YESAB

Yukon Environmental and
Socio-economic Assessment Board

Designated Office Evaluation Report

Quartz Exploration – Brewery Creek

Project Number: 2021-0093

Proponent: Sabre Gold Mines

Assessment Completion Date: December 17, 2021

Dawson City Designated Office

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Summary

The Project is a quartz exploration program on 1075 claims around Brewery Creek. The Project is the continuation of an existing quartz exploration program currently licenced as LQ00364. The site is approximately 57 km east of Dawson City and accessed along existing roads. The Project is located within the Tr'ondëk Hwech'in and First Nation of Na-Cho Nyak Dun Traditional Territories and is adjacent to several Tr'ondëk Hwech'in Settlement Land parcels (R-7A, R-80B, R-22B, R-79B, S-159B, R-2A). No activities are proposed on Settlement Land. Activities will occur year-round, for 10 years.

No exploration activities will occur in the following reclaimed areas: Blue Pit, Moosehead, Ice Fog, North Slope, and Pacific. Additionally, no exploration activities will occur in the camp area or the heap leach facility.

The Dawson Designated Office initially solicited views and information on the Project, from August 9 to September 8, 2021. The comment period was extended at the request of First Nation of Nacho Nyak Dun. Comment submissions were received from Transport Canada, Tr'ondëk Hwëch'in, First Nation of Na-Cho Nyak Dun, Fisheries and Oceans Canada, Government of Yukon, Environment and Climate Change Canada and Yukon Conservation Society. Additional views and information were sought from November 16 to 30, 2021 due to changes in project scope. Comments were received from ECCC.

The Designated Office identified the following valued environmental and socio-economic components that will be adversely affected by the Project: water quality, wildlife and wildlife habitat, personal safety and heritage resources. The Designated Office determined that the Project is likely to have significant adverse effects to water quality, wildlife and wildlife habitat and heritage resources such that additional terms and conditions are recommended.

The Decision Bodies, Government of Yukon and Fisheries and Oceans Canada, will review the Recommendation and the accompanying reasons described in this Evaluation Report. The Decision Bodies will issue a Decision Document that will either a) accept the recommendation, b) vary the recommendation, or c) reject the recommendation.

Assessment Outcome

Under s. 56(1)(b) of the Yukon Environmental and Socio-economic Assessment Act, the Dawson City Designated Office recommends to the Decision Bodies that the Project be allowed to proceed, subject to specified terms and conditions. The Designated Office determined that the Project is likely to have significant adverse environmental and socio-economic effects in or outside Yukon that can be mitigated by those terms and conditions.

The terms and conditions of the recommendations are as follows:

1. Prior to conducting bulk sampling, a plan must be developed that describes how Metal Leaching and Acid Rock Drainage (ML/ARD) test work will be conducted and what mitigation and monitoring will be in place to reduce risks.
2. All bulk sample bags shall be removed from the site at the end of the exploration season, or by Dec 31st each year.
3. The Proponent shall follow a three-phased approach to mitigate effects to migrating caribou. The three phases shall be implemented as per the following table:

Response Level	Triggers	Response
1	When one or more collared Fortymile caribou move east of Dawson or one or more collared Porcupine Caribou move into the Klondike watershed, the Proponent shall take the following steps in anticipation of a large number of caribou arriving at the project area:	- Notify all site personnel that caribou are approaching the project area and to remain alert to the presence of caribou. Staff should be aware that a temporary shutdown of activities may be required and the timeline that may be required to occur in. - Environmental monitors to conduct site inspection to identify any hazards or risks, report on those risks, and ensure mitigations can be enacted before arrival of caribou herd. - Any sightings of caribou to be reported immediately to the Regional Biologist. - Briefings on caribou movements to occur with the Regional Biologist as identified by the Regional Biologist.
2	When one or more collared Fortymile caribou move east across the Dempster Highway or west of Hamilton Creek; or one or more collared Porcupine Caribou move south of Antimony mountain or north of Strickland Lake, the Proponent shall take the following steps in anticipation of a large number of Caribou arriving at the project area:	- Restrict all non-essential traffic on project roads and plan access road activity to reduce the frequency of disturbance to caribou (e.g. convoy vehicles off site to Dempster Highway during shift change). - Reduce speed limit on road to 40 km/h to reduce the likelihood of collisions with caribou. - Defer non-essential project activities to a later date including drilling and blasting activities. - Place additional signage as required to manage human traffic away from key pinch points, concentrations of caribou, or areas with additional risk of vehicular strikes. - Ensure temporary shutdown identified in response level 3 is being implemented with the goal of being shut down before caribou enter the 1 km project buffer.
3	Applies to migratory movements only - does not apply to overwintering groups of caribou: triggered by one or more collared caribou (Fortymile or Porcupine) within 1 km of project activities or observations of large groups of caribou within 1 km	- All exploration activities are to be shut down prior to caribou entering this zone but camp may remain open. - Temporarily stop all traffic along major roads. - Environmental monitors will monitor movement of caribou through the area and immediately address any project related problems that appear to be impeding caribou movements. - Contact the Regional Biologist to discuss project activity if caribou remain in the area for more than 2 weeks.

4. Reclamation and/or decommissioning of roads and trails shall be progressive in nature and shall be documented annually in the post-season report. Reclamation and/or decommissioning of roads and trails shall occur as soon as roads and trails are no longer needed for exploration activities unless the need is documented in the post- and pre-season reports. The status of roads and trails (i.e. active or inactive) including an attributed GPS track of all newly created roads and trails (i.e. road or trail width and surface material) and on-going/completed reclamation activities shall be reported to the Chief, Mining Land Use annually via post-season reports.

5. The Proponent shall store all attractants, including garbage, kitchen waste and strained solids from grey water in a container that prevents access by bears and other wildlife, until properly disposed of according to the *Solid Waste Regulations* or burned daily to ash by forced air and fuel fired incineration according to the *Air Emissions Regulations*.
6. The Proponent shall install a portable electric fence around the perimeter of camp, or at the very minimum, around the kitchen, food preparation area, grey water sump, and waste disposal area.
7. Activities shall be avoided within 500 m of lek sites from April 1 to April 20 between 5 am 10 am, and within 1 km of leks during the peak attendance period, from 5 am to 10 am between April 20 and May 4.
8. Clearing within 2 km of active nesting sites shall not occur during the Sharp-tailed grouse nesting period from May 7th to June 8th.
9. The Proponent shall notify the Dawson Regional Biologist (867-993-6461) of any newly identified lek locations.
10. A heritage resources impact assessment shall be completed in advance of ground disturbing activities in areas with elevated potential for the presence of archaeological or historic sites. This includes areas identified in 2016 as “Heritage Potential Zone-Surveyed-High” and “Heritage Potential Zone-Unsurveyed”.
11. Upon discovery of a heritage resource, the Proponent shall notify the Heritage Department of Tr'ondëk Hwëch'in and of the First Nation of Na-Cho Nyak Dun in addition to Government of Yukon, Chief of Mining Lands and Yukon Heritage.
12. A flagged 30 m ‘no work zone’ shall be maintained around archaeological site LaVg-3.

For more information, please contact:

Dawson City Designated Office

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PART A. BACKGROUND

Part A provides the context and background information required for the assessment of the Quartz Exploration – Brewery Creek (the Project). Section 1.0 identifies the requirement for an assessment under the *Yukon Environmental and Socio-economic Assessment Act* (YESAA), while Sections 2.0, 3.0 and 4.0 provide information and baseline data for the Project and project area. Section 5.0 identifies the scope of the assessment, including matters that were considered in evaluating the significance of potential effects of the Project.

1.0 REQUIREMENT FOR AN ASSESSMENT

The purpose of the proposed project is to undertake quartz exploration activities on the Brewery Creek property. While several activities are likely to be undertaken in conjunction with the Project, under s. 47 of the *Yukon Environmental and Socio-economic Assessment Act* (YESAA), the Project is subject to an assessment by the Dawson City Designated Office due to the following circumstances:

- The proposed activity is listed in column 1 of Schedule 1 of the *Assessable Activities, Exceptions and Executive Committee Projects Regulations* (Activity Regulations) and not listed in column 2 as excepted. The proponent proposes to undertake activities listed in Part 1, item 1 of the Activity Regulations. The specific activity is listed as:

  On other than an Indian reserve, exploration for the purpose of quartz mining, or other activity in relation to exploration for the purpose of quartz, on a quartz grant.

- Is proposed to be undertaken in Yukon; and
- An authorization or the grant of an interest in land by a government agency, independent regulatory agency, municipal government, or First Nation is required for the activity to be undertaken.

1.1 Decision Body

Based upon the definition of Decision Body in YESAA, the Designated Office has identified Government of Yukon and Fisheries and Oceans Canada as Decision Bodies for the Project. The Decision Bodies will review the Recommendation and the accompanying reasons described in this Evaluation Report. The Decision Bodies will issue a Decision Document that will either a) accept the recommendation, b) vary the recommendation, or c) reject the recommendation. The triggering authorizations that are required from the Decision Bodies are noted in Table 1.

Table 1: The Decision Bodies[1]

Decision Bodies	Authorization Required	Act or Regulation
Government of Yukon - Energy, Mines and Resources, Mineral Resources Branch	Quartz Mining Land Use Permit	*Quartz Mining Act*
Fisheries and Oceans Canada	*Fisheries Act* Authorization	*Fisheries Act*

[1] This information is based on the project proposal and other information submitted to the Designated Office during the assessment.

The Designated Office notes that, although the Designated Office initially identified Transport Canada as a Decision Body, the Designated Office subsequently determined that they do not fall within the definition of Decision Body under YESAA. As such, Transport Canada is not included in the above table. The reasons for the Designated Office's ultimate determinations on this are as follows:

- Transport Canada advised that they do not have the power to issue an authorization for the Project as proposed in this assessment (YOR 2021-0155-0032 and -0073).

Clarification on inclusion of Fisheries and Oceans Canada:

DFO indicated that they are not identifying as a Decision Body as they are of the view that the Proponent can avoid and mitigate impacts to fish and fish habitat and should not require an authorization under the *Fisheries Act* (YOR 2021-0093-0031). However, given that DFO has the power to issue an authorization for the Project, DFO remains a potential Decision Body for the Project. DFO notes that if there is a change to the project proposal than what has been presented, DFO should be contacted for further review.

2.0 PROJECT DESCRIPTION

2.1 Proponent Information

The Proponent for the Project is Sabre Gold Mines. Contact information for the Proponent is available on the YESAB Online Registry (YOR) Project Proposal (YOR 2021-0093-0001).

2.2 Geographical Context

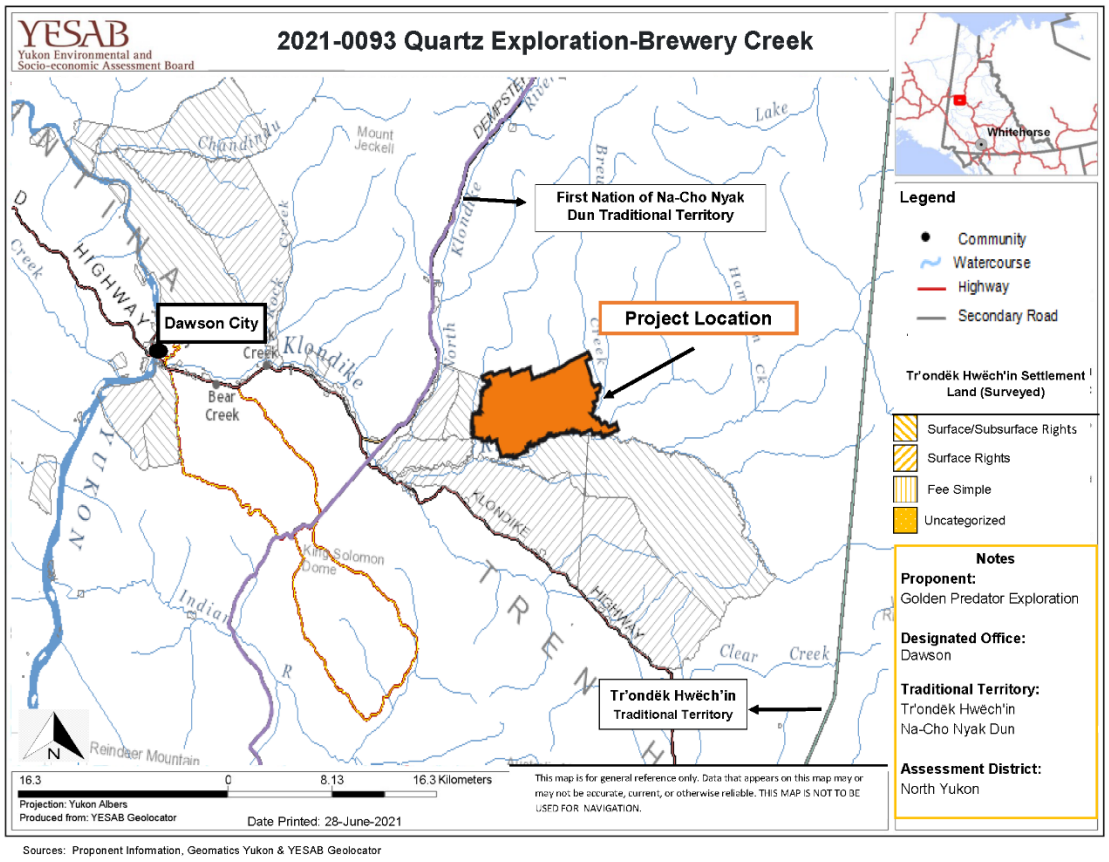

Figure 1: Project Location

Table 2: Project Location, Coordinates and Geographical Parameters

Project Coordinates: Map Sheet: 116-B-01, 116-A-04 and 115-O-16	Decimal Degrees NW 64.07739˚ N 138.36538˚ W NE 64.11986˚ N 138.02060˚ W SW 64.03256˚ N 137.90305˚ W SE 64.00479˚ N 138.38044˚ W
First Nation Traditional Territories Involved:	Tr'ondëk Hwëch'in First Nation of Na-Cho Nyak Dun
Drainage Region:	Major Drainage Area: Yukon Drainage Area Sub Drainage Area: Central Yukon Sub-sub Drainage Area: Klondike
Nearby Watercourses or Waterbodies:	Brewery Creek, Laura Creek and Klondike River

2.3 Project History

The Brewery Creek mine has a history that dates to the mid-1990s. The following section summarizes the history of the permits, YESAB assessments and project activities of the Brewery Creek mine from 1995 to 2021. The history of the licences, permits and approvals are summarized in Table 3. YESAB assessments for the Brewery Creek mine and quartz exploration projects are summarized in Table 4.

The information provided below is primarily from the Project Proposal (YOR 2021-0093-0001) and the Site Visit and Desktop Study Report (YOR 2021-0093-0036):

- 1995: Loki Gold Corporation received approvals and permits for the Brewery Creek Mine (Water Use Licence QZ94-003).
- 1996: Viceroy Resource Corporation (Viceroy) acquired Loki Gold Corporation and the Brewery Creek Mine (Water Use Licence QZ96-007).
- 1996-2001: Production

  From 1996 to 2001, the Brewery Creek Mine operated seasonally, from April to October. The mining property comprised eight separate open pits, associated waste rock piles and a heap leach facility (Figure 2). The Brewery Creek Mine was a conventional truck and shovel open pit mine. The typical process involves blasting rock into small fragment and transferring it using haul trucks to either the ore heaps (heap leach pads) or waste rock pile, depending on its economic value. Ore was stacked on the heap pad and applied a cyanide solution to leach the gold.

  Approximately 300 hectares of land was disturbed during the life of the mine (YOR 2013-0011-003-1).
- 2002: Mining and gold leaching operations ceased (YOR 2013-0011-003-1).

- 2005: Water Licence was assigned to Alexco Resources Corp.

  Licence was also amended (Amendment #7, Application QZ03-062) to enable closure activities.

- 2009: Golden Predator Corp (Golden Predator) acquired the Brewery Creek mine for Alexco Resources Corp.

  The leach pad dyke at the corner of cell one was breached, as per existing plans, in order to prevent the buildup of water behind the dyke (Alexco Resource Corp, 2010b).

- 2011: Mine was fully closed and reclaimed except for some remaining facilities.

- 2012: Golden Predator acquired 100% interest Brewery Creek. Golden Predator acquired a Type B Water Licence and a Class 4 Mining Land Use Approval for 120-person camp and advanced exploration activity.

- 2013: Golden Predator submitted a proposal to the Dawson City Designated Office to re-activate the previous mine activities including open pit mining, ore processing and gold recovery (YESAB Project 2013-0011). The assessment was discontinued as YESAB determined the Dawson City Designated Office did not have jurisdiction to assess the project proposal.

- 2019: Heap Leach Cover Removal

  From August-September 2019, Golden Predator began clearing the undeveloped cells of the heap leach facility (cells 8-10) (Golden Predator, 2020), followed by stripping of the cover of cells 1-7 in anticipation of potential re-processing of heap ore.

- 2021: Brewery Creek property transferred to Sabre Gold Mines Corp., a merger between Golden Predator Mining Corp. and Arizona Gold Corp.

Table 3: Water Use Licences, Mining Land Use Approvals and Quartz Mining Licence for Brewery Creek Mine Production and Quartz Exploration

Permit type	Permit Number	Issue date	Expiry Date	Active/Inactive Permit	Scope/Activities	Licencee
Water Use Licence (Type A)	QZ94-003	07/12/1995	12/31/2006	Inactive	Mine production and closure, mine and camp water use, security, waste deposit, water management and monitoring.	Loki Gold Corporation
Water Use Licence (Type A)	QZ96-007-2	08/28/1997	12/31/2021	Inactive	Amendment to QZ94-003. Mine production and closure, mine and camp water use, security, waste deposit, water management and monitoring.	Viceroy Resource Corporation

Water Use Licence (Type A)	QZ96-007-13	03/10/2005	N/A	Inactive	Assignment of Water Licence QZ96-007 to Alexco Resource Corporation	Alexco Resources Corp
Water Use Licence (Type A)	QZ96-007-15	08/29/2013	N/A	Inactive	Assignment of Water Licence QZ96-00 to Golden Predator Canada Corp.	Golden Predator Canada Corp.
Water Use Licence (Type B)	MN12-038	08/06/2012	07/05/2022	Active	Camp expansion, camp water use, disposal of domestic waste.	Golden Predator Canada Corp.
Class 4 Mining Land Use Approval	LQ00364	07/06/2012	07/05/2022	Active	120-person camp, advanced exploration activities	Golden Predator Canada Corp.
Quartz Mining Licence	A99-001	05/19/1999	12/31/2021	Active	Mine production, closure and reclamation, monitoring and inspections	Golden Predator Canada Corp.
Commercial Dump Permit	81-047	10/01/2019	12/31/2028	Active	Dump operations, waste storage, incineration	Golden Predator Canada Corp.

Table 4: YESAB Assessments for the Brewery Creek Mine and Quartz Exploration

Project Number	Title	Scope	Outcome
2009-0135	Class 3 Quartz Exploration Program	20-person camp, advanced exploration activities	Project was recommended to proceed with Terms and Conditions
2012-0091	Class 4 Quartz Exploration Project - Combined projects 2012-0007 and 2012-0073	120 person camp, advanced exploration activities	Project was recommended to proceed with Terms and Conditions
2013-0011	Re-activation Brewery Creek Mine	Mining, milling and gold recovery	Assessment was discontinued

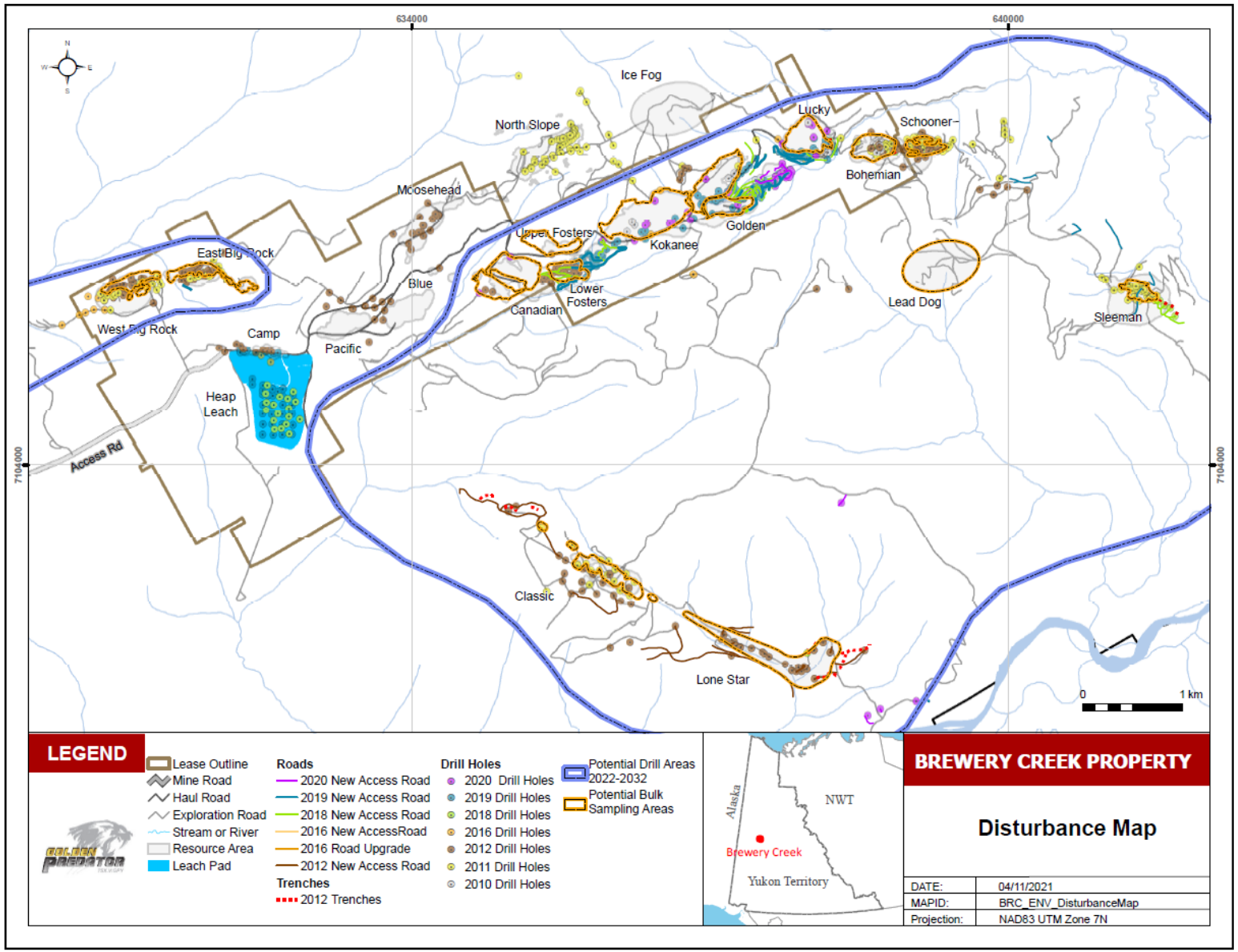

Figure 2: Historic Disturbance Map (YOR 2021-0093-0061)

3.0 PROJECT SCOPE

The project scope defines the project to be assessed and includes all activities described in the project proposal and any subsequent information provided by the Proponent. The project scope includes project activities and project design features that prevent, control or reduce adverse project effects.

The Project is a quartz exploration program on 1075 claims around Brewery Creek. The Project is the continuation of an existing quartz exploration program currently licenced as LQ00364. The site is approximately 57 km east of Dawson City and accessed along existing roads. The Project is located within the Tr'ondëk Hwech'in and First Nation of Na-Cho Nyak Dun Traditional Territories and is adjacent to several Tr'ondëk Hwech'in Settlement Land parcels (R-7A, R-80B, R-22B, R-79B, S-159B, R-2A). No activities are proposed on Settlement Land. Activities will occur year-round, for 10 years.

- No exploration activities will occur in the following reclaimed areas: Blue Pit, Moosehead, Ice Fog, North Slope, and Pacific. Additionally, no exploration activities will occur in the camp area or the heap leach facility
- Use of heavy equipment
    - If activities are to occur in the spring, sharp-tailed grouse surveys will be conducted within 500 m radius of the work area. If a lek is located, a 200 m limited disturbance buffer will be implemented for the active lek period. There will be no new disturbance within the lek, and there will be no traffic within 200 m before 10 AM or after 8 PM. This will be implemented for activities from late March through early June. This may be adjusted by site-specific measures such as topography that limits visibility of activity from a lek site.
    - If a sharp-tailed grouse nest is located, a 200 m no disturbance buffer will be implemented for the active nesting period.
- Access Development
    - 15 km (7m wide) of new roads
    - 15 km (2.5 m wide) of new trails
    - 30 km upgrading of existing roads
    - Water bars, cross ditches, appropriate sloped grading and crowning to mitigate/control surface road runoff from entering watercourses
    - New roads and trails will be constructed at least 30 m from watercourses
    - No new fords, bridges or culverts
    - Culvert reconstruction where necessary
    - Trails, if satisfactory in length, will be dog-legged to interrupt sightlines
    - Helicopter use for emergency purposes
        - Avoid helicopter flights over areas where caribou are concentrated on their winter range or during the fall rut where conditions permit.
        - Pilots will follow the Flying in Caribou Country guidelines when safe to do so and adhere to the following vertical flight altitudes:
            - Maintain vertical flight altitudes ≥ 300 m above ground level throughout the year;
            - Maintain vertical flight altitudes ≥ 600 m above ground level during calving and post-calving (15 May to 15 July) and rut (15 September to 15 October).
        - When caribou are observed, flight routes will be modified to maximize the vertical and horizontal separation distance between the aircraft and the animals.

Whenever possible, a minimum 1,000 m horizontal distance from caribou will be maintained, especially during seasonally sensitive time periods.
        - When caribou are observed and an evasion response is detected, aircrafts should ascend to a higher flight altitude and veer away from caribou when safe to do so.
        - Flight routes will be adjusted to avoid areas where caribou were recently observed or areas where they are regularly observed and, whenever possible, flight paths will place a mountain ridge between the aircraft and caribou until they have left the area.
- Mechanized trenching
    - Up to 55 trenches (average size 30 m long x 1.5 m wide x 2 m deep)
    - Total volume is 10 000 m^3
    - Maintain at least a 30 m vegetation buffer between trenches and watercourses
    - All stockpile material from the excavation of trenches will be located at least 30 m from natural watercourses.
    - Trenches sloped at one end and backfilled as soon as no longer needed
    - Trenches will be visually inspected for signs of sulphide mineralization. Trenches with sulphide mineralization present will be prioritized for progressive reclamation.
    - Reclaimed exploration trenches areas will be contoured to shed water away from the excavation using angles that will not result in sedimentation and erosion
- Drilling
    - Water use:
        - Up to 100 m^3/day
        - water sourced from nearby creeks
        - use of fish screens
    - Up to 6 drill rigs operating simultaneously
    - Reverse Circulation
        - Up to 1 500 holes
        - 20 000 m
    - Diamond
        - Up to 1 500 holes
        - 20 000 m
    - No discharge to the environment. Only biologically inert drilling fluids will be used and all drill fluids will be contained in a sump 30 m from any watercourse.
    - No drilling within 30 m of any watercourse
    - Drill sites will be progressively reclaimed throughout the season
    - All sumps must be at least 30 m away from the highwater mark and must only contain drill cuttings.
- Clearing
    - Up to 100 clearings per claim each year for drilling
        - 300 m^2 for drilling (total 30 000 m^2)
    - Up to 5 clearings per claim each year for trenching
        - 200 m^2 for trenching (total 1 000 m^2)
    - Up to 3 clearings per claim each year for bulk sampling
        - 600 m^2 for bulk sampling (total 1 800 m^2)
    - Clearings will occur at least 30 m from watercourses
    - Prior to clearing for trenches a pre-clearing ground survey of the area will be conducted to determine if there are nesting birds in the area.
    - Clearing will be avoided within 1 km of known raptor nests between April 1 to July 31.

- Fuel Storage
    - Diesel : 55 000 L
    - Gas : 5 000 L
    - Propane : 30 000 L
    - Jet A and B : 2 000 L
    - Oil: 800 L
    - Fuel will be stored in double walled approved envirotanks
    - Appropriately sized spill kits will be located near all fuel sources
    - Fuel and refueling will be at least 30 m from watercourses
- Bulk Sampling
    - Up to 5 000 tonnes/year (50 000 tonnes total;
    - Material trucked off site to a contractor laboratory site
    - Bulk samples will be placed on a level lined surface, 100 m away from any watercourse, and removed from site as soon as possible. Arrangements for transport will be made prior to excavation to ensure the material be moved within a reasonable timeframe
- Continued use of 120-person camp
    - Camp used year-round
- Waste Management
    - Continued use of permitted Solid Waste Disposal Facility and Incinerator
        - Located 500 m from camp
        - Enclosed in an electric fenced area
    - Special Waste Storage Area (sea-can)
- Progressive and final reclamation
    - Slope stability in steep areas will be checked and re-contoured/re-vegetated as required.
    - Any ditches or berms that may cause water to channel will be re-graded.
    - Stockpiled topsoil, brush and other organic debris will be distributed over disturbed areas to promote re-vegetation.
    - All trenches, including areas of bulk sample removal, will be immediately backfilled.
- Progressive and final reclamation activities for access development
    - Deteriorating sections of the roads/ trails will be repaired on an ongoing basis
    - All areas will be re-sloped, contoured or otherwise stabilized to prevent long-term soil erosion, slumping and subsidence
    - Compacted surfaces will be scarified to promote re-vegetation
    - Re-establishment of the vegetative mat
    - On steep slopes, earth berms may be built to divert surface runoff away from the road surface
    - Compacted surfaces will be scarified
    - Roads/trails will be re-contoured, as necessary
- No transportation or use of cyanide
- No activities in wetlands
- All hazardous substances at the site will have secondary containment structures to capture and contain the accidental release of hazardous substances
- Stockpiling of material will be at least 30 m from any watercourse Proponent will communicate seasonal activities and timing of activities to Tr'ondëk Hwëch'in citizens that may be affected by the proposed project by sharing Sabre Mines pre-season plan
- Proponent will work with self-governing First Nations to identify and resolve potential land use conflicts and any potential negative effects
- No alcohol or illegal drugs shall be permitted on the project site

3.1 Project Details

The project details described below were obtained from the following documents:

- Project Proposal Form (YOR 2021-0093-0001)
- Property Map (YOR 2021-0093-0004)
- Property Haul Roads (YOR 2021-0093-0005)
- Wildlife Management Plan (YOR 2021-0093-0007)
- Waste and Hazardous Materials Management Plan (YOR 2021-0093-0008)
- Spill Contingency Plan (YOR 2021-0093-0009)
- Surface Erosion Prevention and Sediment Control Management Plan (YOR 2021-0093-0010)
- Heritage Resource Management Plan (YOR 2021-0093-0011)
- Information Request 1 response (YOR 2021-0093-0014)
- Information Request 2 response (YOR 2021-0093-0048)
- Information Request 3 response (YOR 2021-0093-0052)
- Information Request 4 response (YOR 2021-0093-0067)

3.1.1 Project Focus Area

As discussed in Section 2.3, the Brewery Creek property has been mined and explored since the mid 1990s. There are several areas within the claim block that have been subject to disturbance and reclamation. The Proponent has provided mapping to clearly indicate where activities will be undertaken and which areas will not be disturbed. Figure 3 is a map provided by the Proponent which delineates where potential drill areas are located (blue polygon) and where bulk sampling will occur. No exploration activities will occur in the following reclaimed areas: Blue Pit, Moosehead, Ice Fog, North Slope, and Pacific. Additionally, no exploration activities will occur in the camp area or the heap leach facility.

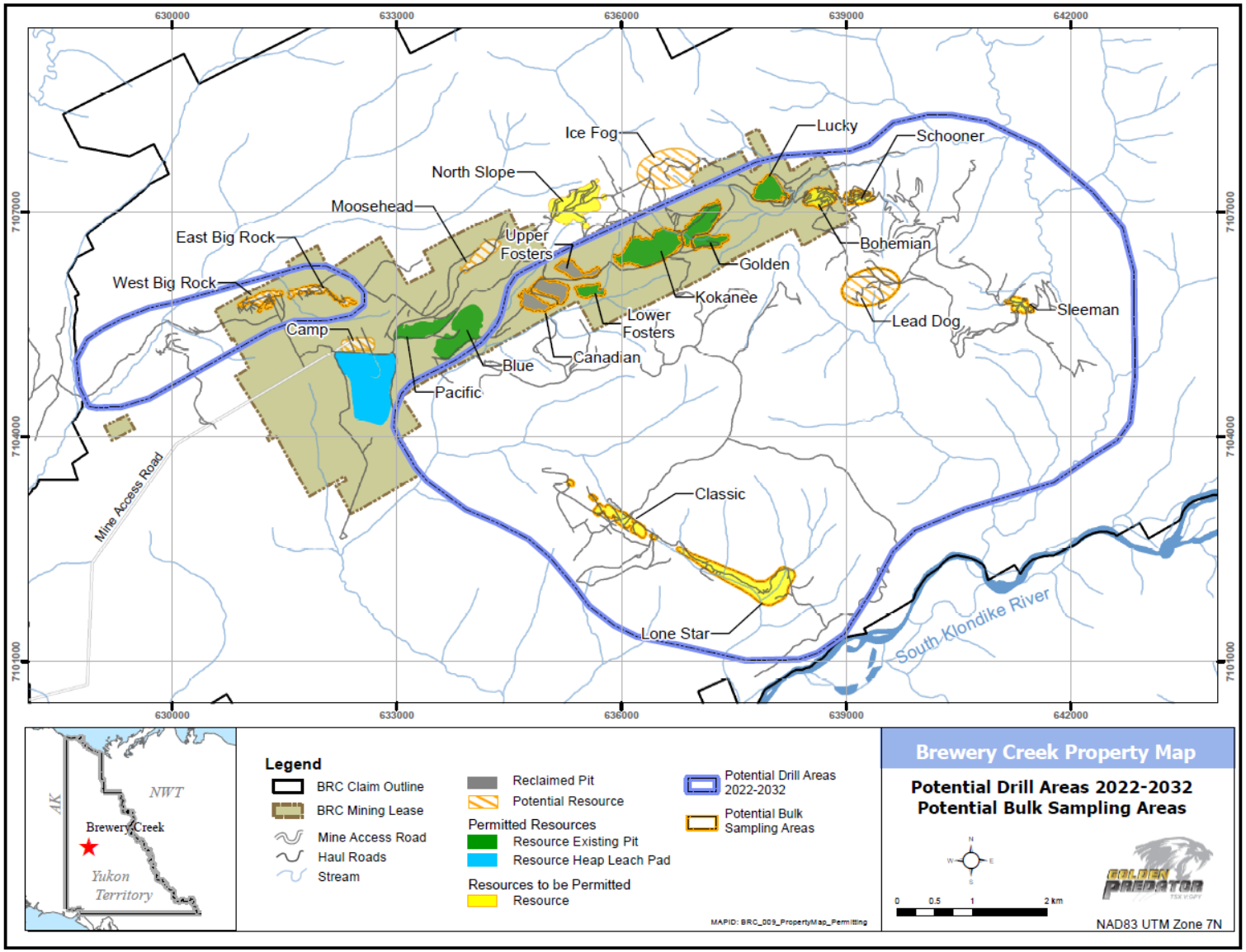

Figure 3: Project Focus Area (YOR 2021-0093-0060)

3.1.2 Access Development

The Brewery Creek property is located approximately 57 km east of Dawson City and is accessible by existing roads. The North Fork Road is connected to a network of exploration and historic roads previously established by the producing mine (Figure 2). There are approximately 180 km of existing roads and trails within the extent of the project area.

The Project includes the development of an additional 15 km of roads (7m wide) within the claim bock. These additional roads will be used to transport personnel as well as light and heavy machinery, equipment and supplies from the main camp to various areas where exploration activities will be conducted. The Project also includes upgrading of up to 30 km of the current road network.

New roads will be constructed by heavy machinery. The vegetative mat will be removed to protect the seed and root stock contained within the mat and will be stored separately from any overburden or bedrock. New access will be designed to avoid permafrost. Side gutters and drainage cuts will be constructed, as required, to avoid water pooling or running down the road. If rutting, gouging, ponding, or permafrost degradation occurs off road or trial, vehicle use will be suspended and/or relocated to ground that can bear the weight of the vehicle without causing such damage.

The site is also accessible by helicopter with an existing landing area adjacent to the camp. The helicopter will be utilized in emergency situations such as personnel extraction. The road network will be the primary method for mobilizing and demobilizing supplies, equipment, and personnel.

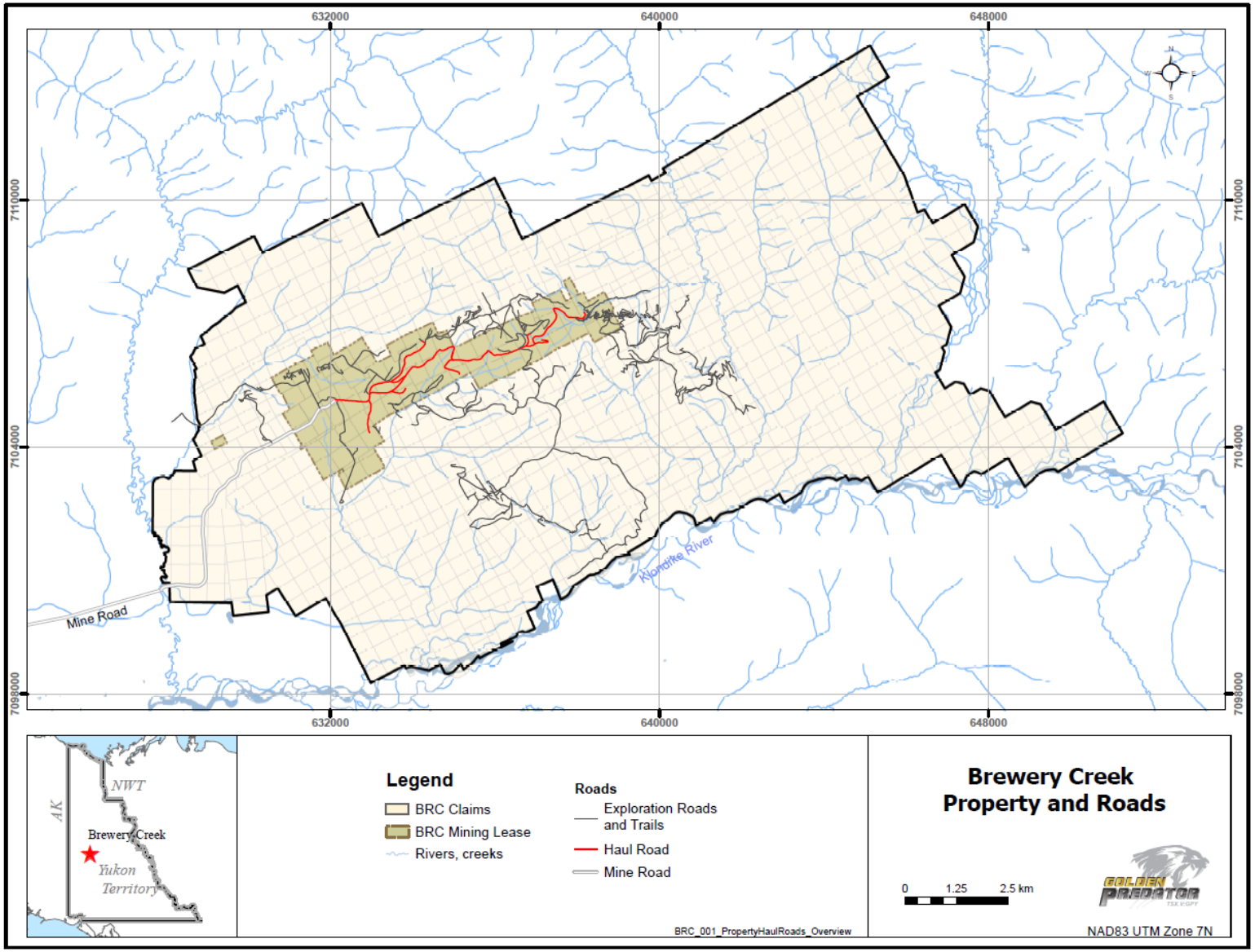

Figure 4: Existing roads and trails (YOR 2021-0093-0005)

3.1.3 Clearing

The Project includes clearing of vegetation for drill pads and trenches. All clearing will be kept at least 30 m away from any watercourse. Prior to clearing for trenches a pre-clearing ground survey of the area will be conducted to determine if there are nesting birds in the area. Clearing will be avoided within 1 km of known raptor nests between April 1 to July 31. The breakdown of required clearings per activities is as follows:

- Up to 100 clearings per claim each year for drilling
    - 300 m^2 for drilling (total 30 000 m^2)
- Up to 5 clearings per claim each year for trenching
    - 200 m^2 for trenching (total 1 000 m^2)
- Up to 3 clearings per claim each year for bulk sampling
    - 600 m^2 for bulk sampling (total 1 800 m^2)

3.1.4 Drilling and Trenching Operations

Drilling

The Project includes drilling and trenching activities for quartz exploration purposes. Up to 6 drill rigs (4 diamond drills and 2 RC drills) will be operated simultaneously with 1 500 track-mounted diamond drill holes and Reverse Circulation (RC) drill holes each, for a total of 3 000 holes over the life of the Project. D6 dozers will transport the drill rigs to the drill sites along existing and new roads. To reduce the overall drilling footprint, low-impact track-mounted RC drills are being used. The RC drills will provide preliminary results to determine if further drilling with a diamond drilling rig is required. All drilling will occur at least 30 metres away from the ordinary high-water mark of any watercourse. .

Very small amounts of fuel will be stored near drills for refueling purposes only and will be contained in a plastic secondary containment tray as per GPE's Spill Contingency Plan. Bio-degradable synthetic lubricants will be used, and sumps established near the drill equipment will catch drilling effluent. All drill fluids will be contained within the sump and when possible, drill mud will be re-circulated. As well, sumps will only house drilling waste, fluids, cutting and will not be within 30 m of a watercourse. The sump will be allowed to dry prior to recontouring and covered with the stored vegetative mat. Drill sites will be progressively reclaimed throughout the season.

Approximately 100 m^3 of water will be used per day for drilling. Water used for drilling will be sourced from nearby creeks. As the drills move from site to site, the sources of water will change accordingly.. Waterlines will be fitted with fish screens to prevent entrapment of fish.

Trenching

The Project includes up to 55 trenches (average size 30 m long x 1.5 m wide x 2 m deep). The total volume of trenching will be up to 10 000 m^3. The Proponent has notes that all trenches will be stabilized and marked to minimize risk to the public. Trenches will be marked and backfilled by first depositing any removed overburden and bedrock and then replacing the vegetative mat that was removed to construct the trench. Trenches will be located primarily on ridge tops. If they are established off ridge, trenches will be cut such that they follow contour lines which will help to minimize erosion. Any trenches created will be

stabilized, have a sloped open end to allow for wildlife egress and be marked to minimize risk to personnel.

In order to avoid sedimentation and erosion, a 30 m vegetation buffer between trenches and watercourses will be maintained. Also, in accordance with Sabre Gold Mines *Sediment and Erosion Plan,* trenches will be backfilled as soon as they are no longer needed for exploration purposes.

Lastly, trenches will be visually inspected for signs of sulphide mineralization. Trenches with sulphide mineralization present will be prioritized for progressive reclamation. Reclaimed exploration trenches areas will be contoured to shed water away from the excavation using angles that will not result in sedimentation and erosion.

3.1.5 Bulk Sampling

Up to 5 000 tonnes/year (50 000 tonnes total) of bulk samples will be excavated using bulldozers, excavators, and rock trucks. Bulk sampling will be trucked off site to a contractor laboratory site. Bulk samples will be temporarily stored on a level lined surface, 100 m away from any watercourse and removed from the site as soon as possible.

The currently known resource areas where this type of activity could occur are shown on Figure 3, and additional areas for bulk sampling will be outlined as exploration progresses.

3.1.6 Camp Operations, Fuel Storage, Waste Management

As the Project is the continued exploration of an area previously disturbed, the Project will continue to use the existing 120-person capacity camp. YESAB visited the project area in August 2019 and Figure 5 and Figure 6 are photographs of the camp and fuel storage area taken during the site visit. The camp will remain open year-round. The camp will continue to use its permitted Solid Waste Disposal Facility and incinerator; both facilities are located 500 m from camp and enclosed in an electric fenced area. Additionally, special water is stored in a sea-can.

Figure 5: Brewery Creek camp and fuel storage area. August 2019 (YESAB)

Figure 6: Brewery Creek camp. August 2019 (YESAB)

All fuel will be transported in bulk along existing access routes to the Project camp. Fuel will be stored in double walled approved envirotanks and all tanks will be registered with the Mining Land Use office in Dawson City. Fuel type and storage capacity are described in Table 5.

Wobble pumps and/or small electric pumps will be used when transferring fuel. Appropriately sized spill kits will be located near all fuel sources and copies of the Spill Response Plan will be made available at each fueling station. All personnel responsible for re-fueling will be familiar with the procedures and emergency contacts within the Plan.

Table 5: Fuel Storage Capacity amounts on the Project Site

Fuel Type	Storage Capacity
Diesel	55 000 L
Gas	5 000 L
Propane	30 000 L
Jet A and B fuel	2 000 L
Oil	800 L

3.1.7 Reclamation

The proponent will follow the Yukon Mineral and Coal Exploration Best Management Practices and Regulatory Guide (Yukon Chamber of Mines, 2010) guidance on reclamation measures. The following measures are from the Yukon Chamber of Mine's guide and have been highlighted by the Proponent as measures that will be undertaken for reclamation purposes:

- Slope stability in steep areas will be checked and re-contoured/re-vegetated as required.
- Deteriorating sections of the roads/ trails will be repaired on an ongoing basis.
- All roads/trails will be reclaimed at decommissioning.
- Any ditches or berms that may cause water to channel will be re-graded.
- On steep slopes, earth berms may be built to divert surface runoff away from the road surface.
- Compacted surfaces will be scarified.
- Roads/trails will be re-contoured, as necessary.
- Stockpiled topsoil, brush and other organic debris will be distributed over disturbed areas to promote re-vegetation.
- All trenches, including areas of bulk sample removal, will be immediately backfilled.

As noted above, the Proponent has included the development of 15 km of new roads as well as upgrading up to 30 km of road within the existing network. The Proponent has proposed the following reclamation measures for roads:

- All areas will be re-sloped, contoured or otherwise stabilized to prevent long-term soil erosion, slumping and subsidence.
- Compacted surfaces will be scarified to promote re-vegetation.
- Re-establishment of the vegetative mat.

4.0 ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING

4.1 Physical Environment

The proposed project straddles the Yukon Plateau North ecoregion and the Mackenzie Mountains ecoregion, although it is mainly situated in the former. The area is known to contain considerable potential for metallic mineral deposits, as demonstrated by the Brewery Creek mine. Extensive discontinuous permafrost with medium ice content is widespread, leading to sporadic discontinuous permafrost along the south-western edge of the region.

The project area is located in the foothills of the Ogilvie Mountains approximately 57 km east of Dawson City, it is bisected from southeast to northwest by the Tintina Trench. Relief on the property ranges from 600 – 1300m, with the terrain consisting of rolling uplands and plateaus with deep, broad U-shaped valleys. The primary streams are Laura, Brewery and Golden Creeks, all are tributaries to the South Klondike/Klondike Rivers (YOR 2021-0093-0001).

4.2 Biological Environment

The Project is located in the northern extent of the Klondike Plateau Ecoregion of the Boreal Cordillera Ecozone and represents the easternmost portion of Beringia, which was largely un-glaciated during the Pleistocene Epoch in what is now known as the Ice Age.

4.2.1 Vegetation

The project area occurs within a previously disturbed (300 hectares) site that was reclaimed in 2011. The dominant vegetation is black spruce and buck brush associated with riparian areas, including willow, birch and mosses. Lower elevation vegetation comprises mainly northern boreal forest, with white spruce, willow and birch prominent. Sub-alpine species such as alpine fir and lodgepole pine occur at higher elevations with true alpine species (mountain avens, dwarf willow, birch) found within the highest sections (YOR 2021-0093-0001).

4.2.2 Wildlife

The Yukon Plateau North ecoregion provides habitat for a variety of wildlife and bird species typical of the boreal forest (Smith, et al., 2004). Mammal species known to occur in this ecoregion include, but are not limited to, grizzly and black bears, woodland caribou, moose, wolverine, marten, wolf, stone sheep, lynx, red fox, beavers and other small mammals. This ecoregion also provides breeding habitat for raptors, songbirds, forest birds and waterfowl.

The Project lies within the Tintina Trench, which is an important migration corridor for many bird species. Wetlands in the ecoregion are used for both breeding and staging areas. Many forest bird species reach the northern limits of their range in this ecoregion, with some species being year-round residents (Smith, et al., 2004).

4.2.2.1 Caribou

The Project is located within the ranges of the Hart River caribou herd, the Porcupine caribou herd and the Fortymile caribou herd.

The Hart River Caribou Herd (HRCH) is a Northern Mountain caribou and is listed as a Species of Special Concern under the *Species at Risk Act*. HRCH's population was estimated at 2700 in 2016 (Dawson Regional Planning Commission, 2020). The range of the HRCH is mostly north of the Project, however, in rare instances, HRCH have calved as close as 2.5 km from the project footprint (YOR 2021-0093-0036). It is known that HRCH may be encountered at any time of the year in this area (YOR 2021-0093-0001).

The northern portion of the proposed claim block overlaps with an identified WKA (Wildlife Key Area) for the HRCH breeding from August to October (Figure 6).

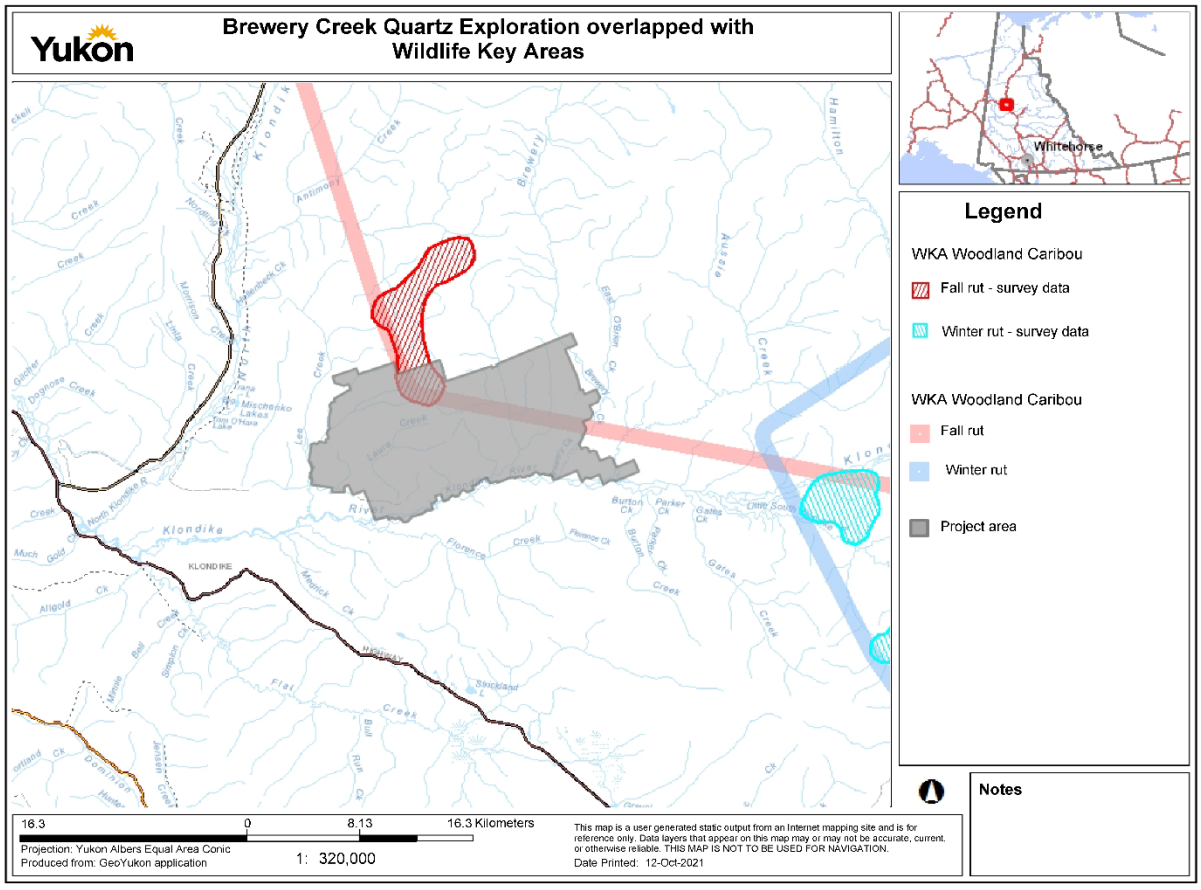

Figure 7. Brewery Creek Quartz Exploration overlapping with Wildlife Key Areas (GeoYukon 2021).

The Porcupine Caribou Herd (PCH) is a barren ground herd that is managed between Yukon, Northwest Territories and Alaska under the terms of the Porcupine Caribou Management Agreement. The PCH's population was estimated at 218,000 in 2017 (Dawson Regional Planning Commission, 2020). PCH have wintered as far south as the North Klondike Highway (arriving as early as mid October and staying through to April) (YOR 2021-0093-0036). In 2005 many caribou from the PCH and the HRCH arrived in Brewery Creek area in mid to late October (well past rut for HRCH), but during the rut for the PCH (YOR 2021-0093-0001).

The Fortymile Caribou Herd (FMCH) is a barren ground herd that migrates between Alaska and the Yukon. The FMCH once numbered in the hundreds of thousands and declined to approximately 6,000 in the 1970s. The herd has since rebounded, with the 2017 herd size estimate of approximately 72,000 animals, and is expanding to inhabit former range in Yukon, including the proposed Project area. Fortymile caribou have used the project area both as a migration pathway and as winter range (YOR 2021-0093-0036).

Most habitats in the southern portion of the project area have burned over the years and are of limited use to the herd (Figure 7), however, portions of the project area do contain some moderate quality winter range (YOR 2021-0093-0037).

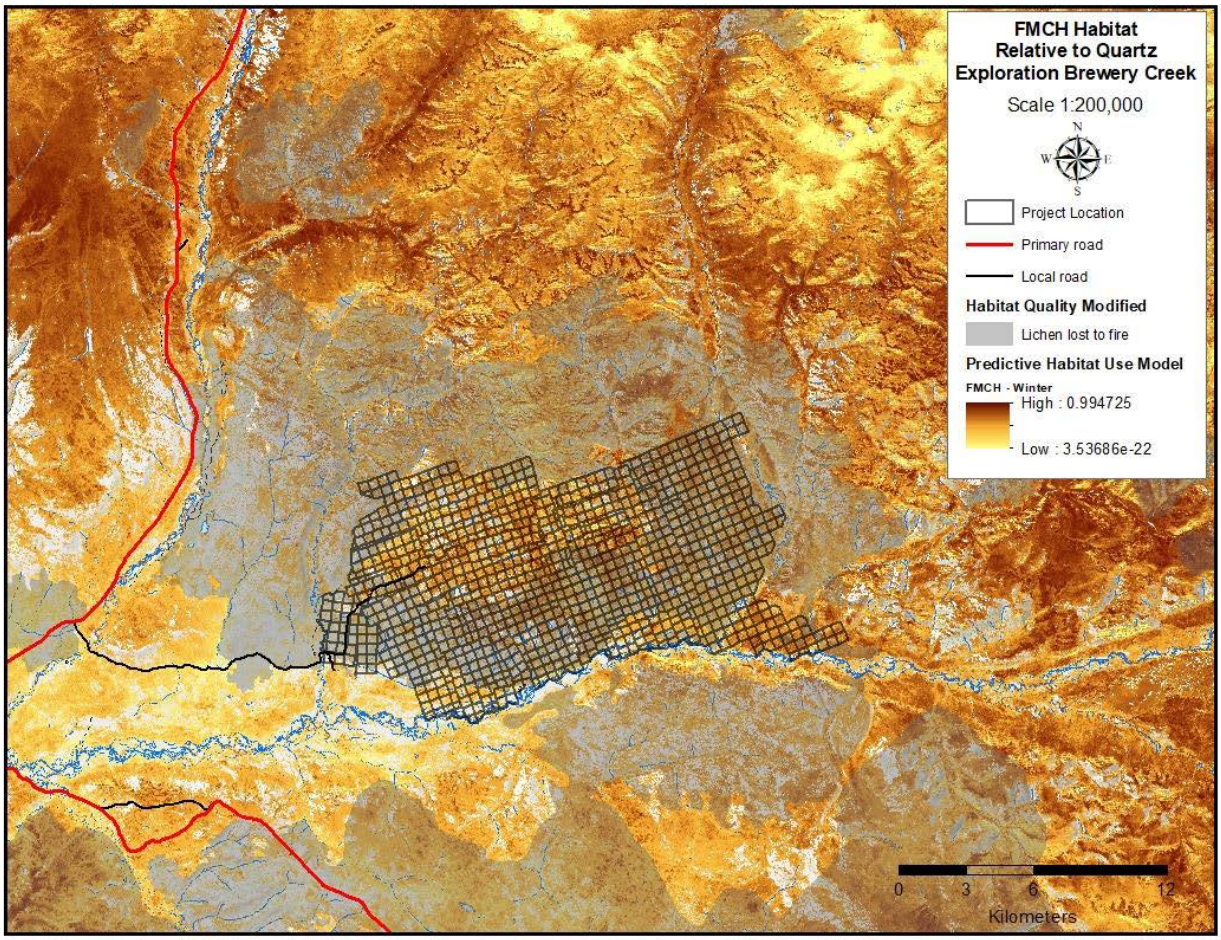

Figure 8. FMCH winter habitat overlapping with the Brewery Creek Mine. Provided by YG (YOR 2021-0093-0036).

The project area is important for caribou migration: in 2013 approximately 7000-10,000 caribou from FMCH migrated through the project footprint. In addition, caribou have been noted to move through this area (west to east or vice versa) for many years in both fall and spring. Historical distributions of FMCH identifies areas adjacent to the South Klondike River as an important winter range for the herd (McDonald & Cooley, 2004). The topography surrounding the Brewery Creek project funnels caribou directly into the project area, as a result, site management to avoid animal entrapment and disturbance to migrating caribou will be very important (YOR 2021-0093-0036).

FMCH are expected to primarily interact with the project during migration although some limited winter use may also occur. Migration in large numbers would most likely come through this area during late September, October or November and again during spring migration in late March through early May (YOR 2021-0093-0036).

4.2.2.2 Moose

The project area is within the Hart River Moose Management Unit. In Yukon, moose are currently managed in 60 Moose Management Units, which “are meant to encompass, to the best extent possible, biologically distinct moose populations. Boundaries are based primarily on natural geographical features (e.g., lakes, watersheds, topography), roads, and in some cases on radio collared moose movement patterns” (Environment Yukon 2016).

The project area overlaps with late moose winter habitat and a mineral lick (YOR 2021-0093-0036).

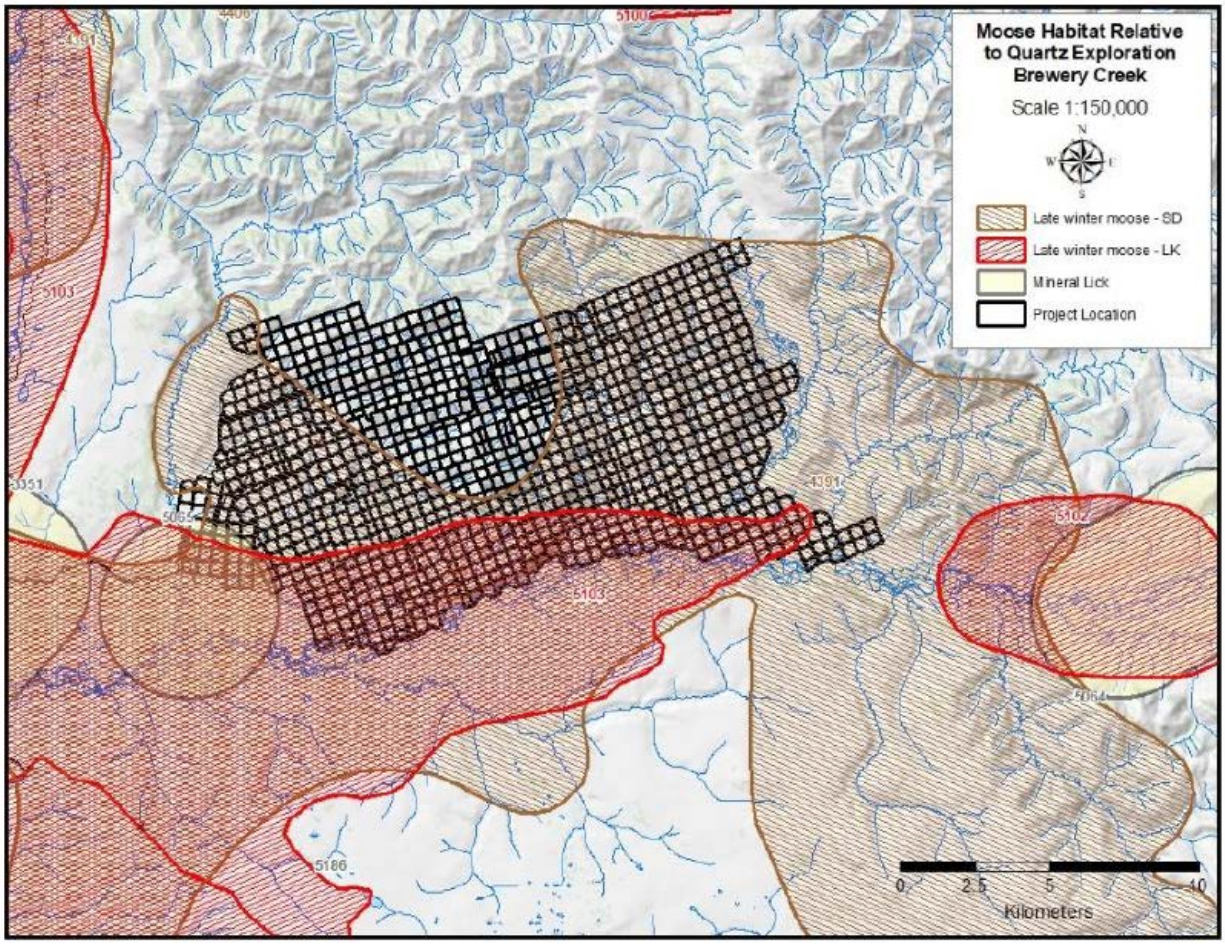

Figure 9. The Project area and late winter moose habitat and mineral lick locations (YOR 2021-0093-0036).

4.2.2.3 Avian Wildlife

The Project is located in Nesting Zone B8 and the area may provide a migratory path, nesting area, or other habitat features for migratory and resident birds. Nesting zones are broad general areas that are

defined by species diversity, mean annual temperature and similarities in nesting periods. The regional nesting period for Zone B8 is early May to late August each year (YOR 2021-0089-0042).

4.2.2.3.1 Sharp-tailed Grouse

The project location contains Sharp-tailed grouse habitat. Sharp-tailed grouse are found in “parkland structure” habitat, which are open areas with low ground cover dispersed in shrub or treed groves; only small pockets of suitable habitat for Sharp-tailed grouse occur in the Yukon. In the Yukon, gravel outwashes with fairly stable aspen parkland habitat and wet sedge-hummock meadows after fire are considered suitable habitats for Sharp-tailed grouse (YOR 2021-0093-0036).

Leks or communal courting grounds, are an important habitat component, which form the centre of social activity throughout the year for a population. Lekking areas generally have small mounds elevated from the surrounding terrain and have little shrub or tree cover. Figure 9 illustrates Sharp-tailed grouse lek key habitat areas that overlap with the Project (YOR 2021-0093-0036).

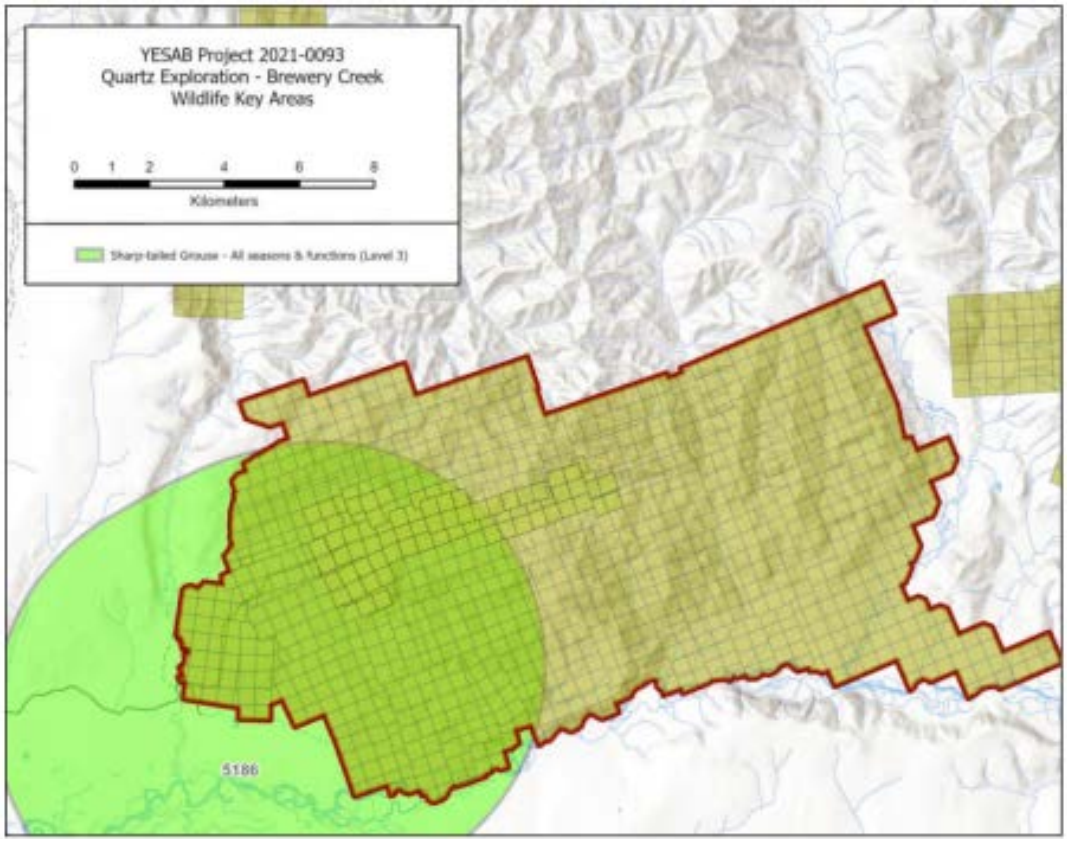

Figure 10**. Sharp-tailed grouse Lek Wildlife Key Area overlapping the Brewery Creek Project (YOR 2021-0093-0036)**

4.2.2.4 Fish and Fish Habitat

The project area is located along the Klondike River and Klondike Tributaries including Brewery Creek and Laura Creek. The Klondike River contains critical habitat requirements for Chinook Salmon (spawning and rearing) and important habitat for resident fish species (Dawson Regional Planning Commission, 2020).

4.3 Socio-economic Environment

The Project is located east of the Dempster Highway and north of the Klondike River, in the Traditional Territories of the Tr'ondëk Hwëch'in and the First Nation of Na-Cho Nyak Dun. Quartz mining has occurred at the Brewery Creek mine since the mid-1990s; other uses in the area include trapping, mineral exploration, hunting, berry-picking and other recreational activities.

4.3.1 Traditional Territory and Settlement Land

The Project is located within the traditional territories of the Tr'ondëk Hwëch'in and the First Nation of Na-Cho Nyak Dun. The Tr'ondëk Hwëch'in are a Yukon First Nation based in Dawson City. The citizenship of roughly 1,100 includes descendants of the Hän-speaking people, who have lived along the Yukon River for tens of thousands of years (Tr'ondëk Hwëch'in n.d.). The First Nation of Na-Cho Nyak Dun is based in Mayo and represents the most northerly community of the Northern Tutchone language and culture group. The citizenship is roughly 600 descendants of Northern Tutchone people from the Mayo area (First Nation of Na-Cho Nyak Dun, 2021).

Traditional territory boundaries and Settlement Lands are defined by the Tr'ondëk Hwëch'in and First Nation of Na-Cho Nyak Dun Final Agreements (Final Agreements). The Final Agreements give First Nations specific rights and roles with respect to the economic activities, heritage, fish and wildlife, land and resource management and other matters within their traditional territories . Many First Nations' rights and benefits established through land claims exist throughout the entire traditional territory including hunting, fishing, economic development and co-management of parks and cultural artifacts (Dawson Regional Planning Commission, 2020).

Tr'ondëk Hwëch'in Settlement Lands R-79B, R-2B, R-22B and R-7A are adjacent to the project area (Figure 10).

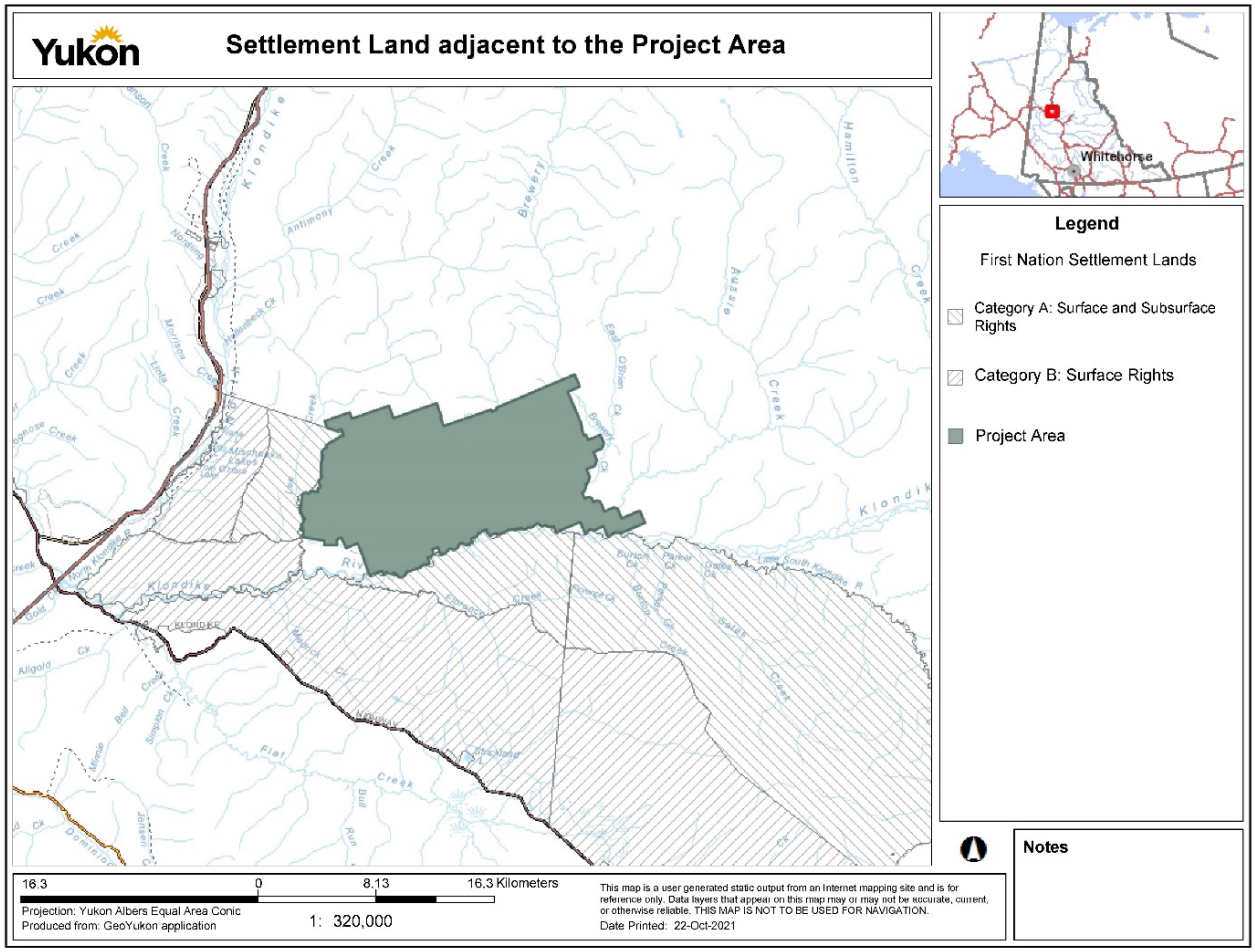

Figure 11. Settlement Land adjacent to the Project Area (GeoYukon).

4.3.2 Heritage Resources

There are a number of known heritage resources in the project area including the South Fork Intake and Camp complex of historic features as well as nine archaeological sites. A portion of the South Fork Ditch also overlaps the project claims. There are also a number of heritage sites (archaeological and historic) adjacent to the project claims and existing access road. It should be noted that the project location has not been fully inventoried for sites to date and it is possible that undocumented heritage resources may be present within the project area (YOR 2021-0093-0036).

There have been various heritage assessments conducted at the Brewery Creek Property; heritage resources overview assessments (HROA) were completed in 2012 and 2016. These HROAs cover the entire project claims area, the assessment identified a number of areas with elevated potential for the presence of archaeological sites that overlap the project location.

In 2016, a heritage resources assessment was conducted which included updates to the 2012 HROA, a Paleontology Resource Overview Assessment and a Preliminary Field Reconnaissance for the Brewery Creek Property as well as a Heritage Resources Impact Assessment (Permit 16-11ASR) for portions of the Brewery Creek property and additional ancillary developments.

Eleven heritage sites were identified during the 2016 work, nine heritage sites were identified within the Brewery Creek Property project claims. Detailed site assessments were conducted at two sites, LaVh-12 (off-claims) and LaVg-3 (on-claims). Site management buffers were determined and flagged in the field for these two sites. The 2016 work also resulted in updated mapping of areas with elevated potential for the presence of archaeological sites within the entire Brewery Creek Property. This includes areas that have not yet been surveyed noted as “Heritage Potential Zone-Unsurveyed” and areas that contain documented heritage sites or ground-truthed areas with elevated heritage potential noted as “Heritage Potential Zone-Surveyed-High”.

4.3.3 Administrative Boundaries

The proposed Project overlaps with Game management area 229, 251, 252 and 250 and trapping concessions 23 and 65. There are numerous active quartz and placer claims in the Project area.

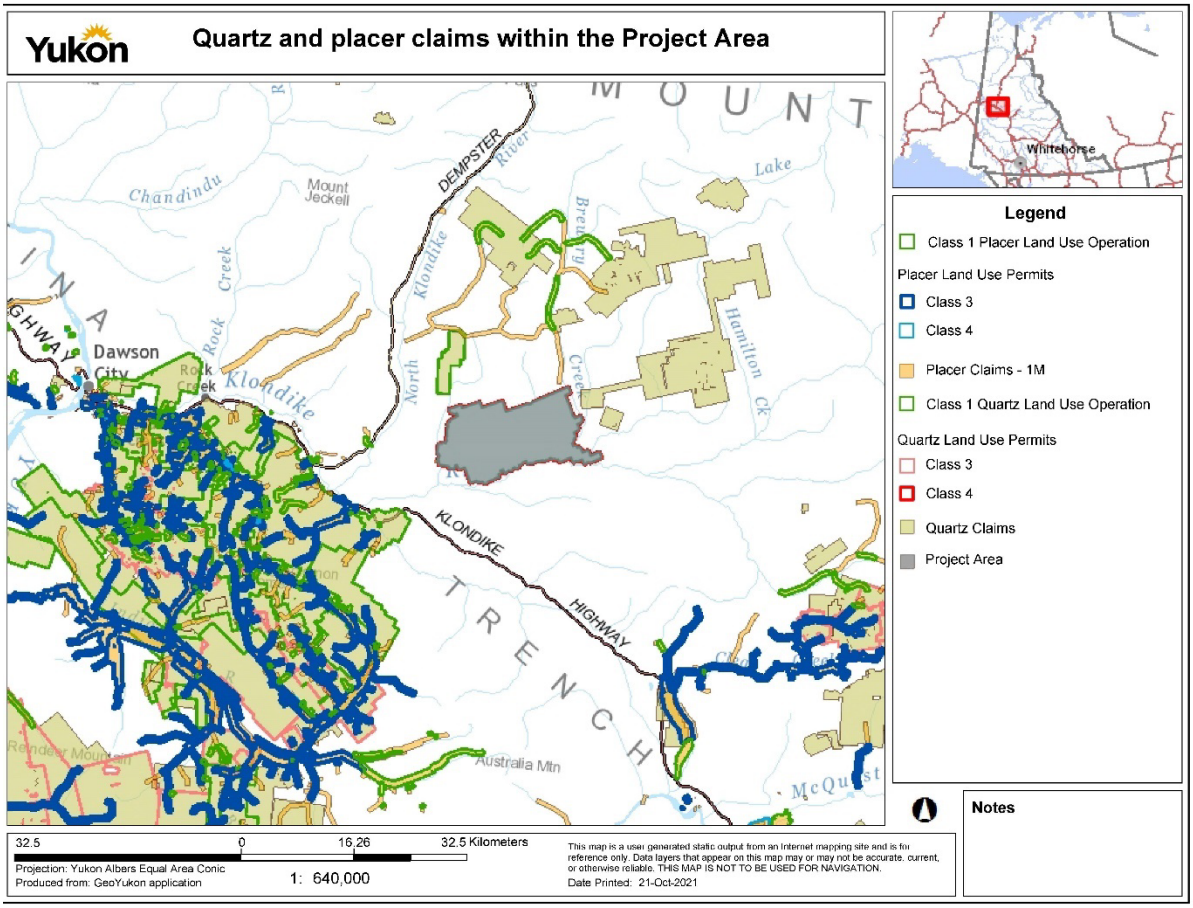

Figure 12. Quartz and placer claims and permits in the project area (GeoYukon)

5.0 SCOPE OF THE ASSESSMENT

The scope of the assessment identifies the matters considered in an assessment. It is determined by considering the activities described in the scope of the Project (identified in Section 3.0) and, based on consideration of the matters set out in s. 42(1) of YESAA, identifying the valued environmental and socio-economic components (VESECs) that may be affected by project activities. Views and information

submitted during the assessment help to identify VESECs and potential effects of the Project to these VESECs.

5.1 Views and Information Submitted

The Dawson Designated Office initially solicited views and information on the Project, from August 9 to September 8, 2021. The comment period was extended at the request of First Nation of Nacho Nyak Dun. Comment submissions were received from Transport Canada (TC), Tr'ondëk Hwëch'in (TH), First Nation of Na-Cho Nyak Dun (NND), Fisheries and Oceans Canada (DFO), Government of Yukon (YG), Environment and Climate Change Canada (ECCC) and Yukon Conservation Society (YCS). Additional views and information were sought from November 16 to 30, 2021 due to changes in project scope. Comments were received from ECCC.

The Designated Office has identified the following relevant concerns, interests and project effects from comments submitted. Key regulatory requirements, best management practices or any other information submitted that is relevant to the assessment is also identified.

5.1.1 Decision Bodies

- DFO is of the view that the proponent can avoid and mitigate impacts to fish and fish habitat and should not require an authorization under the *Fisheries Act* if they adhere to best practices and measures outlined in their plans in addition to those listed above. The potential direct and indirect effects to fish and fish habitat can be avoided or mitigated (DFO).

- As no new water crossings will be required Transport Canada does not have any authority over the project and is not a decision body (TC).

5.1.2 Recommendations from Past Projects

- YESAB's recommendations from past projects (2012-0091) should be included in the recommendations for the current project (YCS).

5.1.3 Regulatory Reminders

- YG-Environment would like to remind the proponent that permits under the *Environment Act* are required for activities regulated under the Act. Activities that may trigger the requirement for an *Environment Act* permit include the handling and disposal of solid and special wastes (YG).

- Proponent must complete an Environmental Health Services Work Camp Assessment Form and submit it to the Environmental Health Services Branch (YG).

5.1.4 Vegetation

- Proponent should minimize disturbance to the vegetative mat and preserve the intact topsoil, seedbank and roots for careful replacement after stripping is complete (TH).

- The Proponent shall ensure soils are applied to the site and are graded, sloped, contoured and decompacted to promote quicker revegetation for annual and final reclamation efforts (TH).

5.1.4.1 Wetlands

- Portions of the project area overlap with wetlands, namely a mix of swamp, fen and bog. TH expressed concerned that mining activities in and near wetlands will affect wetland functions, wildlife habitat, and the ecological and cultural integrity of the landscape (TH).
- Proponent shall not undertake mining-related activities in or near wetlands (TH).
- Riparian buffers greater than 30 m should be considered and implemented (e.g., in sensitive areas such as wetlands or alpine areas) (NND).

5.1.4.2 Invasive Species

- When equipment is moved to new locations there is a potential to introduce new and undesirable plant species to an area (TH).
- The proponent should provide a formal written plan on how they intend to address the issue of invasive species (YCS).

5.1.5 Waste

- The removal of waste to a designated waste handling facility such as the Dawson (Quigley) Landfill is the preferred waste management solution (TH).

5.1.6 Draft Land Use Plan

- The Brewery Creek property is located within the Land Management Unit (LMU) #8, entitled "Lower Brewery/Hamilton". The Draft Plan has designated this LMU as an Integrated Stewardship Area (ISA) 3, meaning, the management intent in this area is for moderate development. For an ISA 3, the precautionary level of surface disturbance allowed is 0.375%, and the precautionary level of linear density allowed is 0.375 km/km^2 (TH).
- Development in the region covered by the draft Dawson should only occur in conformity and consistent with the terms and objectives of the draft DRP (NND).

5.1.7 Water Quality

- Under 14.8.1 of the Tr'ondëk Hwëch'in Final Agreement, the First Nation "has the right to have water which is on or flowing through or adjacent to its Settlement Land remain substantially unaltered as to quantity, quality and rate of flow, including seasonal rate of flow" (TH).
- Terms and conditions should ensure that the project does not diminish the quantity, water quality or flow rate of Klondike River tributaries in the area (TH).
- All bulk samples bags shall be removed from the site at the end of the exploration season, or by Dec 31st of each year (YG).
- No waste rock shall be stored within 30 meters of a watercourse (YG).
- To safeguard Tr'ondëk Hwëch'in water rights under the Final Agreement, and the downstream aquatic environment, the Proponent should work with regulators to monitor water quality (TH).

- Background turbidity levels should be collected <1 day and ideally <1 year to develop an understanding of background levels that accounts for seasonal and interannual variation of conditions (NND).

- Proponent should provide adequate data to characterize whether adverse effects to water quality could occur from acid rock drainage and/or metal leaching (ECCC).

- Proponent should put adequate mitigation measures in place to avoid environmental impacts from ARD/ML where necessary (ECCC).

5.1.8 Wildlife and Wildlife Habitat

- Avoid disturbing any sheep seen during flights (or from the ground), especially during lambing season, May 1 to June 15 (TH).

5.1.8.1 Caribou

- ENV's recommendations are directed at mitigating effects to the three caribou herds that are likely to interact with the project: Hart River, Fortymile and Porcupine caribou herds (YG).

- Disturbance caused by flights is an additional concern for caribou, particularly in fall during the rut, or early winter when they move west into the Yukon (TH).

- Due to the size of this operation, the demonstrated migration routes through the area by both FMCH and more rarely PCH, and the previous history of animal entrapment, ENV recommends a three-level approach to caribou mitigations. The approach to caribou mitigations are further discussed in Part B of this document (YG).

- If caribou migrate into an active work area, all activities should be suspended until the herd have left the area (TH).

- YESAB should recommend that a Cumulative Effects Study for the range of the Hart Caribou Herd be commissioned and completed prior to any further permits being granted (YCS).

5.1.8.2 Moose

- Moose is a key traditional food and holds much importance for Tr'ondëk Hwëch'in citizens (TH).

- Drill holes should be securely covered when proponent is not on site and earthworks backfilled in the fall (TH).

5.1.8.3 Bears

- Minimizing contact between humans and bears helps to sustain viable bear populations as well as protecting people out on the land from negatively conditioned bear (TH).

- The Proponent shall store all attractants, including garbage, kitchen waste and strained solids from grey water in a container that prevents access by bears and other wildlife, until properly disposed of according to the *Solid Waste Regulation* or burned daily to ash by forced air and fuel fired incineration according to the *Air Emissions Regulations* (YG).

- The Proponent shall install a portable electric fence around the perimeter of camp, or at the very minimum, around the kitchen, food preparation area, grey water sump, and waste disposal area (YG).

5.1.8.4 Avian wildlife

- The Project overlaps with Wildlife Key Areas (WKA) for Sharp-tailed grouse with known lek locations within the claim boundary (YG).
- Active bird nests may be disturbed or destroyed during land clearing activities. This may directly impact nesting success. Where possible, land clearing and stripping of the surface layer should take place outside of the nesting season, April 15 to July 31 (YG).

5.1.8.5 Fish and Fish Habitat

- Klondike River is important Chinook Spawning Habitat (TH).
- All watercourses in the project area are assumed to be fish-bearing unless sufficient investigations are completed or barriers to fish passage are identified that would preclude fish access (DFO).
- To avoid potential effects to fish and fish habitat, an interim code of practice has been developed for culvert maintenance and can be found on the Projects Near Water website at https://www.dfo-mpo.gc.ca/pnw-ppe/codes/culvert-maintenance-entretien-ponceaux-eng.html (DFO).

5.1.9 Heritage Resources

- To the Tr'ondëk Hwëch'in (TH), heritage resources are valuable because they are at the core of who we are as a people (TH).
- There are a number of known heritage resources in the project area including the South Fork Intake and Camp complex of historic features as well as nine archaeological sites. A portion of the South Fork Ditch also overlaps the project claims (YG).
- A heritage resources impact assessment shall be completed in advance of ground disturbing activities in areas with elevated potential for the presence of archaeological or historic sites (YG).
- In the event that heritage resources are encountered, please contact the TH Heritage Department at (867) 993-7100 ext. 113.
- As with existing project, the Proponent should, in addition to TH, include NND in consultation for HROA or HRIA development and implementation as well as in the event of found artefacts (NND).

5.1.10 Traditional and Cultural Land Use

- The project is adjacent to TH settlement land parcels R-7A, R-80B, R-22B, R-79B, S-159B, and R-2A. Tr'ondëk Hwëch'in selected these parcels because of their value as traditional hunting, fishing, or trapping areas. For these areas to remain viable for cultural pursuits, fish, moose, and caribou habitat must be protected (TH).

- Though activities are not proposed directly on Settlement Land, proposed activities on adjacent claims may have negative impact(s) on the site and the wildlife that use the area (TH).

- Provisions of the TH Final Agreement do grant access to Settlement Land for various reasons, such as existing mineral rights, the rights of access are subject to conditions, including that there shall be no unnecessary interference with the use and peaceful enjoyment by the Yukon First Nation of its Settlement Land (18.6.1.3). TH is concerned that quartz exploration near or on claims adjacent to Settlement Land parcels could interfere with use and peaceful enjoyment of the land due to noise, dust, odours or changes to the view-shed (TH).

- The project activities should be planned to have minimal impacts to the enjoyment and use of Settlement Land. Proponent should contact interest holder(s) for these parcels to discuss how to mitigate impacts the project may have on the citizens' 18.6.1.3 rights (TH).

5.1.11 Other users

- The Proponent should initiate and maintain good communication with the outfitter of Concession #3 and discuss location and timing of activities, especially if helicopter activities occur (YG).

- The proposed project overlaps trapping concessions #23 and 65. The Proponent should contact the trappers directly to inquire about their current trapping activities, including placement of trapping trails and established trapping sets in the area to ensure that the proposed project does not negatively impact the trapper (TH).

5.1.12 Health and Safety

- Proponent shall identify mitigations to manage and reduce risk of public health outbreaks including gastrointestinal illness and communicable diseases such as tuberculosis, mumps and flu (YG).

5.2 Determination of Significance

In order to mitigate a potential adverse effect, the Designated Office must first find significance. In addressing what may constitute a "significant" adverse effect, the Designated Office considered the following factors:

Magnitude: The extent of a change from baseline conditions as a result of a proposed project.

Likelihood: The probability that an adverse effect will occur.

Geographic Extent: The spatial area(s) in which an effect is predicted to be detectable.

Duration: The length of time an effect is predicted to last.

Frequency: How often an effect is predicted to occur.

Timing: When an effect is predicted to occur.

Reversibility: The degree to which a valued environmental or socio-economic component can be returned to baseline conditions or other established reference point after proposed activities have ceased.

Not all the factors are relevant to all effects; a specific effect's characterization and corresponding significance determination may rely on a subset of these criteria.

5.2.1 Consideration of Cumulative Effects

With regards to cumulative effects, subsection 42(1)(d) of the *Yukon Environmental and Socio-economic Assessment Act* (YESAA) instructs Designated Offices to consider:

> 42(1)(d) the significance of any adverse cumulative environmental or socio-economic effects that have occurred or might occur in connection with the project or existing project in combination with the effects of other projects for which proposals have been submitted under subsection 50(1) or any activities that have been carried out, are being carried out or are likely to be carried out in or outside Yukon;
>
> (d)(1) any studies or research undertaken under subsection 112(1) that are relevant to the project or existing project;
>
> (d)(2) the need for effects monitoring.

The consideration of cumulative effects is a key contextual factor in determining the significance of potential project effects.

5.3 Other Matters Considered

5.3.1.1 Dawson Regional Land Use Plan

The Project falls within the Dawson regional land use planning region. The Tr'ondëk Hwëch'in First Nation and Government of Yukon formed the Dawson Regional Land Use Planning Commission in 2018 to achieve the objectives of Chapter 11 of the Tr'ondëk Hwëch'in Final Agreement. In 2019, a Commission of six members jointly nominated by Tr'ondëk Hwëch'in and the Government of Yukon was formed to achieve the requested establishment of a regional land use planning commission outlined in Chapter 11 of the Tr'ondëk Hwëch'in Final Agreement. On June 15, 2021, a Draft Regional Plan was released by the Dawson Regional Land Use Planning Commission (Dawson Regional Planning Commission, 2021).

As described in the draft plan, a regional land use plan is a collective statement about how to manage land and resources within a given area. The final plan will provide guidance for land and resource decision making within the Dawson Planning Region. The Designated Office notes, that a regional land use plan is not a legal document and does not replace existing legislation or affect First Nations rights established by land claim agreements and constitutional law (Dawson Regional Planning Commission, 2021).

Since the draft plan was released in June 2021, the Commission has been engaging stakeholders and seeking input on the draft plan. The outcomes of these engagement efforts will be considered in the development of the final Dawson Regional Land Use Plan. Dawson Designated Office recognizes the significant amount of work that has led to the draft plan and the considerable amount of work to be completed before the plan is finalized. While the draft plan is not yet final, it contains relevant information about environmental and socio-economic values in specific areas throughout the planning region.

5.3.1.1.1 Land Management Unit 8: Lower Brewery/Hamilton

The Project is located in Land Management Unit (LMU) 8: Lower Brewery/Hamilton within the draft plan. LMU 8 is comprised of Crown land and six Tr'ondëk Hwëch'in Settlement Land parcels. The Land Use Designation for this LMU is Integrated Stewardship Area (ISA) 3. ISAs are used to identify areas where higher levels of industrial and other development can occur. The intent of areas with these designations is to enable existing and future economic activities for both surfaces uses and subsurface resource extraction. More specifically, ISA 3 areas are intended to be areas of moderate development that have moderate ecological and cultural values within a moderate sensitive biophysical setting. These ISA 3 areas also have a conservative threshold for development (Dawson Regional Planning Commission 2021). The Management Intent Statement, which refers to the Commission's vision for this LMU, is as follows:

> Our management intent for this area will focus on sustainable development by means of cumulative effects management, access management, and the preservation of key values. This area contains a past-producing heap-leach mine and associated infrastructure which has the potential to re-open. It is also the location of considerable adequate habitat for key wildlife species and sociocultural use. It is important that this area remain open for current and future mineral interests without undermining its important environmental and cultural attributes.

To achieve the Commission's vision for this LMU, the Plan outlines four Special Management Directions:

> In addition to all applicable general management directions, development in this area is subject to:
>
> 1. The viewscape off the Dempster Highway should be maintained for its aesthetic and natural value.
>
> 2. With the exception of winter access, surface access infrastructure off the Dempster Highway only considered through Plan variance or amendment.
>
> 3. Heap-leach mining involves the use of chemicals, namely a cyanide-based solution, to extract precious metals from ore. Use of heap-leach mining practices in this area should take every precaution to not harm the surrounding aquatic environment. The collection of accurate and robust baseline data collection on groundwater and surface water quality parameters as well as continued monitoring for impacts will be important considerations for development in this area.
>
> 4. This area contains important habitat for Sharp-tailed grouse, which are a species of management concern. Development in this area should be planned for in such a way that impacts to key habitat for Sharp-tailed grouse are minimized.

The above information will be considered as part a contextual factor when identifying project effects and determining the significance of adverse effects.

5.3.2 Global Health Considerations

At the time of issuance of this Evaluation Report, the World Health Organization has declared a pandemic regarding the novel coronavirus COVID-19. Various levels of government, including YG, have enacted measures and are likely to enact additional measures to limit the spread of the COVID-19 virus. The

situation is fluid and it is impossible to predict outcomes or what the situation may be like at the time the Project is proposed to be carried out. The determinations and recommendations made in this Evaluation Report are made with the expectation that proponents will follow all recommended measures by Yukon's Chief Medical Officer of Health and/or other relevant regulatory regimes that will require measures in response to COVID-19 to be undertaken. Consequently, COVID-19, its possible effects, and responses to it are not addressed further in this Evaluation Report.

5.4 Valued Environmental and Socio-economic Components

The Designated Office has identified the following VESECs as being adversely affected by the Project:

- Water Quality (This VESEC will be further discussed in Section 6 of this report.)

  Drilling and trenching activities and storage of bulk samples have the potential to result in acid rock drainage and metal leaching, which could reduce water quality in receiving watercourses and contaminate the environment.

- Wildlife and Wildlife Habitat, including caribou, moose, bears, Sharp-tailed grouse and avian wildlife. (This VESEC will be further discussed in Section 7 of this report.)

  The Project involves activities such as the use of heavy equipment, fuel storage, vegetation clearing, drilling, trenching, and the continued use of a large camp. These activities have the potential to result in wildlife disturbance, habitat removal and wildlife injury or mortality.

- Personal Safety (This VESEC will be further discussed in Section 8 of this report.)

  The Project will employ up to 120 people who will be housed on-site in a camp. The establishment of isolated camps, which tend to have a male-dominated workforce, may increase the frequency and severity of harassment and abuse towards women and LGBT+ persons in the workplace.

- Heritage Resources (This VESEC will be further discussed in Section 9 of this report.)

  The use of heavy equipment, drilling, trenching and the clearing of vegetation may result in the loss, alteration, or destruction of heritage resources.

5.4.1 Concerns and Interests Considered but not Assessed Further

The Designated Office considered the following concerns and interests, but determined there are no known pathways of effects. The following section(s) further explains how the Designated Office considered identified concerns, project design features and relevant legislation that eliminate pathways of adverse effects.

5.4.1.1 Wetlands

Wetland areas were identified in the project area by Tr'ondëk Hwëch'in (see Section 4.2.1.1). The Designated Office, through an information request, asked the Proponent to confirm whether activities will occur in wetland areas identified in the map provided by Tr'ondëk Hwëch'in (YOR 2021-0093-0045). In response to the information request, the Proponent stated that "there are no plans to complete any work in the wetland's area" (YOR 2021-0093-0049).

Given that there are no project activities within the mapped wetland areas, the Designated Office has determined that there is no pathway to effects from project activities to wetlands. As a result, impacts to wetlands will not be assessed further.

5.4.1.2 Effects to water quality from waste rock

Comments provided by Government of Yukon (YOR 2021-0093-0037) raised concerns about adverse impacts to water quality from waste rock storage, testing and monitoring at the project location. Mitigations were recommended by YG to address potential effects. Waste rock storage is not proposed by the Proponent and therefore is not included in the project scope or the scope of this assessment. Project effects to water quality from waste rock storage will not be assessed further.

5.4.1.3 Effects to water quality from the heap leach facility

In the original project proposal, the Proponent indicated that project activities would occur in the heap leach facility. Government of Yukon (YOR 2021-0093-0037) raised concerns about adverse impacts to water quality and opposed authorization of bulk sampling in the heap leach facility. In their response to information request 2, the Proponent clarified that no project activities will occur in the heap leach facility (YOR 2021-0093-0049). Given this clarification of the project scope, project effects to water quality from activities within the heap leach facility will not be assessed further.

5.4.1.4 Aquatic Resources

Adverse impacts to fish and fish habitat from project activities were raised by the Fisheries and Oceans Canada and Government of Yukon (YOR 2021-0093-0031; -0037). These project activities include spills, stripping of vegetation, drainage culverts and water withdrawal activities. Several project design features mitigate adverse effects to fish and fish habitat, these include (YOR 2021-0093-0048; -0049; -0014; -0001):

- Waterlines will be fitted with fish screens to prevent entrapment of fish in accordance with Department of Fisheries and Oceans *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater.*
- No drilling, clearing, trenching, stockpiling of material, sumps, fuel storage, roads or refueling within at least 30 m of any watercourse.
- Reclaimed exploration trenches areas will be contoured to shed water away from the excavation using angles that will not result in sedimentation and erosion
- Bulk samples will be at least 100 m from any watercourse.
- All hazardous substance at the site will have secondary containment structures to capture and contain the accidental release of hazardous substances.

DFO is of the view that the Proponent can mitigate impacts to fish and fish habitat and should not require an authorization under the *Fisheries Act* if the Proponent adheres to best practices and measures outlined in their plans in addition to measures recommended by DFO. Given the Proponent's project design features listed above, and the measures recommended by DFO, the Designated Office has determined that there is no pathway to effects from project activities on aquatic resources. Furthermore, the Dawson Designated Office has determined a pathway to effects from project activities to water

quality, which is addressed in Section 6.0. As a result, project effects to aquatic resources will not be assessed further.

5.4.1.5 Public Health Outbreaks

Comments provided by the Government of Yukon raised concerns about the risk of public health outbreaks. The COVID-19 global pandemic is considered in Section 5.3.2. The determinations and recommendations made in this Evaluation Report are made with the expectation that proponents will follow all recommended measures by Yukon's Chief Medical Officer of Health and/or other relevant regulatory regimes, including the *Public Health and Safety Regulations, Camp Sanitation Regulations* and the *Communicable Disease Regulations*, that will require measures to address public health outbreaks. Consequently, public health outbreaks, their possible effects, and responses to it are not addressed further in this Evaluation Report.

5.4.1.6 Project effects to water quality from fuel storage

The Project includes the storage of various types of fuel. Comments provided by Tr'ondëk Hwëch'in raised concerns about fuel contamination from an accident or spill. The Proponent has proposed project design features as well as a Spill Contingency Plan (YOR 2021-0093-0009) to mitigate any potential adverse effects from fuel spills. Measures that will be taken include all fuel will be stored in double walled approved envirotanks. Wobble pumps and/or small electric pumps will be used when transferring fuel. Appropriately sized spill kits will be located near all fuel sources and copies of the Spill Response Plan will be made available at each fueling station at all times. All personnel responsible for re-fueling will be familiar with the procedures and emergency contacts within the Plan. Lastly, no refuelling will occur within 30 m of any watercourse.

The Dawson Designated Office determined that the project design and application of relevant legislation effectively remove pathways of effects to water quality from fuel storage. Relevant legislation, including the *Environment Act, Spills Regulations* preclude project proponents from intentionally releasing deleterious substances, including fuels, into the surrounding environment. Project effects to water quality from fuel contamination is not considered further.

5.4.1.7 Settlement Land

The project area does not overlap Settlement Land, however there are several Settlement Land parcels that are located around the perimeter including R-7A, R-80B, R-22B, R-79B, S-159B, and R-2A. In their comments, Tr'ondëk Hwëch'in raised concerns that quartz exploration near or on claims adjacent to Settlement Land parcels could interfere with use and peaceful enjoyment of the land due to noise, dust, odours or changes to the view-shed. Tr'ondëk Hwëch'in also recommended a mitigation which included a buffer zone with minimized activity and reduced landscape impacts on claims adjacent to Settlement Land.

In Information Request 2, the Designated Office presented this information to the Proponent and asked for clarification on how effects from activities near Settlement Land would be mitigated, and whether buffers are planned. In response, the Proponent indicated that there are no planned buffer zones and noted they will communicate seasonal activities and timing of activities to Tr'ondëk Hwëch'in citizens that may be affected by the proposed project by sharing Sabre Mines pre-season plan. The Proponent also noted that they will work with self-governing First Nations to identify and resolve potential land use conflicts and any potential negative effects.

In a subsequent follow-up email, Tr'ondëk Hwëch'in noted that the Proponent's project design features addressed their concerns and that adverse effects to Settlement Land from the Project are not anticipated (YOR 2021-0093-0077) . As such, the Designated Office has not identified a pathway to effects on Settlement Land. Effects to Settlement Land and its users is not considered further.

5.4.1.8 Avian Wildlife

The Project falls within Nesting Zone B8 and in these areas, the regional nesting period for migratory birds extends from early May to late August. Project activities includes vegetation clearing for activities such as drilling, trenching and access development and can occur at any time during the year. To identify the presence of migratory birds and remove the potential for adverse effects to avian wildlife, the Proponent has noted that bird pre-clearing surveys will be undertaken prior to undertaking such activities. Furthermore, effects related to direct mortality and the destruction of nests/eggs is covered by existing legislation, such as the Migratory Birds Act (1994). For these reasons, the Designated Office has not identified a pathway to effects from project activities on migratory birds. Project effects to migratory birds are not addressed further.

PART B. ASSESSMENT AND REASONS FOR RECOMMENDATION

Part B of this evaluation report presents the effects assessment of the Project on VESECs identified in Section 5.0. For each VESEC identified, an overview is provided followed by a discussion on relevant contextual factors, an effects characterization analysis and a determination of significance. Where adverse project effects are determined to be significant, terms and conditions are recommended.

6.0 WATER QUALITY

6.1 Overview

The following sections will evaluate adverse effects to water quality from the mobilization of soil or metals into the receiving environment. Reduced water quality at the project location, and downstream, could occur as a result of metal leaching and acid rock drainage (ML/ARD), which can contaminate the receiving environment. ML/ARD has the potential to occur from exposure of potentially acid generating rock from bulk samples, drilling and trenching.

The Project could result in decreased water quality in the Klondike River and downstream waters. Tr'ondëk Hwëch'in Settlement Land parcels (R-7A, R-80B, R-22B, R-79B, S-159B and R-2A) are adjacent to the project area (Figure 12). Water resources that flow on or adjacent to Settlement Land could also be affected.

The Designated Office has determined that the Project will result in significant adverse environmental effects to water quality, such that terms and conditions are recommended. The following sections provide the rationale for this determination.

6.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to water quality.

- *Waters Act*
- *Waters Regulation*
- *Yukon Quartz Mining Act and Land Use Regulations*
  - 30. Drill holes that pose a hazard or that lead to ground water must be plugged to prevent flow of water to the surface.
- *Tr'ondëk Hwëch'in Final Agreement*
  - Chapter 14 Water Management

6.3 Consideration of Past, Present, and Likely Activities

The spatial boundary for the Designated Office's consideration of cumulative effects to water quality is the project area and all other activities that occur on tributaries to the Klondike River (i.e. within the Klondike River watershed). Rather than selecting a buffer, this method was used as most quartz and placer mining activities found within this spatial cope may contribute cumulatively to effects to water quality though their

connection by waterways. Placer and quartz mining activities can have adverse effects to water quality through point source and non-point source sedimentation, and fuel spills. Project effects to water quality from quartz mining can include ML/ARD and the discharge of effluent into the environment. While effects to water quality are likely to be most severe at the localized level depending on the amount of contamination, effects diminish over distance as they are diluted.

The Designated Office notes that effects to water quality from ML/ARD may last beyond the duration of the Project because once ML/ARD has been initiated it can persist for hundreds of years (Price & Errington, 1998).

The Brewery Creek mine was operational from 1995 to 2001; the water licence was amended in 2005 to allow for closure activities and is set to expire on December 31, 2021. The water licence includes surface and groundwater quality monitoring. Over the last decade, water quality is changing in the heap and the surrounding surface water and groundwater. In the receiving environment, increasing concentrations of sulphate and nitrate are apparent in groundwater and increasing nitrate concentrations in Carolyn Creek (YOR 2021-0093-0037).

Other activities that require exposing new rock surfaces can result in reduced water quality from ML/ARD.

6.4 Characterization of Project Effects

6.4.1 Project Effect: Reduced Water Quality

Project activities, including drilling of up to 3 000 drill holes, construction of up to 55 trenches and sampling and storage of up to 50 000 tonnes of bulk samples, will expose rock material to the elements. The weathering of iron sulphide minerals when rock materials are exposed to oxygen and water can result in acid rock drainage and/or metal leaching (ML/ARD) (Stantec Consulting Ltd. , 2004). Past mining activity at Brewery Creek did encounter areas of the property with ML/ARD potential (example: Blue zone), as well as some pits with low pH water (Blue, Pacific) (YOR 2021-0093-0037).

Drainage waters from sulphidic deposits can contain elevated concentrations of metals and other elements at any pH (Price, 2009). Problematic drainage occurs primarily from the exposure of sulphidic deposits to oxygen and water that results in oxidation. Oxidation changes the chemical species from a relatively insoluble form into free ionic species that are easily dissolved. Once dissolved, these metals are readily transported by water. The oxidation of some sulphide minerals produces acid. In the absence of neutralizing minerals, the lower drainage pH can increase the rate of sulphide oxidation, solubility of many products of sulphide oxidation, and rate of weathering of other minerals.

There are numerous examples throughout the world where elevated concentrations of metals from exposed mineralization have adverse effects on water quality. In North America, ML/ARD have led to significant ecological damage, contaminated rivers, loss of aquatic life and multimillion-dollar cleanup costs for industry and government. In 1995, the ML/ARD liability associated with existing Canadian tailings and waste rock is estimated to be between $2 billion and $5 billion (Geocon - SNC Lavalin Environment, 1995).

Government of Yukon, Environment and Climate Change Canada, Tr'ondëk Hwëch'in and First Nation of Na-Cho Nyak Dun provided comments on the Project noting concerns for water quality and that project activities that expose new rock to weathering present risks of developing ML/ARD (YOR 2021-0093-0037; -0034; -0042; -0038). In additional proposal documents and in the response to Information Request #2

(YOR 2021-0093-0048; -0049), the Proponent proposed the following measures to reduce the potential for adverse environmental effects to water quality:

Trenches

- Up to 30 m vegetation buffer between trenches and watercourses
- All stockpile material from the excavation of trenches will be located at least 30 m from natural watercourses.

Drilling and sumps

- No drilling or clearing within 30 m of any watercourse
- All sumps must be at least 30 m away from the highwater mark and must only contain drill cuttings.

Bulk samples

- Bulk samples will be placed on a level lined surface, 100 m away from any watercourse, and removed from site as soon as possible. Arrangements for transport will be made prior to excavation to ensure the material be moved within a reasonable timeframe.

There is still a high potential for adverse impacts to water quality from ML/ARD even with the implementation of project design features above and relevant regulations (Section 7.2). Given that past mining at the site has encountered rock samples with ML/ARD potential and there has not been ML/ARD characterization of the bulk samples, the likelihood of ML/ARD potential at the site is considered high.

Although the Proponent has committed to removing bulk samples from the site as soon as possible, there is no clear timeframe for bulk sample removal or parameters on the maximum amount of bulk samples storage on site. As there is a large quantity of bulk samples proposed for the Project (50 000 tonnes) and no clear timeframe for when the bulk sample removal, the magnitude of effects on water quality from ML/ARD at the site is also considered high.

6.5 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse environmental effects on water quality. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

1. Prior to conducting bulk sampling, a plan must be developed that describes how Metal Leaching and Acid Rock Drainage (ML/ARD) test work will be conducted and what mitigation and monitoring will be in place to reduce risks.

2. All bulk sample bags shall be removed from the site at the end of the exploration season, or by Dec 31st each year.

Project design features and regulatory requirements, in combination with the terms and conditions described above, should ensure a low probability of adverse effects to water quality from project activities.

Project activities, including drilling of up to 3 000 drill holes, construction of up to 55 trenches and sampling of up to 50 000 tonnes of bulk samples, will expose rock material to the elements and has the

potential to initiate ML/ARD. Elevated pH and metal concentrations resulting from ML/ARD has the potential to impact water quality downstream in the receiving environment.

According to the BC Guidelines for Metal Leaching and Acid Rock Drainage, an ML/ARD program (including prediction, prevention, mitigation and monitoring strategies) is recommended whenever "significant bedrock or unconsolidated earth will be excavated or exposed." The guide suggests that the minimum disturbance for which an ML/ARD program is warranted is 1 000 tonnes of material (YOR 2021-0093-0037). The Project involves removal of up to 50 000 tonnes of material over 10 years. Development of a ML/ARD program prior to bulk sampling could mitigate the potential for impacts to water quality from the Project.

Given that past mining at the site has encountered rock samples with ML/ARD potential, the likelihood of ML/ARD potential at the site is considered high. As there is a large quantity of bulk samples proposed for the Project (50 000 tonnes), the magnitude of effects on water quality from ML/ARD at the site is considered high. The Designated Office considers adverse environmental effects to water quality to be significant, such that additional terms and conditions have been recommended.

7.0 WILDLIFE AND WILDLIFE HABITIAT

7.1 Overview

Wildlife and wildlife habitat has been identified as a VESEC for this assessment because the Project overlaps with critical wildlife habitat and involves activities that are likely to affect certain wildlife species or critical habitat features. Wildlife species in the project area have considerable value from an ecological, cultural, subsistence and economic perspective. YG, TH, NND, and ECCC submitted comments related to the importance to the Porcupine Caribou Herd (PCH), Hart River Caribou Herd (HRCH) and Fortymile Caribou Herd (FMCH) as well as important habitats for both moose and sharp tailed grouse overlapping the project area.

As outlined in Section 4.0, the Project occurs in an area that supports a variety of wildlife species. Specifically, the project area is located within the ranges of three caribou herds. The project also overlaps with wildlife key areas (WKA) for moose (late winter) and sharp tailed grouse. Project effects to wildlife and wildlife habitat will be discussed in the context of impacts to ungulates, bears and Sharp-tailed grouse. These species were identified because of project's location within key habitat areas or effects pathways identified below:

- Ungulates (Section 7.2)
    - The Project area is located within a WKA for moose and in proximity to the Porcupine Caribou Herd (PCH), Hart River Caribou Herd (HRCH) and Fortymile Caribou Herd (FMCH) ranges. Access development and upgrading can result in increased ungulate mortality from increased predation. Human presence and heavy equipment use can result in disturbance and displacement of ungulates. Drill holes and trenching can result in entrapment leading to injury or mortality.
- Bears (Section 7.3)
    - Improper attractant storage and management as well as an increase in human presence can result in bear habituation and mortality.

- Sharp-Tailed Grouse (Section 7.4)
    - The Project overlaps with a WKA for Sharp-tailed grouse with known leks in the project boundary Human presence and heavy equipment use for mining purposes such as drilling, trenching and clearing may adversely affect Sharp-tailed Grouse reproductive activities at leks or breeding sites.

The existence of past and present activities suggests that the current environment contains an area of ongoing and extensive exploration and mining. As such, depending on the species being considered below, any additional disturbance to current conditions have the potential to be significant. The Designated Office has determined that the Project is likely to result in significant adverse effects to ungulates, bears and sharp tailed grouse, such that additional terms and conditions have been recommended. The rationale for this determination is provided below.

7.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to wildlife and wildlife habitat.

- *Environment Act* (Yukon)
- *Wildlife Act* (Yukon)
    - s. (17) and (92) Section 17 speaks to the destruction, taking or possession of eggs or nests while section 92 speaks to the harassment of wildlife. Neither section addresses avoidance or fragmentation of wildlife. Effects to wildlife are not limited to direct loss of habitat by clearing but also indirect loss relating to human presence, and noise disturbance inherent to industrial activity
    - *S.93* (2) No person shall encourage any wildlife to become a public nuisance
    - S.93 (3) Subject to subsection (4), a person shall be deemed to have encouraged dangerous wildlife to become a public nuisance if the person feeds it or leaves food or garbage in a place where dangerous wildlife may have access to it and he or she does not take reasonable precautions to prevent dangerous wildlife from having access to it or being attracted to the area by it.
    - *Hunting Regulations*
    - *Solid Waste Regulations*
- Tr'ondëk Hwëch'in Final Agreement, Chapter 16
- The First Nation of Na-Cho Nyak Dun Final Agreement, Chapter 16

7.3 Consideration of Past, Present and Future Likely Activities

In considering the significance of adverse effects to wildlife and wildlife habitat from the Project, the Designated Office considered cumulative effects of the Project in combination with other projects and

activities surrounding the project area. While project activities are limited to the claim block, the spatial scope of effects can extend beyond the claim block's boundary.

A majority of the project area overlaps Game Management Areas (GMAs) 251, with a small portion on the eastern end of the claim block overlapping GMA 250. In considering effects to wildlife, establishing the GMAs as the spatial scope of project effects is most adequate as this is how Government of Yukon manages wildlife.

The temporal scope of the cumulative effects consideration is 10 years because this represents the period that project activities have the potential to contribute cumulatively to effects to bears. The Project is located in an area that has had a large well-established camp for decades. The spatial scope includes active quartz mining activities with some limited placer activities, which do not include camps. Considerable active and historical mineral exploration and mining have been undertaken in the Brewery Creek area. There is also an extensive road and trail network within project area (see Figure 4), which is proposed to be upgraded and increased by 15 km of road and 15 km of trails. While the Brewery Creek mine site is currently the main industrial activity in both GMAs, there are several other Class 1 quartz and placer Land Use permits which have the potential to develop into larger operations throughout the Project's temporal scope. These operations would include similar activities to the Project could compound the effects to wildlife and wildlife habitat.

Much of the area around the claim block is Tr'ondëk Hwëch'in Settlement Land and is used for traditional and recreation land use activities. Licenced and subsistence harvesting of caribou and moose in the Brewery Creek area is a common activity and is likely to continue during the temporal scope of the Project. Along the North Fork Road there are industrial activities such as placer exploration and the proposed North Fork hydro project (YESAB Project 2021-0151). These activities, in conjunction with the Project, have the potential to cause disturbance and displacement to wildlife in the area. It is likely that the activities outlined above will continue for the entire temporal scope of the Project. Traditional, recreational and industrial activities have been occurring for decades in the general area and all have the potential to affect wildlife and wildlife habitat.

7.4 Ungulates

Moose and caribou are a highly valued species to both First Nations and the Yukon as a whole. Moose and caribou are ubiquitous in the Dawson region and may be encountered year-round in a variety of environments. These species are valued for both cultural, subsistence and economic reasons.

The project area overlaps important winter moose habitat (see Figure 8). As discussed in section 4.2.2, the project area also overlaps with the Porcupine Caribou Herd (PCH), Hart River Caribou Herd (HRCH) and Fortymile Caribou Herd (FMCH) ranges and project activities are likely to interact with each of these herds to a varying degree.

Porcupine Caribou Herd

Comments provided to the Designated Office by YG-Environment have outlined how and when each caribou herd has may interact with the project location. The PCH have wintered as far south as the North Klondike Highway (arriving as early as mid October and staying through to April). In 2005, the PCH moved into the then abandoned Brewery Creek mine site shortly after fencing had been removed from around one of the water management ponds (YOR 2021-0093-0037).

Hart River Caribou Herd

The range of the HRCH is mostly north of the project however, in rare instances HRCH have calved as close as 2.5 km from the project area (YOR 2021-0093-0037).

Fortymile Caribou Herd

Fortymile caribou have used the project area both as a migration pathway and as winter range. Most habitats in the southern portion of the project area have burned over the years and are of limited use to the herd (see Figure 9), however, portions of the project area do contain some moderate quality winter range (YOR 2021-0093-0037). The area is important for FMCH migration: in 2013 ~7000-10,000 caribou from the FMCH migrated through the project area. In addition, caribou have been noted to move through this area (west to east or vice versa) for many years in both fall and spring. Historical distributions of FMCH identifies areas adjacent to the South Klondike River as an important winter range for the herd (McDonald & Cooley, 2004). The topography surrounding the Brewery Creek project funnels caribou directly into the project area - so site management to avoid animal entrapment and disturbance to migrating caribou will be very important. FMCH are expected to primarily interact with the project during migration although some limited winter use may also occur. Migration in large numbers would most likely come through this area during late September, October or November and again during spring migration in late March through early May (YOR 2021-0093-0037).

Ungulates such as moose and caribou may be disturbed or displaced from the Project site due to the presence of people, heavy equipment use and exploration infrastructure. Furthermore, linear development and access to previously inaccessible areas can increase mortality through increased predation and harvesting. Finally, exploration infrastructure, such as trenches, test pits, and drill holes, may result in moose injury and/or mortality from entrapment if not properly managed.

The Designated Office has determined that the Project is likely to result in significant adverse effects to ungulates such that further mitigations are recommended.

7.4.1 Characterization of Project Effects

7.4.1.1 Project Effect: Disturbance and Displacement

Moose

Moose can frequent the area year-round, but are most expected throughout the late winter (i.e. February to April). Project activities are proposed to occur year-round, therefore there is a clear temporal overlap with late-winter use of the area by moose and project activities. Moose may experience displacement from the project area as a result of auditory disturbances or as a result of a decrease in suitable habitat due to road construction and use, clearing, drilling, trenching or bulk sampling. Sensory disturbances subject moose to stress, affecting cow health and the success of calving rates. Given that project activities are planned to occur year-round, the likelihood of sensory disturbance is high. However, as moose are most expected throughout the late winter, effects to moose are seasonal and short-term.

The Proponent has outlined that they will follow the Yukon Mineral and Coal Exploration Best Management Practices and Regulatory Guide's (Yukon Chamber of Mines, 2010) guidance on reclamation measures for on-going and final reclamation. Progressive and final reclamation will ensure that moose will return once project activities have ceased and, as such, any disturbance or displacement from habitat is considered reversible. Progressive reclamation also aligns with the draft Dawson Land Use Plan's General Management Direction for moose which encourages the practice of progressive reclamation of disturbed areas to create suitable moose habitat (Dawson Regional Planning Commission, 2021).

Caribou

Caribou from three herds have historically used the project area or its surrounding area as important habitat. The project area has been used as winter habitat for the PCH and in rare instances the HRCH have calved as close as 2.5 km from the project area. The FMCH have used the project area both as a migration pathway and as winter range. Large numbers of Fortymile caribou have been seen in the project area and project activities can potentially affect the herds by disrupting their movements between seasonal ranges. The FMCH is expanding to inhabit their historical range in Yukon, which includes the proposed project area (YOR 2021-0093-0037). FMCH migration to winter range is likely to occur in mid-October, but movements and timing are variable so large numbers may come through this area of Yukon as early as mid-September.

Heavy equipment use, movement of earth and human presence at the project location can cause the herd to avoid this migration area. For migratory herds, it is critical that leaders be allowed to reach their desired location. Blockage or deflection from migration routes has been shown as a leading cause of the disappearance of large migratory populations of ungulates globally (Berger 2004; Bolger et al. 2009). Additionally, the draft Dawson Land Use Plan's General Management Directions recognizes that the size, extent, duration and level of activities should be avoided in significant caribou habitat during important biological periods (Dawson Regional Planning Commission, 2021). As evidenced by the historical information provided by YG-Environment, it is likely that the PCH and FMCH will use the project area. Therefore the probability of project activities displacing the caribou is also high. Given their sensitivity to disturbance, any change of use of the area by either of the migrating caribou herds could lead to effects that long lasting and irreversible. Provided that project activities are likely to displace caribou and that the reversibility of effects is low, any activities that may cause disturbance to any migrating and/or summering caribou in this area, have the potential to result in significant adverse effects to herd growth.

The Proponent has acknowledged the potential for wildlife such as caribou to be encountered in the project area and has included operational mitigation measures in their Wildlife Management Plan (YOR 2021-0093-0007; the Plan). The Plan notes that if wildlife such as caribou, bears, raptors, etc. are encountered in an active work area such as an active drilling site, operational activities should decrease or stop until the wildlife have left the work area of their own accord. Additionally, the Plan notes that employees should not encourage the wildlife to leave the area unless harm is posed to the wildlife or a negative human interaction may occur (YOR 2021-0093-0007). Specifically for instances occurring during the rut (15 September to 15 October) where caribou are observed within an individual claim block in which high intensity exploration activities are occurring, the Plan notes that these activities within that individual claim block shall cease if it is safe to do so. Work may resume to full activity once caribou have left the individual claim block of their own accord (YOR 2021-0093-0007).

The project design features outlined in the Wildlife Management Plan are designed to mitigate effects only when caribou are encountered or observed in the project area. As such, when implemented these measured do not decrease the high probability of project activities displacing caribou that are not observed. Furthermore, as noted above, project activities can cause migrating herds to avoid important migration areas, which can result in large magnitude population size effects.

In order to limit the potential for caribou displacement, YG-Environment recommended a three level approach to caribou mitigations which are triggered by increasing proximity of collared caribou or the observation of large groups of caribou (more than 50) (YOR 2021-0093-0037). This tiered approach would involve the Regional Biologist notifying the Proponent when collared caribou move into pre-determined locations and decreasing levels of various activities. By implementing the correct decrease in

level of activities early and before caribou reach the site the likelihood and magnitude of adverse effects to the migrating herd can be reduced.

7.4.1.2 Project Effect: Disturbance from Helicopter Use

The Proponent has indicated that helicopter flights are only planned for emergency purposes. Even so, infrequent flights can still disturb ungulates, notably caribou, and effects can be of high magnitude. The Proponent's Wildlife Management Plan contains several mitigation measures to reduce the magnitude of effects to caribou from helicopter use. These measures include the following:

- Avoid helicopter flights over areas where caribou are concentrated on their winter range or during the fall rut where conditions permit.
- Pilots will follow the Flying in Caribou Country guidelines when safe to do so and adhere to the following vertical flight altitudes:
    - Maintain vertical flight altitudes ≥ 300 m above ground level throughout the year;
    - Maintain vertical flight altitudes ≥ 600 m above ground level during calving and post-calving (15 May to 15 July) and rut (15 September to 15 October).
- When caribou are observed, flight routes will be modified to maximize the vertical and horizontal separation distance between the aircraft and the animals. Whenever possible, a minimum 1,000m horizontal distance from caribou will be maintained, especially during seasonally sensitive time periods.
- When caribou are observed and an evasion response is detected, aircrafts should ascend to a higher flight altitude and veer away from caribou when safe to do so.
- Flight routes will be adjusted to avoid areas where caribou were recently observed or areas where they are regularly observed and, whenever possible, flight paths will place a mountain ridge between the aircraft and caribou until they have left the area.

While comments around helicopter use and impact to ungulates were submitted the effects pathway is quite limited given that helicopter use will be for emergency purposes only. With safe work practices, helicopter use is anticipated to be highly infrequent, therefore the likelihood of caribou disturbance from helicopter flights is low. The project design features for flying in caribou country, identified in the wildlife management plan, should ensure that effects to caribou are of low magnitude.

7.4.1.3 Project Effect: Entrapment

Moose and caribou may be subject to entrapment if earthworks such trenches and drillholes are inadequately sloped, not suitable for wildlife egress or are not capped after required for mining purposes. The Proponent has planned to drill up to 3000 holes, either Reverse Circulation or Diamond drilling, for quartz exploration purposes. The Proponent has provided an estimate of up to 32 800 m^2 of total clearings for drilling, trenching and bulk sampling (YOR-2021-0093-0001). Drill holes and trenches can act as terrain traps for wildlife, including moose and caribou. The large quantity of proposed drill holes and clearings, as well as any unreclaimed areas form previous workings may lead to significant impacts to ungulates that are irreversible. Given the geographic extent of the Project, the large quantities of drilling and clearing increases the frequency and magnitude of potential adverse effects to ungulates from entrapment.

Project activities are planned to be undertaken year-round and therefore will overlap temporally with the moose WKA as well as the various timing windows where the three distinct caribou herds interact with the project area. Ungulates may be injured from unexpected trips or falls due to alteration of the landscape. As an example, YG-Environment highlighted an instance in 2005 when the PCH moved into the then abandoned Brewery Creek mine site shortly after fencing had been removed (YOR 2021-0093-0037). This resulted in caribou being stuck in mining infrastructure. Events such as these highlight the importance of site management when large numbers of caribou are moving through the project area and the potential risks that industrial sites can have on caribou.

Project activities such as the creation of drill holes and trenches can lead to wildlife entrapment. Any drill holes left uncapped or unfilled for any length of period where they are not required for mining purposes or trench improperly sloped to not allow ungulates to escape can still potentially result in entrapment. The Proponent has proposed some design features such as progressively reclaiming drill sites throughout the season and sloping trenches at one end and backfilling them as soon as no longer needed. These mitigation measures and the implementation of other regulatory measures will reduce the likelihood and frequency of adverse effects to ungulates from potential entrapment in mining structures. The Designated Office has determined that the Project is not likely to have significant adverse effects to ungulates from potential entrapment such that further mitigation is not required.

7.4.1.4 Project Effect: Increased Predation

The proposed expansion of the existing road network by 15 km of new roads and 15 km of new trails into high quality moose habitat will contribute to the growing fragmentation of wildlife habitat and continue to increase accessibility for hunters. Cutlines and trails create a longer line-of-sight enabling hunters to see, and sometimes harvest, animals that might otherwise escape undetected. Additionally, wolves are well-known for their use of human-made development/utility corridors to access areas that would either not be accessed or access those areas more frequently. The effect of increased linear feature development is increased harvest of wildlife by both human hunters and wolves (YOR 2021-0093-0037).

The Brewery Creek mine site is only accessible through one access point along the North Fork road which is gated and monitored at all times to deter unauthorized personnel from entering the property (YOR 2021-0093-0001). The access roads are, therefore, isolated and monitored for public access. Moreover, the Proponent has noted that signage will be posted at all times on the mine road indicating it is not a public road and that there is active mining and mineral exploration activity in the area. Lastly, as outlined in the Wildlife Management Plan, the Proponent has a no hunting policy for all its employees, contractors and subcontractors working in the project area and will continue to enforce this (YOR 2021-0093-0007). These measures including controlling who can access the project area and a no hunting policy for employees will reduce the likelihood of increased predation from hunting.

While effects from increased predation from hunting will be mitigated through project design features, increased hunting from predators, such as wolves, from increased access are likely to occur. The effects of new access and the longer line-of-sight can be reduced with timely reclamation and decommissioning of roads and trails once no longer needed. The Proponent has noted in their Wildlife Management Plan that trails, if satisfactory in length, will be dog-legged to interrupt sightlines (YOR 2021-0093-00007). While this may reduce the likelihood of effects while the trails are in place, timely reclamation will ensure that the increased sight lines are removed completely. Comments provided by YG-Environment recommended that any construction or reclamation of access should be documented in pre- and post-season reports as an assurance that new access is not permanent (YOR 2021-0093-0037). The significant adverse effects of new access can be reduced with timely reclamation and decommissioning of roads and trails once no longer needed.

7.4.2 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse environmental effects on moose. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

3. The Proponent shall follow a three-phased approach to mitigate effects to migrating caribou. The three phases shall be implemented as per the following table:

Response Level	Triggers	Response
1	When one or more collared Fortymile caribou move east of Dawson or one or more collared Porcupine Caribou move into the Klondike watershed, the Proponent shall take the following steps in anticipation of a large number of caribou arriving at the project area:	- Notify all site personnel that caribou are approaching the project area and to remain alert to the presence of caribou. Staff should be aware that a temporary shutdown of activities may be required and the timeline that may be required to occur in. - Environmental monitors to conduct site inspection to identify any hazards or risks, report on those risks, and ensure mitigations can be enacted before arrival of caribou herd. - Any sightings of caribou to be reported immediately to the Regional Biologist. - Briefings on caribou movements to occur with the Regional Biologist as identified by the Regional Biologist.
2	When one or more collared Fortymile caribou move east across the Dempster Highway or west of Hamilton Creek; or one or more collared Porcupine Caribou move south of Antimony mountain or north of Strickland Lake, the Proponent shall take the following steps in anticipation of a large number of Caribou arriving at the project area:	- Restrict all non-essential traffic on project roads and plan access road activity to reduce the frequency of disturbance to caribou (e.g. convoy vehicles off site to Dempster Highway during shift change). - Reduce speed limit on road to 40 km/h to reduce the likelihood of collisions with caribou. - Defer non-essential project activities to a later date including drilling and blasting activities. - Place additional signage as required to manage human traffic away from key pinch points, concentrations of caribou, or areas with additional risk of vehicular strikes. - Ensure temporary shutdown identified in response level 3 is being implemented with the goal of being shut down before caribou enter the 1 km project buffer.
3	Applies to migratory movements only - does not apply to overwintering groups of caribou: triggered by one or more collared caribou (Fortymile or Porcupine) within 1 km of project activities or observations of large groups of caribou within 1 km	- All exploration activities are to be shut down prior to caribou entering this zone but camp may remain open. - Temporarily stop all traffic along major roads. - Environmental monitors will monitor movement of caribou through the area and immediately address any project related problems that appear to be impeding caribou movements. - Contact the Regional Biologist to discuss project activity if caribou remain in the area for more than 2 weeks.

4. Reclamation and/or decommissioning of roads and trails shall be progressive in nature and shall be documented annually in the post-season report. Reclamation and/or decommissioning of roads and trails shall occur as soon as roads and trails are no longer needed for exploration activities unless the need is documented in the post- and pre-season reports. The status of roads and trails (i.e. active or inactive) including an attributed GPS track of all newly created roads and trails (i.e. road or trail width and surface material) and on-going/completed reclamation activities shall be reported to the Chief, Mining Land Use annually via post-season reports.

Disturbance and Displacement

Historical information provided by YG-Environment demonstrate that it is likely that the PCH and FMCH will use the project area. The probability of project activities displacing caribou is high and given their sensitivity to disturbance, any change of use of the area by either of the migrating caribou herds could lead to effects that are long lasting and irreversible. Given that project activities are likely to displace caribou and that the reversibility of effects is low, any activities that may cause disturbance to any migrating and/or summering caribou in this area, have the potential to result in significant adverse effects to caribou.

The Proponent has outlined measures in their Wildlife Management Plan (YOR 2021-0093-0007) to reduce the disturbance effects to caribou once they have been seen in active work area. The Wildlife Management Plan does not address impacts to caribou that are in proximity to the site but which may not have been observed. In order to limit the potential for effects to occur, YG-Environment recommended a three-level approach to caribou mitigations which are triggered by increasing proximity of collared caribou or the observation of large groups of caribou (more than 50) (YOR 2021-0093-0037). This tiered approach decrease the level of activities early and before caribou reach the site and therefore reduce the likelihood and magnitude of adverse effects.

Helicopter Use

Comments provided to the Designated Office noted that helicopter use has the potential to impact ungulates. However, the Proponent's measures outlined in the Wildlife Management Plan and limiting helicopter use to emergency purposes only significantly reduce the effects pathways to ungulates. Assuming safe work practices effects to caribou from helicopter use are likely not significant.

Entrapment

Mining infrastructure left un-reclaimed has the potential to result in injury or mortality from entrapment The Proponent has proposed design features such as progressively reclaiming drill sites throughout the season and sloping trenches at one end and backfilling them as soon as no longer needed. These mitigation measures and the implementation of other regulatory measures will reduce the likelihood and frequency of adverse effects to ungulates from potential entrapment in mining structures. The Designated Office has determined that the Project is not likely to have significant adverse effects to ungulates from potential entrapment such that further mitigation is not required.

Increased Predation

The proposed expansion of the existing road network by 15 km of new roads and 15 km of new trails into high quality moose habitat will contribute to the growing fragmentation of wildlife habitat and continue to increase accessibility for hunters. The Proponent has included mitigation measures including controlling access to the project area, a no hunting policy for employees, and dog-legging trails will reduce the

likelihood of increased predation from hunting and wolves. However, while the project design features included by the Proponent will reduce the likelihood of effects, as long as roads and trails are present and left unreclaimed, the effects are irreversible. The significant adverse effects of new and existing access can be reduced with timely reclamation and decommissioning of roads and trails once no longer needed.

7.5 Bears

Grizzly and black bears inhabit the project area and have intrinsic environmental and social value, playing important roles in maintaining healthy ecosystem functions and generally providing opportunities for wildlife viewing and hunting. While black bear populations in Yukon are stable, grizzly bears are listed as a species of conservation concern under COSEWIC.

The Designated Office has determined that the Project is likely to have significant adverse effects to bears as a result of presence of attractants such as food waste, petroleum products, and other odorous substances such that further mitigation is required. The following sections describe the rationale used to determine effects of the project activities on bears.

7.5.1 Characterization of Project Effects

The Project involves the use, storage and disposal of garbage, kitchen waste, fuel and hazardous materials, and the continued operation of a well-established camp for up to 120 people. The Project proposal notes that the camp will be open year-round (YOR 2021-0093-0001). Bears are attracted to smells from food, food wastes, and fuel and petroleum by-products. Bears are also likely to be attracted to grey water (water used in food preparation, associated cleaning and showers) given their strong odours. Accordingly, the use, storage and disposal of such attractants will inevitably draw bears to the project site, leading to increases in human-bear conflicts that could ultimately result in bear mortality.

7.5.1.1 Project Effect: Increased human-bear conflict

The Project involves activities, namely the operation of camp facilities and presence of attractants that will likely increase the potential for increased human-bear conflict. Comments submitted by YG-Environment note that both grizzly and black bears are common in the project area (YOR 2021-00093-0037). The primary pathway to increases in human-bear conflict is through attractant mismanagement. Human-bear conflicts are generally a result of habituation, a shift in the behavioural responses of wildlife species to humans, where wildlife become emboldened and progressively lose their inherent fear of humans. This most commonly results from food conditioning. Bears are curious animals that seek out unfamiliar odours. Both grizzly and black bears have an impeccable sense of smell and excellent memories, particularly with respect to food sources; they will return to food sources recurrently if their scavenging proves successful. Adequate attractant management is key in deterring bears before they become habituated thereby avoiding or minimizing habituation and limiting the pathway of effects.

A rise in human-bear conflicts imposes safety risks onto local miners and increases the likelihood that such conflicts will lead to direct mortality to bears: if a bear regularly visits a camp or claim block, it will likely be shot and killed. While black bear populations in Yukon are stable, grizzly bears have a low reproduction rate. Given their status as a species of special concern, adverse effects to bears, grizzlies in particular, are irreversible, and can represent an important change from baseline if population numbers are affected.

The Project proposes the continued use of its permitted Solid Waste Disposal Facility and incinerator. Both facilities are located 500 m from camp and enclosed in an electric fenced area. Additionally, special

waste is stored in a sea-can. While the Project is operational, all garbage and food wastes will be disposed of at designated locations at the camp and work site (YOR 2021-0093-0007).While these commitments reduce risk, they do not effectively deter recurring bear visitations, especially is a bear has been habituated by poorly stored attractants at other nearby camps. As such, additional mitigation measures are recommended to reduce the likelihood of recurring bear visitations and minimize adverse effects to bears from project activities.

7.5.2 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse environmental effects on bears. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

5. The Proponent shall store all attractants, including garbage, kitchen waste and strained solids from grey water in a container that prevents access by bears and other wildlife, until properly disposed of according to the *Solid Waste Regulations* or burned daily to ash by forced air and fuel fired incineration according to the *Air Emissions Regulations*.

6. The Proponent shall install a portable electric fence around the perimeter of camp, or at the very minimum, around the kitchen, food preparation area, grey water sump, and waste disposal area.

This significance determination includes consideration of project effects in connection with effects from past, present, and likely activities. Moreover, relevant regulatory and legislative requirements were also considered. The Project has the potential to attract bears to the project area, and result in human-bear conflicts. Project activities will occur for up to 10 years, during which human-bear conflicts could occur.

Bears are expected to pass through the project area regularly and the Project involves the storage of wastes and food, and the disposal of grey water that will inevitably attract bears to the area. The Project proposes the continued use of its permitted Solid Waste Disposal Facility and incinerator. Both facilities are located 500 m from camp and enclosed in an electric fenced area. Additionally, special waste is stored in a sea-can. While the Project is operational, all garbage and food wastes will be disposed of at designated locations at the camp and work site (YOR 2021-0093-0007).While these commitments reduce risk, they do not effectively deter recurring bear visitations, especially is a bear has been habituated by poorly stored attractants at other nearby camps. As such, additional mitigation measures are recommended to reduce the likelihood of recurring bear visitations and minimize adverse effects to bears from project activities.

7.6 Sharp-Tailed Grouse

Sharp-tailed grouse have a limited distribution in the Yukon, which in addition to their unique habitat requirements, restricted movements, and intense social behaviour makes them particularly vulnerable to disturbance (YOR 2021-0093-0037).

Only small pockets of suitable habitat for Sharp-tailed grouse occur in the Yukon (YOR 2021-0093-0037). There is a WKA for Sharp-tailed grouse in the project area and known leks have been identified by YG-Environment. There is potential that the project activities may adversely affect Sharp-tailed grouse reproductive activities at leks, or breeding sites, which form the centre of social activity throughout the year for a population. The Designated Office has determined that the Project is likely to have significant

adverse effects to Sharp-tailed grouse such that additional terms and conditions are recommended. The rationale for this recommendation is provided in the following sections.

7.6.1 Characterization of Project Effects

The project overlaps with Wildlife Key Areas for Sharp-tailed grouse with known lek locations within the claim block. The precise location of leks is not published as this information is confidential. The Proponent is encouraged to contact the Dawson Regional Biologist to get the precise location of the known lek.

7.6.1.1 Project Effect: Disturbance of Sharp-tailed Grouse during lekking period

The draft Dawson Land Use plan highlights that Sharp-tailed grouse are known in LMU #8 (Lower Brewery/Hamilton) and incudes a Special Management Direction specifically for Sharp-tailed grouse. The Special Management Direction notes that the area in this LMU contains important habitat for sharp-tailed grouse, which are a species of management concern. Development in this area should be planned for in such a way that impacts to key habitat for sharp-tailed grouse are minimized (Dawson Regional Planning Commission, 2021).

During April-May Sharp-tailed grouse gather on focal points called leks to mate. Males will display at leks between 5 am and 10 am from early April to mid-May and can be negatively affected by disturbances. Females on the other hand, only attend the lek for a brief 4 day-window, commonly April 20 to May 4 (depending on climatic conditions). Females are more sensitive to disturbances and will avoid leks with physical or audible disturbances (YOR 2021-0093-0037). As a result, reproductive activities can be disrupted from project activities including the use of heavy equipment and vegetation clearing. The disruption can result in a lost reproductive season, which could have long lasting and irreversible impacts on local populations. Comments provided to the Designated Office from YG-Environment note that to mitigate any audible disturbance to Sharp-tailed grouse, the Proponent is recommended to avoid activities within 500 m of a lek from April 1 to April 20 annually from 5 am to 10 am, and within 1 km of leks during the peak attendance period, from 5 am to 10 am between April 20 and May. Avoiding the lek area during these periods will reduce the likelihood of any long lasting and irreversible impacts on local populations of Sharp-tailed grouse.

In order to bolster the understanding of the location of leks in the area, YG-Environment encourages the Proponent to report any Sharp-tailed grouse leks found to the Dawson Regional Biologist (867-993-6461).

7.6.2 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse environmental effects on sharp tailed grouse. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

7. Activities shall be avoided within 500 m of lek sites from April 1 to April 20 between 5 am 10 am, and within 1 km of leks during the peak attendance period, from 5 am to 10 am between April 20 and May 4.

8. Clearing within 2 km of active nesting sites shall not occur during the Sharp-tailed grouse nesting period from May 7th to June 8th.

9. The Proponent shall notify the Dawson Regional Biologist (867-993-6461) of any newly identified lek locations.

The project overlaps with Wildlife Key Areas for Sharp-tailed grouse with known lek locations within the claim block. Project activities including heavy equipment use and clearing of vegetation can result in a lost reproductive season, which could have long lasting and irreversible impacts on local populations. Disturbance to Sharp-tailed grouse can be mitigated by avoiding leks during specific breeding times throughout the year.

The draft Dawson Land Use plan acknowledges that the area contains important habitat for sharp-tailed grouse and YG-Environment is aware of certain leks in the area, the potential for unidentified leks within the project location exists. Given the high quality habitat in the area, the probability of new unknown leks being identified is high. Identification of new leks, and avoidance of those areas during critical breeding times is equally important and will further reduce the extent of population level effects.

8.0 PERSONAL SAFETY

8.1 Overview

This section focuses on personal safety in the workplace, particularly as it relates to harassment and violence towards women and sexual/gender minorities.

The Project will employ up to 120 people who will be housed on-site in a camp. Employees may be hired locally from Dawson City or from elsewhere. The establishment of isolated camps, which tend to have a male-dominated workforce, may increase the frequency and severity of harassment and violence towards women and LGBTQ+ (includes people who are lesbian, gay, bisexual, trans and queer, but implies with the plus sign that questioning, intersex, asexual people, two-spirited and others who are not specifically identified are included as well) in the workplace. Studies have shown that women and sexual minorities disproportionally experience workplace harassment and assault (Gibson and Klinck 2005), resulting in adverse effects to personal safety in the workplace.

For the purposes of this assessment, personal safety, workplace violence and workplace harassment are defined as follows:

“Personal safety” is the condition of being safe from physical harm and psychological harm. It involves freedom from worry about physical safety as well as being victimized by hostility, violence, and harassment.

“Workplace violence” is the threatened, attempted or actual application of physical force toward a worker that is likely to cause harm or lead a worker to believe that they are likely to be harmed (OHS Regulations, 1.02.). This includes exposure or likely exposure to domestic violence in a workplace and the resulting harm to anyone in that workplace (Occupational Health and Safety (OHS) Regulations, 19.05.).

“Workplace harassment” is any objectionable comments or behaviours that we know, or should know, are likely unwelcome. This includes any inappropriate comments or objectionable behaviour relating to a worker’s sex, sexual orientation, gender identity or gender expression (OHS Regulations, 1.02.).

8.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to personal safety, particularly with regards to harassment and violence. Certain sections have been highlighted as particularly important to the Designated Office’s consideration.

- Yukon *Human Rights Act*

14(1) No person shall

(a) harass any individual or group by reference to a prohibited ground of discrimination;

(b) retaliate or threaten to retaliate against an individual who objects to the harassment.

- Federal *Criminal Code*

With regards to personal safety, the Criminal Code specifies that the following acts are unlawful: assault, crimes of a sexual nature (e.g. sexual assault), uttering threats, murder, manslaughter, disorderly conduct (i.e. indecent acts including nudity, causing disturbance, indecent exhibition, loitering, etc.), offences against private property (i.e. theft, robbery, extortion, breaking and entering, etc.), and criminal harassment.

- Yukon *Occupational Health and Safety Regulations*

The *Occupational Health and Safety Regulations* was amended to broaden the definition of hazard to include workplace violence and harassment and to address workplace violence and harassment prevention (amendments in effect September 4, 2021).

> 1.03.01(1) Every employer must conduct hazard assessments in accordance with this section and in relation to each of the employer's workplaces, in order to identify existing and potential hazards in the workplace and to determine the extent of the risk of injury arising from those hazards.
>
> 19.01(1) Every employer must, in relation to each of the employer's workplaces
>
> (a) develop a written policy statement and procedures respecting the prevention of violence and harassment, and implement those procedures;
>
> (b) give necessary training to workers in relation to the policy statement and procedures; and
>
> (c) provide adequate supervision in order to ensure that workers comply with the policy statement and procedures.

8.3 Consideration of Past, Present, and Likely Activities

As described in Section 10.4, below, the establishment of isolated camps may increase the likelihood and magnitude of harassment and violence towards women and LGBTQ+, resulting in adverse effects to personal safety in the workplace. The Designated Office notes that the effects of harassment or violence may last beyond the duration of the Project or any individual's employment in the industry. Adverse effects on an individual from the Project may combine with adverse effects from projects that the individual worked at prior to the Project or will work at following the Project. Effects from multiple projects are likely cumulative.

It is difficult to define a precise temporal scope or define all the direct and indirect effects of personal safety in the workplace. For the Coffee Gold Project, Government of Yukon commented that: "adverse impacts to employees will have direct and indirect effects on the well-being of their families and communities through potential impacts on family and community stability; family violence; infectious disease (YOR 2017-0211-454-1). The comments provided by Government of Yukon highlight that the adverse effects to an individual or multiple individuals will compound to result in adverse effects to the individual's family and community.

The closest community to the Project is Dawson City (population 2 303 (Yukon Bureau of Statistics, 2021)). Yukon communities experience a higher level of vulnerability due to direct and indirect trauma experienced through residential schools and other colonial legacies, due to the territory's greater population of Indigenous people compared to other parts of Canada (MMIWG 2019). This vulnerability is further demonstrated through higher rates of police-reported crime, higher severity of crime and higher rates of addiction in the Yukon compared to the Canadian average (Statistics Canada, 2020). The 2020

statistics of reported crime demonstrate that the Yukon experiences violent crime and criminal traffic offences causing death or bodily harm are almost four times the national rate (Statistics Canada, 2020). The Yukon has the highest rate of alcohol use and the highest rate of opioid deaths in Canada (Government of Yukon, 2021). The higher rates and severity of crime and addiction in the Yukon results in a greater likelihood of violence and harassment in the workplace. It also compounds the effects of violence and harassment in the workplace on an individual or individuals, which would result in additional adverse effects to the individual's family and community.

8.4 Characterization of Project Effects

The Project will employ up to 120 people who will be housed on-site in a camp. Academic and non-academic research has demonstrated a trend of industrialized camps resulting in violence and harassment towards women (Tallichet, 2000; Gibson & Klinck, 2005; Gibson & Scoble, 2004). The Missing and Murdered Indigenous Women and Girls (MMIWG) Inquiry released the following recommendation: "We call upon all resource-extraction and development industries to consider the safety and security of Indigenous women, girls and 2SLGBTQQIA people" (MMIWG, 2019). In addition, the draft Dawson Regional Land Use Plan recommends that the Parties shall implement requirements for proponents of large-scale advanced exploration and mining companies in the Dawson planning region to prepare gender-based socio-economic and impact assessment (Dawson Regional Planning Commission, 2020).

Despite a lack of data on the prevalence of harassment and abuse within industrialized workcamps; research indicates that harassment and violence is highly likely. From a survey of Canadian workers on violence and harassment in the workplace, harassment was the most common type of behaviour experienced by survey respondents (60%), 30% of respondents experienced sexual harassment, 21% experienced violence and 3% experienced sexual violence (Government of Canada, 2017).

Sexual harassment is more prevalent in workplaces with a higher ratio of men in positions of power (Government of Canada, 2017). The proposal does not provide information regarding the male to female hiring ratio; however, recently assessed proposals for similar activities (e.g. YESAB project 2020-0046) indicated an anticipated 1:5 ratio of men to women in camp. The Designated Office expects a similar ratio to apply for this Project.

There is a high magnitude of adverse effects to personal safety due to workplace violence and harassment. Violence, harassment and bullying of all people — is unacceptable both in and outside the workplace. Society has demonstrated low tolerance for such behaviour through the passage of legislation such as the Canadian Criminal Code and the Yukon *Human Rights Act* and recent amendments to the Yukon *Occupational Health and Safety Regulations*. Studies indicate that workplace abuse and stress are related to poorer mental health, including sleep disorders, depression, anxiety, post-traumatic stress disorder and symptoms, and psychological distress (Gunnarsdottir, et al., 2006) (Nabe-Nielsen, et al., 2017).

Substance use has been found to increase or worsen abuse. The Proponent has mitigated the impacts of substance use by not permitting alcohol and illegal drugs on the project site (2021-0093-0019).

The *Occupational Health and Safety Regulations* amendments require employers to conduct hazard assessments (including violence and harassment), to identify existing and potential hazards in the workplace and to determine the extent of the risk of injury arising from those hazards. The employer is required to develop a written policy statement and procedures respecting the prevention of violence and harassment and implement those procedures. The procedures must include a process for an employee to

bring a complaint to or against their employer; a process to investigate a complaint or incident; corrective actions and support to workers after an incident or complaint (Yukon Workers' Compensation Health and Safety Board, 2021). The employer is also required to train workers on the policy and procedures and provide supervision to ensure worker compliance. If contraventions of the OHS Regulations are found, a Yukon Workers' Compensation Health and Safety Board officer may issue orders for the employer to comply, order an investigation and/or apply enforcement measures (Yukon Workers' Compensation Health and Safety Board, 2021). The Proponent has indicated that they are reviewing their policies and procedures to adhere to the new requirements (YOR 2021-0093-0023).

The Designated Office has determined that there is a low probability that project activities will result in adverse impacts to personal safety. This was determined based on the *Occupational Health and Safety Regulations* amendments, which will require a hazards assessment on workplace violence and harassment; policy and training on the prevention of workplace violence and harassment and supervision to ensure worker compliance. Adherence to all existing legislation should ensure a low probability of significant adverse effects to personal safety.

8.5 Significance Determination

The Dawson Designated Office has determined that the Project will not have significant adverse socio-economic effects to personal safety.

The Designated Office has reviewed the *Occupational Health and Safety Regulations* amendments which require employers to conduct hazard assessments, including violence and harassment hazards, to identify existing and potential hazards in the workplace and to determine the extent of the risk of injury arising from those hazards. The employer is required to develop a written policy statement and procedures respecting the prevention of violence and harassment and implement those procedures. The employer is also required to train workers on the policy and procedures and provide supervision to ensure worker compliance. If contraventions of the OHS Regulations are found, a Yukon Workers' Compensation Health and Safety Board officer may issue orders for the employer to comply, order an investigation and/or apply enforcement measures (Yukon Workers' Compensation Health and Safety Board, 2021). The Proponent has indicated they are reviewing their policies and procedures to adhere to the to the new requirements (YOR 2021-0093-0023). Adherence to all existing legislation should ensure a low probability of significant adverse effects to personal safety from the Project.

9.0 HERITAGE RESOURCES

9.1 Overview

The Project occurs within the Traditional Territory of the Tr'ondëk Hwëch'in and First Nation of Na-Cho Nyak Dun. A heritage resource assessment was conducted in the project area and identified a number of areas with elevated potential for the presence of archaeological sites. The following project activities may result in the loss, alteration, or destruction of a heritage resource:

- Heavy equipment use and vegetation clearing
- Road and trail construction
- Exploration trenching and drilling

In addition to the tangible heritage resources, other less physical elements are considered heritage resources. These include place names, heritage routes and stories. The Umbrella Final Agreement and YESAA have a much broader definition of heritage resources than Government of Yukon that shall be considered.

A heritage resource is defined under YESAA as:

a) a moveable work or assembly of works of people or of nature, other than a record only, that is of scientific or cultural value for its archaeological, paleontological, ethnological, prehistoric, historic or aesthetic features;

b) record, regardless of its physical form or characteristics, that is of scientific or cultural value for its archaeological, paleontological, ethnological, prehistoric, historic or aesthetic features; or

c) an area of land that contains a work or assembly of works referred to in paragraph (a) or an area that is of aesthetic or cultural value, including a human burial site outside a recognized cemetery (See YESAA s.2.)

In determining the effects of the proposed Project on this VESEC, the assessment focuses primarily on the effects of surface disturbances to heritage resources, including effects to both tangible and intangible markers. The Designated Office has determined that the Project is likely to have significant adverse effects to heritage resources such that further mitigation is required. The following sections describe the rationale used to determine effects of the project activities on heritage resources.

9.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance heritage resources.

- *Historic Resources Act* (Yukon)
    - s. (64) No person shall destroy or alter any historic object, whether or not the person owns it, or any human remains, except in accordance with a historic resources permit. S.Y. 1991, c.8, s.63.

- *Archaeological Sites Regulations*
    - s. (4) No person shall excavate, alter, or otherwise disturb an archaeological site, or remove an archaeological object from an archaeological site, without a Class 2 permit.
- *Placer Mining Land Use Regulations*, Schedule 1 Operating Conditions
    - E. 8. Operations must not be carried out within 30m of a known historical/archaeological, palaeontological, or burial site unless the Chief indicates, in writing, that such activities may be carried out.
    - E. 9. Any sites containing historic/archaeological objects or human remains, or burial sites discovered in the course of carrying out an operation must be immediately marked and protected from further disturbance and, and as soon as practicable, the discovery reported to the Chief. No further activities may be carried out within 30m of the site until the Chief indicates, in writing, that the activities may be resumed.
- *Tr'ondëk Hwëch'in Heritage Act*
    - Discovery of Heritage Resources s.23, s.24
- *Tr'ondëk Hwëch'in Final Agreement*, Chapter 13 - Heritage
- *First Nation of Na-Cho Nyak Dun Final Agreement*, Chapter 13 - Heritage

9.3 Consideration of Past, Present, and Likely Activities

Heritage resources in the area are linked to Tr'ondëk Hwëch'in and First Nation of Na-Cho Nyak Dun activities in the traditional territory that date back tens of thousands of years. Although a heritage resource assessment was conducted in 2012 and 2016, the project area has not been fully inventoried for sites to date and the assessment identified a number of areas with elevated potential for the presence of archaeological sites that overlap the project area (YOR 2021-0093-0036). As a result, it is possible that undocumented heritage resources may be present in the project area.

During the 2016 assessment, nine heritage sites were identified within the project area and a detailed site assessment was conducted at one on-claim archaeological site LaVg-3. Site management buffers were determined and flagged in the field for this site. It should be noted that the majority of the archaeological sites identified during previous heritage assessments have not been fully assessed and therefore established site boundaries for these sites do not exist (YOR 2021-0093-0036).

Palaeontological fossils are common in the region and it is possible that fossils will be encountered during project activities (YOR 2021-0093-0036).

Ground disturbing activities have the potential to cause significant adverse effects to heritage resources. Activities in the area include quartz exploration, and access development, all of which have the potential to create an adverse cumulative impact on heritage resources.

Placer and quartz exploration and mining operations vary in size and scale and involve stripping and clearing soil and vegetation, excavation, and material processing. Additional project components include

a support camp and waste disposal. Historical mining in the area and the likelihood of its continued presence places the Project's footprint in a cumulative context. The destruction, alteration and/or loss of heritage resources may occur during the proposed Project's duration.

The Designated Office notes however, effects to heritage resources may last beyond the duration of the Project because the destruction of a heritage resource is permanent. The nature of a heritage resource is such that it is very difficult to predict the exact location. Most individual heritage resources that are separated by a meaningful spatial distance are more appropriately considered a singular resource rather than a collective resource.

9.4 Characterization of Project Effects

9.4.1 Project Effect: Heritage Resource Alteration, Fragmentation or Loss

Project activities, including heavy equipment use, ground disturbing activities and access development, may result in the damage or destruction of items of historical or heritage value, should they occur within the project site. Land clearing and ground disturbing activities may adversely affect heritage or historic resources by destroying or altering all or part of a resource, isolating a resource from its natural setting and introducing physical, chemical or visual elements that are out of character with the historic or heritage resources and its setting. Moveable objects or features are exposed and whether inadvertently or with intent, vandalism, removal, or damage may result.

Regarding heritage resources within the project area, Government of Yukon indicates that there are a number of known heritage resources in the project area including the South Fork Intake and Camp complex of historic features, as well as nine known archaeological sites. One archaeological site has been inventoried and identified as LaVg-3 (YOR 2021-0093-0036). The claim block has not been fully inventoried for sites to date and it is possible that undocumented heritage resources may be present within the project area. Government of Yukon Tourism-Heritage department suggests that there are areas of elevated potential for heritage resources that overlap the project area (YOR 2021-0093-0036).

Tr'ondëk Hwëch'in and the First Nation of Na-Cho Nyak Dun provided a broad definition of heritage resources which could includes (YOR 2021-0093-0042 and -0038):

- Harvestable resources such as wildlife, fish, plants, and their habitats and ecosystems;
- Migration routes, waterways, trails, salt licks and calving areas;
- Trap lines and/ or subsistence trapping of fur-bearing animals;
- Traditional medicines;
- Raw materials such as bark, wood, stone, bone, fibres and dyes;
- Place names, stories and where they connect with the land;
- Camps, trails, caches, sacred and burial sites;
- Cultural place names, stories and traditional knowledge; and
- Archaeological and historic sites.

The value of a heritage resource is not entirely based on their physical or material properties but also for the associative or symbolic attributes with which they are imbued. This value is created from its exposure to many periods or stages in history and not just for its existence at a single moment in time. The heritage resources described for the area related to the Project gains value from the interaction of nature and

human activities; these resources may include movable or immovable resources above ground or buried, on land or in water and whose features are both natural and fabricated. The removal or destruction of a resource is irreplaceable; the value or values associated with it may be forever lost.

Physical effects to heritage resources may occur during the lifetime of the Project; however, the effects from the alteration, fragmentation, or loss of a heritage resource may have effects lasting beyond the Project's temporal scope. The nature of heritage resources and the values associated with them is such that their destruction is permanent. Therefore, project effects to heritage resources are not reversible. Heritage resources are of great important to Tr'ondëk Hwëch'in and the First Nation of Na-Cho Nyak, Dun which place great value on heritage resources due to the direct relation to their identity, culture, and history.

Given the significance of documented and undocumented heritage resources, the magnitude of effects is considered high.

9.5 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse socio-economic effects on heritage resources. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

10. A heritage resources impact assessment shall be completed in advance of ground disturbing activities in areas with elevated potential for the presence of archaeological or historic sites. This includes areas identified in 2016 as "Heritage Potential Zone-Surveyed-High" and "Heritage Potential Zone-Unsurveyed".

11. Upon discovery of a heritage resource, the Proponent shall notify the Heritage Department of Tr'ondëk Hwëch'in and of the First Nation of Na-Cho Nyak Dun in addition to Government of Yukon, Chief of Mining Lands and Yukon Heritage.

12. A flagged 30 m 'no work zone' shall be maintained around archaeological site LaVg-3.

Standard terms and conditions of placer mining authorizations, in combination with the terms and conditions described above, should ensure a low probability of adverse effects to known heritage resources.

Given that the project area has nine known heritage sites and contains a number of areas with elevated potential for the presence of archaeological sites, there is a high likelihood of encountering undocumented heritage sites in the project area. The Proponent has committed to the following project design feature: "If work is to be completed in areas identified as having elevated heritage potential and a heritage resource impact assessment (HRIA) did not assess these new areas, an additional HRIA must be completed on these new areas only" (YOR 2021-0093-0011). Although, the Proponent has committed to completing a HRIA, the HRIA should be completed in advance of ground disturbing activities to mitigate adverse impacts to heritage resources. Given reasons stated below, encounters with undocumented heritage resources are likely to result in significant adverse effects.

Many heritage resources are inconspicuous and hard to detect. Given the ground disturbing nature of the Project, it is probable that the Project will result in the alteration, fragmentation, or loss of undocumented heritage resources, should they exist.

Under existing legislation noted above, the First Nation is not notified of the discovery of heritage resources on Commissioner's Land that are not defined as archaeological or paleontological. The Proponent has committed to the following project design feature: "All unrecorded archaeological and historical resources including chance finds and disturbances must be reported to the Cultural Services Branch, Department of Tourism and Culture, Government of Yukon and Tr'ondëk Hwëch'in and the Na-Cho Nyak Dun self-governing First Nations" (YOR 2021-0093-0011). Even with this commitment, The Designated Office notes that First Nation governments would not be notified of the discovery of heritage resources on Commissioner's Land, by the Proponent or YG, that are not defined as archaeological, historical or palaeontological. Without such notification, adverse effects to a heritage resource as defined by in the affected First Nations may occur without the First Nation knowing. In other cases, a heritage resource may be misidentified, and destroyed prior to consultation with the affected First Nation.

Finally, the Designated Office was presented with information that an archaeological site LaVg-3 overlaps with the project area. To mitigate effects to this site, Government of Yukon Tourism-Heritage department has recommended that "a flagged 30 m 'no work zone' shall be maintained around archaeological site LaVg-3".

Given the high importance Tr'ondëk Hwëch'in and the First Nation of Na-Cho Nyak Dun places on heritage resources for their identity and culture, current legislation may not prevent significant adverse effects to heritage resources. The removal or destruction of a resource is irreplaceable and the value associated with it may be forever lost. The Designated Office considers adverse effects to heritage resources to be significant.

10.0 CONCLUSION OF THE ASSESSMENT

Under s. 56(1)(b) of the Yukon Environmental and Socio-economic Assessment Act, the Dawson City Designated Office recommends to the Decision Bodies that the Project be allowed to proceed, subject to specified terms and conditions. The Designated Office determined that the Project is likely to have significant adverse environmental and socio-economic effects in or outside Yukon that can be mitigated by those terms and conditions.

The terms and conditions of the recommendations are as follows:

1. Prior to conducting bulk sampling, a plan must be developed that describes how Metal Leaching and Acid Rock Drainage (ML/ARD) test work will be conducted and what mitigation and monitoring will be in place to reduce risks.
2. All bulk sample bags shall be removed from the site at the end of the exploration season, or by Dec 31st each year.
3. The Proponent shall follow a three-phased approach to mitigate effects to migrating caribou. The three phases shall be implemented as per the following table:

Response Level	Triggers	Response
1	When one or more collared Fortymile caribou move east of Dawson or one or more collared Porcupine Caribou move into the Klondike watershed, the Proponent shall take the following steps in anticipation of a large number of caribou arriving at the project area:	- Notify all site personnel that caribou are approaching the project area and to remain alert to the presence of caribou. Staff should be aware that a temporary shutdown of activities may be required and the timeline that may be required to occur in. - Environmental monitors to conduct site inspection to identify any hazards or risks, report on those risks, and ensure mitigations can be enacted before arrival of caribou herd. - Any sightings of caribou to be reported immediately to the Regional Biologist. - Briefings on caribou movements to occur with the Regional Biologist as identified by the Regional Biologist.
2	When one or more collared Fortymile caribou move east across the Dempster Highway or west of Hamilton Creek; or one or more collared Porcupine Caribou move south of Antimony mountain or north of Strickland Lake, the Proponent shall take the following steps in anticipation of a large number of Caribou arriving at the project area:	- Restrict all non-essential traffic on project roads and plan access road activity to reduce the frequency of disturbance to caribou (e.g. convoy vehicles off site to Dempster Highway during shift change). - Reduce speed limit on road to 40 km/h to reduce the likelihood of collisions with caribou. - Defer non-essential project activities to a later date including drilling and blasting activities. - Place additional signage as required to manage human traffic away from key pinch points, concentrations of caribou, or areas with additional risk of vehicular strikes. - Ensure temporary shutdown identified in response level 3 is being implemented with the goal of being shut down before caribou enter the 1 km project buffer.

3	Applies to migratory movements only - does not apply to overwintering groups of caribou: triggered by one or more collared caribou (Fortymile or Porcupine) within 1 km of project activities or observations of large groups of caribou within 1 km	- All exploration activities are to be shut down prior to caribou entering this zone but camp may remain open. - Temporarily stop all traffic along major roads. - Environmental monitors will monitor movement of caribou through the area and immediately address any project related problems that appear to be impeding caribou movements. - Contact the Regional Biologist to discuss project activity if caribou remain in the area for more than 2 weeks.

4. Reclamation and/or decommissioning of roads and trails shall be progressive in nature and shall be documented annually in the post-season report. Reclamation and/or decommissioning of roads and trails shall occur as soon as roads and trails are no longer needed for exploration activities unless the need is documented in the post- and pre-season reports. The status of roads and trails (i.e. active or inactive) including an attributed GPS track of all newly created roads and trails (i.e. road or trail width and surface material) and on-going/completed reclamation activities shall be reported to the Chief, Mining Land Use annually via post-season reports.
5. The Proponent shall store all attractants, including garbage, kitchen waste and strained solids from grey water in a container that prevents access by bears and other wildlife, until properly disposed of according to the *Solid Waste Regulations* or burned daily to ash by forced air and fuel fired incineration according to the *Air Emissions Regulations*.
6. The Proponent shall install a portable electric fence around the perimeter of camp, or at the very minimum, around the kitchen, food preparation area, grey water sump, and waste disposal area.
7. Activities shall be avoided within 500 m of lek sites from April 1 to April 20 between 5 am 10 am, and within 1 km of leks during the peak attendance period, from 5 am to 10 am between April 20 and May 4.
8. Clearing within 2 km of active nesting sites shall not occur during the Sharp-tailed grouse nesting period from May 7th to June 8th.
9. The Proponent shall notify the Dawson Regional Biologist (867-993-6461) of any newly identified lek locations.
10. A heritage resources impact assessment shall be completed in advance of ground disturbing activities in areas with elevated potential for the presence of archaeological or historic sites. This includes areas identified in 2016 as “Heritage Potential Zone-Surveyed-High” and “Heritage Potential Zone-Unsurveyed”.
11. Upon discovery of a heritage resource, the Proponent shall notify the Heritage Department of Tr'ondëk Hwëch'in and of the First Nation of Na-Cho Nyak Dun in addition to Government of Yukon, Chief of Mining Lands and Yukon Heritage.
12. A flagged 30 m ‘no work zone’ shall be maintained around archaeological site LaVg-3.

10.1 Authorization of Recommendation / Referral

The undersigned is authorized pursuant to s. 23(2) of YESAA to make this Recommendation:

Amélie Morin

December 16, 2021

Manager, Dawson City DO

Appendix A REFERENCES

All references to documents on the YESAB Online Registry (YOR) can be found by searching for the Project and document number on the YOR at https://www.yesabregistry.ca.

Alexco Resource Corp, 2009. *2008 Annual Water License Report. Submitted to the Yukon Water Board. Water Use License QZ96-007.,* s.l.: s.n.

Alexco Resource Corp, 2010a. *Brewery Creek - From Assessment and Permitting through Production to Post Closure: A Post Closure Analysis of a Northern Heap Leach Mine.,* s.l.: s.n.

Alexco Resource Corp, 2010b. *2009 Annual Water License Report. Submitted to the Yukon Water Board. Water Use License QZ96-007.,* s.l.: s.n.

Dawson Regional Planning Commission, 2020. *"Dawson Planning Region Resource Assessment Report ,* City of Dawson, Yukon: s.n.

Dawson Regional Planning Commission, 2020. *Dawson Planning Region Resource Assessment Report,* City of Dawson, Yukon Canada: s.n.

Dawson Regional Planning Commission, 2021. *Draft Regional Plan,* Dawson City: Dawson Regional Planning Commission.

Ducks Unlimited Canada, 2021. *Dawson Wetland Classification Users Guide,* s.l.: s.n.

First Nation of Na-Cho Nyak Dun, 2021. *History - First Nation of Na-Cho Nyak Dun.* [Online]
Available at: https://www.nndfn.com/history/
[Accessed 2021].

Geocon - SNC Lavalin Environment, 1995. *Economic Evaluation of Acid Mine Drainage Technologies,* s.l.: MEND 5.8.1. Economic Evaluation of Acid Mine Drainage.

Gibson, G. & Klinck, J., 2005. *Canada's Resilient North: The Impact of Mining on Aboriginal Communities,* s.l.: Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health.

Gibson, G. & Scoble, M., 2004. *Regenderneering the mining industry: A Survey of Women,* s.l.: Canadian Institute of Mining Bulletin.

Golden Predator, 2020. *2019 Annual Water License Report: Submitted to the Yukon Water Board. ,* s.l.: s.n.

Government of Canada, 2017. *Harassment and sexual violence in the workplace - what we heard.* [Online]
Available at: https://www.canada.ca/content/dam/canada/employment-social-development/services/health-safety/reports/workplace-harassment-sexual-violence-EN.pdf
[Accessed 2021].

Government of Yukon, 2021. *Opioid deaths - Joint New Release with Yukon Coroner's Service, the Office of Yukon's Chief Medical Officer of Health and Yukon RCMP.* [Online]
Available at: https://yukon.ca/sites/yukon.ca/files/jus-coroners-joint-media-release-opioid-deaths-february-

19-2021_1.pdf
[Accessed December 3, 2021].

Gunnarsdottir, H. et al., 2006. *Lifestyle, harassment at work and self-assessed health of female flight attendants, nurses and teachers,* s.l.: s.n.

Hango, D. & Moyser, M., 2018. *Harassment in the Canadian Workplace,* s.l.: Statistics Canada.

McDonald, J. & Cooley, D., 2004. *The historical annual range use patterns of Fortmile caribou herd. Yukon Fish and Wildlife Branch Report MRC-10-01.,* s.l.: s.n.

MiHR, 2016. *Strengthening Mining's Talent Alloy – Exploring Diversity and Inclusion,* https://mihr.ca/wp-content/uploads/2020/03/Strengthening-Minings-Talent-Alloy-Exploring-Diversity-and-Inclusion-NewLogo.pdf: Mining Industry Human Resources Council.

MMIWG, 2019. *9 National Inquiry Into Missing and Murdered Indigenous Women and Girls (MMIWG). Reclaiming Power and Place:,* s.l.: http://www.mmiwg-ffada.ca/wp-content/uploads/2019/06/Final_Report.

Nabe-Nielsen, K. P. et al., 2017. *The Role of Psychological Stress Reactions in the Longitudinal Relation Between Workplace Bullying and Turnover,* s.l.: Journal of Occupational and Environmental Medicine.

Potié, J., 2020. *Sharp-tailed grouse (Tympanuchus phasianellus) in a resource development area at the northern edge of the species' range, Department of Natural Resource Sciences, McGill University, Macdonald Campus, Montréal, Québec, April 2020,* s.l.: s.n.

Price, W., 2009. *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials,* s.l.: MEND Report.

Price, W. & Errington, J., 1998. *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia,* s.l.: Government of British Columbia.

Smith, C., Meikle, J. & Roots, C., 2004. *Ecoregions of the Yukon Territory: Biophysical Properties of Yukon Landscapes,* Summerland, British Columbia : Agriculture and Agri-Food Canada.

Stantec Consulting Ltd. , 2004. *Review of Water Quality Issues in Neutral pH Drainage: Examples and Emerging Priorities for the Mining Industries in Canada. ,* s.l.: MEND Report 10.1.

Statistics Canada, 2020. *Police-reported crime in Canada,* s.l.: www150.statcan.gc.ca/n1/daily-quotidien/210727/dq210727a-eng.htm?indid=4751-2&indgeo=0.

Statistics Canada, 2020. *Victims of police-reported violent crime and traffic violations causing bodily harm or death, by type of violation, sex of victim and age of victim,* s.l.: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3510005101&pickMembers%5B0%5D=1.1&pickMembers%5B1%5D=6.20200101&pickMembers%5B2%5D=5.2.

Tallichet, S., 2000. *Barrier's to women's advancement in underground coal mining,* s.l.: Rural Sociology.

Yukon Bureau of Statistics, 2021. *Population Report, Second Quarter 2021.* [Online]
Available at: https://yukon.ca/sites/yukon.ca/files/ybs/populationq2_2021.pdf

Yukon Chamber of Mines, 2010. *Yukon Mineral and Coal Exploration: Best Management Practices and Regulatory Guide,* s.l.: Yukon Chamber of Mines.

Yukon Placer Secretariat, 2016. *Fish Habitat Design, Operation and Reclamation Workbook and Worksheets for Placer Mining in the Yukon Territory,* Whitehorse, Yukon: s.n.

Yukon Workers' Compensation Health and Safety Board, 2021. *Workplace Violence and Harassment Prevention Guide.* [Online]
Available at: https://www.wcb.yk.ca/web-0044/resources/web-0051/wvhp-guide
[Accessed 2021].