucking					800 571 2057
BGC	Vancouver	Derek Kinakin			604 684 5900
BGC	Kamloops	Warren Newcomen			250 374 8600
Cascom Radio	Yellowknife	Aaron Jaque	867-445-6225	Office	867 765 2020
PnR Exploration Services	Smithers	Peter McGuinness			250 877 8278
Granmac Services	Stewart	Gina McKay		Office	250 636 2402
Granmac Services	Stewart	Grant McKay	250-552-2120	Office	250 636 2307
Golder Engineering	Vancouver	Jonathan Chow	604-240-7527	Office	604-296-4375
Sienna Networks	Terrace	Robert Chapman	250-641-3416	Office	778-505-2010
Hy-Tech Drilling	Smithers	Fraser Stewart or Reagan Churnish			250 847 9301
Lakelse Helicopters	Terrace		Ops Manager	250-641-8387	250 635 3245
Kalum Kabs	Terrace	Bryan Halbauer			250 635 7177
KCBL	Vancouver	Graham Parkinson			604 669 3800
Matrix Aviation Solutions	Hazelton	Martin Knutson	Principal		867 445 2640
Matrix Aviation Solutions	Langley	Mike Kenney	COO	604-345 9447	604-538 4574
Matrix Helicopters	Langley	Mike Pawluk	Manager Aviation	604-802-4858	604-538 4574
ERM	Smithers		office admin		250-877-7838
Sodexho	Smithers	Ed Van Mierlo		250-641-4411	250 771 5484
Northwest Truck Rental / Shuttle	Smithers	Fred Wilson			250 876 8149
Tsetlaut Consultation Society	Hazelton	George Simpson			250 842 5651

Other Camps					
SNIPGOLD (ISKUT-SEABRIDGE)	**Geology Office**				**778-655-4634**
	Kitchen	**778-652-0278**		**Main office**	**778-652-0283**
Pretium (Brucejack)					778-724-4186 ext 108
Forrest Kerr Project (AltaGas)					
Site Manager - Matt Weber		mobile	s.22	Office	250-645-7609
Accomodations booking	Maureen Inkster		Maureen.Inkster@altagas.ca		250-645-7603

Other Numbers	
King Eddy Hotel (Stewart)	250 636 2244
Bell II Lodge (Amon Johnson)	250 275 4770
National Car Rental (Terrace)	250 635 6855
Bulkley Valley Wholesale (Smithers)	250 847 3313
Seabridge Stewart Warehouse	250 636 2505
Northern Motor Inn (Terrace)	250 635 6375

MEMORANDUM

To: Whom it May Concern
From: Jessy Chaplin, MSc., RPBio, P.Ag., Director of Permitting & Compliance, Seabridge Gold Inc.
Date: February 9, 2021

Snowfields Notice of Work Application (NOW) pre-submission Indigenous Group review.

Seabridge Gold's 100% owned subsidiary KSM Mining ULC (KSMCo) prepared a NOW Application for our recently acquired Snowfields tenure in January 2021. On January 21st the draft NOW Application was shared with five Indigenous Groups related to the KSM Project for a two-week period, ending February 8th for comments and input on the NOW. The Indigenous Groups engaged with are listed here:

- Gitxsan Nation
- Tahltan Central Government (TCG)
- Nisga'a Lisims Government (NLG)
- Gitanyow Hereditary Chiefs Office (GHC)
- Tsetsaut/Skii km Lax Ha (TSKLH)

s.16

Comment Tracking Table

Snowfields NOW Application Feb 2021

	Indigenous Group	Date	Reviewer	Comment

s.16

Notice of Work

Hwy 37 Gravel Sources

Tracking Number: 100334592

Applicant Information

If approved, will the authorization be issued to an Individual or Company/Organization?	Company/Organization
What is your relationship to the company/organization?	Agent

APPLICANT COMPANY/ORGANIZATION CONTACT INFORMATION

Applicant is an Individual or an Organization to whom this authorization Permit / Tenure / Licence will be issued, if approved.

Name:	KSM Mining ULC
Doing Business As:	
Phone:	250-847-4704
Fax:	
Email:	jessy@seabridgegold.com
BC Incorporation Number:	BC1174031
Extra Provincial Inc. No:	
Society Number:	
GST Registration Number:	
Contact Name:	Jessy Chaplin
Mailing Address:	106 Front Street East Suite 400 Toronto ON M5A 1E1

AGENT INFORMATION

Please enter the contact information of the Individual/Organization who is acting on behalf of the applicant.

Name:	McElhanney Ltd.
Doing Business As:	McElhanney Ltd.
Phone:	778-648-2000
Fax:	
Email:	edavidson@mcelhanney.com
BC Incorporation Number:	
Extra Provincial Inc. No:	
Society Number:	
GST Registration Number:	
Contact Name:	Emily Davidson
Mailing Address:	1-5008 Pohle Avenue Terrace BC V8G4S8
Letter(s) Attached:	Yes (KSM Agent Letter - MMLCI-jc signed.pdf)

CORRESPONDENCE E-MAIL ADDRESS

If you would like to receive correspondence at a different email address than shown above, please provide the correspondence email address here. If left blank, all correspondence will be sent to the above given email address.

Email:	edavidson@mcelhanney.com
Contact Name:	Emily Davidson

TECHNICAL INFORMATION

APPLICATION INFORMATION

Type of Notice of Work:	Sand & Gravel
Is this a New Permit or an Amendment to an existing permit for this property?	New Permit

MINE INFORMATION

Do you have an existing mine number?	No
Name of the property:	Hwy 37 Gravel Sources
Tenure Numbers:	Tenure Numbers in attached Technical Memo titled “NoW Permit application No. 100334592, Aggregate and Quarry Investigative Plans”, dated January 4, 2021 for details.
Crown Grant / District Lot Numbers:	All sites are on unsurveyed Crown Land, Cassiar District
Directions to site from nearest municipality:	Please see Table 1 and 3 for site coordinates and directions to nearest municipality in the attached Memo titled “NoW Permit application No. 100334592, Aggregate and Quarry Investigative Plans”, dated January 4, 2021
Geographic Coordinates of Mine:	Coordinates for B2CC Site are shown in the Geographic Coordinates of Mine field. **Latitude:** 56.7401800 **Longitude:** -129.7781700
Maximum Annual Tonnage Extracted:	0 tonnes

INFORMATION ABOUT PROPOSED ACTIVITIES

Activities to be undertaken:

Access roads, trails, heli pads, air strips and boat ramps
Exploration Surface Drilling
Mechanical Trenching / Test Pits

FIRST AID

Proposed First Aid equipment on site: Level 2 First Aid Kit
Level of First Aid Certificate held by attendant: Occupational First Aid Level 1

DESCRIPTION OF WORK PROGRAM

If you prefer to upload a document, please enter "see attached document" and attach the document in the "Document Upload" step later in the application under "Other".

Sufficient details of your work program to enable a good understanding of the types and scope of the activities that will be conducted:

Test pit assessments at 7 sites to 3 m depth to determine if deposits suitable for sand and gravel source. Drill assessments to approximately 30 m depth at 6 potential rock quarry sources. Test Pits to 3 m depth at one potential camp location to characterize subsurface soil conditions. Fourteen sites total.

See attached Technical Memo titled “NoW Permit application No. 100334592, Aggregate and Quarry Investigative Plans”, dated January 4, 2021.

TIME OF PROPOSED ACTIVITIES

Proposed start and end date: Feb 15, 2021 to Feb 15, 2023

Please remember that you need to give 10 days notice to the Inspector of Mines of your intention to start work, and 7 days notice of your intention to stop work.

ACCESS

Access presently gated: No

PRESENT STATE OF LAND

Please identify what the present state of the land is where you would like to undertake your activities. If some of the questions do not apply to you please enter n/a in the space provided.

Present condition of the land:	For details of each of the 14 sites, refer to Appendix D. Present State of Land Data in attached Technical Memo titled, "NoW Permit Application No. 100334592, Aggregate and Quarry Investigation Plans", dated January 4, 2021.
Type of vegetation:	For details of each of the 14 sites, refer to Appendix D. Present State of Land Data in

	attached Technical Memo titled, "NoW Permit Application No. 100334592, Aggregate and Quarry Investigation Plans", dated January 4, 2021.
Physiography:	For details of each of the 14 sites, refer to Appendix D. Present State of Land Data in attached Technical Memo titled, "NoW Permit Application No. 100334592, Aggregate and Quarry Investigation Plans", dated January 4, 2021.
Current means of access:	For details of each of the 14 sites, refer to Appendix D. Present State of Land Data in attached Technical Memo titled, "NoW Permit Application No. 100334592, Aggregate and Quarry Investigation Plans", dated January 4, 2021.
Old equipment:	For details of each of the 14 sites, refer to Appendix D. Present State of Land Data in attached Technical Memo titled, "NoW Permit Application No. 100334592, Aggregate and Quarry Investigation Plans", dated January 4, 2021.
Recreational trails / use:	For details of each of the 14 sites, refer to Appendix D. Present State of Land Data in attached Technical Memo titled, "NoW Permit Application No. 100334592, Aggregate and Quarry Investigation Plans", dated January 4, 2021.

ACCESS TO TENURE

Do you need to build a road, create stream crossings or other surface disturbance that will not be on your tenure? No

LAND OWNERSHIP

Application area in a community watershed: No
Proposed activities on private land: No

Proposed activities on Crown land: Yes
Licence of Occupation: No

Have you applied for a Licence of Occupation? No

Please apply for a Licence of Occupation.

Activities in a park: No

CULTURAL HERITAGE RESOURCES

Cultural Heritage applies to a large spectrum of heritage resources that is defined as "an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people."

The Archaeology Branch of the Ministry of Forests, Land and Natural Resource Operations is responsible for the administration of the Heritage Conservation Act as it applies to archaeological sites. The Archaeology Branch has developed guidelines for companies engaged in natural resource extraction to aid in planning for and avoiding or managing impacts to protected archaeological sites.

Are you aware of any protected archaeological sites that may be affected by the proposed project? No

FIRST NATIONS ENGAGEMENT

In making decisions on authorizations, the government will be fulfilling its responsibility to consult, and where appropriate, accommodate First Nations. The government takes this responsibility seriously and encourages the applicant to engage First Nations early and often as part of any planned development.

Establishing good relations with First Nations who might be affected by a proposed development is a key part of any successful mining operation. The Ministry of Energy and Mines encourages applicants to engage and information share with First Nations that might be affected by a proposed development prior to submitting an application. The earlier in the life of a proposed activity that the avenues of communication are established the greater the likelihood that the relationships formed will be constructive and beneficial to all parties. A lack of information sharing and engagement by the applicant may result in extended timeframes for decision.

Applicants should keep a detailed record of information sharing and engagement with First Nations on their project in the event the government needs to review it. Information on First Nations information sharing and engagement should include the following: a list of First Nations contacted, whether the activity was modified based on feedback from First Nations, and whether the applicant has entered into any informal or formal agreements with First Nations in connection with the project.

The Consultative Areas Database Public Map Service is an online, interactive mapping tool that allows you to identify First Nations who have treaty rights or asserted or proven rights or title on the land base. More information can be found at http://maps.gov.bc.ca/ess/sv/cadb/.

Have you shared information and engaged with First Nations in the area of the proposed activity? Yes

Please tell us about your engagements in the field below or attach a your record of engagement by uploading it at the "Document Upload" step later in the application process. If you are attaching your record later, please enter in the text box "See record attached". Please ensure your record does not contain an individual's personal information such as contact information.

Describe your First Nations engagement activities: Yes, KSM Mining ULC maintains active engagement with all Indigenous groups surrounding the property. KSM Mining ULC is grateful to the Gitxsan Nation for their continuing support of the KSM project.

KSM Mining ULC signed an impacts benefit agreement with Nisga'a Lisims Government in 2013, an agreement with Gitanyow Hereditary Chiefs in 2014 and a benefits agreement with the Tahltan Nation in 2019.

This application has been sent to the above Indigenous Groups for review and comment prior to submitting to MEMLCI. Their comments are included in the Attachment "2021 01 21 - Highway37 Gravel Sources Pre-Submission Engagement Tracking Table - FINAL". The Engagement Tracking Table also refers to the attached document "KSM Approved Standard Operating Procedures (SOPs) for Clearing and Construction of Batch 1 Activities (Rescan 2014)".

Detailed Record of Engagement for First Nations and Nisga'a Lisims Government will be provided upon request.

As a result of the engagement, are you aware of any cultural heritage resources in the area where the work is proposed? No

MECHANICAL TRENCHING / TEST PITS

MAPS

Unless this is an area based application mark the locations of the proposed trenches/pits on the map. You will upload the maps at the document upload step later in the application process.

ACTIVITIES

Click on the "Add Activity" button to add one or more activities. Select your activity out of the list and enter the disturbed area and timber volume.

Activity	Number of sites	Disturbed Area (ha)	Merchantable timber volume (m^3)
Trenches and Test Pits	137	0.06	8.00
Total:		**0.06**	**8.00**

RECLAMATION PROGRAM

Describe the proposed reclamation and timing for this specific activity:	All test pits will be back filled with cuttings immediately after exploration depth is reached. Organic topsoils will be skimmed prior to digging and placed in a separate stock pile. Topsoil will be used to dress the finished grade of the backfilled test pit. Brush and any woody debris removed will be replaced over any disturbed areas. Any felled trees will be bucked to 4 to 6ft lengths and placed over disturbed areas. Reseeding is planned in all areas where soil is visible after test pitting to discourage invasive species.
Estimated cost of reclamation activities described above:	$0.00

EXPLORATION SURFACE DRILLING

MAPS

Unless this an area based application mark the locations of the proposed surface drilling on the map. The maps will be uploaded at the document upload step later in the application.

ACTIVITIES

Click on the "Add Activity" button to add one or more activities. Select your activity out of the list and enter the disturbed area and timber volume.

Activity	Number of sites	Disturbed Area (ha)	Merchantable timber volume (m^3)
Diamond Drilling - Surface	26	0.30	18.00
Total:	**26**	**0.30**	**18.00**

SUPPORT OF DRILL PROGRAM

The drill program will be:	Combination of Ground, Helicopter and/or Water Supported

RECLAMATION PROGRAM

Describe the proposed reclamation and timing for this specific activity:	Sites will be reclaimed as soon as subsurface exploration is complete (within one month). Drill platforms will be reclaimed as follows: Heli-rig sites will have all equipment and construction materials removed with the exception of drill collar stake. Woody debris will be placed over clearing. Any felled trees will be bucked into 4 to 6 ft lengths and spread across the disturbed areas. Drill sites accessed by trail will also have all equipment and construction debris removed. Drill sites will be scarified and woody debris (trees bucked to 4 to 6ft lengths) and spread across disturbed site. All drill holes will be backfilled/grouted (or cuttings with a concrete surface plug) with a collar stake left in place. Reseeding is planned in all areas where soil is visible after drilling to discourage invasive species. Costs of reclamation are included in the test pit and drill hole programs and have no extra specific reclamation expense.
Please describe the location of the Core Storage (including latitude and longitude if known):	Core will be stored at the KSM Mining ULC warehouse in Stewart, BC. This is at 55º 56’ 08.69” N, 129º 59’21.9” W.
Estimated cost of reclamation activities described above:	$0.00

ACCESS ROADS, TRAILS, HELI PADS, AIR STRIPS AND BOAT RAMPS

MAPS

Mark the locations of the proposed access roads and trails on the map. The maps will be uploaded at the document upload step later in the application.

ACTIVITIES

Click on the "Add Activity" button to add one or more activities. Select your activity out of the list and enter the length in km, the total disturbed area and total merchantable timber volume.

Activity	Length (km)	Disturbed Area (ha)	Merchantable timber volume (m^3)
Exploration Trail - New	11.29	1.81	17.00
Total:	**11.29**	**1.81**	**17.00**

BRIDGES, CULVERTS AND CROSSINGS

Are you proposing any bridges, culverts and/or other river / stream crossings? No

RECLAMATION PROGRAM

Describe the proposed reclamation and timing for this specific activity: Exploration trails will be deactivated by recontouring to original surface and re-establishing any natural drainages if cuts and fills are required. Note that the proposed trails will utilize existing topography and tracked or UTV mounted drill equipment for overland access is proposed to minimize exploration trail construction (cuts and fills into mineral soil). Installation of culverts is not anticipated due to route selection away from drainages and if a drainage is encountered that cannot be crossed with corduroy or water bar and a culvert is required, then the culvert will be removed and the original drainage path re-established upon completion of the drill program. Expense is part of demobilizing excavator for test pits or drill equipment. Reclamation will be completed immediately following removal of drill equipment once drilling is complete. Reseeding is planned in all areas where soil is visible after test pitting to discourage invasive species.

Estimated cost of reclamation activities described above: $0.00

ADDITIONAL INFORMATION

Please note that you may require a Special Use Permit under the Forest Practices Code of British Columbia Act or a Land Act tenure or other authorization under the legislation to use roads to access your tenure.

For further information please contact FrontCounter BC.

TIMBER CUTTING

Total merchantable timber volume: 43.00 m3

Free Use Permit

Based on the information provided you will require a Free Use Permit as the total volume of merchantable timber to be cut does not exceed 50 m3. This permit will be automatically applied for as part of this Notice of Work.

EQUIPMENT

Click on the "Add Equipment" button to add one type of equipment at a time. All equipment must comply with the requirements of the Health, Safety and Reclamation Code.

Quantity	Type	Size / Capacity
1	Drill	Heli-Portable Diamond Drill
1	Drill	Diamond - Rugged Terrain UTV Mounted
1	Excavator	Cat 315C or Similar
2	Truck	Pickup trucks for Crew
1	Truck	Water tank truck
1	Truck	Dumptruck and Trailer to Haul Excavator

SUMMARY OF RECLAMATION

Based on the information you have provided on the previous screens the Summary of Reclamation is:

Activity	Total Affected area (ha)	Estimated cost of reclamation ($)
Access roads, trails, etc.	1.81	0.00
Exploration Surface Drilling	0.30	0.00
Mechanical Trenching, etc.	0.06	0.00
Subtotal:	2.17	0.00
Unreclaimed disturbance from previous year:	0.00	
Disturbance planned for reclamation this year:	2.17	
Total:	**0.00**	**0.00**

OTHER CONTACTS

Please enter the contacts that are applicable to your application.

Contact Info		Type of Contact
Name:	KSM Mining ULC	Tenure Holder
Doing Business As:		
Phone:	250-847-4704	
Fax:		
Email:	jessy@seabridgegold.com	
BC Inc. Number:	BC1174031	
Extra Provincial Number:		
Society Number:		
GST Registration Number:		
Contact Name:	Jessy Chaplin	
Mailing Address:	106 Front Street East Street Toronto BC M5A 1E1	

Name:	KSM Mining ULC	Permittee
Doing Business As:		
Phone:	250-847-4704	
Fax:		
Email:	jessy@seabridgegold.com	
BC Inc. Number:	BC1174031	
Extra Provincial Number:		
Society Number:		
GST Registration Number:		
Contact Name:	Jessy Chaplin	
Mailing Address:	106 Front Street East Street Toronto BC M5A 1E1	

Name:	McElhanney Ltd	Mine manager
Doing Business As:		
Phone:	250-847-4040	
Fax:		

Email:	edavidson@mcelhanney.com
BC Inc. Number:	
Extra Provincial Number:	
Society Number:	
GST Registration Number:	
Contact Name:	Emily Davidson
Mailing Address:	3907 4th St Street Smithers BC V0J 2N0

Name:	McElhanney Ltd	Site operator
Doing Business As:		
Phone:	250-847-4040	
Fax:		
Email:	edavidson@mcelhanney.com	
BC Inc. Number:		
Extra Provincial Number:		
Society Number:		
GST Registration Number:		
Contact Name:	Emily Davidson	
Mailing Address:	3907 4th St Street Smithers BC V0J 2N0	

LOCATION INFORMATION

LAND DETAILS

Do you have the legal description of the land or the civic address then click on 'Add Land Information'.

DRAWINGS

All applications must include the appropriate maps and applications received without maps will be returned. All maps must be in colour, computer generated, with a scale, north arrow and a detailed legend.

For Mineral, Coal and Placer applications you must provide a minimum of 3 maps:
- A Location Map which must show the location of the property in relation to the nearest community with the access route from the community to the work site clearly marked;
- A Tenure Map which must show the boundaries of the tenure(s) and tenure numbers, at a scale of 1:20,000 or less;
- A Map of Proposed Work which must show topography, water courses, existing access, existing disturbance, contour lines, known cultural heritage resources and/or protected heritage property, at a scale of 1:10,000 or 1:5,000. For site specific applications the location of all proposed exploration activities must be shown; for area-based applications the work area must be shown as a polygon, with the location of all proposed exploration activities for year 1 shown, and shape files provided of the area.

For Sand & Gravel/Quarry applications you must provide a Plan View, Cross and Longitudinal Sections and a Land Title/Crown Land Tenure Map. Details of these requirements are listed in the Sand & Gravel/Quarry Operations Activity sheet.

☑ I have one or more files (PDF, JPG, PNG etc.) with my maps

MAP FILES

Do you have a PDF or image file of a drawn map? You can upload it here.

Description	Filename
Appendix C Exploration Surface Drilling Investigation Plan Maps	Appendix C Exploration Dril...
Figure 1. KSM Regional Location Map	Figure 1 KSM Regional Locat...

Figure 2. Investigation Sites for Seabridge Gold	Figure 2 InvestigationSites...
Tenure Maps	Appendix A Tenure Maps.pdf
Test Pit Investigation Plan Maps	Appendix B Test Pit Investi...

☑ I have shape files from my Geographic Information System

SPATIAL FILES

Do you have a spatial file from your GIS system? You can upload it here.

Description	Filename
KML Shape Files of each site location	Seabridge NoW Application S...

ATTACHED DOCUMENTS

Document Type	Description	Filename
Archaeological Chance Find Procedure	Archeological Chance Find Procedure	KSM Project Archaeological ...
Mine Emergency Response Plan	Mine Emergency Response Plan	KSM Project Mine EmergencyR...
Other	Hwy 37 Gravel Sources Support Memo	2511-01367-01 NoW Applicati...
Record of First Nations Engagement	2021 01 21 - Highway 37 Gravel Sources Pre-Submission Engagement Tracking Table	2021 01 21 - Highway 37 Gra...
Record of First Nations Engagement	KSM Approved Standard Operating Procedures (SOPs) for Clearing and Construction of Batch 1 Activities (Rescan 2014)	KSM Approved Standard Opera...

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PRIVACY NOTE FOR THE COLLECTION, USE AND DISCLOSURE OF PERSONAL INFORMATION

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FrontCounter BC Program Director
FrontCounter BC, Provincial Operation
441 Columbia Street
Kamloops, BC V2C 2T3

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REFERRAL INFORMATION

Some applications may also be passed on to other agencies, ministries or other affected parties for referral or consultation purposes. A referral or notification is necessary when the approval of your application might affect someone else's rights or resources or those of the citizens of BC. An example of someone who could receive your application for referral purposes is a habitat officer who looks after the fish and wildlife in the area of your application. This does not apply to all applications and is done only when required.

Please enter contact information below for the person who would best answer questions about your application that may arise from anyone who received a referral or notification.

Company / Organization:	KSM Mining ULC
Contact Name:	Jessy Chaplin
Contact Address:	106 Front Street East Suite 400 Toronto ON M5A 1E1
Contact Phone:	250-847-4704
Contact Email:	jessy@seabridgegold.com

☑ **I hereby consent to the disclosure of the information contained in this application to other agencies, government ministries or other affected parties for referral or First Nation consultation purposes.**

IMPORTANT NOTICES

- Once you click 'Next' the application will be locked down and you will NOT be able to edit it any more.

DECLARATION

☑ By submitting this application form, I, declare that the information contained on this form is complete and accurate.

OFFICE

Office to submit application to: Smithers

PROJECT INFORMATION

Is this application for an activity or project which requires more than one natural resource authorization from the Province of BC? No

APPLICANT SIGNATURE

Applicant Signature	**Date**

OFFICE USE ONLY

Office Smithers	**File Number**	**Project Number**
	Disposition ID	**Client Number**

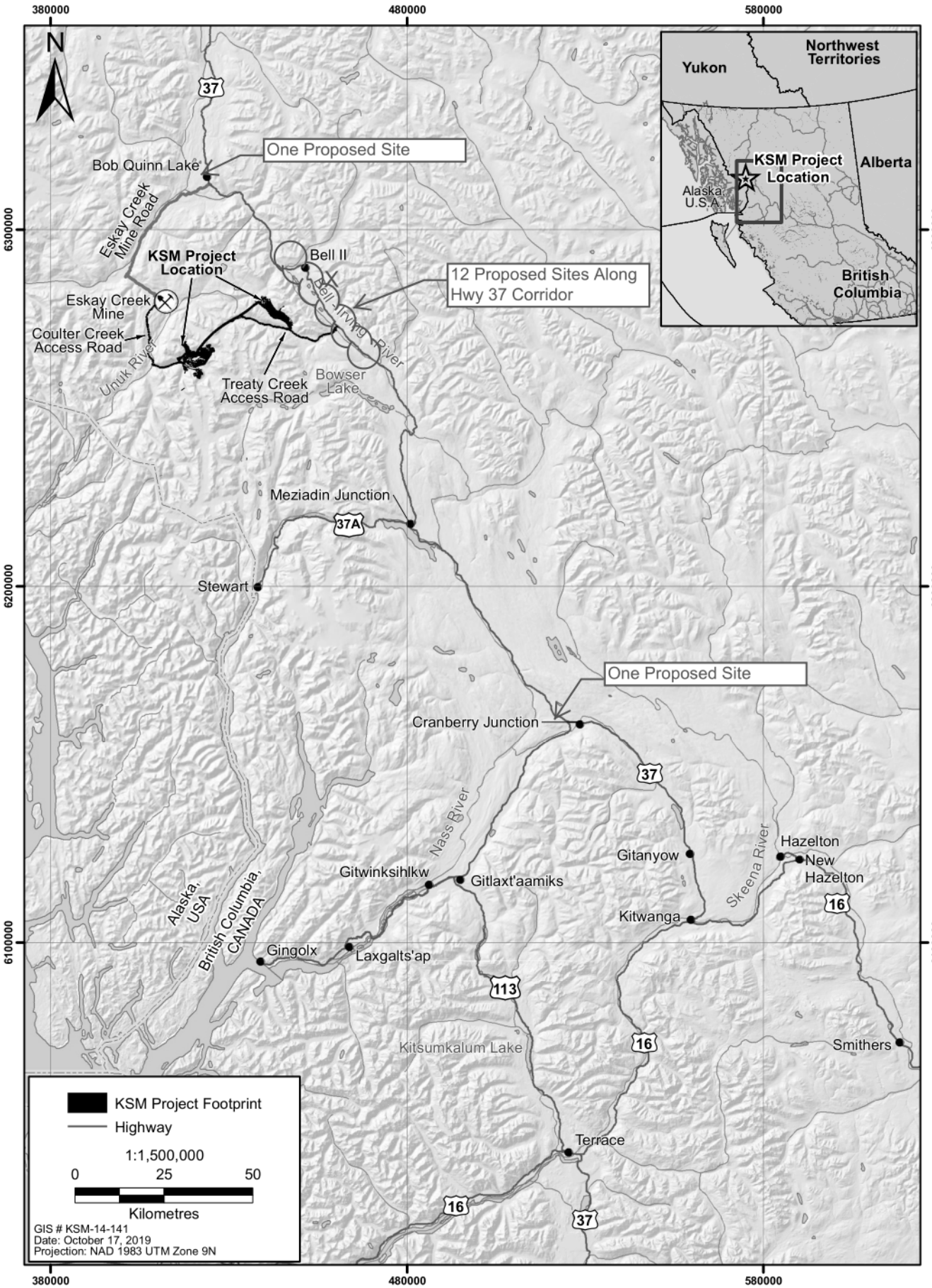
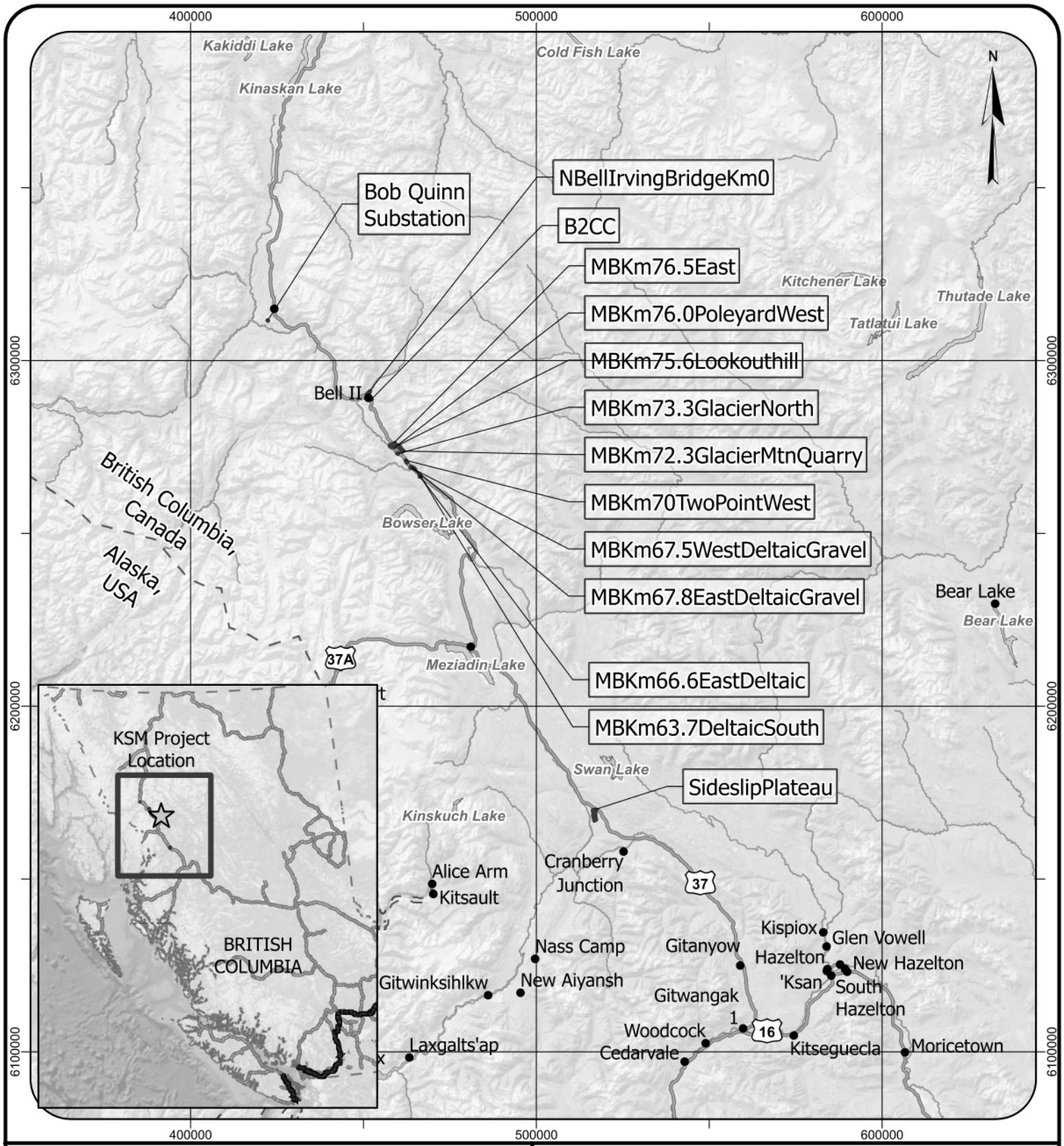


Figure 1: KSM Project Regional Location



Investigation Location

0 50 100 km

Scale: 1:1,500,000 NAD 1983 UTM Zone 9N

McElhanney

KSM MINING ULC

FIGURE 2

INVESTIGATION SITES FOR SEABRIDGE GOLD

December 17, 2020

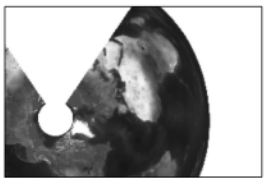
McElhanney Ltd.

B2CC

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area



1: 20,000

0 0.41 0.83 km

N

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

McElhanney Ltd.

Bob Quinn Substation

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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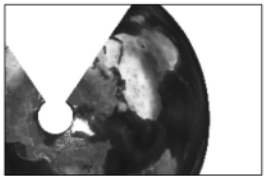

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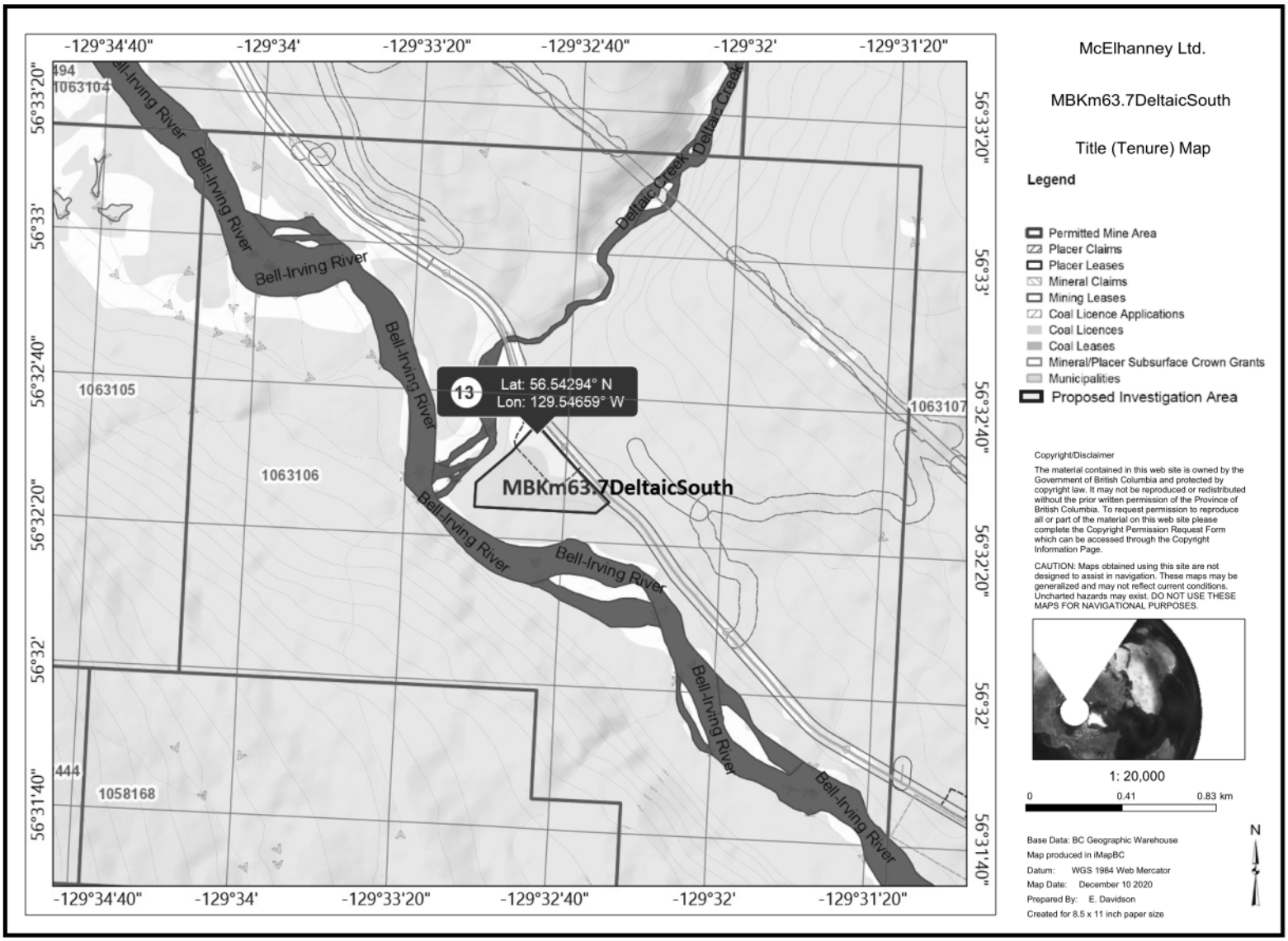
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size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-129°34'
-129°33'20"
-129°32'40"
-129°32'
-129°31'20"
56°33'20"
56°33'
56°32'40"
56°32'20"
56°32'
56°31'40"
Bell-Irving River
Deltaic Creek
13
Lat: 56.54294° N
Lon: 129.54659° W
MBKm63.7DeltaicSouth
1063104
1063105
1063106
1063107
1058168
McElhanney Ltd.
MBKm63.7DeltaicSouth
Title (Tenure) Map
Legend
Permitted Mine Area
Placer Claims
Placer Leases
Mineral Claims
Mining Leases
Coal Licence Applications
Coal Licences
Coal Leases
Mineral/Placer Subsurface Crown Grants
Municipalities
Proposed Investigation Area
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1: 20,000
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Base Data: BC Geographic Warehouse
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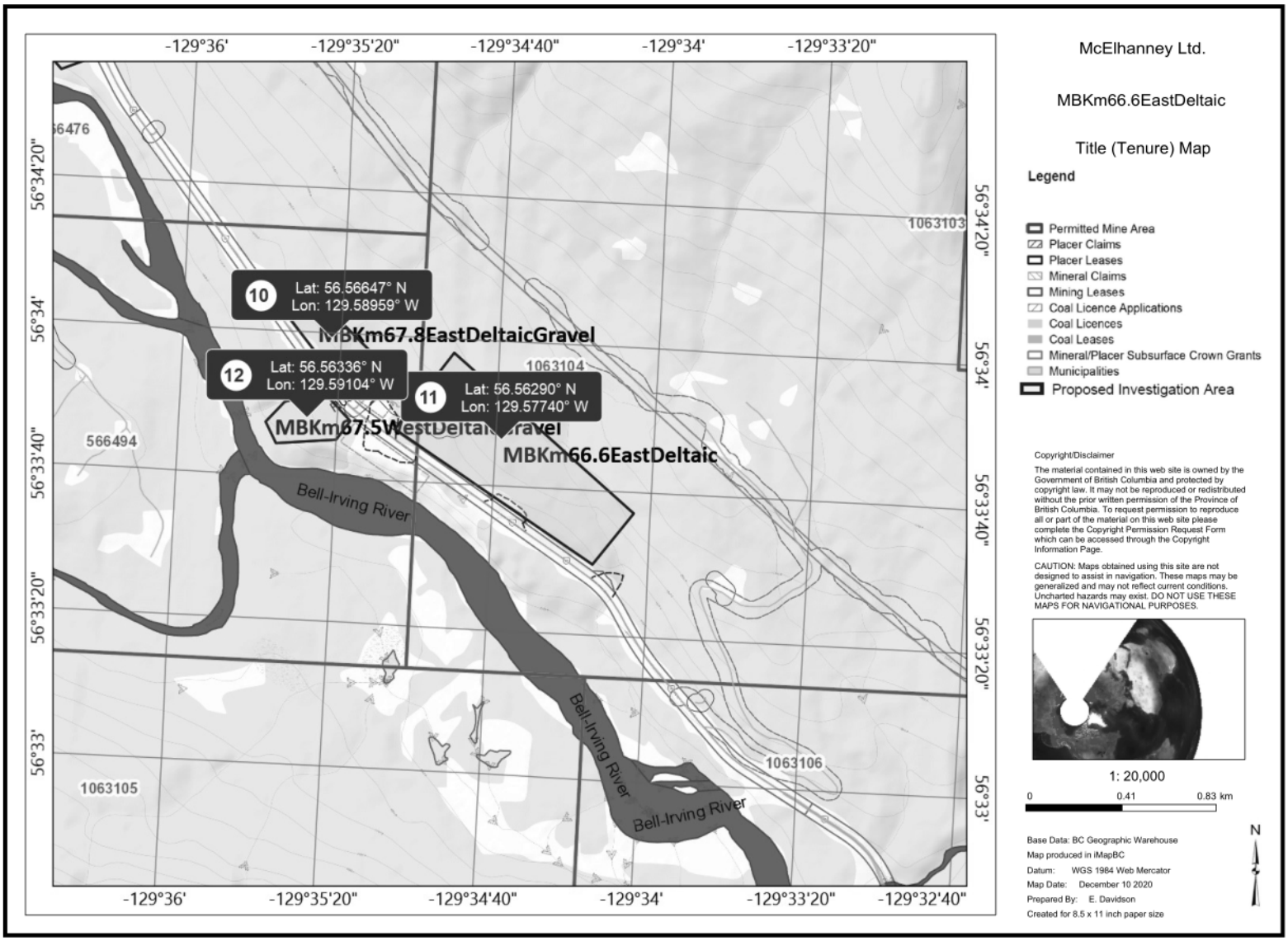
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size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-129°34'
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-129°32'40"
56°34'20"
56°34'
56°33'40"
56°33'20"
56°33'
10
Lat: 56.56647° N
Lon: 129.58959° W
MBKm67.8EastDeltaicGravel
12
Lat: 56.56336° N
Lon: 129.59104° W
11
Lat: 56.56290° N
Lon: 129.57740° W
MBKm67.5WestDeltaicGravel
MBKm66.6EastDeltaic
Bell-Irving River
Bell-Irving River
Bell-Irving River
1063103
1063104
1063105
1063106
566494
McElhanney Ltd.
MBKm66.6EastDeltaic
Title (Tenure) Map
Legend
Permitted Mine Area
Placer Claims
Placer Leases
Mineral Claims
Mining Leases
Coal Licence Applications
Coal Licences
Coal Leases
Mineral/Placer Subsurface Crown Grants
Municipalities
Proposed Investigation Area
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1: 20,000
0
0.41
0.83 km
N
Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

McElhanney Ltd.

MBKm67.5WestDeltaicGravel

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
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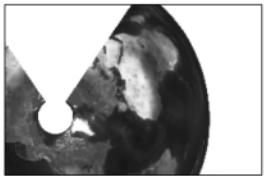

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Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

MBKm66.6EastDeltaicGravel

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
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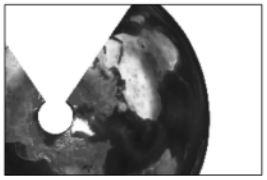

1: 10,000

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Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

MBKm70TwoPointWest

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
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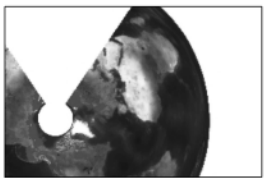

1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

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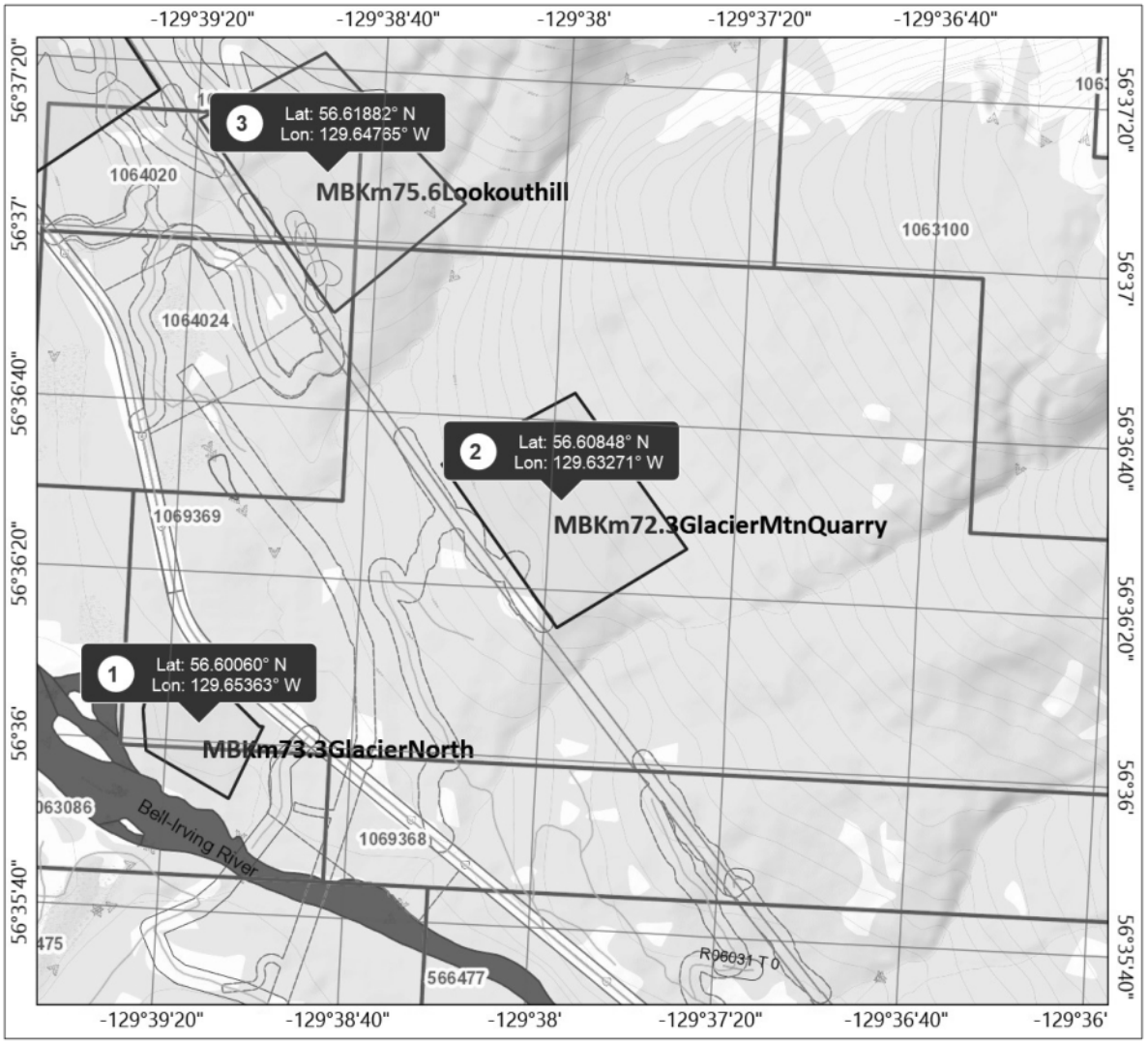

McElhanney Ltd.

MBKm72.3GlacierMtnQuarry

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
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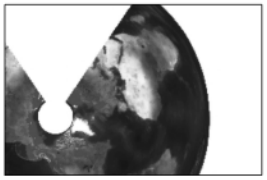

1: 20,000

0 0.41 0.83 km

N

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

McElhanney Ltd.

MBKm73.3GlacierNorth

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
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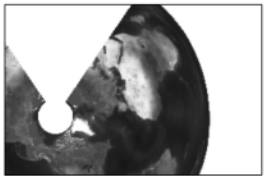
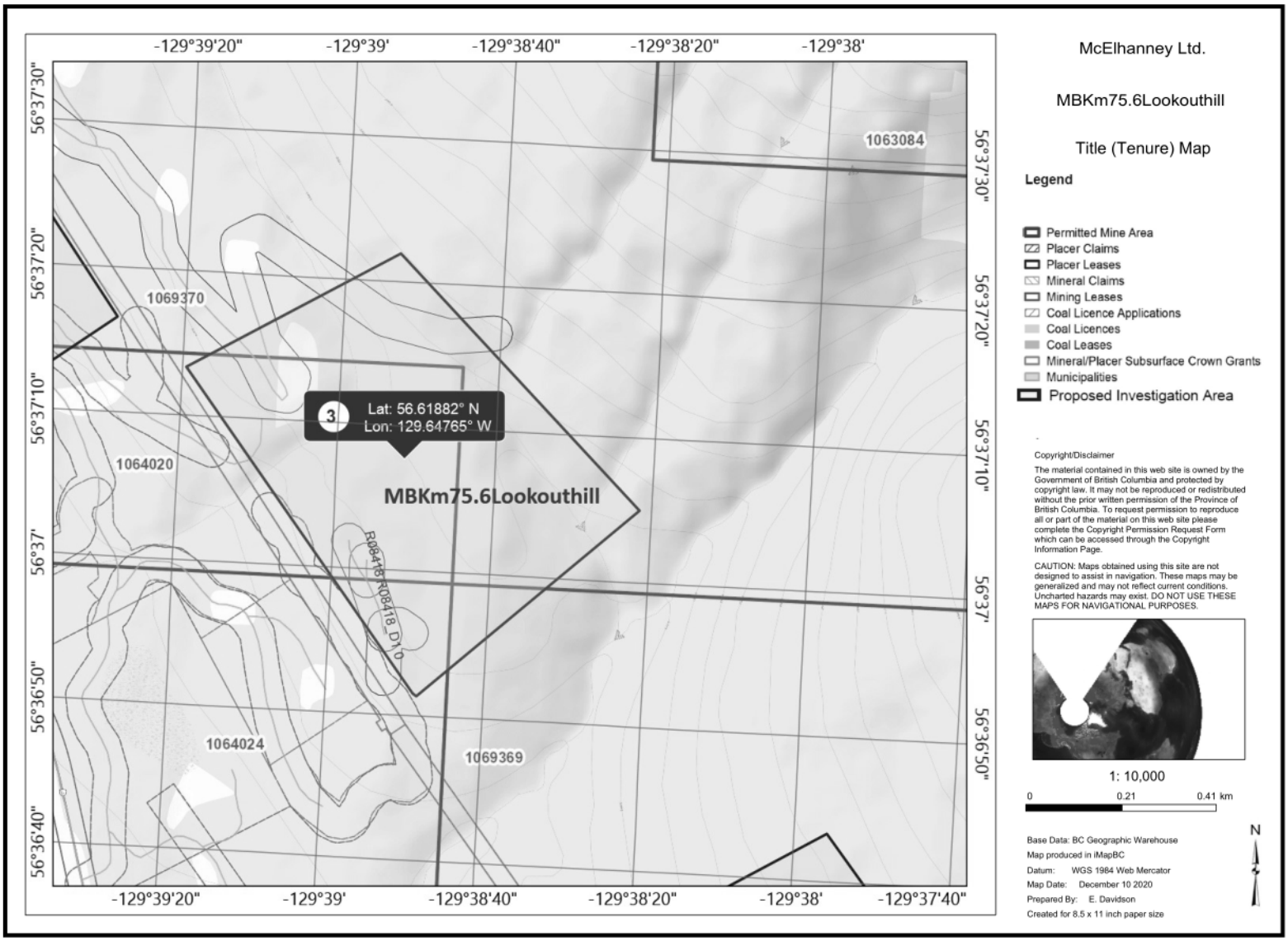


1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N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56°37'20"
56°37'10"
56°37'
56°36'50"
56°36'40"
1063084
1069370
1064020
1064024
1069369
3
Lat: 56.61882° N
Lon: 129.64765° W
MBKm75.6Lookouthill
R08418R08418_D1_0
McElhanney Ltd.
MBKm75.6Lookouthill
Title (Tenure) Map
Legend
Permitted Mine Area
Placer Claims
Placer Leases
Mineral Claims
Mining Leases
Coal Licence Applications
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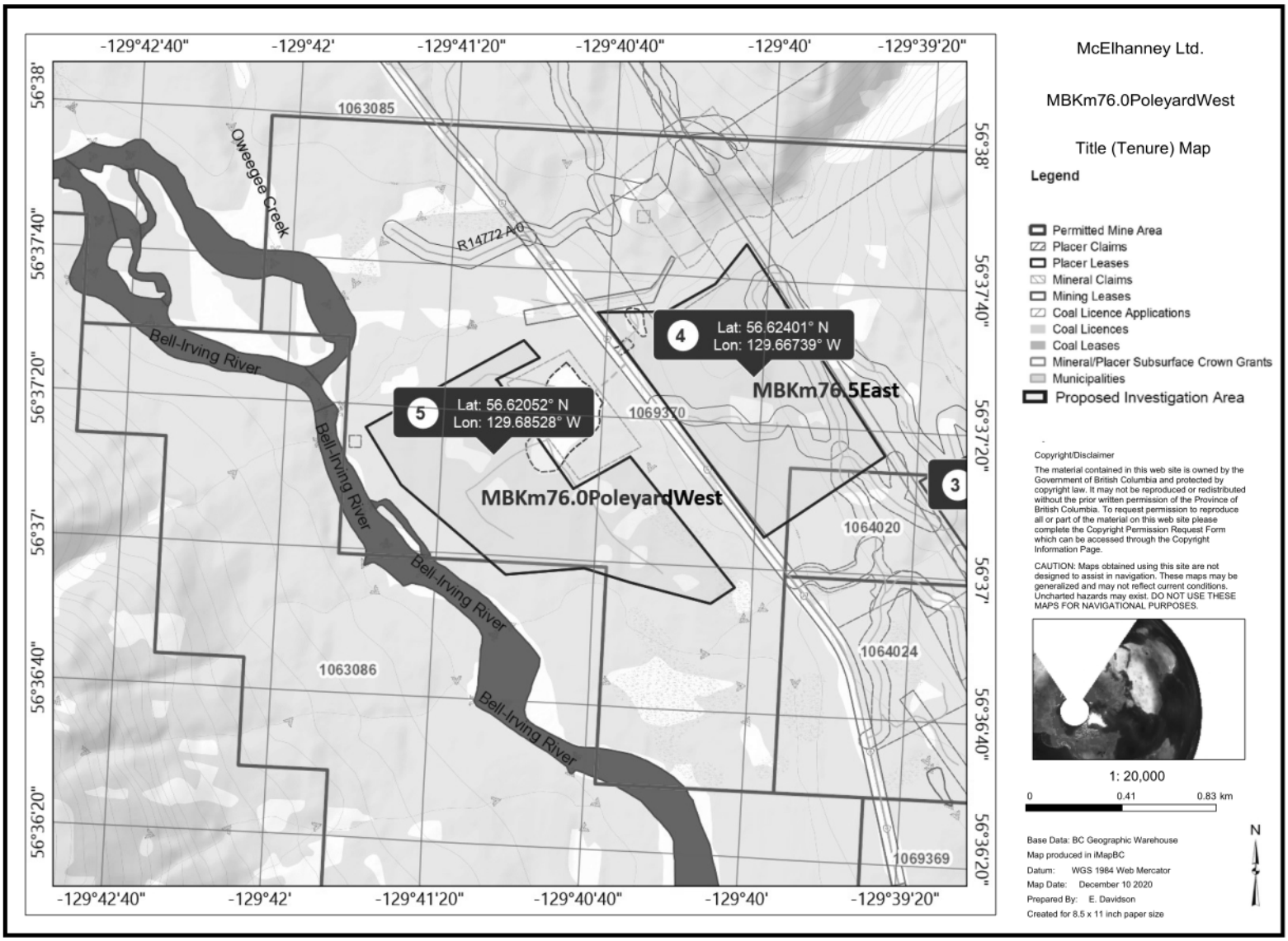
1: 10,000
0
0.21
0.41 km
N
Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size



McElhanney Ltd.

MBKm76.0PoleyardWest

Title (Tenure) Map

Legend

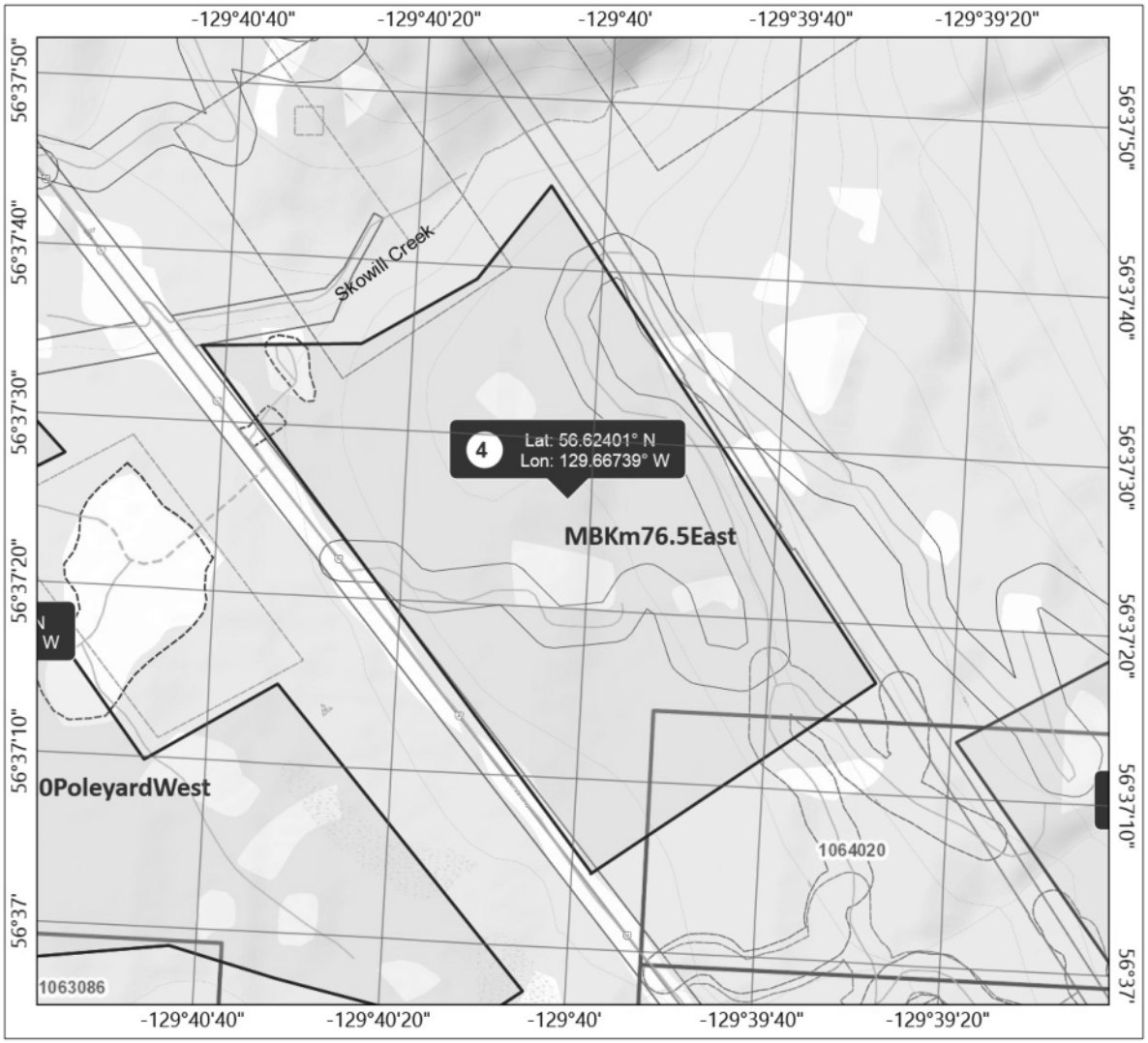
- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

1: 20,000

0 0.41 0.83 km

N

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size



McElhanney Ltd.

MBKm76.5East

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
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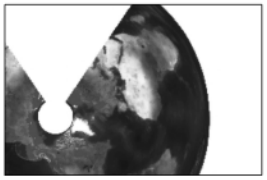


1: 10,000

0 0.21 0.41 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

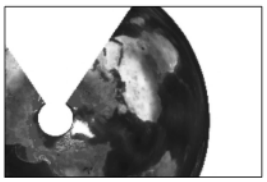
McElhanney Ltd.

NBellIrvingBridgeKm0

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area



1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

SideslipPlateau

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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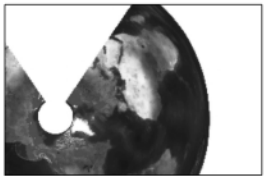


1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse

Map produced in iMapBC

Datum: WGS 1984 Web Mercator

Map Date: December 10 2020

Prepared By: E. Davidson

Created for 8.5 x 11 inch paper size

N

BRITISH COLUMBIA

B2CC

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Ten (10) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

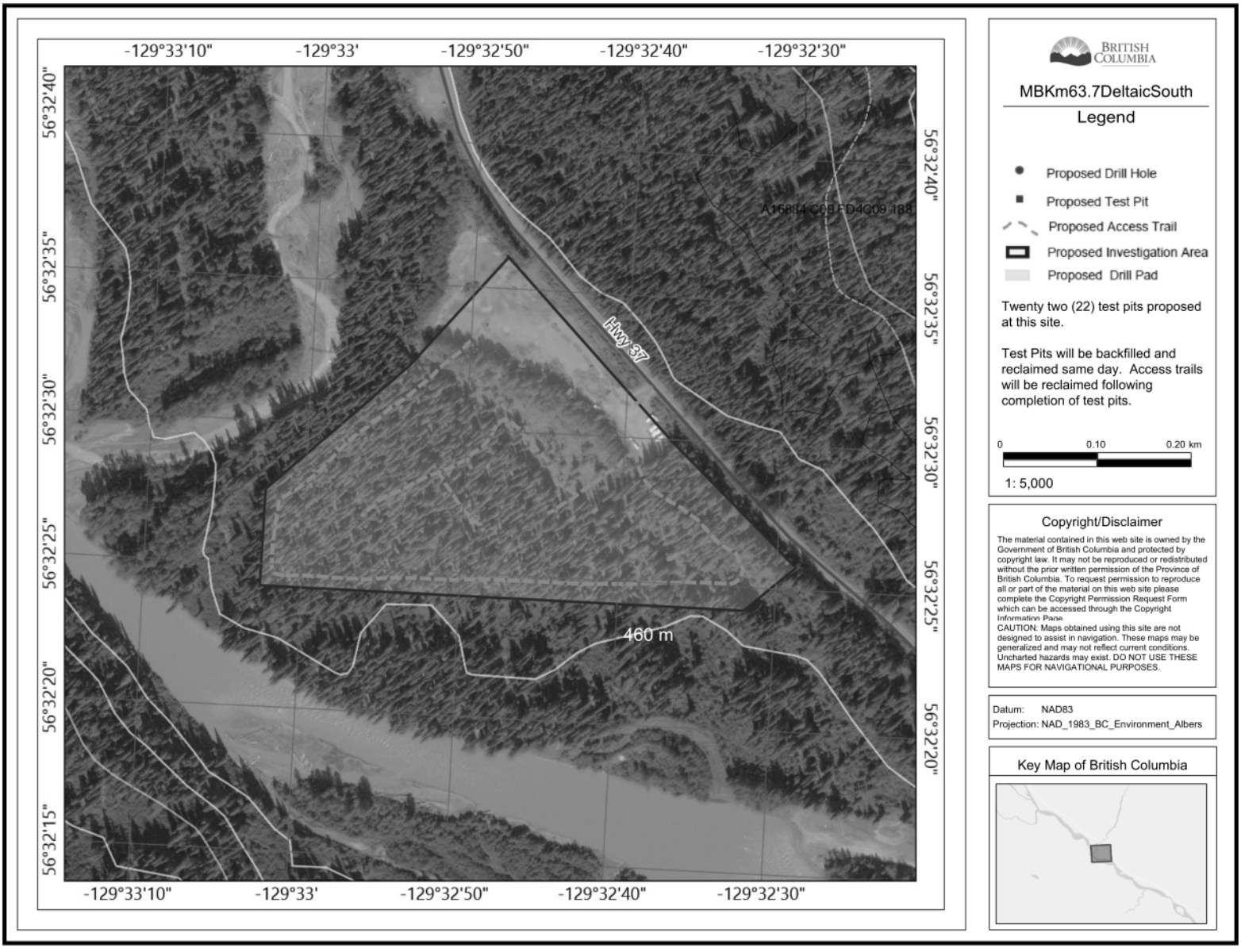
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia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-129°33'
-129°32'50"
-129°32'40"
-129°32'30"
56°32'40"
56°32'35"
56°32'30"
56°32'25"
56°32'20"
56°32'15"
Hwy 37
460 m
MBKm63.7DeltaicSouth
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Twenty two (22) test pits proposed at this site.
Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.
0
0.10
0.20 km
1: 5,000
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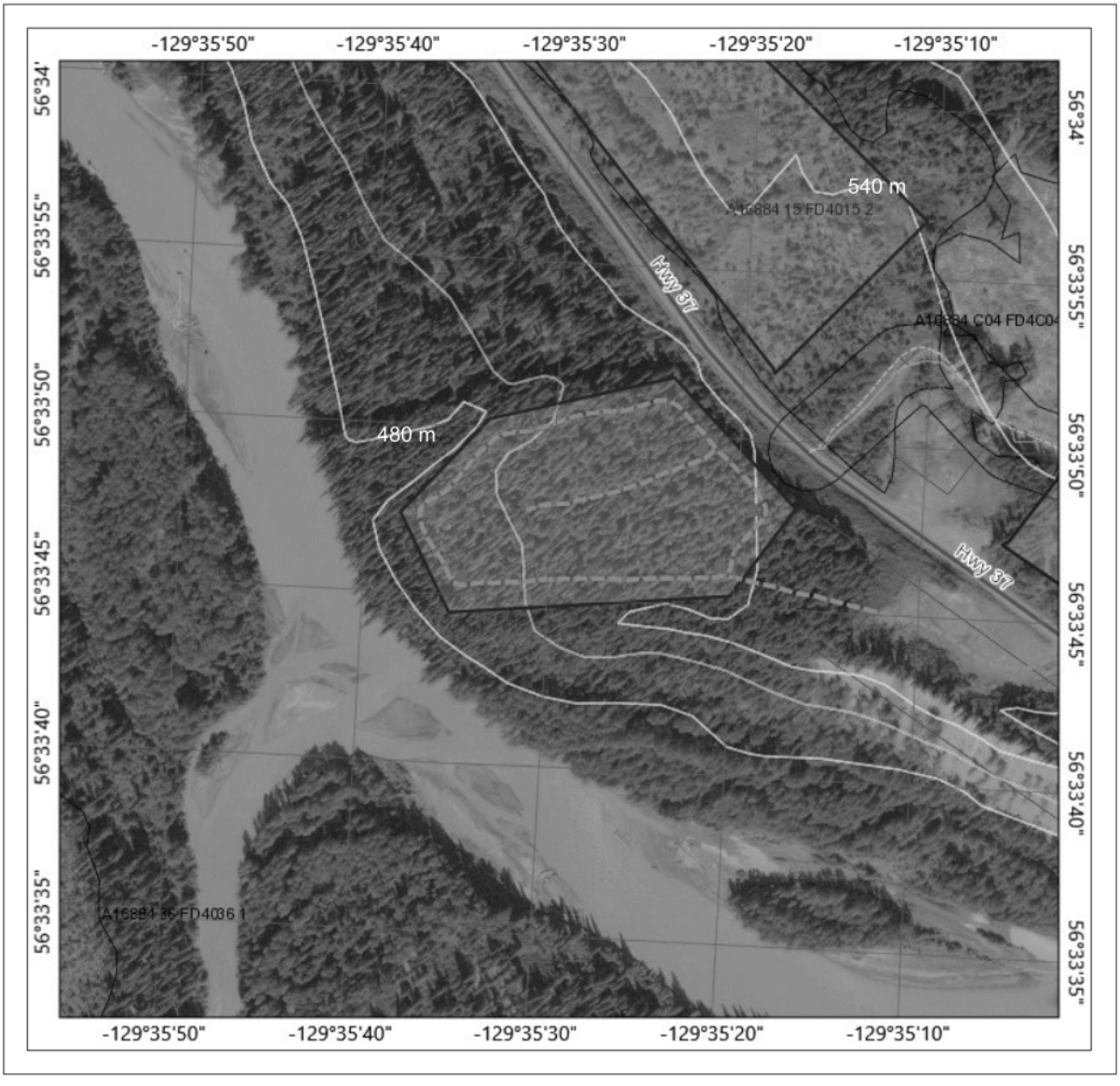
Projection: NAD_1983_BC_Environment_Albers
Key Map of British Columbia



BRITISH COLUMBIA

MBKm67.5WestDeltaicGravel

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Eleven (11) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

0 0.10 0.20 km

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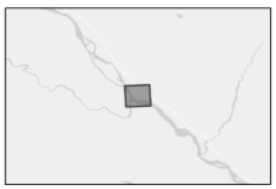
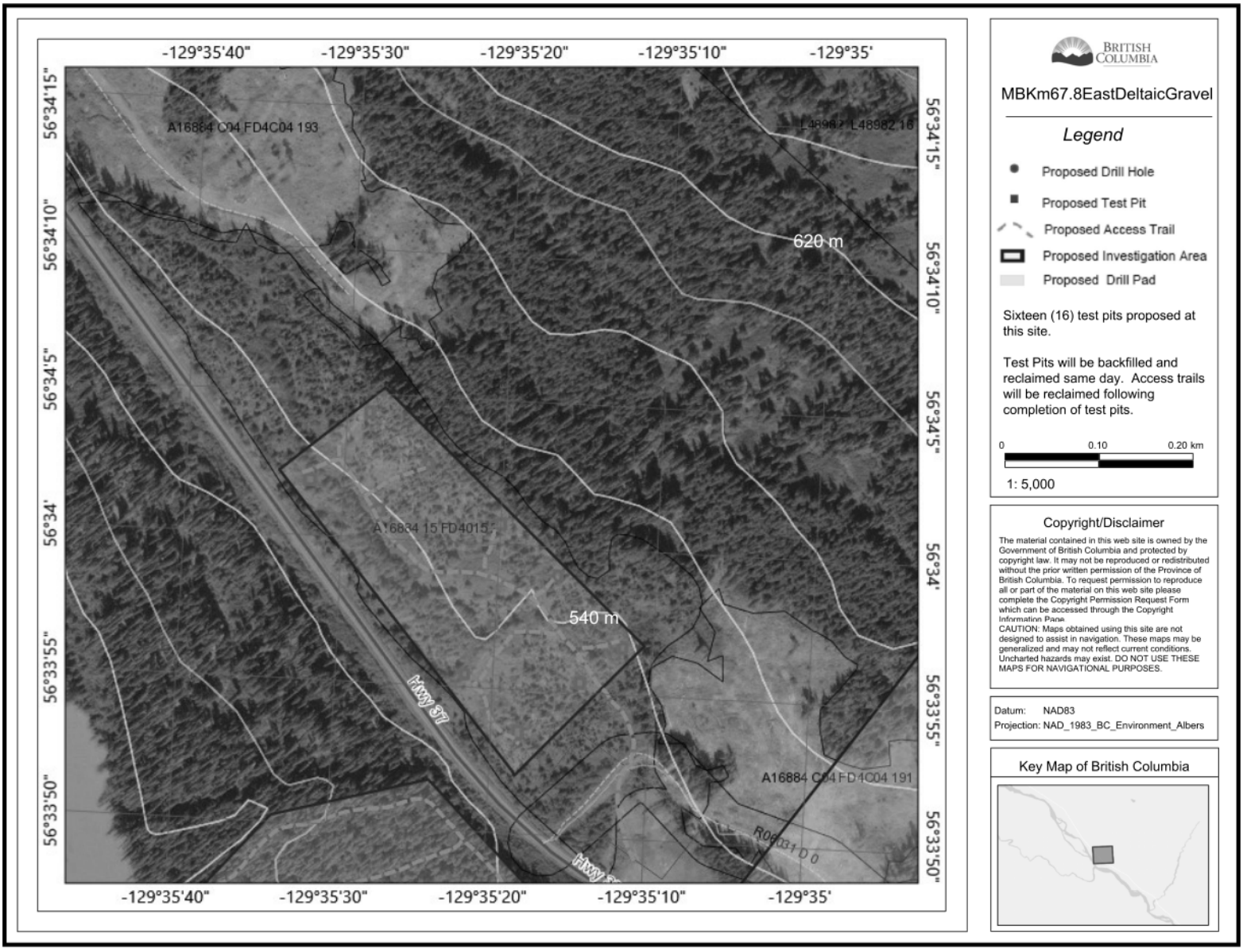
Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia

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-129°35'10"
-129°35'
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56°34'10"
56°34'5"
56°34'
56°33'55"
56°33'50"
A16884 C04 FD4C04 193
620 m
A16884 15 FD4015
540 m
Hwy 37
A16884 C04 FD4C04 191
MBKm67.8EastDeltaicGravel
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Sixteen (16) test pits proposed at this site.
Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.
0
0.10
0.20 km
1: 5,000
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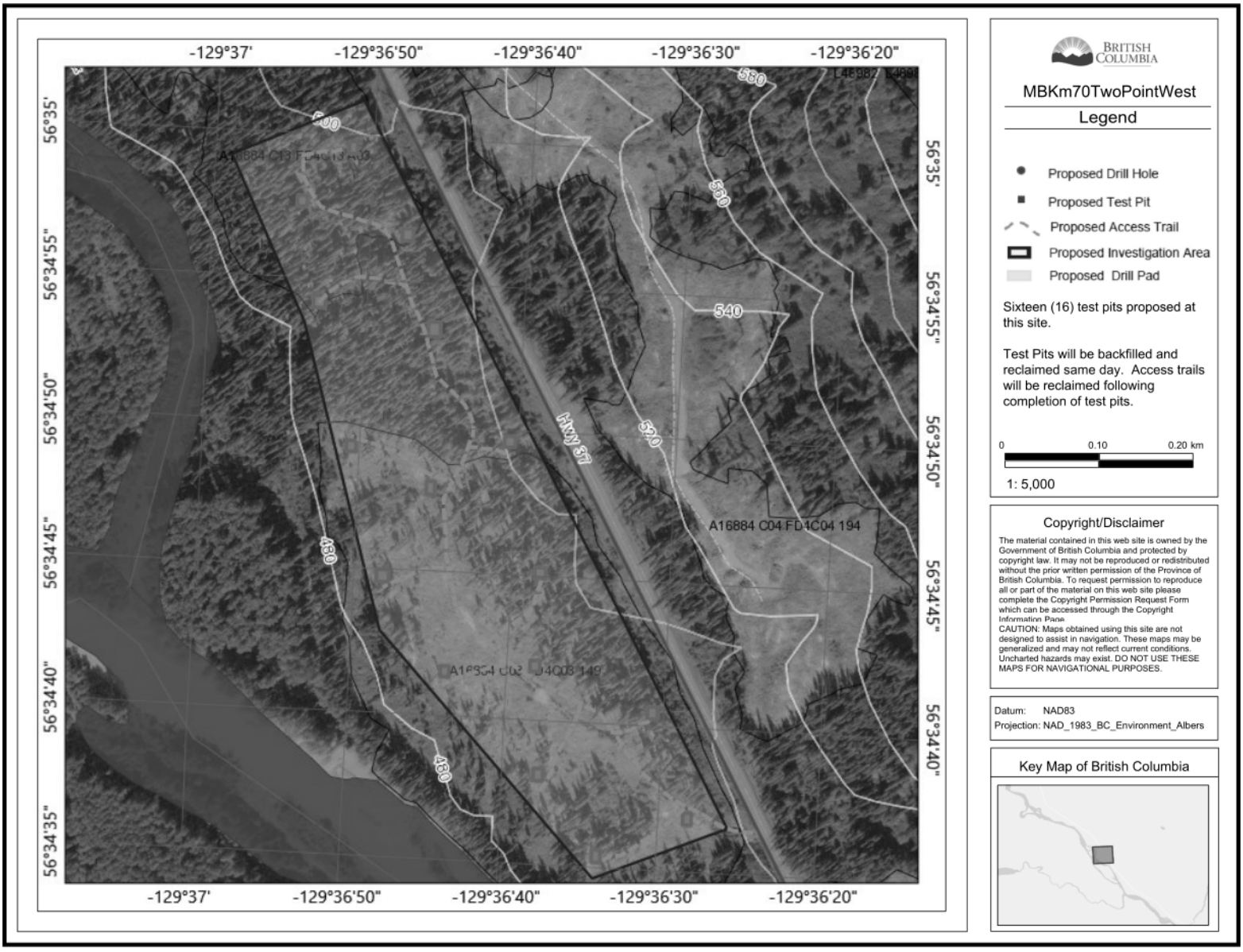


BRITISH COLUMBIA

MBKm70TwoPointWest

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Sixteen (16) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

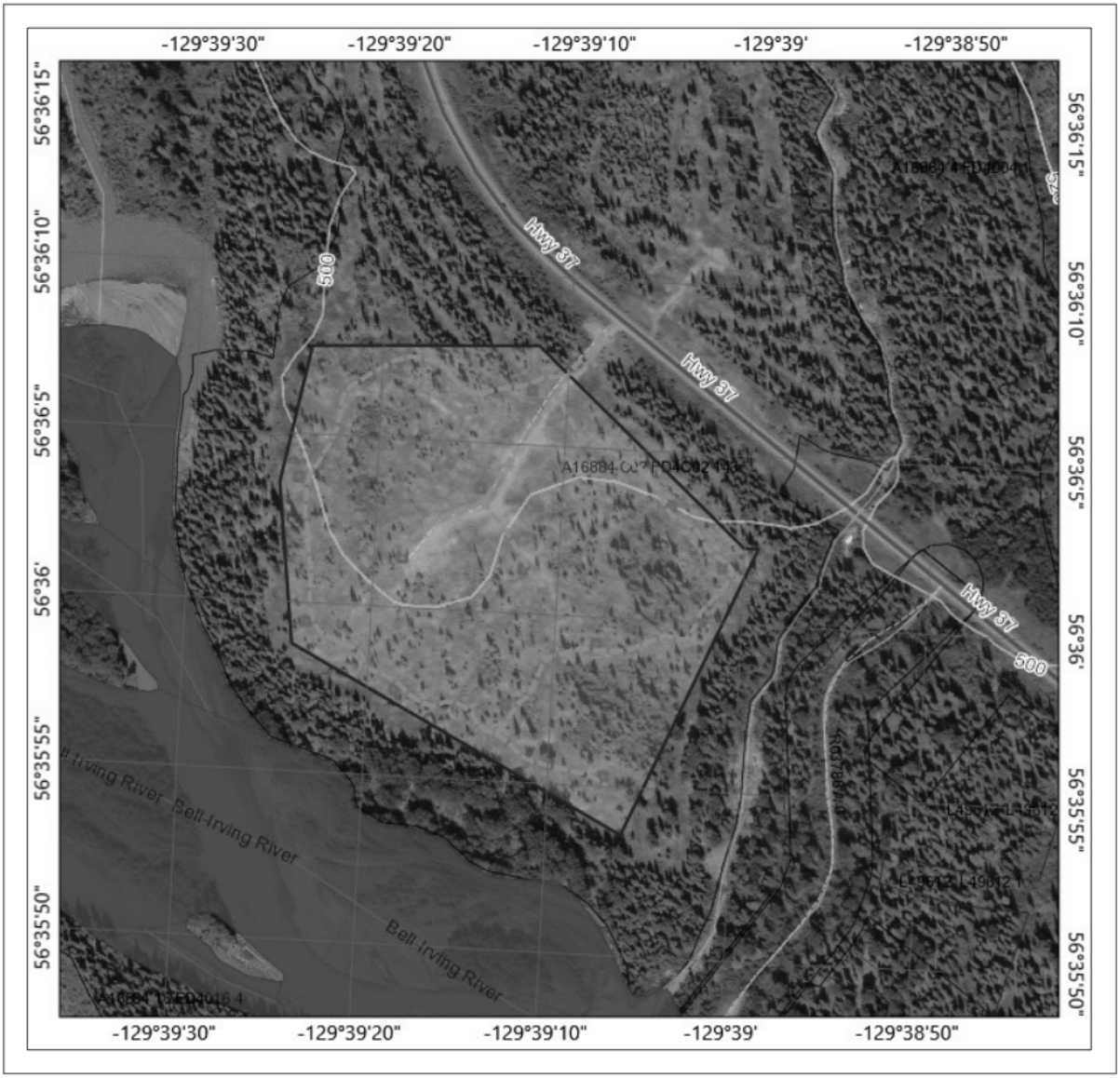
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm73.3GlacierNorth

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Fourteen (14) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

0 0.10 0.20 km

1: 5,000

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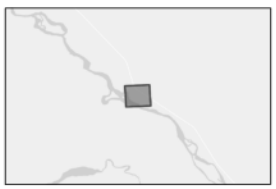
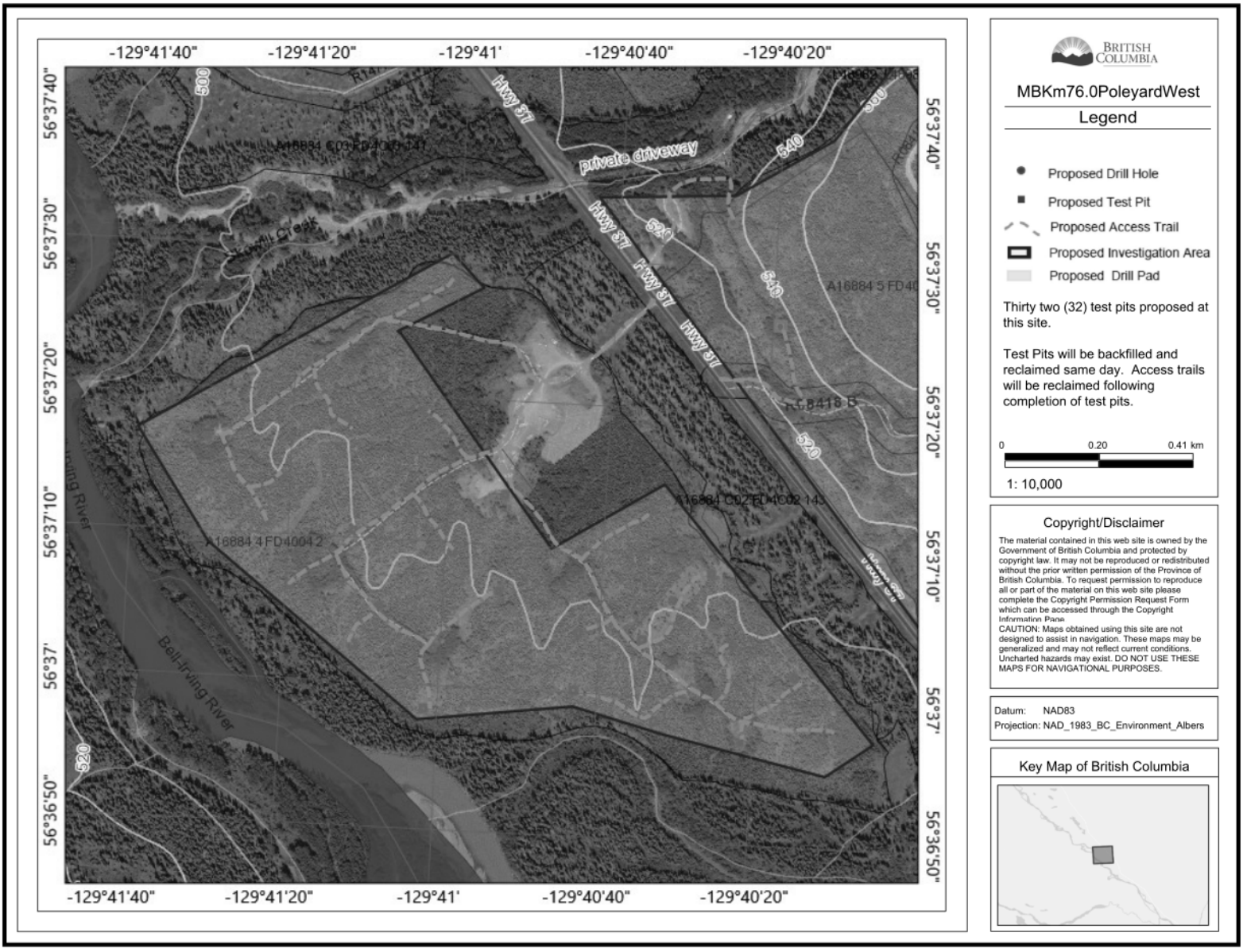
Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia





BRITISH COLUMBIA

MBKm76.0PoleyardWest

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Thirty two (32) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

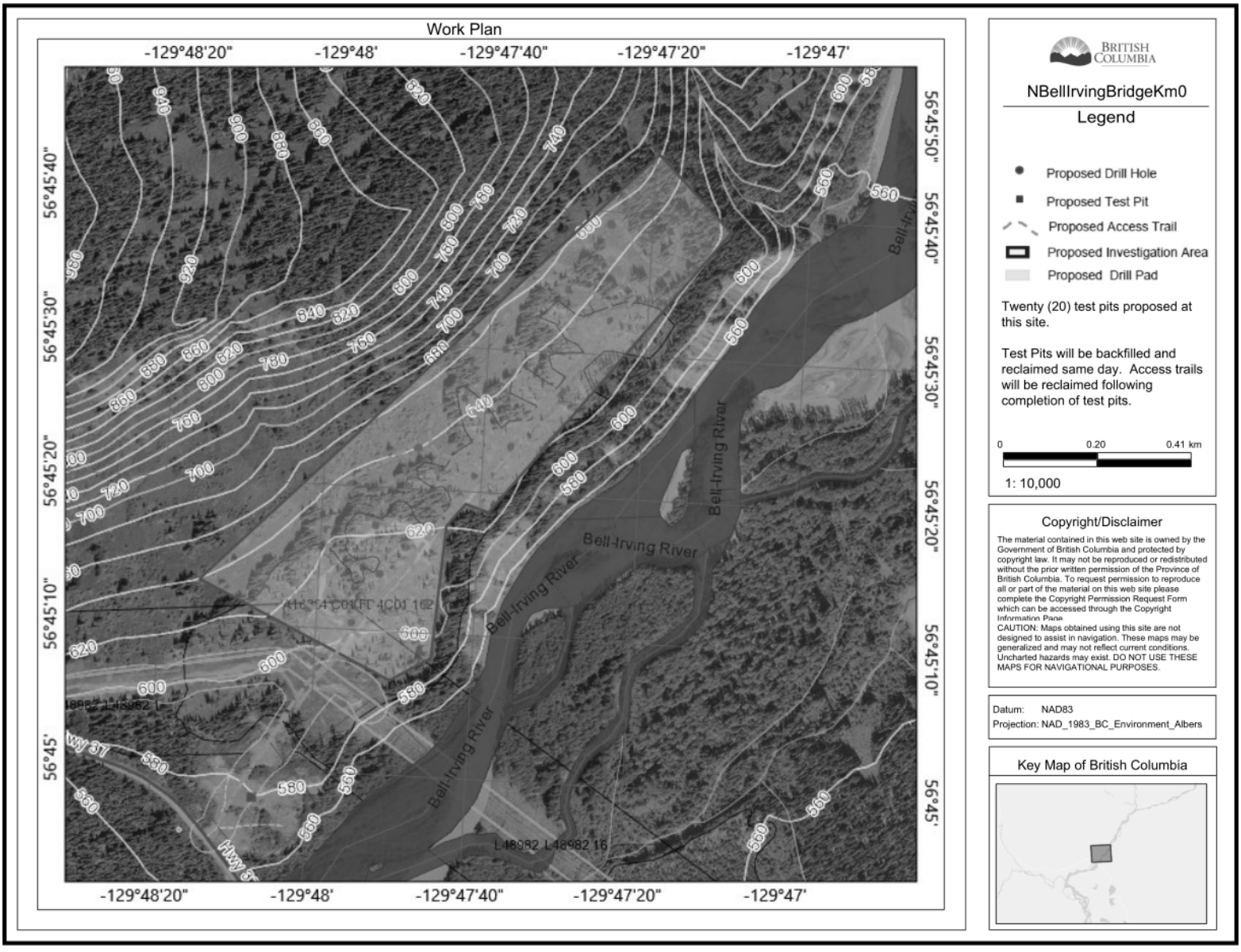
0 0.20 0.41 km

1: 10,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia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-129°48'
-129°47'40"
-129°47'20"
-129°47'
56°45'40"
56°45'30"
56°45'20"
56°45'10"
56°45'
Bell-Irving River
L48982 L48982 16
NBellIrvingBridgeKm0
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Twenty (20) test pits proposed at this site.
Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.
0
0.20
0.41 km
1: 10,000
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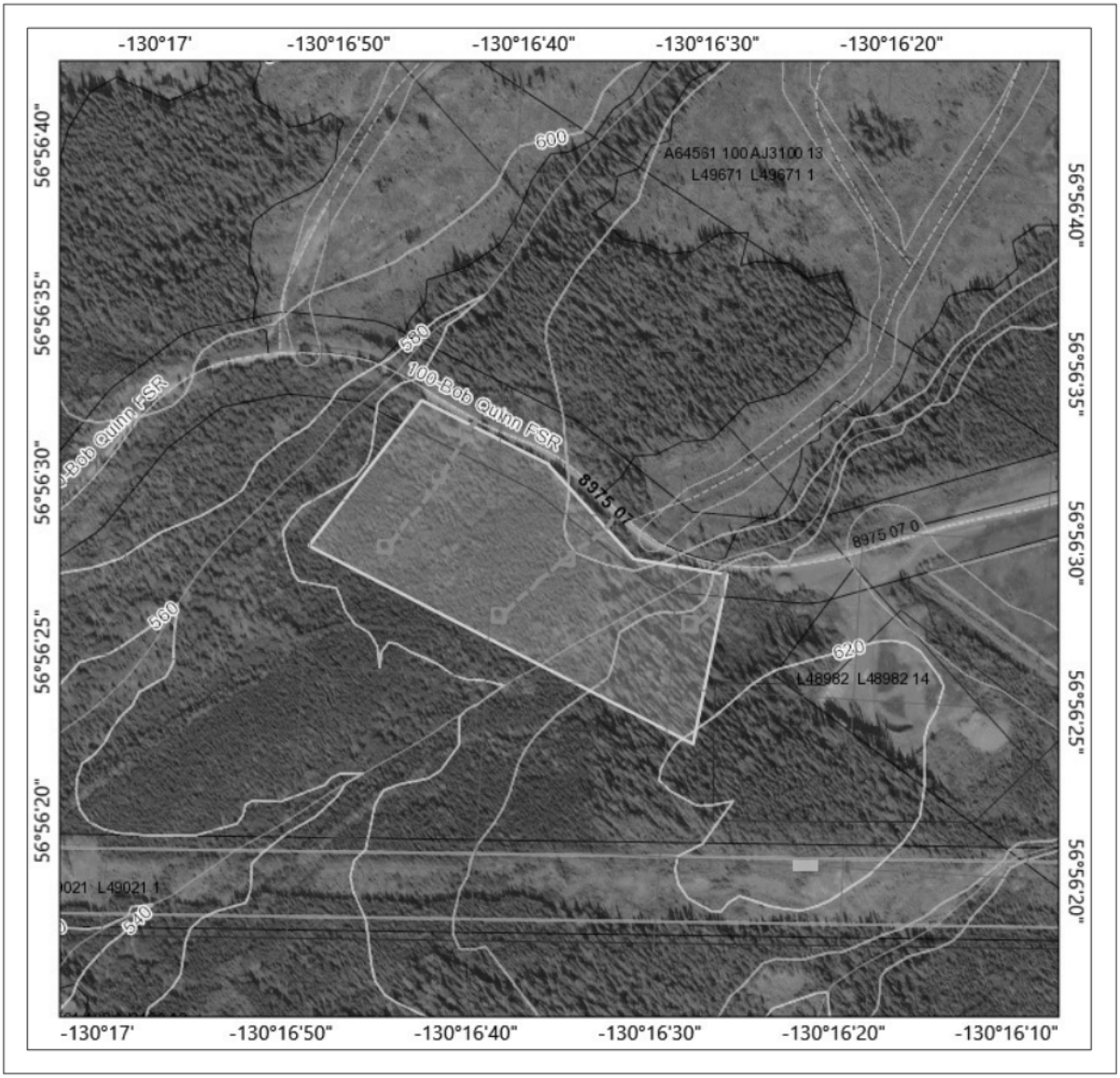


Bob Quinn Substation

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Five (5) drill holes proposed at this site. Five (5) drill pads to be constructed.

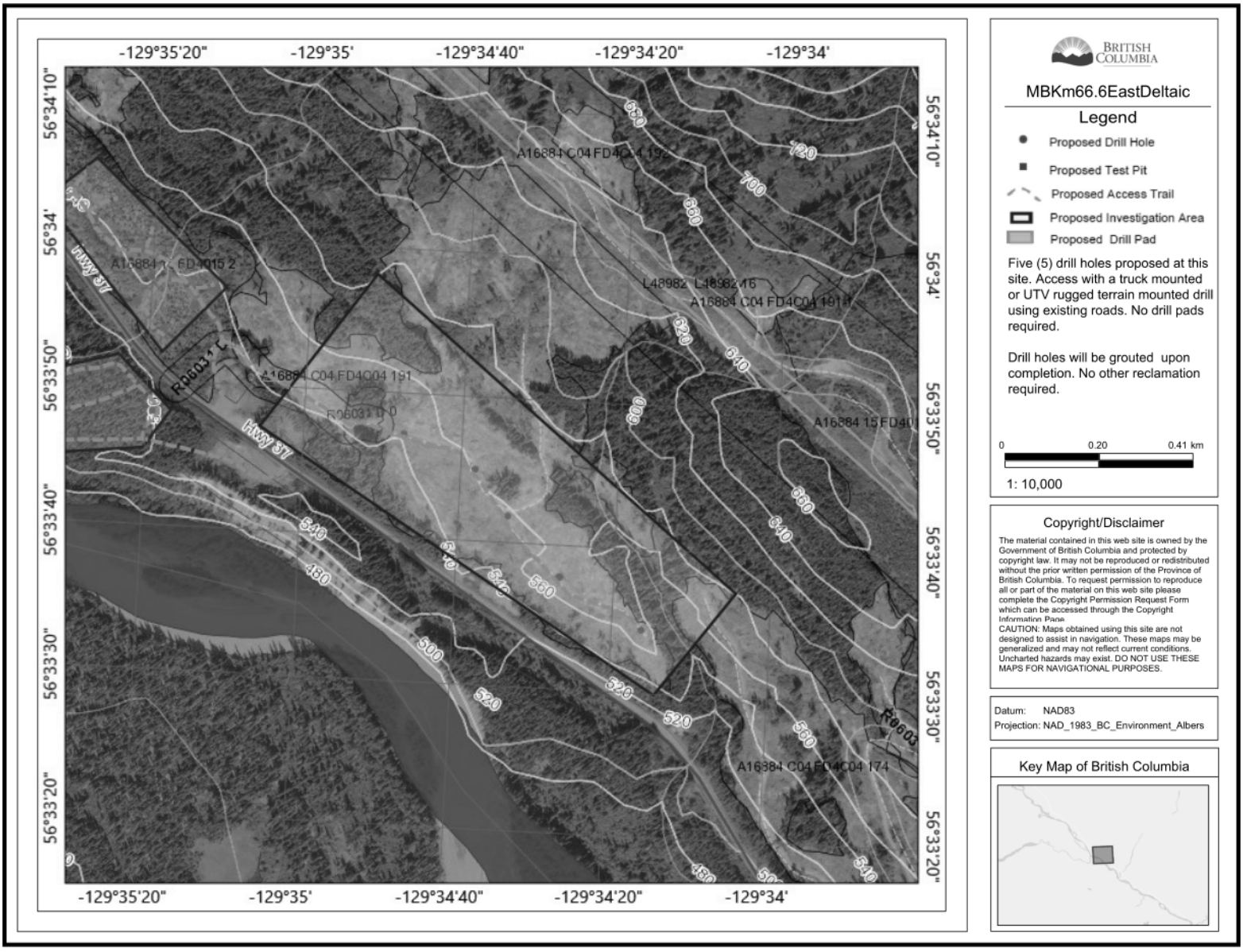
Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

0 0.10 0.20 km

1: 5,000

Datum: NAD83
Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia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-129°35'
-129°34'40"
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-129°34'
56°34'10"
56°34'
56°33'50"
56°33'40"
56°33'30"
56°33'20"
A16884 C04 FD4C04 192
A16884 C04 FD4C04 191
A16884 C04 FD4C04 174
L48982 L48982 16
A16884 C04 FD4C04 191
A16884 15 FD40
Hwy 37
R06031 D 0
Rd603
MBKm66.6EastDeltaic
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Five (5) drill holes proposed at this site. Access with a truck mounted or UTV rugged terrain mounted drill using existing roads. No drill pads required.
Drill holes will be grouted upon completion. No other reclamation required.
0
0.20
0.41 km
1: 10,000
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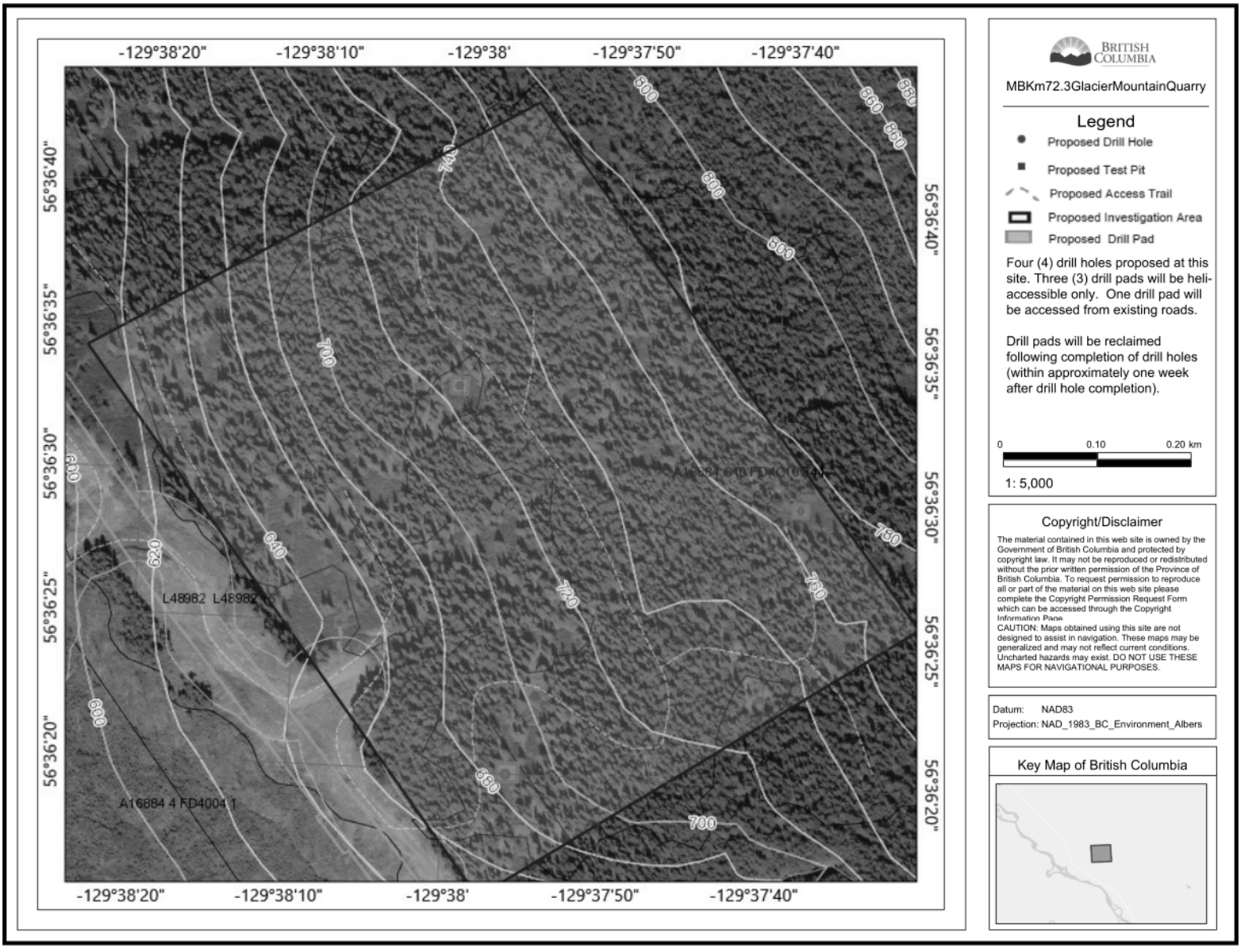


BRITISH COLUMBIA

MBKm72.3GlacierMountainQuarry

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Four (4) drill holes proposed at this site. Three (3) drill pads will be heli-accessible only. One drill pad will be accessed from existing roads.

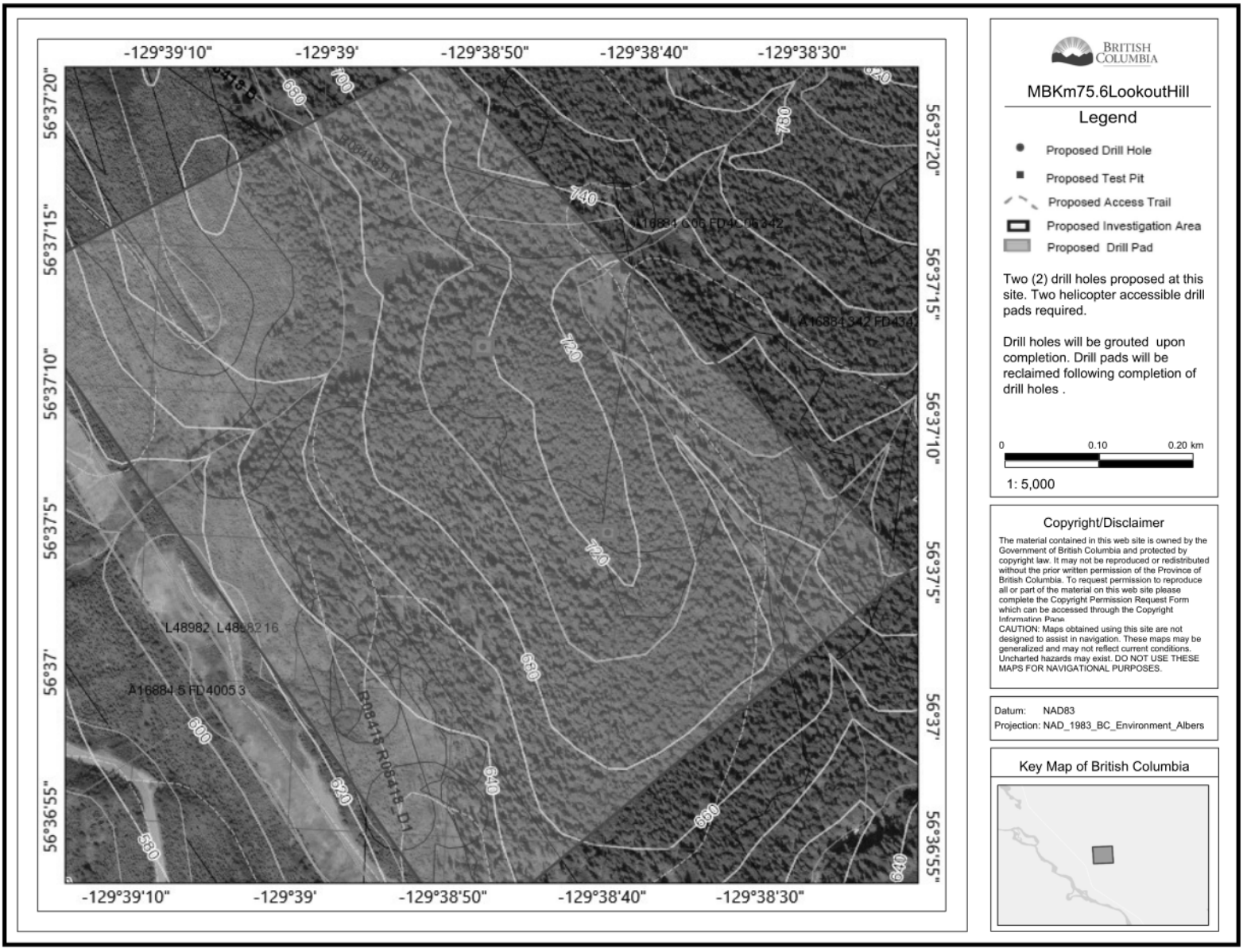
Drill pads will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

0 0.10 0.20 km

1: 5,000

Datum: NAD83
Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm75.6LookoutHill

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Two (2) drill holes proposed at this site. Two helicopter accessible drill pads required.

Drill holes will be grouted upon completion. Drill pads will be reclaimed following completion of drill holes .

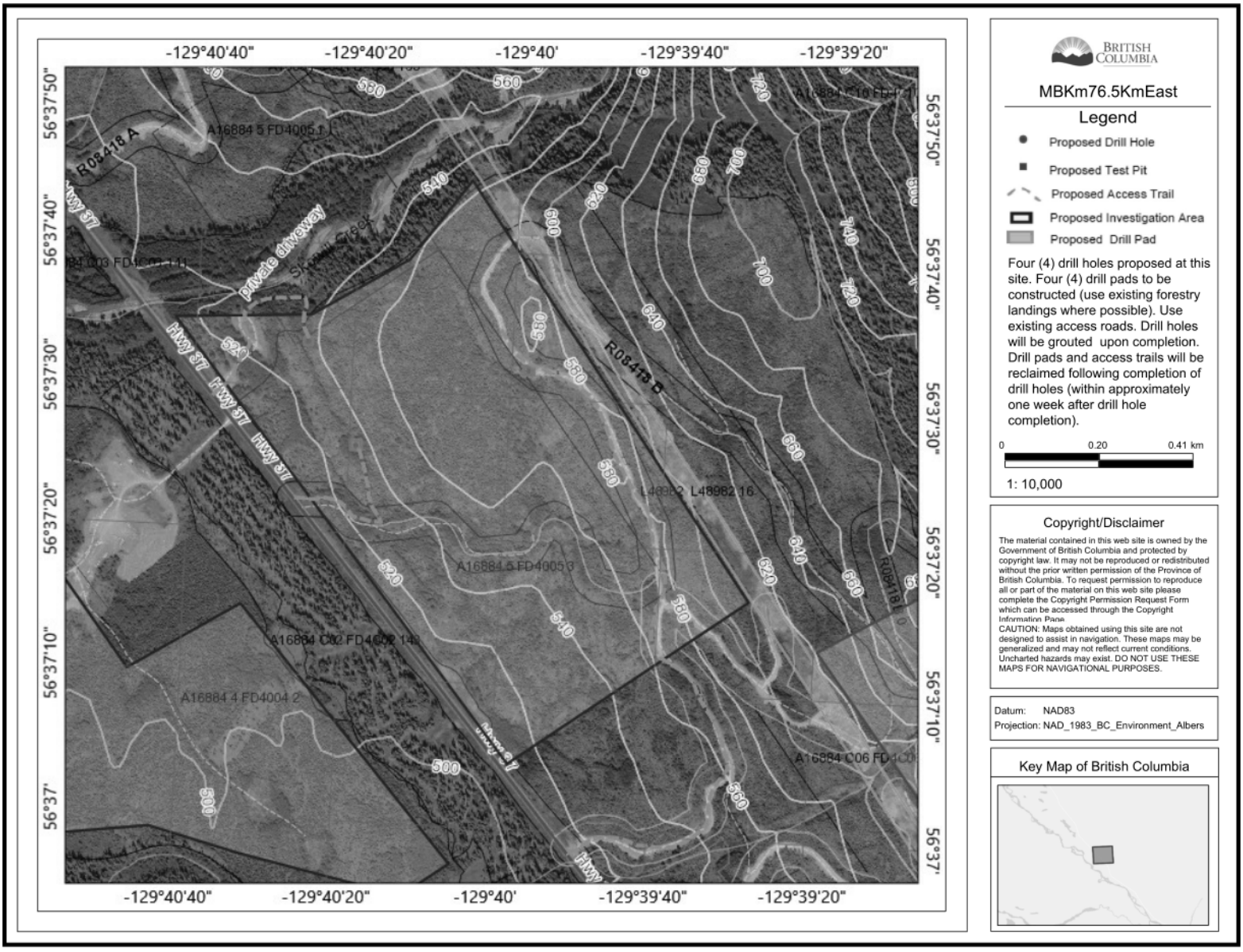
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm76.5KmEast

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Four (4) drill holes proposed at this site. Four (4) drill pads to be constructed (use existing forestry landings where possible). Use existing access roads. Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

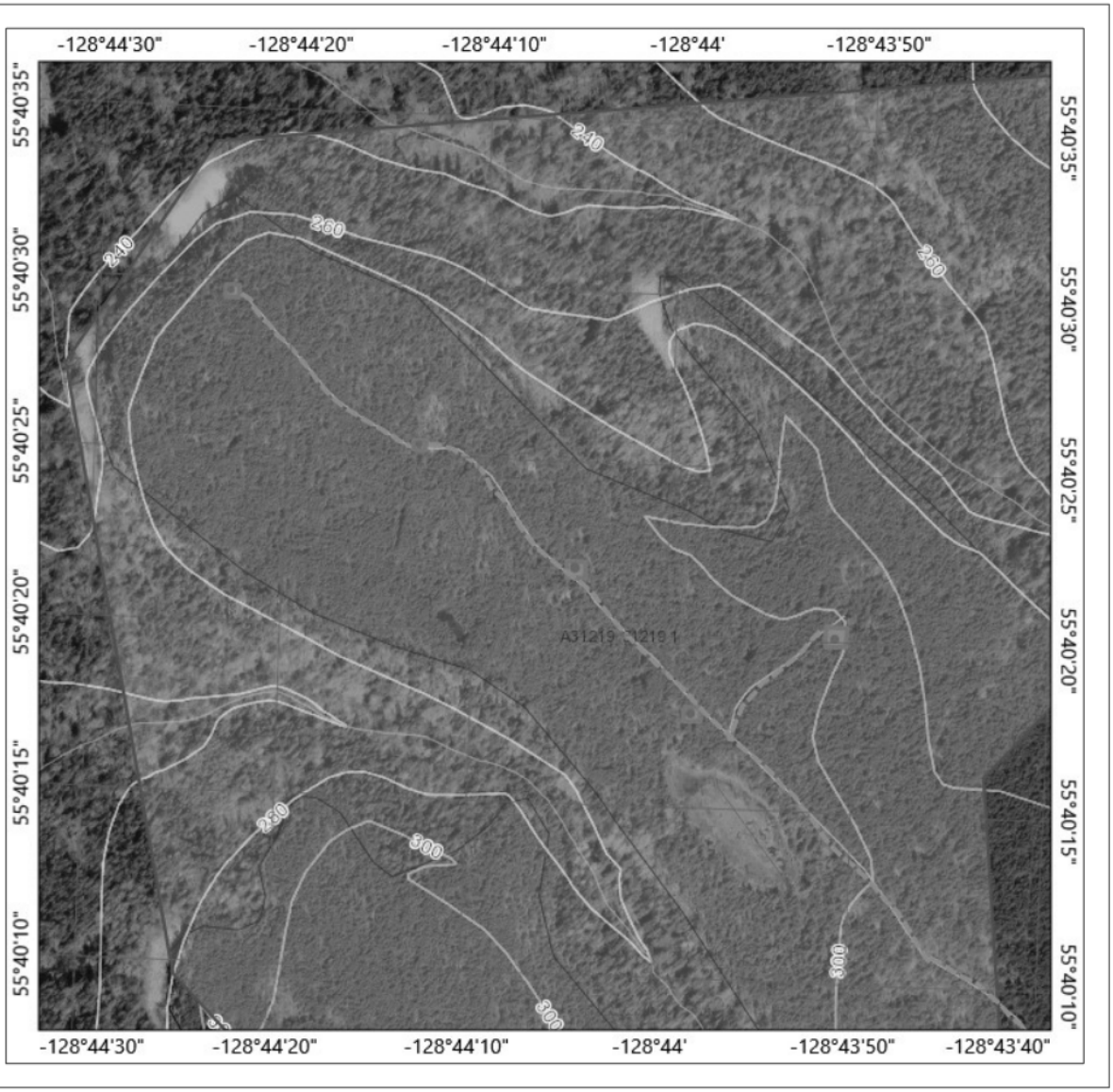
0 0.20 0.41 km

1: 10,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

Sideslip Plateau North Portion

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Five (5) drill holes proposed in the northern portion. Utilize a UTV mounted drill rig to minimize drill pad area. Use existing access roads, some brushing may be required. Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

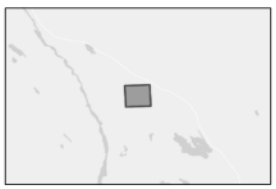
0 0.10 0.20 km

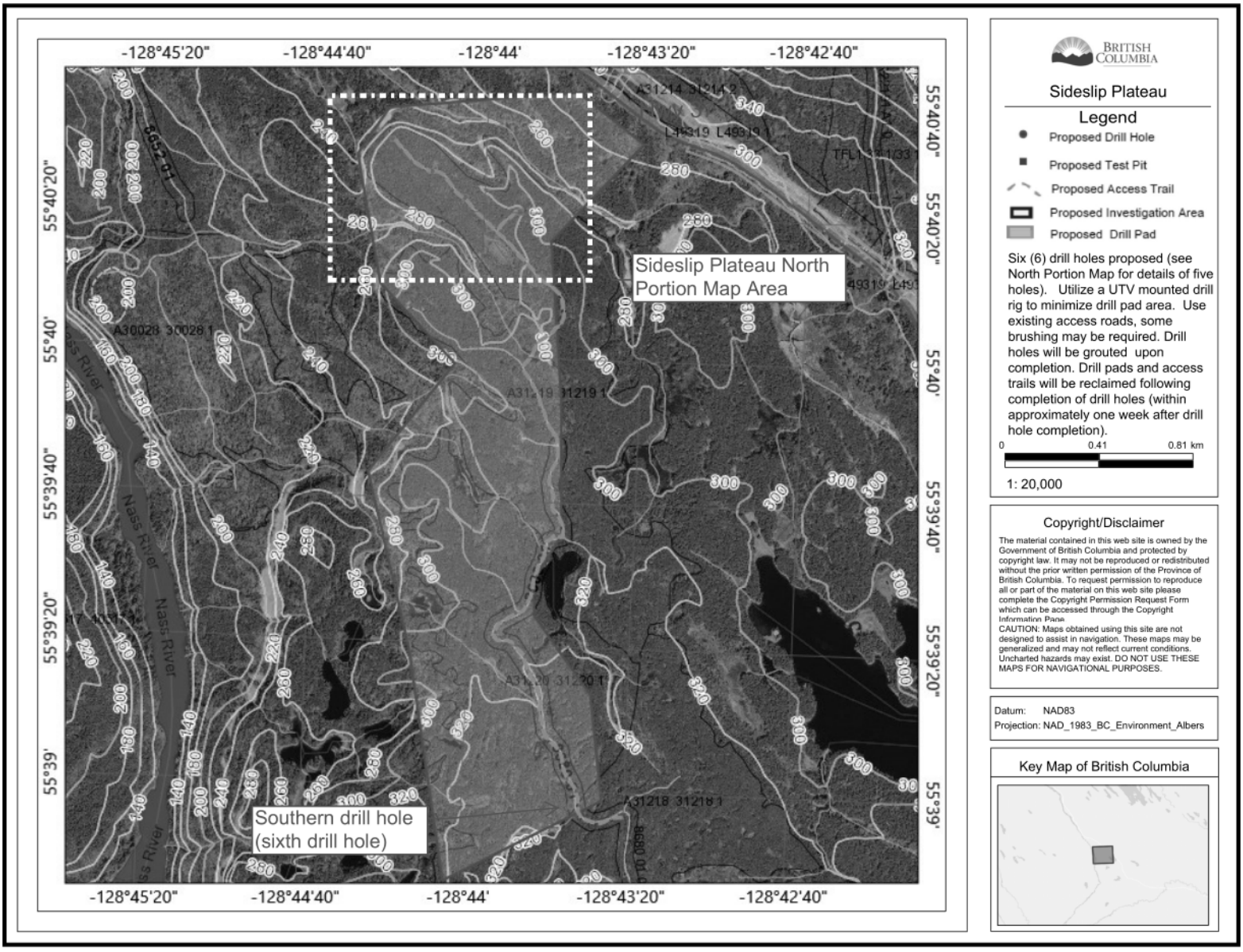
1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia

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-128°44'40"
-128°44'
-128°43'20"
-128°42'40"
55°40'20"
55°40'
55°39'40"
55°39'20"
55°39'
Sideslip Plateau North Portion Map Area
Southern drill hole (sixth drill hole)
Nass River
Sideslip Plateau
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Six (6) drill holes proposed (see North Portion Map for details of five holes). Utilize a UTV mounted drill rig to minimize drill pad area. Use existing access roads, some brushing may be required. Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).
0
0.41
0.81 km
1: 20,000
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Key Map of British Columbia

KSM Project Archaeological Chance Find Procedure

There are more than 32,000 archaeological sites currently recorded in British Columbia with many more being added to the provincial inventory every year. For this reason, it is very likely that you will encounter an archaeological site during your lifetime either knowingly or unknowingly. This protocol has been established to increase awareness of this important resource and to assist in planning future developments.

The remnants of British Columbia's earliest cultures are represented in today's landscape by a wide variety of site types, most of which are related to art, habitations, resource gathering and production, tool making, and traditional ceremonial or ritual activities. Some sites that may be immediately visible to a non-archaeologist include:

- Rock art, including pictographs and petroglyphs.
- Tree art and Culturally Modified Trees (CMT'S) such as bark stripping and planks.
- Surface features such as depressions created by former habitations, earthen fortifications; rock cairns, fish traps, clam gardens, burned rock and middens.
- Artifacts that have become visible on the land surface owing to erosion or recent land altering activity. These may be produced in a variety of materials such as stone, bone, antler, wood, or shell. Artifacts made of obsidian (volcanic glass) are common in the region.
- Buried cultural remains that may be sighted in a cut-bank, excavation, eroded shoreline, or other exposed deposit (such as melting out of a glacier).

If you discover a site in the course of your work that you suspect may be a possible archaeological site;

- Stop all work in the area to avoid damaging the site.
- **Do not disturb any archaeological remains that you may encounter.**
- Report your discovery to your supervisor or if they are unavailable, Seabridge Gold's Environmental Manager will provide further instructions and can be reached 250-847-4704.
- Isolate and protect the area.
- Note the location and leave all discoveries in place.
- Prepare an initial Chance Find Form.
- KSM Mining ULC will contact the Project Archaeologist.
- The Project Archaeologist will assess the potential significance of the find. If it is determined to be archaeological in nature they will contact the Archaeology Branch.
- The archaeologist, in consultation with the Archaeology Branch, will conduct a investigation consistent with the Archeology Permit.
- The archaeologist will work with KSM Mining ULC and the Mine Site Manager to prepare a Site Instruction to recommence work in the area.
- A site report will be submitted to KSM Mining ULC, First Nations and the Archeological Branch.

If you discover what you suspect may be a possible human remains in the course of your work;

- Stop all work in the area to avoid damaging the site.
- **Do not disturb any possible human remains that you may encounter.**
- Report your discovery to your supervisor or if they are unavailable, the Company who will provide further instructions.
- If you are unable to contact a Company representative, and the suspected human remains appear to be current, contact the RCMP.
- If you are unable to contact a Company representative, please contact the Archaeology Branch by telephone at 250-953-3334.

The following steps will generally be followed

- The Coroner's Office and local policing authority are notified and the Coroner's Office determines whether the matter is of contemporary forensic concern.
- If the remains are not of forensic concern, the branch will attempt to facilitate disposition of the remains.
- If a cultural affiliation for the remains can be determined, the branch will contact an organization representing that cultural group. If the remains are of aboriginal ancestry, the branch will attempt to contact the relevant First Nation(s).
- Generally, if remains are still buried and are under no immediate threat of further disturbance, they will not be excavated or removed. If the remains have been partially or completely removed, the Branch will facilitate disposition.

Archaeological Chance Find Report Form

Recorder's Name/Affiliation:_____

Date:_____

Location of chance find (Location description, UTM coordinates, road, quarter section, depth below surface):_____

_____

_____

Description of find:_____

_____

_____

Method used to mark and protect find:_____

_____

_____

Distribution:

☐	☐	☐	☐
Mine Site Manager	KSM Mining ULC	Site Archaeologist	Archaeology Branch

Sketch Map	Photo

Comment Tracking Table Highway 37 Gravel Sources Application for a Notice of Work

Cmt #	Indigenous Group	Date	Reviewer	Comment	Seabridge Gold Response

s.16

Page 073 of 224 to/à Page 074 of 224

Withheld pursuant to/removed as

s.16

Our File: [2511-01367-01]

TECHNICAL MEMO

To	From
Ministry of Energy, Mines and Low Carbon Innovation	Emily Davidson, P.Eng., P.Geo. Geotechnical Engineer Agent to KSM Seabridge Gold Inc.
Re	**Date**
NoW Permit Application No. 100334592 Aggregate and Quarry Investigation Plans	January 4, 2021

1. Introduction

KSM Seabridge Gold Inc. (KSM) is submitting a Notice of Work (NoW) Application (Tracking Number 100334592) to conduct investigative testing for thirteen (13) potential aggregate sources and one (1) camp site location along the Highway 37 Corridor between Bob Quinn Lake and Cranberry Junction, BC (See Figure 1. KSM Project Regional Location Map). McElhanney Ltd. (McElhanney) is acting Agent to KSM for permit applications.

Representatives from Ministry of Energy, Mines and Low Carbon Innovation (MEMLCI), KSM and McElhanney discussed on November 26, 2020 combining all fourteen (14) sites into one NoW permit application for investigative purposes. This memo provides the supporting data for each of the sites to support the NoW Application No. 100334592. Names and coordinates of each site, and the type of investigation proposed at each site are listed in Table 1. Site Names, Coordinates and Investigation Type. Figure 2. Investigation Sites for Seabridge Gold shows the location of each of the sites along the Hwy 37 Corridor. The following sections list the information required and referenced in the NoW Permit Application. Note that the Legal Description of all sites is Unsurveyed Crown Land in the Cassiar District.

Site Name	Latitude	Longitude	Investigation Type
MBKm70TwoPointWest	56.57986	-129.61191	Test Pits
MBKm67.8EastDeltaicGravel	56.56647	-129.58959	Test Pits
MBKm67.5WestDeltaicGravel	56.56336	-129.59104	Test Pits
MBKm63.7DeltaicSouth	56.54294	-129.54659	Test Pits
MBKm73.3GlacierNorth	56.6006	-129.65363	Test Pits
MBKm76.0PoleyardWest	56.62052	-129.68528	Test Pits
NBellIrvingBridgeKm0	56.75463	-129.79772	Test Pits
MBKm76.5East	56.62401	-129.66739	Drill Holes
MBKm66.6EastDeltaic	56.5629	-129.5774	Drill Holes
Bob Quinn Substation	56.94123	-130.27714	Drill Holes
MBKm75.6Lookouthill	56.61882	-129.64765	Drill Holes
SideslipPlateau	55.67363	-128.73386	Drill Holes
MBKm72.3GlacierMtnQuarry	56.60848	-129.63271	Drill Holes
B2CC	56.74018	-129.77817	Test Pits

Table 1. Site Names, Coordinates and Investigation Type

1.1. TENURE NUMBERS

Table 2. Tenure Numbers lists all tenure overlaps in each of the subject sites. Tenure Maps for each site are listed in Appendix A. Tenure maps.

Sites	Mineral Tenures	Commercial Recreation Tenure
MBKm70TwoPointWest	566474*, 566477*, 566476*	6406136
MBKm67.8EastDeltaicGravel	566494*	6406136
MBKm67.5WestDeltaicGravel	566494*	6406136
MBKm63.7DeltaicSouth	1063106	6406136
MBKm73.3GlacierNorth	1069369, 1063086	6406136
MBKm76.0PoleyardWest	1069370, 1063086	6406136
NBellIrvingBridgeKm0	None	6406136
MBKm76.5East	1069370, 1064020*	6406136
MBKm66.6EastDeltaic	566494*, 1063104	6406136
Bob Quinn Substation	None	None
MBKm75.6Lookouthill	1069370, 1064020*	6406136
SideslipPlateau	None	None
MBKm72.3GlacierMtnQuarry	1069369	6406136
B2CC	None	6406136

* Denotes Tenures held by KSM Mining ULC.

Table 2. Tenure Numbers.

1.2. DETAILED DIRECTIONS FROM THE SITE TO THE NEAREST MUNICIPALITY

The following table lists the detailed directions from each site to the nearest municipality. All sites are closest to Stewart with the exception of SideslipPlateau which is closer to Kitwanga.

Site Names	Direction from Site to Nearest Municipality
MBKm70TwoPointWest	70 Km SE on BC-37 then west 60.6 Km on Hwy37A (130.6Km total)
MBKm67.8EastDeltaicGravel	67.8 Km SE on BC-37 then west 60.6 Km on Hwy37A (128.4Km total)
MBKm67.5WestDeltaicGravel	67.5 Km SE on BC-37 then west 60.6 Km on Hwy37A (128.1Km total)
MBKm63.7DeltaicSouth	63.7 Km SE on BC-37 then west 60.6 Km on Hwy37A (124.3Km total)
MBKm73.3GlacierNorth	73.3 Km SE on BC-37 then west 60.6 Km on Hwy37A (133.9Km total)
MBKm76.0PoleyardWest	76.0 Km SE on BC-37 then west 60.6 Km on Hwy37A (137Km total)
NBellIrvingBridgeKm0	93.2 Km SE on BC-37 then west 60.6 Km on Hwy37A (154Km total)
MBKm76.5East	76.5 Km SE on BC-37 then west 60.6 Km on Hwy37A (137.5Km total)
MBKm66.6EastDeltaic	66.6 Km SE on BC-37 then west 60.6 Km on Hwy37A (127.2Km total)
Bob Quinn Substation	137 Km SE on BC-37 then west 60.6 Km on Hwy37A (197Km total)
MBKm75.6Lookouthill	75.6 Km SE on BC-37 then west 60.6 Km on Hwy37A (136.2Km total)
SideslipPlateau	87.4 Km SE on BC-37 to Kitwanga
MBKm72.3GlacierMtnQuarry	72.3 Km SE on BC-37 then west 60.6 Km on Hwy37A (132.9Km total)
B2CC	91.5 Km SE on BC-37 then west 60.6 Km on Hwy37A (152Km total)

Table 3. Directions to Nearest Municipality

1.3. DESCRIPTION OF INVESTIGATION PLANS

1.3.1. Mechanical Test Pit Investigation Plans

Eight (8) sites have test pit investigation plans prepared. Test pit locations and new exploration trails to access the test pits are shown on the individual site maps listed in Appendix B – Test Pit Investigation Plan Maps. Note the details on the exploration trails are described in Section 1.3.3 of this Memo. Table 4. Test Pit Site Details lists the following:

- Name of each site;
- Area of site polygon in Hectares;
- Number of test pits proposed;
- Area of Disturbance (m^2); and
- Merchantable Timber Removal Estimate (m^3).

Site Names	Area (Ha)	Number of Test Pits	Area of Disturbance (m^2)	Merchantable Timber Removal Estimate (m^3)
MBKm70TwoPointWest	16.5	16	72	0
MBKm67.8EastDeltaicGravel	6.8	12	54	0
MBKm67.5WestDeltaicGravel	5.4	11	50	5
MBKm63.7DeltaicSouth	12.1	22	99	3
MBKm73.3GlacierNorth	12.9	14	63	0
MBKm76.0PoleyardWest	72.8	32	144	0
NBellIrvingBridgeKm0	44.0	19	86	0
B2CC	4.6	11	50	0
Total	**175.1**	**137**	**617 (0.06 Ha)**	**8**

Table 4. Test Pit Site Details

1.3.2. Exploration Surface Drilling Investigation Plans

Six (6) sites have exploration surface drilling investigation plans prepared. Drill platforms, drill hole locations and new exploration trails to access the drill sites are shown on the individual site maps listed in Appendix C – Exploration Surface Drilling Investigation Plan Maps. Note the details on the exploration trails are described in Section 1.3.3 of this Memo. Table 5. Details lists the following:

- Name of each site;
- Area of site polygon in Hectares;
- Number of drill holes proposed;
- Area of Drill Platform Disturbance (m^2); and
- Merchantable Timber Removal Estimate (m^3).

Site Names	Area (Ha)	Number of Drill Holes	Number of Drill Platforms	Area of Disturbance (m^2)	Merchantable Timber Removal Estimate (m^3)
MBKm76.5East	70.0	4	4	576	0
MBKm66.6EastDeltaic	35.0	5	0	0	0
Bob Quinn Substation	5.5	5	5	720	10
MBKm75.6Lookouthill	46.0	2	2	288	8
SideslipPlateau	237.0	6	6	864	0
MBKm72.3GlacierMtnQuarry	39.2	4	4	576	0
Total	**432.7**	**26**	**21**	**3024 (0.30 Ha)**	**18**

Table 5. Exploration Surface Drilling Investigation Plan Details

1.3.3.New Exploration Trails

Eleven (11) sites require new exploration trails to access the investigation area. The trails required to access each of the sites are shown on the individual site maps in Appendix B and C. Sites will all be accessed from Hwy 37 by existing access and trail and no new access is required off of the main highway. Within the exploration areas, most sites will be accessed by existing trails and cut block roads. Table 6. New Exploration Trail Details lists the length of new exploration trails required to access the intended test pit or drill hole locations. Note that some drill platforms will be accessed by helicopter and will not require any new trails. The amount of disturbance for the exploration trail will vary based on the type of equipment that will be used. Tracked excavator trails for test pits will have the least amount of disturbance. Table 6. Includes the following details:

- Name of each site;
- Length of new exploration trail proposed (Km);
- Area of Disturbance (m^2); and
- Merchantable Timber Removal Estimate (m^3).

Site Names	Length in Km	Area Disturbance (m^2)	Merchantable Timber Removal Estimate (m^3)
MBKm70TwoPointWest	0.95	760	0
MBKm67.8EastDeltaicGravel	0.60	480	0
MBKm67.5WestDeltaicGravel	1.08	863	3
MBKm63.7DeltaicSouth	1.41	1128	2
MBKm73.3GlacierNorth	0	0	0
MBKm76.0PoleyardWest	3.07	2456	0
NBellIrvingBridgeKm0	1.00	800	0
B2CC	0.35	280	0
MBKm76.5East	0.45	1800	0
MBKm66.6EastDeltaic	0	0	0
Bob Quinn Substation	0.35	1400	12
MBKm75.6Lookouthill	0	0	0
SideslipPlateau	2.00	8000	0
MBKm72.3GlacierMtnQuarry	0.03	120	0
Total	**11.29**	**18087 1.81 (Ha)**	**17**

Table 6. New Exploration Trail Details

1.4. PRESENT STATE OF LAND

Appendix D, Present State of Land Data describes the details of the present state of land for each site where KSM proposes to undertake activities. Appendix D includes the following details for each site:

- Present condition of the land;
- Vegetation;
- Physiography (topography, elevation, presence of wetlands, glaciers, etc.);
- Current means of access;
- Presence of any old equipment, buildings or cabins on site; and
- Recreation trails/use.

1.5. CLOSING

Please do not hesitate to contact the undersigned should you have any questions or comments.

Sincerely,

McElhanney Ltd.

Prepared by:

Emily Davidson, P.Eng., P.Geo.
Division Manager, Geotechnical and Materials

Attachments:

Figure 1. KSM Project Regional Location Map

Figure 2. Investigation Sites for Seabridge Gold

Appendix A – Tenure Maps

Appendix B – Test Pit Investigation Plan Maps

Appendix C – Exploration Surface Drilling Investigation Plan Maps

Appendix D – Present State of Land Data

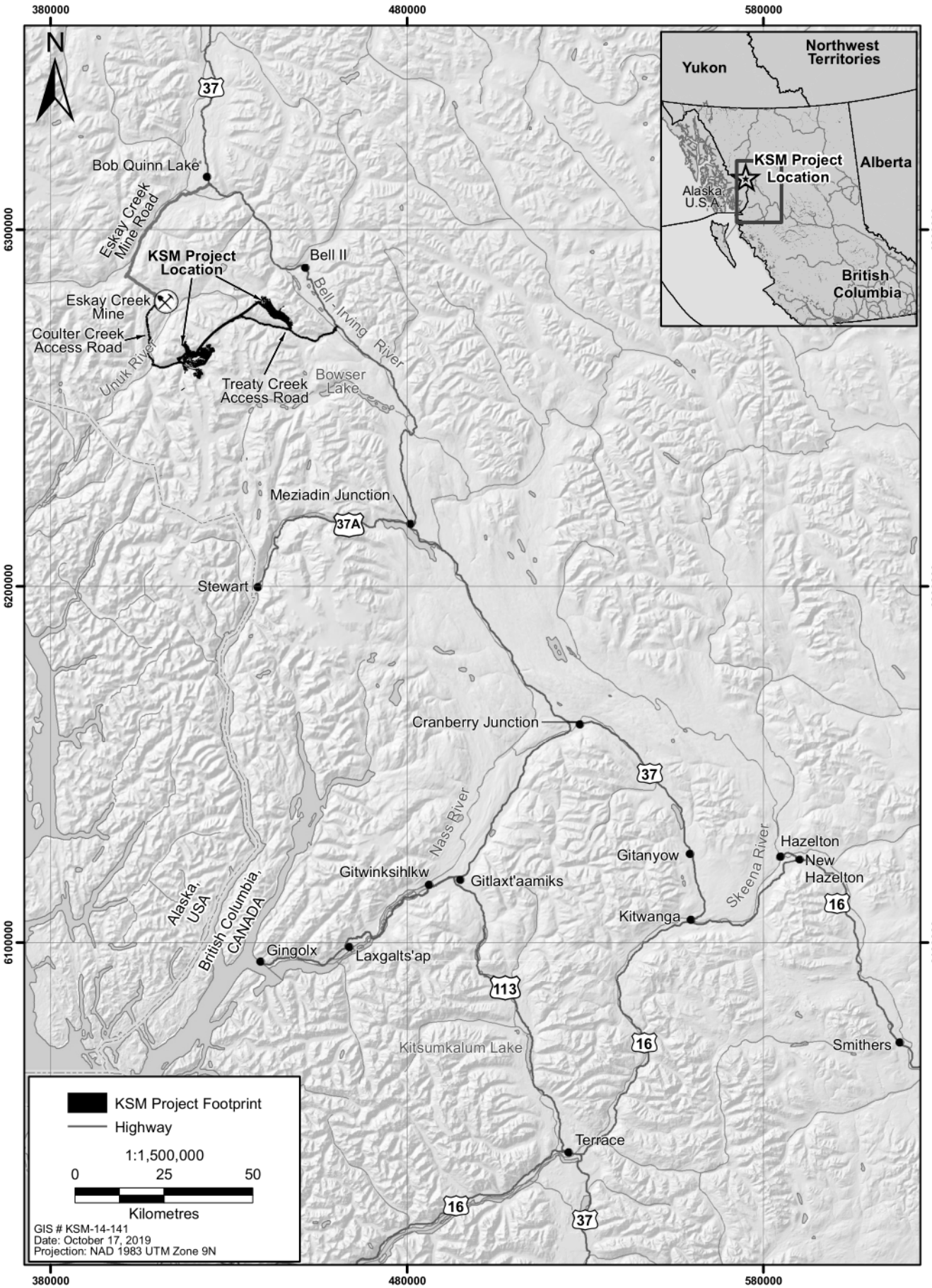
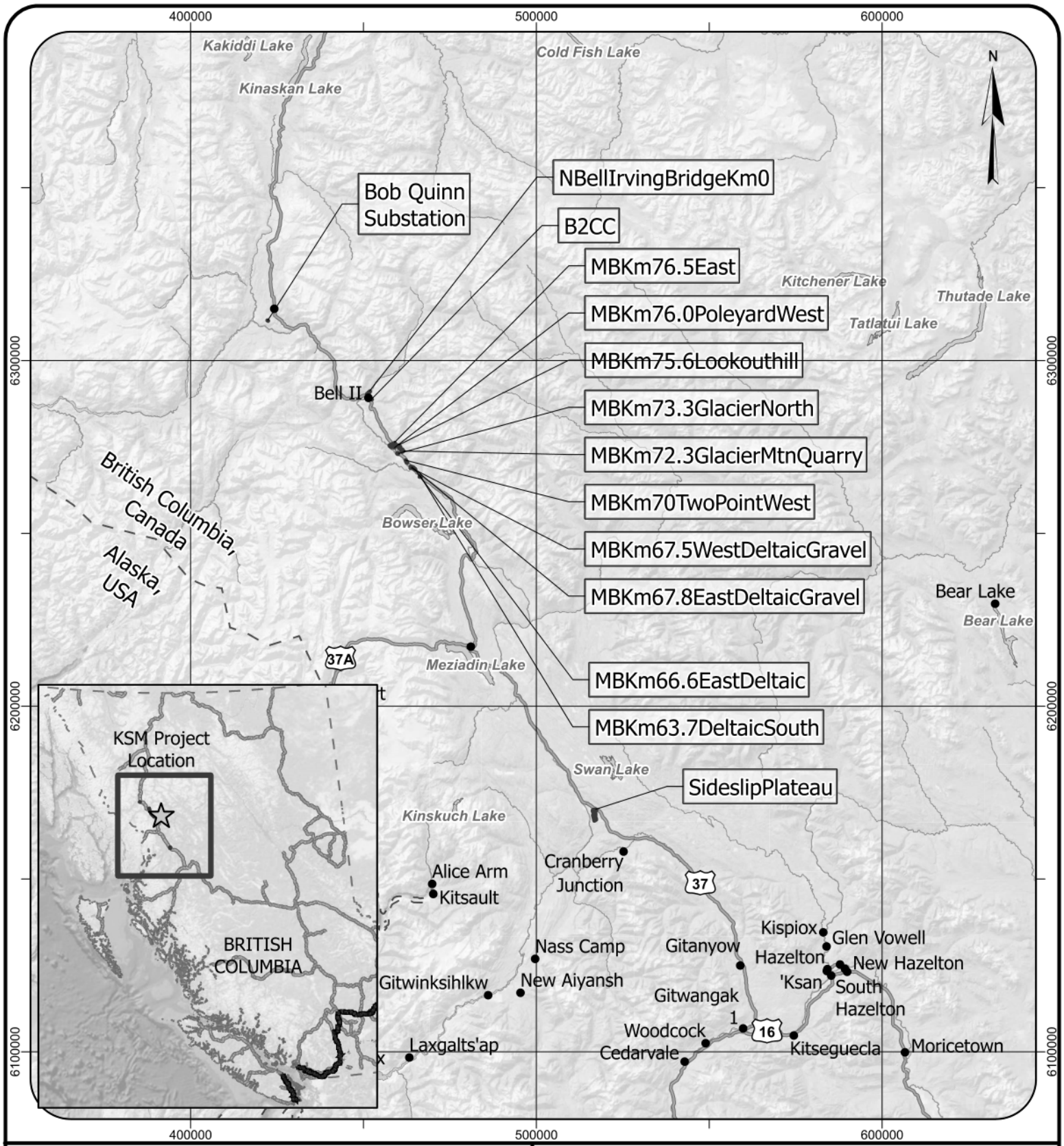


Figure 1: KSM Project Regional Location



Investigation Location

0 50 100 km

Scale: 1:1,500,000 NAD 1983 UTM Zone 9N

McElhanney

KSM MINING ULC

FIGURE 2

INVESTIGATION SITES FOR SEABRIDGE GOLD

December 17, 2020 | Page 1 of 1

APPENDIX A

Tenure Maps

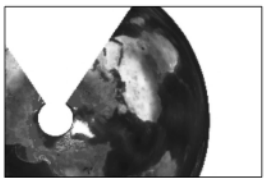
McElhanney Ltd.

B2CC

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area



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0 0.41 0.83 km

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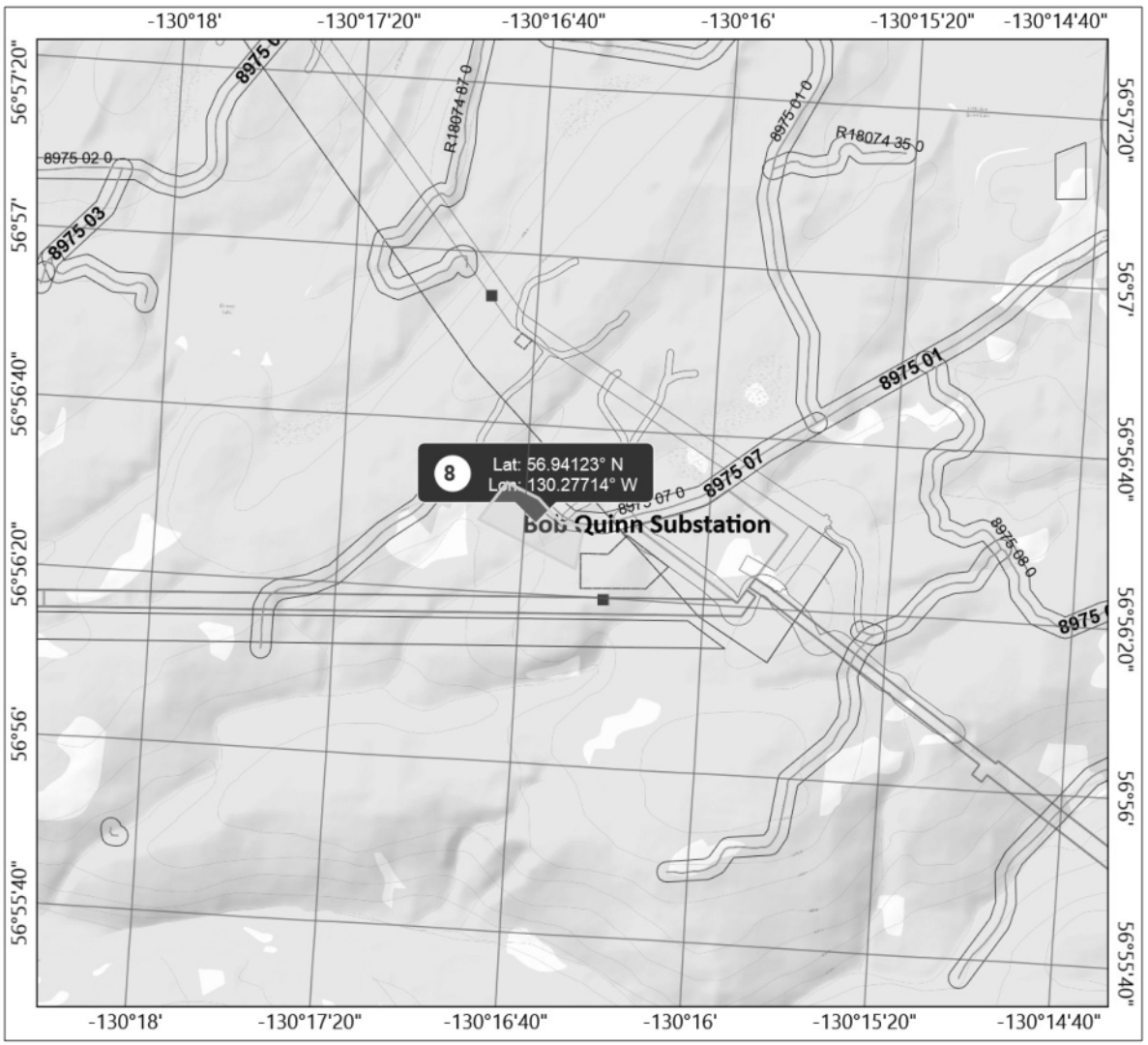
Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size



McElhanney Ltd.

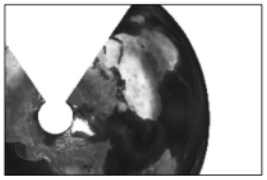
Bob Quinn Substation

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

CAUTION: Maps obtained using this site are not designed to assist in navigation. These maps may be generalized and may not reflect current conditions. Uncharted hazards may exist. DO NOT USE THESE MAPS FOR NAVIGATIONAL PURPOSES.



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Base Data: BC Geographic Warehouse

Map produced in iMapBC

Datum: WGS 1984 Web Mercator

Map Date: December 10 2020

Prepared By: E. Davidson

Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

MBKm63.7DeltaicSouth

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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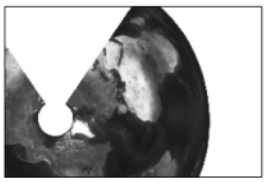

1: 20,000

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Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

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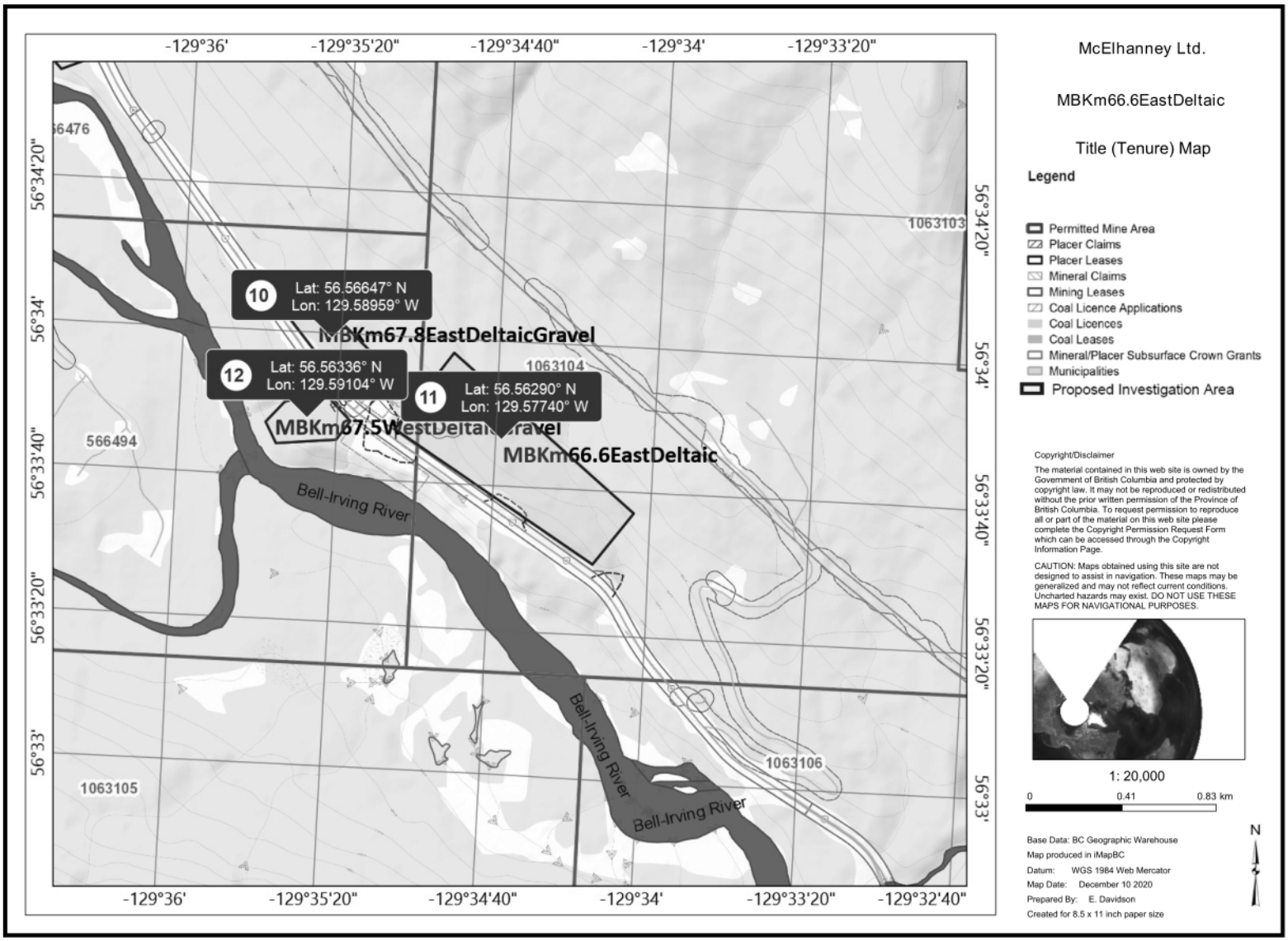
-129°36'
-129°35'20"
-129°34'40"
-129°34'
-129°33'20"
-129°32'40"
56°34'20"
56°34'
56°33'40"
56°33'20"
56°33'
10
Lat: 56.56647° N
Lon: 129.58959° W
MBKm67.8EastDeltaicGravel
12
Lat: 56.56336° N
Lon: 129.59104° W
11
Lat: 56.56290° N
Lon: 129.57740° W
MBKm67.5WestDeltaicGravel
MBKm66.6EastDeltaic
Bell-Irving River
Bell-Irving River
Bell-Irving River
1063103
1063104
1063105
1063106
566494
McElhanney Ltd.
MBKm66.6EastDeltaic
Title (Tenure) Map
Legend
Permitted Mine Area
Placer Claims
Placer Leases
Mineral Claims
Mining Leases
Coal Licence Applications
Coal Licences
Coal Leases
Mineral/Placer Subsurface Crown Grants
Municipalities
Proposed Investigation Area
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1: 20,000
0
0.41
0.83 km
N
Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

McElhanney Ltd.

MBKm67.5WestDeltaicGravel

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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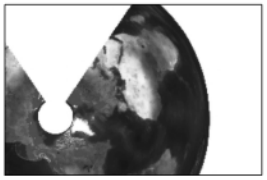

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Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

MBKm66.6EastDeltaicGravel

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
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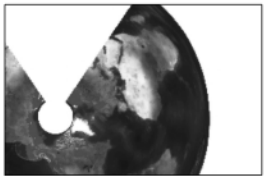

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Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

MBKm70TwoPointWest

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
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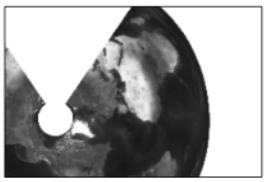

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0 0.41 0.83 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

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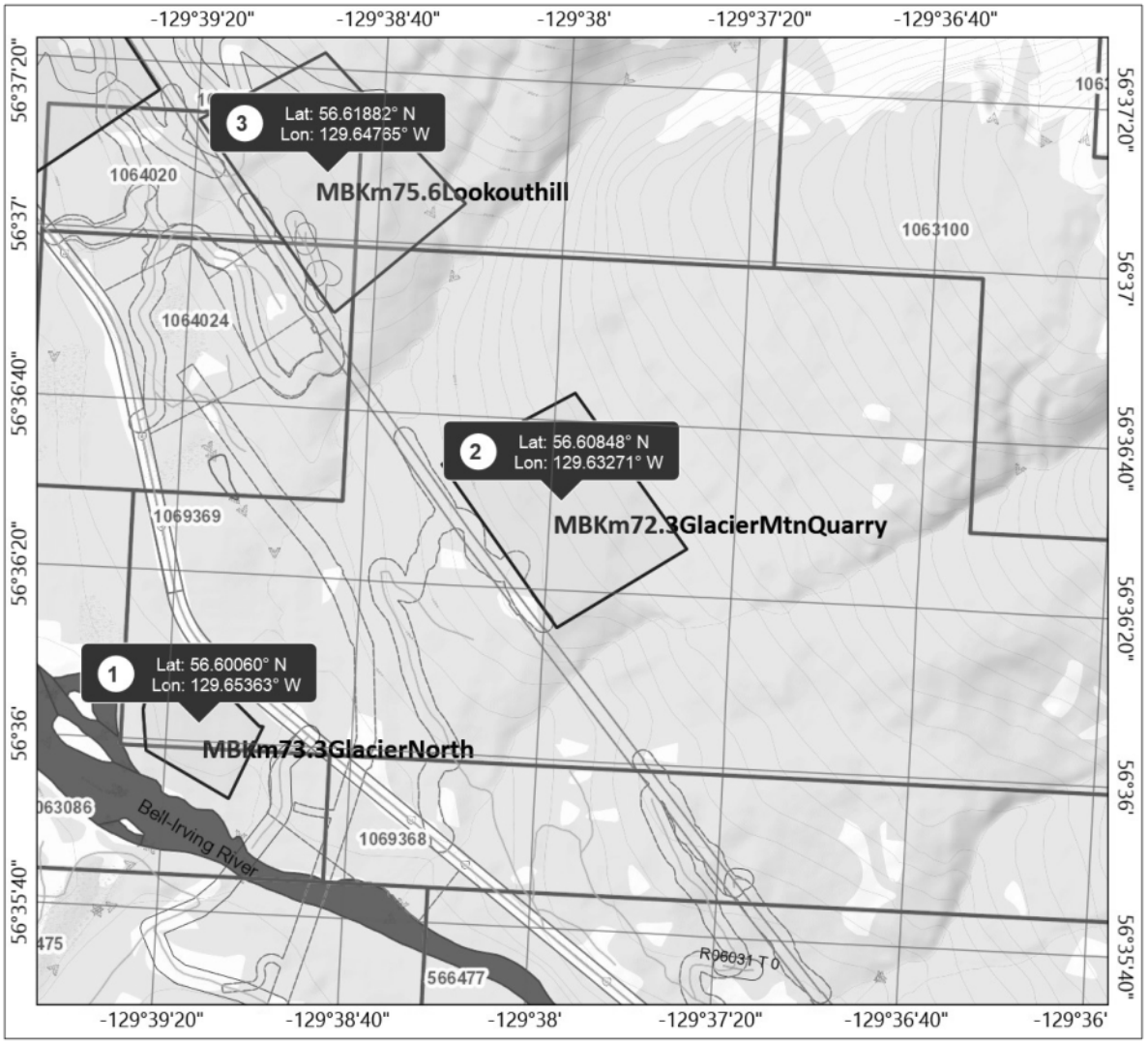

McElhanney Ltd.

MBKm72.3GlacierMtnQuarry

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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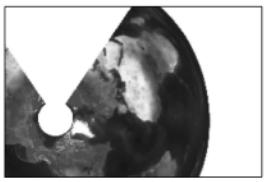
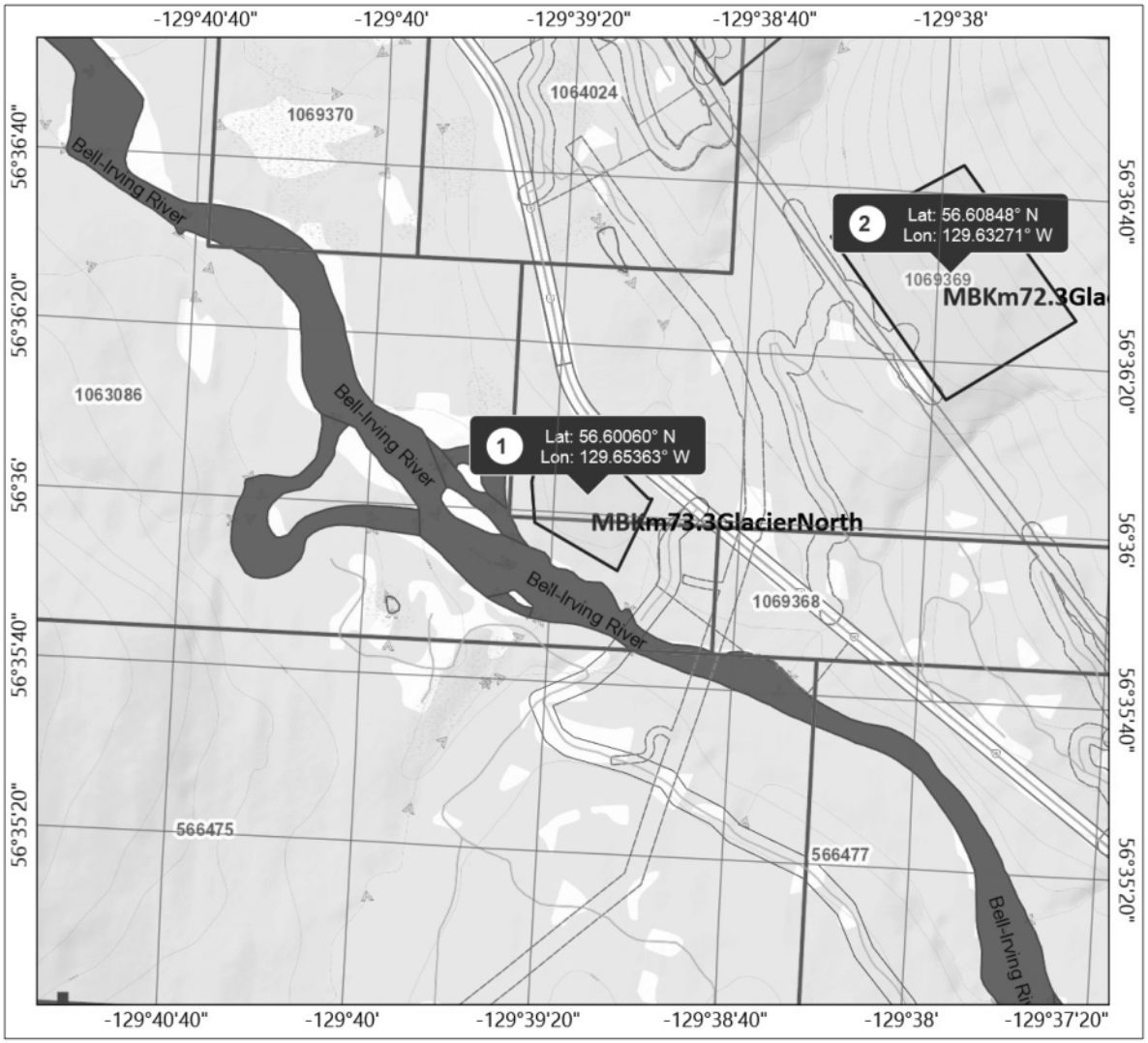


1: 20,000

0 0.41 0.83 km

N

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size



McElhanney Ltd.

MBKm73.3GlacierNorth

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
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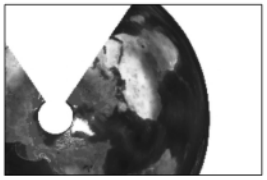

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Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

MBKm75.6Lookouthill

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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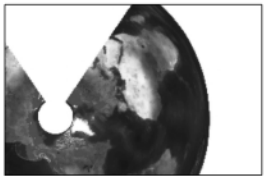

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Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

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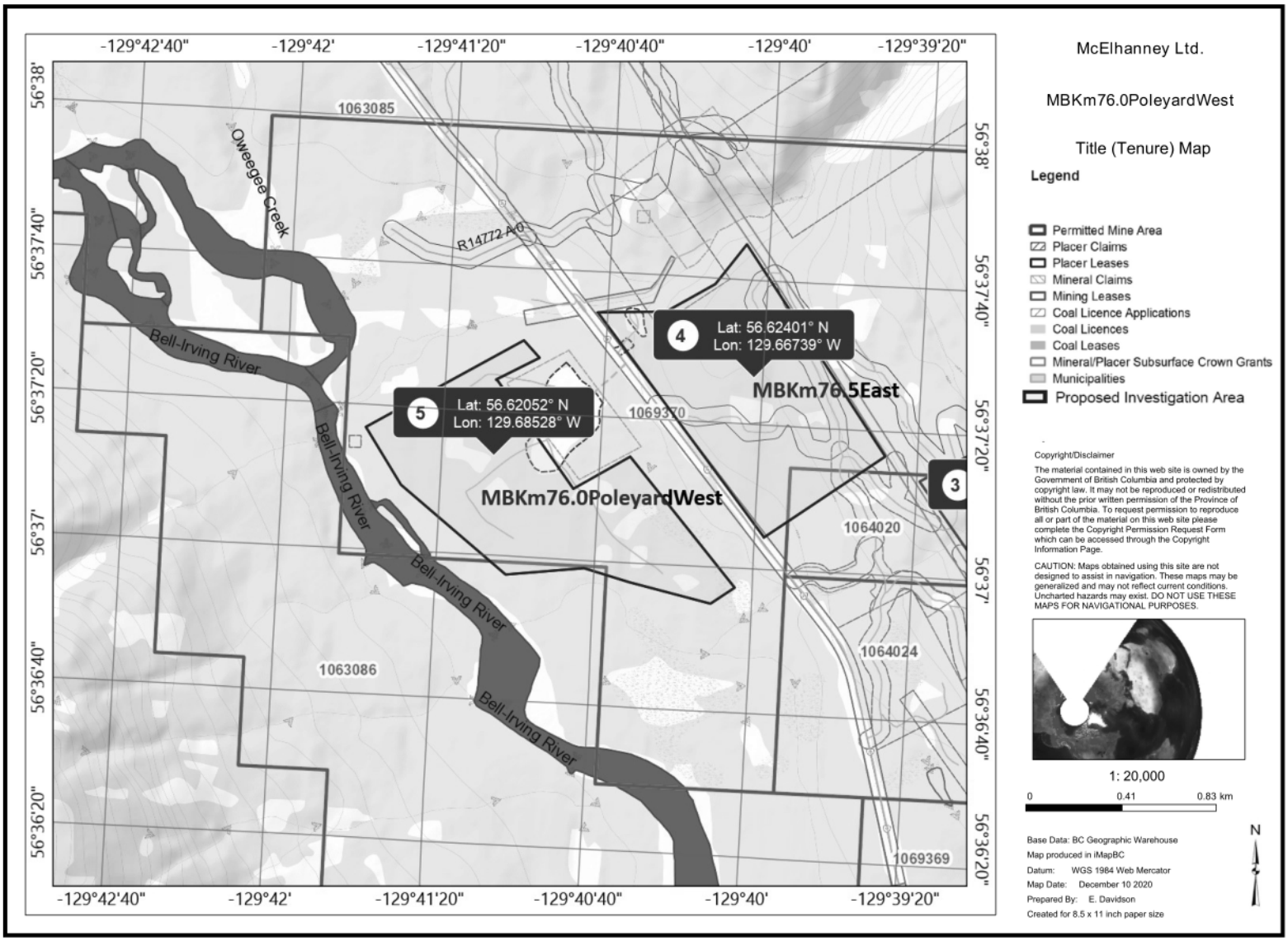

McElhanney Ltd.

MBKm76.0PoleyardWest

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

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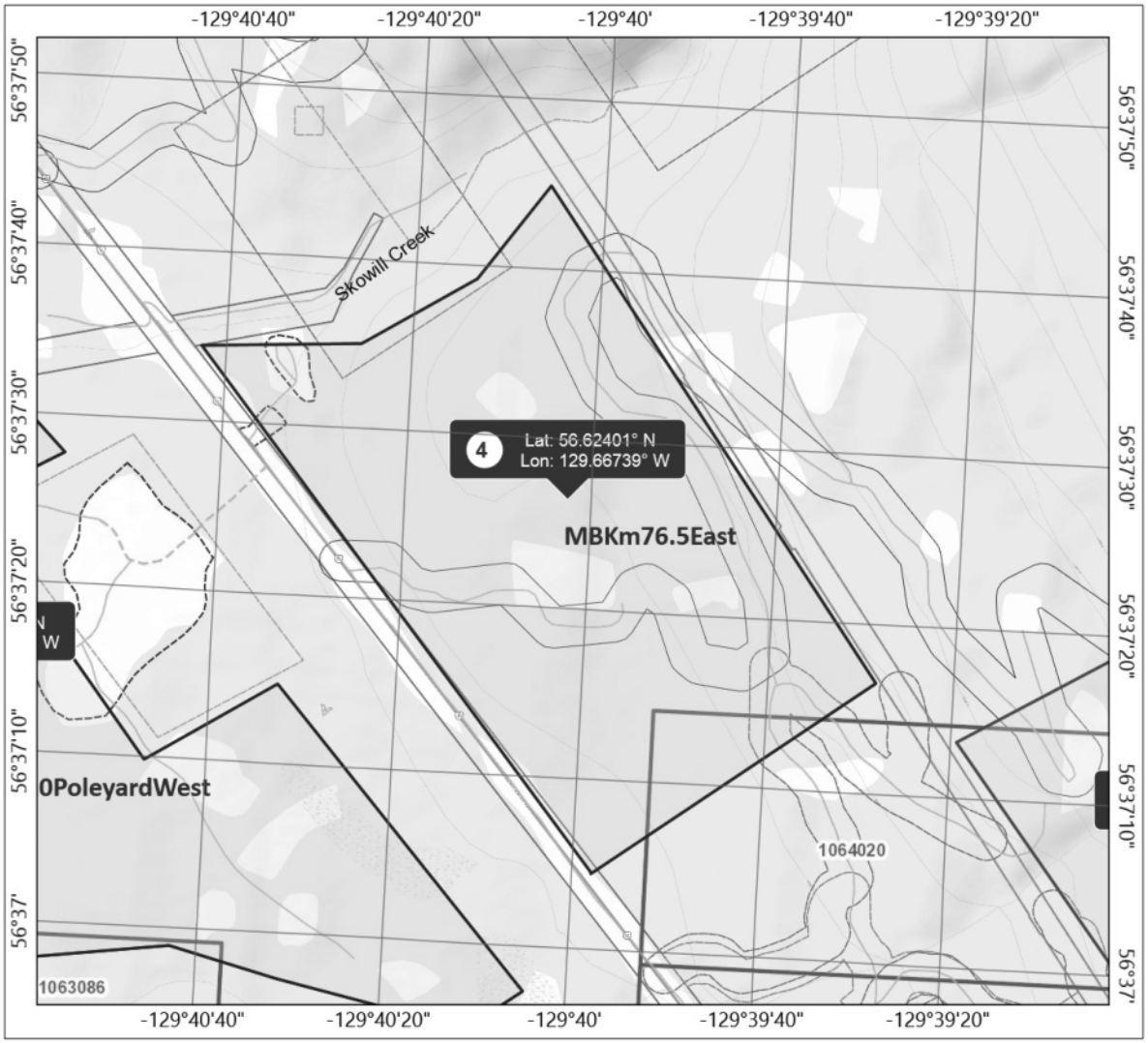

McElhanney Ltd.

MBKm76.5East

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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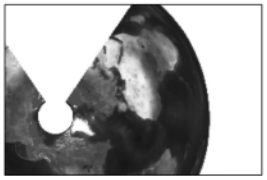

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0 0.21 0.41 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

NBellIrvingBridgeKm0

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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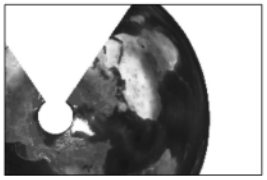

1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse
Map produced in iMapBC
Datum: WGS 1984 Web Mercator
Map Date: December 10 2020
Prepared By: E. Davidson
Created for 8.5 x 11 inch paper size

N

McElhanney Ltd.

SideslipPlateau

Title (Tenure) Map

Legend

- Permitted Mine Area
- Placer Claims
- Placer Leases
- Mineral Claims
- Mining Leases
- Coal Licence Applications
- Coal Licences
- Coal Leases
- Mineral/Placer Subsurface Crown Grants
- Municipalities
- Proposed Investigation Area

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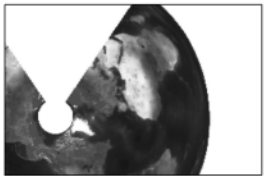


1: 20,000

0 0.41 0.83 km

Base Data: BC Geographic Warehouse

Map produced in iMapBC

Datum: WGS 1984 Web Mercator

Map Date: December 10 2020

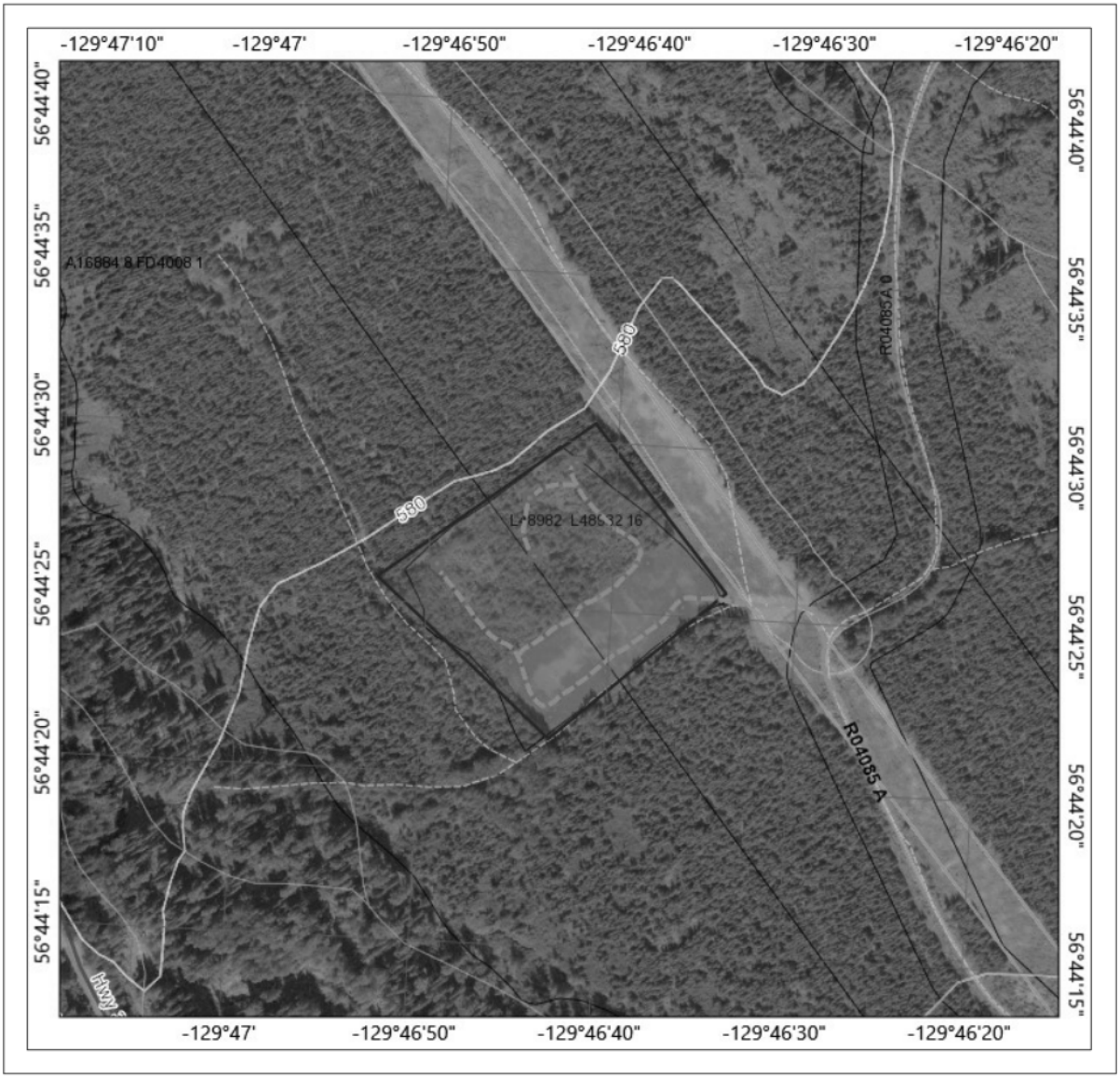
Prepared By: E. Davidson

Created for 8.5 x 11 inch paper size

N

APPENDIX B

Test Pit Investigation Plan Maps



BRITISH COLUMBIA

B2CC

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Ten (10) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia

BRITISH COLUMBIA

MBKm63.7DeltaicSouth

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Twenty two (22) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

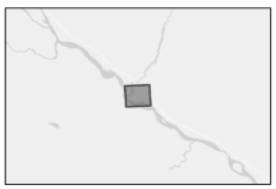
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm67.5WestDeltaicGravel

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Eleven (11) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

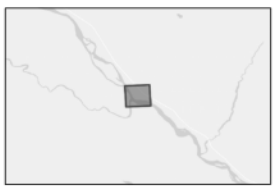
0 0.10 0.20 km

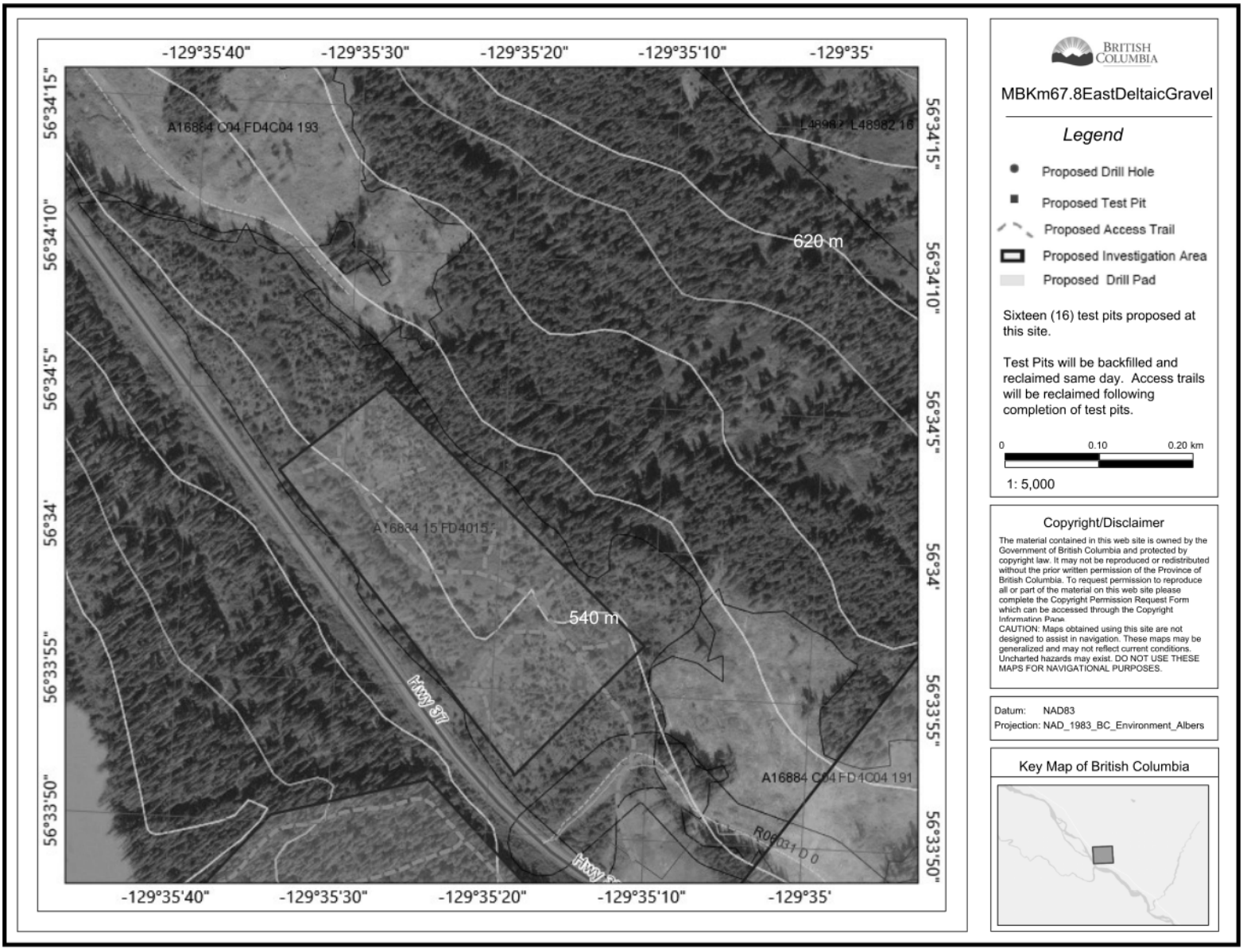
1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia





BRITISH COLUMBIA

MBKm67.8EastDeltaicGravel

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Sixteen (16) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

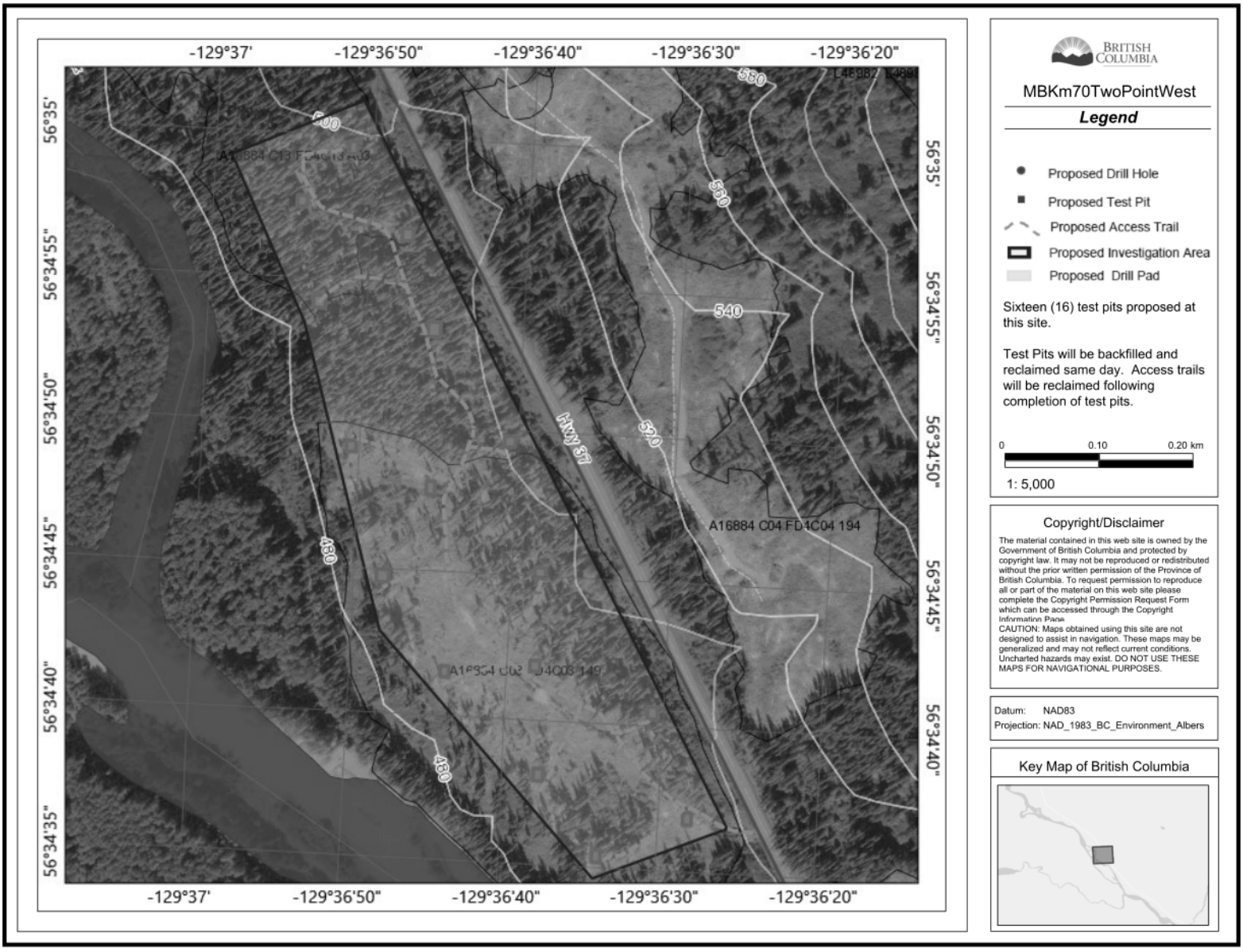
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm70TwoPointWest

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Sixteen (16) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

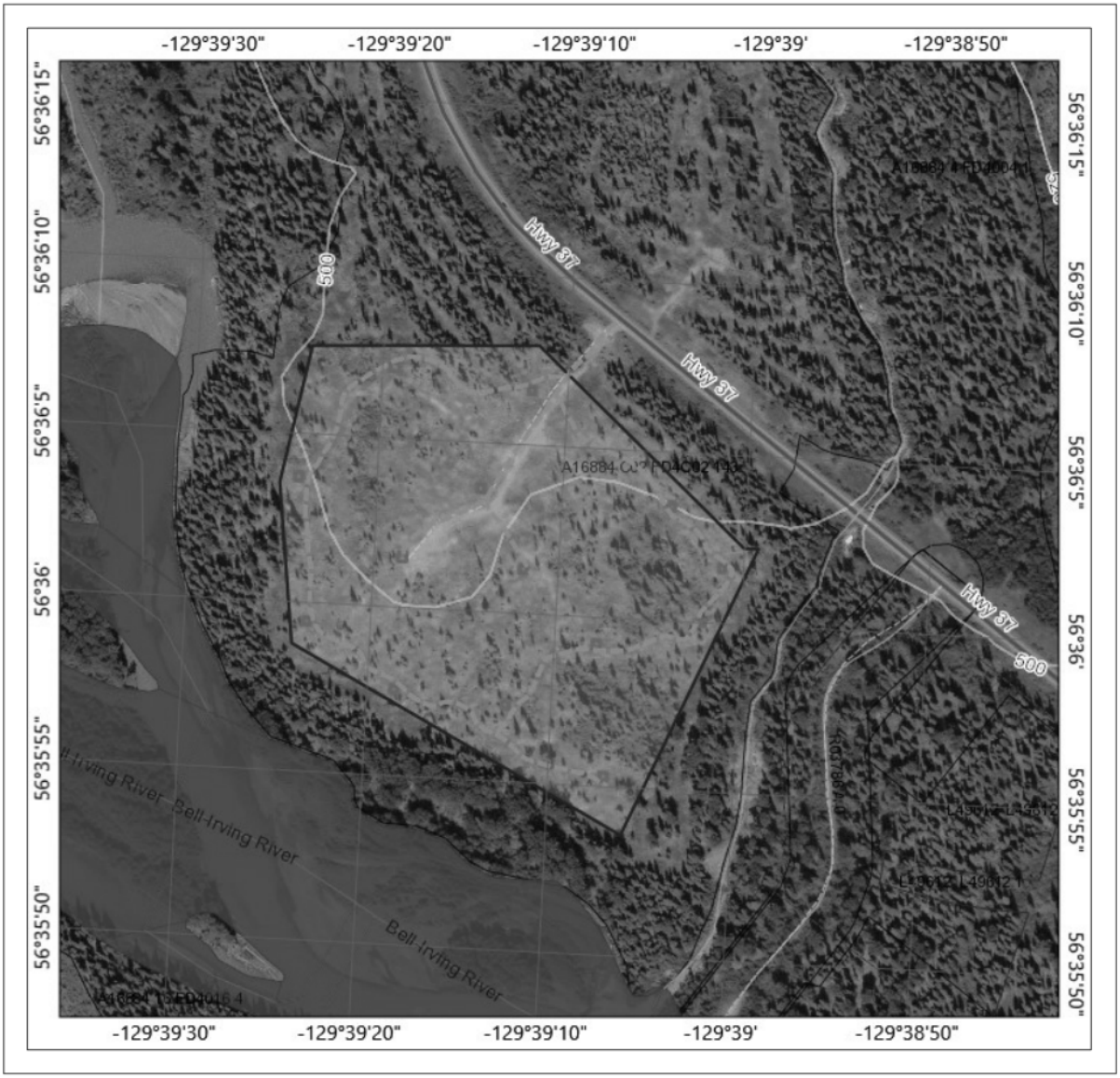
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm73.3GlacierNorth

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Fourteen (14) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

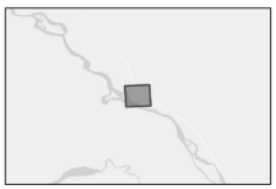
0 0.10 0.20 km

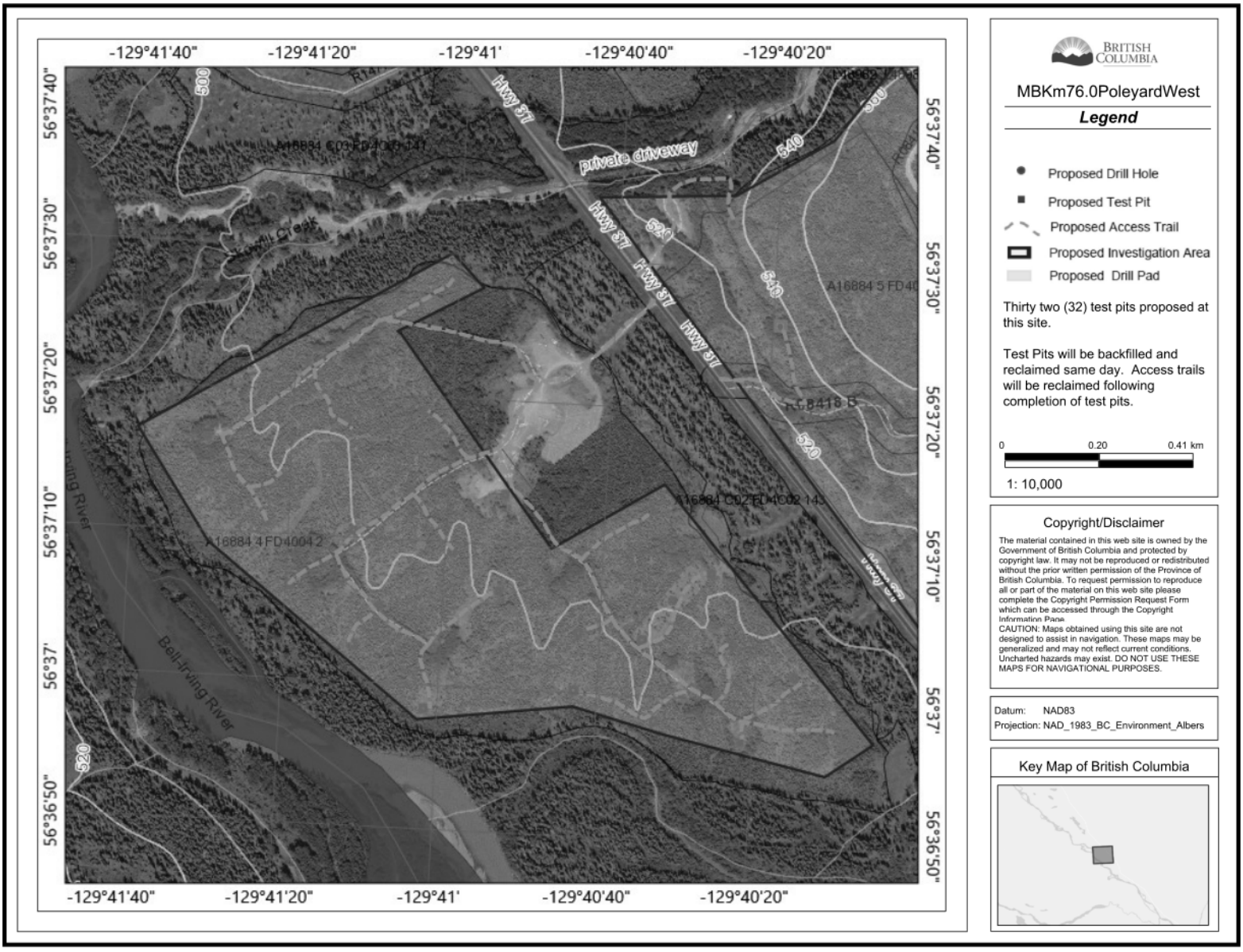
1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia





BRITISH COLUMBIA

MBKm76.0PoleyardWest

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Thirty two (32) test pits proposed at this site.

Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.

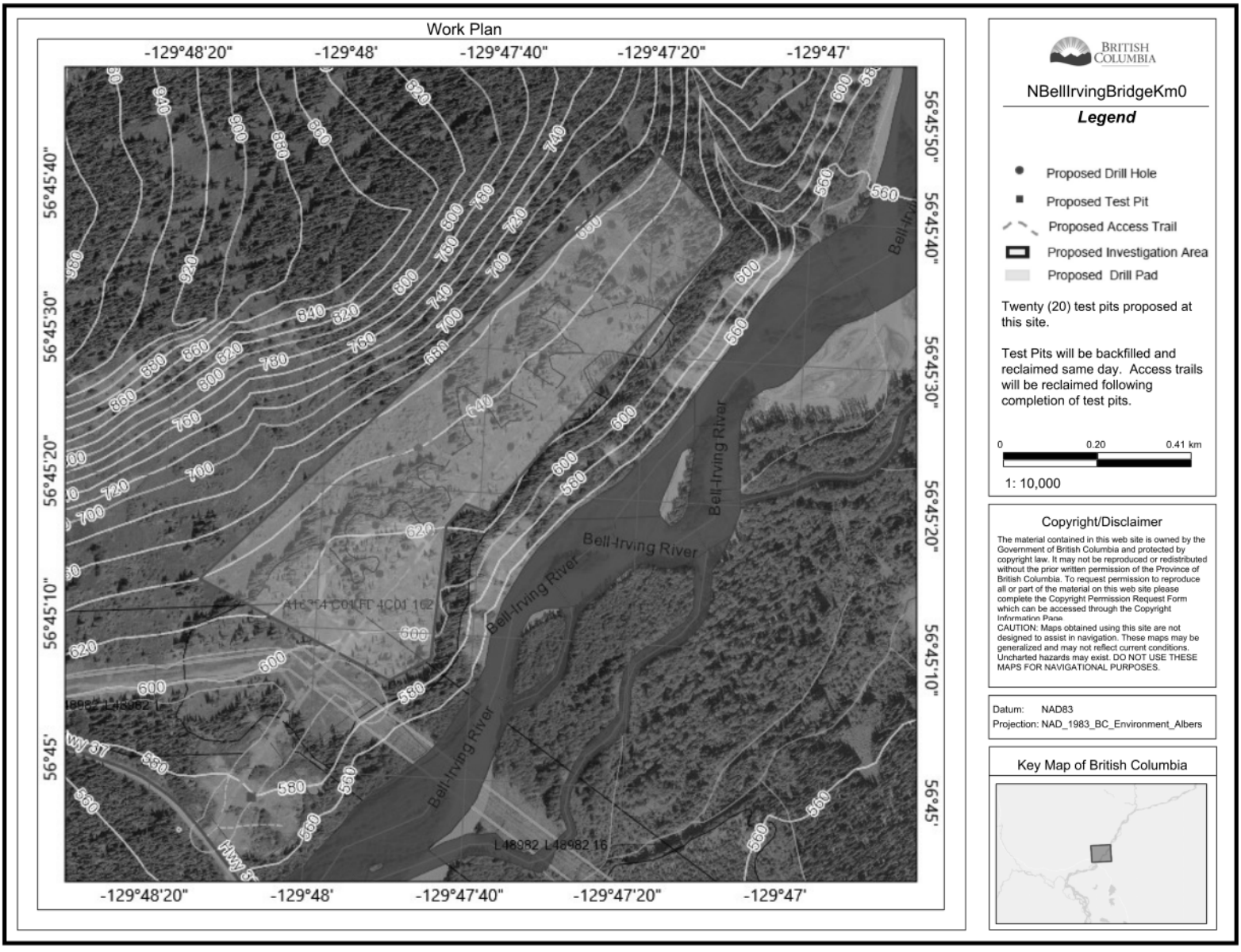
0 0.20 0.41 km

1: 10,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia


Work Plan
-129°48'20"
-129°48'
-129°47'40"
-129°47'20"
-129°47'
56°45'40"
56°45'30"
56°45'20"
56°45'10"
56°45'
Bell-Irving River
L48982 L48982 16
NBellIrvingBridgeKm0
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Twenty (20) test pits proposed at this site.
Test Pits will be backfilled and reclaimed same day. Access trails will be reclaimed following completion of test pits.
0
0.20
0.41 km
1: 10,000
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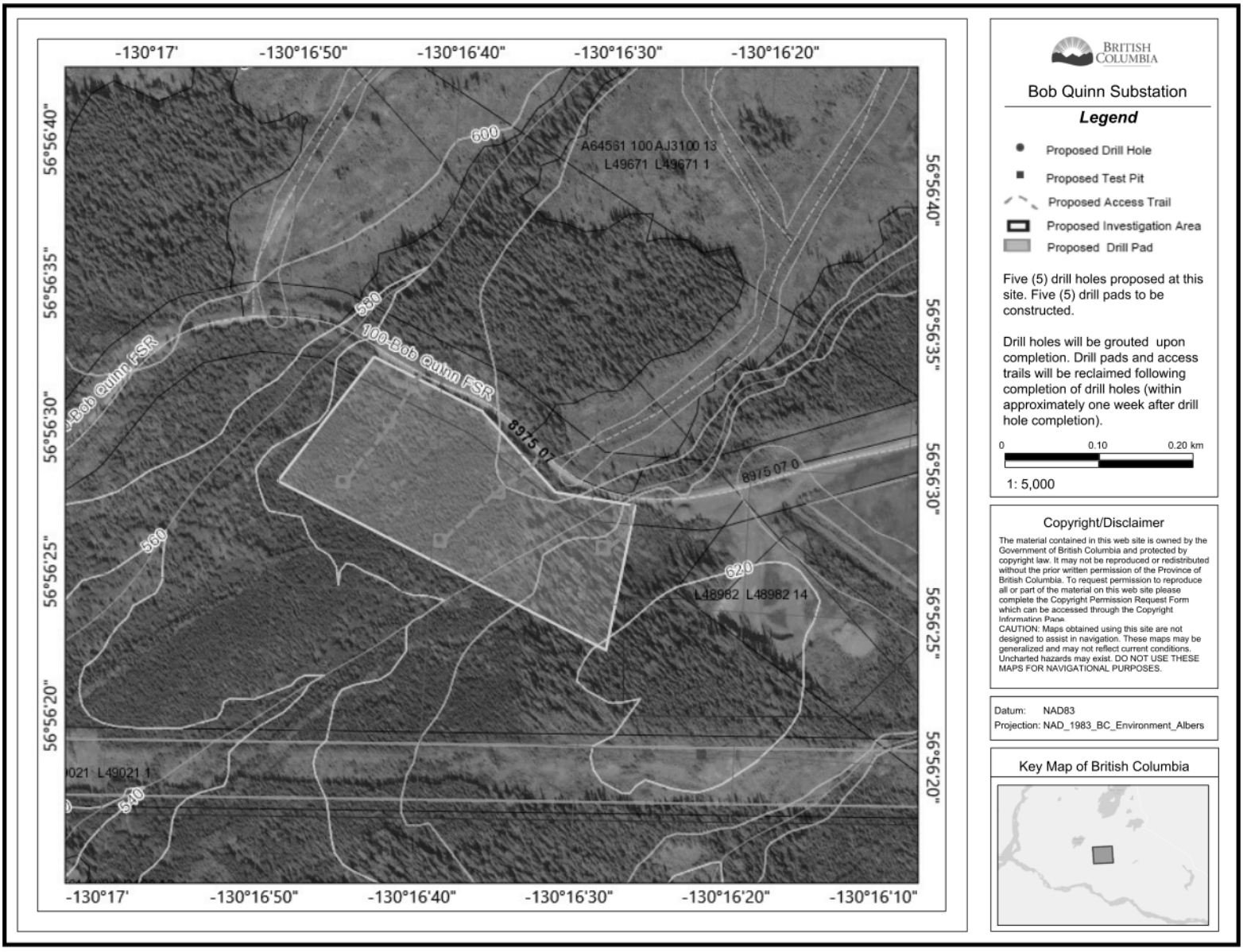
APPENDIX C

Exploration Surface Drilling Investigation Plan Maps


-130°17'
-130°16'50"
-130°16'40"
-130°16'30"
-130°16'20"
-130°16'10"
56°56'40"
56°56'35"
56°56'30"
56°56'25"
56°56'20"
600
A64561 100 AJ3100 13
L49671 L49671 1
530
100-Bob Quinn FSR
8975 07
8975 07 0
560
620
L48962 L48982 14
540
Bob Quinn Substation
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Five (5) drill holes proposed at this site. Five (5) drill pads to be constructed.
Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).
0
0.10
0.20 km
1: 5,000
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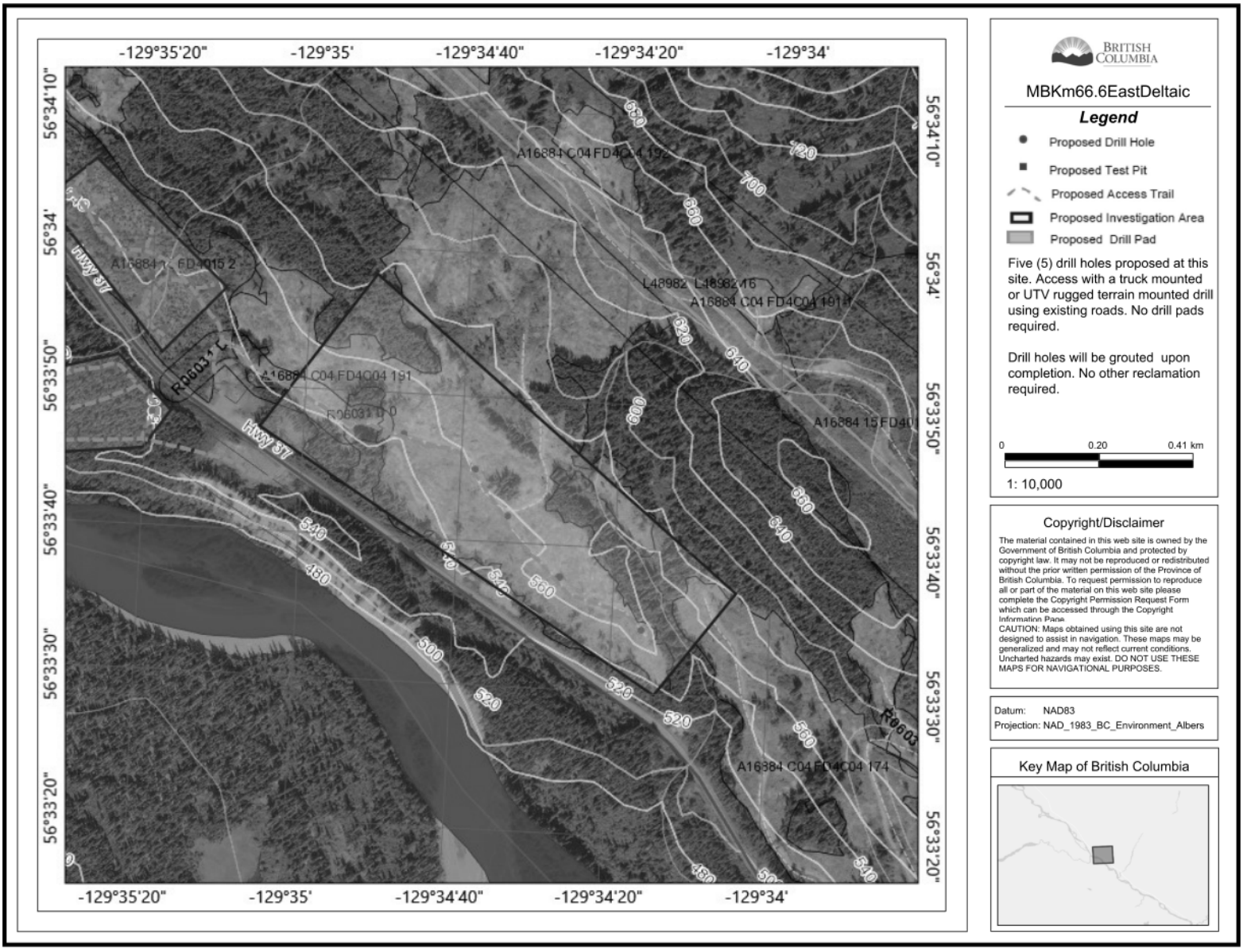
Key Map of British Columbia


-129°35'20"
-129°35'
-129°34'40"
-129°34'20"
-129°34'
56°34'10"
56°34'
56°33'50"
56°33'40"
56°33'30"
56°33'20"
Hwy 37
R06031
A16884 C04 FD4C04 191
A16884 C04 FD4C04 174
L48982 L48982 16
A16884 C04 FD4C04 191
MBKm66.6EastDeltaic
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Five (5) drill holes proposed at this site. Access with a truck mounted or UTV rugged terrain mounted drill using existing roads. No drill pads required.
Drill holes will be grouted upon completion. No other reclamation required.
0
0.20
0.41 km
1: 10,000
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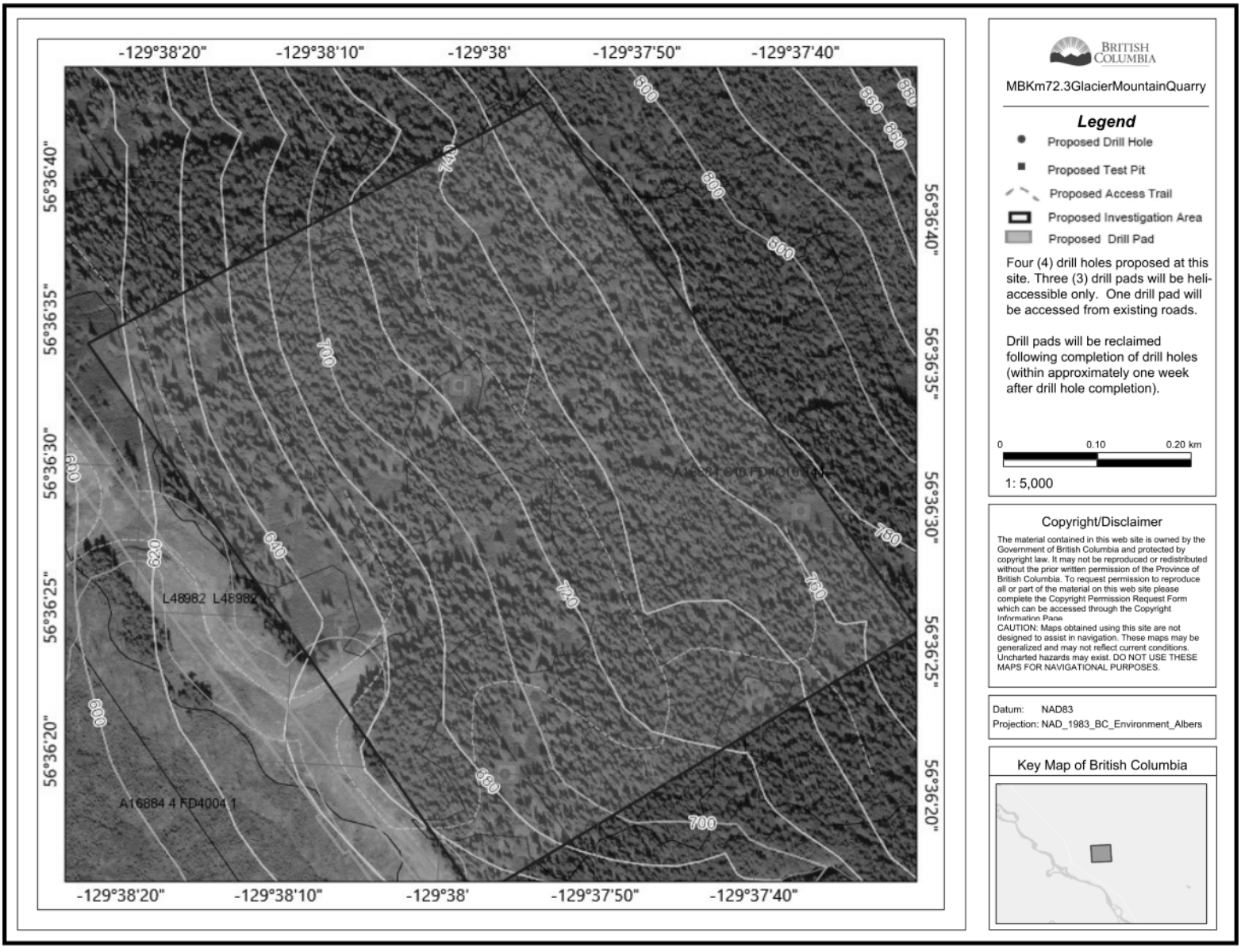
Projection: NAD_1983_BC_Environment_Albers
Key Map of British Columbia


-129°38'20"
-129°38'10"
-129°38'
-129°37'50"
-129°37'40"
56°36'40"
56°36'35"
56°36'30"
56°36'25"
56°36'20"
600
620
640
660
680
700
720
740
760
780
L48982 L48982
A16884 4 FD4004 1
MBKm72.3GlacierMountainQuarry
Legend
Proposed Drill Hole
Proposed Test Pit
Proposed Access Trail
Proposed Investigation Area
Proposed Drill Pad
Four (4) drill holes proposed at this site. Three (3) drill pads will be heli-accessible only. One drill pad will be accessed from existing roads.
Drill pads will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).
0
0.10
0.20 km
1: 5,000
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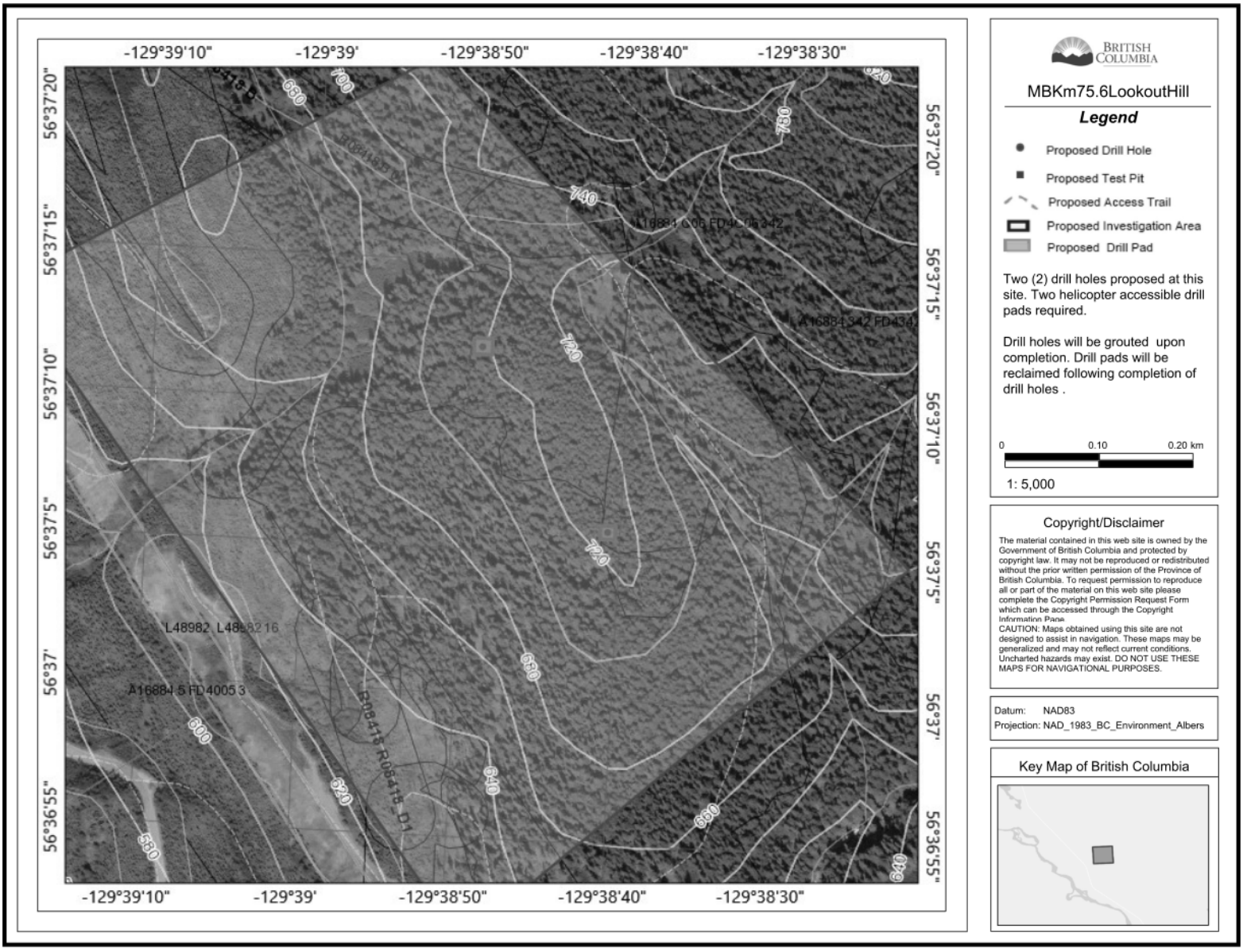
Projection: NAD_1983_BC_Environment_Albers
Key Map of British Columbia



BRITISH COLUMBIA

MBKm75.6LookoutHill

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Two (2) drill holes proposed at this site. Two helicopter accessible drill pads required.

Drill holes will be grouted upon completion. Drill pads will be reclaimed following completion of drill holes .

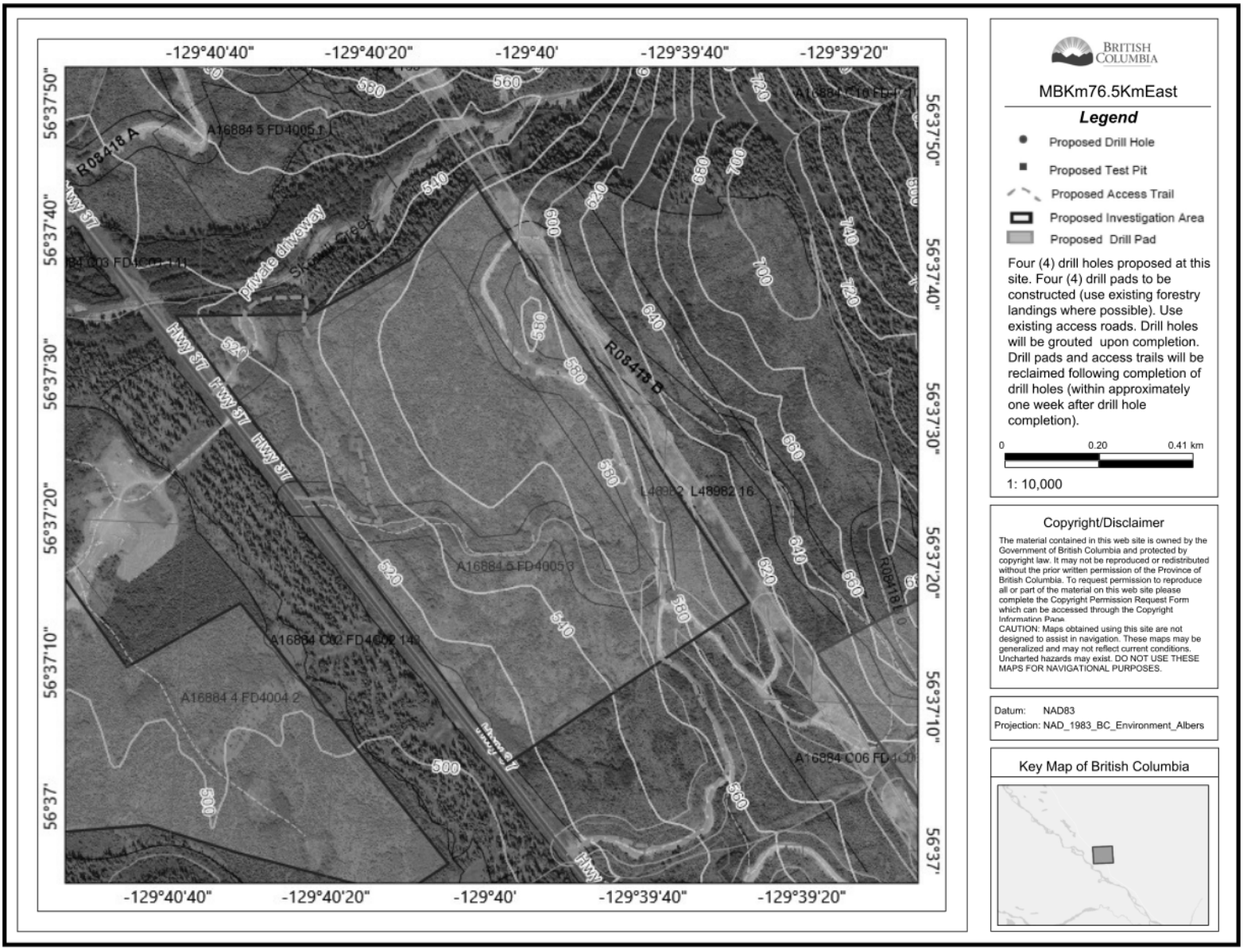
0 0.10 0.20 km

1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

MBKm76.5KmEast

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Four (4) drill holes proposed at this site. Four (4) drill pads to be constructed (use existing forestry landings where possible). Use existing access roads. Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

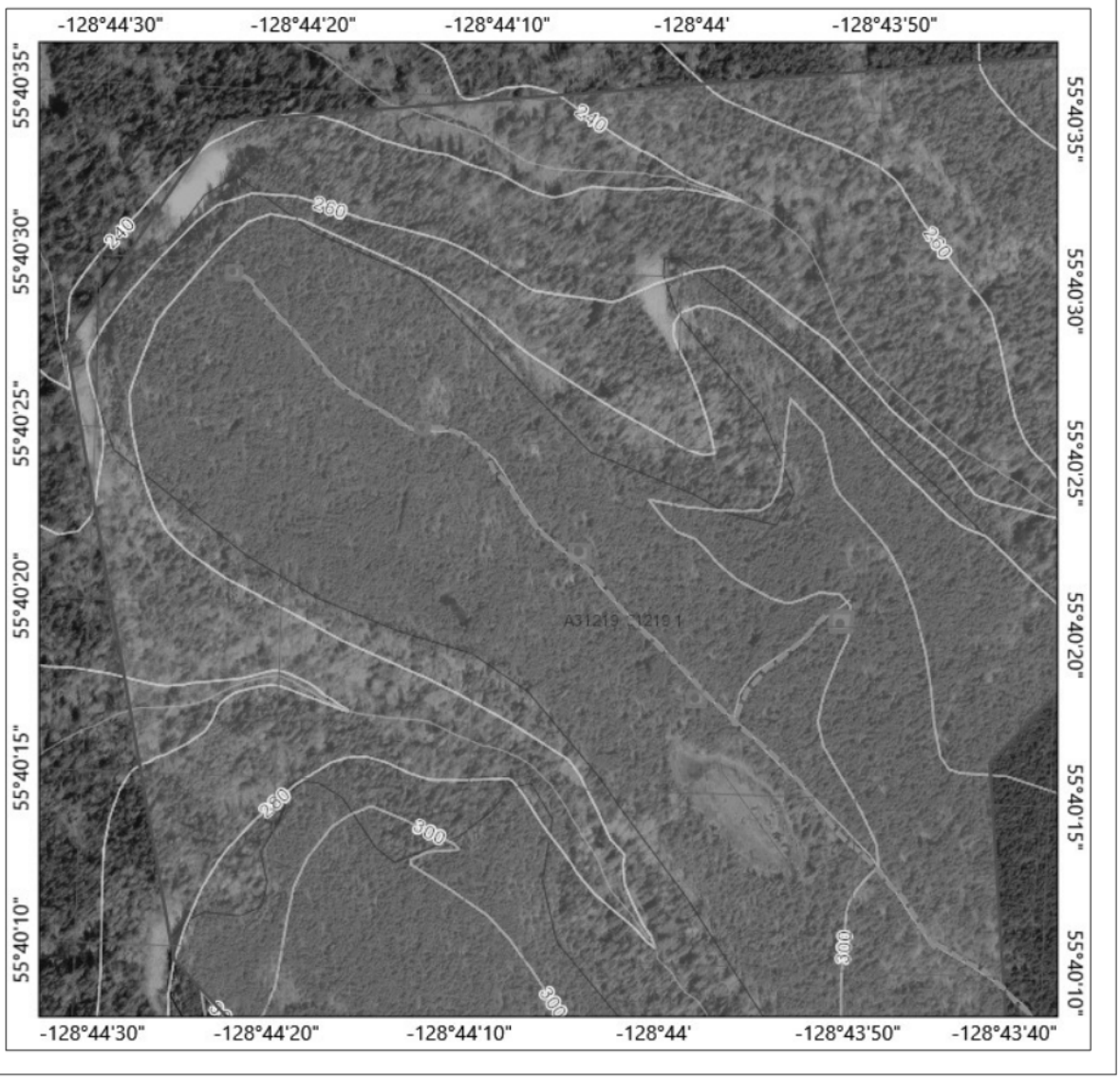
0 0.20 0.41 km

1: 10,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

Sideslip Plateau North Portion

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Five (5) drill holes proposed in the northern portion. Utilize a UTV mounted drill rig to minimize drill pad area. Use existing access roads, some brushing may be required. Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

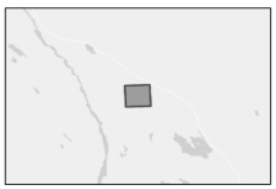
0 0.10 0.20 km

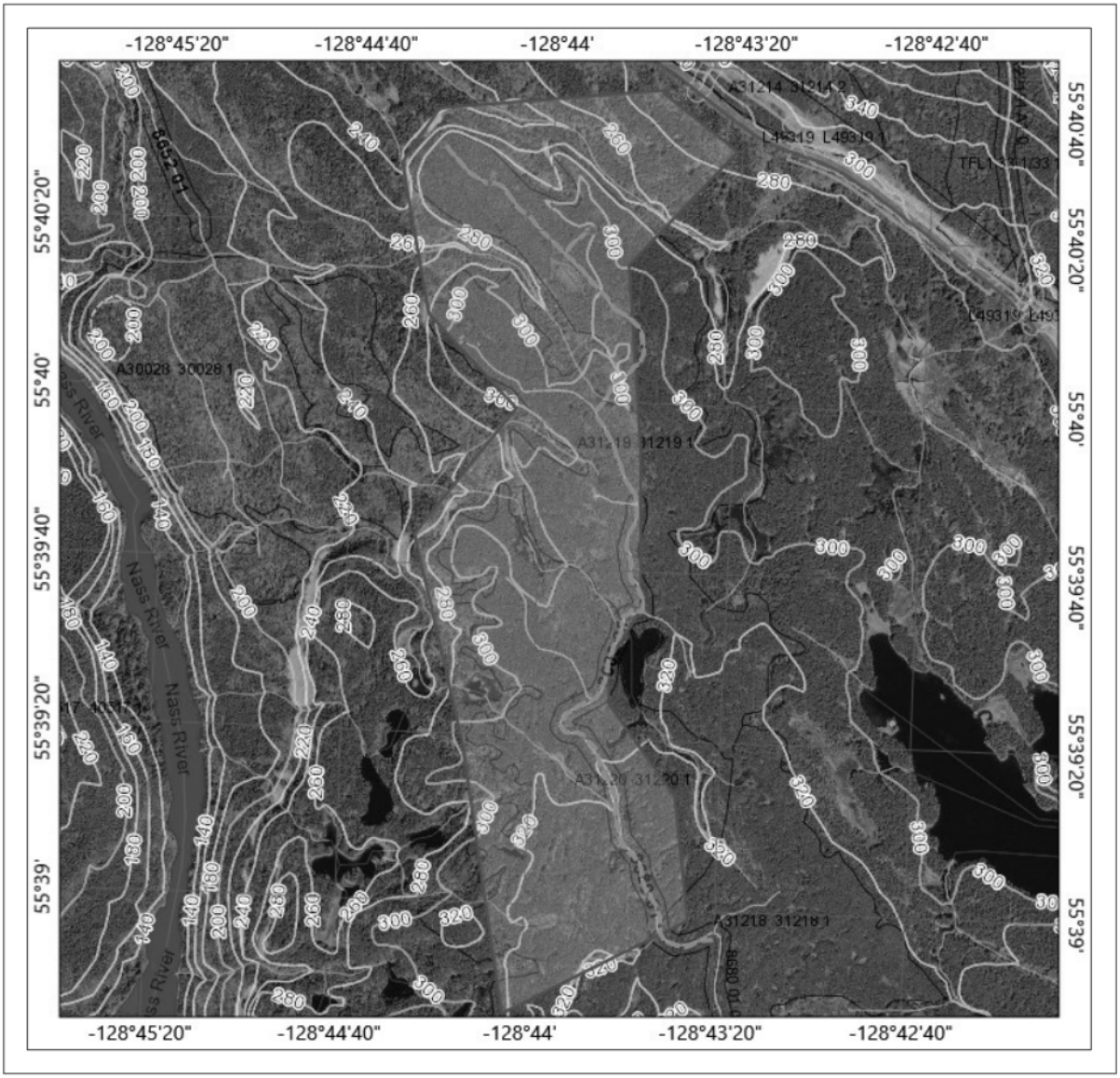
1: 5,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia





BRITISH COLUMBIA

Sideslip Plateau

Legend

- Proposed Drill Hole
- Proposed Test Pit
- Proposed Access Trail
- Proposed Investigation Area
- Proposed Drill Pad

Six (6) drill holes proposed (see North Portion Map for details of five holes). Utilize a UTV mounted drill rig to minimize drill pad area. Use existing access roads, some brushing may be required. Drill holes will be grouted upon completion. Drill pads and access trails will be reclaimed following completion of drill holes (within approximately one week after drill hole completion).

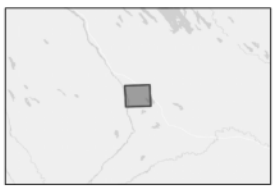
0 0.41 0.81 km

1: 20,000

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



APPENDIX D

Present State of Land Data

Site: MBKm70TwoPointWest	
Present Condition of Land	The Site is located adjacent to the Highway 37 transportation corridor and is partially previously disturbed as it has been subject to current and historical development such as timber harvesting
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. Dominant species include Subalpine fir and hybrid white spruce on mesic and wetter sites, while single species stands of mountain hemlock occupy some rocky and dry sites. The valley bottoms contain primarily fen wetlands, with some marshes being present along the fringes of open water into the river. Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (*Centaurea maculosa*), common toadflax (*Linaria vulgaris*), Canada thistle (*Cirsium arvense*), perennial sow-thistle (*Sonchus arvensis*), king devil (*Hieracium praealtum*), and oxeye daisy (*Leucanthemum vulgare*).
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. The site is gently sloping, whereas valley slopes to the east of the highway are moderate to very steep (slope grade is about 45%). The Site is located at an approximate elevation of approximately 490 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	The Site is located adjacent to Highway 37, and will be accessed via open cutblock areas with spurs into surrounding late-seral stage forested areas, as required.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access is assumed to occur along Highway 37 due to accessibility.

Site: MBKm67.8EastDeltaicGravel	
Present Condition of Land	The Site is located adjacent to the Highway 37 transportation corridor and is partially previously disturbed as it has been subject to current and historical development such as timber harvesting, existing land tenures for mineral exploration, NTL tenure, and gravel pits.
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. Dominant species include Subalpine fir and hybrid white spruce on mesic and wetter sites, while single species stands of mountain hemlock occupy some rocky and dry sites. The valley bottoms contain primarily fen wetlands, with some marshes being present along the fringes of open water into the river. Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (Centaurea maculosa), common toadflax (Linaria vulgaris), Canada thistle (Cirsium arvense), perennial sow-thistle (Sonchus arvensis), king devil (Hieracium praealtum), and oxeye daisy (Leucanthemum vulgare).
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. The site is gently sloping and located at elevation 540 m; whereas valley slopes to the east of the highway are moderate to very steep, (slope grade is about 45%), at an approximate elevation of 1,065 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	Site is located adjacent to Highway 37, and portions will be accessed via an existing MoTI access trail. Tracked excavator, within late seral stage timber stands, will build approximately 1.2 km of new access trail.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 is assumed to occur due to accessibility.

Site: MBKm67.5WestDeltaicGravel	
Present Condition of Land	The Site is located adjacent to the Highway 37 transportation corridor and is partially previously disturbed, as it has been subject to current and historical development such as timber harvesting, existing land tenures for mineral exploration, and gravel pits.
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. Dominant species include Subalpine fir and hybrid white spruce on mesic and wetter sites, while single species stands of mountain hemlock occupy some rocky and dry sites. The valley bottoms contain primarily fen wetlands, with some marshes being present along the fringes of open water into the river. Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (Centaurea maculosa), common toadflax (Linaria vulgaris), Canada thistle (Cirsium arvense), perennial sow-thistle (Sonchus arvensis), king devil (Hieracium praealtum), and oxeye daisy (Leucanthemum vulgare).
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. The site is gently sloping and located at elevation 480 m, whereas east of the highway valley slopes are moderate to very steep (slope grade is about 45%), at an approximate elevation of 1,065 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	Site is located adjacent to Highway 37, and will be accessed via portions of an existing MoTI access trail. Other portions may require minor clearing of mature timber, consisting less than 50 m^3.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 is assumed to occur due to accessibility.

Site: MBKm63.7DeltaicSouth	
Present Condition of Land	The Site is located adjacent to the Highway 37 transportation corridor, is partially previously disturbed, and has been subject to current and historical development such as timber harvesting, existing land tenures for mineral exploration, and gravel pits.
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. Dominant species include Subalpine fir and hybrid white spruce on mesic and wetter sites, while single species stands of mountain hemlock occupy some rocky and dry sites. The valley bottoms contain primarily fen wetlands, with some marshes being present along the fringes of open water into the river. Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (Centaurea maculosa), common toadflax (Linaria vulgaris), Canada thistle (Cirsium arvense), perennial sow-thistle (Sonchus arvensis), king devil (Hieracium praealtum), and oxeye daisy (Leucanthemum vulgare).
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. The site is on the south side of the Deltaic Creek alluvial fan where it enters Bell-Irving River. Approximate elevation of the site is 470 m. Valley slopes east of the highway are moderate to very steep (slope grade is about 45%), at an approximate elevation of 1,065 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	Site is located adjacent to Highway 37, and will be accessed via an existing access trail to a gravel pit. Some brushing and removal of mature timber (<20m^3)
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 is assumed to occur due to accessibility.

Site: MBKm73.3GlacierNorth	
Present Condition of Land	The Site is, located adjacent to the Highway 37 transportation corridor and is extensively previously disturbed as it has been subject to current and historical development such as timber harvesting and previous laydown or staging area.
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. Dominant species include Subalpine fir and hybrid white spruce on mesic and wetter sites, while single species stands of mountain hemlock occupy some rocky and dry sites. The valley bottoms contain primarily fen wetlands, with some marshes being present along the fringes of open water into the river. Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (Centaurea maculosa), common toadflax (Linaria vulgaris), Canada thistle (Cirsium arvense), perennial sow-thistle (Sonchus arvensis), king devil (Hieracium praealtum), and oxeye daisy (Leucanthemum vulgare).
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. Approximate elevation of the site is 500 m. The site is gently sloping, whereas east of the highway valley slopes are moderate to very steep (slope grade is about 45%), at an approximate elevation of 1,065 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	Use existing access into cutblock for unloading/loading equipment. Excavator to travel in open areas for majority of pit locations.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 is assumed to occur due to accessibility.

Site: MBKm76.0PoleyardWest	
Present Condition of Land	The Site is located adjacent to the Highway 37 transportation corridor, was previously extensively disturbed as it has been subject to current and historical development such as timber harvesting
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. Dominant species include Subalpine fir and hybrid white spruce on mesic and wetter sites, while single species stands of mountain hemlock occupy some rocky and dry sites. The valley bottoms contain primarily fen wetlands, with some marshes being present along the fringes of open water into the river. The site is revegetated by well-established second-growth immature forest. Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (*Centaurea maculosa*), common toadflax (*Linaria vulgaris*), Canada thistle (*Cirsium arvense*), perennial sow-thistle (*Sonchus arvensis*), king devil (*Hieracium praealtum*), and oxeye daisy (*Leucanthemum vulgare*).
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. The site is gently sloping, whereas east of the highway valley slopes are moderate to very steep (slope grade is about 45%), at an approximate elevation of 1,065 m. Site elevation is approximately 500 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	Access from previous poleyard (MoTI reserve). No mature timber clearing will be required, as access will use historical cutblock trails where possible. Minor brushing of trails may be required.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 is assumed to occur due to accessibility.

Site: NBellIrvingBridgeKm0	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor and has been subject to current and historical timber harvesting along the Bell-Irving River valley. The site is located between Highway 37 and the Northwest Transmission Line right of way.
Vegetation	Low-elevation (ICHvc and CWHwm) floodplain forests and wetlands dominate low elevation vegetation within the Bell-Irving River watershed. Forest areas are thick conifer stands extending up to the treeline at approximately 1,120 m. The valley bottom at this site, close to the Bell-Irving River, and contains primarily fen wetlands, with some marshes being present along the fringes of open water into the river.
Physiography	Located adjacent to the Bell-Irving River and riparian areas at the bottom of a valley that contains the Highway 37 corridor. Valley slopes are moderate to very steep (slope grade is about 45%) immediately adjacent to the northern portion of the Site. The site is located oatn a steep slope toward the Bell-Irving River, at an approximate elevation of 1,065 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. While organic deposits are present, they tend to be thin in most locations.
Current Means of Access	Access to the Site would likely require using an existing MoTI and NTL right-of-way access roads and cross these crown tenures. Authorizations from MoTI and/or BC Hydro and Power Authority may be required for access. Equipment will be unloaded in existing, previously cleared laydown area.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 and the Bell-Irving River is assumed to occur due to accessibility.

Site: B2CC	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor and has been subject to current and historical timber harvesting. This Site is located adjacent to the existing operating Bell II camp and NTL right of way.
Vegetation	The Site is primarily located within previously disturbed conifer forest; a historical cutblock area, and NTL tenure. A former cleared NTL laydown site appears to be adjacent to the site. Conifer forest extends up to the treeline at approximately 1,120 m.
Physiography	The Site is located at the bottom of a valley that contains the Highway 37 corridor and NTL right-of-way. The location is gently sloping. Valley slopes to the east are moderate to very steep (slope grade is about 45%). The Site is located at an approximate elevation of 580 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes.
Current Means of Access	Existing access via Highway 37 to a former cleared laydown area, on NTL Tenure. Access to this site will likely require a stream crossing.
Presence of Old Equipment/Buildings/ Cabins	Former Bell II camp and a NTL right-of-way Tenure.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 and existing Bell II trails is assumed to occur due to accessibility.

Site: Bob Quinn Substation	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor and has been subject to historical development such as timber harvesting. This Site is located adjacent to the existing operating Bob Quinn Substation and Transmission Line Right of Way.
Vegetation	The Site is primarily located within conifer forest.
Physiography	The Site is located at the bottom of a valley that contains the Highway 37 corridor and Bob Quinn Substation. The location is gently sloping. Valley slopes to the east and west are moderate to very steep (slope grade is about 45%). The Site is located at an approximate elevation of 600 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes.
Current Means of Access	Existing means of access via Hwy 37 and Bob Quinn FSR.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 and Bob Quin FSR is assumed to occur due to accessibility.

Site: SideslipPlateau	
Present Condition of Land	The Site is located approximately 600 m southwest of the Highway 37 transportation corridor, approximately 20 km north of the Highway 37 - Nisga'a Highway Cranberry Junction. The site has had previous disturbance from timber harvesting and associated road building. Middle-aged forests have regenerated across prior logged areas. There does not appear to be actively used access
Vegetation	Low-elevation (ICH mc 1) forests with middle-aged PI (lodgepole pine) of 50% crown closure dominate regenerated forest on the higher elevation areas, surrounded by wetter mature forests and wetlands in the intervening depressions, Potential for invasive plants to occur exists in areas close to Highway 37, including spotted knapweed (*Centaurea maculosa*), common toadflax (*Linaria vulgaris*), Canada thistle (*Cirsium arvense*), perennial sow-thistle (*Sonchus arvensis*), king devil (*Hieracium praealtum*), and oxeye daisy (*Leucanthemum vulgare*).
Physiography	The general site area is a drier gently sloping to undulating upland area surrounded by wetter depressions, the Sideslip Lake drainage and ponds and fen wetlands draining towards the Nass River located located 1.6 km to the east. The upland area is fringed by small linear escarpments demarcating the edge (?) of the underlying volcanic(?) flows. Glacial surficial deposits are likely comprised of till on the upland, and thicker till and organic deposits in the wetter depressions. Approximate elevation of the site is 300 m.
Current Means of Access	Access from Highway 37 using historical cutblock trails where possible. Minor brushing of historical trails may be required and possibly dome felling of medium growth timber along trails.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 is assumed to occur due to accessibility. It is unknown whether former logging trails are used for recreational hunting.

Site: MBKm76.5East	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor and has been subject to current and historical timber harvesting.
Vegetation	The Site is primarily located within previously disturbed conifer forest; a historical cutblock area, and NTL tenure. Conifer forest extends up to the treeline at approximately 1,120 m.
Physiography	The Site is located at the bottom of a valley that contains the Highway 37 corridor and NTL right-of-way. The location is gently to moderately sloping sloping. Valley slopes to the east are moderate to very steep (slope grade is about 45%). The Site is located between approximate elevations of 520 to 580 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes.
Current Means of Access	Existing access via Highway 37 and through existing cutblock access roads. Some brushing of overgrown roads may be required. Use NTL access roads to several drill sites.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 and existing Bell II trails is assumed to occur due to accessibility.

Site: MBKm66.6EastDeltaic	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor and has been subject to current and historical timber harvesting.
Vegetation	The Site is primarily located within previously disturbed conifer forest; a historical cutblock area, and NTL tenure. Conifer forest extends up to the treeline at approximately 1,120 m.
Physiography	The Site is located at the bottom of a valley that contains the Highway 37 corridor and NTL right-of-way. The location is gently sloping. Valley slopes to the east are moderate to very steep (slope grade is about 45%). The Site is located at an approximate elevation of 560 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes.
Current Means of Access	Existing access via Highway 37 through an existing MoTI reserve and on existing cutblock access roads.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known. Recreational access along Highway 37 and existing Bell II trails is assumed to occur due to accessibility.

Site: MBKm75.6Lookouthill	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor. The site is mostly mature timber and some areas of previous timber harvesting.
Vegetation	Site is located in conifer forests that extends up the valley slopes to treeline at approximately 1,120 m elevation.
Physiography	The Site is located on the lower slopes of the valley that contains the Highway 37 corridor and NTL right-of-way. The general area is moderate to steep sloping, with drill platforms located on topographic breaks (gently sloping areas). Valley slopes to the east are moderate to very steep (slope grade is about 45%). The Site is located between elevations of 620 m and 720 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes.
Current Means of Access	Access from Highway 37 and use existing NTL access roads to site. Drill platforms at 720 m elevation will be accessed by helicopter.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known.

Site: MBKm72.3GlacierMtnQuarry	
Present Condition of Land	The Site is located in proximity to the Highway 37 transportation corridor. The site is mostly mature timber with natural openings (where drill platforms are planned).
Vegetation	Site is located in conifer forests that extends up the valley slopes to treeline at approximately 1,120 m elevation.
Physiography	The Site is located on the lower slopes of the valley that contains the Highway 37 corridor and NTL right-of-way. The general area is moderate to steep sloping, with drill platforms located on topographic breaks (gently sloping areas). Valley slopes to the east are moderate to very steep (slope grade is about 45%). The Site is located between elevations of 640 m and 760 m. Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes.
Current Means of Access	Access from Highway 37 and use existing NTL access roads to site. Drill platforms will be accessed by helicopter.
Presence of Old Equipment/Buildings/ Cabins	None known.
Recreation Trails/Use	No recreational trails are known.

KSM MINING ULC

A SUBSIDIARY OF SEABRIDGE GOLD INC.

November 27, 2020

Ministry of Energy, Mines and Low Carbon Innovation
3726 Alfred Avenue
Bag 5000
Smithers, BC V0J 2N0

To Whom It May Concern:

Re: Agent for Lands, Water Sustainability Act Permitting and Mines Act Applications

Please be advised that KSM Mining ULC have retained the services of McElhanney Ltd., as our appointed agent for Mines Act, Land Act and Water Sustainability Act permitting applications pertaining to aggregate (sand and gravel), quarry work and camp developments for the KSM Project.

If you have any questions, please contact the undersigned at 250-847-4704 or jessy@seabridgegold.net

Yours truly,

Jessy Chaplin, MSc., P.Ag., RPBio
Director of Permitting
Seabridge Gold Inc.

Copy to:
Emily Davidson, P.Eng., P.Geo., McElhanney Ltd.

MINE EMERGENCY PLAN FOR SEABRIDGE GOLD
KSM EXPLORATION PROJECT – 2018

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MEDICAL EMERGENCY

- **ALERT DISPATCHER OF LOCATION AND NATURE OF EMERGENCY, WHO WILL ALERT MINE MANAGER AND LEVEL 3 FIRST AID ATTENDANT IMMEDIATELY**
- **DISPATCHER ORDERS ALL NON-EMERGENCY RELATED RADIO TRANSMISSIONS TO STOP**
- **LEVEL 3 FIRST AID ATTENDANT WILL DETERMINE IF PATIENT IS TO BE BROUGHT IMMEDIATELY TO CAMP OR MUST BE EXAMINED BEFORE TRANSPORT**
- **FIELD WORKERS WILL SECURE AREA AND PROVIDE EMERGENCY FIRST AID AND WAIT FOR INSTRUCTIONS FROM DISPATCHER**
- **ANY OTHER FIELD WORKERS WILL STOP WORK AND WAIT AT SUITABLE HELICOPTER LANDING SITE FOR INSTRUCTIONS**

FIRE EMERGENCY

- **YELL "FIRE, FIRE, FIRE!", GET ASSISTANCE, DO NOT FIGHT FIRE ALONE**

- **ASSESS IMMEDIATE DANGER (FUEL OR EXPLOSIVE SOURCES) AND TAKE APPROPRIATE ACTION**

- **MINE MANAGER IS IN CHARGE AND WILL PROVIDE INSTRUCTIONS TO ANY PERSONNEL ON SITE**

- **TURN OFF FUEL SOURCES**

- **TURN OFF GENERATOR IF FIRE IS ELECTRICAL**

- **CONTROL FIRE WITH EXTINGUISHERS, FIREHOSE, ETC. IF NO IMMEDIATE DANGERS ARE APPARENT**

- **IF FIRE IS OUT OF CONTROL, EVACUATE TO SAFE AREA OPPOSITE OF WIND DIRECTION, NEAR WATER. BRING RADIOS, SATELLITE PHONE, AND FIRE FIGHTING TOOLS, CHAINSAW AND GAS.**

- **IN CASE OF FOREST FIRE, CONTACT BC FOREST HOT LINE: 1-800-663-5555**

AVIATION EMERGENCY: OVERDUE AIRCRAFT

- **OVERDUE AIRCRAFT IS CLASSIFIED AS ONE HALF HOUR LATE OR 30 MINUTES AFTER ETA**

- **DISPATCHER WILL ADVISE MINE MANAGER OF OVERDUE AIRCRAFT AND PROVIDE AIRCRAFT REGISTRATION, PERSONS ON BOARD, ROUTING, LAST CONTACT TIME**

- **MINE MANAGER WILL ADVISE OTHER PILOTS ON PROJECT AND LAKELSE HELICOPTERS TERRACE BASE MANAGER OF SITUATION: 1-250-635-3245**

- **FOLLOW COURSE OF ACTION RECOMMENDED BY LAKELSE HELICOPTERS TERRACE BASE MANAGER**

- **IF LAKELSE BASE MANAGER NOT AVAILABLE, MINE MANAGER WILL CONTACT RESCUE CO-ORDINATION CENTER COMOX: 1-800-567-5111**

- **FOR ADDITIONAL PROCEDURES REFER TO LAKELSE AIR ONSITE EMERGENCY RESPONSE PLAN**

AVALANCHE INCIDENT

- **CONTACT DISPATCH AND REPORT CURRENT LOCATION, WHO IS INVOLVED AND KNOWN FACTS OF INCIDENT.**

- **MINE MANAGER IS CONTACTED AND TAKES CONTROL OF INCIDENT RESPONSE.**

- **RADIO SILENCE EXCEPT FOR EMERGENCY TRAFFIC IS STARTED AND ALL OTHER CREWS SHELTER IN PLACE OR FIND SAFE REFUGE.**

- **RESPONSE TEAM LEAVES FOR INCIDENT SITE ON FIRST AVAILABLE HELICOPTER.**

- **CONTACT OFF SITE RESPONSE TEAMS OR EMERGENCY SERVICES AS NECESSARY.**

- **MINE MANAGER FOLLOWS AVALANCHE INCIDENT RESPONSE PLAN.**

OVERDUE FIELD CREW CHECK-IN

- **AN OVERDUE FIELD CREW CHECK-IN IS DEFINED AS A CREW THAT HAS FAILED TO CONTACT DISPATCH WITHIN 30 MINUTES OF PLANNED CHECK-IN TIME.**

- **DISPATCH WILL ATTEMPT TO CONTACT SAID CREW AND ANY OTHER GROUND OR AIR CREWS THAT MAY BE WITHIN VISUAL OR RADIO RANGE.**

- **IF AFTER 30 MINUTES NO CONTACT IS MADE THE CLOSEST HELICOPTER WILL BE DISPATCHED TO CONDUCT AN AERIAL SEARCH FOR THE CREW. IF HELICOPTER ORIGINATES FROM CAMP IT WILL DEPART WITH FIRST AID ATTENDANT AND JUMP KIT ON BOARD.**

- **IF CONTACT CANNOT BE MADE BY HELICOPTER IN 30 MINUTES THE MINE MANAGER WILL ORDER A GROUND SEARCH AS CONDITIONS PERMIT.**

- **MINE MANAGER WILL MAKE THE DECISION ON WHEN OR IF OUTSIDE ASSISTANCE IS NEEDED.**

WILDLIFE ENCOUNTERS

- **IN CAMP: ADVISE MINE MANAGER IMMEDIATELY OF LOCATION, PERSONNEL INVOLVED, NATURE OF ENCOUNTER, WHO WILL DETERMINE THE APPROPRIATE COURSE OF ACTION**

- **IN THE FIELD: IF AN ANIMAL ENCOUNTER IS DETERMINED TO BE POTENTIALLY DANGEROUS, IMMEDIATELY RADIO CAMP AND ADVISE DISPATCHER OF LOCATION AND SITUATION**

- **IF ANIMAL IS NOT INTIMIDATED BY YOUR PRESENCE, STAND UP AND SPEAK DIRECTLY TO ANIMAL IN CALM BUT ASSERTIVE MANNER. TURN RADIO UP AT FULL VOLUME AND HAVE DISPATCHER SPEAK AS THIS MAY DISTURB AND SCARE OFF THE ANIMAL**

- **IF ANIMAL CONTINUES TO APPROACH, AND IS AT SUFFICIENT DISTANCE (NOT LESS THAN 30 METERS), FIRE CRACKER FLARE TO SCARE OFF**

- **IF ANIMAL APPROACHES WITHIN 10 METERS, USE BEAR SPRAY AIMED AT FACE**

- **IF GRIZZLY BEAR ATTACK IS IMMINENT, TAKE CROUCHING POSITION FACING DOWN AND PROTECT HEAD AND NECK WITH BACKPACK, DO NOT MOVE UNTIL BEAR IS GONE**

- **IF BLACK BEAR ATTACK IS IMMINENT, DO NOT RUN, BUT YELL AGGRESSIVELY AND FIGHT OFF THE ANIMAL WITH WHATEVER ITEMS ARE AT HAND**

HYDROCARBON SPILL RESPONSE

- **ASSESS IMMEDIATE FIRE OR EXPLOSIVE HAZARDS AND TAKE APPROPRIATE ACTION**

- **IF SPILL IS DUE TO LEAK DETERMINE SOURCE AND SHUT OFF VALVES**

- **SMALL SPILLS (< 1 LITRE): MOP UP WITH ABSORBENT MATTING, SPRINKLE GATOR CLAY DRY POWDER, PLACE CONTAMINATED MATERIAL IN CONTAINER FOR DISPOSAL**

- **SPILLS OF 1 TO 100 LITRES: ADVISE MINE MANAGER IMMEDIATELY AND GET ASSISTANCE. CONTAIN WITH DIGGING TOOLS AND ABSORBMENT MATTING, CREATE BERM TO STOP FLOW**

- **LARGE SPILLS (>100 LITRES): ADVISE MINE MANAGER IMMEDIATELY AND GET ASSISTANCE. CONTAIN AS BEST AS CONDITIONS PERMIT.**

- **MINE MANAGER WILL REPORT LARGE SPILLS TO BC ENVIRONMENTAL EMERGENCY HOT LINE:**
  1-800-663-3456

6. EMERGENCY CONTACT LIST

Updated December 18,2020

KSM Project Location	
Geographic Description	650km NW of Vancouver, 65km N-NW of Stewart, at headwaters of Sulphurets Creek
Coordinates	Lat/Long: 56° 29' 13" North 130° 17' 50" West
	Utm Nad 83: 420,000 East 6,261,000 North
Helicopters	Lakelse Helicopters Astar 350. Registration C-NBR,C-BCN, G-MNI, F-XPM, or G-PTC

Project Telephone Numbers / Email					
Mine Manager - Mike Savell /Emily Davidson	msavell@seabridgegold.com	edavidson@mcelhanney.com - 250 847 4040			**778-652-0292**
Camp Manager - Mel Smitzniuk	ksmseabridge@matrixco.ca				**778-652-0287**
Dispatch	ksmdispatch@matrixco.ca				**778-652-0287**
Smithers Admin - Lesli Van Horn	ksmadmin@seabridgegold.com				**250-847-4704**
Radios:				*Rx:*	*Tx:*
C1 Repeater (Ch. 1, KSM)				164.025	169.005
C1 Simplex (Ch. 2, KSM)				164.025	←
C2 Repeater (Ch. 3, Seabee)				164.670	169.650
C2 Simplex (Ch. 4, Seabee)				164.670	←
Lakelse Helicopters (Ch. 5)				153.200	153.200
Eskay Creek Mine (Ch. 6)				165.465	165.465
Medical / Hospitals:					
Air Ambulance Provincial Dispatch					800 561-8011
Stewart Health Centre	On Duty Nurse To Answer Health Questions, ER On-Call				250 636 2221
Terrace Hospital	Non-Emergency				250 635 2211
Terrace Hospital	Emergency Ward				250 638 4060
Co-Ordinates:	Lat/Long: 54° 30' 36" North 128° 35' 45" Wes			Arrival 160°, Departure 340°	
Dease Lake Health Center					250 771 4444
Smithers Hospital					250 847 2611
BC Poison Control					800 567 8911
Fire:					
Forest Fire Hotline					800 663-5555
Dease Lake Fire					250 771 3134
Stewart Fire					250 636 2345
Terrace Fire					250 635 7878
Rescue / Missing Persons:	Example: Call RCC if helicopter is missing (Information given by RCC)				
Rescue Coordination Centre	Call 911 first if medical reason-They assess and call RCC if needed				800 567 5111
Police:					
Stewart RCMP					250 636 2233
Terrace RCMP					250 638 7400
Dease Lake RCMP					250 771 4111
Environmental:					
Environmental Emergency Reporting					800 663-3456
Other Government Agencies:					
Doug Flynn, Mines Inspector		mobile	250-877-9747	office	250 847 7386
Andrea Ross, Mines Inspector		mobile	250-877-1480	office	250-847-7768
BC WCB Notification Of Accident					866 922 4357

Seabridge Management					
Rudi Fronk - Chairman/CEO	Toronto			Office	416 367 9292
Jay Layman – President/COO	Denver			Cell	s.22
Bill Threlkeld – Senior V.P.	Denver	Res.	s.22	Cell	
Peter Williams - Sr VP Tech Ser.	Denver			Cell	
Brent Murphy – V.P. Env.Affairs	Denver			Cell	
Mike Skurski - V.P. Tech Serv.	Denver			Cell	
Mike Savell – Mine Manager 1	Oakville	Res.		Cell	
Tim Dodd – Mine Manager 2	Missoula	Res.		Cell	
Peter J. Erwich – Snowstorm	Denver	Res.		Cell	
Marcus Adam - Iskut Manager	Vancouver			Cell	
Jim Freeman – Geologist		Res.		Cell	
Randy Campbell - Snowstorm	Vancouver			Cell	
Gloria Trujillo - Exec. Secretary	Toronto			Office	416 367 9292
Seabridge Office Smithers	Smithers	Elizabeth Miller, Jessy Chaplin		Office	250 847 4704

Contractors					
Adapt Mountain Safety Services	Invermere	Ken Black	ken@adaptmountain.com		250 344 0708
			@ Brucejack camp		778-724 4186 ext 102
Bandstra Trucking					800 571 2057
BGC	Vancouver	Derek Kinakin			604 684 5900
BGC	Kamloops	Warren Newcomen			250 374 8600
Cascom Radio	Yellowknife	Aaron Jaque	867-445-6225	Office	867 765 2020
PnR Exploration Services	Smithers	Peter McGuinness			250 877 8278
Granmac Services	Stewart	Gina McKay		Office	250 636 2402
Granmac Services	Stewart	Grant McKay	250-552-2120	Office	250 636 2307
Golder Engineering	Vancouver	Jonathan Chow	604-240-7527	Office	604-296-4375
Sienna Networks	Terrace	Robert Chapman	250-641-3416	Office	778-505-2010
Hy-Tech Drilling	Smithers	Fraser Stewart or Reagan Churnish			250 847 9301
Lakelse Helicopters	Terrace		Ops Manager	250-641-8387	250 635 3245
Kalum Kabs	Terrace	Bryan Halbauer			250 635 7177
KCBL	Vancouver	Graham Parkinson			604 669 3800
Matrix Aviation Solutions	Hazelton	Martin Knutson	Principal		867 445 2640
Matrix Aviation Solutions	Langley	Mike Kenney	COO	604-345 9447	604-538 4574
Matrix Helicopters	Langley	Mike Pawluk	Manager Aviation	604-802-4858	604-538 4574
ERM	Smithers		office admin		250-877-7838
Sodexho	Smithers	Ed Van Mierlo		250-641-4411	250 771 5484
Northwest Truck Rental / Shuttle	Smithers	Fred Wilson			250 876 8149
Tsetlaut Consultation Society	Hazelton	George Simpson			250 842 5651

Other Camps					
SNIPGOLD (ISKUT-SEABRIDGE)	**Geology Office**				**778-655-4634**
	Kitchen	**778-652-0278**		**Main office**	**778-652-0283**
Pretium (Brucejack)					778-724-4186 ext 108
Forrest Kerr Project (AltaGas)					
Site Manager - Matt Weber		mobile	s.22	Office	250-645-7609
Accomodations booking	Maureen Inkster		Maureen.Inkster@altagas.ca		250-645-7603

Other Numbers	
King Eddy Hotel (Stewart)	250 636 2244
Bell II Lodge (Amon Johnson)	250 275 4770
National Car Rental (Terrace)	250 635 6855
Bulkley Valley Wholesale (Smithers)	250 847 3313
Seabridge Stewart Warehouse	250 636 2505
Northern Motor Inn (Terrace)	250 635 6375

Seabridge Gold Inc.

KSM PROJECT
Standard Operating Procedures for Clearing and Construction of Batch 1 Activities

SEABRIDGE GOLD

Rescan™ Environmental Services Ltd.
Rescan Building, 15th Floor - 1111 West Hastings Street
Vancouver, BC Canada V6E 2J3
Tel: (604) 689-9460 Fax: (604) 687-4277

September 2014

KSM PROJECT

STANDARD OPERATING PROCEDURES FOR CLEARING AND CONSTRUCTION OF BATCH 1 ACTIVITIES

September 2014
Project #0196301-0034-0004

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Prepared for:

SEABRIDGE GOLD

Seabridge Gold Inc.

Prepared by:

Rescan™
Engineers & Scientists

Rescan Environmental Services Ltd.
Vancouver, British Columbia

KSM PROJECT

STANDARD OPERATING PROCEDURES FOR CLEARING AND CONSTRUCTION OF BATCH 1 ACTIVITIES

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1. Overview of Operating Procedures for Clearing and Construction

1.1 INTRODUCTION

This document provides direction for environmental managers during the construction and operation of the Batch 1 permitting activities. These activities include the construction of project access roads, roads in the TMF and Mine Site, construction of camps and certain water treatment facilities and other early-stage facilities.

The biological information discussed in this document was collected during baseline surveys for the KSM EA Application. This document builds upon the conceptual Environmental Management System (EMS) and Environmental Management Plans (EMPs) for the KSM Project (Figure 1.1-1). The plans presented here provide standard operating procedures (SOPs), mitigation measures, and monitoring plans to assist in implementation of the KSM Project.

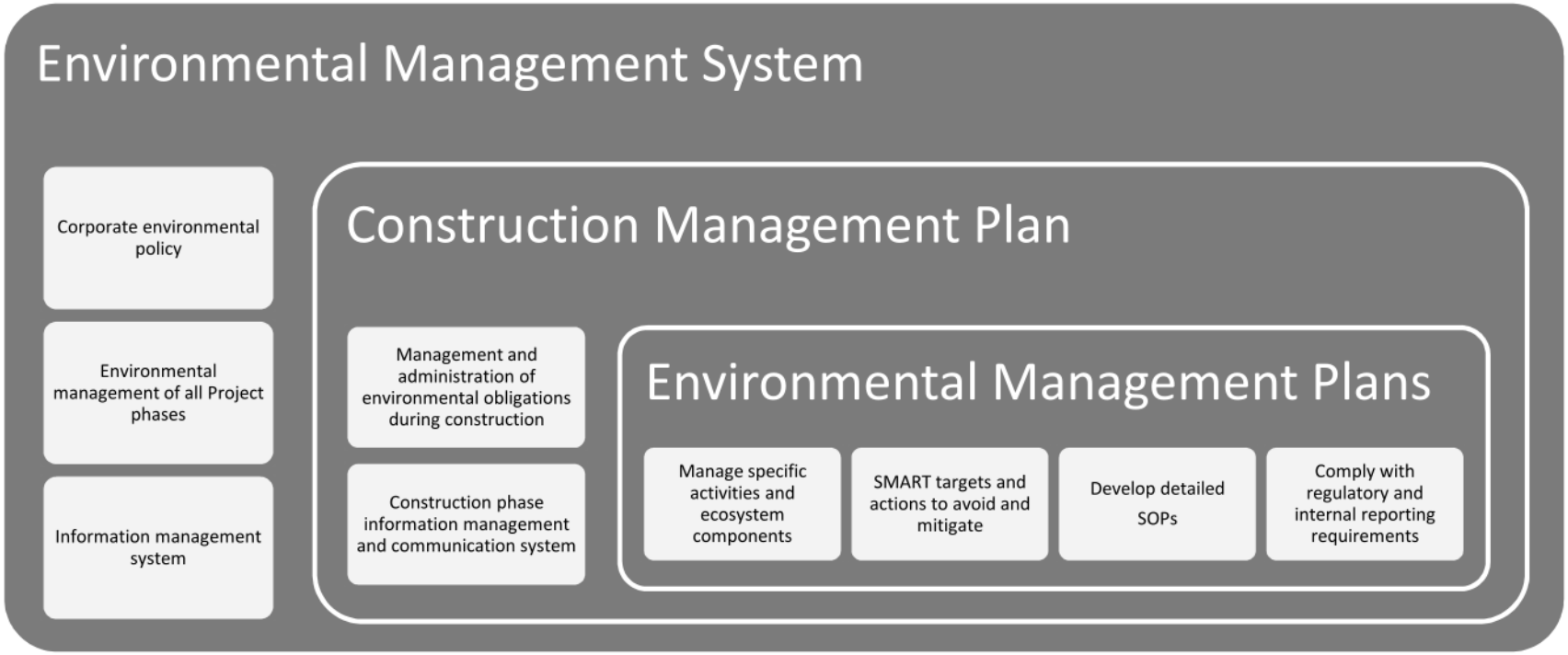
The goal of this document is to provide the environmental staff and construction crews carrying out construction with information that can be used to coordinate construction activities and avoid negative effects on the environment (biophysical and human). The document includes details on:

- the location of environmental values that require special management;
- overlapping seasonal windows that constrain construction and prioritizing these based on legislation, sensitivity of the resource to disturbance; and
- standard operating procedures that must be applied to avoid negative environmental and social impacts.

The real-world objectives of this Standard Operation Procedure is to reduce project impacts to environmental and heritage features on the landscape. These include (in order that they occur in the document:

1. avoid disturbing or destroying the residences of wildlife species while they are in use;
2. avoid having effects on listed wildlife species;
3. avoid disturbing wildlife species during seasons when they are stressed or vulnerable to disturbance (such moose in winter);
4. provide management advice for problem wildlife, camps, wastes, employee education, roads, aircraft and avalanche control activities to reduce effects on wildlife;
5. Clear and manage vegetation following FIRPA best management practices;
6. Manage activities near wetlands to reduce effects of altered shade, water flow and sediment on wetlands;
7. Manage vegetation and erosion near rivers to avoid effects on fish; and
8. Manage activities to minimize any effects on heritage resources.

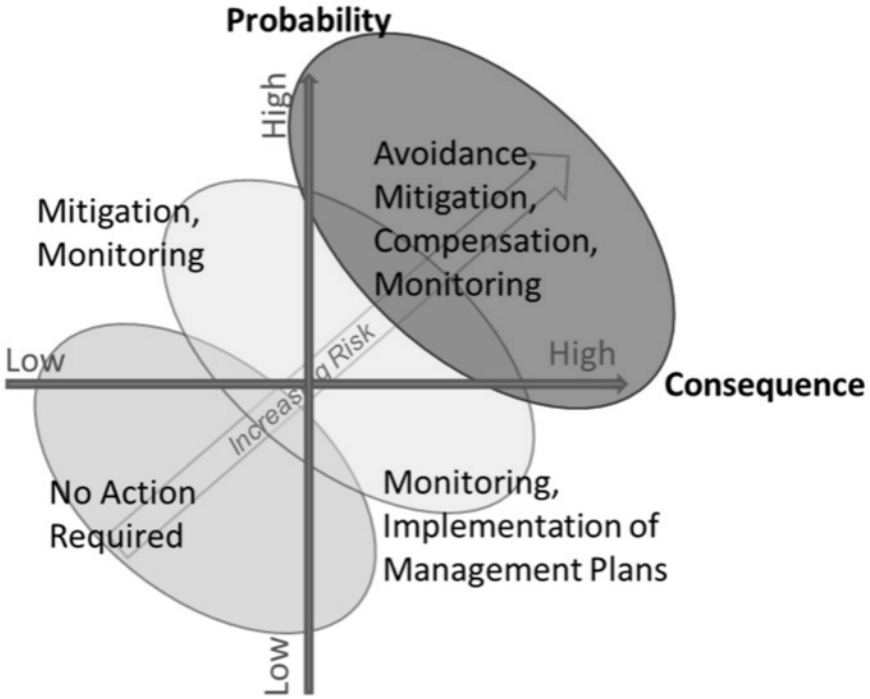
Figure 1.1-1. Environmental Management System



1.2 RISK MANAGEMENT APPROACH

This document uses a risk-based approach to reduce negative impacts on fish, wildlife, and terrestrial ecosystems and vegetation, and archaeological values (Figure 1.2-1). Risk is defined as the probability that an adverse event will occur combined with the consequences of an adverse event (Sayers, Hall, and Meadowcroft 2002). It informs management decision-making on risk reduction by providing a framework that allows for the identification of cause and effect and helps resolve issues related to overlapping operational seasonal constraints. This approach has been employed in various fields from wildfire, flood, and ecological risk management (Blackwell et al. 2004) (Sayers, Hall, and Meadowcroft 2002).

Figure 1.2-1. Management Intervention Increases with Increased Risk



The approach taken here reviewed the individual social and environmental values to identify which consequences would require mitigation, such as the critical winter habitat for moose, rare ecosystems, or where legislated regulations exist for fish and other values. Clearing activities can pose a high probability of loss or disturbance several environmental values. Where Project clearing activities intersect high social or environmental values, areas of high risk were identified. To reduce risk and possible Project effects, mitigation measures and SOPs have been developed specific to each value. Where risk is moderate, general measures have been included to reduce risk to these values.

Static values on the landscape such as wetlands, streams, or listed ecosystems, which don't change spatially, are relatively simple to manage in contrast to seasonal habitats or nesting or denning sites that change over time. To manage static values, Special Management Zones have been created that will be flagged in the field and have specific management measures to mitigate project effects.

For seasonal clearing, restrictions mitigate environmental effects of the project on values such as fisheries and wildlife. However, these restrictions can include most of the calendar year when they are developed without consideration of each other and without evaluating risk. To avoid making the Project unfeasible, but still mitigating the effects, a risk based approach for seasonal timing windows

has been developed. For moose, bear, and goat, seasonal habitat that is high risk has been identified and mapped. For other animals such a fisher, specific SOPs such as pre-clearing surveys have been developed. Through a coordinated approach that considers key values that may be affected, the level of risk, and appropriate SOPs or mitigation, the prioritization of construction timing can be effectively managed to avoid impacts on key values.

One consideration for managers is that sometimes a combination of environmental values and best management guidelines at a site produce timing windows or management activities which are mutually exclusive. Table 1.2-1 provides a decision-making hierarchy for which environmental values will be prioritized based on the degree of risk of an adverse effect. This hierarchy was set based on the relative strength of the guidance documents (legislation vs. best management practices) and the risk of adverse effects to the valued ecosystem component.

Table 1.2-1. Risk Ratings for Archaeological Sites, Fish, Western Toads, Wildlife Species, and Ecosystems

Value	Decision Hierarchy	Standard Operating Procedures General Approach
Archaeological Sites	1	• Site alteration permits • No work zones • Monitoring • Chance find procedures
Legislated Species Protection: Western Toads and Fish	2	• Riparian Reserve and Management Zones
Breeding Birds	3	• Breeding bird surveys between April 1st to August 1st • No work zones
Seasonal Habitat for Important/Sensitive Wildlife	4	• Avoidance measures • Pre-construction surveys • Monitoring
Red-listed Ecosystems/Wetlands	5	• Special Reserve and Management Zones
Blue-listed Ecosystems	6	• Special Reserve and Management Zones

For instance, if best management practices (e.g. timing windows) to preserve fish habitat were contradictory to practices for a blue-listed ecosystem, then those for fish would be followed because fish are higher on the decision hierarchy than blue listed ecosystems.

This document also contains monitoring plans for the construction period that will be used to evaluate the success of SOPs and mitigation measures in achieving the goals and objectives stated in the management sections. Where objectives are not being met, monitoring will be used to evaluate and assess the causes for this failure and be used to adapt the management plans to ensure SOPs are successful at reducing negative environmental effects and reducing risk.

1.3 HIERARCHY OF MITIGATION ACTIONS

This Standard Operating Procedure includes mitigation actions for minimizing effects on environmental and heritage resources. These mitigation actions will follow a hierarchy of decision making, as listed below:

1. Timing Windows – conduct activities outside of the times during a year when the environmental resources are sensitive to effects of the project.

Example: Raptors nest during May 1 to July 31, so schedule felling and construction outside of this period.

2. Operational Buffers – set up operational buffers or setbacks from environmental or cultural resources. If construction cannot be conducted outside of the timing windows, then surveys would be conducted prior to clearing or construction work. If surveys identified an environmental or heritage resource, then set an operational buffer around the site for the duration of the timing window.

   Example: If clearing must occur during the raptor breeding season, conduct pre-felling surveys for raptor nests. If a nest is found, then institute an operational buffer around the nest until July 31.

3. Work Provisions in Buffer Areas – for several operational buffers, such as Riparian Reserve Zones around fish-bearing streams work will be allowed in the area but with specific management instructions to reduce effects on the environmental or heritage resource.

   Example: Riparian Reserve Zones will be set around fish bearing streams where the use of heavy equipment will be managed to reduce effects on soil and vegetation.

Box 1: Setting and Managing Operational Buffers

Operational Buffers are defined by a variety of best management practices, scientific studies, and other sources, depending on the environmental or heritage resource in question. Some buffer distances, such as the Riparian Reserve Zones, are widely adopted by a variety of industries and are considered standard practice.

Other operational buffers are defined primarily for forestry, such as setbacks around raptor nests, to provide a sufficient number of trees surrounding the nest to limit temperature changes and the potential for windthrow. In other cases, there are no explicit operational buffers defined in best management practices, such as the distance between construction activities and moose in winter range.

This Standard Operating Procedure has proposed operational buffers for a variety of wildlife, fish, wetland and heritage resources which are designed to protect this resource while maintaining the operability of the project.

These operational buffers should be seen as a minimum distance between activities which may cause disturbances to environmental and heritage resources. The Environmental Manager will set and manage operational buffers on a case by case basis to move selected high-disturbance activities as far outside the buffer as possible, while low-disturbance activities can occur closer to the buffer. In certain circumstances, critical project activities may occur inside buffers if their activities are tightly managed.

Box 2: Example of Risk Management and Operational Buffers

An occupied raptor nest has been observed adjacent to a location where the road passes a planned quarry and log loadout. At this location, four activities are planned: 1) felling, 2) road construction, 3) log loading and 4) blasting. The environmental manager rates the relative risk of these activities and determines that both log loading and blasting are high-risk activities for raptors and so these activities are put on hold until the end of the raptor breeding period.

The environmental manager rates road construction as a medium-risk activity for raptors and so allows road construction to proceed up to the 50 m buffer listed in the clearing management section for raptors. The movement of the mechanical feller is rated as a low-risk activity for raptors and meanwhile the movement forward of the mechanical feller is considered a project-critical activity to continue road construction. In this scenario, the environmental manager allows the mechanical feller to proceed through the operational buffer around the nest and proceed clearing vegetation for the road. Any activities where any work is conducted inside the buffers is strictly controlled and monitored by the wildlife staff, and recorded in an operational log during the construction period.

1.4 SUPPORTING MAPS

Four map booklets have been produced to support clearing and construction during Batch 1 Permitting. Baseline data was collected for the project between 2008 and 2013 and these data were used to provide detailed management instructions on the maps. Baseline surveys and mapping included:

- Habitat suitability mapping for wildlife species;
- Field surveys for moose, mountain goat, bears, American marten, western toad, bats, raptors, waterbirds (ducks) and other migratory birds;
- Vegetation mapping using TEM and PEM;
- Vegetation and soils surveys to support the TEM and PEM;
- Wetland surveys in project footprint areas;
- Fisheries surveys at the majority of river and stream crossings; and
- Archaeology assessments along the road routes and project footprints.

These are listed below:

- *Map Booklet 1 – Habitat Risk Maps: Treaty Creek and TMF*
- *Map Booklet 2 – Habitat Risk Maps: Coulter Creek and Mine Site*
- *Map Booklet 3 – Clearing Maps: Treaty Creek and TMF*
- *Map Booklet 4 – Clearing Maps: Coulter Creek and Mine Site*

2. Wildlife Management

2.1 WILDLIFE MANAGEMENT DURING CLEARING AND CONSTRUCTION

Mitigation activities and pre-construction surveys have been developed for certain wildlife species that will require management during clearing and construction activities. Mitigation activities for the selected wildlife species are summarized in Table 2.1-1. Four supporting map booklets have been produced that show the areas where these procedures apply (Habitat Risk Maps for Treaty and Coulter Creeks and Clearing Maps for Treaty and Coulter Creeks).

Table 2.1-1. Mitigation Activities for all Wildlife Species during Vegetation Clearing and Construction

Species	Timing	Habitat	Mitigation Activities
Moose	Winter (January 1 to April 30)	Late Winter High Quality and UWR	• Locations of high risk (late winter habitat and provincial UWR in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek • The preferred option is to avoid working in these areas during winter • If construction during winter, then pre-clearing and construction monitoring will be conducted by an environmental monitor • Under average snowpack conditions (low elevation snowpack less than 1 m) and with three or less individuals, a short break will be called if moose are present, proceed when moose are beyond 100 m • During severe winter conditions (snowpack greater than 1.3 m) and more than three individuals occur, activity will be halted indefinitely until moose are beyond 200 m from the site, and the onsite monitor (RPBio) is satisfies that the animals have moved off and will not be unduly disturbed. • Sighting and mitigation will be reported to the environmental manager.
Moose	Calving (late April – early June)	All Habitats	If female moose with newborn calf is observed, then: • The sighting will be reported to the environmental department • A short break will be called and an environmental monitor will observe the moose to ensure it moves away. • If the animal cannot or does not move away, then work will be suspended for several hours or days for the moose to move away.
Moose	All Year	All Habitats	During felling or construction if a moose is incidentally observed within 100 m: • Felling and construction activity halted; proceed when moose are beyond 100 m
Moose	All Year	Constructed road areas	If a moose is observed incidentally on the access roads: during operations: • No work stoppage will be triggered. • Traffic management will be triggered (Section 2.5) giving moose the right of way.

(continued)

Table 2.1-1. Mitigation Activities for all Wildlife Species during Vegetation Clearing and Construction (continued)

Species	Timing	Habitat	Mitigation Activities
Mountain Goat	Winter (November 1 to April 30)	UWRs	• Winter high-quality habitats and kidding habitats are displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek. • The preferred option is to avoid activities in high-quality habitat and within 500 m of goat UWRs during winter. • If work planned in these areas during winter, then conduct pre-clearing surveys. • If goats observed within a 500 m buffer then pause work until goats have moved off.
Mountain Goat	All Year	All Habitats	If goats without kids (May 1 to July 15) and goats (July 16 to October 31) are incidentally observed in areas of operational roads or facilities, then: • Refer to traffic management in Section 2.5, giving goats the right away. • If goats with kids are observed between May 1 and July 1 within a 500 m buffer during clearing activities then pause work until goats have moved off. Pre-clearing surveys may also be conducted.
Bears	October 31 to April 30	High Quality Denning habitat	• High quality denning habitats for grizzly bear are displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek. • High quality denning habitats for black bear are concentrated in riparian and old large old growth stands, but are difficult to map and should be interpreted in the field. • The preferred option is to avoid clearing in these areas during winter. • If clearing to occur in black bear denning areas (old growth forest), then pre-survey clearing before snow falls for dens. • Note: Batch 1 activities do not overlap with any high-quality denning habitat identified for grizzly bear. • If black bear dens detected, set a 100 m buffer until emergence where only limited work may occur inside the buffer. • Limited work includes moving machinery through the area and conducting project-critical clearing or movement. High and moderate risk works would be deferred until the dens are no longer occupied.
Bears	April 30 to October 31	All Habitats	• If bears are observed at the work site for clearing or construction that do not move away, then the environmental manager will be notified and a work pause may be triggered. • Bears that are repeatedly observed at project or camp sites may be problem bears, which are discussed in wildlife conflict management, Section 2.2, and camp and waste management for wildlife, Section 2.3. • If bears incidentally observed on the operational areas of the roads, report observations to environment department. Vehicles will follow mitigation listed in the road management, section 2.5.

(continued)

Table 2.1-1. Mitigation Activities for all Wildlife Species during Vegetation Clearing and Construction (continued)

Species	Timing	Habitat	Mitigation Activities
Fisher and Marten	Winter (Mid February – mid April)	High Quality Denning Habitat for Fisher and Marten	• High quality denning habitats include all forested areas, with a higher likelihood in old growth areas. • Avoid clearing in old growth forests during the winter, if possible, otherwise: • Conduct pre-clearing surveys in the area to be felled and a 100 m buffer surrounding the project footprint. • If an active den is found, institute a 50 m buffer from the den where limited work is conducted. • Limited work includes moving machinery through the area and conducting project-critical clearing or movement. High and moderate risk work would be deferred until the dens are no longer occupied.
Toads	May to August	Breeding Ponds	• Avoid works in identified ponds during breeding season is preferred option • Provide 10 m buffer around identified breeding wetlands until the wetlands are no longer in use. • Install drift fencing around breeding ponds within or immediately adjacent to the project footprint to guide toadlets and adult toads away from the project area, and deter them from crossing active roads. • Potential and known breeding ponds are displayed in Map Booklet 3 – Clearing Maps: Treaty Creek and Map Booklet 4 – Clearing Maps: Coulter Creek
Bats	Spring and Summer (April 1 to September 30)	High-quality roosting habitat	• Avoid clearing during spring and summer period in old growth forested habitat. • If clearing is planned, then conduct pre-clearing surveys in conjunction with bird surveys. • If a summer bat roost is observed (Category 1* tree as per Table 2-1-9), mark the tree and a 30 m buffer where work will be limited until the fall, when bats will leave the roost tree. • If the tree, or buffer, is in a project-critical area, such as a river crossing, bridge location, etc., then the environmental manager will contact FLNRO and determine a possible course of action for moving the bats out of the roost tree.
Raptors	May 1 to July 31	Forests	• Schedule vegetation clearing outside of raptor nesting timing in forested areas. • If clearing is planned in these areas, during the raptor nesting, conduct pre-clearing surveys • If an active nest is found, establish 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, consult with FLNRO and remove or move the nest if it is in the project footprint.

(continued)

Table 2.1-1. Mitigation Activities for all Wildlife Species during Vegetation Clearing and Construction (completed)

Species	Timing	Habitat	Mitigation Activities
Waterbirds in wetlands	May 1 to July 31	Wetlands	• Schedule vegetation clearing outside of waterbird nesting timing in forested areas. • If clearing is planned in these areas, during the waterbird nesting, conduct pre-clearing surveys • If an active nest is found, establish 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.
Harlequin Duck	February 15 to August 30	Rivers with Wet Widths > 10 m	• Schedule vegetation clearing outside of Harlequin duck nesting timing in forested areas. • If clearing is planned in these areas, during the Harlequin duck nesting, conduct pre-clearing surveys • If an active nest is found, establish a 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.
Great Blue Heron	February 15 to August 30	High-Quality Habitat	• Schedule vegetation clearing outside of great blue heron nesting timing in forested areas. • If clearing is planned in these areas, during the great blue heron nesting, conduct pre-clearing surveys • If an active nest is found, establish a 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.
Landbirds	May 1 to July 31	Forests	• Schedule vegetation clearing outside of landbird nesting timing in forested areas. • If clearing is planned in these areas, during the landbird nesting, conduct pre-clearing surveys • If an active nest is found, establish a 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.

Note that management in this section is directed at clearing and construction activities of the roads and facilities. For areas where construction of the road is complete ("roads in use"), refer to management activities listed under wildlife conflict management (Section 2.2) and road management for wildlife (Section 2.5).

2.1.1 Clearing Management for Moose

2.1.1.1 Introduction

Moose were selected as a valued ecosystem component (VC) because of their social and economic importance to local First Nations and resident hunters as well their ecological value and the recent concerns for their conservation due to the declining population in the adjacent Nass Wildlife Area. Moose are protected legislatively by the provincial *Wildlife Act* (1996c), and guidance for management is provided by the provincial *Forest and Range Practices Act* (2002) (FRPA) including legislation to conserve and manage identified ungulate winter ranges (UWR).

Moose are most sensitive to disturbance during winter (Jan-March) when deep snow limits their range to valley bottoms and challenges their energy balance and nutritional ecology. Moose are also sensitive to disturbance during calving (April to June) and possibly during the rut (late September to early October) however consequences of disturbances are not as great as during winter.

Habitat Suitability Mapping (HSM) and provincial UWR mapping were used to identify high-quality winter habitat, which is reported on map books 1 and 2. Aerial surveys during winter confirmed that the high-quality habitat mapped was preferentially used by moose in the regional study area (RSA).

Sensitive areas for moose in the RSA that will interact with Batch 1 activities are late winter habitat located at:

1. The area of the Bell-Irving River and lower Treaty Creek to approximately 15 km up the Treaty Creek Access road, and
2. the lower elevation areas of the Unuk River where the Coulter Creek Route crosses the river.

From an engineering perspective, the area where winter clearing may be required is in the wetlands and cottonwood stands where the TCAR crosses the Bell-Irving River. All other areas can be cleared effectively outside of the winter period. Hence, the provisions for clearing management for moose are restricted to a 1-2 km length of road immediately adjacent to highway 37. This is important from an operational perspective, since this area is a) small and b) in a single location, and so would not unduly affect project scheduling.

2.1.1.2 Goals and Objectives

The objective is to reduce disturbance to moose, particularly during winter and in late spring when they are calving.

2.1.1.3 Pre-clearing Surveys

Pre-clearing surveys will be conducted prior to road construction to determine the presence of moose in the area being cleared if clearing or construction is scheduled during periods when moose are sensitive to disturbance (winter and spring). The surveys will be conducted in conjunction with the activity (i.e. within 24 hours) and an environmental monitor will be looking for signs of moose including fresh tracks or activity associated with moose use. All monitoring will be directed by a registered professional biologist (RPBio) with appropriate experience with moose in BC. Emphasis will be on detecting the presence of moose, particularly those with calves using high-quality winter range habitat, and moose with calves during spring.

Monitoring of moose during construction will be conducted by ground surveys with individuals on foot at least 300 m ahead of the construction activities. This method provides an effective and continuous method of monitoring, capable of identifying the most recent moose use during construction. Moose hidden in thicker vegetation beyond the surveyor’s ability to see could escape detection. If work crews observe a moose, they will report observations and contuct the work pause until the moose moves away.

Alternative methods could involve aerial survey, however it is anticipated that the disturbance to wildlife and reduced period of time a helicopter could be in the air prior to clearing in addition to the resourcing needed for survey would make it less effective or practical than ground surveys.

2.1.1.4 Mitigation Activities and Triggers

Mitigation is directed by season and habitat type (see map books 1 and 2). The most important season for moose is winter, when the range of moose is limited by deep snow. The preferred option to limit disturbance to moose is to avoid clearing during winter (January 1 to April 30). If this is not feasible, pre-construction monitoring will occur and activity stopped when moose are observed within 100 m and activity commences when the moose moves beyond the buffer distance.

Note that the areas of high-quality moose habitat used in map books 1 and 2 were generated during baseline surveys. Provincially designated UWRs are not used in the mapping because 1) moose UWRs have only been mapped by the province for the eastern half of the regional study area, and 2) the high-quality late-winter mapping covers a slightly larger area compared to the UWR.

In most cases, moose will actively avoid project activities during all times of year and incidental observations of moose during felling and construction will be rare. Where a moose is observed during felling and construction, crews will take a short break and allow the moose to move off at its own pace. Moose will not be actively pursued or driven away.

Risk to moose is influenced by the combination of moose sensitivity and the number of individuals exposed. Sensitivity is determined by seasonal behavior, physiology or activity and the later may be further influenced by sex of the individual.

Examples:

1. High Risk: Moose are most sensitive in winter, when they are at an energy deficit and vulnerable to starvation if reserves are depleted from excess activity or stress, and cows many of which will be pregnant during winter as well as guiding calves of the year are also vulnerable. A concentration of cow and calf moose in winter (such as observed along the Bell Irving River during aerial inventory) in deep snowpack with little opportunity to move is therefore at the highest risk of being affected by the development.
2. Medium Risk: During calving (late April – early June), female moose with newborn calves in the first 1-3 days, may be hesitant to move because the calf may have limited mobility. If a female moose with a newborn calf is observed at the work site during clearing or construction, the environment department will be informed and work will be suspended until the animal has a chance to move away.
3. Medium Risk: A single bull moose in winter with a normal snow pack year would be at a lower risk than a pregnant female or a female with a calf or a group of females.
4. Low Risk: A bull moose in summer or fall when resources are plentiful and moose movements are not restricted would represent the least risk to the population from disturbance generated by the development.

Incidental observations of moose crossing or using the constructed road will be reported to the environmental department. Traffic management will be triggered if the moose is on the road (Section 2.5), giving the animal the right of way and allowing it to leave the road corridor. However, these incidental observations do not trigger additional mitigation such as suspension of work activities.

Table 2.1-2 summarises the timing, habitat, triggers and mitigation activities for activity on the site.

Table 2.1-2. Timing and Mitigation Activities for Construction in Moose Habitat

Timing	Habitat	Mitigation Activities
Winter (January 1 to April 30)	Late Winter High Quality and UWR	• Locations of high risk (late winter habitat and provincial UWR in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek • The preferred option is to avoid working in these areas during winter • If construction during winter, then pre-clearing and construction monitoring will be conducted by an environmental monitor • Under average snowpack conditions (low elevation snowpack less than 1 m) and with three or less individuals, a short break will be called if moose are present, proceed when moose are beyond 100 m • During severe winter conditions (snowpack greater than 1.3 m) and more than three individuals occur, activity will be halted indefinitely until moose are beyond 200 m from the site, and the onsite monitor (RPBio) is satisfies that the animals have moved off and will not be unduly disturbed. • Sighting and mitigation will be reported to the environmental manager.
Calving (late April – early June)	All Habitats	If female moose with newborn calf is observed, then: • The sighting will be reported to the environmental department • A short break will be called and an environmental monitor will observe the moose to ensure it moves away. • If the animal cannot or does not move away, then work will be suspended for several hours or days for the moose to move away.
All Year	All Habitats	During felling or construction if a moose is incidentally observed within 100 m: • Felling and construction activity halted; proceed when moose are beyond 100 m
All Year	Constructed road areas	If a moose is observed incidentally on the access roads during operations: • No work stoppage will be triggered. • Traffic management will be triggered (Section 2.5) giving moose the right of way.

2.1.1.5 Detailed Procedures

Surveyor Qualifications

Pre-clearing surveys will be conducted by a Registered Professional Biologist with appropriate experience with moose in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Monitoring will occur for all development activity that requires physical work (e.g. falling, excavation, etc.) that will occur in winter (January 1 – April 30) within 1) in high-quality winter habitat or 2) within moose UWRs. Monitoring will also occur during the calving period (late April - early June) in high-quality winter habitat where construction activities are occurring. These areas are displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek.

Methods

A surveyor will survey on foot ahead (at least 300 m) of the activity within 24 hours before the proposed development (ideally in the morning prior to operation, and as the development advances). The individual will report moose and stay with the operation (at a safe distance) for the duration of the development activity to survey for moose.

Actions

Mitigation actions to be conducted if moose are observed are listed in Table 2.1-2.

Reporting

Daily internal reporting by the Environmental Monitor will be conducted and include the effort that the monitor has put into surveying (start and end times), as well as documenting information on moose observations including time of observation, physical condition, age, sex and number of moose. Notes on behaviour and response to the activity will also be requested, as will records of actions taken.

This information will be summarised into a daily wildlife monitoring log during the construction period which will be summarized into an annual report for construction activities. Comments on apparent health of the observed moose (fitness, tick infestation etc.) as well as how well the mitigation strategy appeared to work to limit impact to moose from the construction works will also be recorded.

2.1.2 Clearing Management for Mountain Goat

2.1.2.1 Introduction

Mountain goats were selected as wildlife VC due to their social and economic importance to local First Nations and resident hunters as well their ecological value, conservation status, and sensitivity to development disturbance. Mountain goats are protected legislatively by the provincial *Wildlife Act* (1996c) and guidance for management is provided by the provincial *Forest and Range Practices Act* (2002) (FRPA) including legislation to conserve and manage identified ungulate winter ranges (UWR) and kidding areas. Guidelines for managing goat in combination with industrial development have been developed by the BC Mountain Goat Management Team (MGMT) in 2010.

Mountain goats are sensitive to noise and disturbance from development, particularly from aircraft and blasting. Goat are vulnerable to disturbance during:

1. winter (November 1 to April 30) in the low elevation forested areas that goats use during winter and mapped as high-quality habitat, some of which are designated UWRs.
2. kidding period (May 1 to July 15) in the high elevation alpine areas that goats use during kidding, summer and fall.

Note that the areas slated for development during the Batch 1 permit phase may interact with the downslope 500 m buffer surrounding winter range, but will not overlap directly with UWR or summer, high elevation range.

Habitat suitability mapping and provincial UWR mapping was used to identify high-quality habitat for goats, which is displayed on map books 1 and 2. Aerial surveys during winter and summer confirmed that goats preferentially use the areas of high-quality habitat identified by mapping.

The Project will interact with the 500 m buffer areas around provincial UWRs along the CCAR from approximately 20 km to 30 km along the Sulphurets River, at the top end of the Mitchell Creek and the

area around Sulphurets Lake. Along the TCAR, the road will overlap the 500 m buffer UWR at approximately 5 km and the South Teigen Road at 12 km.

Monitoring of goats will be done by a surveyor with a spotting scope located at an effective vantage point on the ground. This has the benefit of allowing stealthy and continuous monitoring. Helicopter survey of areas pre-development may also be used to supplement the ground surveys as they increase the area that can be viewed in a short period of time. The method is weather dependant and can cause additional disturbance (particularly in winter) to goats.

2.1.2.2 Goals and Objectives

The objective is to reduce disturbance to goat from development particularly during sensitive periods of winter and kidding.

2.1.2.3 Pre-clearing Surveys

If construction is scheduled during the winter season, then pre-clearing surveys will be conducted during winter when project activities are within 500 m of high-quality goat habitat (Rescan 2009). All actions regarding mountain goat clearing management will be directed by a registered professional biologist (RPBio) with appropriate experience with ungulates in BC. Surveys will be conducted by a qualified professional within 24 hours before proposed disturbance, and development will be halted if goats are observed within 500 m during sensitive timing periods (i.e. winter) until animals are beyond the recommended threshold distance of 500 m.

Note that kidding is assumed to occur at mid to high elevation, generally up-slope and outside of the area slated for development during Batch 1 permitting and consequently no pre-clearing surveys are planned during the kidding period (spring), summer or fall when goats are at high elevation. If goats with kids are observed, additional surveys will be added and mitigation, including stopping construction activity, will occur.

2.1.2.4 Mitigation Activities and Triggers

Mitigation is determined by 1) habitat type, 2) season and 3) the number of goats observed. Examples include:

1. High risk areas include the UWRs and 500 m buffer around UWRs. High risk seasons are winter and kidding and larger groups of goats, particularly nannies with kids represent higher risk groups.
2. Medium risk scenarios include forested areas outside of UWRs and their 500 m buffer during winter when goats are at low elevation and may be spotted in the forest.
3. Low risk scenarios include the summer and fall periods when goats will occur at high elevations, far upslope from the road construction activities or the spotting of a single male animal in shoulder seasons (early winter or spring) at low elevation.

To mitigate for development disturbance, activity will be avoided in high-quality winter habitat and provincial UWRs during the winter season (November 1 to April 30). If this is not feasible, the recommended action is pre-construction monitoring with a halt of activity if goats are observed within 500 m of ground-based activities. Note that this buffer distance is being set for the winter time, when as well as high elevation open habitat, goats inhabit dense krummholts and forested habitat and where observations of animals beyond a few tens of meters will be challenging. Observers may have to rely on

detection of tracks as indicators. Table 2.1-3 summarises the timing, habitat, triggers and mitigation activities for activity on the site.

Table 2.1-3. Timing and Mitigation Activities for Construction in Mountain Goat Habitat

Timing	Habitat	Mitigation Activities
Winter (November 1 to April 30)	UWRs	• Winter high-quality habitats and kidding habitats are displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek. • The preferred option is to avoid activities in high-quality habitat and within 500 m of goat UWRs during winter • If work planned in these areas during winter, then conduct pre-clearing surveys • If goats observed within a 500 m buffer then pause work until goats have moved off.
All Year	All Habitats	If goats without kids (May 1 to July 15) and goats (July 16 to October 31) are incidentally observed in areas of operational roads or facilities, then: • refer to traffic management in Section 2.5, giving goats the right away. • if goats with kids are observed between May 1 and July 1 within a 500 m buffer during clearing activities then pause work until goats have moved off. Pre-clearing surveys may also be conducted.

Note that no mitigation activities are planned during the kidding period because the Batch 1 activities only influence the lowest elevation winter habitat and do not overlap kidding habitat. Also note that specific rules already apply to helicopter usage and mountain goat (Section 2.6).

2.1.2.5 Detailed Procedures

Surveyor Qualifications

Pre-clearing surveyors will be a Registered Professional Biologist with appropriate experience with mountain ungulates in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Monitoring will occur for all development activity that will result in active construction noise, visual disturbance, or physical work (e.g. falling, excavation, blasting) and that will occur in winter (November 1 until April 30) within high-quality winter habitat or within 500 m of provincial goat UWRs. These areas are shown in: Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek.

Methods

A surveyor will survey suitable goat habitat by spotting scope at least 500 m ahead of the activity and prior to 24 hours of the proposed development (ideally in the morning prior to operation, and advancing as the development progresses). Helicopter survey may be used to supplement ground survey if topography requires it, including situating the surveyor at optimal vantage points. The individual will record goat observations for the duration of the development activity.

Actions

Mitigation actions to be conducted if mountain goats are observed are listed in Table 2.1-3. Flight management is identified in the Aircraft Management (Section 2.6).

Reporting

Daily internal reporting will be conducted and include the effort that the monitor has put into surveying (start and end times), as well as documenting information on goat observations including time of observation, physical condition, age, sex (if possible) and number of goats. Notes on behaviour and response to the activity will also be recorded, as will observations of other sensitive wildlife incidentally observed. This information will be summarised into a daily wildlife monitoring log which will be summarized into an annual report during construction.

2.1.3 Clearing Management for Bears

2.1.3.1 Introduction

Grizzly bear and black bear are both present on the site and grizzly bear are protected (provincial blue-listed species and federal COSEWIC species of Special Concern). Both species were chosen as VCs because of their importance to First Nations and social and economic value as game animals, as well as their contribution to local biodiversity. Bears are protected by the provincial *Wildlife Act*, (1996c) while the *Forest and Range Practices Act* (2002) has capacity to legislate wildlife habitat areas (WHAs) to manage important areas for grizzly bear conservation. While grizzly and black bear share similar foraging habitat, denning habits of the two species differ.

This section provides monitoring and activities to minimize effects on bears during construction. Wildlife conflict management is considered in Section 2.2. Bears hibernating in dens are vulnerable if these areas are developed while bears are in the dens.

Habitat suitability mapping for grizzly and black bears was conducted during baseline studies. This mapping identified that high-quality denning habitat for black bears occurs in the RSA, including in some areas of the access roads in areas of large mature cottonwoods and conifers, particularly in the Bell-Irving, lower Treaty and Unuk valleys. Baseline DNA mark-recapture surveys identified that both black and grizzly bears are common in the RSA with concentrations of bears in the major valley systems, including the Bell-Irving, Treaty, and Unuk valleys.

Sensitive habitats for grizzly bears that occur on or near the road routes include the salmon spawning reaches along the Unuk River, the downstream reaches of Treaty Creek up to Todedada Creek, and Bell Irving River as well as the forest fire burn north of Treaty Creek near the confluence with the Bell Irving River (approximately 5 km on the Treaty Creek Road). Overlap with moose winter habitat also provides important areas for grizzly seeking carrion from winter kill, and this area is associated with the lower flood plain area of the Bell Irving River, Treaty Creeks (TCAR) and Unuk River (CCAR). Grizzlies excavate dens in areas with deeper soils, with cool and moderate slopes generally above tree line. Batch 1 development does not occur in these areas and no effects on denning grizzlies are anticipated.

Key black bear denning habitat occurs at the lowest elevation of the Bell Irving River, and Treaty Creek associated with old growth cottonwood stands that may provide den sites (approximately 0 to 10 km along the TCAR). The riparian habitat along the Unuk River at 15 km to 20 km along the CCAR may also provide denning habitat for black bear.

2.1.3.2 Goals and Objectives

The objectives are to ensure that development does not harm hibernating black bears and to minimize disturbance effects on both grizzly and black bears.

2.1.3.3 Pre-clearing Surveys

If clearing or construction are scheduled during the winter (October 31-April 30), then pre-clearing surveys will be conducted for grizzly bear dens before snow covers dens (October) and for black bear dens prior to physical work (within 24 hours). Surveys will include area that will be physically altered (excavated, cleared etc.) within 100 m of the work area. All actions regarding bear clearing management will be directed by a registered professional biologist (RPBio) with appropriate experience with bears in BC.

2.1.3.4 Mitigation Activities and Triggers

Bears are vulnerable to development activities during the winter (October 31-April 30) when they are in their dens. The preferred option is to conduct felling and construction activities outside of these periods in high-quality denning habitat for black and grizzly bears. These areas are displayed in map books 1 and 2. Risk of adverse effects on bears includes:

1. High risk – if vegetation clearing is occurring during winter in high quality black bear denning habitat (forest with large, old growth trees on Bell-Irving River, Treaty Creek or Unuk River), black bears could be disturbed or injured by felling activities. If felling and construction are planned during these periods in high-quality denning habitat for black or grizzly bears, then pre-clearing surveys would be conducted. If dens are observed, then a 100 m buffer would be established until the bears have left the den. Bears are very vulnerable during hibernation as they are unable to flee or respond to exposure or threats.
2. Medium risk - When bears are out of their dens, they will generally avoid areas of active felling and construction. If animals are observed at the felling or construction site that are hesitant to move away, then the environmental manager will be informed and a work pause may be conducted. Bears require substantial food resources to attain fat reserves for winter, and some concentrated sources such as spawning salmon, can make up a large portion of annual bear requirements. Generally risk to bears will be medium-level in areas associated with a food source that concentrates bears, such as a salmon spawning reach that may attract multiple bears and be heavily used. Ground surveys would identify these areas and construction may be halted on recommendations by the RPBio wildlife monitor in charge.
3. Lowest risk - would be associated with areas that provide little food to attract bears either because of a lack of vegetation or animal protein, or the value of forage changes with plant phenology, and it would be anticipated that sign observed would be transitory and not delay work.
4. Low risk – denning grizzly bear would be at risk from development that includes excavation of ground during winter time in area above treeline with deep soils and moderate sloped, cooler aspects. Since Batch 1 activities do not include these areas, there is little to no risk of causing harm to denning grizzly bears.

Bears will be incidentally observed on the constructed areas of the road and project site. Incidental observations of bears will be reported to the environmental department. Traffic management is dealt with in Section 2.5. Incidental observations of bears on already constructed areas of the project will not trigger a work pause or other mitigation aside from traffic management. Table 2.1-4 summarises the timing, habitat, triggers, and management activities for bears.

Table 2.1-4. Timing and Mitigation Activities for Construction in Bear Habitat

Timing	Habitat	Mitigation Activities
October 31 to April 30	High Quality Denning habitat	• High quality denning habitats for grizzly bear are displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek. • High quality denning habitats for black bear are concentrated in riparian and old large old growth stands, but are difficult to map and should be interpreted in the field. • The preferred option is to avoid clearing in these areas during winter. • If clearing to occur in black bear denning areas (old growth forest), then pre-survey clearing before snow falls for dens. • Note: Batch 1 activities do not overlap with any high-quality denning habitat identified for grizzly bear. • If black bear dens detected, set a 100 m buffer until emergence where only limited work may occur inside the buffer. • Limited work includes moving machinery through the area and conducting project-critical clearing or movement. High and moderate risk works would be deferred until the dens are no longer occupied.
April 30 to October 31	All Habitats	• If bears are observed at the work site for clearing or construction that do not move away, then the environmental manager will be notified and a work pause may be triggered. • Bears that are repeatedly observed at project or camp sites may be problem bears, which are discussed in wildlife conflict management, Section 2.2, and camp and waste management for wildlife, Section 2.3. • If bears incidentally observed on the operational areas of the roads, report observations to environment department. Vehicles will follow mitigation listed in the road management, section 2.5.

2.1.3.5 Detailed Procedures

Surveyor Qualifications

Pre-clearing surveyors will be a Registered Professional Biologist with appropriate experience with bears in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Monitoring triggers will include any physical activity to occur in high-quality grizzly or black bear denning habitat during the denning period (October 30 to April 30). High-quality denning habitat and is displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek.

Methods

Surveys for grizzly bear dens will be conducted in late October/early November prior to the snow hiding dens. Surveyors will look for evidence of excavation and bear sign and record the location.

Black bear denning is associated with low elevation forested areas with large trees and root wads. Surveyors will search for trees or root balls that may be of sufficient size and decay class to support denning by black bear within 100 m of the work area within 24 hours of clearing. This survey effort can also be timed to accommodate fisher den survey (Section 2.1.5). Evidence of use will also be recorded and dens will be identified spatially and their location communicated to the construction crew.

Actions

Mitigation actions to be conducted if grizzly or black bear dens or active animals are observed are listed in Table 2.1-4. Management of problem wildlife is listed in section 2.2.

Reporting

Daily internal reporting will be conducted and include detailing the effort that the monitor has put into surveying (start and end times), as well as documenting information on bear observations including time of observation, species, physical condition, age, sex (if possible) and number of bears. Notes on behaviour and response to the activity will also be recorded. This information will be summarised into a daily wildlife monitoring log which will be summarized into an annual report during construction.

2.1.4 Clearing Management for American Marten and Fisher

2.1.4.1 Introduction

Fisher and American marten were evaluated in the EA as furbearer VCs. American marten are the most abundant and valuable furbearer for harvest by aboriginal and non-aboriginal trappers in the region, while fisher are provincially blue-listed. Both species are protected by the provincial *Wildlife Act* (1996c). The Identified Wildlife Management Strategy (IWMS 2004) of the provincial *Forest and Ranges Practices Act* (2002) presents management objectives and procedures for integrating fisher conservation with industrial development. Also, the Cassiar-Iskut-Stikine Land and Resource Management Plan (LRMP) identifies strategies for integrating marten conservation with integrated resource use.

Both species rely on mature and old growth forest as a key component of their habitat. Marten require large tracts of conifer forest to provide habitat for providing winter life requisites and denning (they can also den in log piles), while fisher are dependent upon large diameter conifer or deciduous trees in stands that are of sufficient decay class to support natal and maternal dens.

Habitat suitability mapping identified high-quality habitat for winter living for American marten which included most of the Bell-Irving, Treaty and Unuk valleys, and mapped areas that may support denning trees for fisher; wherever old growth forest supported large diameter trees that could have decay resulting in cavities.s.18
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Marten use a much wider range of suitable denning structure which can include boles of decadent trees, hollow logs, underground dens as well as debris piles from logging slash. This suggests that marten denning may occur across much of the forested area associated with Batch 1 development along both the Coulter Creek and Treaty Creek access roads. Marten will readily move kits to alternate den sites when disturbed, increasing their resilience to disturbance.

2.1.4.2 Goals and Objectives

The goals are to minimize effects on active fisher and American marten dens by avoiding work during the denning period or by conducting pre-clearing surveys and instituting buffers around active dens. Greatest effort will be directed at identifying fisher dens, as this species is provincially blue-listed, while American marten is not a conservation concern.

2.1.4.3 Pre-clearing Surveys

If works are scheduled in high-quality fisher or marten denning habitat during the denning period (mid-March until end of June, then pre-clearing surveys will be conducted prior to physical works (falling, excavation etc.), with the best time occurring prior to leaf out (i.e. fall, winter and early spring). All actions regarding fisher and marten clearing management will be directed by a registered professional biologist (RPBio) with appropriate experience with arboreal furbearers in BC.

Ground searches focused on detecting suitable fisher tree dens, particularly in large diameter (>90 cm) cottonwood, advanced decay and entrance dimensions ("Tier 3" trees) with further search and documenting of evidence of use will be relied on to prevent disturbance to fisher. This method is recommended by Rich Weir, Provincial Furbearer Specialist, and allows sub-stand level features to be identified, and immediately evaluated for their occupancy by fisher. The method is adaptable and time effective, however it can result in some trees being missed as subjectivity in selecting candidate denning trees is required, as is interpretation of evidence of fisher by sign on tree trunks. Remote cameras can be used to supplement track evidence and provide positive evidence of use.

Alternative approaches such as placement of remote cameras, track plates or use of hair snags may detect presence of fisher, but they do not provide a means of detecting dens. Telemetry requires capture and handling of animals potentially causing mortality, without certainty of detecting dens in the affected areas. Use of dogs is a possibility, but may be restricted by deep snow and availability of trained animals.

2.1.4.4 Mitigation Activities and Triggers

Mitigation is directed by season and habitat type (see map books 1 and 2). Fisher and marten are vulnerable when they are in their dens during the denning season (mid-March – end of June). The first choice for mitigation is to avoid clearing activities in high-quality denning habitat during the winter period when dens are active. Note that high-quality habitat for fisher denning is similar to that for black bear, so the mitigation activities are the same. The highest risk to fisher will be from the possibility of destruction of a natal or maternal den between mid-March and the end of June. This could occur if large, decaying cottonwoods that support cavities that may be used for denning are felled or knocked down during construction. Activity in areas that does not support old growth forest with large diameter trees would have little risk to fisher.

If felling cannot be scheduled outside of the winter denning season in high-quality habitat, then pre-construction surveys will be conducted.

If an active fisher or marten den is found, then a 50 m buffer will be set around the den while it is active.

Table 2.1-5 summarises the timing, habitat, triggers and mitigation activities for working in fisher and marten denning habitat.

Table 2.1-5. Timing, Habitat, Triggers and Mitigation Activities for Construction in Marten and Fisher Habitat

Timing	Habitat	Mitigation Activities
Natal/Maternal period (Mid-March – end of June)	High Quality Denning Habitat for Fisher and Marten	• High quality denning habitats include all forested areas, with a higher likelihood in old growth areas. • Avoid clearing in old growth forests during the winter, if possible, otherwise: • Conduct pre-clearing surveys in the area to be felled and a 100 m buffer surrounding the project footprint. • If an active den is found, institute a 50 m buffer from the den where limited work is conducted. • Limited work includes moving machinery through the area and conducting project-critical clearing or movement. High and moderate risk work would be deferred until the dens are no longer occupied.

2.1.4.5 Detailed Procedures

Surveyor Qualifications

Pre-clearing surveyors will be conducted by a Registered Professional Biologist with appropriate experience with arboreal furbearers in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Monitoring for active fisher dens will include a pre-clearing survey conducted once during the natal and maternal denning period (approximately mid-March to end of June) within high-quality denning habitat for fisher and marten. The survey will include the area of high-quality denning habitat that may be physically altered with an additional 50 m buffer included around the footprint. High-quality denning habitat and is displayed in Map Booklet 1 – Habitat Risk Maps: Treaty Creek and Map Booklet 2 – Habitat Risk Maps: Coulter Creek.

Methods

Survey will be conducted by foot for dens. Fisher denning is associated with low elevation forested areas with large trees (particularly black cottonwood in the KSM RSA) that can support hollows or cavities for female fisher. The focus will be on identifying Tier 3 trees (Table 2.1-6) Surveys will be conducted during the early provincially determined critical natal and maternal denning period (March 15 to June 30th) before leaf-out and prior to construction. The monitoring will include the surveyors searching for trees that may be of sufficient size and decay class to support cavities that may be used as dens by female fisher.

Marten dens incidentally encountered will be recorded during this survey. Potential den trees will be recorded and evaluated for evidence of fisher use including presence of hair, fresh tracks to the tree etc. Weir and Almuedo (2010) state that evaluation of den occupancy by fisher can be achieved through visual assessment of the tree bole. When fishers climb trees, they tend to flake bark off the tree and leave fine scrape marks (1–2 mm wide), approximately 1 cm apart, from their claws. As female fishers will use a reproductive den for periods of over 3 weeks, they will climb the den tree

several times per day, which will leave conspicuous evidence of use.If a den is located it will be documented and its location coordinates marked with a GPS (Weir and Almuedo 2010).

Table 2.1-6. Tree Attributes Used to Identify Potential Fisher Dens

Tier	Necessary Attributes	Identification Criteria
1	Sufficient size and correct tree species	Any activity ¤ 90 cm dbh
2	Sufficient size, correct tree species, and advanced decay	Any activity ¤ 90 cm dbh, with advanced decay in the stem, and a potential entrance (i.e., rotten branch 5 – 10 cm diameter, existing hole [woodpecker, rotten crack] < 5 cm wide at narrowest axis)
3	Sufficient size, correct tree species, advanced decay, and entrance dimensions	Any activity ¤ 90 cm dbh, with existing entrance 5 – 10 cm wide at narrowest axis leading to advanced decay

Workers (e.g. fallers, machine operators, etc.) on site will all be responsible for identifying marten dens during construction in winter. The incidental observations will be reported immediately to the environmental monitor on site with the operation who will confirm use and record details including a description of the den and location.

Actions

Mitigation actions to be conducted if active marten or fisher dens are found are listed in Table 2.1-5.

Reporting

Pre-clearing surveys will include detailing the effort that the monitor has put into surveying (start and end times), as well as documenting information on fisher and marten observations including time and date of observation, species, physical condition, age, sex (if possible) and number of individuals. This information will be summarised into a daily wildlife monitoring log.

2.1.5 Clearing Management for Western Toad

2.1.5.1 Introduction

The western toad was evaluated as a VC because it is designated a species of Special Concern on Schedule 1 of SARA (COSEWIC 2002; BC CDC 2013). Western toads are red-listed as near threatened by the International Union for Conservation of Nature, and is the only international red-listed amphibian in Canada (Wind and Dupuis 2002; IUCN 2013). In BC, the western toad population is considered secure. Western toads are afforded protection under the *Wildlife Act* (1996c) and have been given a relatively high priority rating of 2 for goal 2 of BC's Conservation Framework, namely preventing native species from becoming at risk.

BC has recognized the importance of protecting wetland breeding sites because of the key role they play in supporting source populations of western toads for surrounding areas (BC MWLAP 2004). Preventing migratory barriers between breeding areas is also important for western toads (Carr and Fahrig 2001).

Toads spend the majority of the year in terrestrial, forested environments. In spring, then migrate (sometimes several km) to breeding ponds, where the adults breed and then return to their terrestrial habitats a few weeks later. Eggs develop into tadpoles and toadlets during the summer and disperse from the breeding pond in late summer. Maintaining the breeding ponds and connectivity to these ponds are the management priorities for western toads.

Baseline surveys were conducted in the local study area (LSA). These baseline surveys classified over 100 potential breeding ponds and conducted ground surveys at all of the highly rated ponds in the LSA. These surveys did not identify any breeding ponds within the project footprint, but did identify a breeding site west of the proposed plant site in the upper Teigen Creek drainage.

As toads may not breed every year, ponds identified as having potential to support western toad breeding still need to be evaluated prior to construction for presence of tadpoles or juveniles. These ponds exist in the Teigen and Treaty Creek drainages, as well as along the Unuk River as identified during the baseline inventory. This will require ground searches of these ponds prior to construction if clearing and construction is occurring during the breeding season. The ground surveys will be conducted during the period when the ponds are expected to support toads, tadpoles or toadlets, and the method is effective for detecting presence within a wetland, and is a RISC standard. The method is not sufficient to determine whether a pond that has no toads observed could support breeding in other years. For the purpose of construction monitoring, the presence or absence of toads at a pond is sufficient to drive mitigation actions during construction. If no toads are present, no mitigation is triggered.

Repeated surveys over 2-3 years would be necessary to identify toad ponds and trigger mitigation (e.g. toad tunnels) during the operation of the road.

2.1.5.2 Goals and Objectives

The goals are to limit effects on toad breeding ponds.

2.1.5.3 Pre-clearing Survey

If vegetation clearing and road construction is planned during the spring and summer (May-August), then pre-clearing surveys will be conducted. All actions regarding western toad clearing management will be directed by a registered professional biologist (RPBio) with appropriate experience with amphibians in BC.

2.1.5.4 Mitigation Activities and Triggers

The following mitigation activities will be implemented to minimize any effects on western toad:

- If clearing and/or construction is planned during the breeding period, pre-clearing surveys for western toad breeding ponds will be conducted.
- If a breeding pond is located within the footprint for the road or other structures, the location of the pond will be reported to the environmental manager, a 10 m buffer will be set around the pond, and work will be limited in this area until the toadlets have left the pond or other suitable mitigation has been conducted such as transplanting the tadpoles.
- If a breeding pond is located within the footprint of the transmission line ROW or other areas where clearing will be conducted, but no structures will be built – a 10 m buffer will be set around the pond where work will be limited and drift fencing will be installed to direct the toadlets and adults leaving the pond away from project activities.
- If a breeding pond is located in a roadside ditch or other water body on the project site, then drift fencing will be installed to direct the toadlets and adults away from the project activities.
- If a ditch is being used as a breeding site, then a road engineer will assess the potential to reconfigure the ditch or other water body (in consultation with the environment manager) to drain the area and limit the attractiveness of the site for toads in future years.

- If toad breeding ponds are identified immediately adjacent to project roads, the option of installing toad tunnels and drift fencing will be reviewed with the environmental manager and road engineer to examine if the site is appropriate for the installation of toad tunnels or if other mitigation, such as drift fencing to guide toads and toadlets away from the project site are most appropriate.
- In order to determine if ponds support toad breeding, ponds which have a high likelihood of supporting toad breeding will be surveyed for at least 2 years during the breeding season to confirm breeding status – which will guide mitigation actions (above) during the operation of the road.

Table 2.1-7 lists the timing, habitat, triggers and mitigation activities for clearing and construction.

Table 2.1-7. Timing, Habitat, Triggers and Mitigation Activities for Construction in Western Toad Habitat

Timing	Habitat	Mitigation Activities
May to August	Breeding Ponds	• Avoid works in identified ponds during breeding season is preferred option • Provide 10 m buffer around identified breeding wetlands until the wetlands are no longer in use. • Install drift fencing around breeding ponds within or immediately adjacent to the project footprint to guide toadlets and adult toads away from the project area, and deter them from crossing active roads. • Potential and known breeding ponds are displayed in Map Booklet 3 – Clearing Maps: Treaty Creek and Map Booklet 4 – Clearing Maps: Coulter Creek

In general the risk to toads is greatest if a breeding pond is affected by a change in water quality or characteristics (depth, turbidity, temperature etc.) when occupied by toads in early metamorphs when they require water to survive. The risks are further increased if the pond supports a large number of toads, and is one of only a few suitable breeding ponds in the near vicinity. Areas with no open water will not be a concern for toad breeding.

2.1.5.5 Detailed Procedures

Surveyor Qualifications

Pre-clearing surveyors will be a Registered Professional Biologist with appropriate experience with amphibians in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Any vegetation clearing and/or impact to wetlands identified from baseline surveys and wetlands mapped (Wetlands Management Section 4). Monitoring will occur ahead of development during the summer (May until August) while western toads are active. Potential wetlands were identified during baseline studies (Rescan, 2012). Locations will include physical work and a 10 m buffer within all forests identified as potentially supporting wetland habitat.

Methods

If clearing or construction is planned for high-quality habitat areas during the sensitive period for western toad breeding (May-August) pre-clearing surveys will be planned. Standard methods are adapted from Pyare (2005) and RIC (1998). A surveyor will survey the areas to be cleared and a 10 m buffer surrounding the project footprint.

Actions

Mitigation actions to be conducted if toad breeding ponds are observed are listed in Table 2.1-7.

Reporting

Daily reporting will be conducted and include detailing the effort that the monitor has put into surveying (start and end times), as well as documenting information on western toad breeding locations including time of observation, and status of breeding (i.e. egg masses). This information will be summarised into a daily wildlife monitoring log which.

2.1.6 Clearing Management for Bats

2.1.6.1 Introduction

Bats were included as a wildlife VC in the effects assessment because a number of bats were detected during summer surveys using Anabat systems in 2008 including the little brown myotis, a species that has been recently listed as federally Endangered by COSEWIC and protected under the federal *SARA* (2002c) and the provincial *Wildlife Act* (1996c).

Two types of areas are important for bats: winter hibernacula and summer roosts. Evaluation of the geology in the local study area (LSA) suggested that there is little likelihood of a winter bat hibernacula occurring in the project footprint.

Summer roosts for bats can occur April 1 to September 30 in tree snags with cavities or loose bark that provides shelter. Similar trees are also chosen by forest birds and raptors for nesting. Old growth, structural stage 6 and 7 trees occur in low elevation valleys, including the Bell-Irving River, Treaty Creek, the Unuk River and Sulphurets Creek. These are the same trees likely to support black bear and fisher denning. These trees are to be identified through pre-construction surveys and identification of wildlife trees.

- Bat roosting habitats are similar to black bear denning habitats. Key black bear denning habitat occurs at the lowest elevation of the Bell Irving River, and Treaty Creek associated with old growth cottonwood stands that may provide den sites (approximately 0 to 10 km along the TCAR). The riparian habitat along the Unuk River at 15 km to 20 km along the CCAR may also provide denning habitat for black bear
- Sensitive habitats for bats that occur within old growth coniferous forests (defined as structural stage 6 and 7 trees), on or near the road routes include the valley bottoms and flood plains of the Bell Irving River, Treaty Creek (TCAR) and Unuk River (CCAR).

Baseline surveys included sampling the local study area (LSA) to determine which bats were present in the area. An analysis was also conducted to determine if any karst topography was present in the project area. One area of karst was mapped in the Mine Area, but drilling on the site indicated that no large voids were present and surveys using roost-loggers during 2013 did not identify a hibernacula.

No formal protocol exists for pre-clearing tree roost surveys in BC (or western Canada). In the absence of a protocol, tree roost surveys will be conducted with guidance from the protocol used in the United Kingdom (Hundt 2012) where substantial protection is afforded roost trees. This method uses a preliminary inspection and a roost tree characterisation classification (Category 1 to 3) with appropriate mitigation for each class. There are challenges in adapting the protocol to a pristine Canadian forest, notably that many trees will need to be examined, different tree and bat species occur, and that numbers of bats likely to occur may be in smaller number than the UK, restricting potential for confirming occupancy from sign (Hundt 2012).

2.1.6.2 Goals and Objectives

The goal is to limit disturbance and effects on summer roosts for bats.

2.1.6.3 Pre-clearing Surveys

If clearing activities are planned during the summer (April 1 to September 30) period, then pre-clearing surveys will be conducted. Surveys will occur at least 100 m ahead of the activity and include the area to be cleared.

2.1.6.4 Mitigation Measures

The first choice for mitigation is to avoid clearing during the summer (April 1 to September 30) of old growth tree snags that may be used by bats as summer roosts. High-quality habitat is defined as forested areas classed as structural stage 6 and 7.

If clearing is planned in these areas, then pre-construction surveys will be conducted. Trees that may support bat roosts are the same types of trees commonly chosen by forest birds and raptors for nests. Surveys for forest birds and bats can be conducted concurrently.

The risk to bats is greatest if key roost trees that provide day or natal roosts to a number of bats are felled or disturbed when they are occupied by bats. These trees are most likely to be the large diameter cottonwoods with cavities, cracks, broken tops etc. that occur at the lowest elevation of the Treaty, Unuk and Bell Irving flood plains. There will be little risk to bats from clearing vegetation that does not support trees capable of providing roosting features.

Identified roost trees (including Category 1* tree as per Hundt 2012) will be marked and retained, along with a 30 m buffer until bats no longer use the roost (October). If the tree, or buffer, is in a project-critical area, such as a river crossing, bridge location, etc., then the environmental manager will contact FLNRO and determine a possible course of action for moving the bats out of the roost.

Table 2.1-8 identifies timing, habitat, triggers and mitigation actions for bats.

Table 2.1-8. Timing, Habitat, Triggers and Mitigation Actions for Construction in Bat Habitat

Timing	Habitat	Mitigation Actions
Spring and Summer (April 1 to September 30)	High-quality roosting habitat	• Avoid clearing during spring and summer period in old growth forested habitat. • If clearing is planned, then conduct pre-clearing surveys in conjunction with bird surveys. • If a summer bat roost is observed (Category 1* tree as per Table 2-1-9), mark the tree and a 30 m buffer where work will be limited until the fall, when bats will leave the roost tree. • If the tree, or buffer, is in a project-critical area, such as a river crossing, bridge location, etc., then the environmental manager will contact FLNRO and determine a possible course of action for moving the bats out of the roost tree.

2.1.6.5 Detailed Procedures

Surveyor Qualifications

Surveyors will be a Registered Professional Biologist with appropriate experience with bats in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Vegetation clearing that occurs during the spring and summer (April until October) within forests that may support large and decadent stems that could be used by roosting bats will trigger pre-construction surveys.

Methods

A ground survey will be conducted which will include looking at large stemmed, decedent trees that may support roosting bats. It is anticipated that this survey will be completed with other pre-clearing monitoring (i.e. forest bird pre-clearing surveys). Adapting Hundt (2012), evidence of potential roosting site features on trees, as well as indicators of bat use such as bat droppings, observed bats etc. will be recorded (additional indicators are listed in Table 2-1-9). These features and signs of use will then be used to classify trees into four categories (Table 2-1-10) for management. Tree Category 1* will be considered for mitigation.

Table 2-1-9. Features of Trees Commonly Used by Bats for Roosting and Field Sign that may be Used as Indicators of Bat Use (Adapted from Hundt 2012)

Features of trees used as bat roosts	Signs indicating possible use by bats
Natural holes	Tiny scratches around entry point
Woodpecker holes	Staining around entry point
Cracks/splits in major limbs	Bat droppings in, and around or below entrance
Loose bark	Audible squeaking at dusk or in warm weather
Hollows/cavities	Flies around entry point
Dense epicormic growth (bats may roost within it)	Distinctive smell of bats
	Smoothing of surfaces around cavity

Actions

Mitigation actions to be conducted if active bat summer roosts are found are listed in Table 2.1-7.

Reporting

Daily reporting will be conducted and include detailing the effort that the monitor has put into surveying (start and end times), as well as documenting information on bat and roost tree observations including time of observation, species, physical condition, age, and number of bats. Roost trees will be described and the location recorded. Notes on behaviour and response to the activity will also be recorded, as will observations of other sensitive wildlife. This information will be summarised into a daily wildlife monitoring log which will be summarized into an annual report during construction.

2.1.7 Clearing Management for Birds

2.1.7.1 Introduction

Avian species that migrate between countries receive protection under the federal *Migratory Bird Convention Act* (1994). Some bird species, including raptors; active bird nests; and some inactive raptor nests, are afforded protection under the British Columbia *Wildlife Act* (1996c), while avian species at risk are protected under the federal *SARA* (2002).

The bird community within the KSM study areas was characterized according to three avian groups: raptors, waterbirds, and landbirds. Raptors include hawks, falcons, owls, and other birds of prey. The term waterbird is used to encompass all birds that exclusively use water as habitat for foraging, breeding, or spring and fall staging during the year and includes diving and dabbling ducks, loons, geese, swans, shorebirds, and riverine birds. Landbirds include songbirds, hummingbirds, woodpeckers, and game birds in terrestrial areas.

Baseline surveys were conducted for raptors, waterbirds and landbirds to identify habitat associations, species richness and the presence of listed species. Several raptor nests were identified through stand watches and call-playback surveys, but none were located in the project footprint area. Given the diversity of birds observed within the site, all habitat types may potentially support some species of breeding bird from lowest riparian forest and wetlands to high elevation alpine tundra.

2.1.7.2 Goals and Objectives

The goal of the surveys is to ensure that active bird nests (those being used for breeding, egg laying and rearing chicks) are not disturbed and/or destroyed.

2.1.7.3 Pre-clearing Surveys

If clearing must be completed during the breeding period (May 1 to July 31; but see Table 2.1-10 for exceptions), pre-clearing surveys will be conducted to identify areas where clearing will be managed. All actions regarding bird clearing management will be directed by a registered professional biologist (RPBio) with appropriate experience with birds in BC.

2.1.7.4 Mitigation Activities

The first choice for mitigation is to schedule vegetation clearing outside of the breeding period for waterbirds and landbirds (May 1 to July 31) (Table 2.1-11). If clearing must be completed during the breeding period, pre-clearing surveys will be conducted to identify locations of active nests and buffer zones will be applied until the nest is inactive.

For raptors and heron rookeries, surveys will be conducted by helicopter in the fall or early spring when deciduous trees lack their leaves and nests are easier to locate. If a nest is found but is inactive, then the environmental manager will contact FLNRO and remove or move the nest.

If an active raptor nest or heron rookery is found, then a 100 m buffer will be established around the nest where only critical project activities will be conducted, such as movement of vehicles or supplies such that road construction can continue on the other side of the buffer. The buffer will be maintained until the bird has left the nest in the fall and the inactive nest will be removed or moved, in consultation with FLNRO.

Table 2.1-10. Timing, Habitat, Triggers and Mitigation Activities for Clearing in Bird Habitat

Type	Timing	Habitat	Mitigation Activities
Raptors	May 1 to July 31	Forests	• Schedule vegetation clearing outside of raptor nesting timing in forested areas. • If clearing is planned in these areas, during the raptor nesting, conduct pre-clearing surveys • If an active nest is found, establish 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, consult with FLNRO and remove or move the nest if it is in the project footprint.
Waterbirds in wetlands	May 1 to July 31	Wetlands	• Schedule vegetation clearing outside of waterbird nesting timing in forested areas. • If clearing is planned in these areas, during the waterbird nesting, conduct pre-clearing surveys • If an active nest is found, establish 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.
Waterbirds - Harlequin Duck	February 15 to August 30	Rivers with Wet Widths > 10 m	• Schedule vegetation clearing outside of Harlequin duck nesting timing in forested areas. • If clearing is planned in these areas, during the Harlequin duck nesting, conduct pre-clearing surveys • If an active nest is found, establish a 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.
Great Blue Heron	February 15 to August 30	High-Quality Habitat	• Schedule vegetation clearing outside of great blue heron nesting timing in forested areas. • If clearing is planned in these areas, during the great blue heron nesting, conduct pre-clearing surveys • If an active nest is found, establish a 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.
Landbirds	May 1 to July 31	Forests	• Schedule vegetation clearing outside of landbird nesting timing in forested areas. • If clearing is planned in these areas, during the landbird nesting, conduct pre-clearing surveys • If an active nest is found, establish a 50 m forested buffer where no work is conducted, with exceptions for critical project activities to advance the road past the buffer. • Once the nest is inactive, vegetation clearing can occur.

Waterbirds are divided into two groups: Harlequin ducks and wetland-nesting waterfowl. Harlequin duck pair surveys will be conducted prior to any work on crossings of streams with wet widths greater than 10 m. If any nests are identified, buffer zones of 50 m radius will be maintained throughout the breeding season, except for critical project activities.

Wetland-nesting waterfowl will be surveyed within <7 days prior to clearing activities in wetland areas. If waterfowl are found nesting in wetlands, work will be limited at the nest site and within a 50 m buffer, except for limited, critical project activities in the buffer zone.

Landbird nests will be surveyed for on foot in forested areas within <7 days prior to clearing activities. If a landbird nest is found, work will be limited at the nest site and within a 50 m buffer, except for limited, critical project activities in the buffer zone.

Table 2.1-11 lists the timing, habitat, triggers and mitigation actions for raptors, waterbirds and landbirds during construction.

2.1.7.5 Detailed Procedures

Surveyor Qualifications

Surveyors will be a Registered Professional Biologist with appropriate experience with birds in BC.

Monitoring Frequency

Pre-clearing surveys may be triggered during vegetation clearing but not during normal operations thereafter.

Monitoring Triggers and Locations

Pre-clearing surveys will be triggered if vegetation clearing of forests or wetland buffers is planned during the nesting season for birds. Locations include any forest, riparian, wetland, or waterbodies identified as high quality habitat during habitat suitability modeling.

Methods

To locate and avoid active raptor, landbird, and waterbird nests should land clearing be scheduled during the sensitive period for raptors (March 1-August 15) or landbirds and wetland birds (April 1 to July 31) and in habitat with a high potential for nesting birds. Two experienced biologists will survey appropriate habitat for active bird nest and conducted the following field procedures:

- Survey procedures are based on Best Management Practices (BC MOE 2013) and RISC standards (RIC 2001).
- Pre-clearing surveys will be conducted no more than 7 days prior to the initiation of clearing activities.
- Survey methods include walking transects within the area to be cleared to search for bird nests or nesting behavior where nests are likely to occur. Where trees and shrubs occur, searching for nesting activity will be conducted using binoculars, auditory cues, and a spotting scope.
- Raptor nests and heron colonies will be surveyed in spring or fall when trees have dropped their leaves and visibility is higher.
- Harlequin duck surveys will follow RISC standards (RIC 2001).
- Surveyors will also search for indirect evidence of nesting. Such evidence includes avian response (e.g., distraction displays, alarm calling) and the presence of fresh white-wash (i.e., excrement) in a tree or on the ground, prey pluckings, and pellets. For cavity nesting species lightly tapping on snags or trees with suitable nest cavities, may bring adults to the entrance of the cavity. Look up and into potential nest holes for emerging adults.

Actions

Mitigation actions to be conducted if active bird nests or inactive raptor nests are observed are listed in Table 2.1-11.

Reporting

Daily reports will include detailing the effort that the monitor has put into surveying (start and end times), as well as documenting information on nest observations and locations including time of observation, species, and number of nestlings (if possible). Nest trees will also be described and location recorded. Notes on behaviour and response to the activity will also be recorded. This information will be summarised into a daily wildlife monitoring log.

2.2 WILDLIFE CONFLICT MANAGEMENT

2.2.1 Introduction

Limiting and preventing wildlife interactions with project personnel requires employee education (Section 2.4), camp and waste management activities (Section 2.3). The KSM EIS Application (Section 26.21.3.3) also committed to developing a plan for wildlife conflict management during active construction and operation phases. This section provides advice on procedures to record bear/human incidents and decision-making criteria to determine the best responses to bear/human incidents

2.2.2 Goals and Objectives

The goal of wildlife conflict management is to minimize wildlife-human interactions, ensure safety of Project employees, and prevent avoidable wildlife mortalities. Objectives related to problem wildlife management include:

1. Train staff to maintain the Project site in a way that will not attract wildlife;
2. Prevent habituation of wildlife to Project facilities and people;
3. Provide a response plan for dealing with adverse human-wildlife interactions; and
4. Avoid destruction of wildlife, unless absolutely necessary.

2.2.3 Mitigation Activities

Mitigation activities to address wildlife conflicts with Project infrastructure and personnel are outlined in Table 2.2-1. This protocol is written to address problem bears; however, it can be used to address conflicts with other wildlife species. Details of these management responses to human-wildlife conflicts are as follows:

1. Monitoring: report and record wildlife sightings and signs.
2. Post warning: provide accurate and current information of potentially dangerous wildlife near construction areas or camp.
3. Area closure: develop a system by which worker access to areas with known wildlife is restricted, pending suitable controls.
4. Adverse conditioning (AVCD): apply AVCD activities to problem wildlife to prevent or reverse habituation.
5. Translocation: capture and relocate problem animals away from the Project area.

6. Destruction: undertake (with authorization from appropriate wildlife management authority) only when an animal is determined to pose an unacceptable hazard to human safety.

Table 2.2-1. Protocol to Determine Appropriate Management Responses to Human-Animal Interaction

Type of Human-Animal Interaction	Management Response					
	Monitor	Post Warning	Area Closure	AVCD	Trans-locate	Destroy
1. Animal sighting or sign reported	X	X				
2. Animal showing normal feeding behaviour and avoids people	X	X				
3. Animal reacting defensively following surprise or provoked encounter (defensive aggression)	X	X	X			
4. Animal tolerates people but ignores them and their facilities (no threat present)	X	X	X	X		
5. Animal shows repeated interest in people and/or human facilities, indicating a potentially food-conditioned animal that approaches personnel closely (habituated)	X	X	X	X		
6. Animal receives minimal or low-level reinforcement to unnatural food sources (mildly food-conditioned)	X	X	X	X	X	
7. Animal is heavily habituated to people and has repeatedly obtained unnatural foods (food-conditioned)	X	X	X	X	X	
8. Animal has previously been relocated and is unlikely to change its behaviour		X	X	X		X
9. Animal displays aggressive, offensive, or predatory behaviour and is an imminent threat to human safety.		X	X			X

2.2.4 Monitoring

Surveyor Qualifications

All staff will be responsible to report incidental wildlife observations, including potentially problem wildlife to their immediate supervisor or the environment manager.

Once a potentially problem animal has been observed, it is the responsibility of the environment manager and the various camp managers and overall site manager to enact the management response. If higher level management response is warranted (Table 2.1-1), then the environment manager will contact FLNRO for advice and discussion prior to AVCD, translocation or destruction of a problem animal.

Monitoring Frequency

Monitoring will be conducted continuously for wildlife through a program of incidental observations from employees.

Monitoring Triggers

Monitoring will be ongoing by all employees on site or in response to wildlife conflicts.

Locations

All locations where work is being undertaken during construction and operation of the site will be monitored.

Methods

Monitoring will occur via incidental observations and reports of problem wildlife to the environmental staff.

Actions

Direct management actions for problem wildlife are listed in Table 2.2-1.

Management actions to manage camp infrastructure and wastes are discussed in Section 2.3.

Employee education activities are discussed in Section 2.4.

Reporting

Reporting on problem wildlife management responses will be included with the annual Wildlife Effects Monitoring Report.

2.3 CAMP AND WASTE MANAGEMENT FOR WILDLIFE

2.3.1 Introduction

Wildlife can be attracted to temporary and permanent camps during active construction and operations due to the presence of waste and other wildlife attractants, and suitable structures that can be used as refuge, shelter, nesting, perching, or roosting habitat. This section discusses strategies to exclude wildlife from using camp infrastructure for resting or breeding purposes. Waste and wildlife attractants are also discussed. The KSM EIS Application committed to developing procedures to restrict wildlife from entering camp facilities (Chapter 4, Environmental Management Plans).

2.3.2 Goals and Objectives

The goal is to make camp infrastructure unsuitable for use by wildlife, thereby reducing the potential of wildlife becoming attracted to or habituated to food rewards from wastes, thereby reducing the potential for human-wildlife interactions and wildlife attraction. The objectives of camp management will be to discourage wildlife from using camp infrastructure and to identify locations for adaptive management if wildlife are accessing camp infrastructure for the purposes of nesting or breeding.

2.3.3 Mitigation Activities

Buildings will be designed and maintained to exclude wildlife wherever possible, such as:

1. Covering vents with mesh to prevent bats, birds, and furbearers (e.g., American marten) from entering;
2. Skirting buildings to deter wildlife from entering under buildings; and
3. Fencing areas that may be attractants to wildlife, such as waste management facilities.

Various wildlife attractants that will be produced during the operation of camps include kitchen, petroleum, and sewage wastes. Wildlife species, particularly black bear, grizzly bear, and American marten, may be attracted to camps. Mitigation related to waste and wildlife attractant management should include:

1. Incinerate all kitchen wastes or have wastes shipped off site in a timely manner;
2. Incinerators located at camps should be fenced to prevent wildlife interactions;

3. Store all attractants and wastes (garbage, food waste) at camps and construction sites in bear-proof storage facilities;
4. Remove food wastes from collection sites regularly and incinerate as soon as possible;
5. Make food waste receptacles available to staff and enforce a no littering policy.
6. Use on-site landfills only for disposal of non-wildlife attracting waste.
7. Store recyclable wastes and chemicals in wildlife-proof facilities; and
8. Conduct regular road and camp cleanups to ensure that no hazardous substances, wires, or loose materials are present to endanger wildlife and ensure proper storage and disposal of hazardous wastes (e.g., fuel).

2.3.4 Camp and Waste Management Monitoring

Surveyor Qualifications

Camp and waste monitoring will be administered by the environmental staff. Employees will be encouraged to report incidental observations of issues related to camps or waste management.

Monitoring Frequency

Incidental observations will be reported and recorded continuously, while periodic monitoring of camp infrastructure will begin with construction and conducted regularly until camp structures are decommissioned with a planned period of every 2 weeks. Frequency may decline with time if no wildlife encounters are recorded, but not less than seasonal inspections.

Monitoring Triggers

Triggers for monitoring will be time-based (every 2 weeks) or in response to incidental observations from on-site personnel.

Locations

Monitoring will occur in all camps, buildings and waste management facilities.

Methods

Monitoring methods will include visual inspections of the outside of camp infrastructure for observations of wildlife interacting with buildings or evidence of use, e.g., nesting materials in vents, scratching or chewing of building materials, evidence of digging beneath buildings or skirting.

Visual inspections will be completed of waste management at camps (e.g., kitchen wastes) and waste storage facilities to ensure compliance. Motion-triggered cameras may be used at waste facilities and other key areas if wildlife interactions are common.

Actions

Where identified, wildlife access points to buildings would be covered with mesh or skirting, and siding to prevent wildlife ingress.

In the event that wildlife are accessing camp infrastructure where the above actions have already been taken, adaptive management will be triggered and a specific plan to limit access by the wildlife species will be developed.

If wastes or other wildlife attractants are found to be misdirected or mismanaged, the environmental monitor shall immediately inform the camp manager and the wastes/attractants shall be moved to an appropriate secure location as soon as possible to prevent attraction of wildlife.

If wildlife are observed attempting to access or are successful in accessing waste storage areas or incinerator facilities, adaptive management will be triggered and additional methods to secure wastes and wildlife attractants will be considered. In addition, management responses for wildlife attempting to access the Project will follow the Protocol for Human-Wildlife Interaction outlined in Section 2.2.

Reporting

Reporting on wildlife interactions with camp infrastructure or waste management facilities and management responses will be included with the annual Wildlife Effects Monitoring Report.

2.4 EMPLOYEE WILDLIFE EDUCATION PROGRAM

2.4.1 Introduction

Employees and contractors will be educated on basic local wildlife ecology (focused on VCs), Project-related concerns for wildlife and biodiversity during the active construction and operation phases. All Project personnel will be encouraged to promote stewardship activities. Employees and contractors will also be expected to comply with the direction provided on wildlife management and to report incidental observations of wildlife, both for safety (e.g., bears near camps) and to guide management activities (e.g., moose on the road).

2.4.2 Goals and Objectives

The goal of Employee Wildlife Education is to create employee and contractor awareness for the potential effects of Project facilities and Project operations on wildlife, minimize disturbance and disruption to wildlife, and ensure safety of all employees. The objectives of Employee Wildlife Education include:

- Providing an accessible and comprehensible wildlife awareness program.
- Ensuring awareness and understanding for the recommended SOPs outlined throughout this document.
- Promoting compliance with SOPs through education and enforcement.

2.4.3 Education Activities

All contractors and employees working on the Project will participate in the Employee Wildlife Education program in conjunction with Project orientation. This program will be supported by standard operating procedures, reporting forms, information sheets, and awareness posters and signage. The education program will include training in the following areas:

- Access road restrictions and operating protocols (e.g., wildlife right-of-way, speed limits, check-ins, road-wildlife reporting programs);
- Awareness of wildlife-sensitive locations (e.g., movement corridors, breeding areas) and wildlife-sensitive periods;
- Local wildlife species of concern and threats to native biodiversity;
- Waste and wildlife attractant management;

- No feeding of wildlife policy;
- No harassment of wildlife;
- No-hunting policies;
- Bear-aware training;
- Wildlife incidental observation reporting;
- Wildlife incident/accident reporting and response procedures;
- Anonymous reporting system for employees to voice concerns and inform management of non-compliance; and
- Compliance requirements and disciplinary action that will be enforced by Project management.

Program Content

Content for the Employee Wildlife Education Program will be developed by professional environmental staff, and will be locally administered at the Project site.

Monitoring Frequency

The employee wildlife education Program will begin at the start of Batch 1 activities and continue throughout construction.

Locations

The Employee Wildlife Education Program will apply to all Project construction sites and will be disseminated to all employees and contractors working on the Project on location during site orientation, or in special circumstances, prior to arrival.

Reporting

Reporting of the # of persons trained and the # of human wildlife incidents will be included in the annual Wildlife Effects Monitoring Report.

2.5 ROAD MANAGEMENT FOR WILDLIFE

Road management for wildlife is included in Appendix K of the Special Use Permit (SUP) application for the Coulter Creek Access Road (CCAR) and Treaty Creek Access Road (TCAR). Mitigation actions in this plan are summarized in the following sections.

2.5.1 Mitigation Actions

Mitigation actions cover the following four areas: KSM Road Access and Traffic Management, Wildlife Right of Way, Road-related Wildlife Mortalities, and Wildlife Incident and Accident Reporting.

2.5.1.1 KSM Road Access and Traffic Management

Measures to reduce impacts to wildlife due to roads include:

- The road will be gated and controlled.
- Minimize effects of direct mortality by conducting vegetation management so as to ensure safe operation (e.g., good sight lines).

- Speed limits will be appropriate to the road designs and signage will be posted to inform drivers of speed limits. The road design criteria for traffic speed on KSM access roads are all less than 60 km/hr.
- Vehicles shall not exceed the maximum posted speed, and shall drive at a speed and in a manner consistent with safe driving under KSM access road prevailing at the time.
- Traffic will be managed, dispatched, and monitored.
- Refuge areas will be ploughed along the road during winter; gaps in snow banks on roads will be created at best spacing to allow an escape for wildlife, preferably on corners to allow moose to escape.
- Road will be closed to the public and to all foot traffic. Road use will be restricted only to persons required for Project construction.
- Private vehicles are prohibited (including snowmobiles and all-terrain vehicles) on the mine access roads.

2.5.1.2 Wildlife Right of Way

There is potential for vehicles to encounter wildlife during KSM road construction and operations. Measures to reduce impacts to wildlife within the road right-of-way include:

- Wildlife will be given the right-of-way on all KSM roads at all times.
- A reporting system will be in place for wildlife encounters (observations and/or interactions) along all KSM roads.
- Development of appropriate mitigation strategies (e.g., signage) for areas of higher frequency of encounters with wildlife.
- Training for drivers will include wildlife education and there will be no tolerance for harassment of wildlife.

2.5.1.3 Road-related Wildlife Mortalities

Despite measures taken to avoid wildlife, accidental vehicle-wildlife collisions are possible. Standard operating procedures for managing road-related wildlife mortalities include:

- Signage will be installed to alert drivers of speed limits, identified wildlife movement corridors, and wildlife sensitive areas.
- Road kill will be removed in a timely manner.
- A reporting system will be in place to record all road-killed or injured wildlife along KSM roads.

2.5.1.4 Wildlife Incident and Accident Reporting on KSM Roads

Standard operating procedures to reduce the incidence of wildlife-vehicle interactions include:

- A reporting system for all wildlife-vehicle interactions and wildlife-road structure interactions (e.g., moose crossing bridges) will be created.
- The reporting system will allow employees to raise concerns anonymously or report observed non-compliance.
- Location, species, date, and type of wildlife-vehicle interactions will be reviewed annually to identify any areas with higher frequencies of interactions.

- All Project or contractor employees will be trained on reporting procedures for wildlife observations and interactions through the Employee Wildlife Education and Compliance Measures (Section 2.4).
- A standard response plan for Project-related wildlife incidents and accidents to ensure the safety of Project employees and wildlife. The plan will be reviewed and adapted as necessary to reduce the incidence of wildlife-vehicle interactions.

2.6 AIRCRAFT MANAGEMENT FOR WILDLIFE

2.6.1 Introduction

Aircraft management for wildlife has been conducted during the exploration phase of the KSM project since 2008 and will be continued into the construction phase to reduce impacts on wildlife from helicopter overflights. This plan is specifically designed for mountain goat, given their sensitivity to helicopter disturbance.

2.6.2 Goals and Objectives

The goals and objectives of aircraft management for wildlife are to reduce sources of disturbance from aircraft overflights on mountain goat.

2.6.3 Mitigation Activities

Mitigation related to mountain goat and helicopters includes:

- Maintaining 2 km horizontal setback and 400 m vertical separation between helicopters and mountain goat habitat as per the Province of BC guidelines;
- Educating pilots as to the importance of avoiding mountain goats, particularly during important periods of the year such as kidding and winter;
- All helicopter activities to be conducted within 2 km line of site from mountain goat winter range (UWR u-6-002) must take place between June 15 and October 31 as per regulations under the Forest and Range Practices Act and weather permitting;
- Established flight paths to access camps and construction areas will be disseminated to all new pilots;
- Use topographic barriers to separate helicopters from mountain goats;
- Keep helicopters below mountain goats if possible;
- Avoid flying directly towards, hovering near, or landing near goats; and
- Minimize number of flights and time spent in the area with potential disturbance.
- Helicopters can drop off specialized work crews in goat habitat, but only when goats are not present.

2.6.4 Aircraft Monitoring

Pilots will be asked to report incidental observations of goats as part of the incidental wildlife reporting program. Employees who feel that pilots have flown too close to goats will be encouraged to report this to the camp manager.

2.7 AVALANCHE MANAGEMENT FOR MOUNTAIN GOAT

2.7.1 Introduction

Avalanche management will be conducted in the winter during the construction and operation phases of the Batch 1 Activities. The objective of this management is to start avalanches during controlled periods and such that avalanches do not endanger the safety and operation of the roads and facilities described in the Batch 1 application. Avalanche management can consist of 1) hand placement of explosives in avalanche start zones, 2) helicopter-dropped explosives, 3) in-place concussive devices in avalanche start zones or 4) ground-launched explosives (avilauncher). Avalanche areas occur in the project area along the southern end of the Snowslide range, in the TMF, Treaty Access road, along Coulter Creek, and Sulphurets creek and the Mine Site.

Mountain goats occupy alpine areas with steep, rocky cliffs during the summer and high elevation forested areas on southern slopes during the winter. Modelling by MOE and Rescan identified winter habitat near Batch 1 activities at several locations (See map books 1 and 2). At certain times, goats will cross avalanche slide areas between forested patches during the winter and be exposed to triggered avalanches.

Typically, both ground-based launchers (similar to the howitzers used on the Coquihalla highway) and helicopter deployment of explosives require the avalanche area to be clear and visible prior to deployment. However, in-place concussive devices that are built into the start zone of avalanche tracks can be deployed during snow events or afterwards.

This plan is designed to limit the chance of mortality for mountain goat.

2.7.2 Goals and Objectives

The goals and objectives of avalanche management for Wildlife are to reduce potential mortality from avalanche measures on mountain goat.

2.7.3 Goat Monitoring and Mitigation Activities

It is estimated that the greatest risk to goats will occur from getting caught in avalanches when they are artificially triggered. As natural mortality to goats is caused by avalanches, removing avalanche risk (as a result of active avalanche management) may partially mitigate for the disturbances to mountain goats as a result of controlling avalanches when they occur, provided that goat mortality does not exceed normally occurring levels. Mitigation activities to limit risks to mountain goats are based on conducting surveys for goats prior to avalanche control and pausing control activities until goats have cleared avalanche paths, which include:

1. Hand-based blasting: Prior to conducting hand-based blasting, as the crews are moved into position by helicopter, a rapid survey of the avalanche path and start zone will be conducted for mountain goats.
2. Helicopter-based blasting: Prior to conducting helicopter-based blasting, a rapid survey will be conducted of the avalanche path and start zone for mountain goats. If the area and area immediately adjacent (within 100 m) to the avalanche path is clear, blasting will proceed. If not goats will be herded away to a safe distance before blasting begins.
3. In-place concussive devices: During clear weather, a ground based survey of the avalanche track will be conducted from a safe location using a spotting scope or similar device. If blasting is planed during a snow event, then no pre-blast surveys will be possible, however it is only

anticipated that this will happen in extreme cases when snow fall occurs over a period of 48 hours. However, during heavy snowfall it is expected that mountain goats will be naturally sheltering in treed areas for cover.

4. Ground-based Avilauncher: During clear weather, a ground based survey of the avalanche track will be conducted from a safe location using a spotting scope or similar device. If mountain goats are observed in the avalanche path, the avalanche control will be paused until goats are able to clear the area.

Avalanche control will be evaluated before and after it is conducted to assess its influence on goats. Spring time avalanche track surveys will be completed to identify if there was the goat mortality (as evidenced from carcasses) and compare number/mortality to control areas where avalanche management is not used. This information will be used to evaluate the effectiveness of the goat clearing techniques, and determine any modification that will be required.

Following the first season of winter active avalanche controls, a monitoring plan will be produced, based on the results of the survey methods described above. Additional monitoring may be recommended, including aerial surveys of potentially project-impacted winter ranges during the winter to evaluate spatial distribution and potential for goats to use more restricted areas as winter advances. Identification of mountain goat winter avalanche tracks localised use will be used to select avalanche control techniques, i.e., in areas where goats typically concentrate, helicopter clearing and helicopter based blasting will be required. In areas where limited goat use is observed, alternative ground methods may be used.

Reporting

Reporting of the results of surveys prior to avalanche control will be recorded in a log and included in the annual Wildlife Effects Monitoring Report.

3. Vegetation Management

This section describes the approach and SOPs developed to support the Batch 1 Permit Application for the KSM Project. The purpose, objectives, and management approach are described for vegetation management during Batch 1 clearing and construction activities. This document will guide clearing activities, debris management, vegetation maintenance, invasive species control, and revegetation measure to minimize environmental impacts and achieve regulatory compliance. It is a component of the Environmental Management and Monitoring Plan that has been requested as part of permitting. Vegetation clearing measures for western toads, birds, wetlands, and fish resources are detailed in *Section 2.1.4 Toad Seasonal Clearing*; *Section 2.17 Birds Seasonal Clearing; Section 4.0 Wetlands Management* and *Section 5.0 Fisheries Management*.

It is expected that pre-clearing surveys will be conducted to identify red- or blue-listed ecosystems and other environmental values not identified during initial reconnaissance. The SOPs identified in this document must be implemented to reduce effects on environmental values identified during these pre-clearing surveys. If, during implementation, existing measures are identified as insufficient, additional measures will be identified in cooperation with the environmental monitor and regulators.

3.1 VEGETATION CLEARING

3.1.1 Introduction

Comprehensive vegetation SOPs are required to minimize environmental impacts. The potential environmental impacts associated with the removal of vegetative cover include the following:

- direct loss or alteration of wildlife habitat within the affected area;
- reduced habitat effectiveness adjacent to the affected area during actual brushing and clearing operations;
- habitat fragmentation from blockage of wildlife movements;
- increased fire hazards from slash accumulations;
- increased erosion potential where vegetation is removed;
- introduction of sediment into watercourses; and
- loss of or damage to merchantable timber.

To characterize vegetation clearing effort, the terrestrial ecosystem mapping (TEM) was further refined at a larger scale to better incorporate vegetation structural characteristics. The detailed vegetation delineation was completed to more clearly define the effort that would be required to clear vegetation based on whether felling and clearing of timber was required or if only brush removal is necessary. Four structural stage classes were developed to assist in identifying clearing effort (Table 3.1-1). Areas were calculated for each vegetation structural stage class. Open forest and closed forest classes were distinguished based on crown closure estimates.

Table 3.1-1. Vegetation Structural Type and Area to be Cleared for Batch 1 Construction Activities

Vegetation Clearing Type	Area (ha)
Barren And Herb Area (herbs, low shrubs, exposed soils)	137
Shrub Area (tall shrub dominated)	186
Open Forest Area (10 to 30% crown closure)	213
Closed Forest Area (> 30% crown closure)	532
Non-vegetated (primarily bedrock, exposed soil, etc.)	21
Total	1089

Following a risk assessment approach, Special Management Areas (SMA) have been assigned to locations where project activities may result in moderate or high risk. Areas of high risk occur where important ecological values are located and activities such as blasting or use of heavy machinery are planned (high consequence and high probability). Moderate to high risk occurs in areas where ecological values such as blue-listed ecosystems overlap with similar construction activities (moderate consequence and high probability). Standard operating procedures have been developed to reduce project effects in both these cases. More restrictive measures are required as risk increases. In the case of low consequence ecosystems, general SOPs are sufficient to reduce project effects.

3.1.2 Goals and Objectives

The goal of vegetation management is to reduce effects on vegetation communities that are identified as listed or rare and to provide best work practices to minimize effects on all vegetation.

Specific objectives of the plan are to:

- provide direction regarding timber salvage and handling;
- minimize vegetation loss and disturbance within all ecosystems, especially those recognized by the BC Conservation Data Centre as red- and/or blue-listed (listed or at-risk ecosystems; no red-listed terrestrial ecosystems were identified);
- minimize potential for windthrow effects along new forest edges resulting from vegetation clearing; and
- manage clearing related debris to reduce fire risk while maintaining wildlife habitat.

3.1.3 Standard Operating Procedures

General SOPs that apply to all areas that require clearing are detailed in Table 3.1-2. These measures are designed to reduce possible effects on all ecosystem types.

3.1.3.1 Special Management Areas

Special Management Areas will be established for all areas where additional SOPS are required for listed terrestrial ecosystems. Two types of reserve exist in Special Management Areas: Reserve Zones and Management Zones. Both Zones must be flagged in the field, prior to work commencing, where they intersect work areas with appropriate field ribbons to ensure they are clearly visible to machine operators and work crews. These zones are shown on maps in:

- *Map Booklet 3 – Clearing Maps: Treaty Creek*
- *Map Booklet 4 – Clearing Maps: Coulter Creek*

Table 3.1-2. Standard Operating Procedures for Ecosystems and Vegetation for Clearing and Construction

Clearing Locations	Standard Operating Procedures
All Sites	Minimize all clearing dimensions regardless of clearing size or ecosystem affected. Pre-clearing surveys will identify and map Special Management Zones or other environmental values that intersect work zones and require special consideration. These areas must be clearly flagged and correctly mapped and required operating procedures identified for the contractor. All areas to be cleared must be clearly flagged prior to commencement of activities. Work boundaries must be clearly defined and observed. Avoid damage to residual trees roots or stems as this can increase risk of windthrow and disease. Conduct windthrow hazard assessments along all new openings greater than 1 ha according to BCTS Windthrow Manual: A Compendium of Information and Tools for Understanding, Predicting and Managing Windthrow on the BC Coast (Zielke et al. 2010). Implement windthrow mitigation measures in areas with high risk. To limit effects on site productivity: classify soil sensitivity according to the Hazard Assessment Keys for evaluating Site Sensitivity to Soil Degrading Processes Guidebook 1 and implement work practices to limit soil disturbance on soils with High to Very High hazard ratings.
Transmission Line ROW	When clearing transmission line rights-of-way (ROW) or other areas where only tree removal is required, retain shrub and herb vegetation to help facilitate the conversion of the site to a long-term stable shrub community. Limit soil disturbance through practices such as winter falling and machine work on snow, employing low ground pressure machinery, and avoiding periods of high soil moisture. Conduct separate hazard tree assessments along all transmission ROWs to ensure worker safety and safe operating conditions for transmission line operation.

[1] *(BC MOF 1999) https://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/HAZARD/HazardAssessKeys-web.pdf*

Special Reserve Zones (SRZ): The Special Reserve Zone includes the environmental value being protected and a buffer (Table 3.1-3). Generally, no machine activity is permitted in SRZs unless the construction footprint occurs in this zone. This zone is designed to reduce effects on the value being protected during infrastructure construction, maintenance, and use. Avoidance of activity in this zone is the primary goal. When this is not possible, minimizing clearing widths and relocating clearing sites such as borrow pits, log lands, and waste areas is required.

Special Management Zones (SMZ): Management zones allow more flexibility in work practices than reserve zones (Table 3.1-3). The goal of this zone is to provide a buffer around the Special Reserve Zone. Limited machine activity is permissible in this zone. Soil disturbance should be minimized through the use of low ground pressure machinery unless the construction footprint occurs in this zone. Permitted activities are described below for each SMZ. Where retention of this zone is possible, it will limit changes in microclimatic conditions such as wind, light, and temperature and reduce the potential for effects such as windthrow or invasive species colonization.

3.2 TIMBER SALVAGE AND DEBRIS MANAGEMENT

3.2.1 Introduction

Timber and debris management focus on identifying possible end use or disposal methods for timber and debris. Issues include:

- economic viability of timber salvage;
- increased wildfire hazard;
- negative effects on habitat; and
- Debris disposal methods.

Table 3.1-3. Special Reserve and Management Zones Buffers and Standard Operating Procedures for Clearing and Construction in Terrestrial Ecosystems

Listed Ecosystems	Total Reserve Buffer (m)	SRZ Buffer (m)	SMZ Buffer (m)	SRZ Standard Operating Procedures	SMZ Standard Operating Procedures
Red Listed Terrestrial Ecosystems	40	10	30	• Pre-clearing survey to identify and flag boundaries; • Avoid construction in this zone if possible through relocation of project infrastructure; • No machine activity unless construction footprint occurs in this zone (i.e. avoidance is not possible); • Limit clearing widths to minimums required for road maintenance and operation; • Re-locate, borrow pits, waste areas, log landings, and other infrastructure that can be feasibly relocated outside reserve zones; and • Maintain native herb and shrub cover outside of construction footprints. • When working in wet soils, ensure changes to soil hydrological functions are minimized. Refer to Table 4.1-1 for guidance on culvert placement.	• Pre-clearing survey to identify and flag boundaries; • Where practical re-locate, borrow pits, waste areas, and log landing outside management zones; and • Conduct wind firming treatments to reduce windthrow risk.
Blue-listed Terrestrial Ecosystems	30	10	20	• Pre-clearing survey to identify and flag boundaries; • Limit clearing widths to minimums required for road maintenance and operation; • Re-locate, borrow pits, waste areas, log landings, and other infrastructure that can be feasibly relocated outside reserve zones; and • Maintain native herb and shrub cover outside of construction footprints. • When working in wet soils, ensure changes to soil hydrological functions are minimized. Refer to Table 4.1-1 for guidance on culvert placement.	• Pre-clearing survey to identify and flag boundaries; • Where practical re-locate, borrow pits, waste areas, and log landing outside management zones; and • Conduct wind firming treatments to reduce windthrow risk.

While the spread of insects and disease is a concern, western balsam bark beetle (*Dryocoetes confuses*), is the primary agent in the Project area. This beetle utilizes downed wood as brood material; however brood production is less in downed versus standing trees. Therefore, no special measures related to tree handling are required for forest health agent control.

3.2.2 Goals and Objectives

The goals are to effectively manage timber use and debris disposal that results from clearing activities. This includes mitigating hazards related to wildfire to acceptable levels; finding markets for merchantable timber where economically viable; and ensuring that cleared areas, especially along the transmission line corridor have coarse and fine woody debris to supply structural diversity for wildlife.

3.2.3 Standard Operating Procedures

Managing roadside and transmission line debris created by clearing is important to help maintain habitat features, reduce impacts to site productivity and soil resources, and to ensure fire hazard is mitigated to reduce liability in the case of wildfire. Standard Operating Procedures are prescribed for debris management in Table 3.2-1.

Table 3.2-1. Timber Salvage and Debris Management Standard Operating Procedures for Clearing and Construction

Debris Management	Standard Operating Procedures
Timber Salvage	Timber may only be cut within the boundaries of an approved occupant Licence to Cut (to be acquired by Seabridge) issued by the Ministry of Forests, Lands, and Natural Resource Operations. Merchantable timber will be offered to local First Nations will be given the first right of refusal. If First Nations decline timber rights, local forest licensees and contractors should be contacted to determine if it is economically viable to auction this wood to them. Trucking costs may be prohibitively high and make this an unfeasible option. Unmerchantable timber should be piled and burned, buried, or chipped to reduce fire hazard to conform to the Wildfire Act requirements regarding hazard abatement.
Falling and Handling	Avoid the felling of obvious wildlife trees (e.g. snags with cavity nests, large trees with stick nests). Follow direction provided by in Section 2.1 Wildlife Management During Clearing and Construction regarding wildlife tree identification and management. During clearing, trees must be felled towards the existing ROW or opening wherever possible. 'Leaners' or felled trees which inadvertently fall into adjacent undisturbed vegetation will be salvaged, or slashed in place to reduce fuel hazard. Timber salvage operations will utilize cut-off type saw equipment, and falling will be undertaken in a manner that minimizes butt shatter, breakage, and off-right-of-way disturbance. Skidders will be used to transport salvaged logs to deck sites when appropriate. Logs will not be skidded through watercourses, wet areas, or thawed muddy ground on the ROW. Where possible feller bunchers should be employed to harvest timber to reduce ground disturbance, and damage to timber. The use of these machines to reach into areas with sensitive soils or in RMZ's where tree thinning is required is encouraged to reduce compaction and rutting. Decked timber must be marked according to the License to Cut Permit timber marking requirements. Logs should be arranged so that butt ends are together to facilitated loading. If no end user or market can be identified for logs, decking is not required. This will reduce skidding and related site impacts. All decked timber will be removed from the right of way prior to the completion of clean up.
Woody Debris Management	Coarse woody debris is an important habitat element, as suggested by First Nations during the KSM working group meetings. In areas that are disturbed during clearing but where no structures or access is required, coarse woody debris will be retained.

(continued)

Table 3.2-1. Timber Salvage and Debris Management Standard Operating Procedures for Clearing and Construction (continued)

Debris Management	Standard Operating Procedures
Coarse Woody Debris Retention ***> 12 cm diameter fuels***	Where logs are available, retain a minimum of 50 to a maximum of 100 logs/ha (equates to 10 to 15 m spacing) > 20 cm diameter at top and > 5 m in length in a scattered distribution. Partially decayed existing coarse woody debris (Decay class III or greater) should be left on site and are not considered in the 50 to 100 logs/ha). All fuels > 12 cm in diameter in excess of these limits must be disposed of according to Salvage or Debris Disposal requirements to conform to the *Wildfire Act*.
Fine Woody Debris Retention	Fine woody piles should be created for wildlife habitat. 10-15 piles/ha no greater than 3 m x 3 m x 2 m in height may be left as habitat features. These are not considered in slash loading estimates for fire hazard reduction. These should be set back 5 m from retained trees and 10 m from burn piles; where the distance from forest edge to road edge is < 8 m, habitat piles are not required.
Fine Woody Debris Slash Loading Limits ***< 12cm diameter fuels***	Slash loading limits are designed to reduce surface fire spread rates, fire intensity, and fire severity and to conform to the *Wildfire Act*. Limits are: • residual slash loading of fuels 7 to 12 cm diameter must not exceed 3 kg/m^2 (30 tonnes/ha); • residual slash loading of fuels < 7 cm must not exceed 1 kg/m2 (10 tonnes/ha); and • in areas where grading is not required, retain all stumps to reduce soil erosion and assist in re-vegetation efforts.
Debris Disposal Methods	Burning, chipping, and burying of woody debris are disposal methods that can be used when timber cannot be marketed. Guidance on the implementation of these methods is provided below.
Burning	Unless exempted by an appropriate authority, all burning is to be conducted in compliance with the BC *Wildfire Act* and *the Environmental Management Act*, and *Open Burning Smoke Control Regulations*. Unless exempted by an appropriate authority, local ventilation indices must be indicated as 'good' prior to ignition of burn piles, using Environment Canada data or better information, and only continue if indices are fair or better. Wildfire Management Branch burning restrictions must be monitored and followed. • burn piles must be constructed to facilitate effective ignition and complete combustion with minimal tending by crews and must have 3 m fuel free zones around them; • No debris may be disposed of within any Special Management Zones including management zones, and 10 m setbacks are required from these areas in wherein no chipping or burning is permitted. One exception to this exists for burning and chipping blue listed ecosystems but only in areas where grading of mineral soil is occurring and all native vegetation will be removed; • burning must occur in the disturbed footprint in areas that will not have native vegetation after construction; • piles must be constructed a minimum of 10 m from existing forest edges and from any reserve zones to reduce scorch and damage to retained trees; • minimize the number of piles to reduce damage to soil resources; and • burning is not permitted within any buffered reserve or management zones areas shown on the maps or that are located during pre-clearing surveys.
Chipping	Chips must be distributed evenly on-site, targeting an average of 5 cm depth over the dispersal area and a maximum depth of 15 cm in any given spot. Chips may not be dispersed within reserve zones or in areas where low-lying herbaceous plants comprise the main component of understorey plants. The chipping or mulching of slash will not be permitted within the riparian management zone of any stream. In particular, chipped cedar debris will not be used for erosion control within a riparian zone as it produces a leachate toxic to fish.

(continued)

Table 3.2-1. Timber Salvage and Debris Management Standard Operating Procedures for Clearing and Construction (completed)

Debris Management	Standard Operating Procedures
Burying	The volume of slash and overburden will first be calculated per lineal metre of road. Generally, for every cubic metre of debris, a metre of clearing will be used for disposal. When excessive slash volumes are encountered, other disposal methods such as chipping or burning will be considered. Buried material will: • be compacted before being covered with soil; • be covered with a minimum of 300 mm of soil; • be placed so as not to interfere with roadway or other drainage, snow removal, design; • sight distance, future developments, or standing timber; and • not interfere with any watercourse. Trenching is a type of burying in which slash and debris are placed in a trench rather than being spread over the ground surface. The volume of debris will determine the size of the trench. To minimize the size of the cleared area, a deep, narrow trench shall be used preferentially over a shallow, wide trench. To prevent undermining tree roots, 3 m of cleared width shall be left between any standing timber and the trench. The trench shall generally lie parallel to the roadway and may be continuous or intermittent, depending on the volume of debris. The woody debris will be placed on the bottom of the trench and compacted before being buried with topsoil and other strippings from the road prism. This method shall be considered where usable subgrade material occurs fairly continuously below a veneer of unsuitable soil. The excavated trench material will be used to raise the subgrade above the normal ground line. Trenching shall not be used on natural slopes with greater than 20% gradient, as it could undermine the road surface, causing long-term subgrade instability.

3.2.4 Monitoring

Surveyor Qualifications

Surveyors should be familiar harvesting operations, vegetation management, operational requirements associated with construction, and with estimating fuel loading and debris management measures. Designation as a Registered Forest Professional (RFP) or Registered Professional Biologist (RPBio) is preferred.

Monitoring Frequency

Monitoring should begin within a week of initiation of clearing activity. Monitoring will consist of an education component to train workers as to the requirements of debris disposal and assist them in estimating debris loading requirements.

Monitoring will be completed on a section by section basis as work is in progress as determined by the finalized construction plans.

Monitoring Triggers

Ongoing as work proceeds or in response to concerns or questions raised during construction.

Locations

All locations where clearing is required with a focus on those areas adjacent to reserves zones and forested areas.

Methods

Visual inspections of completed work areas to estimate if salvage operations and debris management measures are in compliance. Issues of non-compliance will be recorded and communicated to the Environmental Manager.

Actions

In the case where debris management is found to not be in compliance, further education and training of implementation crews will occur. These actions will be documented in the annual report.

Reporting

Timber salvage and debris management monitoring will be completed annually during construction and recorded in a log with the environment department.

3.3 VEGETATION MAINTENANCE

3.3.1 Introduction

Vegetation maintenance roadside and along transmission corridors must be managed, where possible, to ensure safe operating conditions such as lines of sight along roads and limits of approach for transmission lines. However, maintaining native vegetation cover assists in reducing erosion, limiting habitat for invasive species, and increases early seral habitat for wildlife. Post construction management of these areas is described below.

3.3.2 Goals and Objectives

The main goals of vegetation maintenance are to ensure safe operating conditions such as roadway lines of sight and transmission line limits of approach while reducing negative environmental effects. The objectives are to maintain or grow a cover self-maintaining of native species that is site appropriate through retention, seeding, planting, or natural in-seeding to reduce soil erosion, improve wildlife habitat, and decrease the likelihood of invasive plant colonization.

For the transmission line, vegetation management objectives are focussed on creating a self-maintaining, shrub dominated community that reduces vegetation management to maintain limits of approach. Management of transmission line vegetation also includes the implementation of a hazard tree management program to reduce outages and the potential for tree strikes that have the potential to ignite wildfires. These programs would start during construction and operate for the life of the project.

3.3.3 Standard Operating Procedures

Avoiding disruption or damage to existing cover is the most effective management strategy in terms of environmental remediation and cost. Where loss of existing cover is unavoidable, the use of task appropriate SOPs will reduce loss (Table 3.3-1).

3.3.4 Monitoring

Surveyor Qualifications

Surveyors should be familiar with vegetation management, operational requirements associated with construction, and vegetation maintenance for transmission lines. Designation as a Registered Forest Professional (RFP) or Registered Professional Biologist (RP Bio) is preferred. All hazard tree assessments must be conducted by a certified hazard tree assessor.

Table 3.3-1. Vegetation Maintenance Requirements

Vegetation Maintenance	Standard Operating Procedures
All Sites	Limit clearing to required footprints to reduce post-construction remediation requirements. In areas where only tree removal is required, preferentially harvest in winter or when soils are dry and use machinery with lower ground pressure and less potential to disturb vegetation.
Roadways	Maintain sight lines on blind corners by encouraging low growing herb and shrub species in these areas through selective brushing. A maximum height for vegetation of 1 m is to be maintained within 3 m of road edges, except where this conflicts with management goals for riparian management areas for fish.
Transmission Line	Vegetation management will remove only species that have the potential to grow into the limits of approach, retaining shrub species that will form a stable community with lower maintenance requirements.
	To reduce power outages and fire risk, a periodic assessment of edge trees by a certified danger tree assessor is required. Hazardous trees must be removed based on the assessor's recommendations.
Reserve Zones	Slash created during vegetation maintenance that is introduced into a water body must be removed immediately. Minimize vegetation maintenance in riparian and wetland reserve zones.
Herbicides	Prefer spot applications and avoid the broad spraying of herbicides, especially adjacent to and Special Management Zones and Riparian Zones. Use of herbicides must be documented by the contractor and all herbicide work areas mapped and flagged with ribbon and signs that indicate where it has been applied.

Monitoring Triggers and Locations

Monitoring will be in response to concerns or questions raised during construction and operations.

Methods

Visual inspections of completed work areas will be completed to estimate if vegetation maintenance measures are resulting in plant communities that meet the goal of creating suitable vegetation cover.

Actions

In the case where vegetation maintenance does not achieve the goal of creating suitable vegetation cover, measures will be adapted to meet the goals and objectives.

Reporting

Vegetation maintenance and monitoring activities will be recorded in a log which will be maintained by the environment department. This log will also document the transmission line ROW hazard tree program including hazard tree assessments and tree removals.

3.4 RE-VEGETATION OF DISTURBED AREAS

3.4.1 Introduction

Planning for re-vegetation of disturbed soils during implementation will reduce negative environmental effects. Re-vegetated areas provide wildlife habitat, biodiversity, and soil stabilization functions. Successful re-vegetation will reduce or prevent soil erosion, which can otherwise affect fish habitat and water quality and prevents invasive species establishment. Prompt re-vegetation of disturbed areas will also reduce costs associated with additional mitigation measures and increase the success of reclamation efforts. This plan is guided and informed by the KSM *Closure and Reclamation Plan*.

Re-vegetation will minimize the following environmental impacts which may result from clearing and construction activities:

- increased soil erosion;
- increased sediment into waterways;
- loss of wildlife habitat;
- increased invasive species;
- reduced potential of reclamation success;
- reduced potential of closure plan success; and
- increased costs for reclamation/closure.

3.4.2 Goals and Objectives

The goal of re-vegetation is to reduce the negative effects associated with soils exposed during construction of the access roads. Re-vegetation short-term objectives include establishing a rapid vegetative cover to reduce soil erosion, particularly on sloping areas or near waterbodies, using appropriate seeding times and mixed for successful germination and plant establishment. Long term objectives involve re-establishing native ecosystems and wildlife habitat. Once soils on disturbed sites have been stabilized, native trees and shrubs can be planted in areas where natural succession is not likely to occur in a timely manner.

3.4.3 Standard Operating Procedure

Measures to ensure prompt re-vegetation with native species to stabilize soils and improve wildlife habitat for cleared areas are listed in Table 3.4-1.

3.4.4 Monitoring

Surveyor Qualifications

Surveyors should be RPFs or RPBio familiar with vegetation management and operational requirements associated with construction and re-vegetation.

Monitoring Frequency

Monitoring will occur in spring and in late summer/early fall to assess re-vegetation success and identify additional areas that require re-vegetation during construction. Areas that are identified as successful re-vegetated will not require future monitoring.

Monitoring Triggers

Monitoring will be seasonal and ongoing as work proceeds or in response to concerns or questions raised during implementation.

Locations

All locations where clearing removes native vegetation and soil is disturbed will be monitored. Focus will be placed on areas where delivery of sediment to streams or wetlands is more likely.

Methods

Visual inspections of plant health will be completed that identify percent cover of vegetation, plant vigour, and plant mortality and visually assess areas for erosion related issues.

Table 3.4-1. Re-vegetation Measures for Cleared Sites

Re-vegetation	Standard Operating Procedures
Seeding Timing	Tree and shrub seed can be applied immediately to areas that are highly erodible and need rapid vegetative cover. Seed after disturbance of the area is no longer anticipated. The best seeding time is usually early spring and early fall but seed mix should be appropriate for expected site conditions. Dormant seeding on snow may also be an option; however, certain conditions can result in a high amount of seed loss and an uneven distribution of seed.
Seed Selection and Site Preparation	Seed selection and site prep activities include the following: • Check seed to be used for erosion control for viability, erosion control characteristics, and site and climate suitability. • Native seed will be used were possible (may require up to 6 months to acquire specialty native seed mixes). • In areas where wildlife conflicts may occur such as along roadways or near camps, seed mixes should not include species that may attract wildlife. • Ensure seed mixes used for re-vegetation do not contain invasive or weedy species (purchase reclamation seed mixes from a reputable dealer, complete with Certificates of Analysis for all species included in the mix). • Test soil fertility to insure sufficient plant nutrients are available. • Rip compacted soils to provide a good seed bed (see Soils Handling/Management Plan). • Re-seed any sites with poor germination. • Legume seed may need to be inoculated with appropriate micro-organisms (e.g., Rhizobia spp.) prior to seeding • Avoid overly aggressive species, especially sod-forming grasses. • Develop site-specific seeding requirements (e.g., rates, densities, species mixes). • In gullies, include species that help reduce/limit slope failures.
Seeding Methods	Broadcast seeding is one of the most common application methods. Vehicles equipped with electric broadcasters can be quite effective for areas accessible by vehicle. Hand application (preferably with hand operated broadcast seeder) can be conducted, however, care should be taken to avoid patchy seed distribution or over-seeding. In areas with high erosion potential that need rapid cover, hydro-seeding is an effective method. Broadcast seeding with the use of erosion control mats will help protect the soils and may be more effective than hydro-seeding. Mixed grass and legume seed should not be applied at rates exceeding 50 kg/ha (higher rates can result in severe seedling competition). For freshly built roads and other disturbed areas, dry seeding is usually the most effective. Aerial broadcast (via a helicopter) is the most effective method for large areas and areas that cannot be accessed by vehicle.
Plant Salvage	Where possible, salvage native plants from one area of disturbance to reclaim other disturbed areas that will not undergo further disturbance. Ensure these areas are monitored for transplanting success and water if necessary.
Planting Methods	Planting of native shrub and tree seedlings will occur preferentially in the spring or in the fall if required. Seedlings may require fertilizer applications based on assessments of soil fertility. In areas with high browse risk, the use of browse protection will be evaluated.

Actions

In the case where re-vegetation is required or re-treatment is required, a detailed prescription will be developed identifying measures required to ensure the site is successfully re-vegetated.

Reporting

Monitoring results will be recorded in a log which will be maintained by the environment department.

3.5 INVASIVE SPECIES MANAGEMENT

This plan provides strategies and SOPs for the on-going management of invasive plants at the Project site and is based on the guiding principles outlined by the Northwest Invasive Plant Council (Northwest Invasive Plant Council 2012), the Invasive Species Council (Invasive Species Council of British Columbia 2008-2013), the *PMP for Invasive Alien Plants on Provincial Crown Lands in Central and Northern British Columbia* (BC MOFR 2010b), as well as the *Invasive Alien Plant Program: Reference Guide* (BC MOFR 2010a) and the Weed Control Act (1996b).

The Northwest Invasive Plant Council (NWIPC) can be used as a support to develop and implement an invasive species control plan using their Funded Project Application form:

http://nwipc.org/documents/private/fundedprojectapplication.pdf

3.5.1 Introduction

The term "invasive plant" includes invasive alien (non-native) plants, and noxious weeds. Invasive plants can displace native vegetation when introduced into natural settings. Disturbed are susceptible to colonization by invasive species and can promote their spread.

3.5.2 Goals and Objectives

The goal of invasive species management is to prevent the establishment of invasive species as a result of the project during construction and operation. The management efforts focus on preventing the introduction of invasive species, controlling conditions that benefit the colonization of invasive species, and avoiding the effects of invasive species, especially on sensitive ecosystems such as wetlands and riparian areas. The objectives are to:

- minimize the introduction and spread of invasive plants;
- minimize ground disturbance (soil compaction, erosion, or unnecessary removal of vegetation);
- avoid/minimize the amount of area cleared of vegetation, particularly in environmentally sensitive areas (rare ecological communities, riparian areas, wetlands, alpine, old growth forest);
- re-vegetate areas of disturbance in a timely manner with native vegetation;
- provide educational training to personnel to help monitor invasive species; and
- detect and eradicate invasive species through monitoring and control.

3.5.3 Standard Operating Procedures

Measures to reduce colonization and control invasive species are detailed in Table 3.5-1.

3.5.4 Monitoring

The aim of the Monitoring Program is to evaluate and document if invasive species management has been successful in detecting and eradicating invasive plants, through implementation of an effective early detection system, inventory, and control program.

Surveyor Qualifications

Surveyors must be familiar with invasive species identification and management.

Table 3.5-1. Invasive Species Standard Operating Procedures for Clearing and Construction

Invasive Species Control	Standard Operating Procedures
Integrated Pest Management	The Environmental staff will work with the NWIPC, familiar with IPM to develop an integrated pest management plan for the project.
Pre-construction surveys	Conduct pre-construction surveys to identify invasive plant species based on species priorities set by the NWIPC. These surveys will identify pre-existing conditions and allow control measures to be implemented to prevent further spread through project related activities.
Clearing	Minimize soil disturbance to reduce creating invasive species habitat.
Re-vegetation	Follow the re-vegetation and vegetation maintenance measures to reduce exposed soil, and ensure all seed mixes are free of invasive species.
Eradication Measures1	The NWIPC provides guidance on species specific control measures. These should inform the development of eradication methods. In some cases herbicides offer the most effected tool to control localized infestations. If herbicide is to be used, the Handbook for Pesticide Applicators and Dispensers (Environment 2005) provides detailed methodology for treatment activities as does the Integrated Vegetation Management Plan for Transmission Rights-of-way (BC Hydro 2010). Where herbicides will be applied use spot-control methods rather than broad spraying to minimize adverse effects.
Education and Training	Training courses for employees are required and can be arranged through the Invasive Plant Council (IPC) or the Northwest Invasive Plant Council (NWIPC). On-site staff is a cost effective way to continuously monitor for many invasive species. The program should include invasive species identification and methods to reduce invasive species spread. Posters of invasive species noted on site must be placed in common areas and updated annually, and project specific booklets of invasive species of concern must be available to all staff.
Reporting by Staff	Develop and implement in house reporting program that informs the invasive species monitoring program.

Monitoring Frequency

Monitoring will be conducted annually during construction. During operations, monitoring will be conducted every 2 to 3 years. Monitoring will occur in spring before flowering and seed dispersal to identify any invasive species on site and assess the success of previous control measures during construction and operation.

Monitoring Triggers

If an infestation has been identified, monitoring will occur on an annual basis for the area in question and in suitable adjacent habitats for the identified invasive species until the infestation has been controlled for a two year period.

Locations

All locations where clearing removes native vegetation and soil is disturbed will be monitored. The focus will be on areas where invasive species introduction to sensitive ecosystems such as riparian areas or wetlands is likely.

Areas that have been re-vegetated with seed will also be priority monitoring sites to ensure contamination of seed has not occurred.

Locations with previous infestations will be monitored annually until no invasive species have been identified over a two year period.

Methods

Visual inspections will be completed that identify invasive species following the Invasive Alien Plant Program: Reference Guide. Locations, species, and abundance will be recorded as well as possible control measures and possible sources of invasive plants. Provincial IAPP Site and Invasive Plant Survey Record forms will be used to record data to facilitate entry into provincial databases:

http://www.for.gov.bc.ca/hra/Publications/invasive_plants/Forms/FS1260.pdf

Actions

In the case where invasive species treatment is required or re-treatment is required, a detailed prescription will be developed identifying measures required to ensure the site is successfully treated.

Reporting

Monitoring results for invasive species including locations, species, spread sources, and control measures and success will be reported for each year where surveys were conducted during construction and operation.

4. Wetlands Management

4.1 WETLANDS CLEARING MEASURES

Clearing SOPs for wetland and monitoring measures were developed to reduce potential effects on wetlands, while taking into account operational requirements and the safety of Project employees.

4.1.1 Introduction

Potential effects on wetlands include the following:

- introduction of deleterious materials (i.e. sediment, fuels, oils, etc.);
- direct loss or disturbance of wetland habitat;
- reductions in water quality affecting aquatic communities;
- physical alteration of local landscape (removal of vegetation and potential alteration to site drainage); and
- loss of habitats or their quality for migratory (i.e., birds, mammals) or transitory (i.e., fish) populations.

4.1.2 Goals and Objectives

The goal is to avoid and/or minimize adverse alterations to wetland functions. The measures to minimize the introduction of sediment and debris, avoid changes to drainage patterns, and reduce the direct disturbance of the Riparian Reserve Zone (RRZ).

4.1.3 Standard Operating Procedures

Riparian Management Areas (RMA) including an RMZ and RRZ have been created to reduce effects on wetlands. The SOPs for wetlands apply to all wetlands including listed wetlands. Listed wetland buffers are included Table 4.1-1. It should be noted, that no red-listed or blue-listed wetlands were identified. The SOPs for these areas and addition measures are included in Table 4.1-1. The reserve zones are shown on:

- *Map Booklet 3 – Clearing Maps: Treaty Creek*
- *Map Booklet 4 – Clearing Maps: Coulter Creek*

4.1.4 Monitoring

The aim of the Monitoring Program is to ensure project SOPs are correctly implemented during construction to reduce negative effects on wetlands.

Surveyor Qualifications

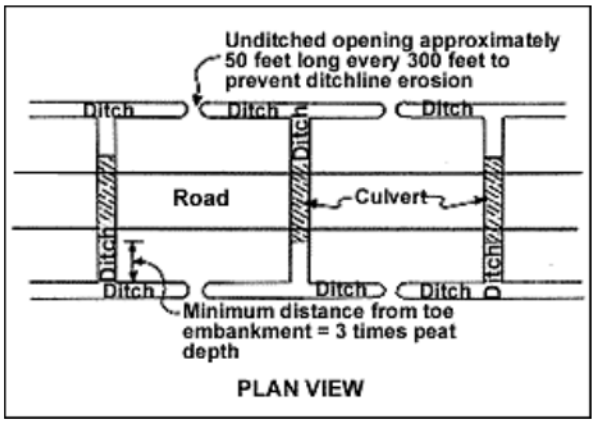
Surveyors should be familiar with harvesting operations, vegetation management, operational requirements associated with construction, hydrology, and with wetland assessment and classification. Designation as a Registered Forest Professional (RFP) or Registered Professional Biologist (RPBio) is preferred.

Table 4.1-1. Wetland Standard Operating Procedures for Clearing and Construction

Wetlands	Standard Operating Procedures			
Timing	Where practical, work in or around a wetland should be scheduled when the ground is frozen (i.e., a minimum 30 cm of frost penetration is preferred). This timing will avoid affecting most of animals that use wetlands and reduce soil compaction, rutting, and changes to site hydrology. When working in non-frozen conditions: • schedule work during favourable weather and low water conditions; • stop work during periods of heavy and persistent precipitation if there is a risk of sediment delivery to the wetland or watercourse; and • complete the work as quickly as possible by ensuring all necessary equipment and materials are onsite and ready for installation in order to minimize the duration of disturbance.			
Riparian Management Areas	**Wetland Size**	**RMA Buffer (m)**	**RRZ Buffer (m)**	**RMZ Buffer (m)**
	1-5 ha	30	10	20
	>5 (or Blue-listed Wetlands)	40	10	30
	Wetland Complexes (or Red-listed Wetlands)	50	10	40
Clearing	Conduct pre-clearing surveys to identify, map, and classify unmapped wetlands. Baseline wetland surveys were carried out in 2012 (Rescan 2012). Flag Riparian Reserve Zones and Management Zones around wetlands where they intersect work areas. RMZ and RRZ SOPs: • avoid construction in wetland RMZ and RRZ where possible; • use low ground pressure machinery; • limit clearing widths to minimums required for road maintenance, limits of approach, and operation; • debris disposal is not permitted in wetland RRZs or RMZs; • relocate, borrow pits, waste areas, log landings, and other cleared areas that can be feasibly constructed outside riparian management areas; and • minimize vegetation removal in and adjacent to wetlands. Restrict root grubbing in and around wetlands. Do not grub within 10 m of water bodies where possible. Re-contour disturbed areas to restore natural cross drainages. Fall trees away from wetlands. RMZ: • conduct wind firming treatments to reduce windthrow risk.			
Machinery	Conduct work with low ground-pressure machinery (e.g., tracked equipment, all-terrain vehicles for crew travel) using portable support structures such as swamp mats where required. Machines must be checked for leaks and biodegradable hydraulic fluid must be used for work in wetland RRZs. Refueling or servicing of equipment is not allowed with wetland management or reserve zones.			
Transmission Line	Do not locate transmission line towers in wetlands where possible. Avoid clearing slow growing trees on wetland margins that do not encroach on the limits of approach.			
Erosion and Sedimentation	Where the potential exists for erosion and sedimentation of water bodies, address erosion problems and properly install sedimentation mitigation measures. Maintain erosion prevention and sedimentation control throughout crossing construction and as required during operations. Ensure that erosion and sedimentation prevention and mitigation measures, if removed or damaged, are reinstalled or repaired as soon as possible.			
Grading	Where road development in wetlands is required, grading to prepare the road surface will be minimal. Where grading is required, implement topsoil salvage (or surface material salvage in the case of organic soils).			

(continued)

Table 4.1-1. Wetland Standard Operating Procedures for Clearing and Construction (completed)

Wetlands	Standard Operating Procedures
Drainage	Roads or other infrastructure that change subsurface and surface water flows can alter wetland hydrology. Design of infrastructure crossing wetlands must ensure that water flow is maintained. Some of the tools used to ensure water flows include: ditches, open drains, underdrains, and culverts. Culverts generally provide the best drainage across roads and are long lasting with little maintenance. Drainage control is critical to successful retention of sediments during and after construction. The necessary control measures will be incorporated in any wetland construction areas to prevent erosion and sedimentation. Avoid altering watercourses where this changes discharge into or out of wetlands.
	Building roads across wetlands with mineral soils (depth or organic soils is < 60 cm) can use conventional road building techniques while ensuring drainage structures maintain hydrologic patterns. Culver placement is shown in the figure below. Placement should consider: • culverts must be a minimum of 0.6 m in diameter (use Q_{100} design flows); • bury them halfway below the soil surface. The top half will transport normal surface flows and the lower half transport normal subsurface water flows; • maintaining subsurface flow is important to reduce uphill ponding and dewatering of wetlands; and • construct ditches adjacent to the toe of the fill slope. Culverts must be placed at low points in wetlands to facilitate subsurface and surface water flows.  *Source: (Wiest 1998)*
Seeding	Seeding of organic soils will not occur in wetlands unless otherwise specified. Disturbed areas instead will be allowed to recover through natural re-colonization processes. Seeding of mineral (inorganic) soils, exposed or used during construction will be performed using an appropriate seed mix. Review seed mixes, fertilizers and application rates with appropriate regulatory agencies prior to field use.

Monitoring Frequency

Monitoring should begin when clearing is initiated adjacent to wetlands.

Monitoring will be completed on a section by section basis as work proceeds as determined by the finalized construction plans.

Monitoring Triggers

Monitoring will occur according to construction work plans and or in response to concerns or questions raised during implementation.

Locations

Monitoring will occur in all wetland locations where clearing is required with a focus on those areas adjacent to reserves zones and management zones.

Methods

Visual inspections of completed work areas to estimate if construction measures have adequately addressed sedimentation control, water management, and that salvage and debris management measures are in compliance. Issues of non-compliance will be recorded and communicated to the Environmental Manager.

Actions

In the case where contractor(s) are found to not be in compliance, further education and training of implementation crews will occur.

Reporting

Reporting on wetland monitoring will be completed during construction and will document contractor compliance with the requirements and the success of the requirements at reducing negative effects on the environment particularly in Riparian Reserve Zones.

5. Fisheries Management

5.1 RIPARIAN VEGETATION CLEARING AND INSTREAM CONSTRUCTION STANDARD OPERATING PROCEDURES

Riparian vegetation is an important component of fish habitat because it stabilizes soils, provides shade and cover, and contributes nutrients and food to the stream in the form of allochthonous inputs. Instream fish habitat is important for fish to carry out their life history processes (e.g., spawning, rearing, over-wintering). This standard operating procedure discusses the treatment of riparian vegetation adjacent to fish bearing and non-fish bearing streams along the KSM access roads/transmission line, and the SOPs for fish and instream fish habitat in fish-bearing streams along the KSM access roads/transmission line. This standard operating procedure also discusses the monitoring requirements for the clearing of riparian areas and instream construction at stream crossing locations.

The fish-bearing status of most streams along the access corridors was assessed in baseline studies from 2008 to 2012; however, these assessments were conducted on an alignment that may be refined for the precise stream crossing locations. Thus, it is expected that prior to clearing, field surveys will be conducted to confirm the fish-bearing status and habitat quality of streams along the access roads/transmission line to ensure that clearing prescriptions for those crossings are accurate. This is only necessary for those crossings where the engineered design differs in location from the draft alignment surveyed during baseline studies.

5.1.1 Introduction

Stream crossing assessments along the CCAR and TCAR were carried out from 2008 to 2012, along the proposed route. Stream crossings were assessed for fish-presence and habitat quality along a 100 to 200 m site. Adjustments to the proposed alignments since the baseline studies were completed may result in a change in the classification of streams if the new alignment falls outside of the site boundaries; therefore, it is important to confirm the fish-bearing status of stream crossings where the road/transmission line alignment has been significantly altered.

5.1.2 Goals and Objectives

The primary objective of this standard operating procedure is to preserve the integrity of fish habitat at and downstream of the crossing site by setting riparian management areas, prescribing specific vegetation treatments within those areas to preserve stream bank integrity, and to prevent the introduction of sediment and deleterious substances to the water.

5.1.3 Standard Operating Procedures

5.1.3.1 Riparian Management Areas

The *Riparian Management Area Guidebook* (BCMOF 1995) prescribes minimum riparian management area (RMA) widths for fish-bearing and non-fish-bearing streams, wetlands, and fisheries sensitive zones. Riparian management areas are comprised of riparian reserve zones (RRZ) around fish bearing streams where tree clearing is limited, and riparian management zones (RMZ) around fish and non-fish bearing streams where tree clearing is allowed but other vegetation clearing is limited. Where roads must cross streams, SOPs are described below to guide clearing and construction to reduce negative effects. The measurement of the management area extends from the top of the streambank to the

specified slope distance or, in the case of a stream in a gully, from the top of the gully to the specified slope distance. Table 5.1-1 presents a summary of the RRZ and RMZ widths for fish-bearing and non-fish-bearing streams of varying sizes. All reserve zones for known water bodies are shown on:

- *Map Booklet 3 – Clearing Maps: Treaty Creek*
- *Map Booklet 4 – Clearing Maps: Coulter Creek*

Table 5.1-1. Minimum Riparian Management Area Widths for Stream Classes

Stream Class	Mean Channel Width (m)	Reserve Zone Width (m)	Management Zone Width (m)	Total RMA Width (m)
Fish Bearing				
S1 – large river	≥ 100	0	100	100
S1	> 20	50	20	70
S2	> 5 ≤ 20	30	20	50
S3	> 1.5 ≤ 5	20	20	40
S4	≤ 1.5	0	30	30
Non-Fish Bearing				
S5	> 3	0	30	30
S6	≤ 3	0	20	20

From (BCMOF 1995)

5.1.3.2 General Riparian Management Area Standard Operating Procedures

Table 5.1-2 lists measures that should be taken within the RMA at all stream crossings to protect bank integrity and water quality (BC MFLNRO, BC MOE, and DFO 2012).

Table 5.1-2. General Riparian Management Area Standard Operating Procedures for Clearing and Construction

Stream Class	Riparian Management Area Standard Operating Procedures
S1-S6	• Fall trees away from streams wherever possible. If trees must be felled across streams for safety reasons, they should be lifted (rather than dragged) out; • Minimize vegetation clearing within the RMZ. Implement construction practices to preserve soil integrity of stream banks at crossings; • Prevent sediment and deleterious substances from entering the stream by implementing sediment and erosion control measures; • Refueling or servicing of equipment is not allowed within RMA; • Minimize the clearing width at the crossing site and retain streamside vegetation within the right-of-way wherever possible; • Re-vegetate and stabilize disturbed soil to prevent post-construction erosion; • Design crossing structures to be perpendicular to the stream to reduce the area required to be cleared; • Remove all slash and debris from felling and place it outside the RMA; • Do not remove natural debris from streams; and • Use temporary crossing structures (rather than fording) to transport machinery across streams. If this is not possible, locate fords in areas with shallow, stable banks and limit crossings to once over and back.

5.1.3.3 Riparian Reserve Zone and Riparian Management Zone Mitigation

S1, S2, and S3 Streams

Streams that have been classified as S1 to S3 require a RRZ and RMZ.

The objective of the RRZ is to preserve shade, cover and bank stability adjacent to the stream, as well as to maintain habitat for terrestrial wildlife. The primary objective of the RMZ, fish bearing streams is to preserve the integrity of the RRZ surrounding the stream.

For this purpose, activities within the RMZ should be focused on managing windthrow risk and retaining wildlife trees. Table 5.1-3 lists mitigation practices that will be followed for S1 to S3 RRZs and RMZs.

Table 5.1-3. Riparian Reserve Zone and Management Zone Standard Operating Procedures for Clearing and Construction

Stream Class	Standard Operating Procedures	
	Riparian Reserve Zone	**Riparian Management Zone**
S1-S3	• Refer to general riparian management area SOPs (Table 5.1-2); • Tree harvesting and brush clearing limited within the road and transmission line right-of-ways; • Clearing limited to the width of the road bed and transmission line or as necessary for snow removal and safe operating conditions; • Maintain trees and shrubs below the transmission line that meet line clearance standards; • Danger trees removed for safety reasons; • Top individual trees within the RRZ that have a high windthrow risk; • Where windthrow poses a significant risk to the integrity of the RRZ, tree clearing will be limited to the width of the road bed, wherever possible.	• Refer to general riparian management area SOPs (Table 5.1-2); • If windthrow is not a hazard and wildlife trees are not present, all trees and vegetation may be cleared to the RRZ boundary; • Feather the outer edge of the RMZ by removing trees prone to windthrow; • Top individual trees within the RMZ that have a high windthrow risk; and • Combine edge feathering and topping in high risk areas.
S4	• Refer to general riparian management area SOPs (Table 5.1-2).	• Refer to general riparian management area SOPs (Table 5.1-2); • Retain windfirm trees with roots embedded in the streambank; • Remove dominant conifers and retain 50% of the remaining trees within 10 m of the channel; • Fall and yard away from the stream, and remove slash and debris from the stream; • Retain smaller trees, understory trees, and herbaceous vegetation within 5 m of the channel; • Retain wildlife trees; and • Where windthrow is a concern, harvest as many windthrow-prone trees and retain smaller conifers for future large woody debris recruitment.

(continued)

Table 5.1-3. Riparian Reserve Zone and Management Zone Standard Operating Procedures for Clearing and Construction (completed)

Stream Class	Standard Operating Procedures	
	Riparian Reserve Zone	Riparian Management Zone
S5	• Refer to general riparian management area SOPs (Table 5.1-2).	• Refer to general riparian management area SOPs (Table 5.1-2). • Valley-Bottom Streams: • Retain 50% of dominant and codominant, windfirm trees throughout the RMZ; • Retain small trees, understory trees, and herbaceous vegetation within 10 m of the channel; and • Retain wildlife trees. • Non-Valley-Bottom Streams (Steep Tributaries): • Retain smaller conifers and deciduous trees within 5 m of the channel; and • Retain leaning trees within 10 m of the channel.
S6	• Refer to general riparian management area SOPs (Table 5.1-2).	• Refer to general riparian management area SOPs (Table 5.1-2); • Fall and yard away from the stream, while retaining a minimum of 10 trees per 100 m of streambank; • Remove slash and debris from the stream; • Retain smaller trees, understory trees, and herbaceous vegetation within 5 m of the channel; and • Retain wildlife trees.

Within the RMZ for S1-S3 streams, these management practices should be applied as much as possible to the right-of-way, with the exception of the area to be cleared for the construction of the road bed and transmission line. Safety is a priority, therefore removal of danger trees or preventing windthrow onto the road bed and transmission line may take precedence over retaining trees in a RRZ. Limit clearing widths as much as possible, while meeting snow removal requirements and safe operating conditions.

S4 Streams

S4 streams are the smallest class of fish-bearing streams. These S4 streams do not require a RRZ, but require a RMZ. The objectives of the RMZ treatment will be focused on maintaining stream bank integrity, protecting fish habitat, and providing cover and large woody debris to the stream. Table 5.1-3 lists mitigation practices that will be followed for S4 RMZs.

Within the RMZ for S4 streams, these management practices should be applied as much as possible to the right-of-way, with the exception of the area to be cleared for the construction of the road bed and transmission line. Safety is a priority, therefore removal of danger trees or preventing windthrow onto the road bed and transmission line may take precedence over retaining trees in a RRZ.

S5 Streams

S5 streams are the largest class of non-fish bearing streams. These S5 streams do not require a RRZ, but require an RMZ. The objective of the RMZ is to protect wildlife habitat, and to maintain stream bank stability. The category is further broken up into valley-bottom streams and non-valley bottom streams (steep tributaries). Table 5.1-3 lists mitigation practices that will be followed for S5 RMZs.

Within the RMZ for S5 streams, these management practices should be applied as much as possible to the right-of-way, with the exception of the area to be cleared for the construction of the road bed and transmission line. Safety is a priority, therefore removal of danger trees or preventing windthrow onto the road bed and transmission line may take precedence over retaining trees in a RRZ.

S6 Streams

The smallest class of non-fish bearing streams are S6 streams. These S6 streams do not require a RRZ, but require a RMZ. The objective of the RMZ is to preserve bank stability, particularly where the stream may enter a fish-bearing waterbody. All S6 streams may be logged to the banks; however, where woody debris or streamside trees are required to maintain bank stability. Table 5.1-3 lists mitigation practices that will be followed.

Within the RMZ for S5 streams, these management practices should be applied as much as possible to the right-of-way, with the exception of the area to be cleared for the construction of the road bed and transmission line. Safety is a priority, therefore removal of danger trees or preventing windthrow onto the road bed and transmission line may take precedence over retaining trees in a RRZ.

5.1.3.4 General Instream Construction Standard Operating Procedures

There are numerous manuals and guidelines on the methods required to prevent loss of fish habitat. These include resources such as the *Fish-Stream Crossing Guidebook* (BC MOF 2002) the *Land Development Guidelines for the Protection of Aquatic Habitat (DFO 1993)*, *Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2014)*, and *Standards and Best Practices for Instream Works* (BC MOE 2010). These guidelines detail the purpose and practices of using erosion and sediment control measures, managing drainage water, working in streams, and designing stream crossings, in addition to recommending operating windows for construction in fisheries sensitive zones Table 5.1-4 lists measures that should be taken during instream construction at stream crossings to protect fish and fish habitat.

5.1.3.5 Instream Reduced Risk Work Windows

The schedule of instream work will follow the recommended periods of least risk for fish species, as outlined in the *Fish-Stream Crossing Guidebook (BC MOF 2002)*. The TCAR will be located in the Nass Timber Supply Area (TSA). The CCAR will be located in the Cassiar TSA. Therefore, different Least Risk Windows for construction will need to be adhered to in each TSA. Tables 5.1-5 and 5.1-6 list the Nass TSA and Cassiar TSA reduced risk work windows for the fish species of concern.

Table 5.1-4. General Instream Construction Standard Operating Procedures

Type	Instream Standard Operating Procedures
Planning	• Acquisition of relevant permit approvals from the BC Ministry of Environment Water Stewardship Division and DFO, and Transport Canada (for navigable waters); • Complete work during the appropriate instream work window; • Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
Fuel Management	• Inspection of all equipment and machinery prior to and during instream/riparian work to ensure that it is clean and free of leaks; • Use of biodegradable fluids (fuels and oils) for machinery working within 30 m of any stream; • Placement of drip pans and spill pads underneath pumps or other stationary machinery within riparian areas; and • Provision of readily accessible spill kits in all areas where machinery or fuel tanks will be used, stored, or refueled, and training of personnel in their use prior to beginning to construction.

(continued)

Table 5.1-4. General Instream Construction Standard Operating Procedures (completed)

Type	Instream Standard Operating Procedures
Sediment and Erosion Control	• Use water diversion structures to direct dirty water from the work zone to a sediment control area; • Install silt fencing, geotextile cloth, straw bales, berms, or other sediment control structures; • Conduct instream work from the point farthest away from the construction access point and working backward; • Special attention will be paid to cut and fill slopes at stream crossings and anywhere that erosion and sediment transport can potentially reach surface drainages; seeding, including stable mulching methods, will be used wherever needed; • Allow constructed ponds to settle before connecting to the stream; • Store soil, substrate, removed vegetation, and building materials in stable areas away from the channel, and covered or contained by erosion control structures or replanted vegetation; • Ensure that all rock materials used in the stream are inert; • Ensure constructed banks are graded at a stable slope; and • Stabilize excavated materials and areas denuded of vegetation using temporary erosion control blankets, biodegradable mats, planted vegetation, or other erosion control techniques; • When they are no longer required, remove non-biodegradable materials brought into the site, including sediment control structures, equipment, and supplies.
Water Management	• Should water diversion be required, coffer dams, pumps, or other approved water diversion methods may be used to temporarily divert water around the construction zone while still maintaining flow downstream. Dirty water will be pumped to a sediment control area where the sediment can settle or be removed before returning water to the stream. Backup pumps may be kept on site in case of mechanical failure; and • Use fish-screens on pumps.
Fish Salvage	• Fish salvage permits will be obtained from the DFO and BC Ministry of Environment; • The pond or stream will be isolated using seine nets; • Passive or active capture techniques, or a combination of the two, will be chosen based on characteristics of the site and will be used to capture fish; • Fish will be immediately removed to recovery buckets; and • Post-recovery fish will be moved to suitable habitat located nearest to the salvage site.

Table 5.1-5. Reduced Risk Work Windows for Fish Species within the Nass Timber Supply Area – Treaty Creek Access Road

Species	Period of Reduced Risk	
	Start Date	End Date
Dolly Varden	June 1	August 31
Bull Trout	June 1	August 31
Coastal Cutthroat Trout	August 1	January 31
Rainbow Trout	August 1	January 31
Mountain Whitefish	June 1	September 15
Coho Salmon	June 15	September 1
Chinook Salmon	June 1	July 15
Sockeye Salmon	June 1	July 20

Table 5.1-6. Reduced Risk Work Windows for Fish Species within the Cassiar Timber Supply Area – Coulter Creek Access Road

Species	Period of Reduced Risk	
	Start Date	End Date
Dolly Varden	June 15	August 31
Bull Trout	June 15	August 31
Coastal Cutthroat Trout	September 1	April 30
Rainbow Trout	September 1	April 30
Coho Salmon	April 1	August 15
Chinook Salmon	May 1	July 31
Sockeye Salmon	April 1	May 31

There are 11 fish-bearing stream crossings along the TCAR, 11 fish-bearing stream crossings along the transmission line, and seven fish-bearing stream crossings along the CCAR. Table 5.1-7 list the fish-bearing stream crossings and the proposed instream reduced risk work windows.

The following fish-bearing stream crossings have multiple species present for which there is no overlapping reduced risk work window (i.e., no window available for instream work throughout the year): Unuk River, Bell-Irving River, Stream 2063, and Stream 5007. Based upon the site specific baseline habitat data, spawning life history, and species habitat preferences (McPhail 2007), the following reduced risk work windows are proposed:

- Unuk River: May 1 - July 31
  - Coho Salmon and Chinook Salmon more likely to spawn at site; and
  - Adopt Coho Salmon and Chinook Salmon work windows.
- Bell-Irving River: June 1 - July 15;
  - Chinook Salmon more likely to spawn at site; and
  - Adopt Chinook Salmon work window.
- Stream 2063: June 15 - August 15
  - Coho Salmon and Dolly Varden more likely to spawn at site; and
  - Adopt Coho Salmon and Dolly Varden work window.
- Stream 5007: June 15 - August 15
  - Coho Salmon and Dolly Varden more likely to spawn at site; and
  - Adopt Coho Salmon and Dolly Varden work window.

Application for agency work window variances will be required for these sites, which will require discussions with regulators to obtain work window variances.

5.1.4 Monitoring

Surveyor Qualifications

Surveyors should be familiar harvesting operations, vegetation management, operational requirements associated with construction, and with stream habitat assessment and classification. The Environmental Monitor will be (or will be supervised by) a Qualified Environmental Professional (QEP), such as a Registered Forest Professional (RFP) or Registered Professional Biologist (RP Bio).

Table 5.1-7. Proposed Reduced Risk Work Windows for Fish-Bearing Streams within Treaty Creek Access Road and Coulter Creek Access Road

Alignment	Waterbody Name	Habitat Type	Infrastructure Type	Stream Class	Location		Species Present	Proposed Reduced Risk Work Window
					Easting	Northing		
Coulter Creek Access Road	2060	Stream	Road	S3	407703	6266547	CO, DV	June 15 - August 15
	Coulter Creek - 2061	Stream	Road	S2	407561	6266553	CO, DV	June 15 - August 15
	2063	Stream	Road	S2	407277	6265832	DV, CO, CCT	June 15 - August 15^
	2064	Stream	Road	S4	407274	6265770	DV*	June 15 - August 31
	Unuk River - 1025	Stream	Road	S1	408275	6263910	CO, CH, SK, DV, CCT	May 1 - July 31^
	5008	Stream	Road	S4	408373	6263805	DV*	June 15 - August 31
	5007	Stream	Road	S2	408404	6263727	DV, CO, CCT	June 15 - August 15^
Treaty Creek Access Road	100	Stream	Road and Transmission Line	S1	457091	6270729	DV*	June 1 - August 31
	108	Stream	Road and Transmission Line	S3	449782	6270082	RB, DV*	August 1 - August 31
	114	Stream	Road and Transmission Line	S2	448987	6270402	DV	June 1 - August 31
	204	Stream	Road and Transmission Line	S4	455882	6270066	DV*	June 1 - August 31
	205	Stream	Road and Transmission Line	S4	455723	6270012	DV*	June 1 - August 31
	209	Stream	Road and Transmission Line	S4	455448	6269847	DV*	June 1 - August 31
	243	Stream	Road	S3	443508	6272703	DV*	June 1 - August 31
	244	Stream	Road and Transmission Line	S2	452180	6269610	RB, DV	August 1 - August 31
	210	Stream	Road and Transmission Line	S3	455190	6269430	RB, DV	August 1 - August 31
	North Treaty Creek - 4011	Stream	Road and Transmission Line	S2	447556	6271912	DV, MWF	June 1 - August 31
	Bell Irving River - 4004	Stream	Road	S1	460039	6272653	BT, CH, CO, DV, MWF, SK, RB	June 1 - July 15^
	Bell Irving River - 4005	Stream	Transmission Line	S1	460325	6272531	BT, CH, CO, DV, MWF, SK, RB	June 1 - July 15^
	Glacier Creek - 4006	Stream	Transmission Line	S3	460192	6273853	DV	June 1 - August 31

**Indicates species not confirmed but likely present based upon habitat characteristics.*
Species: BT = Bull Trout; CH = Chinook Salmon; CO = Coho Salmon; DV = Dolly Varden; MWF = Mountain Whitefish; SK = Sockeye Salmon; RB = Rainbow Trout/Steelhead
^ Requires agency variance approval

Monitoring Frequency

Riparian

Monitoring should begin within a week of initiation of clearing activity. Monitoring will consist of an education component to train workers as to the requirements of riparian mitigation.

Monitoring will be completed on a section by section basis as work is in progress as determined by the finalized construction plans.

Instream

Once road right of way clearing has commenced and several weeks in advance of a stream crossing; an experienced Environmental Monitor/Environmental Professional and the Construction Supervisor will review the timing, crossing type, mitigation measures required, and government agency conditions. The Environmental Monitor/Environmental Professional and the Construction Supervisor will conduct a site visit. They will examine the stream crossing to discuss how the actual work will be done to determine the specific steps, material requirements, mitigation approaches (e.g., dewatering, site isolation, erosion and sediment controls), and construction techniques (i.e., build from one stream bank, one-time crossing of equipment, requirements for temporary crossing structures, sub-excavation, bank protection). A Stream Crossing Plan will be developed, which consists of a field diagram and details of how the work will be completed. The Stream Crossing Plan will be used during construction.

Several days in advance of crossing a stream, the Environmental Monitor will revisit the site to determine if stream conditions have changed since the previous visit (e.g., high stream discharge, new erosional event), and document pre-construction conditions. The Environmental Monitor and Construction Supervisor will coordinate to ensure the required crews, equipment, materials and supplies will be onsite for the stream crossing work.

For stream crossing construction, the Environmental Monitor and Construction Supervisor arrive onsite early for the work and conduct a tailboard meeting with the construction crew to review safety issues, environmental conditions, the Stream Crossing Plan, mitigation measures and ensure construction crews understand how the work will be done to achieve compliance. This ensures construction crews understand the sensitivity of the site (e.g., fish bearing, protecting water quality, erosion controls).

Monitoring Triggers

Monitoring will occur according to active construction work plans and or in response to concerns or questions raised during implementation.

Locations

At all fish-bearing stream crossings along the TCAR, CCAR, and transmission line alignment.

Methods

Riparian

Visual inspections of completed work areas to estimate if riparian management measures are in compliance. Issues of non-compliance will be recorded and communicated to the Environmental Manager.

Instream

The Environmental Monitor, construction crew, and/or a fish salvage crew will undertake any work-site isolation, fish salvage, water quality measurements (e.g., turbidity), and install the diversion or erosion control materials before heavy equipment start working along the banks or instream. These measures are recorded on the Daily Environmental Monitor Log Sheet.

The Environmental Monitor will record observations and photos of water quality, sediment/erosion control measures implemented, mitigation measures installed during the construction work, and checks that the work complies with regulatory conditions and Stream Crossing Plan. The Environmental Monitor will be typically onsite for stream bank or instream works, machine crossings or any work which has potential to negatively impact water quality, but the Environmental Monitor may not be required onsite full-time if the construction crew is spending the day away from the creek (i.e. low risk activities away from creek). Any adjustments/changes to the Stream Crossing Plan will be noted during the work through frequent coordination and communication between the Environmental Monitor and construction crew.

Actions

Any non-compliance issues will be dealt with as they occur (e.g., riparian management errors, unexpected sediment release, poor performance of the isolation berms, sediment control on the roads). The Environmental Monitor has the authority to issue halt work orders if issues arise. Through good communication and effective implementation onsite, the use of Halt Work Orders are rarely used, but the Environmental Monitor can exercise this option to prevent negative impacts and to re-adjust the Stream Crossing Plan.

Reporting

As the riparian management and stream crossing installation is finalized, the Environmental Monitor documents the conditions, activities, water quality, and mitigation measures on the Daily Log Sheet. The Environmental Monitor provides a summary of any riparian management and stream crossing issues, photos, challenges, and successes in a Weekly or Monthly Environmental Monitor Summary Report. Regulatory agencies will be provided copies of the Weekly or Monthly Environmental Monitor Summary Reports during construction; and undertake site inspections, if required.

6. Archaeology Management

There are seven known archaeological sites within the KSM Project development area. Archaeological sites (both recorded and unrecorded) are protected in British Columbia (BC) by the *Heritage Conservation Act* (HCA; (1996a)). If impacts to archaeological sites cannot be avoided additional archaeological studies and permits will be required. This process generally takes at least one year to complete and therefore should be undertaken well in advance of construction scheduling.

Archaeological sites are non-renewable resources, very susceptible to disturbance, and are finite in number. They are protected for their historical, cultural, scientific, and educational value to the general public, local communities, and First Nations. Alteration to protected archaeological sites requires a site alteration permit issued under Section 12 of the HCA (1996a).

6.1 ARCHAEOLOGY MANAGEMENT

This section includes management information that will be required to manage archaeological sites within the Project area. Site specific management guidelines will be developed through consultation with the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations. This should begin at least one year in advance of potential impacts to archaeological sites to ensure there is adequate time for all necessary permits and mitigation work required for issuance of a Site Alteration Permit.

6.1.1 Project Specific Issues

Archaeological Impact Assessments (AIAs) completed for the KSM Project identified seven archaeological sites that may be impacted either directly or indirectly by Project activities (Farquharson et al. 2012). Site alteration permits will be required prior to construction for all archaeological sites that will be impacted by the Project. Two archaeological sites HdTn-1 and HdTn-2 are beyond the scope of this SOP[1], two of the archaeological sites (HcTo-1 and HdTo-7) were mitigated through systematic data recovery in 2013 under HCA Permit 2013-0172 and monitoring is recommended during construction, one site (HdTk-4) will require either avoidance or systematic data recovery prior to construction, and two (HdTl-1 and HdTo-6) may be indirectly impacted by increased human presence if SOPs to ensure avoidance described in Section 6.1.3.2 are not implemented (Table 6.1-1). In the unlikely event that an archaeological site is identified during the Project the Archaeological Chance Find Procedure will be followed.

6.1.2 Goals and Objectives

The goal of the mitigation measures is to reduce adverse impacts to archaeological sites to negligible significance through avoidance or systematic data recovery.

Specific objectives of the plan are to:

- provide potential avoidance measures for HdTk-4;
- provide monitoring recommendations for archaeological sites HdTl-1 and HdTo-6 located within 500 m of Project infrastructure; and

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- outline the archaeological chance find procedure for dealing with the potential identification of currently unknown archaeological sites during Project phases.

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6.1.3 Mitigation Measures

At archaeological sites HcTo-1, HdTo-7 and possibly HdTk-4, requiring mitigation through systematic data recovery, a final methodology will be determined in consultation with the Archaeology Branch. The work will be carried out by a Professional Archaeologist (RPCA) under a *Heritage Conservation Act* Section 14 permit. In order to impact an archaeological site the following steps are required:

1. Issuance of an Archaeological Investigation Permit under Section 14 of the HCA, by the Archaeology Branch, (completed for HcTo-1 and HdTo-7).
2. Conduct the field investigations during snow free conditions required to satisfy the provisions of the Section 14 Archaeological Investigation Permit (completed for HcTo-1 and HdTo-7).
3. Complete the permit report including recommendations to the satisfaction of the Archaeology Branch (completed for HcTo-1 and HdTo-7).
4. Apply for a Site Alteration Permit under Section 12 of the HCA.
5. Upon reception of the Section 12 Site Alteration permit impacts may proceed, subject to any conditions stipulated in the permit.

All of the permit applications and approvals include an allowance by the Archaeology Branch for Aboriginal input and comments. Approval for impacts to archaeological sites is given, or not given, at the sole discretion of the Archaeology Branch. The process leading to a decision on issuance of a Site Alteration Permit generally takes at least one year to complete and therefore should be scheduled to begin well in advance of construction. From both an archaeological and permitting perspective avoidance of a site is usually the preferred approach. A sample methodology for an Archaeological Investigation Permit is provided for reference below in section 6.1.3.1. Avoidance measures are provided in Section 6.1.3.2.

6.1.3.1 Avoidance Measures

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s.18 . As the clearing of vegetation but no ground disturbance is anticipated capping or fencing and construction monitoring of the site may be acceptable mitigation measures. Approval of these measures by the Archaeology Branch, and a Site Alteration Permit issued under Section 12 of the HCA will be required prior to the implementation of any protection measures within the site boundaries.

To protect archaeological sites HdTl-1 and HdTo-6 located within 500 m of Project infrastructure, that may be indirectly impacted by increased human presence, mine employees and contractors will be educated about site avoidance, and sites will be marked as “no work zones” on Project construction maps. Periodic monitoring of these sites will be used to determine if these measures are effective.

Archaeological sites are shown on:

- *Map Booklet 3 – Clearing Maps: Treaty Creek*
- *Map Booklet 4 – Clearing Maps: Coulter Creek*

6.1.4 Monitoring

To evaluate the effectiveness of the implemented measures monitoring will be undertaken.

Archaeological Monitor Qualifications

Archaeological monitors will have a RISC (Resource Information Standards Committee) Training; and will be familiar with the original condition of the archaeological sites and able to determine if unanticipated impacts have occurred.

Monitoring Frequency

Monitoring will be conducted during construction activity within 50 m of known archaeological sites; and monitoring will be undertaken periodically during the construction and operations phases to ensure that no unanticipated impacts have occurred to sites where avoidance was recommended.

Monitoring Triggers

Monitoring will occur periodically as work proceeds.

Monitoring will occur in response to archaeological chance finds during construction or operations.

During construction activity within 50 m of an archaeological site monitoring is required.

Locations

All locations during construction that are within 50 m of known archaeological sites will be monitored.

During operations at archaeological sites where avoidance is the implemented mitigation measure monitoring is required.

Methods

Visual inspections will be completed of areas to ensure that no impacts to the ground surface have occurred within archaeological site boundaries.

Inspection of a sample of excavated material during ground altering activities is required within 50 m of an archaeological site.

Actions

If an archaeological site is located during monitoring the Chance Find Procedure will be followed.

If there have been impacts to the ground surface at an archaeological site the Manager of Environment will be contacted.

Consult with the Archaeology Branch to determine if additional mitigation measures are required.

Reporting

Reporting on archaeological monitoring will be issued annually during construction or as necessary due to adverse impacts. Annual or event reporting will include:

- Site photographs;
- UTMs for any disturbances;
- Details of any actions taken to protect the archaeological sites;
- Recommendations for any changes to the protective measures, if required.

6.2 CHANCE FIND PROCEDURES

Even the most thorough archaeological study may not identify all archaeological resources that may be present and the Archaeological Chance Find Procedure for the Project will continue to be implemented. All Project staff will be familiarized with the procedure and the protocols for managing any chance finds that may occur during construction and operations. The Chance Find Procedure for the Project is outlined below in section 6.2.1.

6.2.1 Chance Find Procedure

The following steps are included in the Chance Find Procedure.

If you discover a site in the course of your work that you suspect may be a possible archaeological site;

- Stop all work in the area to avoid damaging the site.
- Do not disturb any archaeological remains that you may encounter.
- Report your discovery to your supervisor or if they are unavailable, the Manager of Environment will provide further instructions.
- Isolate and protect the area.
- Note the location and leave all discoveries in place.
- Prepare an initial Chance Find Form.
- The Manager of the Environment will contact the Archaeology Branch, as required.

If you discover what you suspect may be a possible human remains in the course of your work, follow the Archaeology and Registry Services Branch Operational Procedures for Found Human Remains:

- Stop all work in the area to avoid damaging the site.
- Do not disturb any possible human remains that you may encounter.
- Report your discovery to your supervisor or, if they are unavailable, the Manager of Environment, who will provide further instructions.
- If you are unable to contact a representative of the proponent, and the suspected human remains appear to be current, contact the RCMP.

The following steps will be followed

- The Coroner's Office and local policing authority are notified and the Coroner's Office determines whether the matter is of contemporary forensic concern.
- If the remains are not of forensic concern, the Archaeology Branch will attempt to facilitate disposition of the remains.
- If a cultural affiliation for the remains can be determined, the Archaeology Branch will contact an organization representing that cultural group. If the remains are of aboriginal ancestry, the Archaeology Branch will attempt to contact the relevant First Nation(s).
- Generally, if remains are still buried and are under no immediate threat of further disturbance, they will not be excavated or removed. If the remains have been partially or completely removed, the Archaeology Branch will facilitate disposition.

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